



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
03-Dec-2021 19:31

EB-2-20211611 21K0284-09 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 11/16/2021 11:50

Instrument: ICPMS1 Analyst: MCB

Analyzed: 11/19/2021 19:36

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21K0284-09 A 02
	Preparation Batch: BJK0487	Filtration Batch: BJK0466
	Prepared: 11/18/2021	Filtration Date: 11/17/2021 16:21
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Barium, Dissolved	7440-39-3	1	0.114	0.500	ND	ug/L	U
Chromium, Dissolved	7440-47-3	1	0.260	0.500	ND	ug/L	U
Iron, Dissolved	7439-89-6	1	18.2	36.0	ND	ug/L	U
Lead, Dissolved	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Manganese, Dissolved	7439-96-5	1	0.142	0.500	ND	ug/L	U
Silver, Dissolved	7440-22-4	1	0.0220	0.200	ND	ug/L	U

Instrument: ICPMS2 Analyst: SKD

Analyzed: 11/22/2021 22:03

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21K0284-09 A 02
	Preparation Batch: BJK0487	Filtration Batch: BJK0466
	Prepared: 11/18/2021	Filtration Date: 11/17/2021 16:21
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vanadium, Dissolved	7440-62-2	1	0.0556	0.200	0.0930	ug/L	J


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EB-2-20211611
21K0284-09 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 11/16/2021 11:50

Instrument: ICPMS1 Analyst: MCB

Analyzed: 11/19/2021 19:36

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21K0284-09 A 02
	Preparation Batch: BJK0487	Filtration Batch: BJK0466
	Sample Size: 25 mL	
	Prepared: 11/18/2021	Final Volume: 25 mL
		Filtration Date: 11/17/2021 16:21

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic, Dissolved	7440-38-2	1	0.0373	0.200	ND	ug/L	U
Cadmium, Dissolved	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Cobalt, Dissolved	7440-48-4	1	0.0178	0.200	ND	ug/L	U
Copper, Dissolved	7440-50-8	1	0.173	0.500	ND	ug/L	U
Nickel, Dissolved	7440-02-0	1	0.0792	0.500	ND	ug/L	U
Selenium, Dissolved	7782-49-2	1	0.179	0.500	ND	ug/L	U
Zinc, Dissolved	7440-66-6	1	2.92	6.00	ND	ug/L	U



Analytical Resources, LLC
Analytical Chemists and Consultants

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EB-2-20211611
21K0284-09 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 7470A

Sampled: 11/16/2021 11:50

Instrument: HYDRA Analyst: SKD

Analyzed: 12/02/2021 16:38

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21K0284-09 A 01

Preparation Batch: BJK0027

Sample Size: 20 mL

Filtration Batch: BJK0466

Prepared: 12/01/2021

Final Volume: 20 mL

Filtration Date: 11/17/2021 16:21

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury, Dissolved	7439-97-6	1	0.000013	0.000100	ND	mg/L	U



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MW-63-20211611

21K0284-10 (Water)

Volatile Organic Compounds

Method: EPA 8260D

Sampled: 11/16/2021 13:36

Instrument: NT3 Analyst: PKC

Analyzed: 11/17/2021 20:21

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0284-10 I

Preparation Batch: BJK0451

Sample Size: 10 mL

Prepared: 11/17/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.05	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.05	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.05	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.14	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.08	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.22	0.60	ND	ug/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				<i>80-129 %</i>	<i>100</i>	<i>%</i>	
<i>Surrogate: Toluene-d8</i>				<i>80-120 %</i>	<i>103</i>	<i>%</i>	
<i>Surrogate: 4-Bromofluorobenzene</i>				<i>80-120 %</i>	<i>103</i>	<i>%</i>	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				<i>80-120 %</i>	<i>97.5</i>	<i>%</i>	


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MW-63-20211611
21K0284-10 (Water)
Volatile Organic Compounds - SIM

Method: EPA 8260D-SIM

Sampled: 11/16/2021 13:36

Instrument: NT7 Analyst: KOTT

Analyzed: 11/26/2021 20:24

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0284-10 H

Preparation Batch: BJK0666

Sample Size: 10 mL

Prepared: 11/24/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	5.01	20.0	ND	ng/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				80-129 %	93.9	%	



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MW-63-20211611

21K0284-10 (Water)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 11/16/2021 13:36

Instrument: NT10 Analyst: VTS

Analyzed: 12/01/2021 15:29

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 3510C SepF
Preparation Batch: BJK0540
Prepared: 11/23/2021

Sample Size: 1000 mL
Final Volume: 1 mL

Extract ID: 21K0284-10 B 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Phenol	108-95-2	1	0.01	0.2	ND	ug/L	U
bis(2-chloroethyl) ether	111-44-4	1	0.03	0.2	ND	ug/L	U
2-Chlorophenol	95-57-8	1	0.03	0.2	ND	ug/L	U
1,3-Dichlorobenzene	541-73-1	1	0.03	0.2	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.03	0.2	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.03	0.2	ND	ug/L	U
Benzyl Alcohol	100-51-6	1	0.02	0.2	ND	ug/L	U
2,2'-Oxybis(1-chloropropane)	108-60-1	1	0.03	0.2	ND	ug/L	U
2-Methylphenol	95-48-7	1	0.03	0.2	ND	ug/L	U
Hexachloroethane	67-72-1	1	0.04	0.2	ND	ug/L	U
N-Nitroso-di-n-Propylamine	621-64-7	1	0.04	0.2	ND	ug/L	U
4-Methylphenol	106-44-5	1	0.03	0.2	ND	ug/L	U
Nitrobenzene	98-95-3	1	0.03	0.2	ND	ug/L	U
Isophorone	78-59-1	1	0.03	0.2	ND	ug/L	U
2-Nitrophenol	88-75-5	1	0.04	1.0	ND	ug/L	U
2,4-Dimethylphenol	105-67-9	1	0.3	1.0	ND	ug/L	U
Bis(2-Chloroethoxy)methane	111-91-1	1	0.03	0.2	ND	ug/L	U
2,4-Dichlorophenol	120-83-2	1	0.1	1.0	ND	ug/L	U
1,2,4-Trichlorobenzene	120-82-1	1	0.03	0.2	ND	ug/L	U
Naphthalene	91-20-3	1	0.03	0.2	ND	ug/L	U
Benzoic acid	65-85-0	1	0.1	2.0	ND	ug/L	U
4-Chloroaniline	106-47-8	1	0.04	1.0	ND	ug/L	U
Hexachlorobutadiene	87-68-3	1	0.04	0.2	ND	ug/L	U
4-Chloro-3-Methylphenol	59-50-7	1	0.1	1.0	ND	ug/L	U
2-Methylnaphthalene	91-57-6	1	0.03	0.2	ND	ug/L	U
Hexachlorocyclopentadiene	77-47-4	1	0.1	1.0	ND	ug/L	U
2,4,6-Trichlorophenol	88-06-2	1	0.2	1.0	ND	ug/L	U
2,4,5-Trichlorophenol	95-95-4	1	0.1	1.0	ND	ug/L	U
2-Chloronaphthalene	91-58-7	1	0.03	0.2	ND	ug/L	U
2-Nitroaniline	88-74-4	1	0.2	1.0	ND	ug/L	U
Acenaphthylene	208-96-8	1	0.02	0.2	ND	ug/L	U
Dimethylphthalate	131-11-3	1	0.04	0.2	ND	ug/L	U
2,6-Dinitrotoluene	606-20-2	1	0.2	1.0	ND	ug/L	U
Acenaphthene	83-32-9	1	0.03	0.2	0.09	ug/L	J



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21K0284-10 (Water)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 11/16/2021 13:36

Instrument: NT10 Analyst: VTS

Analyzed: 12/01/2021 15:29

Analysis by: Analytical Resources, LLC

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
3-Nitroaniline	99-09-2	1	0.2	1.0	ND	ug/L	U
2,4-Dinitrophenol	51-28-5	1	0.2	2.0	ND	ug/L	U
Dibenzofuran	132-64-9	1	0.02	0.2	ND	ug/L	U
4-Nitrophenol	100-02-7	1	0.06	1.0	ND	ug/L	U
2,4-Dinitrotoluene	121-14-2	1	0.1	1.0	ND	ug/L	U
Fluorene	86-73-7	1	0.02	0.2	ND	ug/L	U
4-Chlorophenylphenyl ether	7005-72-3	1	0.02	0.2	ND	ug/L	U
Diethyl phthalate	84-66-2	1	0.06	0.2	0.07	ug/L	J
4-Nitroaniline	100-01-6	1	0.2	1.0	ND	ug/L	U
4,6-Dinitro-2-methylphenol	534-52-1	1	0.4	2.0	ND	ug/L	U
N-Nitrosodiphenylamine	86-30-6	1	0.03	0.2	ND	ug/L	U
4-Bromophenyl phenyl ether	101-55-3	1	0.02	0.2	ND	ug/L	U
Hexachlorobenzene	118-74-1	1	0.04	0.2	ND	ug/L	U
Pentachlorophenol	87-86-5	1	0.1	1.0	ND	ug/L	U
Phenanthrene	85-01-8	1	0.02	0.2	ND	ug/L	U
Anthracene	120-12-7	1	0.03	0.2	ND	ug/L	U
Carbazole	86-74-8	1	0.04	0.2	ND	ug/L	U
Di-n-Butylphthalate	84-74-2	1	0.05	0.2	ND	ug/L	U
Fluoranthene	206-44-0	1	0.03	0.2	ND	ug/L	U
Pyrene	129-00-0	1	0.03	0.2	ND	ug/L	U
Butylbenzylphthalate	85-68-7	1	0.07	0.2	ND	ug/L	U
Benzo(a)anthracene	56-55-3	1	0.04	0.2	ND	ug/L	U
3,3'-Dichlorobenzidine	91-94-1	1	0.3	1.0	ND	ug/L	U
Chrysene	218-01-9	1	0.04	0.2	ND	ug/L	U
bis(2-Ethylhexyl)phthalate	117-81-7	1	0.2	0.2	ND	ug/L	U
Di-n-Octylphthalate	117-84-0	1	0.05	0.2	ND	ug/L	U
Benzo(a)fluoranthene, Total		1	0.08	0.4	ND	ug/L	U
Benzo(a)pyrene	50-32-8	1	0.05	0.2	ND	ug/L	U
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.06	0.2	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	1	0.07	0.2	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	1	0.04	0.2	ND	ug/L	U
1-Methylnaphthalene	90-12-0	1	0.03	0.2	ND	ug/L	U
Surrogate: 2-Fluorophenol				30-160 %	42.3	%	
Surrogate: Phenol-d5				30-160 %	26.7	%	*
Surrogate: 2-Chlorophenol-d4				30-160 %	80.2	%	
Surrogate: 1,2-Dichlorobenzene-d4				30-160 %	73.2	%	
Surrogate: Nitrobenzene-d5				30-160 %	77.5	%	



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MW-63-20211611

21K0284-10 (Water)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 11/16/2021 13:36

Instrument: NT10 Analyst: VTS

Analyzed: 12/01/2021 15:29

Analysis by: Analytical Resources, LLC

Analyte	CAS Number	Recovery Limits	Recovery	Units	Notes
Surrogate: 2-Fluorobiphenyl		30-160 %	89.0	%	
Surrogate: 2,4,6-Tribromophenol		30-160 %	91.8	%	
Surrogate: p-Terphenyl-d14		30-160 %	101	%	Q


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MW-63-20211611
21K0284-10 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 11/16/2021 13:36

Instrument: FID4 Analyst: TWC

Analyzed: 11/27/2021 03:31

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21K0284-10 D 01

Preparation Batch: BJK0537

Sample Size: 500 mL

Prepared: 11/22/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	0.100	ND	mg/L	U
Motor Oil Range Organics (C24-C38)	RRO	1	0.200	ND	mg/L	U
<i>Surrogate: o-Terphenyl</i>			50-150 %	93.9	%	



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MW-63-20211611

21K0284-10 (Water)

Aroclor PCB

Method: EPA 8082A

Sampled: 11/16/2021 13:36

Instrument: ECD7 Analyst: JGR

Analyzed: 11/30/2021 22:35

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJK0538 Prepared: 11/23/2021	Sample Size: 1000 mL Final Volume: 0.5 mL	Extract ID: 21K0284-10 A 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJK0302 Cleaned: 29-Nov-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21K0284-10 A 01
Sample Cleanup:	Cleanup Method: Sulfuric Acid Cleanup Batch: CJK0300 Cleaned: 29-Nov-2021	Initial Volume: 0.5 uL Final Volume: 0.5 uL	Extract ID: 21K0284-10 A 01
Sample Cleanup:	Cleanup Method: Sulfur Cleanup Batch: CJK0301 Cleaned: 29-Nov-2021	Initial Volume: 0.5 uL Final Volume: 0.5 uL	Extract ID: 21K0284-10 A 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Aroclor 1016	12674-11-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1221	11104-28-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1232	11141-16-5	1	0.002	0.010	ND	ug/L	U
Aroclor 1242	53469-21-9	1	0.002	0.010	ND	ug/L	U
Aroclor 1248	12672-29-6	1	0.002	0.010	ND	ug/L	U
Aroclor 1254	11097-69-1	1	0.002	0.010	ND	ug/L	U
Aroclor 1260	11096-82-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1262	37324-23-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1268	11100-14-4	1	0.003	0.010	ND	ug/L	U
Surrogate: Decachlorobiphenyl				29-120 %	76.2	%	
Surrogate: Tetrachlorometaxylene				32-120 %	75.2	%	
Surrogate: Decachlorobiphenyl [2C]				29-120 %	76.9	%	
Surrogate: Tetrachlorometaxylene [2C]				32-120 %	77.0	%	


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Method: EPA 6020B

Sampled: 11/16/2021 13:36

Instrument: ICPMS1 Analyst: MCB

Analyzed: 11/30/2021 21:36

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJK0731 Sample Size: 25 mL
 Prepared: 11/30/2021 Final Volume: 25 mL

Extract ID: 21K0284-10 C 02

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Barium	7440-39-3	1	0.114	0.500	4.37	ug/L	
Chromium	7440-47-3	2	0.520	1.00	ND	ug/L	U
Iron	7439-89-6	2	13.3	72.0	6880	ug/L	D
Lead	7439-92-1	2	0.103	0.200	0.142	ug/L	J, D
Silver	7440-22-4	2	0.0440	0.400	ND	ug/L	U
Vanadium	7440-62-2	2	0.111	0.400	2.34	ug/L	D


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Method: EPA 6020B UCT-KED

Sampled: 11/16/2021 13:36

Instrument: ICPMS1 Analyst: MCB

Analyzed: 11/30/2021 21:36

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJK0731 Sample Size: 25 mL
 Prepared: 11/30/2021 Final Volume: 25 mL

Extract ID: 21K0284-10 C 02

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	1	0.0373	0.200	14.1	ug/L	
Cadmium	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Cobalt	7440-48-4	1	0.0178	0.200	0.765	ug/L	
Copper	7440-50-8	1	0.173	0.500	0.897	ug/L	
Nickel	7440-02-0	1	0.0792	0.500	2.82	ug/L	
Selenium	7782-49-2	1	0.179	0.500	ND	ug/L	U
Zinc	7440-66-6	1	2.92	6.00	ND	ug/L	U



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MW-63-20211611

21K0284-10 (Water)

Metals and Metallic Compounds

Method: EPA 7470A

Sampled: 11/16/2021 13:36

Instrument: HYDRA Analyst: ML

Analyzed: 11/23/2021 15:44

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21K0284-10 C

Preparation Batch: BJK0611

Sample Size: 20 mL

Prepared: 11/23/2021

Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000013	0.000100	ND	mg/L	U


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 03-Dec-2021 19:31

MW-63-20211611
21K0284-10RE1 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 11/16/2021 13:36

Instrument: ICPMS1 Analyst: MCB

Analyzed: 12/01/2021 21:08

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21K0284-10RE1 C 02
	Preparation Batch: BJK0731	Sample Size: 25 mL
	Prepared: 11/30/2021	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Manganese	7439-96-5	10	1.42	5.00	788	ug/L	D


 Shannon & Wilson, Inc
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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 03-Dec-2021 19:31

MW-63-20211611
21K0284-11 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 11/16/2021 13:36

Instrument: ICPMS1 Analyst: MCB

Analyzed: 11/24/2021 03:45

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21K0284-11 A 02
	Preparation Batch: BJK0487	Filtration Batch: BJK0466
	Prepared: 11/18/2021	Filtration Date: 11/17/2021 16:21
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Iron, Dissolved	7439-89-6	5	91.0	180	4720	ug/L	D
Manganese, Dissolved	7439-96-5	5	0.710	2.50	670	ug/L	D

Instrument: ICPMS2 Analyst: SKD

Analyzed: 11/22/2021 23:18

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21K0284-11 A 02
	Preparation Batch: BJK0487	Filtration Batch: BJK0466
	Prepared: 11/18/2021	Filtration Date: 11/17/2021 16:21
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Barium, Dissolved	7440-39-3	1	0.114	0.500	2.74	ug/L	
Chromium, Dissolved	7440-47-3	1	0.260	0.500	ND	ug/L	U
Lead, Dissolved	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Silver, Dissolved	7440-22-4	1	0.0220	0.200	ND	ug/L	U
Vanadium, Dissolved	7440-62-2	1	0.0556	0.200	0.901	ug/L	


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 03-Dec-2021 19:31

MW-63-20211611
21K0284-11 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 11/16/2021 13:36

Instrument: ICPMS1 Analyst: MCB

Analyzed: 11/30/2021 01:24

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21K0284-11 A 02
	Preparation Batch: BJK0487	Filtration Batch: BJK0466
	Sample Size: 25 mL	
	Prepared: 11/18/2021	Filtration Date: 11/17/2021 16:21
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Selenium, Dissolved	7782-49-2	1	0.179	0.500	ND	ug/L	U
Zinc, Dissolved	7440-66-6	1	2.92	6.00	ND	ug/L	U

Instrument: ICPMS2 Analyst: SKD

Analyzed: 11/22/2021 23:18

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21K0284-11 A 02
	Preparation Batch: BJK0487	Filtration Batch: BJK0466
	Sample Size: 25 mL	
	Prepared: 11/18/2021	Filtration Date: 11/17/2021 16:21
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.0373	0.200	2.12	ug/L	
Cadmium, Dissolved	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Cobalt, Dissolved	7440-48-4	1	0.0178	0.200	0.709	ug/L	
Copper, Dissolved	7440-50-8	1	0.173	0.500	0.394	ug/L	J
Nickel, Dissolved	7440-02-0	1	0.0792	0.500	2.18	ug/L	



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
03-Dec-2021 19:31

MW-63-20211611

21K0284-11 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 7470A

Sampled: 11/16/2021 13:36

Instrument: HYDRA Analyst: SKD

Analyzed: 12/02/2021 16:41

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21K0284-11 A 01

Preparation Batch: BJL0027

Sample Size: 20 mL

Filtration Batch: BJK0466

Prepared: 12/01/2021

Final Volume: 20 mL

Filtration Date: 11/17/2021 16:21

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury, Dissolved	7439-97-6	1	0.000013	0.000100	ND	mg/L	U



Analytical Report

Shannon & Wilson, Inc
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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
03-Dec-2021 19:31

MW-64-20211611

21K0284-12 (Water)

Volatile Organic Compounds

Method: EPA 8260D

Sampled: 11/16/2021 14:47

Instrument: NT3 Analyst: PKC

Analyzed: 11/17/2021 20:46

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0284-12 K

Preparation Batch: BJK0451

Sample Size: 10 mL

Prepared: 11/17/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	0.25	ug/L	
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.05	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.05	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.05	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.14	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.08	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.22	0.60	ND	ug/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>					<i>80-129 %</i>	<i>94.3 %</i>	
<i>Surrogate: Toluene-d8</i>					<i>80-120 %</i>	<i>105 %</i>	
<i>Surrogate: 4-Bromofluorobenzene</i>					<i>80-120 %</i>	<i>105 %</i>	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>					<i>80-120 %</i>	<i>102 %</i>	



Analytical Report

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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
03-Dec-2021 19:31

MW-64-20211611

21K0284-12 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM

Sampled: 11/16/2021 14:47

Instrument: NT11 Analyst: VTS

Analyzed: 11/27/2021 11:09

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJK0539 Prepared: 11/23/2021	Sample Size: 500 mL Final Volume: 0.5 mL	Extract ID: 21K0284-12 F 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJK0280 Cleaned: 26-Nov-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21K0284-12 F 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	1	0.001	0.010	0.006	ug/L	J
2-Methylnaphthalene	91-57-6	1	0.001	0.010	0.012	ug/L	
1-Methylnaphthalene	90-12-0	1	0.0009	0.010	0.012	ug/L	
Acenaphthylene	208-96-8	1	0.002	0.010	ND	ug/L	U
Acenaphthene	83-32-9	1	0.003	0.010	0.047	ug/L	
Dibenzofuran	132-64-9	1	0.002	0.010	0.008	ug/L	J
Fluorene	86-73-7	1	0.002	0.010	0.013	ug/L	
Phenanthrene	85-01-8	1	0.001	0.010	0.027	ug/L	
Anthracene	120-12-7	1	0.001	0.010	0.004	ug/L	J
Carbazole	86-74-8	1	0.001	0.010	0.003	ug/L	J
Fluoranthene	206-44-0	1	0.002	0.010	0.010	ug/L	J
Pyrene	129-00-0	1	0.001	0.010	0.007	ug/L	J
Benzo(a)anthracene	56-55-3	1	0.0008	0.010	0.0009	ug/L	J
Chrysene	218-01-9	1	0.0009	0.010	0.001	ug/L	J
Benzo(b)fluoranthene	205-99-2	1	0.0005	0.010	ND	ug/L	U
Benzo(k)fluoranthene	207-08-9	1	0.003	0.010	ND	ug/L	U
Benzo(j)fluoranthene	205-82-3	1	0.002	0.010	ND	ug/L	U
Benzo(a)pyrene	50-32-8	1	0.002	0.010	ND	ug/L	U
Perylene	1985-5-0	1	0.006	0.010	ND	ug/L	U
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.001	0.010	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	1	0.001	0.010	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	1	0.001	0.010	ND	ug/L	U
Surrogate: 2-Methylnaphthalene-d10				42-120 %	82.4	%	
Surrogate: Dibenzo[a,h]anthracene-d14				29-120 %	67.3	%	
Surrogate: Fluoranthene-d10				57-120 %	94.7	%	


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 03-Dec-2021 19:31

MW-64-20211611
21K0284-12 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 11/16/2021 14:47

Instrument: FID4 Analyst: TWC

Analyzed: 11/27/2021 03:51

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21K0284-12 D 01

Preparation Batch: BJK0537

Sample Size: 460 mL

Prepared: 11/22/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	0.109	0.226	mg/L	
HC ID: DRO						
Motor Oil Range Organics (C24-C38)	RRO	1	0.217	ND	mg/L	U
Surrogate: o-Terphenyl			50-150 %	94.3	%	


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 03-Dec-2021 19:31

MW-64-20211611
21K0284-12 (Water)
Aroclor PCB

Method: EPA 8082A

Sampled: 11/16/2021 14:47

Instrument: ECD7 Analyst: JGR

Analyzed: 11/30/2021 22:56

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJK0538 Prepared: 11/23/2021	Sample Size: 1000 mL Final Volume: 0.5 mL	Extract ID: 21K0284-12 A 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJK0302 Cleaned: 29-Nov-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21K0284-12 A 01
Sample Cleanup:	Cleanup Method: Sulfuric Acid Cleanup Batch: CJK0300 Cleaned: 29-Nov-2021	Initial Volume: 0.5 uL Final Volume: 0.5 uL	Extract ID: 21K0284-12 A 01
Sample Cleanup:	Cleanup Method: Sulfur Cleanup Batch: CJK0301 Cleaned: 29-Nov-2021	Initial Volume: 0.5 uL Final Volume: 0.5 uL	Extract ID: 21K0284-12 A 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Aroclor 1016	12674-11-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1221	11104-28-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1232	11141-16-5	1	0.002	0.010	ND	ug/L	U
Aroclor 1242	53469-21-9	1	0.002	0.010	ND	ug/L	U
Aroclor 1248	12672-29-6	1	0.002	0.010	ND	ug/L	U
Aroclor 1254	11097-69-1	1	0.002	0.010	ND	ug/L	U
Aroclor 1260	11096-82-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1262	37324-23-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1268	11100-14-4	1	0.003	0.010	ND	ug/L	U
<i>Surrogate: Decachlorobiphenyl</i>				29-120 %	67.6	%	
<i>Surrogate: Tetrachlorometaxylene</i>				32-120 %	70.1	%	
<i>Surrogate: Decachlorobiphenyl [2C]</i>				29-120 %	68.4	%	
<i>Surrogate: Tetrachlorometaxylene [2C]</i>				32-120 %	71.8	%	


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Reported:
 03-Dec-2021 19:31

MW-64-20211611
21K0284-12 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 11/16/2021 14:47

Instrument: ICPMS1 Analyst: MCB

Analyzed: 11/30/2021 21:42

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJK0731 Sample Size: 25 mL
 Prepared: 11/30/2021 Final Volume: 25 mL

Extract ID: 21K0284-12 C 02

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Barium	7440-39-3	1	0.114	0.500	8.35	ug/L	
Chromium	7440-47-3	2	0.520	1.00	0.858	ug/L	J, D
Iron	7439-89-6	2	36.4	72.0	11600	ug/L	D
Lead	7439-92-1	2	0.103	0.200	ND	ug/L	U
Silver	7440-22-4	2	0.0440	0.400	ND	ug/L	U
Vanadium	7440-62-2	2	0.111	0.400	2.39	ug/L	D


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 03-Dec-2021 19:31

MW-64-20211611
21K0284-12 (Water)
Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 11/16/2021 14:47

Instrument: ICPMS1 Analyst: MCB

Analyzed: 11/30/2021 21:42

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJK0731 Sample Size: 25 mL
 Prepared: 11/30/2021 Final Volume: 25 mL

Extract ID: 21K0284-12 C 02

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	1	0.0373	0.200	4.62	ug/L	
Cadmium	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Cobalt	7440-48-4	1	0.0178	0.200	0.234	ug/L	
Copper	7440-50-8	1	0.173	0.500	ND	ug/L	U
Nickel	7440-02-0	1	0.0792	0.500	0.396	ug/L	J
Selenium	7782-49-2	1	0.179	0.500	ND	ug/L	U
Zinc	7440-66-6	1	2.92	6.00	ND	ug/L	U



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
03-Dec-2021 19:31

MW-64-20211611

21K0284-12 (Water)

Metals and Metallic Compounds

Method: EPA 7470A

Sampled: 11/16/2021 14:47

Instrument: HYDRA Analyst: ML

Analyzed: 11/23/2021 15:46

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21K0284-12 C

Preparation Batch: BJK0611

Sample Size: 20 mL

Prepared: 11/23/2021

Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000013	0.000100	ND	mg/L	U



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
03-Dec-2021 19:31

MW-64-20211611
21K0284-12RE1 (Water)

Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 11/16/2021 14:47

Instrument: ICPMS1 Analyst: MCB

Analyzed: 12/01/2021 21:12

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO₃ matrix
Preparation Batch: BJK0731 Sample Size: 25 mL
Prepared: 11/30/2021 Final Volume: 25 mL

Extract ID: 21K0284-12RE1 C 02

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Manganese	7439-96-5	10	1.42	5.00	835	ug/L	D


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 03-Dec-2021 19:31

MW-64-20211611
21K0284-13 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 11/16/2021 14:47

Instrument: ICPMS1 Analyst: MCB

Analyzed: 11/24/2021 03:50

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21K0284-13 A 02
	Preparation Batch: BJK0487	Filtration Batch: BJK0466
	Prepared: 11/18/2021	Filtration Date: 11/17/2021 16:21
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Iron, Dissolved	7439-89-6	5	91.0	180	3410	ug/L	D
Manganese, Dissolved	7439-96-5	5	0.710	2.50	688	ug/L	D

Instrument: ICPMS2 Analyst: SKD

Analyzed: 11/22/2021 23:23

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21K0284-13 A 02
	Preparation Batch: BJK0487	Filtration Batch: BJK0466
	Prepared: 11/18/2021	Filtration Date: 11/17/2021 16:21
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Barium, Dissolved	7440-39-3	1	0.114	0.500	0.603	ug/L	
Chromium, Dissolved	7440-47-3	1	0.260	0.500	0.479	ug/L	J
Lead, Dissolved	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Silver, Dissolved	7440-22-4	1	0.0220	0.200	ND	ug/L	U
Vanadium, Dissolved	7440-62-2	1	0.0556	0.200	0.689	ug/L	


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 03-Dec-2021 19:31

MW-64-20211611
21K0284-13 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 11/16/2021 14:47

Instrument: ICPMS1 Analyst: MCB

Analyzed: 11/30/2021 01:28

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21K0284-13 A 02
	Preparation Batch: BJK0487	Filtration Batch: BJK0466
	Sample Size: 25 mL	
	Prepared: 11/18/2021	Filtration Date: 11/17/2021 16:21
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Selenium, Dissolved	7782-49-2	1	0.179	0.500	ND	ug/L	U
Zinc, Dissolved	7440-66-6	1	2.92	6.00	ND	ug/L	U

Instrument: ICPMS2 Analyst: SKD

Analyzed: 11/22/2021 23:23

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21K0284-13 A 02
	Preparation Batch: BJK0487	Filtration Batch: BJK0466
	Sample Size: 25 mL	
	Prepared: 11/18/2021	Filtration Date: 11/17/2021 16:21
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.0373	0.200	3.11	ug/L	
Cadmium, Dissolved	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Cobalt, Dissolved	7440-48-4	1	0.0178	0.200	0.199	ug/L	J
Copper, Dissolved	7440-50-8	1	0.173	0.500	ND	ug/L	U
Nickel, Dissolved	7440-02-0	1	0.0792	0.500	0.235	ug/L	J



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
03-Dec-2021 19:31

MW-64-20211611

21K0284-13 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 7470A

Sampled: 11/16/2021 14:47

Instrument: HYDRA Analyst: SKD

Analyzed: 12/02/2021 16:57

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21K0284-13 A 01

Preparation Batch: BJL0027

Sample Size: 20 mL

Filtration Batch: BJK0466

Prepared: 12/01/2021

Final Volume: 20 mL

Filtration Date: 11/17/2021 16:21

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury, Dissolved	7439-97-6	1	0.000013	0.000100	ND	mg/L	U



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
03-Dec-2021 19:31

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - Quality Control

Batch BJK0451 - EPA 5030C (Purge and Trap)

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0451-BLK1)						Prepared: 17-Nov-2021 Analyzed: 17-Nov-2021 14:17					
Vinyl Chloride	ND	0.08	0.20	ug/L							U
1,1-Dichloroethene	ND	0.08	0.20	ug/L							U
trans-1,2-Dichloroethene	ND	0.07	0.20	ug/L							U
cis-1,2-Dichloroethene	ND	0.08	0.20	ug/L							U
Benzene	ND	0.05	0.20	ug/L							U
Trichloroethene	ND	0.07	0.20	ug/L							U
Toluene	ND	0.05	0.20	ug/L							U
Tetrachloroethene	ND	0.09	0.20	ug/L							U
Ethylbenzene	ND	0.05	0.20	ug/L							U
m,p-Xylene	ND	0.14	0.40	ug/L							U
o-Xylene	ND	0.08	0.20	ug/L							U
Xylenes, total	ND	0.22	0.60	ug/L							U
<i>Surrogate: 1,2-Dichloroethane-d4</i>	4.48			ug/L	5.00		89.5	80-129			
<i>Surrogate: Toluene-d8</i>	5.22			ug/L	5.00		104	80-120			
<i>Surrogate: 4-Bromofluorobenzene</i>	5.04			ug/L	5.00		101	80-120			
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	4.89			ug/L	5.00		97.9	80-120			
LCS (BJK0451-BS1)						Prepared: 17-Nov-2021 Analyzed: 17-Nov-2021 12:09					
Vinyl Chloride	8.72	0.08	0.20	ug/L	10.0		87.2	66-133			
1,1-Dichloroethene	8.19	0.08	0.20	ug/L	10.0		81.9	69-135			
trans-1,2-Dichloroethene	8.15	0.07	0.20	ug/L	10.0		81.5	78-128			
cis-1,2-Dichloroethene	8.38	0.08	0.20	ug/L	10.0		83.8	80-121			
Benzene	9.26	0.05	0.20	ug/L	10.0		92.6	80-120			
Trichloroethene	9.17	0.07	0.20	ug/L	10.0		91.7	80-120			
Toluene	9.43	0.05	0.20	ug/L	10.0		94.3	80-120			
Tetrachloroethene	9.94	0.09	0.20	ug/L	10.0		99.4	80-120			
Ethylbenzene	9.20	0.05	0.20	ug/L	10.0		92.0	80-120			
m,p-Xylene	18.8	0.14	0.40	ug/L	20.0		94.0	80-121			
o-Xylene	9.27	0.08	0.20	ug/L	10.0		92.7	80-121			
Xylenes, total	28.1	0.22	0.60	ug/L	30.0		93.5	76-127			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	4.39			ug/L	5.00		87.8	80-129			
<i>Surrogate: Toluene-d8</i>	5.24			ug/L	5.00		105	80-120			
<i>Surrogate: 4-Bromofluorobenzene</i>	5.07			ug/L	5.00		101	80-120			
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	5.10			ug/L	5.00		102	80-120			


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 03-Dec-2021 19:31

Analysis by: Analytical Resources, LLC
Volatile Organic Compounds - Quality Control
Batch BJK0451 - EPA 5030C (Purge and Trap)

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BJK0451-BSD1)						Prepared: 17-Nov-2021 Analyzed: 17-Nov-2021 13:00					
Vinyl Chloride	8.71	0.08	0.20	ug/L	10.0		87.1	66-133	0.16	30	
1,1-Dichloroethene	8.43	0.08	0.20	ug/L	10.0		84.3	69-135	2.89	30	
trans-1,2-Dichloroethene	8.79	0.07	0.20	ug/L	10.0		87.9	78-128	7.53	30	
cis-1,2-Dichloroethene	8.76	0.08	0.20	ug/L	10.0		87.6	80-121	4.48	30	
Benzene	9.51	0.05	0.20	ug/L	10.0		95.1	80-120	2.62	30	
Trichloroethene	9.49	0.07	0.20	ug/L	10.0		94.9	80-120	3.43	30	
Toluene	9.50	0.05	0.20	ug/L	10.0		95.0	80-120	0.77	30	
Tetrachloroethene	10.8	0.09	0.20	ug/L	10.0		108	80-120	8.35	30	
Ethylbenzene	10.1	0.05	0.20	ug/L	10.0		101	80-120	9.16	30	
m,p-Xylene	21.0	0.14	0.40	ug/L	20.0		105	80-121	11.20	30	
o-Xylene	10.0	0.08	0.20	ug/L	10.0		100	80-121	7.75	30	
Xylenes, total	31.0	0.22	0.60	ug/L	30.0		103	76-127	10.10	30	
<i>Surrogate: 1,2-Dichloroethane-d4</i>	4.24			ug/L	5.00		84.8	80-129			
<i>Surrogate: Toluene-d8</i>	5.11			ug/L	5.00		102	80-120			
<i>Surrogate: 4-Bromofluorobenzene</i>	5.30			ug/L	5.00		106	80-120			
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	5.06			ug/L	5.00		101	80-120			


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 03-Dec-2021 19:31

Analysis by: Analytical Resources, LLC
Volatile Organic Compounds - Quality Control
Batch BJK0547 - EPA 5030C (Purge and Trap)

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0547-BLK1)		Prepared: 19-Nov-2021 Analyzed: 19-Nov-2021 18:09								
Gasoline Range Organics (Tol-Nap)	ND	100	ug/L							U
Surrogate: Toluene-d8	5.20		ug/L	5.00		104	80-120			
Surrogate: 4-Bromofluorobenzene	5.28		ug/L	5.00		106	80-120			
LCS (BJK0547-BS1)		Prepared: 19-Nov-2021 Analyzed: 19-Nov-2021 16:03								
Gasoline Range Organics (Tol-Nap)	936	100	ug/L	1000		93.6	72-128			
Surrogate: Toluene-d8	5.04		ug/L	5.00		101	80-120			
Surrogate: 4-Bromofluorobenzene	5.36		ug/L	5.00		107	80-120			
LCS Dup (BJK0547-BSD1)		Prepared: 19-Nov-2021 Analyzed: 19-Nov-2021 16:53								
Gasoline Range Organics (Tol-Nap)	867	100	ug/L	1000		86.7	72-128	7.57	30	
Surrogate: Toluene-d8	5.13		ug/L	5.00		103	80-120			
Surrogate: 4-Bromofluorobenzene	5.56		ug/L	5.00		111	80-120			


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 03-Dec-2021 19:31

Analysis by: Analytical Resources, LLC
Volatile Organic Compounds - Quality Control
Batch BJK0565 - EPA 5030C (Purge and Trap)

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0565-BLK1)		Prepared: 22-Nov-2021 Analyzed: 22-Nov-2021 10:12								
Gasoline Range Organics (Tol-Nap)	ND	100	ug/L							U
Surrogate: Toluene-d8	5.17		ug/L	5.00		103	80-120			
Surrogate: 4-Bromofluorobenzene	5.16		ug/L	5.00		103	80-120			
LCS (BJK0565-BS1)		Prepared: 22-Nov-2021 Analyzed: 22-Nov-2021 08:06								
Gasoline Range Organics (Tol-Nap)	870	100	ug/L	1000		87.0	72-128			
Surrogate: Toluene-d8	5.08		ug/L	5.00		102	80-120			
Surrogate: 4-Bromofluorobenzene	5.57		ug/L	5.00		111	80-120			
LCS Dup (BJK0565-BSD1)		Prepared: 22-Nov-2021 Analyzed: 22-Nov-2021 08:57								
Gasoline Range Organics (Tol-Nap)	883	100	ug/L	1000		88.3	72-128	1.58	30	
Surrogate: Toluene-d8	5.22		ug/L	5.00		104	80-120			
Surrogate: 4-Bromofluorobenzene	5.46		ug/L	5.00		109	80-120			


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 03-Dec-2021 19:31

Analysis by: Analytical Resources, LLC
Volatile Organic Compounds - SIM - Quality Control
Batch BJK0666 - EPA 5030C (Purge and Trap)

Instrument: NT7 Analyst: KOTT

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0666-BLK1)					Prepared: 24-Nov-2021 Analyzed: 26-Nov-2021 16:08						
Vinyl chloride	ND	5.01	20.0	ng/L							U
Surrogate: 1,2-Dichloroethane-d4	5780			ng/L	5000		116	80-129			
Surrogate: Toluene-d8	4730			ng/L	5000		94.7	80-120			
LCS (BJK0666-BS1)					Prepared: 24-Nov-2021 Analyzed: 26-Nov-2021 14:42						
Vinyl chloride	458	5.01	20.0	ng/L	500		91.6	62-141			
Surrogate: 1,2-Dichloroethane-d4	5830			ng/L	5000		117	80-129			
Surrogate: Toluene-d8	5020			ng/L	5000		100	80-120			
LCS Dup (BJK0666-BSD1)					Prepared: 24-Nov-2021 Analyzed: 26-Nov-2021 15:39						
Vinyl chloride	392	5.01	20.0	ng/L	500		78.5	62-141	15.40	30	
Surrogate: 1,2-Dichloroethane-d4	3960			ng/L	5000		79.2	80-129			*
Surrogate: Toluene-d8	4820			ng/L	5000		96.4	80-120			


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 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 03-Dec-2021 19:31

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - Quality Control
Batch BJK0540 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0540-BLK1)						Prepared: 23-Nov-2021 Analyzed: 01-Dec-2021 12:57					
Phenol	ND	0.01	0.2	ug/L							U
bis(2-chloroethyl) ether	ND	0.03	0.2	ug/L							U
2-Chlorophenol	ND	0.03	0.2	ug/L							U
1,3-Dichlorobenzene	ND	0.03	0.2	ug/L							U
1,4-Dichlorobenzene	ND	0.03	0.2	ug/L							U
1,2-Dichlorobenzene	ND	0.03	0.2	ug/L							U
Benzyl Alcohol	ND	0.02	0.2	ug/L							U
2,2'-Oxybis(1-chloropropane)	ND	0.03	0.2	ug/L							U
2-Methylphenol	ND	0.03	0.2	ug/L							U
Hexachloroethane	ND	0.04	0.2	ug/L							U
N-Nitroso-di-n-Propylamine	ND	0.04	0.2	ug/L							U
4-Methylphenol	ND	0.03	0.2	ug/L							U
Nitrobenzene	ND	0.03	0.2	ug/L							U
Isophorone	ND	0.03	0.2	ug/L							U
2-Nitrophenol	ND	0.04	1.0	ug/L							U
2,4-Dimethylphenol	ND	0.3	1.0	ug/L							U
Bis(2-Chloroethoxy)methane	ND	0.03	0.2	ug/L							U
2,4-Dichlorophenol	ND	0.1	1.0	ug/L							U
1,2,4-Trichlorobenzene	ND	0.03	0.2	ug/L							U
Naphthalene	ND	0.03	0.2	ug/L							U
Benzoic acid	ND	0.1	2.0	ug/L							U
4-Chloroaniline	ND	0.04	1.0	ug/L							U
Hexachlorobutadiene	ND	0.04	0.2	ug/L							U
4-Chloro-3-Methylphenol	ND	0.1	1.0	ug/L							U
2-Methylnaphthalene	ND	0.03	0.2	ug/L							U
Hexachlorocyclopentadiene	ND	0.1	1.0	ug/L							U
2,4,6-Trichlorophenol	ND	0.2	1.0	ug/L							U
2,4,5-Trichlorophenol	ND	0.1	1.0	ug/L							U
2-Chloronaphthalene	ND	0.03	0.2	ug/L							U
2-Nitroaniline	ND	0.2	1.0	ug/L							U
Acenaphthylene	ND	0.02	0.2	ug/L							U
Dimethylphthalate	ND	0.04	0.2	ug/L							U
2,6-Dinitrotoluene	ND	0.2	1.0	ug/L							U
Acenaphthene	ND	0.03	0.2	ug/L							U
3-Nitroaniline	ND	0.2	1.0	ug/L							U


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 03-Dec-2021 19:31

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - Quality Control
Batch BJK0540 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0540-BLK1)						Prepared: 23-Nov-2021 Analyzed: 01-Dec-2021 12:57					
2,4-Dinitrophenol	ND	0.2	2.0	ug/L							U
Dibenzofuran	ND	0.02	0.2	ug/L							U
4-Nitrophenol	ND	0.06	1.0	ug/L							U
2,4-Dinitrotoluene	ND	0.1	1.0	ug/L							U
Fluorene	ND	0.02	0.2	ug/L							U
4-Chlorophenylphenyl ether	ND	0.02	0.2	ug/L							U
Diethyl phthalate	ND	0.06	0.2	ug/L							U
4-Nitroaniline	ND	0.2	1.0	ug/L							U
4,6-Dinitro-2-methylphenol	ND	0.4	2.0	ug/L							U
N-Nitrosodiphenylamine	ND	0.03	0.2	ug/L							U
4-Bromophenyl phenyl ether	ND	0.02	0.2	ug/L							U
Hexachlorobenzene	ND	0.04	0.2	ug/L							U
Pentachlorophenol	ND	0.1	1.0	ug/L							U
Phenanthrene	ND	0.02	0.2	ug/L							U
Anthracene	ND	0.03	0.2	ug/L							U
Carbazole	ND	0.04	0.2	ug/L							U
Di-n-Butylphthalate	ND	0.05	0.2	ug/L							U
Fluoranthene	ND	0.03	0.2	ug/L							U
Pyrene	ND	0.03	0.2	ug/L							U
Butylbenzylphthalate	ND	0.07	0.2	ug/L							U
Benzo(a)anthracene	ND	0.04	0.2	ug/L							U
3,3'-Dichlorobenzidine	ND	0.3	1.0	ug/L							U
Chrysene	ND	0.04	0.2	ug/L							U
bis(2-Ethylhexyl)phthalate	ND	0.2	0.2	ug/L							U
Di-n-Octylphthalate	ND	0.05	0.2	ug/L							U
Benzo(a)fluoranthene, Total	ND	0.08	0.4	ug/L							U
Benzo(a)pyrene	ND	0.05	0.2	ug/L							U
Indeno(1,2,3-cd)pyrene	ND	0.06	0.2	ug/L							U
Dibenzo(a,h)anthracene	ND	0.07	0.2	ug/L							U
Benzo(g,h,i)perylene	ND	0.04	0.2	ug/L							U
1-Methylnaphthalene	ND	0.03	0.2	ug/L							U
Surrogate: 2-Fluorophenol	3.77			ug/L	7.50		50.2	30-160			
Surrogate: Phenol-d5	2.43			ug/L	7.50		32.4	30-160			
Surrogate: 2-Chlorophenol-d4	6.72			ug/L	7.50		89.5	30-160			


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 Project: Lower Duwamish Q4
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 Project Manager: Meg Strong

Reported:
 03-Dec-2021 19:31

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - Quality Control
Batch BJK0540 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0540-BLK1)					Prepared: 23-Nov-2021 Analyzed: 01-Dec-2021 12:57						
Surrogate: 1,2-Dichlorobenzene-d4	4.13			ug/L	5.00		82.7	30-160			
Surrogate: Nitrobenzene-d5	4.28			ug/L	5.00		85.5	30-160			
Surrogate: 2-Fluorobiphenyl	4.83			ug/L	5.00		96.7	30-160			
Surrogate: 2,4,6-Tribromophenol	7.27			ug/L	7.50		96.9	30-160			
Surrogate: p-Terphenyl-d14	5.34			ug/L	5.00		107	30-160			Q
LCS (BJK0540-BS1)					Prepared: 23-Nov-2021 Analyzed: 01-Dec-2021 13:35						
Phenol	1.6	0.01	0.2	ug/L	5.00		31.7	30-160			
bis(2-chloroethyl) ether	3.8	0.03	0.2	ug/L	5.00		75.1	30-160			
2-Chlorophenol	3.2	0.03	0.2	ug/L	5.00		64.1	30-160			
1,3-Dichlorobenzene	2.9	0.03	0.2	ug/L	5.00		57.4	30-160			
1,4-Dichlorobenzene	3.2	0.03	0.2	ug/L	5.00		64.0	30-160			
1,2-Dichlorobenzene	3.0	0.03	0.2	ug/L	5.00		59.4	30-160			
Benzyl Alcohol	2.3	0.02	0.2	ug/L	5.00		46.1	30-160			
2,2'-Oxybis(1-chloropropane)	3.5	0.03	0.2	ug/L	5.00		70.7	30-160			
2-Methylphenol	2.9	0.03	0.2	ug/L	5.00		57.8	30-160			
Hexachloroethane	2.8	0.04	0.2	ug/L	5.00		56.3	30-160			
N-Nitroso-di-n-Propylamine	3.3	0.04	0.2	ug/L	5.00		66.5	30-160			
4-Methylphenol	2.6	0.03	0.2	ug/L	5.00		52.9	30-160			
Nitrobenzene	3.6	0.03	0.2	ug/L	5.00		71.3	30-160			
Isophorone	5.2	0.03	0.2	ug/L	5.00		104	30-160			
2-Nitrophenol	4.1	0.04	1.0	ug/L	5.00		82.1	30-160			Q
2,4-Dimethylphenol	8.8	0.3	1.0	ug/L	13.0		67.8	30-160			
Bis(2-Chloroethoxy)methane	4.3	0.03	0.2	ug/L	5.00		86.7	30-160			
2,4-Dichlorophenol	10.3	0.1	1.0	ug/L	13.0		79.2	30-160			
1,2,4-Trichlorobenzene	2.9	0.03	0.2	ug/L	5.00		58.0	30-160			
Naphthalene	3.2	0.03	0.2	ug/L	5.00		63.7	30-160			
Benzoic acid	6.7	0.1	2.0	ug/L	23.0		28.9	30-160			*
4-Chloroaniline	1.9	0.04	1.0	ug/L	13.0		14.2	30-160			*
Hexachlorobutadiene	2.4	0.04	0.2	ug/L	5.00		48.3	30-160			
4-Chloro-3-Methylphenol	11.6	0.1	1.0	ug/L	13.0		89.0	30-160			
2-Methylnaphthalene	3.5	0.03	0.2	ug/L	5.00		70.6	30-160			
Hexachlorocyclopentadiene	2.8	0.1	1.0	ug/L	13.0		21.6	30-160			*, Q
2,4,6-Trichlorophenol	11.6	0.2	1.0	ug/L	13.0		89.4	30-160			
2,4,5-Trichlorophenol	11.3	0.1	1.0	ug/L	13.0		86.9	30-160			


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 03-Dec-2021 19:31

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - Quality Control
Batch BJK0540 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJK0540-BS1)						Prepared: 23-Nov-2021 Analyzed: 01-Dec-2021 13:35					
2-Chloronaphthalene	3.8	0.03	0.2	ug/L	5.00		75.8	30-160			
2-Nitroaniline	12.7	0.2	1.0	ug/L	13.0		97.7	30-160			
Acenaphthylene	3.2	0.02	0.2	ug/L	5.00		63.2	30-160			
Dimethylphthalate	3.8	0.04	0.2	ug/L	5.00		76.3	30-160			
2,6-Dinitrotoluene	13.3	0.2	1.0	ug/L	13.0		102	30-160			
Acenaphthene	3.4	0.03	0.2	ug/L	5.00		67.9	30-160			
3-Nitroaniline	11.2	0.2	1.0	ug/L	13.0		86.3	30-160			
2,4-Dinitrophenol	17.3	0.2	2.0	ug/L	23.0		75.4	30-160			
Dibenzofuran	4.0	0.02	0.2	ug/L	5.00		79.2	30-160			
4-Nitrophenol	3.5	0.06	1.0	ug/L	13.0		26.9	30-160			*
2,4-Dinitrotoluene	13.4	0.1	1.0	ug/L	13.0		103	30-160			Q
Fluorene	2.6	0.02	0.2	ug/L	5.00		51.1	30-160			Q
4-Chlorophenylphenyl ether	2.3	0.02	0.2	ug/L	5.00		46.8	30-160			Q
Diethyl phthalate	3.7	0.06	0.2	ug/L	5.00		74.3	30-160			
4-Nitroaniline	13.4	0.2	1.0	ug/L	13.0		103	30-160			
4,6-Dinitro-2-methylphenol	21.4	0.4	2.0	ug/L	23.0		92.9	30-160			
N-Nitrosodiphenylamine	3.8	0.03	0.2	ug/L	5.00		75.8	30-160			
4-Bromophenyl phenyl ether	4.1	0.02	0.2	ug/L	5.00		81.3	30-160			
Hexachlorobenzene	3.5	0.04	0.2	ug/L	5.00		70.7	30-160			
Pentachlorophenol	4.5	0.1	1.0	ug/L	13.0		34.9	30-160			Q
Phenanthrene	3.8	0.02	0.2	ug/L	5.00		75.1	30-160			
Anthracene	3.5	0.03	0.2	ug/L	5.00		69.5	30-160			
Carbazole	3.9	0.04	0.2	ug/L	5.00		77.5	30-160			
Di-n-Butylphthalate	4.2	0.05	0.2	ug/L	5.00		83.7	30-160			
Fluoranthene	5.1	0.03	0.2	ug/L	5.00		101	30-160			Q
Pyrene	4.9	0.03	0.2	ug/L	5.00		98.9	30-160			Q
Butylbenzylphthalate	4.6	0.07	0.2	ug/L	5.00		92.4	30-160			Q
Benzo(a)anthracene	4.1	0.04	0.2	ug/L	5.00		81.2	30-160			
3,3'-Dichlorobenzidine	12.3	0.3	1.0	ug/L	13.0		94.2	30-160			
Chrysene	3.7	0.04	0.2	ug/L	5.00		74.5	30-160			
bis(2-Ethylhexyl)phthalate	4.3	0.2	0.2	ug/L	5.00		86.2	30-160			
Di-n-Octylphthalate	3.9	0.05	0.2	ug/L	5.00		77.9	30-160			
Benzo(a)fluoranthene, Total	8.3	0.08	0.4	ug/L	10.0		82.5	30-160			
Benzo(a)pyrene	3.8	0.05	0.2	ug/L	5.00		75.2	30-160			
Indeno(1,2,3-cd)pyrene	3.6	0.06	0.2	ug/L	5.00		71.4	30-160			



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
03-Dec-2021 19:31

Analysis by: Analytical Resources, LLC

Semivolatile Organic Compounds - Quality Control

Batch BJK0540 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJK0540-BS1)						Prepared: 23-Nov-2021 Analyzed: 01-Dec-2021 13:35					
Dibenzo(a,h)anthracene	3.4	0.07	0.2	ug/L	5.00		68.5	30-160			
Benzo(g,h,i)perylene	3.3	0.04	0.2	ug/L	5.00		66.7	30-160			
1-Methylnaphthalene	3.8	0.03	0.2	ug/L	5.00		76.9	30-160			
Surrogate: 2-Fluorophenol	3.52			ug/L	7.50		46.9	30-160			
Surrogate: Phenol-d5	2.43			ug/L	7.50		32.3	30-160			
Surrogate: 2-Chlorophenol-d4	5.57			ug/L	7.50		74.3	30-160			
Surrogate: 1,2-Dichlorobenzene-d4	3.29			ug/L	5.00		65.7	30-160			
Surrogate: Nitrobenzene-d5	3.78			ug/L	5.00		75.7	30-160			
Surrogate: 2-Fluorobiphenyl	3.99			ug/L	5.00		79.7	30-160			
Surrogate: 2,4,6-Tribromophenol	6.25			ug/L	7.50		83.4	30-160			
Surrogate: p-Terphenyl-d14	5.14			ug/L	5.00		103	30-160			Q
LCS Dup (BJK0540-BSD1)						Prepared: 23-Nov-2021 Analyzed: 01-Dec-2021 14:13					
Phenol	2.0	0.01	0.2	ug/L	5.00		39.2	30-160	21.20	30	
bis(2-chloroethyl) ether	4.8	0.03	0.2	ug/L	5.00		95.9	30-160	24.40	30	
2-Chlorophenol	4.0	0.03	0.2	ug/L	5.00		79.6	30-160	21.60	30	
1,3-Dichlorobenzene	3.6	0.03	0.2	ug/L	5.00		72.3	30-160	22.90	30	
1,4-Dichlorobenzene	4.1	0.03	0.2	ug/L	5.00		83.0	30-160	25.80	30	
1,2-Dichlorobenzene	3.8	0.03	0.2	ug/L	5.00		75.1	30-160	23.20	30	
Benzyl Alcohol	2.9	0.02	0.2	ug/L	5.00		57.2	30-160	21.60	30	
2,2'-Oxybis(1-chloropropane)	4.5	0.03	0.2	ug/L	5.00		89.4	30-160	23.30	30	
2-Methylphenol	3.6	0.03	0.2	ug/L	5.00		71.6	30-160	21.30	30	
Hexachloroethane	3.6	0.04	0.2	ug/L	5.00		72.2	30-160	24.80	30	
N-Nitroso-di-n-Propylamine	4.1	0.04	0.2	ug/L	5.00		82.3	30-160	21.30	30	
4-Methylphenol	3.2	0.03	0.2	ug/L	5.00		64.4	30-160	19.50	30	
Nitrobenzene	4.5	0.03	0.2	ug/L	5.00		90.7	30-160	24.00	30	
Isophorone	6.5	0.03	0.2	ug/L	5.00		129	30-160	21.70	30	
2-Nitrophenol	5.4	0.04	1.0	ug/L	5.00		109	30-160	27.80	30	Q
2,4-Dimethylphenol	10.9	0.3	1.0	ug/L	13.0		83.9	30-160	21.20	30	
Bis(2-Chloroethoxy)methane	5.5	0.03	0.2	ug/L	5.00		110	30-160	24.10	30	
2,4-Dichlorophenol	13.9	0.1	1.0	ug/L	13.0		107	30-160	29.40	30	
1,2,4-Trichlorobenzene	3.5	0.03	0.2	ug/L	5.00		70.8	30-160	20.00	30	
Naphthalene	4.0	0.03	0.2	ug/L	5.00		79.7	30-160	22.40	30	
Benzoic acid	8.6	0.1	2.0	ug/L	23.0		37.2	30-160	25.10	30	
4-Chloroaniline	2.3	0.04	1.0	ug/L	13.0		17.8	30-160	22.40	30	*



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
03-Dec-2021 19:31

Analysis by: Analytical Resources, LLC

Semivolatile Organic Compounds - Quality Control

Batch BJK0540 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BJK0540-BSD1)						Prepared: 23-Nov-2021 Analyzed: 01-Dec-2021 14:13					
Hexachlorobutadiene	3.1	0.04	0.2	ug/L	5.00		61.8	30-160	24.40	30	
4-Chloro-3-Methylphenol	14.5	0.1	1.0	ug/L	13.0		112	30-160	22.80	30	
2-Methylnaphthalene	4.5	0.03	0.2	ug/L	5.00		90.3	30-160	24.50	30	
Hexachlorocyclopentadiene	4.3	0.1	1.0	ug/L	13.0		33.2	30-160	42.40	30	*, Q
2,4,6-Trichlorophenol	14.7	0.2	1.0	ug/L	13.0		113	30-160	23.20	30	
2,4,5-Trichlorophenol	14.0	0.1	1.0	ug/L	13.0		108	30-160	21.60	30	
2-Chloronaphthalene	4.8	0.03	0.2	ug/L	5.00		95.2	30-160	22.70	30	
2-Nitroaniline	16.3	0.2	1.0	ug/L	13.0		125	30-160	24.60	30	
Acenaphthylene	3.9	0.02	0.2	ug/L	5.00		78.0	30-160	20.80	30	
Dimethylphthalate	4.6	0.04	0.2	ug/L	5.00		91.4	30-160	18.00	30	
2,6-Dinitrotoluene	16.8	0.2	1.0	ug/L	13.0		129	30-160	23.30	30	
Acenaphthene	4.3	0.03	0.2	ug/L	5.00		86.6	30-160	24.30	30	
3-Nitroaniline	13.6	0.2	1.0	ug/L	13.0		105	30-160	19.10	30	
2,4-Dinitrophenol	23.8	0.2	2.0	ug/L	23.0		103	30-160	31.30	30	*
Dibenzofuran	4.9	0.02	0.2	ug/L	5.00		98.3	30-160	21.50	30	
4-Nitrophenol	4.3	0.06	1.0	ug/L	13.0		32.8	30-160	19.70	30	
2,4-Dinitrotoluene	16.9	0.1	1.0	ug/L	13.0		130	30-160	23.20	30	Q
Fluorene	3.1	0.02	0.2	ug/L	5.00		62.6	30-160	20.30	30	Q
4-Chlorophenylphenyl ether	3.3	0.02	0.2	ug/L	5.00		65.6	30-160	33.40	30	*, Q
Diethyl phthalate	4.4	0.06	0.2	ug/L	5.00		88.8	30-160	17.90	30	
4-Nitroaniline	16.2	0.2	1.0	ug/L	13.0		125	30-160	19.20	30	
4,6-Dinitro-2-methylphenol	26.6	0.4	2.0	ug/L	23.0		116	30-160	21.90	30	
N-Nitrosodiphenylamine	4.7	0.03	0.2	ug/L	5.00		93.8	30-160	21.20	30	
4-Bromophenyl phenyl ether	5.0	0.02	0.2	ug/L	5.00		99.5	30-160	20.20	30	
Hexachlorobenzene	4.4	0.04	0.2	ug/L	5.00		87.8	30-160	21.60	30	
Pentachlorophenol	5.9	0.1	1.0	ug/L	13.0		45.6	30-160	26.40	30	Q
Phenanthrene	4.4	0.02	0.2	ug/L	5.00		87.9	30-160	15.70	30	
Anthracene	4.3	0.03	0.2	ug/L	5.00		85.2	30-160	20.30	30	
Carbazole	4.8	0.04	0.2	ug/L	5.00		95.9	30-160	21.20	30	
Di-n-Butylphthalate	5.1	0.05	0.2	ug/L	5.00		103	30-160	20.40	30	
Fluoranthene	6.1	0.03	0.2	ug/L	5.00		123	30-160	19.20	30	Q
Pyrene	6.1	0.03	0.2	ug/L	5.00		123	30-160	21.40	30	Q
Butylbenzylphthalate	5.5	0.07	0.2	ug/L	5.00		111	30-160	18.00	30	Q
Benzo(a)anthracene	4.9	0.04	0.2	ug/L	5.00		97.9	30-160	18.60	30	
3,3'-Dichlorobenzidine	14.6	0.3	1.0	ug/L	13.0		112	30-160	17.20	30	


 Shannon & Wilson, Inc
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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 03-Dec-2021 19:31

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - Quality Control
Batch BJK0540 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BJK0540-BSD1)						Prepared: 23-Nov-2021 Analyzed: 01-Dec-2021 14:13					
Chrysene	4.6	0.04	0.2	ug/L	5.00		91.9	30-160	20.90	30	
bis(2-Ethylhexyl)phthalate	5.2	0.2	0.2	ug/L	5.00		103	30-160	18.00	30	
Di-n-Octylphthalate	4.7	0.05	0.2	ug/L	5.00		94.3	30-160	19.00	30	
Benzo(a)fluoranthenes, Total	9.9	0.08	0.4	ug/L	10.0		99.2	30-160	18.40	30	
Benzo(a)pyrene	4.6	0.05	0.2	ug/L	5.00		91.7	30-160	19.80	30	
Indeno(1,2,3-cd)pyrene	4.4	0.06	0.2	ug/L	5.00		87.4	30-160	20.10	30	
Dibenzo(a,h)anthracene	4.2	0.07	0.2	ug/L	5.00		84.6	30-160	21.10	30	
Benzo(g,h,i)perylene	4.2	0.04	0.2	ug/L	5.00		83.4	30-160	22.30	30	
1-Methylnaphthalene	4.8	0.03	0.2	ug/L	5.00		97.0	30-160	23.10	30	
Surrogate: 2-Fluorophenol	4.20			ug/L	7.50		56.0	30-160			
Surrogate: Phenol-d5	2.93			ug/L	7.50		39.0	30-160			
Surrogate: 2-Chlorophenol-d4	6.68			ug/L	7.50		89.0	30-160			
Surrogate: 1,2-Dichlorobenzene-d4	3.97			ug/L	5.00		79.4	30-160			
Surrogate: Nitrobenzene-d5	4.62			ug/L	5.00		92.5	30-160			
Surrogate: 2-Fluorobiphenyl	4.87			ug/L	5.00		97.4	30-160			
Surrogate: 2,4,6-Tribromophenol	7.53			ug/L	7.50		100	30-160			
Surrogate: p-Terphenyl-d14	5.88			ug/L	5.00		118	30-160			Q


 Shannon & Wilson, Inc
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 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 03-Dec-2021 19:31

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - SIM - Quality Control
Batch BJK0539 - EPA 3510C SepF

Instrument: NT11 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0539-BLK1)						Prepared: 23-Nov-2021 Analyzed: 27-Nov-2021 08:32					
Naphthalene	0.002	0.001	0.010	ug/L							J
2-Methylnaphthalene	0.001	0.001	0.010	ug/L							J
1-Methylnaphthalene	ND	0.0009	0.010	ug/L							U
Acenaphthylene	ND	0.002	0.010	ug/L							U
Acenaphthene	ND	0.003	0.010	ug/L							U
Dibenzofuran	ND	0.002	0.010	ug/L							U
Fluorene	ND	0.002	0.010	ug/L							U
Phenanthrene	ND	0.001	0.010	ug/L							U
Anthracene	ND	0.001	0.010	ug/L							U
Carbazole	ND	0.001	0.010	ug/L							U
Fluoranthene	ND	0.002	0.010	ug/L							U
Pyrene	ND	0.001	0.010	ug/L							U
Benzo(a)anthracene	ND	0.0008	0.010	ug/L							U
Chrysene	ND	0.0009	0.010	ug/L							U
Benzo(b)fluoranthene	ND	0.0005	0.010	ug/L							U
Benzo(k)fluoranthene	ND	0.003	0.010	ug/L							U
Benzo(j)fluoranthene	ND	0.002	0.010	ug/L							U
Benzo(a)pyrene	ND	0.002	0.010	ug/L							U
Perylene	ND	0.006	0.010	ug/L							U
Indeno(1,2,3-cd)pyrene	ND	0.001	0.010	ug/L							U
Dibenzo(a,h)anthracene	ND	0.001	0.010	ug/L							U
Benzo(g,h,i)perylene	ND	0.001	0.010	ug/L							U
Surrogate: 2-Methylnaphthalene-d10	0.253			ug/L	0.300		84.3	42-120			
Surrogate: Dibenzo[a,h]anthracene-d14	0.200			ug/L	0.300		66.7	29-120			
Surrogate: Fluoranthene-d10	0.293			ug/L	0.300		97.6	57-120			
LCS (BJK0539-BS1)						Prepared: 23-Nov-2021 Analyzed: 27-Nov-2021 09:02					
Naphthalene	0.235	0.001	0.010	ug/L	0.300		78.4	37-120			
2-Methylnaphthalene	0.253	0.001	0.010	ug/L	0.300		84.2	37-120			
1-Methylnaphthalene	0.251	0.0009	0.010	ug/L	0.300		83.8	29-120			
Acenaphthylene	0.266	0.002	0.010	ug/L	0.300		88.5	41-120			
Acenaphthene	0.269	0.003	0.010	ug/L	0.300		89.6	41-120			
Dibenzofuran	0.252	0.002	0.010	ug/L	0.300		84.1	38-120			
Fluorene	0.265	0.002	0.010	ug/L	0.300		88.3	43-120			


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 Project: Lower Duwamish Q4
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Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - SIM - Quality Control
Batch BJK0539 - EPA 3510C SepF

Instrument: NT11 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJK0539-BS1)						Prepared: 23-Nov-2021 Analyzed: 27-Nov-2021 09:02					
Phenanthrene	0.261	0.001	0.010	ug/L	0.300		87.1	41-120			
Anthracene	0.259	0.001	0.010	ug/L	0.300		86.3	40-120			
Carbazole	0.266	0.001	0.010	ug/L	0.300		88.6	30-160			
Fluoranthene	0.272	0.002	0.010	ug/L	0.300		90.6	45-120			
Pyrene	0.268	0.001	0.010	ug/L	0.300		89.2	41-120			
Benzo(a)anthracene	0.270	0.0008	0.010	ug/L	0.300		90.1	42-120			
Chrysene	0.256	0.0009	0.010	ug/L	0.300		85.4	44-120			
Benzo(b)fluoranthene	0.238	0.0005	0.010	ug/L	0.300		79.3	44-120			
Benzo(k)fluoranthene	0.251	0.003	0.010	ug/L	0.300		83.8	50-120			
Benzo(j)fluoranthene	0.269	0.002	0.010	ug/L	0.300		89.8	39-160			
Benzofluoranthenes, Total	0.759	0.004	0.010	ug/L	0.900		84.3	46-120			
Benzo(a)pyrene	0.249	0.002	0.010	ug/L	0.300		82.9	35-120			
Perylene	0.236	0.006	0.010	ug/L	0.300		78.5	30-160			
Indeno(1,2,3-cd)pyrene	0.225	0.001	0.010	ug/L	0.300		75.0	37-120			
Dibenzo(a,h)anthracene	0.223	0.001	0.010	ug/L	0.300		74.3	34-120			
Benzo(g,h,i)perylene	0.191	0.001	0.010	ug/L	0.300		63.6	38-120			
Surrogate: 2-Methylnaphthalene-d10	0.282			ug/L	0.300		94.0	42-120			
Surrogate: Dibenzo[a,h]anthracene-d14	0.227			ug/L	0.300		75.6	29-120			
Surrogate: Fluoranthene-d10	0.300			ug/L	0.300		100	57-120			
LCS Dup (BJK0539-BSD1)						Prepared: 23-Nov-2021 Analyzed: 27-Nov-2021 09:39					
Naphthalene	0.243	0.001	0.010	ug/L	0.300		80.9	37-120	3.14	30	
2-Methylnaphthalene	0.261	0.001	0.010	ug/L	0.300		87.0	37-120	3.28	30	
1-Methylnaphthalene	0.259	0.0009	0.010	ug/L	0.300		86.2	29-120	2.87	30	
Acenaphthylene	0.267	0.002	0.010	ug/L	0.300		89.0	41-120	0.54	30	
Acenaphthene	0.271	0.003	0.010	ug/L	0.300		90.4	41-120	0.88	30	
Dibenzofuran	0.254	0.002	0.010	ug/L	0.300		84.8	38-120	0.83	30	
Fluorene	0.268	0.002	0.010	ug/L	0.300		89.4	43-120	1.22	30	
Phenanthrene	0.271	0.001	0.010	ug/L	0.300		90.3	41-120	3.54	30	
Anthracene	0.271	0.001	0.010	ug/L	0.300		90.5	40-120	4.74	30	
Carbazole	0.277	0.001	0.010	ug/L	0.300		92.2	30-160	4.01	30	
Fluoranthene	0.281	0.002	0.010	ug/L	0.300		93.6	45-120	3.25	30	
Pyrene	0.275	0.001	0.010	ug/L	0.300		91.6	41-120	2.70	30	
Benzo(a)anthracene	0.277	0.0008	0.010	ug/L	0.300		92.2	42-120	2.33	30	
Chrysene	0.268	0.0009	0.010	ug/L	0.300		89.4	44-120	4.63	30	


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 03-Dec-2021 19:31

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - SIM - Quality Control
Batch BJK0539 - EPA 3510C SepF

Instrument: NT11 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BJK0539-BS1)						Prepared: 23-Nov-2021 Analyzed: 27-Nov-2021 09:39					
Benzo(b)fluoranthene	0.244	0.0005	0.010	ug/L	0.300		81.4	44-120	2.61	30	
Benzo(k)fluoranthene	0.266	0.003	0.010	ug/L	0.300		88.6	50-120	5.59	30	
Benzo(j)fluoranthene	0.283	0.002	0.010	ug/L	0.300		94.3	39-160	4.93	30	
Benzo(a)fluoranthene, Total	0.793	0.004	0.010	ug/L	0.900		88.1	46-120	4.43	30	
Benzo(a)pyrene	0.258	0.002	0.010	ug/L	0.300		85.9	35-120	3.44	30	
Perylene	0.243	0.006	0.010	ug/L	0.300		81.1	30-160	3.19	30	
Indeno(1,2,3-cd)pyrene	0.239	0.001	0.010	ug/L	0.300		79.6	37-120	5.87	30	
Dibenzo(a,h)anthracene	0.230	0.001	0.010	ug/L	0.300		76.5	34-120	2.90	30	
Benzo(g,h,i)perylene	0.204	0.001	0.010	ug/L	0.300		68.1	38-120	6.73	30	
Surrogate: 2-Methylnaphthalene-d10	0.273			ug/L	0.300		91.1	42-120			
Surrogate: Dibenzo[a,h]anthracene-d14	0.220			ug/L	0.300		73.2	29-120			
Surrogate: Fluoranthene-d10	0.291			ug/L	0.300		97.1	57-120			


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 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 03-Dec-2021 19:31

Analysis by: Analytical Resources, LLC
Petroleum Hydrocarbons - Quality Control
Batch BJK0537 - EPA 3510C SepF

Instrument: FID4 Analyst: TWC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0537-BLK1)									
				Prepared: 22-Nov-2021 Analyzed: 27-Nov-2021 00:37					
Diesel Range Organics (C12-C24)	ND	0.100	mg/L						U
Motor Oil Range Organics (C24-C38)	ND	0.200	mg/L						U
<i>Surrogate: o-Terphenyl</i>	0.199		mg/L	0.225	88.5	50-150			
LCS (BJK0537-BS1)									
				Prepared: 22-Nov-2021 Analyzed: 27-Nov-2021 00:56					
Diesel Range Organics (C12-C24)	2.22	0.100	mg/L	3.00	74.0	56-120			
<i>Surrogate: o-Terphenyl</i>	0.186		mg/L	0.225	82.7	50-150			
LCS Dup (BJK0537-BSD1)									
				Prepared: 22-Nov-2021 Analyzed: 27-Nov-2021 01:16					
Diesel Range Organics (C12-C24)	2.63	0.100	mg/L	3.00	87.7	56-120	16.90	30	
<i>Surrogate: o-Terphenyl</i>	0.223		mg/L	0.225	99.0	50-150			



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
03-Dec-2021 19:31

Analysis by: Analytical Resources, LLC

Aroclor PCB - Quality Control

Batch BJK0538 - EPA 3510C SepF

Instrument: ECD7 Analyst: JGR/TWC

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0538-BLK1)						Prepared: 23-Nov-2021 Analyzed: 30-Nov-2021 20:07					
Aroclor 1016	ND	0.002	0.010	ug/L							U
Aroclor 1221	ND	0.002	0.010	ug/L							U
Aroclor 1232	ND	0.002	0.010	ug/L							U
Aroclor 1242	ND	0.002	0.010	ug/L							U
Aroclor 1248	ND	0.002	0.010	ug/L							U
Aroclor 1254	ND	0.002	0.010	ug/L							U
Aroclor 1260	ND	0.003	0.010	ug/L							U
Aroclor 1262	ND	0.003	0.010	ug/L							U
Aroclor 1268	ND	0.003	0.010	ug/L							U
Surrogate: Decachlorobiphenyl	0.0135			ug/L	0.0200		67.7	29-120			
Surrogate: Tetrachlorometaxylene	0.0136			ug/L	0.0200		68.2	32-120			
Surrogate: Decachlorobiphenyl [2C]	0.0139			ug/L	0.0200		69.5	29-120			
Surrogate: Tetrachlorometaxylene [2C]	0.0156			ug/L	0.0200		77.8	32-120			
LCS (BJK0538-BS1)						Prepared: 23-Nov-2021 Analyzed: 30-Nov-2021 20:28					
Aroclor 1016	0.047	0.002	0.010	ug/L	0.0500		93.2	54-120			
Aroclor 1260	0.043	0.003	0.010	ug/L	0.0500		85.5	51-128			
Surrogate: Decachlorobiphenyl	0.0144			ug/L	0.0200		72.1	29-120			
Surrogate: Tetrachlorometaxylene	0.0157			ug/L	0.0200		78.5	32-120			
Surrogate: Decachlorobiphenyl [2C]	0.0148			ug/L	0.0200		73.9	29-120			
Surrogate: Tetrachlorometaxylene [2C]	0.0154			ug/L	0.0200		77.0	32-120			
LCS Dup (BJK0538-BSD1)						Prepared: 23-Nov-2021 Analyzed: 30-Nov-2021 20:49					
Aroclor 1016 [2C]	0.046	0.002	0.010	ug/L	0.0500		91.4	54-120	1.62	30	
Aroclor 1260	0.041	0.003	0.010	ug/L	0.0500		82.2	51-128	3.88	30	
Surrogate: Decachlorobiphenyl	0.0141			ug/L	0.0200		70.5	29-120			
Surrogate: Tetrachlorometaxylene	0.0155			ug/L	0.0200		77.5	32-120			
Surrogate: Decachlorobiphenyl [2C]	0.0141			ug/L	0.0200		70.4	29-120			
Surrogate: Tetrachlorometaxylene [2C]	0.0156			ug/L	0.0200		78.2	32-120			


 Shannon & Wilson, Inc
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 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 03-Dec-2021 19:31

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds - Quality Control
Batch BJK0611 - TWM EPA 7470A

Instrument: HYDRA Analyst: ML

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0611-BLK1)						Prepared: 23-Nov-2021	Analyzed: 23-Nov-2021 15:21				
Mercury	ND	0.000013	0.000100	mg/L							U
LCS (BJK0611-BS1)						Prepared: 23-Nov-2021	Analyzed: 23-Nov-2021 15:23				
Mercury	0.00187	0.000013	0.000100	mg/L	0.00200		93.7	80-120			
Duplicate (BJK0611-DUP1)						Source: 21K0284-08	Prepared: 23-Nov-2021	Analyzed: 23-Nov-2021 15:28			
Mercury	ND	0.000013	0.000100	mg/L		ND					U
Matrix Spike (BJK0611-MS1)						Source: 21K0284-08	Prepared: 23-Nov-2021	Analyzed: 23-Nov-2021 15:30			
Mercury	0.000948	0.000013	0.000100	mg/L	0.00100	ND	94.8	75-125			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Matrix Spike Dup (BJK0611-MSD1)						Source: 21K0284-08	Prepared: 23-Nov-2021	Analyzed: 23-Nov-2021 15:37			
Mercury	0.000883	0.000013	0.000100	mg/L	0.00100	ND	88.3	75-125	7.09	20	
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
03-Dec-2021 19:31

Analysis by: Analytical Resources, LLC

Metals and Metallic Compounds - Quality Control

Batch BJK0731 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0731-BLK1)						Prepared: 30-Nov-2021 Analyzed: 30-Nov-2021 18:56						
Barium	135	ND	0.114	0.500	ug/L							U
Barium	137	ND	0.0765	0.500	ug/L							U
Iron	54	ND	18.2	36.0	ug/L							U
Iron	57	ND	6.63	36.0	ug/L							U
Lead	208	ND	0.0513	0.100	ug/L							U
Manganese	55	ND	0.142	0.500	ug/L							U
Silver	107	ND	0.0220	0.200	ug/L							U
Vanadium	51a	ND	0.0556	0.200	ug/L							U
Vanadium	51b	ND	0.0521	0.200	ug/L							U
Arsenic	75a	ND	0.0373	0.200	ug/L							U
Cadmium	111	ND	0.0300	0.100	ug/L							U
Cadmium	114	ND	0.0400	0.100	ug/L							U
Cobalt	59	ND	0.0178	0.200	ug/L							U
Copper	63	ND	0.173	0.500	ug/L							U
Copper	65	ND	0.350	0.500	ug/L							U
Nickel	60	ND	0.0792	0.500	ug/L							U
Nickel	62	ND	0.220	0.500	ug/L							U
Selenium	78	ND	0.179	0.500	ug/L							U
Zinc	66	ND	2.92	6.00	ug/L							U
Zinc	67	ND	0.940	6.00	ug/L							U
Blank (BJK0731-BLK2)						Prepared: 30-Nov-2021 Analyzed: 01-Dec-2021 18:53						
Chromium	52	ND	0.260	0.500	ug/L							U
Chromium	53	ND	0.239	0.500	ug/L							U
LCS (BJK0731-BS1)						Prepared: 30-Nov-2021 Analyzed: 30-Nov-2021 19:01						
Barium	135	24.0	0.114	0.500	ug/L	25.0		95.9	80-120			
Barium	137	24.0	0.0765	0.500	ug/L	25.0		96.0	80-120			
Iron	54	4970	18.2	36.0	ug/L	5000		99.5	80-120			
Iron	57	5040	6.63	36.0	ug/L	5000		101	80-120			
Lead	208	26.0	0.0513	0.100	ug/L	25.0		104	80-120			
Manganese	55	24.4	0.142	0.500	ug/L	25.0		97.6	80-120			
Silver	107	26.1	0.0220	0.200	ug/L	25.0		104	80-120			
Vanadium	51a	24.4	0.0556	0.200	ug/L	25.0		97.7	80-120			
Vanadium	51b	24.4	0.0521	0.200	ug/L	25.0		97.7	80-120			



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
03-Dec-2021 19:31

Analysis by: Analytical Resources, LLC

Metals and Metallic Compounds - Quality Control

Batch BJK0731 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJK0731-BS1)						Prepared: 30-Nov-2021 Analyzed: 30-Nov-2021 19:01						
Arsenic	75a	25.5	0.0373	0.200	ug/L	25.0		102	80-120			
Cadmium	111	25.3	0.0300	0.100	ug/L	25.0		101	80-120			
Cadmium	114	26.2	0.0400	0.100	ug/L	25.0		105	80-120			
Cobalt	59	25.9	0.0178	0.200	ug/L	25.0		104	80-120			
Copper	63	26.1	0.173	0.500	ug/L	25.0		104	80-120			
Copper	65	26.4	0.350	0.500	ug/L	25.0		106	80-120			
Nickel	60	26.4	0.0792	0.500	ug/L	25.0		106	80-120			
Nickel	62	27.2	0.220	0.500	ug/L	25.0		109	80-120			
Selenium	78	82.1	0.179	0.500	ug/L	80.0		103	80-120			
Zinc	66	86.0	2.92	6.00	ug/L	80.0		107	80-120			
Zinc	67	80.7	0.940	6.00	ug/L	80.0		101	80-120			
LCS (BJK0731-BS2)						Prepared: 30-Nov-2021 Analyzed: 01-Dec-2021 18:57						
Chromium	52	25.9	0.260	0.500	ug/L	25.0		103	80-120			
Chromium	53	26.7	0.239	0.500	ug/L	25.0		107	80-120			
Duplicate (BJK0731-DUP1)						Source: 21K0284-08 Prepared: 30-Nov-2021 Analyzed: 30-Nov-2021 20:09						
Barium	135	ND	0.114	0.500	ug/L		ND					U
Iron	54	ND	18.2	36.0	ug/L		ND					U
Manganese	55	ND	0.142	0.500	ug/L		ND					U
Vanadium	51a	ND	0.0556	0.200	ug/L		ND					U
Arsenic	75a	ND	0.0373	0.200	ug/L		ND					U
Cadmium	111	ND	0.0300	0.100	ug/L		ND					U
Cobalt	59	ND	0.0178	0.200	ug/L		ND					U
Copper	63	0.638	0.173	0.500	ug/L		0.206			102.00	20	L
Nickel	60	ND	0.0792	0.500	ug/L		ND					U
Selenium	78	ND	0.179	0.500	ug/L		0.300					U
Zinc	66	ND	2.92	6.00	ug/L		ND					U
Duplicate (BJK0731-DUP2)						Source: 21K0284-08 Prepared: 30-Nov-2021 Analyzed: 01-Dec-2021 21:39						
Chromium	52	ND	0.260	0.500	ug/L		ND					U
Lead	208	ND	0.0513	0.100	ug/L		ND					U
Silver	107	ND	0.0220	0.200	ug/L		ND					U
Matrix Spike (BJK0731-MS1)						Source: 21K0284-08 Prepared: 30-Nov-2021 Analyzed: 30-Nov-2021 20:14						
Barium	135	24.7	0.114	0.500	ug/L	25.0	ND	99.0	75-125			



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
03-Dec-2021 19:31

Analysis by: Analytical Resources, LLC

Metals and Metallic Compounds - Quality Control

Batch BJK0731 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike (BJK0731-MS1)		Source: 21K0284-08		Prepared: 30-Nov-2021		Analyzed: 30-Nov-2021 20:14						
Iron	54	5120	18.2	36.0	ug/L	5000	ND	102	75-125			
Manganese	55	24.7	0.142	0.500	ug/L	25.0	ND	98.7	75-125			
Vanadium	51a	25.3	0.0556	0.200	ug/L	25.0	ND	101	75-125			
Arsenic	75a	24.9	0.0373	0.200	ug/L	25.0	ND	99.5	75-125			
Cadmium	111	24.6	0.0300	0.100	ug/L	25.0	ND	98.2	75-125			
Cobalt	59	25.6	0.0178	0.200	ug/L	25.0	ND	102	75-125			
Copper	63	25.7	0.173	0.500	ug/L	25.0	0.206	102	75-125			
Nickel	60	25.8	0.0792	0.500	ug/L	25.0	ND	103	75-125			
Selenium	78	78.3	0.179	0.500	ug/L	80.0	0.300	97.5	75-125			
Zinc	66	81.8	2.92	6.00	ug/L	80.0	ND	102	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike (BJK0731-MS2)		Source: 21K0284-08		Prepared: 30-Nov-2021		Analyzed: 01-Dec-2021 21:44						
Chromium	52	26.4	0.260	0.500	ug/L	25.0	ND	106	75-125			
Lead	208	26.0	0.0513	0.100	ug/L	25.0	ND	104	75-125			
Silver	107	23.4	0.0220	0.200	ug/L	25.0	ND	93.6	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BJK0731-MSD1)		Source: 21K0284-08		Prepared: 30-Nov-2021		Analyzed: 30-Nov-2021 20:19						
Barium	135	24.2	0.114	0.500	ug/L	25.0	ND	96.7	75-125	2.34	20	
Iron	54	5070	18.2	36.0	ug/L	5000	ND	101	75-125	1.12	20	
Manganese	55	24.7	0.142	0.500	ug/L	25.0	ND	98.8	75-125	0.13	20	
Vanadium	51a	25.2	0.0556	0.200	ug/L	25.0	ND	101	75-125	0.35	20	
Arsenic	75a	25.4	0.0373	0.200	ug/L	25.0	ND	102	75-125	2.15	20	
Cadmium	111	25.2	0.0300	0.100	ug/L	25.0	ND	101	75-125	2.71	20	
Cobalt	59	25.6	0.0178	0.200	ug/L	25.0	ND	103	75-125	0.32	20	
Copper	63	25.8	0.173	0.500	ug/L	25.0	0.206	102	75-125	0.27	20	
Nickel	60	26.2	0.0792	0.500	ug/L	25.0	ND	105	75-125	1.58	20	
Selenium	78	78.4	0.179	0.500	ug/L	80.0	0.300	97.6	75-125	0.06	20	
Zinc	66	83.4	2.92	6.00	ug/L	80.0	ND	104	75-125	1.93	20	

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BJK0731-MSD2)		Source: 21K0284-08		Prepared: 30-Nov-2021		Analyzed: 01-Dec-2021 21:48						
Chromium	52	26.9	0.260	0.500	ug/L	25.0	ND	107	75-125	1.74	20	
Lead	208	25.6	0.0513	0.100	ug/L	25.0	ND	102	75-125	1.57	20	



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
03-Dec-2021 19:31

Analysis by: Analytical Resources, LLC

Metals and Metallic Compounds - Quality Control

Batch BJK0731 - REN EPA 600/4-79-020 4.1.4 HNO₃ matrix

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (BJK0731-MSD2)			Source: 21K0284-08			Prepared: 30-Nov-2021			Analyzed: 01-Dec-2021 21:48			
Silver	107	23.1	0.0220	0.200	ug/L	25.0	ND	92.3	75-125	1.43	20	

Recovery limits for target analytes in MS/MSD QC samples are advisory only.


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 03-Dec-2021 19:31

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds (dissolved) - Quality Control
Batch BJK0487 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0487-BLK1)						Prepared: 18-Nov-2021 Analyzed: 19-Nov-2021 18:01						
Barium, Dissolved	135	ND	0.114	0.500	ug/L							U
Barium, Dissolved	137	ND	0.0765	0.500	ug/L							U
Chromium, Dissolved	52	ND	0.260	0.500	ug/L							U
Chromium, Dissolved	53	ND	0.239	0.500	ug/L							U
Lead, Dissolved	208	ND	0.0513	0.100	ug/L							U
Silver, Dissolved	107	ND	0.0220	0.200	ug/L							U
Arsenic, Dissolved	75a	ND	0.0373	0.200	ug/L							U
Cadmium, Dissolved	111	ND	0.0300	0.100	ug/L							U
Cadmium, Dissolved	114	ND	0.0400	0.100	ug/L							U
Cobalt, Dissolved	59	ND	0.0178	0.200	ug/L							U
Copper, Dissolved	63	ND	0.173	0.500	ug/L							U
Copper, Dissolved	65	ND	0.350	0.500	ug/L							U
Nickel, Dissolved	60	ND	0.0792	0.500	ug/L							U
Nickel, Dissolved	62	ND	0.220	0.500	ug/L							U
Selenium, Dissolved	78	ND	0.179	0.500	ug/L							U
Zinc, Dissolved	66	ND	2.92	6.00	ug/L							U
Zinc, Dissolved	67	ND	0.940	6.00	ug/L							U
Blank (BJK0487-BLK3)						Prepared: 18-Nov-2021 Analyzed: 23-Nov-2021 17:57						
Iron, Dissolved	54	ND	18.2	36.0	ug/L							U
Iron, Dissolved	57	ND	18.2	36.0	ug/L							U
Manganese, Dissolved	55	ND	0.142	0.500	ug/L							U
LCS (BJK0487-BS1)						Prepared: 18-Nov-2021 Analyzed: 19-Nov-2021 18:06						
Barium, Dissolved	135	22.3	0.114	0.500	ug/L	25.0		89.3	80-120			
Barium, Dissolved	137	22.4	0.0765	0.500	ug/L	25.0		89.7	80-120			
Chromium, Dissolved	52	23.3	0.260	0.500	ug/L	25.0		93.0	80-120			
Chromium, Dissolved	53	23.1	0.239	0.500	ug/L	25.0		92.2	80-120			
Lead, Dissolved	208	23.5	0.0513	0.100	ug/L	25.0		94.2	80-120			
Silver, Dissolved	107	24.3	0.0220	0.200	ug/L	25.0		97.1	80-120			
Arsenic, Dissolved	75a	22.6	0.0373	0.200	ug/L	25.0		90.6	80-120			
Cadmium, Dissolved	111	22.6	0.0300	0.100	ug/L	25.0		90.4	80-120			
Cadmium, Dissolved	114	22.5	0.0400	0.100	ug/L	25.0		90.1	80-120			
Cobalt, Dissolved	59	23.5	0.0178	0.200	ug/L	25.0		94.2	80-120			
Copper, Dissolved	63	23.9	0.173	0.500	ug/L	25.0		95.6	80-120			


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 03-Dec-2021 19:31

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds (dissolved) - Quality Control
Batch BJK0487 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJK0487-BS1)						Prepared: 18-Nov-2021 Analyzed: 19-Nov-2021 18:06						
Copper, Dissolved	65	24.0	0.350	0.500	ug/L	25.0		96.1	80-120			
Nickel, Dissolved	60	23.5	0.0792	0.500	ug/L	25.0		94.0	80-120			
Nickel, Dissolved	62	23.2	0.220	0.500	ug/L	25.0		92.9	80-120			
Selenium, Dissolved	78	70.3	0.179	0.500	ug/L	80.0		87.9	80-120			
Zinc, Dissolved	66	74.5	2.92	6.00	ug/L	80.0		93.1	80-120			
Zinc, Dissolved	67	69.5	0.940	6.00	ug/L	80.0		86.9	80-120			
LCS (BJK0487-BS3)						Prepared: 18-Nov-2021 Analyzed: 23-Nov-2021 18:02						
Iron, Dissolved	54	5140	18.2	36.0	ug/L	5000		103	80-120			
Iron, Dissolved	57	5220	18.2	36.0	ug/L	5000		104	80-120			
Manganese, Dissolved	55	24.9	0.142	0.500	ug/L	25.0		99.4	80-120			
Duplicate (BJK0487-DUP1)						Source: 21K0284-09 Prepared: 18-Nov-2021 Analyzed: 19-Nov-2021 19:41						
Barium, Dissolved	135	ND	0.114	0.500	ug/L		ND					U
Chromium, Dissolved	52	ND	0.260	0.500	ug/L		ND					U
Lead, Dissolved	208	ND	0.0513	0.100	ug/L		ND					U
Silver, Dissolved	107	ND	0.0220	0.200	ug/L		ND					U
Arsenic, Dissolved	75a	ND	0.0373	0.200	ug/L		ND					U
Cadmium, Dissolved	111	ND	0.0300	0.100	ug/L		ND					U
Cobalt, Dissolved	59	ND	0.0178	0.200	ug/L		ND					U
Copper, Dissolved	63	ND	0.173	0.500	ug/L		ND					U
Nickel, Dissolved	60	ND	0.0792	0.500	ug/L		ND					U
Selenium, Dissolved	78	ND	0.179	0.500	ug/L		ND					U
Zinc, Dissolved	66	ND	2.92	6.00	ug/L		ND					U
Duplicate (BJK0487-DUP3)						Source: 21K0284-09 Prepared: 18-Nov-2021 Analyzed: 30-Nov-2021 00:40						
Iron, Dissolved	54	ND	18.2	36.0	ug/L		ND					U
Manganese, Dissolved	55	ND	0.142	0.500	ug/L		ND					U
Matrix Spike (BJK0487-MS1)						Source: 21K0284-09 Prepared: 18-Nov-2021 Analyzed: 19-Nov-2021 19:45						
Barium, Dissolved	135	22.5	0.114	0.500	ug/L	25.0	ND	90.1	75-125			
Chromium, Dissolved	52	22.8	0.260	0.500	ug/L	25.0	ND	91.0	75-125			
Lead, Dissolved	208	23.7	0.0513	0.100	ug/L	25.0	ND	94.7	75-125			
Silver, Dissolved	107	25.2	0.0220	0.200	ug/L	25.0	ND	101	75-125			
Arsenic, Dissolved	75a	23.8	0.0373	0.200	ug/L	25.0	ND	95.4	75-125			
Cadmium, Dissolved	111	23.0	0.0300	0.100	ug/L	25.0	ND	92.1	75-125			


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 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 03-Dec-2021 19:31

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds (dissolved) - Quality Control
Batch BJK0487 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike (BJK0487-MS1)		Source: 21K0284-09		Prepared: 18-Nov-2021		Analyzed: 19-Nov-2021 19:45						
Cobalt, Dissolved	59	24.4	0.0178	0.200	ug/L	25.0	ND	97.5	75-125			
Copper, Dissolved	63	25.2	0.173	0.500	ug/L	25.0	ND	101	75-125			
Nickel, Dissolved	60	24.4	0.0792	0.500	ug/L	25.0	ND	97.5	75-125			
Selenium, Dissolved	78	73.1	0.179	0.500	ug/L	80.0	ND	91.3	75-125			
Zinc, Dissolved	66	77.7	2.92	6.00	ug/L	80.0	ND	97.1	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike (BJK0487-MS3)		Source: 21K0284-09		Prepared: 18-Nov-2021		Analyzed: 30-Nov-2021 00:45						
Iron, Dissolved	54	5090	18.2	36.0	ug/L	5000	ND	102	75-125			
Manganese, Dissolved	55	24.1	0.142	0.500	ug/L	25.0	ND	96.4	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BJK0487-MSD1)		Source: 21K0284-09		Prepared: 18-Nov-2021		Analyzed: 19-Nov-2021 19:49						
Barium, Dissolved	135	23.1	0.114	0.500	ug/L	25.0	ND	92.4	75-125	2.52	20	
Chromium, Dissolved	52	23.7	0.260	0.500	ug/L	25.0	ND	94.9	75-125	4.12	20	
Lead, Dissolved	208	24.4	0.0513	0.100	ug/L	25.0	ND	97.6	75-125	2.97	20	
Silver, Dissolved	107	25.2	0.0220	0.200	ug/L	25.0	ND	101	75-125	0.13	20	
Arsenic, Dissolved	75a	23.6	0.0373	0.200	ug/L	25.0	ND	94.4	75-125	1.00	20	
Cadmium, Dissolved	111	23.9	0.0300	0.100	ug/L	25.0	ND	95.7	75-125	3.74	20	
Cobalt, Dissolved	59	24.7	0.0178	0.200	ug/L	25.0	ND	98.6	75-125	1.15	20	
Copper, Dissolved	63	25.0	0.173	0.500	ug/L	25.0	ND	100	75-125	0.87	20	
Nickel, Dissolved	60	24.9	0.0792	0.500	ug/L	25.0	ND	99.6	75-125	2.20	20	
Selenium, Dissolved	78	72.9	0.179	0.500	ug/L	80.0	ND	91.1	75-125	0.26	20	
Zinc, Dissolved	66	78.1	2.92	6.00	ug/L	80.0	ND	97.6	75-125	0.55	20	

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BJK0487-MSD3)		Source: 21K0284-09		Prepared: 18-Nov-2021		Analyzed: 30-Nov-2021 00:50						
Iron, Dissolved	54	5100	18.2	36.0	ug/L	5000	ND	102	75-125	0.17	20	
Manganese, Dissolved	55	23.8	0.142	0.500	ug/L	25.0	ND	95.1	75-125	1.37	20	

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Instrument: ICPMS2 Analyst: SKD

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 03-Dec-2021 19:31

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds (dissolved) - Quality Control
Batch BJK0487 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: SKD

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0487-BLK2)						Prepared: 18-Nov-2021 Analyzed: 22-Nov-2021 20:29						
Vanadium, Dissolved	51a	ND	0.0556	0.200	ug/L							U
Vanadium, Dissolved	51b	ND	0.0521	0.200	ug/L							U
LCS (BJK0487-BS2)						Prepared: 18-Nov-2021 Analyzed: 22-Nov-2021 20:34						
Vanadium, Dissolved	51a	23.1	0.0556	0.200	ug/L	25.0		92.5	80-120			
Vanadium, Dissolved	51b	23.4	0.0521	0.200	ug/L	25.0		93.7	80-120			
Duplicate (BJK0487-DUP2)						Source: 21K0284-09 Prepared: 18-Nov-2021 Analyzed: 22-Nov-2021 22:08						
Vanadium, Dissolved	51a	ND	0.0556	0.200	ug/L		0.0930					U
Matrix Spike (BJK0487-MS2)						Source: 21K0284-09 Prepared: 18-Nov-2021 Analyzed: 22-Nov-2021 22:13						
Vanadium, Dissolved	51a	22.9	0.0556	0.200	ug/L	25.0	0.0930	91.1	75-125			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.												
Matrix Spike Dup (BJK0487-MSD2)						Source: 21K0284-09 Prepared: 18-Nov-2021 Analyzed: 22-Nov-2021 22:18						
Vanadium, Dissolved	51a	23.1	0.0556	0.200	ug/L	25.0	0.0930	91.9	75-125	0.85	20	
Recovery limits for target analytes in MS/MSD QC samples are advisory only.												


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 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 03-Dec-2021 19:31

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds (dissolved) - Quality Control
Batch BJL0027 - TWM EPA 7470A

Instrument: HYDRA Analyst: SKD

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJL0027-BLK1)						Prepared: 01-Dec-2021 Analyzed: 02-Dec-2021 16:18					
Mercury, Dissolved	ND	0.000013	0.000100	mg/L							U
LCS (BJL0027-BS1)						Prepared: 01-Dec-2021 Analyzed: 02-Dec-2021 16:21					
Mercury, Dissolved	0.00208	0.000013	0.000100	mg/L	0.00200		104	80-120			
Duplicate (BJL0027-DUP1)						Source: 21K0284-04 Prepared: 01-Dec-2021 Analyzed: 02-Dec-2021 17:04					
Mercury, Dissolved	0.000018	0.000013	0.000100	mg/L		0.000018			2.23	20	J
Matrix Spike (BJL0027-MS1)						Source: 21K0284-04 Prepared: 01-Dec-2021 Analyzed: 02-Dec-2021 17:06					
Mercury, Dissolved	0.00122	0.000013	0.000100	mg/L	0.00100	0.000018	120	75-125			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Matrix Spike Dup (BJL0027-MSD1)						Source: 21K0284-04 Prepared: 01-Dec-2021 Analyzed: 02-Dec-2021 17:09					
Mercury, Dissolved	0.00123	0.000013	0.000100	mg/L	0.00100	0.000018	121	75-125	0.47	20	
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
03-Dec-2021 19:31

Certified Analyses included in this Report

Analyte	Certifications
EPA 6020B in Water	
Silver-107	WADOE,WA-DW,DoD-ELAP,NELAP
Barium-135	NELAP,WADOE,DoD-ELAP,ADEC
Barium-137	NELAP,WADOE,DoD-ELAP,ADEC
Chromium-52	NELAP,WADOE,DoD-ELAP,ADEC
Chromium-53	NELAP,WADOE,DoD-ELAP,ADEC
Iron-54	NELAP,WADOE,DoD-ELAP
Iron-57	NELAP,WADOE,DoD-ELAP
Manganese-55	NELAP,WADOE,DoD-ELAP
Lead-208	NELAP,WADOE,DoD-ELAP,ADEC
Vanadium-51a	NELAP,DoD-ELAP,WADOE,ADEC
Vanadium-51b	NELAP,DoD-ELAP,WADOE,ADEC
Silver-107	WA-DW,DoD-ELAP,NELAP
Barium-135	NELAP,WADOE,DoD-ELAP,ADEC
Barium-137	NELAP,WADOE,DoD-ELAP,ADEC
Chromium-52	NELAP,WADOE,DoD-ELAP,ADEC
Chromium-53	NELAP,WADOE,DoD-ELAP,ADEC
Iron-54	NELAP,WADOE,DoD-ELAP
Iron-57	NELAP,WADOE,DoD-ELAP
Manganese-55	NELAP,WADOE,DoD-ELAP
Lead-208	NELAP,WADOE,DoD-ELAP,ADEC
Vanadium-51a	NELAP,DoD-ELAP,WADOE,ADEC
Vanadium-51b	NELAP,DoD-ELAP,WADOE,ADEC
EPA 6020B UCT-KED in Water	
Arsenic-75a	WADOE,WA-DW,DoD-ELAP,ADEC,NELAP
Cadmium-111	NELAP,WADOE,DoD-ELAP,ADEC
Cadmium-114	NELAP,WADOE,DoD-ELAP,ADEC
Cobalt-59	NELAP,DoD-ELAP,WADOE
Copper-63	NELAP,WADOE,DoD-ELAP
Copper-65	NELAP,WADOE,DoD-ELAP
Nickel-60	NELAP,WADOE,DoD-ELAP,ADEC
Nickel-62	NELAP,WADOE,DoD-ELAP,ADEC
Selenium-78	NELAP,WADOE,DoD-ELAP
Zinc-66	WADOE,WA-DW,DoD-ELAP
Zinc-67	WADOE,WA-DW,DoD-ELAP
Arsenic-75a	NELAP,WADOE,DoD-ELAP,ADEC


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Cadmium-111	NELAP,WADOE,DoD-ELAP,ADEC
Cadmium-114	NELAP,WADOE,DoD-ELAP,ADEC
Cobalt-59	DoD-ELAP,NELAP,WADOE
Copper-63	NELAP,WADOE,DoD-ELAP
Copper-65	NELAP,WADOE,DoD-ELAP
Nickel-60	NELAP,WADOE,DoD-ELAP,ADEC
Nickel-62	NELAP,WADOE,DoD-ELAP,ADEC
Selenium-78	NELAP,WADOE,DoD-ELAP
Zinc-66	NELAP,WADOE,DoD-ELAP
Zinc-67	NELAP,WADOE,DoD-ELAP

EPA 7470A in Water

Mercury	WADOE,NELAP,DoD-ELAP
Mercury	WADOE,NELAP,DoD-ELAP

EPA 8082A in Water

Aroclor 1016	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1016 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1221	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1221 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1232	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1232 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1242	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1242 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1248	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1248 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1254	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1254 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1260	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1260 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1262	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1262 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1268	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1268 [2C]	WADOE,DoD-ELAP,NELAP,ADEC

EPA 8260D in Water

Chloromethane	DoD-ELAP,ADEC,NELAP,WADOE
Vinyl Chloride	DoD-ELAP,ADEC,NELAP,WADOE
Bromomethane	DoD-ELAP,ADEC,NELAP,WADOE
Chloroethane	DoD-ELAP,ADEC,NELAP,WADOE
Trichlorofluoromethane	DoD-ELAP,ADEC,NELAP,WADOE


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Project: Lower Duwamish Q4

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Acrolein	DoD-ELAP,NELAP,WADOE
1,1,2-Trichloro-1,2,2-Trifluoroethane	DoD-ELAP,ADEC,NELAP,WADOE
Acetone	DoD-ELAP,ADEC,NELAP,WADOE
1,1-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Iodomethane	DoD-ELAP,NELAP,WADOE
Methylene Chloride	DoD-ELAP,ADEC,NELAP,WADOE
Acrylonitrile	DoD-ELAP,NELAP,WADOE
Carbon Disulfide	DoD-ELAP,NELAP,WADOE
trans-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Vinyl Acetate	DoD-ELAP,NELAP,WADOE
1,1-Dichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
2-Butanone	DoD-ELAP,NELAP,WADOE
2,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
cis-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Chloroform	DoD-ELAP,ADEC,NELAP,WADOE
Bromochloromethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1,1-Trichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
Carbon tetrachloride	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
Benzene	DoD-ELAP,ADEC,NELAP,WADOE
Trichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
Bromodichloromethane	DoD-ELAP,ADEC,NELAP,WADOE
Dibromomethane	DoD-ELAP,ADEC,NELAP,WADOE
2-Chloroethyl vinyl ether	DoD-ELAP,ADEC,NELAP,WADOE
4-Methyl-2-Pentanone	DoD-ELAP,NELAP,WADOE
cis-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
Toluene	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
2-Hexanone	DoD-ELAP,NELAP,WADOE
1,1,2-Trichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,3-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
Tetrachloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Dibromochloromethane	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dibromoethane	DoD-ELAP,NELAP,WADOE
Chlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Ethylbenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,1,1,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,WADOE


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

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m,p-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
o-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
Styrene	DoD-ELAP,NELAP,WADOE
Bromoform	DoD-ELAP,NELAP,WADOE
1,1,2,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,2,3-Trichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,4-Dichloro 2-Butene	DoD-ELAP,ADEC,NELAP,WADOE
n-Propylbenzene	DoD-ELAP,NELAP,WADOE
Bromobenzene	DoD-ELAP,NELAP,WADOE
Isopropyl Benzene	DoD-ELAP,NELAP,WADOE
2-Chlorotoluene	DoD-ELAP,ADEC,NELAP,WADOE
4-Chlorotoluene	DoD-ELAP,ADEC,NELAP,WADOE
t-Butylbenzene	DoD-ELAP,NELAP,WADOE
1,3,5-Trimethylbenzene	DoD-ELAP,NELAP,WADOE
1,2,4-Trimethylbenzene	DoD-ELAP,NELAP,WADOE
s-Butylbenzene	DoD-ELAP,NELAP,WADOE
4-Isopropyl Toluene	DoD-ELAP,NELAP,WADOE
1,3-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,4-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
n-Butylbenzene	DoD-ELAP,NELAP,WADOE
1,2-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dibromo-3-chloropropane	DoD-ELAP,ADEC,NELAP,WADOE
1,2,4-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Hexachloro-1,3-Butadiene	DoD-ELAP,ADEC,NELAP,WADOE
Naphthalene	DoD-ELAP,ADEC,NELAP,WADOE
1,2,3-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Dichlorodifluoromethane	DoD-ELAP,ADEC,NELAP,WADOE
Methyl tert-butyl Ether	DoD-ELAP,ADEC,NELAP,WADOE
n-Hexane	WADOE
2-Pentanone	WADOE

EPA 8260D-SIM in Water

Acrylonitrile	NELAP,WADOE
Vinyl chloride	NELAP,WADOE
1,1-Dichloroethene	NELAP,WADOE
cis-1,2-Dichloroethene	NELAP,WADOE
trans-1,2-Dichloroethene	NELAP,WADOE
Trichloroethene	NELAP,WADOE
Tetrachloroethene	NELAP,WADOE
1,1,2,2-Tetrachloroethane	NELAP,WADOE


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1,2-Dichloroethane

NELAP,WADOE

Benzene

NELAP,WADOE

EPA 8270E in Water

Phenol

NELAP,DoD-ELAP

bis(2-chloroethyl) ether

NELAP,DoD-ELAP

2-Chlorophenol

NELAP,DoD-ELAP

1,3-Dichlorobenzene

NELAP,DoD-ELAP

1,4-Dichlorobenzene

NELAP,DoD-ELAP

1,2-Dichlorobenzene

NELAP,DoD-ELAP

Benzyl Alcohol

NELAP,DoD-ELAP

2,2'-Oxybis(1-chloropropane)

NELAP,DoD-ELAP

2-Methylphenol

NELAP,DoD-ELAP

Hexachloroethane

NELAP,DoD-ELAP

N-Nitroso-di-n-Propylamine

NELAP,DoD-ELAP

4-Methylphenol

NELAP,DoD-ELAP

Nitrobenzene

NELAP,DoD-ELAP

Isophorone

NELAP,DoD-ELAP

2-Nitrophenol

NELAP,DoD-ELAP

2,4-Dimethylphenol

NELAP,DoD-ELAP

Bis(2-Chloroethoxy)methane

NELAP,DoD-ELAP

2,4-Dichlorophenol

NELAP,DoD-ELAP

1,2,4-Trichlorobenzene

NELAP,DoD-ELAP

Naphthalene

NELAP,DoD-ELAP

Benzoic acid

NELAP,DoD-ELAP

4-Chloroaniline

NELAP,DoD-ELAP

Hexachlorobutadiene

NELAP,DoD-ELAP

4-Chloro-3-Methylphenol

NELAP,DoD-ELAP

2-Methylnaphthalene

NELAP,DoD-ELAP

Hexachlorocyclopentadiene

NELAP,DoD-ELAP

2,4,6-Trichlorophenol

NELAP,DoD-ELAP

2,4,5-Trichlorophenol

NELAP,DoD-ELAP

2-Chloronaphthalene

NELAP,DoD-ELAP

2-Nitroaniline

NELAP,DoD-ELAP

Acenaphthylene

NELAP,DoD-ELAP

Dimethylphthalate

NELAP,DoD-ELAP

2,6-Dinitrotoluene

NELAP,DoD-ELAP

Acenaphthene

NELAP,DoD-ELAP

3-Nitroaniline

NELAP,DoD-ELAP

2,4-Dinitrophenol

NELAP,DoD-ELAP


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Dibenzofuran	NELAP,DoD-ELAP
4-Nitrophenol	NELAP,DoD-ELAP
2,4-Dinitrotoluene	NELAP,DoD-ELAP
Fluorene	NELAP,DoD-ELAP
4-Chlorophenylphenyl ether	NELAP,DoD-ELAP
Diethyl phthalate	NELAP,DoD-ELAP
4-Nitroaniline	NELAP,DoD-ELAP
4,6-Dinitro-2-methylphenol	NELAP,DoD-ELAP
N-Nitrosodiphenylamine	NELAP,DoD-ELAP
4-Bromophenyl phenyl ether	NELAP,DoD-ELAP
Hexachlorobenzene	NELAP,DoD-ELAP
Pentachlorophenol	NELAP,DoD-ELAP
Phenanthrene	NELAP,DoD-ELAP
Anthracene	NELAP,DoD-ELAP
Carbazole	NELAP,DoD-ELAP
Di-n-Butylphthalate	NELAP,DoD-ELAP
Fluoranthene	NELAP,DoD-ELAP
Pyrene	NELAP,DoD-ELAP
Butylbenzylphthalate	NELAP,DoD-ELAP
Benzo(a)anthracene	NELAP,DoD-ELAP
3,3'-Dichlorobenzidine	NELAP,DoD-ELAP
Chrysene	NELAP,DoD-ELAP
bis(2-Ethylhexyl)phthalate	NELAP,DoD-ELAP
Di-n-Octylphthalate	NELAP,DoD-ELAP
Benzo(b)fluoranthene	NELAP,DoD-ELAP
Benzo(k)fluoranthene	NELAP,DoD-ELAP
Benzo(a)fluoranthene, Total	NELAP
Benzo(a)pyrene	NELAP,DoD-ELAP
Indeno(1,2,3-cd)pyrene	NELAP,DoD-ELAP
Dibenzo(a,h)anthracene	NELAP,DoD-ELAP
Benzo(g,h,i)perylene	NELAP,DoD-ELAP
N-Nitrosodimethylamine	NELAP,DoD-ELAP
1-Methylnaphthalene	NELAP,DoD-ELAP

EPA 8270E-SIM in Water

Naphthalene	ADEC,DoD-ELAP,NELAP,WADOE
2-Methylnaphthalene	ADEC,DoD-ELAP,NELAP
1-Methylnaphthalene	ADEC,DoD-ELAP,NELAP,WADOE
Biphenyl	NELAP
Acenaphthylene	ADEC,DoD-ELAP,NELAP,WADOE


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Acenaphthene	ADEC, DoD-ELAP, NELAP, WADOE
Dibenzofuran	ADEC, DoD-ELAP, NELAP
Fluorene	ADEC, DoD-ELAP, NELAP, WADOE
Phenanthrene	ADEC, DoD-ELAP, NELAP, WADOE
Anthracene	ADEC, DoD-ELAP, NELAP, WADOE
Carbazole	NELAP
Fluoranthene	ADEC, DoD-ELAP, NELAP, WADOE
Pyrene	ADEC, DoD-ELAP, NELAP, WADOE
Benzo(a)anthracene	ADEC, DoD-ELAP, NELAP, WADOE
Chrysene	ADEC, DoD-ELAP, NELAP, WADOE
Benzo(b)fluoranthene	ADEC, DoD-ELAP, NELAP, WADOE
Benzo(k)fluoranthene	ADEC, DoD-ELAP, NELAP, WADOE
Benzo(j)fluoranthene	ADEC, DoD-ELAP, NELAP, WADOE
Benzo(e)pyrene	NELAP
Benzo(a)pyrene	ADEC, DoD-ELAP, NELAP, WADOE
Perylene	ADEC, NELAP
Indeno(1,2,3-cd)pyrene	ADEC, DoD-ELAP, NELAP, WADOE
Dibenzo(a,h)anthracene	ADEC, DoD-ELAP, NELAP, WADOE
Benzo(g,h,i)perylene	ADEC, DoD-ELAP, NELAP, WADOE

NWTPH-Dx in Water

Diesel Range Organics (C12-C24)	DoD-ELAP, NELAP, WADOE
Diesel Range Organics (C10-C25)	DoD-ELAP, NELAP, WADOE
Diesel Range Organics (Tol-C18)	DoD-ELAP, NELAP, WADOE
Diesel Range Organics (C10-C24)	DoD-ELAP, NELAP, WADOE
Diesel Range Organics (C10-C28)	DoD-ELAP, NELAP, WADOE
Diesel Range Organics (C12-C22)	DoD-ELAP
Diesel Range Organics (C12-C25)	DoD-ELAP
Motor Oil Range Organics (C24-C38)	DoD-ELAP, NELAP, WADOE
Motor Oil Range Organics (C25-C36)	DoD-ELAP, NELAP, WADOE
Motor Oil Range Organics (C24-C40)	DoD-ELAP, NELAP, WADOE
Residual Range Organics (C23-C32)	DoD-ELAP
Mineral Spirits Range Organics (Tol-C12)	DoD-ELAP, NELAP, WADOE
Mineral Oil Range Organics (C16-C28)	DoD-ELAP, NELAP, WADOE
Kerosene Range Organics (Tol-C18)	DoD-ELAP, NELAP, WADOE
JP8 Range Organics (C8-C18)	DoD-ELAP, NELAP, WADOE
JP5 Range Organics (C10-C16)	DoD-ELAP, NELAP, WADOE
JP4 Range Organics (Tol-C14)	DoD-ELAP, NELAP, WADOE
Jet-A Range Organics (C10-C18)	DoD-ELAP, NELAP, WADOE
Creosote Range Organics (C12-C22)	DoD-ELAP, NELAP, WADOE


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Bunker C Range Organics (C10-C38)	DoD-ELAP,NELAP,WADOE
Stoddard Range Organics (C8-C12)	DoD-ELAP,NELAP,WADOE
Transformer Oil Range Organics (C12-C28)	DoD-ELAP,NELAP,WADOE

NWTPHg in Water

Gasoline Range Organics (Tol-Nap)	WADOE,DoD-ELAP
Gasoline Range Organics (2MP-TMB)	WADOE,DoD-ELAP
Gasoline Range Organics (Tol-C12)	WADOE,DoD-ELAP
Gasoline Range Organics (C6-C10)	WADOE,ADEC,DoD-ELAP
Gasoline Range Organics (C5-C12)	WADOE,DoD-ELAP

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	17-015	03/28/2023
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	02/28/2022
NELAP	ORELAP - Oregon Laboratory Accreditation Program	WA100006-012	05/12/2022
WADOE	WA Dept of Ecology	C558	06/30/2022
WA-DW	Ecology - Drinking Water	C558	06/30/2022



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Notes and Definitions

*	Flagged value is not within established control limits.
B	This analyte was detected in the method blank.
D	The reported value is from a dilution
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL)
J	Estimated concentration value detected below the reporting limit.
L	Analyte concentration is ≤ 5 times the reporting limit and the replicate control limit defaults to $\pm$ RL instead of 20% RPD
P1	The reported value is greater than 40% difference between the concentrations determined on two GC columns where applicable.
Q	Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria ($<20\%$ RSD, $<20\%$ drift or minimum RRF)
U	This analyte is not detected above the reporting limit (RL) or if noted, not detected above the limit of detection (LOD).
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
[2C]	Indicates this result was quantified on the second column on a dual column analysis.



Analytical Resources, LLC
Analytical Chemists and Consultants

14 December 2021

Meg Strong
Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle, WA 98103-8636

RE: Lower Duwamish Q4

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)
21K0303

Associated SDG ID(s)
N/A

Shelly
Fishel

Digitally signed
by Shelly Fishel
Date: 2021.12.14
14:00:26 -08'00'

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, LLC

Shelly Fishel, Project Manager

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



ARI Assigned Number: 21K0303		Turn-around Requested: standard		Page: 1 of 1		 Analytical Resources, Incorporated Analytical Chemists and Consultants 4611 South 134th Place, Suite 100 Tukwila, WA 98168 206-695-6200 206-695-6201 (fax) www.arilabs.com																	
ARI Client Company: Shannon + Wilson		Phone:		Date: 11/17/21				Ice Present? Y															
Client Contact: Shoshana Howard				No. of Coolers: 3				Cooler Temps: 4.7, 2.9, 5.4															
Client Project Name: LDW																							
Client Project #: 21-1-12596		Samplers: CTL, RMV		Analysis Requested						Notes/Comments													
Sample ID	Date	Time	Matrix	No. Containers	TPH-G	TPH-Dx	BTEX	HVOCs	mTBE	PAHs	Full SVOCs	Limited SVOCs	metals	metals	hexavalent chromium	Attenuation indicators	hardness						
MW-60-20211711	11/17	10:30	GW	22	X	X	X	X		X			X	①		X							
MW-72-20211711	11/17	1206	GW	15		X	⊗	X		⊗	X			①					⊗ Hold				
MW-8-20211711	11/17	1316	GW	9	X	X	X		X					②									
MW-68-20211711	11/17	1410	GW	13		X	X	X			X		X	①			X						
TB-6-20211711	11/17	1320	W	5			X	X	X														
X																							
Comments/Special Instructions • Metals are <u>not</u> field filtered • Reference project for detection limits					Relinquished by: (Signature) <i>Rose Vogt</i> Printed Name: Rose Vogt Company: Shannon + Wilson Date & Time: 11/17/2021 1456					Received by: (Signature) <i>Raven Barberg</i> Printed Name: Raven Barberg Company: ARI Date & Time: 11/17/21 1456					Relinquished by: (Signature) _____ Printed Name: _____ Company: _____ Date & Time: _____								

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, notwithstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.


 Shannon & Wilson, Inc
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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
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Reported:
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ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-60-20211711	21K0303-01	Water	17-Nov-2021 10:30	17-Nov-2021 14:56
MW-60-20211711	21K0303-02	Water	17-Nov-2021 10:30	17-Nov-2021 14:56
MW-72-20211711	21K0303-03	Water	17-Nov-2021 12:06	17-Nov-2021 14:56
MW-72-20211711	21K0303-04	Water	17-Nov-2021 12:06	17-Nov-2021 14:56
MW-8-20211711	21K0303-05	Water	17-Nov-2021 13:10	17-Nov-2021 14:56
MW-8-20211711	21K0303-06	Water	17-Nov-2021 13:10	17-Nov-2021 14:56
MW-68-20211711	21K0303-07	Water	17-Nov-2021 14:10	17-Nov-2021 14:56
MW-68-20211711	21K0303-08	Water	17-Nov-2021 14:10	17-Nov-2021 14:56
TB-6-20211711	21K0303-09	Water	17-Nov-2021 13:20	17-Nov-2021 14:56



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Work Order Case Narrative

Client: Shannon & Wilson, Inc
Project: Lower Duwamish Q4
Work Order: 21K0303

Sample receipt

Samples as listed on the preceding page were received 17-Nov-2021 14:56 under ARI work order 21K0303. For details regarding sample receipt, please refer to the Cooler Receipt Form.

PCB Aroclors - EPA Method SW8082A

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits except Decachlorobiphenyl which was out of control high in the initial calibration verification SJL0010-ICV1 on column zb-5. Data reported from passing column zb-35.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within control limits.

Gasoline by NWTPH-g (GC/MS)

The sample(s) were analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within control limits.

Volatiles - EPA Method SW8260D



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The sample(s) were analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within control limits.

Volatiles - EPA Method 8260D-SIM (Selected Ion Monitoring)

The sample(s) were analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within control limits.

Semivolatiles - EPA Method SW8270E

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements except as follows. 4-Chlorophenylphenyl ether, Florene, Hexachlorocyclopentadiene and Pentachlorophenol which were out of control low and 2,4-Dinitrotoluene, 2-Nitrophenol, Butylbenzylphthalate, Fluoranthene, Pyrene and p-Terphenyl-d14 which were out of control high in the initial calibration verification SJL0050-ICV1. All samples which contain analyte have been flagged with a "Q" qualifier.

Hexachlorocyclopentadiene and Pentachlorophenol which were out of control low and Fluoranthene and Pyrene which were out of control high in the continuing calibration verification SJL0050-CCV1. 2,4-Dinitrophenol, 4,6-Dinitro-2-methylphenol, Benzo(g,h,i)perylene, Benzoic Acid, Hexachlorocyclopentadiene and Pentachlorophenol which were out of control low in the low concentration calibration verification SJL0050-LCV1. 4,6-Dinitro-2-methylphenol, Benzoic Acid and Pentachlorophenol which were out of control low and internal standard Chrysene-d12 which was out of control high in the low concentration calibration verification SJL0050-LCV2.

Internal standard areas were within limits except Chrysene-d12 which was out of control high in the low concentration


 Shannon & Wilson, Inc
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calibration verification SJL0050-LCV2.

The surrogate percent recoveries were within control limits except p-Terphenyl-d14 which was out of control high in the initial calibration verification SJL0050-ICV1. All samples which contain analyte have been flagged with a "Q" qualified.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries were within control limits except Benzoic Acid, 4-Chloroaniline, Hexachlorocyclopentadiene and 4-Nitrophenol which were out of control low in the blanks spike. The BS/BSD relative percent difference (RPD) were within control limits except Hexachlorocyclopentadiene, 2,4-Dinitrotoluene and 4-Chlorophenylphenyl ether. Deviations have been flagged.

Polynuclear Aromatic Hydrocarbons (PAH) - EPA Method SW8270E-SIM

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within control limits.

Total Metals and Hardness - EPA Method 6010D

The sample(s) were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Sample specific QC was performed in association with sample 21K0303-07 in batch BJK0505. The matrix spike/matrix spike duplicate (MS/MSD) spike recoveries and relative percent difference (RPD) were within advisory control limits. The duplicate (DUP) relative percent difference (RPD) were within advisory control limits.

Total and Dissolved Metals - EPA Method 6020B

The sample(s) were digested and analyzed within the recommended holding times.


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Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Sample specific QC was performed in association with sample 21K0303-08 in Dissolved Metals batch BJK0730. The duplicate (DUP) relative percent difference (RPD) were within advisory control limits except Manganese. The matrix spike/matrix spike duplicate (MS/MSD) spike recoveries were within advisory control limits except Manganese which was out of control low. A post digestion spike was performed for Manganese which met advisory control limits. The MS/MSD relative percent difference (RPD) were within advisory control limits. Deviations have been flagged.

Wet Chemistry

The sample(s) were prepared and analyzed within the recommended holding times except Sulfite. The Sulfite holding time was exceeded upon sample receipt and data has been flagged.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Sample specific QC was performed in association with sample 21K0303-01 in Sulfite batch BJK0469, Ferrous Iron batch BJK0468 and Anions batch BJK0496. The matrix spike (MS) percent recoveries and the duplicate (DUP) relative percent difference (RPD) were within advisory control limits.

Total and Dissolved Mercury - EPA Method 7470/7471

The sample(s) were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Sample specific QC was performed in association with sample 21K0303-03 in the Total Mercury batch BJK0571. The matrix spike/matrix spike duplicate (MS/MSD) spike recoveries and relative percent difference (RPD) were within advisory control limits. The duplicate (DUP) relative percent difference (RPD) were within advisory control limits.

Diesel/Heavy Oil Range Organics - WA-Ecology Method NW-TPHDx



Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
14-Dec-2021 13:43

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within control limits.

Volatile Gases - MEE by RSK175

The sample(s) were analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within control limits.

Sample specific QC was performed in association with sample 21K0303-01 in batch BJK0560. The duplicate relative percent difference (RPD) were within advisory control limits.



WORK ORDER

21K0303

Samples will be discarded 90 days after submission of a final report unless other instructions are received.

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish Q4

Project Number: 21-1-12596-012

Preservation Confirmation

Container ID	Container Type	pH	
21K0303-01 A	Glass NM, Amber, 1000 mL		
21K0303-01 B	Glass NM, Amber, 1000 mL		
21K0303-01 C	HDPE NM, 500 mL, 1:1 HNO3	<2	Pass
21K0303-01 D	Small OJ, 500 mL, EDTA	>2	Fail
21K0303-01 E	HDPE NM, 500 mL		
21K0303-01 F	HDPE NM, 500 mL		
21K0303-01 G	Glass NM, Amber, 500 mL, HCl		
21K0303-01 H	Glass NM, Amber, 500 mL		
21K0303-01 I	Glass NM, Amber, 500 mL		
21K0303-01 J	Glass NM, Amber, 500 mL		
21K0303-01 K	Glass NM, Amber, 500 mL		
21K0303-01 L	VOA Vial, Clear, 40 mL, HCL		
21K0303-01 M	VOA Vial, Clear, 40 mL, HCL		
21K0303-01 N	VOA Vial, Clear, 40 mL, HCL		
21K0303-01 O	VOA Vial, Clear, 40 mL, HCL		
21K0303-01 P	VOA Vial, Clear, 40 mL, HCL		
21K0303-01 Q	VOA Vial, Clear, 40 mL, HCL		
21K0303-01 R	VOA Vial, Clear, 40 mL, HCL		
21K0303-01 S	VOA Vial, Clear, 40 mL, HCL		
21K0303-01 T	VOA Vial, Clear, 40 mL, HCL		
21K0303-02 A	HDPE NM, 500 mL	>2	Fail
21K0303-02 B	HDPE NM, 500 mL	>2	Fail
21K0303-03 A	Glass NM, Amber, 1000 mL		
21K0303-03 B	Glass NM, Amber, 1000 mL		
21K0303-03 C	HDPE NM, 500 mL, 1:1 HNO3	<2	Pass
21K0303-03 D	Glass NM, Amber, 500 mL		
21K0303-03 E	Glass NM, Amber, 500 mL		
21K0303-03 F	Glass NM, Amber, 500 mL		
21K0303-03 G	Glass NM, Amber, 500 mL		
21K0303-03 H	VOA Vial, Clear, 40 mL, HCL		
21K0303-03 I	VOA Vial, Clear, 40 mL, HCL		
21K0303-03 J	VOA Vial, Clear, 40 mL, HCL		
21K0303-03 K	VOA Vial, Clear, 40 mL, HCL		
21K0303-03 L	VOA Vial, Clear, 40 mL, HCL		



WORK ORDER

21K0303

Samples will be discarded 90 days after submission of a final report unless other instructions are received.

Client: Shannon & Wilson, Inc

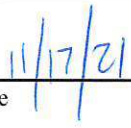
Project Manager: Shelly Fishel

Project: Lower Duwamish Q4

Project Number: 21-1-12596-012

21K0303-03 M	VOA Vial, Clear, 40 mL, HCL		
21K0303-03 N	VOA Vial, Clear, 40 mL, HCL		
21K0303-04 A	HDPE NM, 500 mL	>2	Fail
21K0303-05 A	HDPE NM, 500 mL, 1:1 HNO3	<2	Pass
21K0303-05 B	Glass NM, Amber, 500 mL		
21K0303-05 C	Glass NM, Amber, 500 mL		
21K0303-05 D	VOA Vial, Clear, 40 mL, HCL		
21K0303-05 E	VOA Vial, Clear, 40 mL, HCL		
21K0303-05 F	VOA Vial, Clear, 40 mL, HCL		
21K0303-05 G	VOA Vial, Clear, 40 mL, HCL		
21K0303-05 H	VOA Vial, Clear, 40 mL, HCL		
21K0303-06 A	HDPE NM, 500 mL	>2	Fail
21K0303-07 A	Glass NM, Amber, 1000 mL		
21K0303-07 B	Glass NM, Amber, 1000 mL		
21K0303-07 C	HDPE NM, 500 mL, 1:1 HNO3	<2	Pass
21K0303-07 D	Glass NM, Amber, 500 mL		
21K0303-07 E	Glass NM, Amber, 500 mL		
21K0303-07 F	Glass NM, Amber, 500 mL		
21K0303-07 G	Glass NM, Amber, 500 mL		
21K0303-07 H	VOA Vial, Clear, 40 mL, HCL		
21K0303-07 I	VOA Vial, Clear, 40 mL, HCL		
21K0303-07 J	VOA Vial, Clear, 40 mL, HCL		
21K0303-07 K	VOA Vial, Clear, 40 mL, HCL		
21K0303-07 L	VOA Vial, Clear, 40 mL, HCL		
21K0303-08 A	HDPE NM, 500 mL	>2	Fail
21K0303-09 A	VOA Vial, Clear, 40 mL, HCL		
21K0303-09 B	VOA Vial, Clear, 40 mL, HCL		
21K0303-09 C	VOA Vial, Clear, 40 mL, HCL		
21K0303-09 D	VOA Vial, Clear, 40 mL, HCL	bubble	
21K0303-09 E	VOA Vial, Clear, 40 mL, HCL	bubble	

Preservation Confirmed By 

Date  11/17/21



Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Shannon & Wilson

Project Name: LDW

COC No(s): _____ (NA)

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Assigned ARI Job No: 21K0303

Tracking No: _____ (NA)

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of the cooler? YES NO

Were custody papers included with the cooler? YES NO

Were custody papers properly filled out (ink, signed, etc.) YES NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)

Time 1456

4.7 2.9 5.4

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: DOO2565

Cooler Accepted by: RB Date: 11/17/21 Time: 1456

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler? YES NO

What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: _____

Was sufficient ice used (if appropriate)? NA YES NO

How were bottles sealed in plastic bags? Individually Grouped Not

Did all bottles arrive in good condition (unbroken)? YES NO

Were all bottle labels complete and legible? YES NO

Did the number of containers listed on COC match with the number of containers received? YES NO

Did all bottle labels and tags agree with custody papers? YES NO

Were all bottles used correct for the requested analyses? YES NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs) ... NA YES NO

Were all VOC vials free of air bubbles? NA YES NO

Was sufficient amount of sample sent in each bottle? YES NO

Date VOC Trip Blank was made at ARI NA 11/1/21

Were the sample(s) split by ARI? NA YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: RB Date: 11/17/21 Time: 1601 Labels checked by: _____

**** Notify Project Manager of discrepancies or concerns ****

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

- Sample labels said MW-70-20211711 but COC says MW-72-20211711, logged based off COC.
- Sample MW-72-20211711 was missing SVOC bottles, logged one of the PAH Hoid bottles for SVOC

By: RB Date: 11/17/21



WORK ORDER

21K0303

Samples will be discarded 90 days after submission of a final report unless other instructions are received.

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish Q4

Project Number: 21-1-12596-012

Preservation Confirmation

Container ID	Container Type	pH	
21K0303-01 A	Glass NM, Amber, 1000 mL		
21K0303-01 B	Glass NM, Amber, 1000 mL		
21K0303-01 C	HDPE NM, 500 mL, 1:1 HNO3	12	Pass
21K0303-01 D	Small OJ, 500 mL, EDTA	>2	Fail
21K0303-01 E	HDPE NM, 500 mL		
21K0303-01 F	HDPE NM, 500 mL		
21K0303-01 G	Glass NM, Amber, 500 mL, HCl		
21K0303-01 H	Glass NM, Amber, 500 mL		
21K0303-01 I	Glass NM, Amber, 500 mL		
21K0303-01 J	Glass NM, Amber, 500 mL		
21K0303-01 K	Glass NM, Amber, 500 mL		
21K0303-01 L	VOA Vial, Clear, 40 mL, HCL		
21K0303-01 M	VOA Vial, Clear, 40 mL, HCL		
21K0303-01 N	VOA Vial, Clear, 40 mL, HCL		
21K0303-01 O	VOA Vial, Clear, 40 mL, HCL		
21K0303-01 P	VOA Vial, Clear, 40 mL, HCL		
21K0303-01 Q	VOA Vial, Clear, 40 mL, HCL		
21K0303-01 R	VOA Vial, Clear, 40 mL, HCL		
21K0303-01 S	VOA Vial, Clear, 40 mL, HCL		
21K0303-01 T	VOA Vial, Clear, 40 mL, HCL		
21K0303-02 A	HDPE NM, 500 mL	>2	Fail (1)
21K0303-02 B	HDPE NM, 500 mL	>2	Fail
21K0303-03 A	Glass NM, Amber, 1000 mL		
21K0303-03 B	Glass NM, Amber, 1000 mL		
21K0303-03 C	HDPE NM, 500 mL, 1:1 HNO3	12	Pass
21K0303-03 D	Glass NM, Amber, 500 mL		
21K0303-03 E	Glass NM, Amber, 500 mL		
21K0303-03 F	Glass NM, Amber, 500 mL		
21K0303-03 G	Glass NM, Amber, 500 mL		
21K0303-03 H	VOA Vial, Clear, 40 mL, HCL		
21K0303-03 I	VOA Vial, Clear, 40 mL, HCL		
21K0303-03 J	VOA Vial, Clear, 40 mL, HCL		
21K0303-03 K	VOA Vial, Clear, 40 mL, HCL		
21K0303-03 L	VOA Vial, Clear, 40 mL, HCL		



WORK ORDER

21K0303

Samples will be discarded 90 days after submission of a final report unless other instructions are received.

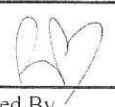
Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish Q4

Project Number: 21-1-12596-012

21K0303-03 M	VOA Vial, Clear, 40 mL, HCL		
21K0303-03 N	VOA Vial, Clear, 40 mL, HCL		
21K0303-04 A	HDPE NM, 500 mL	>2	Fail (1)
21K0303-05 A	HDPE NM, 500 mL, 1:1 HNO3	<2	Pass
21K0303-05 B	Glass NM, Amber, 500 mL		
21K0303-05 C	Glass NM, Amber, 500 mL		
21K0303-05 D	VOA Vial, Clear, 40 mL, HCL		
21K0303-05 E	VOA Vial, Clear, 40 mL, HCL		
21K0303-05 F	VOA Vial, Clear, 40 mL, HCL		
21K0303-05 G	VOA Vial, Clear, 40 mL, HCL		
21K0303-05 H	VOA Vial, Clear, 40 mL, HCL		
21K0303-06 A	HDPE NM, 500 mL	>2	Fail (1)
21K0303-07 A	Glass NM, Amber, 1000 mL		
21K0303-07 B	Glass NM, Amber, 1000 mL		
21K0303-07 C	HDPE NM, 500 mL, 1:1 HNO3	<2	Pass
21K0303-07 D	Glass NM, Amber, 500 mL		
21K0303-07 E	Glass NM, Amber, 500 mL		
21K0303-07 F	Glass NM, Amber, 500 mL		
21K0303-07 G	Glass NM, Amber, 500 mL		
21K0303-07 H	VOA Vial, Clear, 40 mL, HCL		
21K0303-07 I	VOA Vial, Clear, 40 mL, HCL		
21K0303-07 J	VOA Vial, Clear, 40 mL, HCL		
21K0303-07 K	VOA Vial, Clear, 40 mL, HCL		
21K0303-07 L	VOA Vial, Clear, 40 mL, HCL		
21K0303-08 A	HDPE NM, 500 mL	>2	Fail (1)
21K0303-09 A	VOA Vial, Clear, 40 mL, HCL		
21K0303-09 B	VOA Vial, Clear, 40 mL, HCL		
21K0303-09 C	VOA Vial, Clear, 40 mL, HCL		
21K0303-09 D	VOA Vial, Clear, 40 mL, HCL	bubble	
21K0303-09 E	VOA Vial, Clear, 40 mL, HCL	bubble	

Preservation Confirmed By 

Date

11/17/21

(1) filtered w/ 0.45 microns
p preserved 10 p4 <2
with 0.75% conc. HNO3
(510419) MM 11/17/21



Printed: 11/17/2021 4:38:14PM

WORK ORDER

21K0303

Samples will be discarded 90 days after submission of a final report unless other instructions are received.

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish Q4

Project Number: 21-1-12596-012

Preservation Confirmation

Container ID	Container Type	pH	
21K0303-01 A	Glass NM, Amber, 1000 mL		
21K0303-01 B	Glass NM, Amber, 1000 mL		
21K0303-01 C	HDPE NM, 500 mL, 1:1 HNO3	2	Pass
21K0303-01 D	Small OJ, 500 mL, EDTA	>2	Fail
21K0303-01 E	HDPE NM, 500 mL		
21K0303-01 F	HDPE NM, 500 mL		
21K0303-01 G	Glass NM, Amber, 500 mL, HCl	1	
21K0303-01 H	Glass NM, Amber, 500 mL		
21K0303-01 I	Glass NM, Amber, 500 mL		
21K0303-01 J	Glass NM, Amber, 500 mL		
21K0303-01 K	Glass NM, Amber, 500 mL		
21K0303-01 L	VOA Vial, Clear, 40 mL, HCL		
21K0303-01 M	VOA Vial, Clear, 40 mL, HCL		
21K0303-01 N	VOA Vial, Clear, 40 mL, HCL		
21K0303-01 O	VOA Vial, Clear, 40 mL, HCL		
21K0303-01 P	VOA Vial, Clear, 40 mL, HCL		
21K0303-01 Q	VOA Vial, Clear, 40 mL, HCL		
21K0303-01 R	VOA Vial, Clear, 40 mL, HCL		
21K0303-01 S	VOA Vial, Clear, 40 mL, HCL		
21K0303-01 T	VOA Vial, Clear, 40 mL, HCL		
21K0303-02 A	HDPE NM, 500 mL	>2	Fail
21K0303-02 B	HDPE NM, 500 mL	>2	Fail
21K0303-03 A	Glass NM, Amber, 1000 mL		
21K0303-03 B	Glass NM, Amber, 1000 mL		
21K0303-03 C	HDPE NM, 500 mL, 1:1 HNO3	2	Pass
21K0303-03 D	Glass NM, Amber, 500 mL		
21K0303-03 E	Glass NM, Amber, 500 mL		
21K0303-03 F	Glass NM, Amber, 500 mL		
21K0303-03 G	Glass NM, Amber, 500 mL		
21K0303-03 H	VOA Vial, Clear, 40 mL, HCL		
21K0303-03 I	VOA Vial, Clear, 40 mL, HCL		
21K0303-03 J	VOA Vial, Clear, 40 mL, HCL		
21K0303-03 K	VOA Vial, Clear, 40 mL, HCL		
21K0303-03 L	VOA Vial, Clear, 40 mL, HCL		

Reviewed By

Date



WORK ORDER

21K0303

Samples will be discarded 90 days after submission of a final report unless other instructions are received.

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish Q4

Project Number: 21-1-12596-012

21K0303-03 M	VOA Vial, Clear, 40 mL, HCL		
21K0303-03 N	VOA Vial, Clear, 40 mL, HCL		
21K0303-04 A	HDPE NM, 500 mL	>2	Fail
21K0303-05 A	HDPE NM, 500 mL, 1:1 HNO3	<2	Pass
21K0303-05 B	Glass NM, Amber, 500 mL		
21K0303-05 C	Glass NM, Amber, 500 mL		
21K0303-05 D	VOA Vial, Clear, 40 mL, HCL		
21K0303-05 E	VOA Vial, Clear, 40 mL, HCL		
21K0303-05 F	VOA Vial, Clear, 40 mL, HCL		
21K0303-05 G	VOA Vial, Clear, 40 mL, HCL		
21K0303-05 H	VOA Vial, Clear, 40 mL, HCL		
21K0303-06 A	HDPE NM, 500 mL	>2	Fail
21K0303-07 A	Glass NM, Amber, 1000 mL		
21K0303-07 B	Glass NM, Amber, 1000 mL		
21K0303-07 C	HDPE NM, 500 mL, 1:1 HNO3	<2	Pass
21K0303-07 D	Glass NM, Amber, 500 mL		
21K0303-07 E	Glass NM, Amber, 500 mL		
21K0303-07 F	Glass NM, Amber, 500 mL		
21K0303-07 G	Glass NM, Amber, 500 mL		
21K0303-07 H	VOA Vial, Clear, 40 mL, HCL		
21K0303-07 I	VOA Vial, Clear, 40 mL, HCL		
21K0303-07 J	VOA Vial, Clear, 40 mL, HCL		
21K0303-07 K	VOA Vial, Clear, 40 mL, HCL		
21K0303-07 L	VOA Vial, Clear, 40 mL, HCL		
21K0303-08 A	HDPE NM, 500 mL	>2	Fail
21K0303-09 A	VOA Vial, Clear, 40 mL, HCL		
21K0303-09 B	VOA Vial, Clear, 40 mL, HCL		
21K0303-09 C	VOA Vial, Clear, 40 mL, HCL		
21K0303-09 D	VOA Vial, Clear, 40 mL, HCL	bubble	
21K0303-09 E	VOA Vial, Clear, 40 mL, HCL	bubble	

Preservation Confirmed By 

Date

11/17/21

① pH < 2, headspace
1840 BF

11/17/21

Reviewed By

Date



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
14-Dec-2021 13:43

MW-60-20211711

21K0303-01 (Water)

Volatile Organic Compounds

Method: EPA 8260D

Sampled: 11/17/2021 10:30

Instrument: NT3 Analyst: PKC

Analyzed: 11/22/2021 10:38

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0303-01 P

Preparation Batch: BJK0565

Sample Size: 10 mL

Prepared: 11/22/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.05	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.05	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.05	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.14	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.08	0.20	0.15	ug/L	J
Xylenes, total	1330-20-7	1	0.22	0.60	0.24	ug/L	J
<i>Surrogate: 1,2-Dichloroethane-d4</i>				<i>80-129 %</i>	<i>85.4</i>	<i>%</i>	
<i>Surrogate: Toluene-d8</i>				<i>80-120 %</i>	<i>101</i>	<i>%</i>	
<i>Surrogate: 4-Bromofluorobenzene</i>				<i>80-120 %</i>	<i>111</i>	<i>%</i>	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				<i>80-120 %</i>	<i>102</i>	<i>%</i>	


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 13:43

MW-60-20211711
21K0303-01 (Water)
Volatile Organic Compounds

Method: NWTPHg

Sampled: 11/17/2021 10:30

Instrument: NT3 Analyst: PKC

Analyzed: 11/22/2021 10:38

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0303-01 P

Preparation Batch: BJK0565

Sample Size: 10 mL

Prepared: 11/22/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Gasoline Range Organics (Tol-Nap)	GRO	1	100	129	ug/L	
HC ID: GRO						
Surrogate: Toluene-d8			80-120 %	101	%	
Surrogate: 4-Bromofluorobenzene			80-120 %	111	%	


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 13:43

MW-60-20211711
21K0303-01 (Water)
Volatile Organic Compounds - SIM

Method: EPA 8260D-SIM

Sampled: 11/17/2021 10:30

Instrument: NT7 Analyst: PB

Analyzed: 11/29/2021 14:52

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0303-01 N

Preparation Batch: BJK0712

Sample Size: 10 mL

Prepared: 11/29/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	5.01	20.0	77.2	ng/L	M
Surrogate: 1,2-Dichloroethane-d4				80-129 %	89.1	%	
Surrogate: Toluene-d8				80-120 %	93.5	%	


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 13:43

MW-60-20211711
21K0303-01 (Water)
Dissolved Gases

Method: EPA RSK-175

Sampled: 11/17/2021 10:30

Instrument: FID6 Analyst: LH

Analyzed: 11/22/2021 10:50

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0303-01 S

Preparation Batch: BJK0560

Sample Size: 10 mL

Prepared: 11/22/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Methane	74-82-8	1	0.65	6680	ug/L	
Ethane	74-84-0	1	1.23	ND	ug/L	U
Ethene	74-85-1	1	1.14	ND	ug/L	U
Acetylene	74-86-2	1	1.06	ND	ug/L	U
<i>Surrogate: Propane</i>			72-122 %	77.8	%	



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
14-Dec-2021 13:43

MW-60-20211711

21K0303-01 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM

Sampled: 11/17/2021 10:30

Instrument: NT11 Analyst: VTS

Analyzed: 11/27/2021 11:39

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF	Sample Size: 500 mL	Extract ID: 21K0303-01 J 01
	Preparation Batch: BJK0539	Final Volume: 0.5 mL	
	Prepared: 11/23/2021		

Sample Cleanup:	Cleanup Method: Silica Gel	Initial Volume: 0.5 mL	Extract ID: 21K0303-01 J 01
	Cleanup Batch: CJK0280	Final Volume: 0.5 mL	
	Cleaned: 26-Nov-2021		

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	1	0.001	0.010	ND	ug/L	U
2-Methylnaphthalene	91-57-6	1	0.001	0.010	0.027	ug/L	
1-Methylnaphthalene	90-12-0	1	0.0009	0.010	1.60	ug/L	E
Acenaphthylene	208-96-8	1	0.002	0.010	0.101	ug/L	
Acenaphthene	83-32-9	1	0.003	0.010	5.02	ug/L	E
Dibenzofuran	132-64-9	1	0.002	0.010	0.049	ug/L	
Fluorene	86-73-7	1	0.002	0.010	2.54	ug/L	E
Phenanthrene	85-01-8	1	0.001	0.010	1.44	ug/L	E
Anthracene	120-12-7	1	0.001	0.010	0.180	ug/L	
Carbazole	86-74-8	1	0.001	0.010	0.197	ug/L	
Fluoranthene	206-44-0	1	0.002	0.010	0.014	ug/L	
Pyrene	129-00-0	1	0.001	0.010	0.005	ug/L	J
Benzo(a)anthracene	56-55-3	1	0.0008	0.010	ND	ug/L	U
Chrysene	218-01-9	1	0.0009	0.010	ND	ug/L	U
Benzo(b)fluoranthene	205-99-2	1	0.0005	0.010	ND	ug/L	U
Benzo(k)fluoranthene	207-08-9	1	0.003	0.010	ND	ug/L	U
Benzo(j)fluoranthene	205-82-3	1	0.002	0.010	ND	ug/L	U
Benzofluoranthenes, Total		1	0.004	0.010	ND	ug/L	U
Benzo(a)pyrene	50-32-8	1	0.002	0.010	ND	ug/L	U
Perylene	1985-5-0	1	0.006	0.010	ND	ug/L	U
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.001	0.010	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	1	0.001	0.010	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	1	0.001	0.010	ND	ug/L	U

Surrogate: 2-Methylnaphthalene-d10

42-120 % 90.7 %

Surrogate: Dibenzo[a,h]anthracene-d14

29-120 % 70.0 %

Surrogate: Fluoranthene-d10

57-120 % 91.2 %


 Shannon & Wilson, Inc
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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 13:43

MW-60-20211711
21K0303-01 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 11/17/2021 10:30

Instrument: FID4 Analyst: TWC

Analyzed: 11/27/2021 04:10

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21K0303-01 H 01

Preparation Batch: BJK0537

Sample Size: 475 mL

Prepared: 11/22/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	0.105	1.76	mg/L	
HC ID: DRO						
Motor Oil Range Organics (C24-C38)	RRO	1	0.211	0.565	mg/L	
HC ID: MOTOR OIL						
Surrogate: o-Terphenyl			50-150 %	108	%	



Analytical Report

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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
14-Dec-2021 13:43

MW-60-20211711

21K0303-01 (Water)

Aroclor PCB

Method: EPA 8082A

Sampled: 11/17/2021 10:30

Instrument: ECD7 Analyst: JGR

Analyzed: 11/30/2021 23:17

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJK0538 Prepared: 11/23/2021	Sample Size: 1000 mL Final Volume: 0.5 mL	Extract ID: 21K0303-01 A 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJK0302 Cleaned: 29-Nov-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21K0303-01 A 01
Sample Cleanup:	Cleanup Method: Sulfuric Acid Cleanup Batch: CJK0300 Cleaned: 29-Nov-2021	Initial Volume: 0.5 uL Final Volume: 0.5 uL	Extract ID: 21K0303-01 A 01
Sample Cleanup:	Cleanup Method: Sulfur Cleanup Batch: CJK0301 Cleaned: 29-Nov-2021	Initial Volume: 0.5 uL Final Volume: 0.5 uL	Extract ID: 21K0303-01 A 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Aroclor 1016	12674-11-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1221	11104-28-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1232	11141-16-5	1	0.002	0.010	ND	ug/L	U
Aroclor 1242	53469-21-9	1	0.002	0.010	ND	ug/L	U
Aroclor 1248	12672-29-6	1	0.002	0.010	ND	ug/L	U
Aroclor 1254	11097-69-1	1	0.002	0.010	ND	ug/L	U
Aroclor 1260	11096-82-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1262	37324-23-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1268	11100-14-4	1	0.003	0.010	ND	ug/L	U
Surrogate: Decachlorobiphenyl				29-120 %	65.7	%	
Surrogate: Tetrachlorometaxylene				32-120 %	51.7	%	P1
Surrogate: Decachlorobiphenyl [2C]				29-120 %	63.4	%	
Surrogate: Tetrachlorometaxylene [2C]				32-120 %	77.7	%	P1


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Reported:
 14-Dec-2021 13:43

MW-60-20211711
21K0303-01 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 11/17/2021 10:30

Instrument: ICPMS1 Analyst: MCB

Analyzed: 11/30/2021 21:26

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJK0731 Sample Size: 25 mL
 Prepared: 11/30/2021 Final Volume: 25 mL

Extract ID: 21K0303-01 C 02

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Barium	7440-39-3	2	0.228	1.00	12.4	ug/L	D
Chromium	7440-47-3	2	0.520	1.00	1.40	ug/L	D
Iron	7439-89-6	2	36.4	72.0	26200	ug/L	D
Lead	7439-92-1	2	0.103	0.200	0.450	ug/L	D
Silver	7440-22-4	2	0.0440	0.400	ND	ug/L	U
Vanadium	7440-62-2	2	0.111	0.400	6.46	ug/L	D


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 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 13:43

MW-60-20211711
21K0303-01 (Water)
Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 11/17/2021 10:30

Instrument: ICPMS1 Analyst: MCB

Analyzed: 11/30/2021 21:26

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJK0731 Sample Size: 25 mL
 Prepared: 11/30/2021 Final Volume: 25 mL

Extract ID: 21K0303-01 C 02

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	2	0.0746	0.400	20.8	ug/L	D
Cadmium	7440-43-9	2	0.0600	0.200	ND	ug/L	U
Cobalt	7440-48-4	2	0.0356	0.400	0.458	ug/L	D
Copper	7440-50-8	2	0.346	1.00	1.89	ug/L	D
Nickel	7440-02-0	2	0.158	1.00	1.50	ug/L	D
Selenium	7782-49-2	2	0.358	1.00	ND	ug/L	U
Zinc	7440-66-6	2	5.84	12.0	ND	ug/L	U



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
14-Dec-2021 13:43

MW-60-20211711

21K0303-01 (Water)

Metals and Metallic Compounds

Method: EPA 7470A

Sampled: 11/17/2021 10:30

Instrument: HYDRA Analyst: ML

Analyzed: 11/23/2021 14:29

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21K0303-01 C

Preparation Batch: BJK0571

Sample Size: 20 mL

Prepared: 11/22/2021

Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000013	0.000100	ND	mg/L	U


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Reported:
 14-Dec-2021 13:43

MW-60-20211711
21K0303-01 (Water)
Wet Chemistry

Method: EPA 300.0

Sampled: 11/17/2021 10:30

Instrument: IC930 Analyst: BF

Analyzed: 11/18/2021 19:18

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 21K0303-01 E

Preparation Batch: BJK0496

Sample Size: 10 mL

Prepared: 11/18/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrate-N	14797-55-8	1	0.100	0.100	ND	mg/L	U

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrite-N	14797-65-0	1	0.100	0.100	ND	mg/L	U

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	1	0.100	0.100	0.164	mg/L	



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Analytical Report

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Project Manager: Meg Strong

Reported:
14-Dec-2021 13:43

MW-60-20211711

21K0303-01 (Water)

Wet Chemistry

Method: SM 3500-Fe B-97

Sampled: 11/17/2021 10:30

Instrument: UV1800-1 Analyst: BF

Analyzed: 11/17/2021 18:54

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 21K0303-01 G

Preparation Batch: BJK0468

Sample Size: 5 mL

Prepared: 11/17/2021

Final Volume: 5 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ferrous Iron		20	0.800	0.800	35.1	mg/L	D


 Shannon & Wilson, Inc
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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 13:43

MW-60-20211711
21K0303-01 (Water)
Wet Chemistry

Method: SM 4500-SO3 B-00

Sampled: 11/17/2021 10:30

Instrument: N/A Analyst: UW

Analyzed: 11/17/2021 17:17

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 21K0303-01

Preparation Batch: BJK0469

Sample Size: 50 mL

Prepared: 11/17/2021

Final Volume: 50 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfite	14265-45-3	1	1.4	1.4	ND	mg/L	H, U



Analytical Report

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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
14-Dec-2021 13:43

MW-60-20211711 21K0303-01RE1 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM

Sampled: 11/17/2021 10:30

Instrument: NT11 Analyst: VTS

Analyzed: 11/30/2021 12:54

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJK0539 Prepared: 11/23/2021	Sample Size: 500 mL Final Volume: 0.5 mL	Extract ID: 21K0303-01RE1 J 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJK0280 Cleaned: 26-Nov-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21K0303-01RE1 J 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	50	0.066	0.500	ND	ug/L	U
2-Methylnaphthalene	91-57-6	50	0.051	0.500	ND	ug/L	U
1-Methylnaphthalene	90-12-0	50	0.046	0.500	2.83	ug/L	D
Acenaphthylene	208-96-8	50	0.093	0.500	0.123	ug/L	J, D
Acenaphthene	83-32-9	50	0.145	0.500	47.6	ug/L	D
Dibenzofuran	132-64-9	50	0.076	0.500	ND	ug/L	U
Fluorene	86-73-7	50	0.076	0.500	7.18	ug/L	D
Phenanthrene	85-01-8	50	0.065	0.500	3.62	ug/L	D
Anthracene	120-12-7	50	0.058	0.500	0.289	ug/L	J, D
Carbazole	86-74-8	50	0.061	0.500	0.171	ug/L	J, D
Fluoranthene	206-44-0	50	0.086	0.500	ND	ug/L	U
Pyrene	129-00-0	50	0.059	0.500	ND	ug/L	U
Benzo(a)anthracene	56-55-3	50	0.038	0.500	ND	ug/L	U
Chrysene	218-01-9	50	0.045	0.500	ND	ug/L	U
Benzo(b)fluoranthene	205-99-2	50	0.023	0.500	ND	ug/L	U
Benzo(k)fluoranthene	207-08-9	50	0.161	0.500	ND	ug/L	U
Benzo(j)fluoranthene	205-82-3	50	0.094	0.500	ND	ug/L	U
Benzo(a)pyrene	50-32-8	50	0.124	0.500	ND	ug/L	U
Perylene	1985-5-0	50	0.293	0.500	ND	ug/L	U
Indeno(1,2,3-cd)pyrene	193-39-5	50	0.051	0.500	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	50	0.067	0.500	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	50	0.071	0.500	ND	ug/L	U
Surrogate: 2-Methylnaphthalene-d10				42-120 %		D1	D1
Surrogate: Dibenzo[a,h]anthracene-d14				29-120 %		D1	D1
Surrogate: Fluoranthene-d10				57-120 %		D1	D1



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
14-Dec-2021 13:43

MW-60-20211711
21K0303-01RE1 (Water)

Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 11/17/2021 10:30

Instrument: ICPMS1 Analyst: MCB

Analyzed: 12/01/2021 20:18

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO₃ matrix
Preparation Batch: BJK0731 Sample Size: 25 mL
Prepared: 11/30/2021 Final Volume: 25 mL

Extract ID: 21K0303-01RE1 C 02

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Manganese	7439-96-5	10	1.42	5.00	967	ug/L	D



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
14-Dec-2021 13:43

MW-60-20211711
21K0303-01RE1 (Water)

Wet Chemistry

Method: EPA 300.0

Sampled: 11/17/2021 10:30

Instrument: IC930 Analyst: BF

Analyzed: 12/02/2021 21:17

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 21K0303-01RE1 E

Preparation Batch: BJK0496

Sample Size: 10 mL

Prepared: 11/18/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	2	0.200	0.200	10.8	mg/L	D


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 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 13:43

MW-60-20211711
21K0303-02 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 11/17/2021 10:30

Instrument: ICPMS1 Analyst: MCB

Analyzed: 11/30/2021 22:36

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21K0303-02 B 02
	Preparation Batch: BJK0730	Filtration Batch: BJK0466
	Prepared: 11/30/2021	Filtration Date: 11/17/2021 16:21
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Barium, Dissolved	7440-39-3	1	0.114	0.500	0.745	ug/L	
Chromium, Dissolved	7440-47-3	2	0.520	1.00	0.864	ug/L	J, D
Iron, Dissolved	7439-89-6	2	36.4	72.0	16300	ug/L	D
Lead, Dissolved	7439-92-1	2	0.103	0.200	ND	ug/L	U
Silver, Dissolved	7440-22-4	2	0.0440	0.400	ND	ug/L	U
Vanadium, Dissolved	7440-62-2	2	0.111	0.400	1.84	ug/L	D


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 13:43

MW-60-20211711
21K0303-02 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 11/17/2021 10:30

Instrument: ICPMS1 Analyst: MCB

Analyzed: 11/30/2021 22:36

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21K0303-02 B 02
	Preparation Batch: BJK0730	Filtration Batch: BJK0466
	Prepared: 11/30/2021	Filtration Date: 11/17/2021 16:21
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection		Reporting		Result	Units	Notes
			Limit	Limit	Limit	Limit			
Arsenic, Dissolved	7440-38-2	1	0.0373	0.200			14.3	ug/L	
Cadmium, Dissolved	7440-43-9	1	0.0300	0.100			ND	ug/L	U
Cobalt, Dissolved	7440-48-4	1	0.0178	0.200			0.290	ug/L	
Copper, Dissolved	7440-50-8	1	0.173	0.500			ND	ug/L	U
Nickel, Dissolved	7440-02-0	1	0.0792	0.500			0.548	ug/L	
Selenium, Dissolved	7782-49-2	1	0.179	0.500			ND	ug/L	U
Zinc, Dissolved	7440-66-6	1	2.92	6.00			ND	ug/L	U



Analytical Resources, LLC
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Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
14-Dec-2021 13:43

MW-60-20211711

21K0303-02 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 7470A

Sampled: 11/17/2021 10:30

Instrument: HYDRA Analyst: SKD

Analyzed: 12/02/2021 16:59

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21K0303-02 B 01

Preparation Batch: BJL0027

Sample Size: 20 mL

Filtration Batch: BJK0466

Prepared: 12/01/2021

Final Volume: 20 mL

Filtration Date: 11/17/2021 16:21

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury, Dissolved	7439-97-6	1	0.000013	0.000100	ND	mg/L	U


 Shannon & Wilson, Inc
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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 13:43

MW-60-20211711
21K0303-02RE1 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 11/17/2021 10:30

Instrument: ICPMS1 Analyst: MCB

Analyzed: 12/01/2021 20:23

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21K0303-02RE1 B 02
	Preparation Batch: BJK0730	Filtration Batch: BJK0466
	Prepared: 11/30/2021	Filtration Date: 11/17/2021 16:21
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Manganese, Dissolved	7439-96-5	10	1.42	5.00	852	ug/L	D



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
14-Dec-2021 13:43

MW-72-20211711

21K0303-03 (Water)

Volatile Organic Compounds

Method: EPA 8260D

Sampled: 11/17/2021 12:06

Instrument: NT3 Analyst: PKC

Analyzed: 11/22/2021 11:03

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0303-03 J

Preparation Batch: BJK0565

Sample Size: 10 mL

Prepared: 11/22/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				80-129 %	86.0	%	
<i>Surrogate: Toluene-d8</i>				80-120 %	103	%	
<i>Surrogate: 4-Bromofluorobenzene</i>				80-120 %	106	%	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				80-120 %	99.4	%	


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MW-72-20211711
21K0303-03 (Water)
Volatile Organic Compounds

Method: NWTPHg

Sampled: 11/17/2021 12:06

Instrument: NT3 Analyst: PKC

Analyzed: 11/22/2021 11:03

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0303-03 J

Preparation Batch: BJK0565

Sample Size: 10 mL

Prepared: 11/22/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Gasoline Range Organics (Tol-Nap)	GRO	1	100	ND	ug/L	U
<i>Surrogate: Toluene-d8</i>			80-120 %	103	%	
<i>Surrogate: 4-Bromofluorobenzene</i>			80-120 %	106	%	


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MW-72-20211711
21K0303-03 (Water)
Volatile Organic Compounds - SIM

Method: EPA 8260D-SIM

Sampled: 11/17/2021 12:06

Instrument: NT7 Analyst: PB

Analyzed: 11/29/2021 15:20

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0303-03 K

Preparation Batch: BJK0712

Sample Size: 10 mL

Prepared: 11/29/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	5.01	20.0	ND	ng/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				80-129 %	114	%	
<i>Surrogate: Toluene-d8</i>				80-120 %	98.7	%	



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MW-72-20211711

21K0303-03 (Water)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 11/17/2021 12:06

Instrument: NT10 Analyst: VTS

Analyzed: 12/01/2021 16:07

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 3510C SepF
Preparation Batch: BJK0540
Prepared: 11/23/2021

Sample Size: 1000 mL
Final Volume: 1 mL

Extract ID: 21K0303-03 B 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Phenol	108-95-2	1	0.01	0.2	ND	ug/L	U
bis(2-chloroethyl) ether	111-44-4	1	0.03	0.2	ND	ug/L	U
2-Chlorophenol	95-57-8	1	0.03	0.2	ND	ug/L	U
1,3-Dichlorobenzene	541-73-1	1	0.03	0.2	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.03	0.2	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.03	0.2	ND	ug/L	U
Benzyl Alcohol	100-51-6	1	0.02	0.2	0.05	ug/L	J
2,2'-Oxybis(1-chloropropane)	108-60-1	1	0.03	0.2	ND	ug/L	U
2-Methylphenol	95-48-7	1	0.03	0.2	ND	ug/L	U
Hexachloroethane	67-72-1	1	0.04	0.2	ND	ug/L	U
N-Nitroso-di-n-Propylamine	621-64-7	1	0.04	0.2	ND	ug/L	U
4-Methylphenol	106-44-5	1	0.03	0.2	ND	ug/L	U
Nitrobenzene	98-95-3	1	0.03	0.2	ND	ug/L	U
Isophorone	78-59-1	1	0.03	0.2	ND	ug/L	U
2-Nitrophenol	88-75-5	1	0.04	1.0	ND	ug/L	U
2,4-Dimethylphenol	105-67-9	1	0.3	1.0	ND	ug/L	U
Bis(2-Chloroethoxy)methane	111-91-1	1	0.03	0.2	ND	ug/L	U
2,4-Dichlorophenol	120-83-2	1	0.1	1.0	ND	ug/L	U
1,2,4-Trichlorobenzene	120-82-1	1	0.03	0.2	ND	ug/L	U
Naphthalene	91-20-3	1	0.03	0.2	ND	ug/L	U
Benzoic acid	65-85-0	1	0.1	2.0	ND	ug/L	U
4-Chloroaniline	106-47-8	1	0.04	1.0	ND	ug/L	U
Hexachlorobutadiene	87-68-3	1	0.04	0.2	ND	ug/L	U
4-Chloro-3-Methylphenol	59-50-7	1	0.1	1.0	ND	ug/L	U
2-Methylnaphthalene	91-57-6	1	0.03	0.2	ND	ug/L	U
Hexachlorocyclopentadiene	77-47-4	1	0.1	1.0	ND	ug/L	U
2,4,6-Trichlorophenol	88-06-2	1	0.2	1.0	ND	ug/L	U
2,4,5-Trichlorophenol	95-95-4	1	0.1	1.0	ND	ug/L	U
2-Chloronaphthalene	91-58-7	1	0.03	0.2	ND	ug/L	U
2-Nitroaniline	88-74-4	1	0.2	1.0	ND	ug/L	U
Acenaphthylene	208-96-8	1	0.02	0.2	ND	ug/L	U
Dimethylphthalate	131-11-3	1	0.04	0.2	ND	ug/L	U
2,6-Dinitrotoluene	606-20-2	1	0.2	1.0	ND	ug/L	U
Acenaphthene	83-32-9	1	0.03	0.2	ND	ug/L	U



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MW-72-20211711

21K0303-03 (Water)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 11/17/2021 12:06

Instrument: NT10 Analyst: VTS

Analyzed: 12/01/2021 16:07

Analysis by: Analytical Resources, LLC

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
3-Nitroaniline	99-09-2	1	0.2	1.0	ND	ug/L	U
2,4-Dinitrophenol	51-28-5	1	0.2	2.0	ND	ug/L	U
Dibenzofuran	132-64-9	1	0.02	0.2	ND	ug/L	U
4-Nitrophenol	100-02-7	1	0.06	1.0	ND	ug/L	U
2,4-Dinitrotoluene	121-14-2	1	0.1	1.0	ND	ug/L	U
Fluorene	86-73-7	1	0.02	0.2	ND	ug/L	U
4-Chlorophenylphenyl ether	7005-72-3	1	0.02	0.2	ND	ug/L	U
Diethyl phthalate	84-66-2	1	0.06	0.2	ND	ug/L	U
4-Nitroaniline	100-01-6	1	0.2	1.0	ND	ug/L	U
4,6-Dinitro-2-methylphenol	534-52-1	1	0.4	2.0	ND	ug/L	U
N-Nitrosodiphenylamine	86-30-6	1	0.03	0.2	ND	ug/L	U
4-Bromophenyl phenyl ether	101-55-3	1	0.02	0.2	ND	ug/L	U
Hexachlorobenzene	118-74-1	1	0.04	0.2	ND	ug/L	U
Pentachlorophenol	87-86-5	1	0.1	1.0	ND	ug/L	U
Phenanthrene	85-01-8	1	0.02	0.2	ND	ug/L	U
Anthracene	120-12-7	1	0.03	0.2	ND	ug/L	U
Carbazole	86-74-8	1	0.04	0.2	ND	ug/L	U
Di-n-Butylphthalate	84-74-2	1	0.05	0.2	ND	ug/L	U
Fluoranthene	206-44-0	1	0.03	0.2	ND	ug/L	U
Pyrene	129-00-0	1	0.03	0.2	ND	ug/L	U
Butylbenzylphthalate	85-68-7	1	0.07	0.2	ND	ug/L	U
Benzo(a)anthracene	56-55-3	1	0.04	0.2	ND	ug/L	U
3,3'-Dichlorobenzidine	91-94-1	1	0.3	1.0	ND	ug/L	U
Chrysene	218-01-9	1	0.04	0.2	ND	ug/L	U
bis(2-Ethylhexyl)phthalate	117-81-7	1	0.2	0.2	0.2	ug/L	J
Di-n-Octylphthalate	117-84-0	1	0.05	0.2	ND	ug/L	U
Benzo(a)fluoranthene, Total		1	0.08	0.4	ND	ug/L	U
Benzo(a)pyrene	50-32-8	1	0.05	0.2	ND	ug/L	U
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.06	0.2	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	1	0.07	0.2	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	1	0.04	0.2	ND	ug/L	U
1-Methylnaphthalene	90-12-0	1	0.03	0.2	ND	ug/L	U
Surrogate: 2-Fluorophenol					30-160 %	42.6 %	
Surrogate: Phenol-d5					30-160 %	26.9 %	*
Surrogate: 2-Chlorophenol-d4					30-160 %	82.6 %	
Surrogate: 1,2-Dichlorobenzene-d4					30-160 %	77.8 %	
Surrogate: Nitrobenzene-d5					30-160 %	80.5 %	



Analytical Resources, LLC
Analytical Chemists and Consultants

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MW-72-20211711

21K0303-03 (Water)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 11/17/2021 12:06

Instrument: NT10 Analyst: VTS

Analyzed: 12/01/2021 16:07

Analysis by: Analytical Resources, LLC

Analyte	CAS Number	Recovery	Recovery	Units	Notes
		Limits			
Surrogate: 2-Fluorobiphenyl		30-160 %	92.2	%	
Surrogate: 2,4,6-Tribromophenol		30-160 %	94.5	%	
Surrogate: p-Terphenyl-d14		30-160 %	101	%	Q


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MW-72-20211711
21K0303-03 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 11/17/2021 12:06

Instrument: FID4 Analyst: TWC

Analyzed: 11/27/2021 04:29

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: EPA 3510C SepF
 Preparation Batch: BJK0537
 Prepared: 11/22/2021

 Sample Size: 500 mL
 Final Volume: 1 mL

Extract ID: 21K0303-03 D 01

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	0.100	ND	mg/L	U
Motor Oil Range Organics (C24-C38)	RRO	1	0.200	ND	mg/L	U
<i>Surrogate: o-Terphenyl</i>			<i>50-150 %</i>	<i>101</i>	<i>%</i>	



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MW-72-20211711

21K0303-03 (Water)

Aroclor PCB

Method: EPA 8082A

Sampled: 11/17/2021 12:06

Instrument: ECD7 Analyst: JGR

Analyzed: 11/30/2021 23:38

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJK0538 Prepared: 11/23/2021	Sample Size: 1000 mL Final Volume: 0.5 mL	Extract ID: 21K0303-03 A 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJK0302 Cleaned: 29-Nov-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21K0303-03 A 01
Sample Cleanup:	Cleanup Method: Sulfuric Acid Cleanup Batch: CJK0300 Cleaned: 29-Nov-2021	Initial Volume: 0.5 uL Final Volume: 0.5 uL	Extract ID: 21K0303-03 A 01
Sample Cleanup:	Cleanup Method: Sulfur Cleanup Batch: CJK0301 Cleaned: 29-Nov-2021	Initial Volume: 0.5 uL Final Volume: 0.5 uL	Extract ID: 21K0303-03 A 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Aroclor 1016	12674-11-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1221	11104-28-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1232	11141-16-5	1	0.002	0.010	ND	ug/L	U
Aroclor 1242	53469-21-9	1	0.002	0.010	ND	ug/L	U
Aroclor 1248	12672-29-6	1	0.002	0.010	ND	ug/L	U
Aroclor 1254	11097-69-1	1	0.002	0.010	ND	ug/L	U
Aroclor 1260	11096-82-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1262	37324-23-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1268	11100-14-4	1	0.003	0.010	ND	ug/L	U
Surrogate: Decachlorobiphenyl				29-120 %	76.2	%	
Surrogate: Tetrachlorometaxylene				32-120 %	77.8	%	
Surrogate: Decachlorobiphenyl [2C]				29-120 %	75.9	%	
Surrogate: Tetrachlorometaxylene [2C]				32-120 %	78.2	%	


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MW-72-20211711
21K0303-03 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 11/17/2021 12:06

Instrument: ICPMS1 Analyst: MCB

Analyzed: 11/30/2021 22:50

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJK0731 Sample Size: 25 mL
 Prepared: 11/30/2021 Final Volume: 25 mL

Extract ID: 21K0303-03 C 02

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Barium	7440-39-3	1	0.114	0.500	2.13	ug/L	
Chromium	7440-47-3	1	0.260	0.500	ND	ug/L	U
Iron	7439-89-6	1	18.2	36.0	239	ug/L	
Lead	7439-92-1	1	0.0513	0.100	0.0560	ug/L	J
Manganese	7439-96-5	1	0.142	0.500	5.50	ug/L	
Silver	7440-22-4	1	0.0220	0.200	ND	ug/L	U
Vanadium	7440-62-2	1	0.0556	0.200	1.76	ug/L	


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MW-72-20211711
21K0303-03 (Water)
Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 11/17/2021 12:06

Instrument: ICPMS1 Analyst: MCB

Analyzed: 11/30/2021 22:50

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJK0731 Sample Size: 25 mL
 Prepared: 11/30/2021 Final Volume: 25 mL

Extract ID: 21K0303-03 C 02

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	1	0.0373	0.200	0.761	ug/L	
Cadmium	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Cobalt	7440-48-4	1	0.0178	0.200	0.131	ug/L	J
Copper	7440-50-8	1	0.173	0.500	0.898	ug/L	
Nickel	7440-02-0	1	0.0792	0.500	1.28	ug/L	
Selenium	7782-49-2	1	0.179	0.500	ND	ug/L	U
Zinc	7440-66-6	1	2.92	6.00	ND	ug/L	U


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MW-72-20211711
21K0303-03 (Water)
Metals and Metallic Compounds

Method: EPA 7470A

Sampled: 11/17/2021 12:06

Instrument: HYDRA Analyst: ML

Analyzed: 11/23/2021 14:15

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21K0303-03 C

Preparation Batch: BJK0571

Sample Size: 20 mL

Prepared: 11/22/2021

Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000013	0.000100	ND	mg/L	U


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MW-72-20211711
21K0303-04 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 11/17/2021 12:06

Instrument: ICPMS1 Analyst: MCB

Analyzed: 11/30/2021 22:40

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21K0303-04 A 02
	Preparation Batch: BJK0730	Filtration Batch: BJK0466
	Prepared: 11/30/2021	Filtration Date: 11/17/2021 16:21
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection		Reporting		Result	Units	Notes
			Limit	Limit	Limit	Limit			
Barium, Dissolved	7440-39-3	1	0.114	0.500			1.60	ug/L	
Chromium, Dissolved	7440-47-3	1	0.260	0.500			ND	ug/L	U
Iron, Dissolved	7439-89-6	1	18.2	36.0			ND	ug/L	U
Lead, Dissolved	7439-92-1	1	0.0513	0.100			ND	ug/L	U
Manganese, Dissolved	7439-96-5	1	0.142	0.500			3.42	ug/L	
Silver, Dissolved	7440-22-4	1	0.0220	0.200			ND	ug/L	U
Vanadium, Dissolved	7440-62-2	1	0.0556	0.200			1.34	ug/L	


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MW-72-20211711
21K0303-04 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 11/17/2021 12:06

Instrument: ICPMS1 Analyst: MCB

Analyzed: 11/30/2021 22:40

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21K0303-04 A 02
	Preparation Batch: BJK0730	Filtration Batch: BJK0466
	Prepared: 11/30/2021	Filtration Date: 11/17/2021 16:21
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection		Reporting		Result	Units	Notes
			Limit	Limit	Limit	Limit			
Arsenic, Dissolved	7440-38-2	1	0.0373	0.200			0.606	ug/L	
Cadmium, Dissolved	7440-43-9	1	0.0300	0.100			0.0390	ug/L	J
Cobalt, Dissolved	7440-48-4	1	0.0178	0.200			0.0640	ug/L	J
Copper, Dissolved	7440-50-8	1	0.173	0.500			0.654	ug/L	
Nickel, Dissolved	7440-02-0	1	0.0792	0.500			1.09	ug/L	
Selenium, Dissolved	7782-49-2	1	0.179	0.500			ND	ug/L	U
Zinc, Dissolved	7440-66-6	1	2.92	6.00			ND	ug/L	U



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MW-72-20211711

21K0303-04 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 7470A

Sampled: 11/17/2021 12:06

Instrument: HYDRA Analyst: SKD

Analyzed: 12/02/2021 17:25

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21K0303-04 A 01

Preparation Batch: BJJ0027

Sample Size: 20 mL

Filtration Batch: BJK0466

Prepared: 12/01/2021

Final Volume: 20 mL

Filtration Date: 11/17/2021 16:21

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury, Dissolved	7439-97-6	1	0.000013	0.000100	ND	mg/L	U


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 13:43

MW-8-20211711
21K0303-05 (Water)
Volatile Organic Compounds

Method: EPA 8260D

Sampled: 11/17/2021 13:10

Instrument: NT3 Analyst: PKC

Analyzed: 11/22/2021 11:28

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0303-05 D

Preparation Batch: BJK0565

Sample Size: 10 mL

Prepared: 11/22/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Benzene	71-43-2	1	0.05	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.05	0.20	0.07	ug/L	J
Ethylbenzene	100-41-4	1	0.05	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.14	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.08	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.22	0.60	ND	ug/L	U
Methyl tert-butyl Ether	1634-04-4	1	0.14	0.50	ND	ug/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				80-129 %	103	%	
<i>Surrogate: Toluene-d8</i>				80-120 %	101	%	
<i>Surrogate: 4-Bromofluorobenzene</i>				80-120 %	102	%	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				80-120 %	101	%	


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 13:43

MW-8-20211711
21K0303-05 (Water)
Volatile Organic Compounds

Method: NWTPHg

Sampled: 11/17/2021 13:10

Instrument: NT3 Analyst: PKC

Analyzed: 11/22/2021 11:28

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0303-05 D

Preparation Batch: BJK0565

Sample Size: 10 mL

Prepared: 11/22/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Gasoline Range Organics (Tol-Nap)	GRO	1	100	ND	ug/L	U
<i>Surrogate: Toluene-d8</i>			80-120 %	101	%	
<i>Surrogate: 4-Bromofluorobenzene</i>			80-120 %	102	%	


 Shannon & Wilson, Inc
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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 13:43

MW-8-20211711
21K0303-05 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 11/17/2021 13:10

Instrument: FID4 Analyst: TWC

Analyzed: 11/27/2021 04:49

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21K0303-05 B 01

Preparation Batch: BJK0537

Sample Size: 500 mL

Prepared: 11/22/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	0.100	ND	mg/L	U
Motor Oil Range Organics (C24-C38)	RRO	1	0.200	ND	mg/L	U
<i>Surrogate: o-Terphenyl</i>			<i>50-150 %</i>	<i>97.2</i>	<i>%</i>	


 Shannon & Wilson, Inc
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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 13:43

MW-8-20211711
21K0303-05 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 11/17/2021 13:10

Instrument: ICPMS1 Analyst: MCB

Analyzed: 12/01/2021 19:02

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO₃ matrix
 Preparation Batch: BJK0731 Sample Size: 25 mL
 Prepared: 11/30/2021 Final Volume: 25 mL

Extract ID: 21K0303-05 A 01

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Silver	7440-22-4	1	0.0220	0.200	ND	ug/L	U


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 13:43

MW-8-20211711
21K0303-05 (Water)
Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 11/17/2021 13:10

Instrument: ICPMS1 Analyst: MCB

Analyzed: 11/30/2021 22:55

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJK0731 Sample Size: 25 mL
 Prepared: 11/30/2021 Final Volume: 25 mL

Extract ID: 21K0303-05 A 01

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	1	0.0373	0.200	26.5	ug/L	
Nickel	7440-02-0	1	0.0792	0.500	0.997	ug/L	
Selenium	7782-49-2	1	0.179	0.500	ND	ug/L	U
Zinc	7440-66-6	1	2.92	6.00	ND	ug/L	U



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
14-Dec-2021 13:43

MW-8-20211711
21K0303-05 (Water)

Metals and Metallic Compounds

Method: EPA 7470A

Sampled: 11/17/2021 13:10

Instrument: HYDRA Analyst: ML

Analyzed: 11/23/2021 14:31

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21K0303-05 A

Preparation Batch: BJK0571

Sample Size: 20 mL

Prepared: 11/22/2021

Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000013	0.000100	ND	mg/L	U


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 13:43

MW-8-20211711
21K0303-06 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 11/17/2021 13:10

Instrument: ICPMS1 Analyst: MCB

Analyzed: 12/01/2021 19:58

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21K0303-06 A 02

Preparation Batch: BJK0730

Sample Size: 25 mL

Filtration Batch: BJK0466

Prepared: 11/30/2021

Final Volume: 25 mL

Filtration Date: 11/17/2021 16:21

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Silver, Dissolved	7440-22-4	1	0.0220	0.200	ND	ug/L	U


 Shannon & Wilson, Inc
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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 13:43

MW-8-20211711
21K0303-06 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 11/17/2021 13:10

Instrument: ICPMS1 Analyst: MCB

Analyzed: 11/30/2021 22:45

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21K0303-06 A 02
	Preparation Batch: BJK0730	Filtration Batch: BJK0466
	Prepared: 11/30/2021	Filtration Date: 11/17/2021 16:21
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic, Dissolved	7440-38-2	1	0.0373	0.200	25.6	ug/L	
Nickel, Dissolved	7440-02-0	1	0.0792	0.500	0.891	ug/L	
Selenium, Dissolved	7782-49-2	1	0.179	0.500	0.213	ug/L	J
Zinc, Dissolved	7440-66-6	1	2.92	6.00	ND	ug/L	U



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
14-Dec-2021 13:43

MW-8-20211711
21K0303-06 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 7470A

Sampled: 11/17/2021 13:10

Instrument: HYDRA Analyst: SKD

Analyzed: 12/02/2021 17:44

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21K0303-06 A 01

Preparation Batch: BJJ0027

Sample Size: 20 mL

Filtration Batch: BJK0466

Prepared: 12/01/2021

Final Volume: 20 mL

Filtration Date: 11/17/2021 16:21

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury, Dissolved	7439-97-6	1	0.000013	0.000100	ND	mg/L	U


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 13:43

MW-68-20211711
21K0303-07 (Water)
Volatile Organic Compounds

Method: EPA 8260D

Sampled: 11/17/2021 14:10

Instrument: NT3 Analyst: PKC

Analyzed: 11/22/2021 11:53

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0303-07 J

Preparation Batch: BJK0565

Sample Size: 10 mL

Prepared: 11/22/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.05	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	0.18	ug/L	J
Toluene	108-88-3	1	0.05	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.05	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.14	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.08	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.22	0.60	ND	ug/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				80-129 %	96.2	%	
<i>Surrogate: Toluene-d8</i>				80-120 %	104	%	
<i>Surrogate: 4-Bromofluorobenzene</i>				80-120 %	104	%	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				80-120 %	102	%	


 Shannon & Wilson, Inc
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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 13:43

MW-68-20211711
21K0303-07 (Water)
Volatile Organic Compounds - SIM

Method: EPA 8260D-SIM

Sampled: 11/17/2021 14:10

Instrument: NT7 Analyst: PB

Analyzed: 11/29/2021 15:49

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0303-07 K

Preparation Batch: BJK0712

Sample Size: 10 mL

Prepared: 11/29/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	5.01	20.0	42.3	ng/L	M
<i>Surrogate: 1,2-Dichloroethane-d4</i>				80-129 %	110	%	
<i>Surrogate: Toluene-d8</i>				80-120 %	98.4	%	



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
14-Dec-2021 13:43

MW-68-20211711

21K0303-07 (Water)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 11/17/2021 14:10

Instrument: NT10 Analyst: VTS

Analyzed: 12/01/2021 16:45

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 3510C SepF
Preparation Batch: BJK0540
Prepared: 11/23/2021

Sample Size: 1000 mL
Final Volume: 1 mL

Extract ID: 21K0303-07 B 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Phenol	108-95-2	1	0.01	0.2	ND	ug/L	U
bis(2-chloroethyl) ether	111-44-4	1	0.03	0.2	ND	ug/L	U
2-Chlorophenol	95-57-8	1	0.03	0.2	ND	ug/L	U
1,3-Dichlorobenzene	541-73-1	1	0.03	0.2	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.03	0.2	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.03	0.2	ND	ug/L	U
Benzyl Alcohol	100-51-6	1	0.02	0.2	ND	ug/L	U
2,2'-Oxybis(1-chloropropane)	108-60-1	1	0.03	0.2	ND	ug/L	U
2-Methylphenol	95-48-7	1	0.03	0.2	ND	ug/L	U
Hexachloroethane	67-72-1	1	0.04	0.2	ND	ug/L	U
N-Nitroso-di-n-Propylamine	621-64-7	1	0.04	0.2	ND	ug/L	U
4-Methylphenol	106-44-5	1	0.03	0.2	ND	ug/L	U
Nitrobenzene	98-95-3	1	0.03	0.2	ND	ug/L	U
Isophorone	78-59-1	1	0.03	0.2	ND	ug/L	U
2-Nitrophenol	88-75-5	1	0.04	1.0	ND	ug/L	U
2,4-Dimethylphenol	105-67-9	1	0.3	1.0	ND	ug/L	U
Bis(2-Chloroethoxy)methane	111-91-1	1	0.03	0.2	ND	ug/L	U
2,4-Dichlorophenol	120-83-2	1	0.1	1.0	ND	ug/L	U
1,2,4-Trichlorobenzene	120-82-1	1	0.03	0.2	ND	ug/L	U
Naphthalene	91-20-3	1	0.03	0.2	ND	ug/L	U
Benzoic acid	65-85-0	1	0.1	2.0	ND	ug/L	U
4-Chloroaniline	106-47-8	1	0.04	1.0	ND	ug/L	U
Hexachlorobutadiene	87-68-3	1	0.04	0.2	ND	ug/L	U
4-Chloro-3-Methylphenol	59-50-7	1	0.1	1.0	ND	ug/L	U
2-Methylnaphthalene	91-57-6	1	0.03	0.2	ND	ug/L	U
Hexachlorocyclopentadiene	77-47-4	1	0.1	1.0	ND	ug/L	U
2,4,6-Trichlorophenol	88-06-2	1	0.2	1.0	ND	ug/L	U
2,4,5-Trichlorophenol	95-95-4	1	0.1	1.0	ND	ug/L	U
2-Chloronaphthalene	91-58-7	1	0.03	0.2	ND	ug/L	U
2-Nitroaniline	88-74-4	1	0.2	1.0	ND	ug/L	U
Acenaphthylene	208-96-8	1	0.02	0.2	ND	ug/L	U
Dimethylphthalate	131-11-3	1	0.04	0.2	ND	ug/L	U
2,6-Dinitrotoluene	606-20-2	1	0.2	1.0	ND	ug/L	U
Acenaphthene	83-32-9	1	0.03	0.2	ND	ug/L	U



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
14-Dec-2021 13:43

MW-68-20211711

21K0303-07 (Water)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 11/17/2021 14:10

Instrument: NT10 Analyst: VTS

Analyzed: 12/01/2021 16:45

Analysis by: Analytical Resources, LLC

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
3-Nitroaniline	99-09-2	1	0.2	1.0	ND	ug/L	U
2,4-Dinitrophenol	51-28-5	1	0.2	2.0	ND	ug/L	U
Dibenzofuran	132-64-9	1	0.02	0.2	ND	ug/L	U
4-Nitrophenol	100-02-7	1	0.06	1.0	ND	ug/L	U
2,4-Dinitrotoluene	121-14-2	1	0.1	1.0	ND	ug/L	U
Fluorene	86-73-7	1	0.02	0.2	ND	ug/L	U
4-Chlorophenylphenyl ether	7005-72-3	1	0.02	0.2	ND	ug/L	U
Diethyl phthalate	84-66-2	1	0.06	0.2	ND	ug/L	U
4-Nitroaniline	100-01-6	1	0.2	1.0	ND	ug/L	U
4,6-Dinitro-2-methylphenol	534-52-1	1	0.4	2.0	ND	ug/L	U
N-Nitrosodiphenylamine	86-30-6	1	0.03	0.2	ND	ug/L	U
4-Bromophenyl phenyl ether	101-55-3	1	0.02	0.2	ND	ug/L	U
Hexachlorobenzene	118-74-1	1	0.04	0.2	ND	ug/L	U
Pentachlorophenol	87-86-5	1	0.1	1.0	ND	ug/L	U
Phenanthrene	85-01-8	1	0.02	0.2	ND	ug/L	U
Anthracene	120-12-7	1	0.03	0.2	ND	ug/L	U
Carbazole	86-74-8	1	0.04	0.2	ND	ug/L	U
Di-n-Butylphthalate	84-74-2	1	0.05	0.2	ND	ug/L	U
Fluoranthene	206-44-0	1	0.03	0.2	ND	ug/L	U
Pyrene	129-00-0	1	0.03	0.2	ND	ug/L	U
Butylbenzylphthalate	85-68-7	1	0.07	0.2	ND	ug/L	U
Benzo(a)anthracene	56-55-3	1	0.04	0.2	ND	ug/L	U
3,3'-Dichlorobenzidine	91-94-1	1	0.3	1.0	ND	ug/L	U
Chrysene	218-01-9	1	0.04	0.2	ND	ug/L	U
bis(2-Ethylhexyl)phthalate	117-81-7	1	0.2	0.2	0.2	ug/L	J
Di-n-Octylphthalate	117-84-0	1	0.05	0.2	ND	ug/L	U
Benzo(a)fluoranthene, Total		1	0.08	0.4	ND	ug/L	U
Benzo(a)pyrene	50-32-8	1	0.05	0.2	ND	ug/L	U
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.06	0.2	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	1	0.07	0.2	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	1	0.04	0.2	ND	ug/L	U
1-Methylnaphthalene	90-12-0	1	0.03	0.2	ND	ug/L	U
Surrogate: 2-Fluorophenol				30-160 %	47.5	%	
Surrogate: Phenol-d5				30-160 %	30.5	%	
Surrogate: 2-Chlorophenol-d4				30-160 %	89.1	%	
Surrogate: 1,2-Dichlorobenzene-d4				30-160 %	83.7	%	
Surrogate: Nitrobenzene-d5				30-160 %	85.0	%	



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
14-Dec-2021 13:43

MW-68-20211711

21K0303-07 (Water)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 11/17/2021 14:10

Instrument: NT10 Analyst: VTS

Analyzed: 12/01/2021 16:45

Analysis by: Analytical Resources, LLC

Analyte	CAS Number	Recovery Limits	Recovery	Units	Notes
Surrogate: 2-Fluorobiphenyl		30-160 %	100	%	
Surrogate: 2,4,6-Tribromophenol		30-160 %	96.3	%	
Surrogate: p-Terphenyl-d14		30-160 %	117	%	Q


 Shannon & Wilson, Inc
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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 13:43

MW-68-20211711
21K0303-07 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 11/17/2021 14:10

Instrument: FID4 Analyst: TWC

Analyzed: 11/27/2021 05:08

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21K0303-07 D 01

Preparation Batch: BJK0537

Sample Size: 500 mL

Prepared: 11/22/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	0.100	0.337	mg/L	
HC ID: DRO						
Motor Oil Range Organics (C24-C38)	RRO	1	0.200	0.274	mg/L	
HC ID: MOTOR OIL						
Surrogate: o-Terphenyl			50-150 %	90.0	%	



Analytical Report

Shannon & Wilson, Inc
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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
14-Dec-2021 13:43

MW-68-20211711

21K0303-07 (Water)

Aroclor PCB

Method: EPA 8082A

Sampled: 11/17/2021 14:10

Instrument: ECD7 Analyst: JGR

Analyzed: 11/30/2021 23:59

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJK0538 Prepared: 11/23/2021	Sample Size: 1000 mL Final Volume: 0.5 mL	Extract ID: 21K0303-07 A 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJK0302 Cleaned: 29-Nov-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21K0303-07 A 01
Sample Cleanup:	Cleanup Method: Sulfuric Acid Cleanup Batch: CJK0300 Cleaned: 29-Nov-2021	Initial Volume: 0.5 uL Final Volume: 0.5 uL	Extract ID: 21K0303-07 A 01
Sample Cleanup:	Cleanup Method: Sulfur Cleanup Batch: CJK0301 Cleaned: 29-Nov-2021	Initial Volume: 0.5 uL Final Volume: 0.5 uL	Extract ID: 21K0303-07 A 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Aroclor 1016	12674-11-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1221	11104-28-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1232	11141-16-5	1	0.002	0.010	ND	ug/L	U
Aroclor 1242	53469-21-9	1	0.002	0.010	ND	ug/L	U
Aroclor 1248	12672-29-6	1	0.002	0.010	ND	ug/L	U
Aroclor 1254	11097-69-1	1	0.002	0.010	0.003	ug/L	J
Aroclor 1260	11096-82-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1262	37324-23-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1268	11100-14-4	1	0.003	0.010	ND	ug/L	U

Surrogate: Decachlorobiphenyl

29-120 % 80.3 %

Surrogate: Tetrachlorometaxylene

32-120 % 74.3 %

Surrogate: Decachlorobiphenyl [2C]

29-120 % 86.2 %

Surrogate: Tetrachlorometaxylene [2C]

32-120 % 75.2 %


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 13:43

MW-68-20211711
21K0303-07 (Water)
Metals and Metallic Compounds

Method: EPA 6010D

Sampled: 11/17/2021 14:10

Instrument: ICP2 Analyst: MVP

Analyzed: 11/19/2021 19:05

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWC EPA 3010A

Extract ID: 21K0303-07 C

Preparation Batch: BJK0505

Sample Size: 25 mL

Prepared: 11/18/2021

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Calcium	7440-70-2	1	0.0220	0.0500	41.7	mg/L	
Magnesium	7439-95-4	1	0.0209	0.0500	0.550	mg/L	


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 13:43

MW-68-20211711
21K0303-07 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 11/17/2021 14:10

Instrument: ICPMS1 Analyst: MCB

Analyzed: 11/30/2021 23:01

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJK0731 Sample Size: 25 mL
 Prepared: 11/30/2021 Final Volume: 25 mL

Extract ID: 21K0303-07 C 02

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Barium	7440-39-3	1	0.114	0.500	5.54	ug/L	
Chromium	7440-47-3	1	0.260	0.500	14.4	ug/L	
Iron	7439-89-6	1	18.2	36.0	327	ug/L	
Lead	7439-92-1	1	0.0513	0.100	1.52	ug/L	
Manganese	7439-96-5	1	0.142	0.500	25.0	ug/L	
Silver	7440-22-4	1	0.0220	0.200	ND	ug/L	U
Vanadium	7440-62-2	1	0.0556	0.200	100	ug/L	


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 Project Manager: Meg Strong

Reported:
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MW-68-20211711
21K0303-07 (Water)
Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 11/17/2021 14:10

Instrument: ICPMS1 Analyst: MCB

Analyzed: 11/30/2021 23:01

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJK0731 Sample Size: 25 mL
 Prepared: 11/30/2021 Final Volume: 25 mL

Extract ID: 21K0303-07 C 02

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	1	0.0373	0.200	14.1	ug/L	
Cadmium	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Cobalt	7440-48-4	1	0.0178	0.200	0.239	ug/L	
Copper	7440-50-8	1	0.173	0.500	8.31	ug/L	
Nickel	7440-02-0	1	0.0792	0.500	1.21	ug/L	
Selenium	7782-49-2	1	0.179	0.500	2.00	ug/L	
Zinc	7440-66-6	1	2.92	6.00	5.82	ug/L	J


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Reported:
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MW-68-20211711
21K0303-07 (Water)
Metals and Metallic Compounds

Method: EPA 7470A

Sampled: 11/17/2021 14:10

Instrument: HYDRA Analyst: ML

Analyzed: 11/23/2021 14:33

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21K0303-07 C

Preparation Batch: BJK0571

Sample Size: 20 mL

Prepared: 11/22/2021

Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000013	0.000100	ND	mg/L	U



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
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Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
14-Dec-2021 13:43

MW-68-20211711

21K0303-07 (Water)

Metals and Metallic Compounds

Method: SM 2340 B-97

Sampled: 11/17/2021 14:10

Instrument: [CALC] Analyst: MVP

Analyzed: 11/23/2021 15:37

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: [CALC]

Extract ID: 21K0303-07

Preparation Batch: [CALC]

Prepared: 11/18/2021

Final Volume: 1

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Hardness		1		106	mg/L CaCO ₃	


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
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MW-68-20211711
21K0303-08 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 11/17/2021 14:10

Instrument: ICPMS1 Analyst: MCB

Analyzed: 11/30/2021 21:56

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21K0303-08 A 02
	Preparation Batch: BJK0730	Filtration Batch: BJK0466
	Prepared: 11/30/2021	Filtration Date: 11/17/2021 16:21
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection		Reporting		Result	Units	Notes
			Limit	Limit	Limit	Limit			
Barium, Dissolved	7440-39-3	1	0.114	0.500			3.48	ug/L	
Chromium, Dissolved	7440-47-3	1	0.260	0.500			12.4	ug/L	
Iron, Dissolved	7439-89-6	1	18.2	36.0			27.0	ug/L	J
Lead, Dissolved	7439-92-1	1	0.0513	0.100			0.0730	ug/L	J
Manganese, Dissolved	7439-96-5	1	0.142	0.500			3.77	ug/L	
Silver, Dissolved	7440-22-4	1	0.0220	0.200			ND	ug/L	U
Vanadium, Dissolved	7440-62-2	1	0.0556	0.200			95.9	ug/L	


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 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
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MW-68-20211711
21K0303-08 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 11/17/2021 14:10

Instrument: ICPMS1 Analyst: MCB

Analyzed: 11/30/2021 21:56

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21K0303-08 A 02
	Preparation Batch: BJK0730	Filtration Batch: BJK0466
	Prepared: 11/30/2021	Filtration Date: 11/17/2021 16:21
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic, Dissolved	7440-38-2	1	0.0373	0.200	13.2	ug/L	
Cadmium, Dissolved	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Cobalt, Dissolved	7440-48-4	1	0.0178	0.200	0.0850	ug/L	J
Copper, Dissolved	7440-50-8	1	0.173	0.500	6.35	ug/L	
Nickel, Dissolved	7440-02-0	1	0.0792	0.500	0.647	ug/L	
Selenium, Dissolved	7782-49-2	1	0.179	0.500	1.58	ug/L	
Zinc, Dissolved	7440-66-6	1	2.92	6.00	ND	ug/L	U


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
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MW-68-20211711
21K0303-08 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 7470A

Sampled: 11/17/2021 14:10

Instrument: HYDRA Analyst: SKD

Analyzed: 12/02/2021 17:46

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21K0303-08 A 01

Preparation Batch: BJJ0027

Sample Size: 20 mL

Filtration Batch: BJK0466

Prepared: 12/01/2021

Final Volume: 20 mL

Filtration Date: 11/17/2021 16:21

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury, Dissolved	7439-97-6	1	0.000013	0.000100	0.000015	mg/L	J



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
14-Dec-2021 13:43

TB-6-20211711
21K0303-09 (Water)

Volatile Organic Compounds

Method: EPA 8260D

Sampled: 11/17/2021 13:20

Instrument: NT3 Analyst: PKC

Analyzed: 11/18/2021 15:32

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0303-09 B

Preparation Batch: BJK0477

Sample Size: 10 mL

Prepared: 11/18/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.05	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.05	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.05	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.14	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.08	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.22	0.60	ND	ug/L	U
Methyl tert-butyl Ether	1634-04-4	1	0.14	0.50	ND	ug/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				80-129 %	105	%	
<i>Surrogate: Toluene-d8</i>				80-120 %	106	%	
<i>Surrogate: 4-Bromofluorobenzene</i>				80-120 %	101	%	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				80-120 %	101	%	


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 13:43

TB-6-20211711
21K0303-09 (Water)
Volatile Organic Compounds - SIM

Method: EPA 8260D-SIM

Sampled: 11/17/2021 13:20

Instrument: NT7 Analyst: PB

Analyzed: 11/29/2021 16:18

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0303-09 E

Preparation Batch: BJK0712

Sample Size: 10 mL

Prepared: 11/29/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	5.01	20.0	ND	ng/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				80-129 %	108	%	
<i>Surrogate: Toluene-d8</i>				80-120 %	97.9	%	


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 13:43

Analysis by: Analytical Resources, LLC
Volatile Organic Compounds - Quality Control
Batch BJK0477 - EPA 5030C (Purge and Trap)

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0477-BLK2)						Prepared: 18-Nov-2021 Analyzed: 18-Nov-2021 14:16					
Vinyl Chloride	ND	0.08	0.20	ug/L							U
1,1-Dichloroethene	ND	0.08	0.20	ug/L							U
trans-1,2-Dichloroethene	ND	0.07	0.20	ug/L							U
cis-1,2-Dichloroethene	ND	0.08	0.20	ug/L							U
Benzene	ND	0.05	0.20	ug/L							U
Trichloroethene	ND	0.07	0.20	ug/L							U
Toluene	ND	0.05	0.20	ug/L							U
Tetrachloroethene	ND	0.09	0.20	ug/L							U
Ethylbenzene	ND	0.05	0.20	ug/L							U
m,p-Xylene	ND	0.14	0.40	ug/L							U
o-Xylene	ND	0.08	0.20	ug/L							U
Xylenes, total	ND	0.22	0.60	ug/L							U
Methyl tert-butyl Ether	ND	0.14	0.50	ug/L							U
<i>Surrogate: 1,2-Dichloroethane-d4</i>	4.59			ug/L	5.00		91.8	80-129			
<i>Surrogate: Toluene-d8</i>	5.07			ug/L	5.00		101	80-120			
<i>Surrogate: 4-Bromofluorobenzene</i>	5.36			ug/L	5.00		107	80-120			
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	5.24			ug/L	5.00		105	80-120			
LCS (BJK0477-BS2)						Prepared: 18-Nov-2021 Analyzed: 18-Nov-2021 12:35					
Vinyl Chloride	10.2	0.08	0.20	ug/L	10.0		102	66-133			
1,1-Dichloroethene	9.57	0.08	0.20	ug/L	10.0		95.7	69-135			
trans-1,2-Dichloroethene	9.67	0.07	0.20	ug/L	10.0		96.7	78-128			
cis-1,2-Dichloroethene	10.0	0.08	0.20	ug/L	10.0		100	80-121			
Benzene	10.7	0.05	0.20	ug/L	10.0		107	80-120			
Trichloroethene	10.5	0.07	0.20	ug/L	10.0		105	80-120			
Toluene	10.8	0.05	0.20	ug/L	10.0		108	80-120			
Tetrachloroethene	11.2	0.09	0.20	ug/L	10.0		112	80-120			
Ethylbenzene	10.7	0.05	0.20	ug/L	10.0		107	80-120			
m,p-Xylene	21.3	0.14	0.40	ug/L	20.0		106	80-121			
o-Xylene	10.5	0.08	0.20	ug/L	10.0		105	80-121			
Xylenes, total	31.8	0.22	0.60	ug/L	30.0		106	76-127			
Methyl tert-butyl Ether	9.55	0.14	0.50	ug/L	10.0		95.5	71-132			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	4.84			ug/L	5.00		96.8	80-129			
<i>Surrogate: Toluene-d8</i>	5.30			ug/L	5.00		106	80-120			


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 13:43

Analysis by: Analytical Resources, LLC
Volatile Organic Compounds - Quality Control
Batch BJK0477 - EPA 5030C (Purge and Trap)

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJK0477-BS2)						Prepared: 18-Nov-2021 Analyzed: 18-Nov-2021 12:35					
Surrogate: 4-Bromofluorobenzene	5.19			ug/L	5.00		104	80-120			
Surrogate: 1,2-Dichlorobenzene-d4	5.16			ug/L	5.00		103	80-120			
LCS Dup (BJK0477-BSD2)						Prepared: 18-Nov-2021 Analyzed: 18-Nov-2021 13:26					
Vinyl Chloride	10.3	0.08	0.20	ug/L	10.0		103	66-133	0.69	30	
1,1-Dichloroethene	9.47	0.08	0.20	ug/L	10.0		94.7	69-135	1.00	30	
trans-1,2-Dichloroethene	10.2	0.07	0.20	ug/L	10.0		102	78-128	5.01	30	
cis-1,2-Dichloroethene	10.2	0.08	0.20	ug/L	10.0		102	80-121	1.36	30	
Benzene	10.9	0.05	0.20	ug/L	10.0		109	80-120	1.06	30	
Trichloroethene	10.6	0.07	0.20	ug/L	10.0		106	80-120	0.65	30	
Toluene	10.8	0.05	0.20	ug/L	10.0		108	80-120	0.42	30	
Tetrachloroethene	10.6	0.09	0.20	ug/L	10.0		106	80-120	5.38	30	
Ethylbenzene	10.2	0.05	0.20	ug/L	10.0		102	80-120	4.62	30	
m,p-Xylene	20.8	0.14	0.40	ug/L	20.0		104	80-121	2.42	30	
o-Xylene	10.3	0.08	0.20	ug/L	10.0		103	80-121	1.42	30	
Xylenes, total	31.1	0.22	0.60	ug/L	30.0		104	76-127	2.09	30	
Methyl tert-butyl Ether	9.61	0.14	0.50	ug/L	10.0		96.1	71-132	0.62	30	
Surrogate: 1,2-Dichloroethane-d4	4.68			ug/L	5.00		93.6	80-129			
Surrogate: Toluene-d8	5.38			ug/L	5.00		108	80-120			
Surrogate: 4-Bromofluorobenzene	5.30			ug/L	5.00		106	80-120			
Surrogate: 1,2-Dichlorobenzene-d4	5.11			ug/L	5.00		102	80-120			



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
14-Dec-2021 13:43

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - Quality Control

Batch BJK0565 - EPA 5030C (Purge and Trap)

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0565-BLK1)		Prepared: 22-Nov-2021 Analyzed: 22-Nov-2021 10:12								
Gasoline Range Organics (Tol-Nap)	ND	100	ug/L							U
Surrogate: Toluene-d8	5.17		ug/L	5.00	103		80-120			
Surrogate: 4-Bromofluorobenzene	5.16		ug/L	5.00	103		80-120			

Blank (BJK0565-BLK2)		Prepared: 22-Nov-2021 Analyzed: 22-Nov-2021 10:12								
Vinyl Chloride	ND	0.08	0.20	ug/L						U
1,1-Dichloroethene	ND	0.08	0.20	ug/L						U
trans-1,2-Dichloroethene	ND	0.07	0.20	ug/L						U
cis-1,2-Dichloroethene	ND	0.08	0.20	ug/L						U
Benzene	ND	0.05	0.20	ug/L						U
Trichloroethene	ND	0.07	0.20	ug/L						U
Toluene	ND	0.05	0.20	ug/L						U
Tetrachloroethene	ND	0.09	0.20	ug/L						U
Ethylbenzene	ND	0.05	0.20	ug/L						U
m,p-Xylene	ND	0.14	0.40	ug/L						U
o-Xylene	ND	0.08	0.20	ug/L						U
Xylenes, total	ND	0.22	0.60	ug/L						U
Methyl tert-butyl Ether	ND	0.14	0.50	ug/L						U
Surrogate: 1,2-Dichloroethane-d4	4.80		ug/L	5.00	95.9		80-129			
Surrogate: Toluene-d8	5.17		ug/L	5.00	103		80-120			
Surrogate: 4-Bromofluorobenzene	5.16		ug/L	5.00	103		80-120			
Surrogate: 1,2-Dichlorobenzene-d4	5.11		ug/L	5.00	102		80-120			

LCS (BJK0565-BS1)		Prepared: 22-Nov-2021 Analyzed: 22-Nov-2021 08:06								
Gasoline Range Organics (Tol-Nap)	870	100	ug/L	1000	87.0		72-128			
Surrogate: Toluene-d8	5.08		ug/L	5.00	102		80-120			
Surrogate: 4-Bromofluorobenzene	5.57		ug/L	5.00	111		80-120			

LCS (BJK0565-BS2)		Prepared: 22-Nov-2021 Analyzed: 22-Nov-2021 08:31								
Vinyl Chloride	9.76	0.08	0.20	ug/L	10.0	97.6	66-133			
1,1-Dichloroethene	9.57	0.08	0.20	ug/L	10.0	95.7	69-135			
trans-1,2-Dichloroethene	9.35	0.07	0.20	ug/L	10.0	93.5	78-128			
cis-1,2-Dichloroethene	10.1	0.08	0.20	ug/L	10.0	101	80-121			
Benzene	10.5	0.05	0.20	ug/L	10.0	105	80-120			



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
14-Dec-2021 13:43

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - Quality Control

Batch BJK0565 - EPA 5030C (Purge and Trap)

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJK0565-BS2)						Prepared: 22-Nov-2021	Analyzed: 22-Nov-2021 08:31				
Trichloroethene	10.5	0.07	0.20	ug/L	10.0		105	80-120			
Toluene	10.7	0.05	0.20	ug/L	10.0		107	80-120			
Tetrachloroethene	11.1	0.09	0.20	ug/L	10.0		111	80-120			
Ethylbenzene	10.5	0.05	0.20	ug/L	10.0		105	80-120			
m,p-Xylene	21.1	0.14	0.40	ug/L	20.0		105	80-121			
o-Xylene	10.3	0.08	0.20	ug/L	10.0		103	80-121			
Xylenes, total	31.4	0.22	0.60	ug/L	30.0		105	76-127			
Methyl tert-butyl Ether	9.56	0.14	0.50	ug/L	10.0		95.6	71-132			
Surrogate: 1,2-Dichloroethane-d4	4.71			ug/L	5.00		94.2	80-129			
Surrogate: Toluene-d8	5.29			ug/L	5.00		106	80-120			
Surrogate: 4-Bromofluorobenzene	5.60			ug/L	5.00		112	80-120			
Surrogate: 1,2-Dichlorobenzene-d4	5.12			ug/L	5.00		102	80-120			
LCS Dup (BJK0565-BSD1)						Prepared: 22-Nov-2021	Analyzed: 22-Nov-2021 08:57				
Gasoline Range Organics (Tol-Nap)	883		100	ug/L	1000		88.3	72-128	1.58	30	
Surrogate: Toluene-d8	5.22			ug/L	5.00		104	80-120			
Surrogate: 4-Bromofluorobenzene	5.46			ug/L	5.00		109	80-120			
LCS Dup (BJK0565-BSD2)						Prepared: 22-Nov-2021	Analyzed: 22-Nov-2021 09:22				
Vinyl Chloride	9.79	0.08	0.20	ug/L	10.0		97.9	66-133	0.25	30	
1,1-Dichloroethene	9.40	0.08	0.20	ug/L	10.0		94.0	69-135	1.74	30	
trans-1,2-Dichloroethene	9.99	0.07	0.20	ug/L	10.0		99.9	78-128	6.62	30	
cis-1,2-Dichloroethene	9.87	0.08	0.20	ug/L	10.0		98.7	80-121	1.97	30	
Benzene	10.6	0.05	0.20	ug/L	10.0		106	80-120	0.55	30	
Trichloroethene	10.4	0.07	0.20	ug/L	10.0		104	80-120	0.90	30	
Toluene	10.6	0.05	0.20	ug/L	10.0		106	80-120	0.98	30	
Tetrachloroethene	11.0	0.09	0.20	ug/L	10.0		110	80-120	0.44	30	
Ethylbenzene	10.1	0.05	0.20	ug/L	10.0		101	80-120	3.86	30	
m,p-Xylene	20.9	0.14	0.40	ug/L	20.0		105	80-121	0.69	30	
o-Xylene	10.2	0.08	0.20	ug/L	10.0		102	80-121	0.68	30	
Xylenes, total	31.2	0.22	0.60	ug/L	30.0		104	76-127	0.69	30	
Methyl tert-butyl Ether	10.1	0.14	0.50	ug/L	10.0		101	71-132	5.67	30	
Surrogate: 1,2-Dichloroethane-d4	4.75			ug/L	5.00		94.9	80-129			
Surrogate: Toluene-d8	5.14			ug/L	5.00		103	80-120			


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 13:43

Analysis by: Analytical Resources, LLC
Volatile Organic Compounds - Quality Control
Batch BJK0565 - EPA 5030C (Purge and Trap)

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BJK0565-BSD2)					Prepared: 22-Nov-2021		Analyzed: 22-Nov-2021 09:22				
Surrogate: 4-Bromofluorobenzene	5.33			ug/L	5.00	107		80-120			
Surrogate: 1,2-Dichlorobenzene-d4	5.11			ug/L	5.00	102		80-120			


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 Project Manager: Meg Strong

Reported:
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Analysis by: Analytical Resources, LLC
Volatile Organic Compounds - SIM - Quality Control
Batch BJK0712 - EPA 5030C (Purge and Trap)

Instrument: NT7 Analyst: PB

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0712-BLK1)					Prepared: 29-Nov-2021		Analyzed: 29-Nov-2021 11:54				
Vinyl chloride	ND	5.01	20.0	ng/L							U
Surrogate: 1,2-Dichloroethane-d4	6130			ng/L	5000		123	80-129			
Surrogate: Toluene-d8	4780			ng/L	5000		95.5	80-120			
LCS (BJK0712-BS1)					Prepared: 29-Nov-2021		Analyzed: 29-Nov-2021 09:33				
Vinyl chloride	410	5.01	20.0	ng/L	500		82.0	62-141			
Surrogate: 1,2-Dichloroethane-d4	4850			ng/L	5000		97.0	80-129			
Surrogate: Toluene-d8	4810			ng/L	5000		96.2	80-120			
LCS Dup (BJK0712-BSD1)					Prepared: 29-Nov-2021		Analyzed: 29-Nov-2021 10:28				
Vinyl chloride	415	5.01	20.0	ng/L	500		83.1	62-141	1.33	30	
Surrogate: 1,2-Dichloroethane-d4	4630			ng/L	5000		92.7	80-129			
Surrogate: Toluene-d8	4900			ng/L	5000		98.1	80-120			


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 13:43

Analysis by: Analytical Resources, LLC
Dissolved Gases - Quality Control
Batch BJK0560 - EPA 5030C (Purge and Trap)

Instrument: FID6 Analyst: LH

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0560-BLK1)		Prepared: 22-Nov-2021 Analyzed: 22-Nov-2021 10:32								
Methane	ND	0.65	ug/L							U
Ethane	ND	1.23	ug/L							U
Ethene	ND	1.14	ug/L							U
Acetylene	ND	1.06	ug/L							U
Surrogate: Propane	1780		ug/L	1800		98.8	72-122			
LCS (BJK0560-BS1)		Prepared: 22-Nov-2021 Analyzed: 22-Nov-2021 09:00								
Methane	348	0.65	ug/L	328		106	80-120			
Ethane	697	1.23	ug/L	615		113	80-120			
Ethene	624	1.14	ug/L	575		109	80-120			
Acetylene	524	1.06	ug/L	530		98.8	73-123			
Surrogate: Propane	1750		ug/L	1800		97.5	62-122			
LCS Dup (BJK0560-BSD1)		Prepared: 22-Nov-2021 Analyzed: 22-Nov-2021 10:14								
Methane	283	0.65	ug/L	328		86.3	80-120	20.60	30	
Ethane	554	1.23	ug/L	615		90.1	80-120	22.80	30	
Ethene	499	1.14	ug/L	575		86.8	80-120	22.30	30	
Acetylene	404	1.06	ug/L	530		76.2	73-123	25.80	30	
Surrogate: Propane	1400		ug/L	1800		77.6	62-122			
Duplicate (BJK0560-DUP1)		Source: 21K0303-01		Prepared: 22-Nov-2021 Analyzed: 22-Nov-2021 11:08						
Methane	6540	0.65	ug/L		6680			2.10	30	
Ethane	ND	1.23	ug/L		ND					U
Ethene	ND	1.14	ug/L		ND					U
Acetylene	ND	1.06	ug/L		ND					U
Surrogate: Propane	1480		ug/L	1800	1400	82.4	72-122			


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 13:43

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - Quality Control
Batch BJK0540 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0540-BLK1)						Prepared: 23-Nov-2021 Analyzed: 01-Dec-2021 12:57					
Phenol	ND	0.01	0.2	ug/L							U
bis(2-chloroethyl) ether	ND	0.03	0.2	ug/L							U
2-Chlorophenol	ND	0.03	0.2	ug/L							U
1,3-Dichlorobenzene	ND	0.03	0.2	ug/L							U
1,4-Dichlorobenzene	ND	0.03	0.2	ug/L							U
1,2-Dichlorobenzene	ND	0.03	0.2	ug/L							U
Benzyl Alcohol	ND	0.02	0.2	ug/L							U
2,2'-Oxybis(1-chloropropane)	ND	0.03	0.2	ug/L							U
2-Methylphenol	ND	0.03	0.2	ug/L							U
Hexachloroethane	ND	0.04	0.2	ug/L							U
N-Nitroso-di-n-Propylamine	ND	0.04	0.2	ug/L							U
4-Methylphenol	ND	0.03	0.2	ug/L							U
Nitrobenzene	ND	0.03	0.2	ug/L							U
Isophorone	ND	0.03	0.2	ug/L							U
2-Nitrophenol	ND	0.04	1.0	ug/L							U
2,4-Dimethylphenol	ND	0.3	1.0	ug/L							U
Bis(2-Chloroethoxy)methane	ND	0.03	0.2	ug/L							U
2,4-Dichlorophenol	ND	0.1	1.0	ug/L							U
1,2,4-Trichlorobenzene	ND	0.03	0.2	ug/L							U
Naphthalene	ND	0.03	0.2	ug/L							U
Benzoic acid	ND	0.1	2.0	ug/L							U
4-Chloroaniline	ND	0.04	1.0	ug/L							U
Hexachlorobutadiene	ND	0.04	0.2	ug/L							U
4-Chloro-3-Methylphenol	ND	0.1	1.0	ug/L							U
2-Methylnaphthalene	ND	0.03	0.2	ug/L							U
Hexachlorocyclopentadiene	ND	0.1	1.0	ug/L							U
2,4,6-Trichlorophenol	ND	0.2	1.0	ug/L							U
2,4,5-Trichlorophenol	ND	0.1	1.0	ug/L							U
2-Chloronaphthalene	ND	0.03	0.2	ug/L							U
2-Nitroaniline	ND	0.2	1.0	ug/L							U
Acenaphthylene	ND	0.02	0.2	ug/L							U
Dimethylphthalate	ND	0.04	0.2	ug/L							U
2,6-Dinitrotoluene	ND	0.2	1.0	ug/L							U
Acenaphthene	ND	0.03	0.2	ug/L							U
3-Nitroaniline	ND	0.2	1.0	ug/L							U


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
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Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - Quality Control
Batch BJK0540 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0540-BLK1)						Prepared: 23-Nov-2021 Analyzed: 01-Dec-2021 12:57					
2,4-Dinitrophenol	ND	0.2	2.0	ug/L							U
Dibenzofuran	ND	0.02	0.2	ug/L							U
4-Nitrophenol	ND	0.06	1.0	ug/L							U
2,4-Dinitrotoluene	ND	0.1	1.0	ug/L							U
Fluorene	ND	0.02	0.2	ug/L							U
4-Chlorophenylphenyl ether	ND	0.02	0.2	ug/L							U
Diethyl phthalate	ND	0.06	0.2	ug/L							U
4-Nitroaniline	ND	0.2	1.0	ug/L							U
4,6-Dinitro-2-methylphenol	ND	0.4	2.0	ug/L							U
N-Nitrosodiphenylamine	ND	0.03	0.2	ug/L							U
4-Bromophenyl phenyl ether	ND	0.02	0.2	ug/L							U
Hexachlorobenzene	ND	0.04	0.2	ug/L							U
Pentachlorophenol	ND	0.1	1.0	ug/L							U
Phenanthrene	ND	0.02	0.2	ug/L							U
Anthracene	ND	0.03	0.2	ug/L							U
Carbazole	ND	0.04	0.2	ug/L							U
Di-n-Butylphthalate	ND	0.05	0.2	ug/L							U
Fluoranthene	ND	0.03	0.2	ug/L							U
Pyrene	ND	0.03	0.2	ug/L							U
Butylbenzylphthalate	ND	0.07	0.2	ug/L							U
Benzo(a)anthracene	ND	0.04	0.2	ug/L							U
3,3'-Dichlorobenzidine	ND	0.3	1.0	ug/L							U
Chrysene	ND	0.04	0.2	ug/L							U
bis(2-Ethylhexyl)phthalate	ND	0.2	0.2	ug/L							U
Di-n-Octylphthalate	ND	0.05	0.2	ug/L							U
Benzo(a)fluoranthene, Total	ND	0.08	0.4	ug/L							U
Benzo(a)pyrene	ND	0.05	0.2	ug/L							U
Indeno(1,2,3-cd)pyrene	ND	0.06	0.2	ug/L							U
Dibenzo(a,h)anthracene	ND	0.07	0.2	ug/L							U
Benzo(g,h,i)perylene	ND	0.04	0.2	ug/L							U
1-Methylnaphthalene	ND	0.03	0.2	ug/L							U
Surrogate: 2-Fluorophenol	3.77			ug/L	7.50		50.2	30-160			
Surrogate: Phenol-d5	2.43			ug/L	7.50		32.4	30-160			
Surrogate: 2-Chlorophenol-d4	6.72			ug/L	7.50		89.5	30-160			


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 Project: Lower Duwamish Q4
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 Project Manager: Meg Strong

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Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - Quality Control
Batch BJK0540 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0540-BLK1)					Prepared: 23-Nov-2021 Analyzed: 01-Dec-2021 12:57						
Surrogate: 1,2-Dichlorobenzene-d4	4.13			ug/L	5.00		82.7	30-160			
Surrogate: Nitrobenzene-d5	4.28			ug/L	5.00		85.5	30-160			
Surrogate: 2-Fluorobiphenyl	4.83			ug/L	5.00		96.7	30-160			
Surrogate: 2,4,6-Tribromophenol	7.27			ug/L	7.50		96.9	30-160			
Surrogate: p-Terphenyl-d14	5.34			ug/L	5.00		107	30-160			Q
LCS (BJK0540-BS1)					Prepared: 23-Nov-2021 Analyzed: 01-Dec-2021 13:35						
Phenol	1.6	0.01	0.2	ug/L	5.00		31.7	30-160			
bis(2-chloroethyl) ether	3.8	0.03	0.2	ug/L	5.00		75.1	30-160			
2-Chlorophenol	3.2	0.03	0.2	ug/L	5.00		64.1	30-160			
1,3-Dichlorobenzene	2.9	0.03	0.2	ug/L	5.00		57.4	30-160			
1,4-Dichlorobenzene	3.2	0.03	0.2	ug/L	5.00		64.0	30-160			
1,2-Dichlorobenzene	3.0	0.03	0.2	ug/L	5.00		59.4	30-160			
Benzyl Alcohol	2.3	0.02	0.2	ug/L	5.00		46.1	30-160			
2,2'-Oxybis(1-chloropropane)	3.5	0.03	0.2	ug/L	5.00		70.7	30-160			
2-Methylphenol	2.9	0.03	0.2	ug/L	5.00		57.8	30-160			
Hexachloroethane	2.8	0.04	0.2	ug/L	5.00		56.3	30-160			
N-Nitroso-di-n-Propylamine	3.3	0.04	0.2	ug/L	5.00		66.5	30-160			
4-Methylphenol	2.6	0.03	0.2	ug/L	5.00		52.9	30-160			
Nitrobenzene	3.6	0.03	0.2	ug/L	5.00		71.3	30-160			
Isophorone	5.2	0.03	0.2	ug/L	5.00		104	30-160			
2-Nitrophenol	4.1	0.04	1.0	ug/L	5.00		82.1	30-160			Q
2,4-Dimethylphenol	8.8	0.3	1.0	ug/L	13.0		67.8	30-160			
Bis(2-Chloroethoxy)methane	4.3	0.03	0.2	ug/L	5.00		86.7	30-160			
2,4-Dichlorophenol	10.3	0.1	1.0	ug/L	13.0		79.2	30-160			
1,2,4-Trichlorobenzene	2.9	0.03	0.2	ug/L	5.00		58.0	30-160			
Naphthalene	3.2	0.03	0.2	ug/L	5.00		63.7	30-160			
Benzoic acid	6.7	0.1	2.0	ug/L	23.0		28.9	30-160			*
4-Chloroaniline	1.9	0.04	1.0	ug/L	13.0		14.2	30-160			*
Hexachlorobutadiene	2.4	0.04	0.2	ug/L	5.00		48.3	30-160			
4-Chloro-3-Methylphenol	11.6	0.1	1.0	ug/L	13.0		89.0	30-160			
2-Methylnaphthalene	3.5	0.03	0.2	ug/L	5.00		70.6	30-160			
Hexachlorocyclopentadiene	2.8	0.1	1.0	ug/L	13.0		21.6	30-160			*, Q
2,4,6-Trichlorophenol	11.6	0.2	1.0	ug/L	13.0		89.4	30-160			
2,4,5-Trichlorophenol	11.3	0.1	1.0	ug/L	13.0		86.9	30-160			


 Shannon & Wilson, Inc
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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 13:43

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - Quality Control
Batch BJK0540 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJK0540-BS1)						Prepared: 23-Nov-2021 Analyzed: 01-Dec-2021 13:35					
2-Chloronaphthalene	3.8	0.03	0.2	ug/L	5.00		75.8	30-160			
2-Nitroaniline	12.7	0.2	1.0	ug/L	13.0		97.7	30-160			
Acenaphthylene	3.2	0.02	0.2	ug/L	5.00		63.2	30-160			
Dimethylphthalate	3.8	0.04	0.2	ug/L	5.00		76.3	30-160			
2,6-Dinitrotoluene	13.3	0.2	1.0	ug/L	13.0		102	30-160			
Acenaphthene	3.4	0.03	0.2	ug/L	5.00		67.9	30-160			
3-Nitroaniline	11.2	0.2	1.0	ug/L	13.0		86.3	30-160			
2,4-Dinitrophenol	17.3	0.2	2.0	ug/L	23.0		75.4	30-160			
Dibenzofuran	4.0	0.02	0.2	ug/L	5.00		79.2	30-160			
4-Nitrophenol	3.5	0.06	1.0	ug/L	13.0		26.9	30-160			*
2,4-Dinitrotoluene	13.4	0.1	1.0	ug/L	13.0		103	30-160			Q
Fluorene	2.6	0.02	0.2	ug/L	5.00		51.1	30-160			Q
4-Chlorophenylphenyl ether	2.3	0.02	0.2	ug/L	5.00		46.8	30-160			Q
Diethyl phthalate	3.7	0.06	0.2	ug/L	5.00		74.3	30-160			
4-Nitroaniline	13.4	0.2	1.0	ug/L	13.0		103	30-160			
4,6-Dinitro-2-methylphenol	21.4	0.4	2.0	ug/L	23.0		92.9	30-160			
N-Nitrosodiphenylamine	3.8	0.03	0.2	ug/L	5.00		75.8	30-160			
4-Bromophenyl phenyl ether	4.1	0.02	0.2	ug/L	5.00		81.3	30-160			
Hexachlorobenzene	3.5	0.04	0.2	ug/L	5.00		70.7	30-160			
Pentachlorophenol	4.5	0.1	1.0	ug/L	13.0		34.9	30-160			Q
Phenanthrene	3.8	0.02	0.2	ug/L	5.00		75.1	30-160			
Anthracene	3.5	0.03	0.2	ug/L	5.00		69.5	30-160			
Carbazole	3.9	0.04	0.2	ug/L	5.00		77.5	30-160			
Di-n-Butylphthalate	4.2	0.05	0.2	ug/L	5.00		83.7	30-160			
Fluoranthene	5.1	0.03	0.2	ug/L	5.00		101	30-160			Q
Pyrene	4.9	0.03	0.2	ug/L	5.00		98.9	30-160			Q
Butylbenzylphthalate	4.6	0.07	0.2	ug/L	5.00		92.4	30-160			Q
Benzo(a)anthracene	4.1	0.04	0.2	ug/L	5.00		81.2	30-160			
3,3'-Dichlorobenzidine	12.3	0.3	1.0	ug/L	13.0		94.2	30-160			
Chrysene	3.7	0.04	0.2	ug/L	5.00		74.5	30-160			
bis(2-Ethylhexyl)phthalate	4.3	0.2	0.2	ug/L	5.00		86.2	30-160			
Di-n-Octylphthalate	3.9	0.05	0.2	ug/L	5.00		77.9	30-160			
Benzo(a)fluoranthene, Total	8.3	0.08	0.4	ug/L	10.0		82.5	30-160			
Benzo(a)pyrene	3.8	0.05	0.2	ug/L	5.00		75.2	30-160			
Indeno(1,2,3-cd)pyrene	3.6	0.06	0.2	ug/L	5.00		71.4	30-160			



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
14-Dec-2021 13:43

Analysis by: Analytical Resources, LLC

Semivolatile Organic Compounds - Quality Control

Batch BJK0540 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJK0540-BS1)						Prepared: 23-Nov-2021 Analyzed: 01-Dec-2021 13:35					
Dibenzo(a,h)anthracene	3.4	0.07	0.2	ug/L	5.00		68.5	30-160			
Benzo(g,h,i)perylene	3.3	0.04	0.2	ug/L	5.00		66.7	30-160			
1-Methylnaphthalene	3.8	0.03	0.2	ug/L	5.00		76.9	30-160			
Surrogate: 2-Fluorophenol	3.52			ug/L	7.50		46.9	30-160			
Surrogate: Phenol-d5	2.43			ug/L	7.50		32.3	30-160			
Surrogate: 2-Chlorophenol-d4	5.57			ug/L	7.50		74.3	30-160			
Surrogate: 1,2-Dichlorobenzene-d4	3.29			ug/L	5.00		65.7	30-160			
Surrogate: Nitrobenzene-d5	3.78			ug/L	5.00		75.7	30-160			
Surrogate: 2-Fluorobiphenyl	3.99			ug/L	5.00		79.7	30-160			
Surrogate: 2,4,6-Tribromophenol	6.25			ug/L	7.50		83.4	30-160			
Surrogate: p-Terphenyl-d14	5.14			ug/L	5.00		103	30-160			Q
LCS Dup (BJK0540-BSD1)						Prepared: 23-Nov-2021 Analyzed: 01-Dec-2021 14:13					
Phenol	2.0	0.01	0.2	ug/L	5.00		39.2	30-160	21.20	30	
bis(2-chloroethyl) ether	4.8	0.03	0.2	ug/L	5.00		95.9	30-160	24.40	30	
2-Chlorophenol	4.0	0.03	0.2	ug/L	5.00		79.6	30-160	21.60	30	
1,3-Dichlorobenzene	3.6	0.03	0.2	ug/L	5.00		72.3	30-160	22.90	30	
1,4-Dichlorobenzene	4.1	0.03	0.2	ug/L	5.00		83.0	30-160	25.80	30	
1,2-Dichlorobenzene	3.8	0.03	0.2	ug/L	5.00		75.1	30-160	23.20	30	
Benzyl Alcohol	2.9	0.02	0.2	ug/L	5.00		57.2	30-160	21.60	30	
2,2'-Oxybis(1-chloropropane)	4.5	0.03	0.2	ug/L	5.00		89.4	30-160	23.30	30	
2-Methylphenol	3.6	0.03	0.2	ug/L	5.00		71.6	30-160	21.30	30	
Hexachloroethane	3.6	0.04	0.2	ug/L	5.00		72.2	30-160	24.80	30	
N-Nitroso-di-n-Propylamine	4.1	0.04	0.2	ug/L	5.00		82.3	30-160	21.30	30	
4-Methylphenol	3.2	0.03	0.2	ug/L	5.00		64.4	30-160	19.50	30	
Nitrobenzene	4.5	0.03	0.2	ug/L	5.00		90.7	30-160	24.00	30	
Isophorone	6.5	0.03	0.2	ug/L	5.00		129	30-160	21.70	30	
2-Nitrophenol	5.4	0.04	1.0	ug/L	5.00		109	30-160	27.80	30	Q
2,4-Dimethylphenol	10.9	0.3	1.0	ug/L	13.0		83.9	30-160	21.20	30	
Bis(2-Chloroethoxy)methane	5.5	0.03	0.2	ug/L	5.00		110	30-160	24.10	30	
2,4-Dichlorophenol	13.9	0.1	1.0	ug/L	13.0		107	30-160	29.40	30	
1,2,4-Trichlorobenzene	3.5	0.03	0.2	ug/L	5.00		70.8	30-160	20.00	30	
Naphthalene	4.0	0.03	0.2	ug/L	5.00		79.7	30-160	22.40	30	
Benzoic acid	8.6	0.1	2.0	ug/L	23.0		37.2	30-160	25.10	30	
4-Chloroaniline	2.3	0.04	1.0	ug/L	13.0		17.8	30-160	22.40	30	*


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 13:43

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - Quality Control
Batch BJK0540 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BJK0540-BSD1)						Prepared: 23-Nov-2021 Analyzed: 01-Dec-2021 14:13					
Hexachlorobutadiene	3.1	0.04	0.2	ug/L	5.00		61.8	30-160	24.40	30	
4-Chloro-3-Methylphenol	14.5	0.1	1.0	ug/L	13.0		112	30-160	22.80	30	
2-Methylnaphthalene	4.5	0.03	0.2	ug/L	5.00		90.3	30-160	24.50	30	
Hexachlorocyclopentadiene	4.3	0.1	1.0	ug/L	13.0		33.2	30-160	42.40	30	*, Q
2,4,6-Trichlorophenol	14.7	0.2	1.0	ug/L	13.0		113	30-160	23.20	30	
2,4,5-Trichlorophenol	14.0	0.1	1.0	ug/L	13.0		108	30-160	21.60	30	
2-Chloronaphthalene	4.8	0.03	0.2	ug/L	5.00		95.2	30-160	22.70	30	
2-Nitroaniline	16.3	0.2	1.0	ug/L	13.0		125	30-160	24.60	30	
Acenaphthylene	3.9	0.02	0.2	ug/L	5.00		78.0	30-160	20.80	30	
Dimethylphthalate	4.6	0.04	0.2	ug/L	5.00		91.4	30-160	18.00	30	
2,6-Dinitrotoluene	16.8	0.2	1.0	ug/L	13.0		129	30-160	23.30	30	
Acenaphthene	4.3	0.03	0.2	ug/L	5.00		86.6	30-160	24.30	30	
3-Nitroaniline	13.6	0.2	1.0	ug/L	13.0		105	30-160	19.10	30	
2,4-Dinitrophenol	23.8	0.2	2.0	ug/L	23.0		103	30-160	31.30	30	*
Dibenzofuran	4.9	0.02	0.2	ug/L	5.00		98.3	30-160	21.50	30	
4-Nitrophenol	4.3	0.06	1.0	ug/L	13.0		32.8	30-160	19.70	30	
2,4-Dinitrotoluene	16.9	0.1	1.0	ug/L	13.0		130	30-160	23.20	30	Q
Fluorene	3.1	0.02	0.2	ug/L	5.00		62.6	30-160	20.30	30	Q
4-Chlorophenylphenyl ether	3.3	0.02	0.2	ug/L	5.00		65.6	30-160	33.40	30	*, Q
Diethyl phthalate	4.4	0.06	0.2	ug/L	5.00		88.8	30-160	17.90	30	
4-Nitroaniline	16.2	0.2	1.0	ug/L	13.0		125	30-160	19.20	30	
4,6-Dinitro-2-methylphenol	26.6	0.4	2.0	ug/L	23.0		116	30-160	21.90	30	
N-Nitrosodiphenylamine	4.7	0.03	0.2	ug/L	5.00		93.8	30-160	21.20	30	
4-Bromophenyl phenyl ether	5.0	0.02	0.2	ug/L	5.00		99.5	30-160	20.20	30	
Hexachlorobenzene	4.4	0.04	0.2	ug/L	5.00		87.8	30-160	21.60	30	
Pentachlorophenol	5.9	0.1	1.0	ug/L	13.0		45.6	30-160	26.40	30	Q
Phenanthrene	4.4	0.02	0.2	ug/L	5.00		87.9	30-160	15.70	30	
Anthracene	4.3	0.03	0.2	ug/L	5.00		85.2	30-160	20.30	30	
Carbazole	4.8	0.04	0.2	ug/L	5.00		95.9	30-160	21.20	30	
Di-n-Butylphthalate	5.1	0.05	0.2	ug/L	5.00		103	30-160	20.40	30	
Fluoranthene	6.1	0.03	0.2	ug/L	5.00		123	30-160	19.20	30	Q
Pyrene	6.1	0.03	0.2	ug/L	5.00		123	30-160	21.40	30	Q
Butylbenzylphthalate	5.5	0.07	0.2	ug/L	5.00		111	30-160	18.00	30	Q
Benzo(a)anthracene	4.9	0.04	0.2	ug/L	5.00		97.9	30-160	18.60	30	
3,3'-Dichlorobenzidine	14.6	0.3	1.0	ug/L	13.0		112	30-160	17.20	30	


 Shannon & Wilson, Inc
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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 13:43

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - Quality Control
Batch BJK0540 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BJK0540-BSD1)						Prepared: 23-Nov-2021 Analyzed: 01-Dec-2021 14:13					
Chrysene	4.6	0.04	0.2	ug/L	5.00		91.9	30-160	20.90	30	
bis(2-Ethylhexyl)phthalate	5.2	0.2	0.2	ug/L	5.00		103	30-160	18.00	30	
Di-n-Octylphthalate	4.7	0.05	0.2	ug/L	5.00		94.3	30-160	19.00	30	
Benzo(a)fluoranthenes, Total	9.9	0.08	0.4	ug/L	10.0		99.2	30-160	18.40	30	
Benzo(a)pyrene	4.6	0.05	0.2	ug/L	5.00		91.7	30-160	19.80	30	
Indeno(1,2,3-cd)pyrene	4.4	0.06	0.2	ug/L	5.00		87.4	30-160	20.10	30	
Dibenzo(a,h)anthracene	4.2	0.07	0.2	ug/L	5.00		84.6	30-160	21.10	30	
Benzo(g,h,i)perylene	4.2	0.04	0.2	ug/L	5.00		83.4	30-160	22.30	30	
1-Methylnaphthalene	4.8	0.03	0.2	ug/L	5.00		97.0	30-160	23.10	30	
Surrogate: 2-Fluorophenol	4.20			ug/L	7.50		56.0	30-160			
Surrogate: Phenol-d5	2.93			ug/L	7.50		39.0	30-160			
Surrogate: 2-Chlorophenol-d4	6.68			ug/L	7.50		89.0	30-160			
Surrogate: 1,2-Dichlorobenzene-d4	3.97			ug/L	5.00		79.4	30-160			
Surrogate: Nitrobenzene-d5	4.62			ug/L	5.00		92.5	30-160			
Surrogate: 2-Fluorobiphenyl	4.87			ug/L	5.00		97.4	30-160			
Surrogate: 2,4,6-Tribromophenol	7.53			ug/L	7.50		100	30-160			
Surrogate: p-Terphenyl-d14	5.88			ug/L	5.00		118	30-160			Q


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 13:43

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - SIM - Quality Control
Batch BJK0539 - EPA 3510C SepF

Instrument: NT11 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0539-BLK1)						Prepared: 23-Nov-2021 Analyzed: 27-Nov-2021 08:32					
Naphthalene	0.002	0.001	0.010	ug/L							J
2-Methylnaphthalene	0.001	0.001	0.010	ug/L							J
1-Methylnaphthalene	ND	0.0009	0.010	ug/L							U
Acenaphthylene	ND	0.002	0.010	ug/L							U
Acenaphthene	ND	0.003	0.010	ug/L							U
Dibenzofuran	ND	0.002	0.010	ug/L							U
Fluorene	ND	0.002	0.010	ug/L							U
Phenanthrene	ND	0.001	0.010	ug/L							U
Anthracene	ND	0.001	0.010	ug/L							U
Carbazole	ND	0.001	0.010	ug/L							U
Fluoranthene	ND	0.002	0.010	ug/L							U
Pyrene	ND	0.001	0.010	ug/L							U
Benzo(a)anthracene	ND	0.0008	0.010	ug/L							U
Chrysene	ND	0.0009	0.010	ug/L							U
Benzo(b)fluoranthene	ND	0.0005	0.010	ug/L							U
Benzo(k)fluoranthene	ND	0.003	0.010	ug/L							U
Benzo(j)fluoranthene	ND	0.002	0.010	ug/L							U
Benzo(a)pyrene	ND	0.002	0.010	ug/L							U
Indeno(1,2,3-cd)pyrene	ND	0.001	0.010	ug/L							U
Dibenzo(a,h)anthracene	ND	0.001	0.010	ug/L							U
Benzo(g,h,i)perylene	ND	0.001	0.010	ug/L							U
Surrogate: 2-Methylnaphthalene-d10	0.253			ug/L	0.300		84.3	42-120			
Surrogate: Dibenzo[a,h]anthracene-d14	0.200			ug/L	0.300		66.7	29-120			
Surrogate: Fluoranthene-d10	0.293			ug/L	0.300		97.6	57-120			

LCS (BJK0539-BS1)						Prepared: 23-Nov-2021 Analyzed: 27-Nov-2021 09:02					
Naphthalene	0.235	0.001	0.010	ug/L	0.300		78.4	37-120			
2-Methylnaphthalene	0.253	0.001	0.010	ug/L	0.300		84.2	37-120			
1-Methylnaphthalene	0.251	0.0009	0.010	ug/L	0.300		83.8	29-120			
Acenaphthylene	0.266	0.002	0.010	ug/L	0.300		88.5	41-120			
Acenaphthene	0.269	0.003	0.010	ug/L	0.300		89.6	41-120			
Dibenzofuran	0.252	0.002	0.010	ug/L	0.300		84.1	38-120			
Fluorene	0.265	0.002	0.010	ug/L	0.300		88.3	43-120			


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Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - SIM - Quality Control
Batch BJK0539 - EPA 3510C SepF

Instrument: NT11 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJK0539-BS1)						Prepared: 23-Nov-2021 Analyzed: 27-Nov-2021 09:02					
Phenanthrene	0.261	0.001	0.010	ug/L	0.300		87.1	41-120			
Anthracene	0.259	0.001	0.010	ug/L	0.300		86.3	40-120			
Carbazole	0.266	0.001	0.010	ug/L	0.300		88.6	30-160			
Fluoranthene	0.272	0.002	0.010	ug/L	0.300		90.6	45-120			
Pyrene	0.268	0.001	0.010	ug/L	0.300		89.2	41-120			
Benzo(a)anthracene	0.270	0.0008	0.010	ug/L	0.300		90.1	42-120			
Chrysene	0.256	0.0009	0.010	ug/L	0.300		85.4	44-120			
Benzo(b)fluoranthene	0.238	0.0005	0.010	ug/L	0.300		79.3	44-120			
Benzo(k)fluoranthene	0.251	0.003	0.010	ug/L	0.300		83.8	50-120			
Benzo(j)fluoranthene	0.269	0.002	0.010	ug/L	0.300		89.8	39-160			
Benzofluoranthenes, Total	0.759	0.004	0.010	ug/L	0.900		84.3	46-120			
Benzo(a)pyrene	0.249	0.002	0.010	ug/L	0.300		82.9	35-120			
Perylene	0.236	0.006	0.010	ug/L	0.300		78.5	30-160			
Indeno(1,2,3-cd)pyrene	0.225	0.001	0.010	ug/L	0.300		75.0	37-120			
Dibenzo(a,h)anthracene	0.223	0.001	0.010	ug/L	0.300		74.3	34-120			
Benzo(g,h,i)perylene	0.191	0.001	0.010	ug/L	0.300		63.6	38-120			
Surrogate: 2-Methylnaphthalene-d10	0.282			ug/L	0.300		94.0	42-120			
Surrogate: Dibenzo[a,h]anthracene-d14	0.227			ug/L	0.300		75.6	29-120			
Surrogate: Fluoranthene-d10	0.300			ug/L	0.300		100	57-120			
LCS Dup (BJK0539-BSD1)						Prepared: 23-Nov-2021 Analyzed: 27-Nov-2021 09:39					
Naphthalene	0.243	0.001	0.010	ug/L	0.300		80.9	37-120	3.14	30	
2-Methylnaphthalene	0.261	0.001	0.010	ug/L	0.300		87.0	37-120	3.28	30	
1-Methylnaphthalene	0.259	0.0009	0.010	ug/L	0.300		86.2	29-120	2.87	30	
Acenaphthylene	0.267	0.002	0.010	ug/L	0.300		89.0	41-120	0.54	30	
Acenaphthene	0.271	0.003	0.010	ug/L	0.300		90.4	41-120	0.88	30	
Dibenzofuran	0.254	0.002	0.010	ug/L	0.300		84.8	38-120	0.83	30	
Fluorene	0.268	0.002	0.010	ug/L	0.300		89.4	43-120	1.22	30	
Phenanthrene	0.271	0.001	0.010	ug/L	0.300		90.3	41-120	3.54	30	
Anthracene	0.271	0.001	0.010	ug/L	0.300		90.5	40-120	4.74	30	
Carbazole	0.277	0.001	0.010	ug/L	0.300		92.2	30-160	4.01	30	
Fluoranthene	0.281	0.002	0.010	ug/L	0.300		93.6	45-120	3.25	30	
Pyrene	0.275	0.001	0.010	ug/L	0.300		91.6	41-120	2.70	30	
Benzo(a)anthracene	0.277	0.0008	0.010	ug/L	0.300		92.2	42-120	2.33	30	
Chrysene	0.268	0.0009	0.010	ug/L	0.300		89.4	44-120	4.63	30	


 Shannon & Wilson, Inc
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 Project: Lower Duwamish Q4
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Reported:
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Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - SIM - Quality Control
Batch BJK0539 - EPA 3510C SepF

Instrument: NT11 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BJK0539-BSD1)						Prepared: 23-Nov-2021 Analyzed: 27-Nov-2021 09:39					
Benzo(b)fluoranthene	0.244	0.0005	0.010	ug/L	0.300		81.4	44-120	2.61	30	
Benzo(k)fluoranthene	0.266	0.003	0.010	ug/L	0.300		88.6	50-120	5.59	30	
Benzo(j)fluoranthene	0.283	0.002	0.010	ug/L	0.300		94.3	39-160	4.93	30	
Benzofluoranthenes, Total	0.793	0.004	0.010	ug/L	0.900		88.1	46-120	4.43	30	
Benzo(a)pyrene	0.258	0.002	0.010	ug/L	0.300		85.9	35-120	3.44	30	
Perylene	0.243	0.006	0.010	ug/L	0.300		81.1	30-160	3.19	30	
Indeno(1,2,3-cd)pyrene	0.239	0.001	0.010	ug/L	0.300		79.6	37-120	5.87	30	
Dibenzo(a,h)anthracene	0.230	0.001	0.010	ug/L	0.300		76.5	34-120	2.90	30	
Benzo(g,h,i)perylene	0.204	0.001	0.010	ug/L	0.300		68.1	38-120	6.73	30	
Surrogate: 2-Methylnaphthalene-d10	0.273			ug/L	0.300		91.1	42-120			
Surrogate: Dibenzo[a,h]anthracene-d14	0.220			ug/L	0.300		73.2	29-120			
Surrogate: Fluoranthene-d10	0.291			ug/L	0.300		97.1	57-120			


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 13:43

Analysis by: Analytical Resources, LLC
Petroleum Hydrocarbons - Quality Control
Batch BJK0537 - EPA 3510C SepF

Instrument: FID4 Analyst: TWC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0537-BLK1)										
					Prepared: 22-Nov-2021 Analyzed: 27-Nov-2021 00:37					
Diesel Range Organics (C12-C24)	ND	0.100	mg/L							U
Motor Oil Range Organics (C24-C38)	ND	0.200	mg/L							U
<i>Surrogate: o-Terphenyl</i>	0.199		mg/L	0.225		88.5	50-150			
LCS (BJK0537-BS1)										
					Prepared: 22-Nov-2021 Analyzed: 27-Nov-2021 00:56					
Diesel Range Organics (C12-C24)	2.22	0.100	mg/L	3.00		74.0	56-120			
<i>Surrogate: o-Terphenyl</i>	0.186		mg/L	0.225		82.7	50-150			
LCS Dup (BJK0537-BSD1)										
					Prepared: 22-Nov-2021 Analyzed: 27-Nov-2021 01:16					
Diesel Range Organics (C12-C24)	2.63	0.100	mg/L	3.00		87.7	56-120	16.90	30	
<i>Surrogate: o-Terphenyl</i>	0.223		mg/L	0.225		99.0	50-150			


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 13:43

Analysis by: Analytical Resources, LLC
Aroclor PCB - Quality Control
Batch BJK0538 - EPA 3510C SepF

Instrument: ECD7 Analyst: JGR/TWC

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0538-BLK1)						Prepared: 23-Nov-2021 Analyzed: 30-Nov-2021 20:07					
Aroclor 1016	ND	0.002	0.010	ug/L							U
Aroclor 1221	ND	0.002	0.010	ug/L							U
Aroclor 1232	ND	0.002	0.010	ug/L							U
Aroclor 1242	ND	0.002	0.010	ug/L							U
Aroclor 1248	ND	0.002	0.010	ug/L							U
Aroclor 1254	ND	0.002	0.010	ug/L							U
Aroclor 1260	ND	0.003	0.010	ug/L							U
Aroclor 1262	ND	0.003	0.010	ug/L							U
Aroclor 1268	ND	0.003	0.010	ug/L							U
Surrogate: Decachlorobiphenyl	0.0135			ug/L	0.0200		67.7	29-120			
Surrogate: Tetrachlorometaxylene	0.0136			ug/L	0.0200		68.2	32-120			
Surrogate: Decachlorobiphenyl [2C]	0.0139			ug/L	0.0200		69.5	29-120			
Surrogate: Tetrachlorometaxylene [2C]	0.0156			ug/L	0.0200		77.8	32-120			
LCS (BJK0538-BS1)						Prepared: 23-Nov-2021 Analyzed: 30-Nov-2021 20:28					
Aroclor 1016	0.047	0.002	0.010	ug/L	0.0500		93.2	54-120			
Aroclor 1260	0.043	0.003	0.010	ug/L	0.0500		85.5	51-128			
Surrogate: Decachlorobiphenyl	0.0144			ug/L	0.0200		72.1	29-120			
Surrogate: Tetrachlorometaxylene	0.0157			ug/L	0.0200		78.5	32-120			
Surrogate: Decachlorobiphenyl [2C]	0.0148			ug/L	0.0200		73.9	29-120			
Surrogate: Tetrachlorometaxylene [2C]	0.0154			ug/L	0.0200		77.0	32-120			
LCS Dup (BJK0538-BSD1)						Prepared: 23-Nov-2021 Analyzed: 30-Nov-2021 20:49					
Aroclor 1016 [2C]	0.046	0.002	0.010	ug/L	0.0500		91.4	54-120	1.62	30	
Aroclor 1260	0.041	0.003	0.010	ug/L	0.0500		82.2	51-128	3.88	30	
Surrogate: Decachlorobiphenyl	0.0141			ug/L	0.0200		70.5	29-120			
Surrogate: Tetrachlorometaxylene	0.0155			ug/L	0.0200		77.5	32-120			
Surrogate: Decachlorobiphenyl [2C]	0.0141			ug/L	0.0200		70.4	29-120			
Surrogate: Tetrachlorometaxylene [2C]	0.0156			ug/L	0.0200		78.2	32-120			



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
14-Dec-2021 13:43

Analysis by: Analytical Resources, LLC

Metals and Metallic Compounds - Quality Control

Batch BJK0505 - TWC EPA 3010A

Instrument: ICP2 Analyst: MVP

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0505-BLK1)						Prepared: 18-Nov-2021	Analyzed: 19-Nov-2021 18:38				
Calcium	ND	0.0220	0.0500	mg/L							U
Blank (BJK0505-BLK3)						Prepared: 18-Nov-2021	Analyzed: 23-Nov-2021 17:31				
Magnesium	ND	0.0209	0.0500	mg/L							U
LCS (BJK0505-BS1)						Prepared: 18-Nov-2021	Analyzed: 19-Nov-2021 18:40				
Calcium	9.49	0.0220	0.0500	mg/L	10.0		94.9	80-120			
LCS (BJK0505-BS2)						Prepared: 18-Nov-2021	Analyzed: 23-Nov-2021 15:16				
Magnesium	10.9	0.0209	0.0500	mg/L	10.0		109	80-120			
Duplicate (BJK0505-DUP1)						Source: 21K0303-07	Prepared: 18-Nov-2021	Analyzed: 19-Nov-2021 19:02			
Calcium	41.4	0.0220	0.0500	mg/L		41.7			0.69	20	
Duplicate (BJK0505-DUP2)						Source: 21K0303-07	Prepared: 18-Nov-2021	Analyzed: 23-Nov-2021 15:35			
Magnesium	0.547	0.0209	0.0500	mg/L		0.550			0.43	20	
Matrix Spike (BJK0505-MS1)						Source: 21K0303-07	Prepared: 18-Nov-2021	Analyzed: 19-Nov-2021 19:17			
Calcium	50.7	0.0220	0.0500	mg/L	10.0	41.7	90.4	75-125			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Matrix Spike (BJK0505-MS2)						Source: 21K0303-07	Prepared: 18-Nov-2021	Analyzed: 23-Nov-2021 15:40			
Magnesium	11.8	0.0209	0.0500	mg/L	10.0	0.550	112	75-125			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Matrix Spike Dup (BJK0505-MSD1)						Source: 21K0303-07	Prepared: 18-Nov-2021	Analyzed: 19-Nov-2021 19:19			
Calcium	50.4	0.0220	0.0500	mg/L	10.0	41.7	86.6	75-125	0.75	20	
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Matrix Spike Dup (BJK0505-MSD2)						Source: 21K0303-07	Prepared: 18-Nov-2021	Analyzed: 23-Nov-2021 15:52			
Magnesium	11.6	0.0209	0.0500	mg/L	10.0	0.550	110	75-125	1.76	20	
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 13:43

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds - Quality Control
Batch BJK0571 - TWM EPA 7470A

Instrument: HYDRA Analyst: ML

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0571-BLK1)						Prepared: 22-Nov-2021 Analyzed: 23-Nov-2021 14:10					
Mercury	ND	0.000013	0.000100	mg/L							U
LCS (BJK0571-BS1)						Prepared: 22-Nov-2021 Analyzed: 23-Nov-2021 14:12					
Mercury	0.00173	0.000013	0.000100	mg/L	0.00200		86.3	80-120			
Duplicate (BJK0571-DUP1)						Source: 21K0303-03 Prepared: 22-Nov-2021 Analyzed: 23-Nov-2021 14:17					
Mercury	ND	0.000013	0.000100	mg/L		ND					U
Matrix Spike (BJK0571-MS1)						Source: 21K0303-03 Prepared: 22-Nov-2021 Analyzed: 23-Nov-2021 14:24					
Mercury	0.000910	0.000013	0.000100	mg/L	0.00100	ND	91.0	75-125			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Matrix Spike Dup (BJK0571-MSD1)						Source: 21K0303-03 Prepared: 22-Nov-2021 Analyzed: 23-Nov-2021 14:26					
Mercury	0.000859	0.000013	0.000100	mg/L	0.00100	ND	85.9	75-125	5.80	20	
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 13:43

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds - Quality Control
Batch BJK0731 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0731-BLK1)						Prepared: 30-Nov-2021 Analyzed: 30-Nov-2021 18:56						
Barium	135	ND	0.114	0.500	ug/L							U
Barium	137	ND	0.0765	0.500	ug/L							U
Iron	54	ND	18.2	36.0	ug/L							U
Iron	57	ND	6.63	36.0	ug/L							U
Lead	208	ND	0.0513	0.100	ug/L							U
Manganese	55	ND	0.142	0.500	ug/L							U
Silver	107	ND	0.0220	0.200	ug/L							U
Vanadium	51a	ND	0.0556	0.200	ug/L							U
Vanadium	51b	ND	0.0521	0.200	ug/L							U
Arsenic	75a	ND	0.0373	0.200	ug/L							U
Cadmium	111	ND	0.0300	0.100	ug/L							U
Cadmium	114	ND	0.0400	0.100	ug/L							U
Cobalt	59	ND	0.0178	0.200	ug/L							U
Copper	63	ND	0.173	0.500	ug/L							U
Copper	65	ND	0.350	0.500	ug/L							U
Nickel	60	ND	0.0792	0.500	ug/L							U
Nickel	62	ND	0.220	0.500	ug/L							U
Selenium	78	ND	0.179	0.500	ug/L							U
Zinc	66	ND	2.92	6.00	ug/L							U
Zinc	67	ND	0.940	6.00	ug/L							U
Blank (BJK0731-BLK2)						Prepared: 30-Nov-2021 Analyzed: 01-Dec-2021 18:53						
Chromium	52	ND	0.260	0.500	ug/L							U
Chromium	53	ND	0.239	0.500	ug/L							U
LCS (BJK0731-BS1)						Prepared: 30-Nov-2021 Analyzed: 30-Nov-2021 19:01						
Barium	135	24.0	0.114	0.500	ug/L	25.0		95.9	80-120			
Barium	137	24.0	0.0765	0.500	ug/L	25.0		96.0	80-120			
Iron	54	4970	18.2	36.0	ug/L	5000		99.5	80-120			
Iron	57	5040	6.63	36.0	ug/L	5000		101	80-120			
Lead	208	26.0	0.0513	0.100	ug/L	25.0		104	80-120			
Manganese	55	24.4	0.142	0.500	ug/L	25.0		97.6	80-120			
Silver	107	26.1	0.0220	0.200	ug/L	25.0		104	80-120			
Vanadium	51a	24.4	0.0556	0.200	ug/L	25.0		97.7	80-120			
Vanadium	51b	24.4	0.0521	0.200	ug/L	25.0		97.7	80-120			


 Shannon & Wilson, Inc
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 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 13:43

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds - Quality Control
Batch BJK0731 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJK0731-BS1)						Prepared: 30-Nov-2021 Analyzed: 30-Nov-2021 19:01						
Arsenic	75a	25.5	0.0373	0.200	ug/L	25.0		102	80-120			
Cadmium	111	25.3	0.0300	0.100	ug/L	25.0		101	80-120			
Cadmium	114	26.2	0.0400	0.100	ug/L	25.0		105	80-120			
Cobalt	59	25.9	0.0178	0.200	ug/L	25.0		104	80-120			
Copper	63	26.1	0.173	0.500	ug/L	25.0		104	80-120			
Copper	65	26.4	0.350	0.500	ug/L	25.0		106	80-120			
Nickel	60	26.4	0.0792	0.500	ug/L	25.0		106	80-120			
Nickel	62	27.2	0.220	0.500	ug/L	25.0		109	80-120			
Selenium	78	82.1	0.179	0.500	ug/L	80.0		103	80-120			
Zinc	66	86.0	2.92	6.00	ug/L	80.0		107	80-120			
Zinc	67	80.7	0.940	6.00	ug/L	80.0		101	80-120			
LCS (BJK0731-BS2)						Prepared: 30-Nov-2021 Analyzed: 01-Dec-2021 18:57						
Chromium	52	25.9	0.260	0.500	ug/L	25.0		103	80-120			
Chromium	53	26.7	0.239	0.500	ug/L	25.0		107	80-120			



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
14-Dec-2021 13:43

Analysis by: Analytical Resources, LLC

Metals and Metallic Compounds (dissolved) - Quality Control

Batch BJK0730 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0730-BLK1)						Prepared: 30-Nov-2021 Analyzed: 30-Nov-2021 18:44						
Barium, Dissolved	135	ND	0.114	0.500	ug/L							U
Barium, Dissolved	137	ND	0.0765	0.500	ug/L							U
Lead, Dissolved	208	ND	0.0513	0.100	ug/L							U
Manganese, Dissolved	55	ND	0.142	0.500	ug/L							U
Silver, Dissolved	107	ND	0.0220	0.200	ug/L							U
Vanadium, Dissolved	51a	ND	0.0556	0.200	ug/L							U
Vanadium, Dissolved	51b	ND	0.0521	0.200	ug/L							U
Arsenic, Dissolved	75a	ND	0.0373	0.200	ug/L							U
Cadmium, Dissolved	111	ND	0.0300	0.100	ug/L							U
Cadmium, Dissolved	114	ND	0.0400	0.100	ug/L							U
Cobalt, Dissolved	59	ND	0.0178	0.200	ug/L							U
Copper, Dissolved	63	ND	0.173	0.500	ug/L							U
Copper, Dissolved	65	ND	0.350	0.500	ug/L							U
Nickel, Dissolved	60	ND	0.0792	0.500	ug/L							U
Nickel, Dissolved	62	ND	0.220	0.500	ug/L							U
Selenium, Dissolved	78	ND	0.179	0.500	ug/L							U
Zinc, Dissolved	66	ND	2.92	6.00	ug/L							U
Zinc, Dissolved	67	ND	0.940	6.00	ug/L							U

Blank (BJK0730-BLK2)						Prepared: 30-Nov-2021 Analyzed: 01-Dec-2021 17:53						
Chromium, Dissolved	52	ND	0.260	0.500	ug/L							U
Chromium, Dissolved	53	ND	0.239	0.500	ug/L							U
Iron, Dissolved	54	ND	18.2	36.0	ug/L							U
Iron, Dissolved	57	ND	18.2	36.0	ug/L							U

LCS (BJK0730-BS1)						Prepared: 30-Nov-2021 Analyzed: 30-Nov-2021 18:49						
Barium, Dissolved	135	24.2	0.114	0.500	ug/L	25.0		96.9	80-120			
Barium, Dissolved	137	24.0	0.0765	0.500	ug/L	25.0		95.9	80-120			
Lead, Dissolved	208	26.3	0.0513	0.100	ug/L	25.0		105	80-120			
Manganese, Dissolved	55	25.0	0.142	0.500	ug/L	25.0		100	80-120			
Silver, Dissolved	107	25.9	0.0220	0.200	ug/L	25.0		104	80-120			
Vanadium, Dissolved	51a	25.1	0.0556	0.200	ug/L	25.0		100	80-120			
Vanadium, Dissolved	51b	25.1	0.0521	0.200	ug/L	25.0		101	80-120			
Arsenic, Dissolved	75a	26.2	0.0373	0.200	ug/L	25.0		105	80-120			
Cadmium, Dissolved	111	25.5	0.0300	0.100	ug/L	25.0		102	80-120			


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 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 13:43

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds (dissolved) - Quality Control
Batch BJK0730 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJK0730-BS1)						Prepared: 30-Nov-2021 Analyzed: 30-Nov-2021 18:49						
Cadmium, Dissolved	114	26.0	0.0400	0.100	ug/L	25.0		104	80-120			
Cobalt, Dissolved	59	27.2	0.0178	0.200	ug/L	25.0		109	80-120			
Copper, Dissolved	63	27.5	0.173	0.500	ug/L	25.0		110	80-120			
Copper, Dissolved	65	27.2	0.350	0.500	ug/L	25.0		109	80-120			
Nickel, Dissolved	60	27.3	0.0792	0.500	ug/L	25.0		109	80-120			
Nickel, Dissolved	62	27.1	0.220	0.500	ug/L	25.0		108	80-120			
Selenium, Dissolved	78	80.9	0.179	0.500	ug/L	80.0		101	80-120			
Zinc, Dissolved	66	86.7	2.92	6.00	ug/L	80.0		108	80-120			
Zinc, Dissolved	67	81.4	0.940	6.00	ug/L	80.0		102	80-120			
LCS (BJK0730-BS2)						Prepared: 30-Nov-2021 Analyzed: 01-Dec-2021 17:57						
Chromium, Dissolved	52	26.1	0.260	0.500	ug/L	25.0		104	80-120			
Chromium, Dissolved	53	26.9	0.239	0.500	ug/L	25.0		107	80-120			
Iron, Dissolved	54	4970	18.2	36.0	ug/L	5000		99.3	80-120			
Iron, Dissolved	57	4910	18.2	36.0	ug/L	5000		98.2	80-120			
Duplicate (BJK0730-DUP1)						Source: 21K0303-08 Prepared: 30-Nov-2021 Analyzed: 30-Nov-2021 22:00						
Barium, Dissolved	135	3.46	0.114	0.500	ug/L		3.48			0.55	20	
Chromium, Dissolved	52	12.4	0.260	0.500	ug/L		12.4			0.07	20	
Iron, Dissolved	54	ND	18.2	36.0	ug/L		27.0					U
Manganese, Dissolved	55	2.51	0.142	0.500	ug/L		3.77			40.20	20	*
Vanadium, Dissolved	51a	95.3	0.0556	0.200	ug/L		95.9			0.68	20	
Arsenic, Dissolved	75a	13.4	0.0373	0.200	ug/L		13.2			1.19	20	
Cadmium, Dissolved	111	ND	0.0300	0.100	ug/L		ND					U
Cobalt, Dissolved	59	0.0750	0.0178	0.200	ug/L		0.0850			12.50	20	J
Copper, Dissolved	63	6.31	0.173	0.500	ug/L		6.35			0.62	20	
Nickel, Dissolved	60	0.584	0.0792	0.500	ug/L		0.647			10.20	20	
Selenium, Dissolved	78	2.04	0.179	0.500	ug/L		1.58			25.00	20	L
Zinc, Dissolved	66	ND	2.92	6.00	ug/L		ND					U
Duplicate (BJK0730-DUP2)						Source: 21K0303-08 Prepared: 30-Nov-2021 Analyzed: 01-Dec-2021 20:33						
Lead, Dissolved	208	0.0700	0.0513	0.100	ug/L		0.0730			4.20	20	J
Silver, Dissolved	107	ND	0.0220	0.200	ug/L		ND					U
Matrix Spike (BJK0730-MS1)						Source: 21K0303-08 Prepared: 30-Nov-2021 Analyzed: 30-Nov-2021 22:05						
Barium, Dissolved	135	28.3	0.114	0.500	ug/L	25.0	3.48	99.2	75-125			


 Shannon & Wilson, Inc
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 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 13:43

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds (dissolved) - Quality Control
Batch BJK0730 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike (BJK0730-MS1)		Source: 21K0303-08		Prepared: 30-Nov-2021		Analyzed: 30-Nov-2021 22:05						
Chromium, Dissolved	52	32.2	0.260	0.500	ug/L	25.0	12.4	79.2	75-125			
Iron, Dissolved	54	4190	18.2	36.0	ug/L	5000	27.0	83.3	75-125			
Manganese, Dissolved	55	22.1	0.142	0.500	ug/L	25.0	3.77	73.4	75-125			*
Vanadium, Dissolved	51a	120	0.0556	0.200	ug/L	25.0	95.9	95.5	75-125			
Arsenic, Dissolved	75a	39.9	0.0373	0.200	ug/L	25.0	13.2	107	75-125			
Cadmium, Dissolved	111	26.7	0.0300	0.100	ug/L	25.0	ND	107	75-125			
Cobalt, Dissolved	59	26.5	0.0178	0.200	ug/L	25.0	0.0850	106	75-125			
Copper, Dissolved	63	32.9	0.173	0.500	ug/L	25.0	6.35	106	75-125			
Nickel, Dissolved	60	27.4	0.0792	0.500	ug/L	25.0	0.647	107	75-125			
Selenium, Dissolved	78	82.8	0.179	0.500	ug/L	80.0	1.58	102	75-125			
Zinc, Dissolved	66	82.7	2.92	6.00	ug/L	80.0	ND	103	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike (BJK0730-MS2)		Source: 21K0303-08		Prepared: 30-Nov-2021		Analyzed: 01-Dec-2021 20:38						
Lead, Dissolved	208	24.4	0.0513	0.100	ug/L	25.0	0.0730	97.4	75-125			
Silver, Dissolved	107	22.8	0.0220	0.200	ug/L	25.0	ND	91.3	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BJK0730-MSD1)		Source: 21K0303-08		Prepared: 30-Nov-2021		Analyzed: 30-Nov-2021 22:11						
Barium, Dissolved	135	28.0	0.114	0.500	ug/L	25.0	3.48	98.1	75-125	0.97	20	
Chromium, Dissolved	52	31.5	0.260	0.500	ug/L	25.0	12.4	76.5	75-125	2.16	20	
Iron, Dissolved	54	4110	18.2	36.0	ug/L	5000	27.0	81.6	75-125	2.11	20	
Manganese, Dissolved	55	21.8	0.142	0.500	ug/L	25.0	3.77	72.0	75-125	1.68	20	*
Vanadium, Dissolved	51a	119	0.0556	0.200	ug/L	25.0	95.9	92.6	75-125	0.61	20	
Arsenic, Dissolved	75a	39.2	0.0373	0.200	ug/L	25.0	13.2	104	75-125	1.81	20	
Cadmium, Dissolved	111	26.4	0.0300	0.100	ug/L	25.0	ND	106	75-125	0.98	20	
Cobalt, Dissolved	59	26.0	0.0178	0.200	ug/L	25.0	0.0850	104	75-125	2.05	20	
Copper, Dissolved	63	32.5	0.173	0.500	ug/L	25.0	6.35	104	75-125	1.22	20	
Nickel, Dissolved	60	26.9	0.0792	0.500	ug/L	25.0	0.647	105	75-125	1.99	20	
Selenium, Dissolved	78	80.8	0.179	0.500	ug/L	80.0	1.58	99.1	75-125	2.43	20	
Zinc, Dissolved	66	82.5	2.92	6.00	ug/L	80.0	ND	103	75-125	0.26	20	

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BJK0730-MSD2)		Source: 21K0303-08		Prepared: 30-Nov-2021		Analyzed: 01-Dec-2021 20:42						
Lead, Dissolved	208	23.7	0.0513	0.100	ug/L	25.0	0.0730	94.5	75-125	3.00	20	


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
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Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds (dissolved) - Quality Control
Batch BJK0730 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (BJK0730-MSD2)			Source: 21K0303-08			Prepared: 30-Nov-2021		Analyzed: 01-Dec-2021 20:42				
Silver, Dissolved	107	22.2	0.0220	0.200	ug/L	25.0	ND	89.0	75-125	2.64	20	

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Post Spike (BJK0730-PS1)			Source: 21K0303-08			Prepared: 30-Nov-2021		Analyzed: 10-Dec-2021 18:39				
Manganese, Dissolved	55	23.8			ug/L	24.8	3.77	81.0	80-120			


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 Project Number: 21-1-12596-012
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Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds (dissolved) - Quality Control
Batch BJL0027 - TWM EPA 7470A

Instrument: HYDRA Analyst: SKD

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit	Notes
Blank (BJL0027-BLK1)						Prepared: 01-Dec-2021 Analyzed: 02-Dec-2021 16:18				
Mercury, Dissolved	ND	0.000013	0.000100	mg/L						U
LCS (BJL0027-BS1)						Prepared: 01-Dec-2021 Analyzed: 02-Dec-2021 16:21				
Mercury, Dissolved	0.00208	0.000013	0.000100	mg/L	0.00200	104	80-120			


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Analysis by: Analytical Resources, LLC
Wet Chemistry - Quality Control
Batch BJK0468 - No Prep Wet Chem

Instrument: UV1800-1 Analyst: BF

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0468-BLK1)					Prepared: 17-Nov-2021 Analyzed: 17-Nov-2021 18:52						
Ferrous Iron	ND	0.040	0.040	mg/L							U
LCS (BJK0468-BS2)					Prepared: 17-Nov-2021 Analyzed: 17-Nov-2021 19:13						
Ferrous Iron	0.481	0.040	0.040	mg/L	0.500		96.3	90-110			
Duplicate (BJK0468-DUP1)					Source: 21K0303-01 Prepared: 17-Nov-2021 Analyzed: 17-Nov-2021 18:55						
Ferrous Iron	35.1	0.800	0.800	mg/L		35.1			0.11	20	D
Matrix Spike (BJK0468-MS1)					Source: 21K0303-01 Prepared: 17-Nov-2021 Analyzed: 17-Nov-2021 18:55						
Ferrous Iron	49.4	0.800	0.800	mg/L	20.0	35.1	71.5	75-125			HC, D

Recovery limits for target analytes in MS/MSD QC samples are advisory only.


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 Project: Lower Duwamish Q4
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Reported:
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Analysis by: Analytical Resources, LLC
Wet Chemistry - Quality Control
Batch BJK0469 - No Prep Wet Chem

Instrument: N/A

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0469-BLK1)					Prepared: 17-Nov-2021 Analyzed: 17-Nov-2021 17:17					
Sulfite	ND	1.4	1.4	mg/L						U
LCS (BJK0469-BS1)					Prepared: 17-Nov-2021 Analyzed: 17-Nov-2021 17:17					
Sulfite	3.9	1.4	1.4	mg/L	5.01		77.8 75-100			
Duplicate (BJK0469-DUP1)					Source: 21K0303-01 Prepared: 17-Nov-2021 Analyzed: 17-Nov-2021 17:17					
Sulfite	ND	1.4	1.4	mg/L		ND				H, U


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Reported:
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Analysis by: Analytical Resources, LLC
Wet Chemistry - Quality Control
Batch BJK0496 - No Prep Wet Chem

Instrument: IC930 Analyst: BF

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0496-BLK1)						Prepared: 18-Nov-2021 Analyzed: 18-Nov-2021 18:38					
Chloride	ND	0.100	0.100	mg/L							U
Nitrate-N	ND	0.100	0.100	mg/L							U
Nitrite-N	ND	0.100	0.100	mg/L							U
Sulfate	ND	0.100	0.100	mg/L							U
LCS (BJK0496-BS1)						Prepared: 18-Nov-2021 Analyzed: 18-Nov-2021 18:58					
Chloride	4.91	0.100	0.100	mg/L	5.00		98.2	90-110			
Nitrate-N	5.00	0.100	0.100	mg/L	5.00		99.9	90-110			
Nitrite-N	5.09	0.100	0.100	mg/L	5.00		102	90-110			
Sulfate	4.76	0.100	0.100	mg/L	5.00		95.3	90-110			
Duplicate (BJK0496-DUP1)						Source: 21K0303-01 Prepared: 18-Nov-2021 Analyzed: 18-Nov-2021 19:38					
Nitrate-N	ND	0.100	0.100	mg/L		ND					U
Nitrite-N	ND	0.100	0.100	mg/L		ND					U
Sulfate	0.140	0.100	0.100	mg/L		0.164			15.80	20	
Duplicate (BJK0496-DUP2)						Source: 21K0303-01RE1 Prepared: 18-Nov-2021 Analyzed: 02-Dec-2021 22:17					
Chloride	10.8	0.200	0.200	mg/L		10.8			0.33	20	D
Matrix Spike (BJK0496-MS1)						Source: 21K0303-01 Prepared: 18-Nov-2021 Analyzed: 18-Nov-2021 19:58					
Nitrate-N	1.93	0.100	0.100	mg/L	2.00	ND	96.3	75-125			
Nitrite-N	1.69	0.100	0.100	mg/L	2.01	ND	84.4	75-125			
Sulfate	1.69	0.100	0.100	mg/L	2.00	0.164	76.1	75-125			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Matrix Spike (BJK0496-MS3)						Source: 21K0303-01RE1 Prepared: 18-Nov-2021 Analyzed: 11-Dec-2021 23:32					
Chloride	22.8	0.500	0.500	mg/L	15.0	10.8	80.0	75-125			D
Sulfate	12.2	0.500	0.500	mg/L	15.0	ND	81.1	75-125			D

Recovery limits for target analytes in MS/MSD QC samples are advisory only.


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

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Certified Analyses included in this Report

Analyte	Certifications
EPA 300.0 in Water	
Chloride	DoD-ELAP,WADOE,WA-DW,NELAP
Nitrate-N	DoD-ELAP,WADOE,WA-DW,NELAP
Nitrite-N	DoD-ELAP,WADOE,WA-DW,NELAP
Sulfate	DoD-ELAP,WADOE,WA-DW,NELAP
EPA 6010D in Water	
Calcium	WADOE,NELAP,DoD-ELAP
Magnesium	WADOE,NELAP,DoD-ELAP
EPA 6020B in Water	
Silver-107	WADOE,WA-DW,DoD-ELAP,NELAP
Barium-135	NELAP,WADOE,DoD-ELAP,ADEC
Barium-137	NELAP,WADOE,DoD-ELAP,ADEC
Chromium-52	NELAP,WADOE,DoD-ELAP,ADEC
Chromium-53	NELAP,WADOE,DoD-ELAP,ADEC
Iron-54	NELAP,WADOE,DoD-ELAP
Iron-57	NELAP,WADOE,DoD-ELAP
Manganese-55	NELAP,WADOE,DoD-ELAP
Lead-208	NELAP,WADOE,DoD-ELAP,ADEC
Vanadium-51a	NELAP,DoD-ELAP,WADOE,ADEC
Vanadium-51b	NELAP,DoD-ELAP,WADOE,ADEC
Silver-107	WA-DW,DoD-ELAP,NELAP
Barium-135	NELAP,WADOE,DoD-ELAP,ADEC
Barium-137	NELAP,WADOE,DoD-ELAP,ADEC
Chromium-52	NELAP,WADOE,DoD-ELAP,ADEC
Chromium-53	NELAP,WADOE,DoD-ELAP,ADEC
Iron-54	NELAP,WADOE,DoD-ELAP
Iron-57	NELAP,WADOE,DoD-ELAP
Manganese-55	NELAP,WADOE,DoD-ELAP
Lead-208	NELAP,WADOE,DoD-ELAP,ADEC
Vanadium-51a	NELAP,DoD-ELAP,WADOE,ADEC
Vanadium-51b	NELAP,DoD-ELAP,WADOE,ADEC
EPA 6020B UCT-KED in Water	
Arsenic-75a	WADOE,WA-DW,DoD-ELAP,ADEC,NELAP
Cadmium-111	NELAP,WADOE,DoD-ELAP,ADEC
Cadmium-114	NELAP,WADOE,DoD-ELAP,ADEC


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Cobalt-59	NELAP,DoD-ELAP,WADOE
Copper-63	NELAP,WADOE,DoD-ELAP
Copper-65	NELAP,WADOE,DoD-ELAP
Nickel-60	NELAP,WADOE,DoD-ELAP,ADEC
Nickel-62	NELAP,WADOE,DoD-ELAP,ADEC
Selenium-78	NELAP,WADOE,DoD-ELAP
Zinc-66	WADOE,WA-DW,DoD-ELAP
Zinc-67	WADOE,WA-DW,DoD-ELAP
Arsenic-75a	NELAP,WADOE,DoD-ELAP,ADEC
Cadmium-111	NELAP,WADOE,DoD-ELAP,ADEC
Cadmium-114	NELAP,WADOE,DoD-ELAP,ADEC
Cobalt-59	DoD-ELAP,NELAP,WADOE
Copper-63	NELAP,WADOE,DoD-ELAP
Copper-65	NELAP,WADOE,DoD-ELAP
Nickel-60	NELAP,WADOE,DoD-ELAP,ADEC
Nickel-62	NELAP,WADOE,DoD-ELAP,ADEC
Selenium-78	NELAP,WADOE,DoD-ELAP
Zinc-66	NELAP,WADOE,DoD-ELAP
Zinc-67	NELAP,WADOE,DoD-ELAP

EPA 7470A in Water

Mercury	WADOE,NELAP,DoD-ELAP
Mercury	WADOE,NELAP,DoD-ELAP

EPA 8082A in Water

Aroclor 1016	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1016 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1221	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1221 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1232	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1232 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1242	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1242 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1248	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1248 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1254	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1254 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1260	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1260 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1262	WADOE,DoD-ELAP,NELAP,ADEC


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Aroclor 1262 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1268	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1268 [2C]	WADOE,DoD-ELAP,NELAP,ADEC

EPA 8260D in Water

Chloromethane	DoD-ELAP,ADEC,NELAP,WADOE
Vinyl Chloride	DoD-ELAP,ADEC,NELAP,WADOE
Bromomethane	DoD-ELAP,ADEC,NELAP,WADOE
Chloroethane	DoD-ELAP,ADEC,NELAP,WADOE
Trichlorofluoromethane	DoD-ELAP,ADEC,NELAP,WADOE
Acrolein	DoD-ELAP,NELAP,WADOE
1,1,2-Trichloro-1,2,2-Trifluoroethane	DoD-ELAP,ADEC,NELAP,WADOE
Acetone	DoD-ELAP,ADEC,NELAP,WADOE
1,1-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Iodomethane	DoD-ELAP,NELAP,WADOE
Methylene Chloride	DoD-ELAP,ADEC,NELAP,WADOE
Acrylonitrile	DoD-ELAP,NELAP,WADOE
Carbon Disulfide	DoD-ELAP,NELAP,WADOE
trans-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Vinyl Acetate	DoD-ELAP,NELAP,WADOE
1,1-Dichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
2-Butanone	DoD-ELAP,NELAP,WADOE
2,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
cis-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Chloroform	DoD-ELAP,ADEC,NELAP,WADOE
Bromochloromethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1,1-Trichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
Carbon tetrachloride	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
Benzene	DoD-ELAP,ADEC,NELAP,WADOE
Trichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
Bromodichloromethane	DoD-ELAP,ADEC,NELAP,WADOE
Dibromomethane	DoD-ELAP,ADEC,NELAP,WADOE
2-Chloroethyl vinyl ether	DoD-ELAP,ADEC,NELAP,WADOE
4-Methyl-2-Pentanone	DoD-ELAP,NELAP,WADOE
cis-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
Toluene	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
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Project: Lower Duwamish Q4
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2-Hexanone	DoD-ELAP,NELAP,WADOE
1,1,2-Trichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,3-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
Tetrachloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Dibromochloromethane	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dibromoethane	DoD-ELAP,NELAP,WADOE
Chlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Ethylbenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,1,1,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,WADOE
m,p-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
o-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
Styrene	DoD-ELAP,NELAP,WADOE
Bromoform	DoD-ELAP,NELAP,WADOE
1,1,2,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,2,3-Trichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,4-Dichloro 2-Butene	DoD-ELAP,ADEC,NELAP,WADOE
n-Propylbenzene	DoD-ELAP,NELAP,WADOE
Bromobenzene	DoD-ELAP,NELAP,WADOE
Isopropyl Benzene	DoD-ELAP,NELAP,WADOE
2-Chlorotoluene	DoD-ELAP,ADEC,NELAP,WADOE
4-Chlorotoluene	DoD-ELAP,ADEC,NELAP,WADOE
t-Butylbenzene	DoD-ELAP,NELAP,WADOE
1,3,5-Trimethylbenzene	DoD-ELAP,NELAP,WADOE
1,2,4-Trimethylbenzene	DoD-ELAP,NELAP,WADOE
s-Butylbenzene	DoD-ELAP,NELAP,WADOE
4-Isopropyl Toluene	DoD-ELAP,NELAP,WADOE
1,3-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,4-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
n-Butylbenzene	DoD-ELAP,NELAP,WADOE
1,2-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dibromo-3-chloropropane	DoD-ELAP,ADEC,NELAP,WADOE
1,2,4-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Hexachloro-1,3-Butadiene	DoD-ELAP,ADEC,NELAP,WADOE
Naphthalene	DoD-ELAP,ADEC,NELAP,WADOE
1,2,3-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Dichlorodifluoromethane	DoD-ELAP,ADEC,NELAP,WADOE
Methyl tert-butyl Ether	DoD-ELAP,ADEC,NELAP,WADOE
n-Hexane	WADOE
2-Pentanone	WADOE



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
14-Dec-2021 13:43

EPA 8260D-SIM in Water

Acrylonitrile	NELAP,WADOE
Vinyl chloride	NELAP,WADOE
1,1-Dichloroethene	NELAP,WADOE
cis-1,2-Dichloroethene	NELAP,WADOE
trans-1,2-Dichloroethene	NELAP,WADOE
Trichloroethene	NELAP,WADOE
Tetrachloroethene	NELAP,WADOE
1,1,2,2-Tetrachloroethane	NELAP,WADOE
1,2-Dichloroethane	NELAP,WADOE
Benzene	NELAP,WADOE

EPA 8270E in Water

Phenol	NELAP,DoD-ELAP
bis(2-chloroethyl) ether	NELAP,DoD-ELAP
2-Chlorophenol	NELAP,DoD-ELAP
1,3-Dichlorobenzene	NELAP,DoD-ELAP
1,4-Dichlorobenzene	NELAP,DoD-ELAP
1,2-Dichlorobenzene	NELAP,DoD-ELAP
Benzyl Alcohol	NELAP,DoD-ELAP
2,2'-Oxybis(1-chloropropane)	NELAP,DoD-ELAP
2-Methylphenol	NELAP,DoD-ELAP
Hexachloroethane	NELAP,DoD-ELAP
N-Nitroso-di-n-Propylamine	NELAP,DoD-ELAP
4-Methylphenol	NELAP,DoD-ELAP
Nitrobenzene	NELAP,DoD-ELAP
Isophorone	NELAP,DoD-ELAP
2-Nitrophenol	NELAP,DoD-ELAP
2,4-Dimethylphenol	NELAP,DoD-ELAP
Bis(2-Chloroethoxy)methane	NELAP,DoD-ELAP
2,4-Dichlorophenol	NELAP,DoD-ELAP
1,2,4-Trichlorobenzene	NELAP,DoD-ELAP
Naphthalene	NELAP,DoD-ELAP
Benzoic acid	NELAP,DoD-ELAP
4-Chloroaniline	NELAP,DoD-ELAP
Hexachlorobutadiene	NELAP,DoD-ELAP
4-Chloro-3-Methylphenol	NELAP,DoD-ELAP
2-Methylnaphthalene	NELAP,DoD-ELAP
Hexachlorocyclopentadiene	NELAP,DoD-ELAP


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

Project: Lower Duwamish Q4

Project Number: 21-1-12596-012

Project Manager: Meg Strong

Reported:

14-Dec-2021 13:43

2,4,6-Trichlorophenol	NELAP,DoD-ELAP
2,4,5-Trichlorophenol	NELAP,DoD-ELAP
2-Chloronaphthalene	NELAP,DoD-ELAP
2-Nitroaniline	NELAP,DoD-ELAP
Acenaphthylene	NELAP,DoD-ELAP
Dimethylphthalate	NELAP,DoD-ELAP
2,6-Dinitrotoluene	NELAP,DoD-ELAP
Acenaphthene	NELAP,DoD-ELAP
3-Nitroaniline	NELAP,DoD-ELAP
2,4-Dinitrophenol	NELAP,DoD-ELAP
Dibenzofuran	NELAP,DoD-ELAP
4-Nitrophenol	NELAP,DoD-ELAP
2,4-Dinitrotoluene	NELAP,DoD-ELAP
Fluorene	NELAP,DoD-ELAP
4-Chlorophenylphenyl ether	NELAP,DoD-ELAP
Diethyl phthalate	NELAP,DoD-ELAP
4-Nitroaniline	NELAP,DoD-ELAP
4,6-Dinitro-2-methylphenol	NELAP,DoD-ELAP
N-Nitrosodiphenylamine	NELAP,DoD-ELAP
4-Bromophenyl phenyl ether	NELAP,DoD-ELAP
Hexachlorobenzene	NELAP,DoD-ELAP
Pentachlorophenol	NELAP,DoD-ELAP
Phenanthrene	NELAP,DoD-ELAP
Anthracene	NELAP,DoD-ELAP
Carbazole	NELAP,DoD-ELAP
Di-n-Butylphthalate	NELAP,DoD-ELAP
Fluoranthene	NELAP,DoD-ELAP
Pyrene	NELAP,DoD-ELAP
Butylbenzylphthalate	NELAP,DoD-ELAP
Benzo(a)anthracene	NELAP,DoD-ELAP
3,3'-Dichlorobenzidine	NELAP,DoD-ELAP
Chrysene	NELAP,DoD-ELAP
bis(2-Ethylhexyl)phthalate	NELAP,DoD-ELAP
Di-n-Octylphthalate	NELAP,DoD-ELAP
Benzo(b)fluoranthene	NELAP,DoD-ELAP
Benzo(k)fluoranthene	NELAP,DoD-ELAP
Benzo(a)fluoranthene, Total	NELAP
Benzo(a)pyrene	NELAP,DoD-ELAP
Indeno(1,2,3-cd)pyrene	NELAP,DoD-ELAP


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

Project: Lower Duwamish Q4

Project Number: 21-1-12596-012

Project Manager: Meg Strong

Reported:

14-Dec-2021 13:43

 Dibenzo(a,h)anthracene
 Benzo(g,h,i)perylene
 N-Nitrosodimethylamine
 1-Methylnaphthalene

 NELAP,DoD-ELAP
 NELAP,DoD-ELAP
 NELAP,DoD-ELAP
 NELAP,DoD-ELAP
EPA 8270E-SIM in Water
 Naphthalene
 2-Methylnaphthalene
 1-Methylnaphthalene

ADEC,DoD-ELAP,NELAP,WADOE

ADEC,DoD-ELAP,NELAP

ADEC,DoD-ELAP,NELAP,WADOE

Biphenyl

NELAP

Acenaphthylene

ADEC,DoD-ELAP,NELAP,WADOE

Acenaphthene

ADEC,DoD-ELAP,NELAP,WADOE

Dibenzofuran

ADEC,DoD-ELAP,NELAP

Fluorene

ADEC,DoD-ELAP,NELAP,WADOE

Phenanthrene

ADEC,DoD-ELAP,NELAP,WADOE

Anthracene

ADEC,DoD-ELAP,NELAP,WADOE

Carbazole

NELAP

Fluoranthene

ADEC,DoD-ELAP,NELAP,WADOE

Pyrene

ADEC,DoD-ELAP,NELAP,WADOE

Benzo(a)anthracene

ADEC,DoD-ELAP,NELAP,WADOE

Chrysene

ADEC,DoD-ELAP,NELAP,WADOE

Benzo(b)fluoranthene

ADEC,DoD-ELAP,NELAP,WADOE

Benzo(k)fluoranthene

ADEC,DoD-ELAP,NELAP,WADOE

Benzo(j)fluoranthene

ADEC,DoD-ELAP,NELAP,WADOE

Benzo(e)pyrene

NELAP

Benzo(a)pyrene

ADEC,DoD-ELAP,NELAP,WADOE

Perylene

ADEC,NELAP

Indeno(1,2,3-cd)pyrene

ADEC,DoD-ELAP,NELAP,WADOE

Dibenzo(a,h)anthracene

ADEC,DoD-ELAP,NELAP,WADOE

Benzo(g,h,i)perylene

ADEC,DoD-ELAP,NELAP,WADOE

EPA RSK-175 in Water

Methane

NELAP

Ethane

NELAP

Ethene

NELAP

Acetylene

NELAP

NWTPH-Dx in Water

Diesel Range Organics (C12-C24)

DoD-ELAP,NELAP,WADOE

Diesel Range Organics (C10-C25)

DoD-ELAP,NELAP,WADOE

Diesel Range Organics (Tol-C18)

DoD-ELAP,NELAP,WADOE


 Shannon & Wilson, Inc
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 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 13:43

Diesel Range Organics (C10-C24)	DoD-ELAP,NELAP,WADOE
Diesel Range Organics (C10-C28)	DoD-ELAP,NELAP,WADOE
Diesel Range Organics (C12-C22)	DoD-ELAP
Diesel Range Organics (C12-C25)	DoD-ELAP
Motor Oil Range Organics (C24-C38)	DoD-ELAP,NELAP,WADOE
Motor Oil Range Organics (C25-C36)	DoD-ELAP,NELAP,WADOE
Motor Oil Range Organics (C24-C40)	DoD-ELAP,NELAP,WADOE
Residual Range Organics (C23-C32)	DoD-ELAP
Mineral Spirits Range Organics (Tol-C12)	DoD-ELAP,NELAP,WADOE
Mineral Oil Range Organics (C16-C28)	DoD-ELAP,NELAP,WADOE
Kerosene Range Organics (Tol-C18)	DoD-ELAP,NELAP,WADOE
JP8 Range Organics (C8-C18)	DoD-ELAP,NELAP,WADOE
JP5 Range Organics (C10-C16)	DoD-ELAP,NELAP,WADOE
JP4 Range Organics (Tol-C14)	DoD-ELAP,NELAP,WADOE
Jet-A Range Organics (C10-C18)	DoD-ELAP,NELAP,WADOE
Creosote Range Organics (C12-C22)	DoD-ELAP,NELAP,WADOE
Bunker C Range Organics (C10-C38)	DoD-ELAP,NELAP,WADOE
Stoddard Range Organics (C8-C12)	DoD-ELAP,NELAP,WADOE
Transformer Oil Range Organics (C12-C28)	DoD-ELAP,NELAP,WADOE

NWTPHg in Water

Gasoline Range Organics (Tol-Nap)	WADOE,DoD-ELAP
Gasoline Range Organics (2MP-TMB)	WADOE,DoD-ELAP
Gasoline Range Organics (Tol-C12)	WADOE,DoD-ELAP
Gasoline Range Organics (C6-C10)	WADOE,ADEC,DoD-ELAP
Gasoline Range Organics (C5-C12)	WADOE,DoD-ELAP

SM 3500-Fe B-97 in Water

Ferrous Iron	WADOE,NELAP
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SM 4500-SO3 B-00 in Water

Sulfite	WADOE,NELAP
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Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	17-015	03/28/2023
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	02/28/2022
NELAP	ORELAP - Oregon Laboratory Accreditation Program	WA100006-012	05/12/2022
WADOE	WA Dept of Ecology	C558	06/30/2022
WA-DW	Ecology - Drinking Water	C558	06/30/2022


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 13:43

Notes and Definitions

*	Flagged value is not within established control limits.
B	This analyte was detected in the method blank.
D	The reported value is from a dilution
D1	Surrogate was not detected due to sample extract dilution
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL)
H	Hold time violation - Hold time was exceeded.
HC	The natural concentration of the spiked analyte is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
J	Estimated concentration value detected below the reporting limit.
L	Analyte concentration is ≤ 5 times the reporting limit and the replicate control limit defaults to $\pm$ RL instead of 20% RPD
M	Estimated value for a GC/MS analyte detected and confirmed by an analyst but with low spectral match parameters.
P1	The reported value is greater than 40% difference between the concentrations determined on two GC columns where applicable.
Q	Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria ($<20\%$ RSD, $<20\%$ drift or minimum RRF)
U	This analyte is not detected above the reporting limit (RL) or if noted, not detected above the limit of detection (LOD).
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
[2C]	Indicates this result was quantified on the second column on a dual column analysis.



Analytical Resources, LLC
Analytical Chemists and Consultants

04 December 2021

Meg Strong
Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle, WA 98103-8636

RE: Lower Duwamish Q4

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)
21K0322

Associated SDG ID(s)
N/A

Shelly
Fishel

Digitally signed by
Shelly Fishel
Date: 2021.12.04
12:52:20 -08'00'

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, LLC

Shelly Fishel, Project Manager

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



Page:	of	
Date:	Ice Present?	
No. of Coolers:	Cooler Temps:	



Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

Client Project Name: <u>LDW</u>					Analysis Requested										Notes/Comments				
Client Project #: <u>21-1-12596</u>		Samplers: <u>DES, RMV</u>			TPH-G	TPH-DX	BTEX	HVOCs	MTBE	PAHs	Full SVOCs	Limited SVOCs	PCBs	metals	Hexavalent Chromium				
Sample ID	Date	Time	Matrix	No. Containers															
MW-76-20211811	11/18	0934	GW	13		X	X	X		X	X		①						
MW-45-20211811	11/18	1040	GW	11		X	X	X				X	②						
MW-31-20211811	11/18	1212	GW	11		X		X		X	X								
MW-55-20211811	11/18	1336	GW	12		X	X	X		X			①	X					
TB-7-20211811	11/18	1338	W	5		X	X	X		X									
Comments/Special Instructions • Metals are <u>not</u> field filtered • Reference project for detection limits					Relinquished by: <u>Rose Vogt</u> (Signature)					Received by: <u>LB</u> (Signature)					Relinquished by: _____ (Signature)				
					Printed Name: <u>Rose Vogt</u>					Printed Name: <u>Kathleen Beasley</u>					Printed Name: _____				
					Company: <u>Shannon + Wilson</u>					Company: <u>ATF</u>					Company: _____				
					Date & Time: <u>11/18/21 1449</u>					Date & Time: <u>11/18/21 14:49</u>					Date & Time: _____				

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.



Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
04-Dec-2021 12:32

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-76-20211811	21K0322-01	Water	18-Nov-2021 09:34	18-Nov-2021 14:49
MW-76-20211811	21K0322-02	Water	18-Nov-2021 09:34	18-Nov-2021 14:49
MW-45-20211811	21K0322-03	Water	18-Nov-2021 09:34	18-Nov-2021 14:49
MW-45-20211811	21K0322-04	Water	18-Nov-2021 10:40	18-Nov-2021 14:49
MW-31-20211811	21K0322-05	Water	18-Nov-2021 12:12	18-Nov-2021 14:49
MW-55-20211811	21K0322-06	Water	18-Nov-2021 13:36	18-Nov-2021 14:49
MW-55-20211811	21K0322-07	Water	18-Nov-2021 13:36	18-Nov-2021 14:49
TB-7-20211811	21K0322-08	Water	18-Nov-2021 13:38	18-Nov-2021 14:49



Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
04-Dec-2021 12:32

Work Order Case Narrative

Client: Shannon & Wilson, Inc
Project: Lower Duwamish Q4
Work Order: 21K0322

Sample receipt

Samples as listed on the preceding page were received 18-Nov-2021 14:49 under ARI work order 21K0322. For details regarding sample receipt, please refer to the Cooler Receipt Form.

PCB Aroclors - EPA Method SW8082A

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within control limits.

Volatiles - EPA Method SW8260D

The sample(s) were analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within control limits.

Volatiles - EPA Method 8260D-SIM (Selected Ion Monitoring)

The sample(s) were analyzed within the recommended holding times.


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 04-Dec-2021 12:32

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within control limits.

Semivolatiles - EPA Method SW8270E

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements except as follows. 4-Chlorophenylphenyl ether, Fluorene, Hexachlorocyclopentadiene, and Pentachlorophenol which were out of control low and 2,4-Dinitrotoluene, 2-Nitrophenol, Butylbenzylphthalate, Fluoranthene, Pyrene and surrogate p-Terphenyl-d14 which were out of control high in the initial calibration verification SJL0050-ICV1. All samples which contain analyte have been flagged with a "Q" qualifier. Hexachlorocyclopentadiene and Pentachlorophenol which were out of control low and Fluoranthene and Pyrene were out of control high in the continuing calibration verification SJL0050-CCV1. 2,4-Dinitrophenol, 4,6-Dinitro-2-methylphenol, Benzo(g,h,i)perylene, Benzoic acid, Hexachlorocyclopentadiene and Pentachlorophenol which were out of control low in low concentration calibration verification SJL0050-LCV1. 4,6-Dinitro-2-methylphenol, Benzoic acid and Pentachlorophenol were out of control low and internal standard Chrysene-d12 which was out of control high in the low concentration calibration verification SJL0050-LCV2.

Internal standard areas were within limits except Chrysene-d12 which was out of control high in the low concentration calibration verification SJL0050-LCV2.

The surrogate percent recoveries were within control limits except p-Terphenyl-d14 which was out of control high in the initial calibration verification SJL0050-ICV1 and has been "Q" qualified. Phenol-d5 was out of control low in sample 21K0322-01 and has been flagged.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries were within control limits except Benzoic Acid, 4-Chloroaniline, Hexachlorocyclopentadiene and 4-Nitrophenol which were out of control low in the blank spike BJK0540-BS1 and 4-Chloroaniline was out of control low in the blank spike duplicate BJK0540-BSD1. The BS/BSD relative percent difference (RPD) were within advisory control limits except 2,4-Dinitrophenol, Hexachlorocyclopentadiene and 4-Chlorophenylphenyl ether. Deviations have been flagged.

Polynuclear Aromatic Hydrocarbons (PAH) - EPA Method SW8270E-SIM


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 04-Dec-2021 12:32

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Total and Dissolved Metals - EPA Method 6020B

The sample(s) were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Sample specific QC was performed in association with sample 21K0322-01 in Total Metals batch BJL0067 and in association with sample 21K0322-02 in Dissolved Metals batch BJK0733. The duplicate (DUP) relative percent difference (RPD) were within advisory control limits. The matrix spike/matrix spike duplicate (MS/MSD) percent recoveries and relative percent difference (RPD) were within advisory control limits except Total Iron percent recovery was out of control low in matrix spike duplicate BJL0067-MSD1 and has been flagged.

Wet Chemistry

The sample(s) were prepared and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Sample specific QC was performed in association with sample 21K0322-06 in batch BJK0526. The matrix spike (MS) percent recoveries and the duplicate (DUP) relative percent difference (RPD) were within advisory control limits.

Total Mercury - EPA Method 7470/7471

The sample(s) were digested and analyzed within the recommended holding times.



Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
04-Dec-2021 12:32

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Sample specific QC was performed in association with sample 21K0322-01 in Total Mercury batch B JL0018 and in association with sample 21K0322-07 in Dissolved Metals batch B JL0061. The duplicate (DUP) relative percent difference (RPD) were within advisory control limits. The matrix spike/matrix spike duplicate (MS/MSD) percent recoveries and relative percent difference (RPD) were within advisory control limits.

Diesel/Heavy Oil Range Organics - WA-Ecology Method NW-TPHDx

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within control limits.



Analytical Resources, LLC
Analytical Chemists and Consultants

Printed: 11/18/2021 4:34:05PM

WORK ORDER

21K0322

Samples will be discarded 90 days after submission of a final report unless other instructions are received.

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish Q4

Project Number: 21-1-12596-012

Preservation Confirmation

Container ID	Container Type	pH
21K0322-01 A	HDPE NM, 500 mL, 1:1 HNO ₃	22 Pass
21K0322-01 B	Glass NM, Amber, 500 mL	
21K0322-01 C	Glass NM, Amber, 500 mL	
21K0322-01 D	Glass NM, Amber, 500 mL	
21K0322-01 E	Glass NM, Amber, 500 mL	
21K0322-01 F	Glass NM, Amber, 500 mL	
21K0322-01 G	Glass NM, Amber, 500 mL	
21K0322-01 H	VOA Vial, Clear, 40 mL, HCL	
21K0322-01 I	VOA Vial, Clear, 40 mL, HCL	
21K0322-01 J	VOA Vial, Clear, 40 mL, HCL	
21K0322-01 K	VOA Vial, Clear, 40 mL, HCL	
21K0322-01 L	VOA Vial, Clear, 40 mL, HCL	
21K0322-02 A	HDPE NM, 500 mL	>2 Fail
21K0322-03 A	Glass NM, Amber, 1000 mL	
21K0322-03 B	Glass NM, Amber, 1000 mL	
21K0322-03 C	HDPE NM, 500 mL, 1:1 HNO ₃	22 Pass
21K0322-03 D	Glass NM, Amber, 500 mL	
21K0322-03 E	Glass NM, Amber, 500 mL	
21K0322-03 F	VOA Vial, Clear, 40 mL, HCL	
21K0322-03 G	VOA Vial, Clear, 40 mL, HCL	
21K0322-03 H	VOA Vial, Clear, 40 mL, HCL	
21K0322-03 I	VOA Vial, Clear, 40 mL, HCL	
21K0322-03 J	VOA Vial, Clear, 40 mL, HCL	
21K0322-04 A	HDPE NM, 500 mL	>2 Fail
21K0322-05 A	Glass NM, Amber, 500 mL	
21K0322-05 B	Glass NM, Amber, 500 mL	
21K0322-05 C	Glass NM, Amber, 500 mL	
21K0322-05 D	Glass NM, Amber, 500 mL	
21K0322-05 E	Glass NM, Amber, 500 mL	
21K0322-05 F	Glass NM, Amber, 500 mL	
21K0322-05 G	VOA Vial, Clear, 40 mL, HCL	
21K0322-05 H	VOA Vial, Clear, 40 mL, HCL	
21K0322-05 I	VOA Vial, Clear, 40 mL, HCL	
21K0322-05 J	VOA Vial, Clear, 40 mL, HCL	

Reviewed By _____

Date _____

Page 1 of 2



Analytical Resources, LLC
Analytical Chemists and Consultants

Printed: 11/18/2021 4:34:05PM

WORK ORDER

21K0322

Samples will be discarded 90 days after submission of a final report unless other instructions are received.

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish Q4

Project Number: 21-1-12596-012

21K0322-05 K	VOA Vial, Clear, 40 mL, HCL	
21K0322-06 A	HDPE NM, 500 mL, 1:1 HNO3	L2 Pass
21K0322-06 B	Glass NM, Amber, 500 mL	
21K0322-06 C	Glass NM, Amber, 500 mL	
21K0322-06 D	Glass NM, Amber, 500 mL	
21K0322-06 E	Glass NM, Amber, 500 mL	
21K0322-06 F	Glass NM, Amber, 250 mL	
21K0322-06 F 01	Glass NM, Amber, 250 mL	
21K0322-06 G	VOA Vial, Clear, 40 mL, HCL	
21K0322-06 H	VOA Vial, Clear, 40 mL, HCL	
21K0322-06 I	VOA Vial, Clear, 40 mL, HCL	
21K0322-06 J	VOA Vial, Clear, 40 mL, HCL	
21K0322-06 K	VOA Vial, Clear, 40 mL, HCL	
21K0322-07 A	HDPE NM, 500 mL	>2 Fg1
21K0322-08 A	VOA Vial, Clear, 40 mL, HCL	
21K0322-08 B	VOA Vial, Clear, 40 mL, HCL	
21K0322-08 C	VOA Vial, Clear, 40 mL, HCL	Bubble
21K0322-08 D	VOA Vial, Clear, 40 mL, HCL	Bubble
21K0322-08 E	VOA Vial, Clear, 40 mL, HCL	Bubble

Preservation Confirmed By DL

Date 11/18/21

Reviewed By _____

Date _____

Page 2 of 2



Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Shannon G. Wilson
COC No(s): _____ (NA)
Assigned ARI Job No: 21K0322

Project Name: LDW
Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____
Tracking No: _____ (NA)

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of the cooler? YES (NO)

Were custody papers included with the cooler? YES (NO)

Were custody papers properly filled out (ink, signed, etc.) YES (NO)

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) 4.4 4.0

Time _____

If cooler temperature is out of compliance fill out form 00070F

Cooler Accepted by: DB Date: 11/18/21 Time: 14:49 Temp Gun ID#: DOO 9708, 0028

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler? YES (NO)

What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: _____

Was sufficient ice used (if appropriate)? ... NA YES (NO)

How were bottles sealed in plastic bags? ... Individually Grouped Not

Did all bottles arrive in good condition (unbroken)? YES (NO)

Were all bottle labels complete and legible? YES (NO)

Did the number of containers listed on COC match with the number of containers received? YES (NO)

Did all bottle labels and tags agree with custody papers? YES (NO)

Were all bottles used correct for the requested analyses? YES (NO)

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs) ... NA YES (NO)

Were all VOC vials free of air bubbles? NA YES (NO)

Was sufficient amount of sample sent in each bottle? YES (NO)

Date VOC Trip Blank was made at ARI: 11/01/21

Were the sample(s) split by ARI? NA YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: DL Date: 11/18/21 Time: 1528 Labels checked by: _____

**** Notify Project Manager of discrepancies or concerns ****

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:
Air Bubbles present, lab to determine sizes.

By: DL Date: 11/18/21

0016F
01/17/2018

Cooler Receipt Form

Revision 014A



Analytical Resources, LLC
Analytical Chemists and Consultants

Printed: 11/18/2021 4:34:05PM

WORK ORDER

21K0322

Samples will be discarded 90 days after submission of a final report unless other instructions are received.

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish Q4

Project Number: 21-1-12596-012

Preservation Confirmation

Container ID	Container Type	pH
21K0322-01 A	HDPE NM, 500 mL, 1:1 HNO ₃	22 Pass
21K0322-01 B	Glass NM, Amber, 500 mL	
21K0322-01 C	Glass NM, Amber, 500 mL	
21K0322-01 D	Glass NM, Amber, 500 mL	
21K0322-01 E	Glass NM, Amber, 500 mL	
21K0322-01 F	Glass NM, Amber, 500 mL	
21K0322-01 G	Glass NM, Amber, 500 mL	
21K0322-01 H	VOA Vial, Clear, 40 mL, HCL	
21K0322-01 I	VOA Vial, Clear, 40 mL, HCL	
21K0322-01 J	VOA Vial, Clear, 40 mL, HCL	
21K0322-01 K	VOA Vial, Clear, 40 mL, HCL	
21K0322-01 L	VOA Vial, Clear, 40 mL, HCL	
21K0322-02 A	HDPE NM, 500 mL	>2 Fail ①
21K0322-03 A	Glass NM, Amber, 1000 mL	
21K0322-03 B	Glass NM, Amber, 1000 mL	
21K0322-03 C	HDPE NM, 500 mL, 1:1 HNO ₃	22 Pass
21K0322-03 D	Glass NM, Amber, 500 mL	
21K0322-03 E	Glass NM, Amber, 500 mL	
21K0322-03 F	VOA Vial, Clear, 40 mL, HCL	
21K0322-03 G	VOA Vial, Clear, 40 mL, HCL	
21K0322-03 H	VOA Vial, Clear, 40 mL, HCL	
21K0322-03 I	VOA Vial, Clear, 40 mL, HCL	
21K0322-03 J	VOA Vial, Clear, 40 mL, HCL	
21K0322-04 A	HDPE NM, 500 mL	>2 Fail ①
21K0322-05 A	Glass NM, Amber, 500 mL	
21K0322-05 B	Glass NM, Amber, 500 mL	
21K0322-05 C	Glass NM, Amber, 500 mL	
21K0322-05 D	Glass NM, Amber, 500 mL	
21K0322-05 E	Glass NM, Amber, 500 mL	
21K0322-05 F	Glass NM, Amber, 500 mL	
21K0322-05 G	VOA Vial, Clear, 40 mL, HCL	
21K0322-05 H	VOA Vial, Clear, 40 mL, HCL	
21K0322-05 I	VOA Vial, Clear, 40 mL, HCL	
21K0322-05 J	VOA Vial, Clear, 40 mL, HCL	

Reviewed By _____

Date _____

Page 1 of 2



Analytical Resources, LLC
Analytical Chemists and Consultants

Printed: 11/18/2021 4:34:05PM

WORK ORDER

21K0322

Samples will be discarded 90 days after submission of a final report unless other instructions are received.

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish Q4

Project Number: 21-1-12596-012

21K0322-05 K	VOA Vial, Clear, 40 mL, HCL	
21K0322-06 A	HDPE NM, 500 mL, 1:1 HNO3	12 Pass
21K0322-06 B	Glass NM, Amber, 500 mL	
21K0322-06 C	Glass NM, Amber, 500 mL	
21K0322-06 D	Glass NM, Amber, 500 mL	
21K0322-06 E	Glass NM, Amber, 500 mL	
21K0322-06 F	Glass NM, Amber, 250 mL	
21K0322-06 F 01	Glass NM, Amber, 250 mL	
21K0322-06 G	VOA Vial, Clear, 40 mL, HCL	
21K0322-06 H	VOA Vial, Clear, 40 mL, HCL	
21K0322-06 I	VOA Vial, Clear, 40 mL, HCL	
21K0322-06 J	VOA Vial, Clear, 40 mL, HCL	
21K0322-06 K	VOA Vial, Clear, 40 mL, HCL	
21K0322-07 A	HDPE NM, 500 mL	>2 Fg1 ①
21K0322-08 A	VOA Vial, Clear, 40 mL, HCL	
21K0322-08 B	VOA Vial, Clear, 40 mL, HCL	
21K0322-08 C	VOA Vial, Clear, 40 mL, HCL	Bubble
21K0322-08 D	VOA Vial, Clear, 40 mL, HCL	Bubble
21K0322-08 E	VOA Vial, Clear, 40 mL, HCL	Bubble

Preservation Confirmed By DL

Date 11/18/21

① filters at 0.45 microns
EPK served to pH 5.2
with 0.75 MLC conc. AWG
(310419) MN 11/18/21

Reviewed By _____

Date _____

Page 2 of 2



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
04-Dec-2021 12:32

MW-76-20211811

21K0322-01 (Water)

Volatile Organic Compounds

Method: EPA 8260D

Sampled: 11/18/2021 09:34

Instrument: NT3 Analyst: PKC

Analyzed: 11/22/2021 14:47

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0322-01 J

Preparation Batch: BJK0565

Sample Size: 10 mL

Prepared: 11/22/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.05	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.05	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.05	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.14	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.08	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.22	0.60	ND	ug/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				<i>80-129 %</i>	<i>91.6</i>	<i>%</i>	
<i>Surrogate: Toluene-d8</i>				<i>80-120 %</i>	<i>101</i>	<i>%</i>	
<i>Surrogate: 4-Bromofluorobenzene</i>				<i>80-120 %</i>	<i>105</i>	<i>%</i>	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				<i>80-120 %</i>	<i>97.1</i>	<i>%</i>	


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 04-Dec-2021 12:32

MW-76-20211811
21K0322-01 (Water)
Volatile Organic Compounds - SIM

Method: EPA 8260D-SIM

Sampled: 11/18/2021 09:34

Instrument: NT7 Analyst: PB

Analyzed: 11/29/2021 16:46

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0322-01 I

Preparation Batch: BJK0712

Sample Size: 10 mL

Prepared: 11/29/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	5.01	20.0	ND	ng/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				80-129 %	113	%	
<i>Surrogate: Toluene-d8</i>				80-120 %	99.2	%	



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
04-Dec-2021 12:32

MW-76-20211811

21K0322-01 (Water)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 11/18/2021 09:34

Instrument: NT10 Analyst: VTS

Analyzed: 12/01/2021 17:23

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 3510C SepF
Preparation Batch: BJK0540
Prepared: 11/23/2021

Sample Size: 1000 mL
Final Volume: 1 mL

Extract ID: 21K0322-01 F 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Phenol	108-95-2	1	0.01	0.2	ND	ug/L	U
bis(2-chloroethyl) ether	111-44-4	1	0.03	0.2	ND	ug/L	U
2-Chlorophenol	95-57-8	1	0.03	0.2	ND	ug/L	U
1,3-Dichlorobenzene	541-73-1	1	0.03	0.2	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.03	0.2	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.03	0.2	ND	ug/L	U
Benzyl Alcohol	100-51-6	1	0.02	0.2	ND	ug/L	U
2,2'-Oxybis(1-chloropropane)	108-60-1	1	0.03	0.2	ND	ug/L	U
2-Methylphenol	95-48-7	1	0.03	0.2	ND	ug/L	U
Hexachloroethane	67-72-1	1	0.04	0.2	ND	ug/L	U
N-Nitroso-di-n-Propylamine	621-64-7	1	0.04	0.2	ND	ug/L	U
4-Methylphenol	106-44-5	1	0.03	0.2	ND	ug/L	U
Nitrobenzene	98-95-3	1	0.03	0.2	ND	ug/L	U
Isophorone	78-59-1	1	0.03	0.2	ND	ug/L	U
2-Nitrophenol	88-75-5	1	0.04	1.0	ND	ug/L	U
2,4-Dimethylphenol	105-67-9	1	0.3	1.0	ND	ug/L	U
Bis(2-Chloroethoxy)methane	111-91-1	1	0.03	0.2	ND	ug/L	U
2,4-Dichlorophenol	120-83-2	1	0.1	1.0	ND	ug/L	U
1,2,4-Trichlorobenzene	120-82-1	1	0.03	0.2	ND	ug/L	U
Naphthalene	91-20-3	1	0.03	0.2	ND	ug/L	U
Benzoic acid	65-85-0	1	0.1	2.0	ND	ug/L	U
4-Chloroaniline	106-47-8	1	0.04	1.0	ND	ug/L	U
Hexachlorobutadiene	87-68-3	1	0.04	0.2	ND	ug/L	U
4-Chloro-3-Methylphenol	59-50-7	1	0.1	1.0	ND	ug/L	U
2-Methylnaphthalene	91-57-6	1	0.03	0.2	ND	ug/L	U
Hexachlorocyclopentadiene	77-47-4	1	0.1	1.0	ND	ug/L	U
2,4,6-Trichlorophenol	88-06-2	1	0.2	1.0	ND	ug/L	U
2,4,5-Trichlorophenol	95-95-4	1	0.1	1.0	ND	ug/L	U
2-Chloronaphthalene	91-58-7	1	0.03	0.2	ND	ug/L	U
2-Nitroaniline	88-74-4	1	0.2	1.0	ND	ug/L	U
Acenaphthylene	208-96-8	1	0.02	0.2	ND	ug/L	U
Dimethylphthalate	131-11-3	1	0.04	0.2	ND	ug/L	U
2,6-Dinitrotoluene	606-20-2	1	0.2	1.0	ND	ug/L	U
Acenaphthene	83-32-9	1	0.03	0.2	0.5	ug/L	



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
04-Dec-2021 12:32

MW-76-20211811

21K0322-01 (Water)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 11/18/2021 09:34

Instrument: NT10 Analyst: VTS

Analyzed: 12/01/2021 17:23

Analysis by: Analytical Resources, LLC

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
3-Nitroaniline	99-09-2	1	0.2	1.0	ND	ug/L	U
2,4-Dinitrophenol	51-28-5	1	0.2	2.0	ND	ug/L	U
Dibenzofuran	132-64-9	1	0.02	0.2	ND	ug/L	U
4-Nitrophenol	100-02-7	1	0.06	1.0	ND	ug/L	U
2,4-Dinitrotoluene	121-14-2	1	0.1	1.0	ND	ug/L	U
Fluorene	86-73-7	1	0.02	0.2	ND	ug/L	U
4-Chlorophenylphenyl ether	7005-72-3	1	0.02	0.2	ND	ug/L	U
Diethyl phthalate	84-66-2	1	0.06	0.2	ND	ug/L	U
4-Nitroaniline	100-01-6	1	0.2	1.0	ND	ug/L	U
4,6-Dinitro-2-methylphenol	534-52-1	1	0.4	2.0	ND	ug/L	U
N-Nitrosodiphenylamine	86-30-6	1	0.03	0.2	ND	ug/L	U
4-Bromophenyl phenyl ether	101-55-3	1	0.02	0.2	ND	ug/L	U
Hexachlorobenzene	118-74-1	1	0.04	0.2	ND	ug/L	U
Pentachlorophenol	87-86-5	1	0.1	1.0	ND	ug/L	U
Phenanthrene	85-01-8	1	0.02	0.2	0.3	ug/L	
Anthracene	120-12-7	1	0.03	0.2	ND	ug/L	U
Carbazole	86-74-8	1	0.04	0.2	ND	ug/L	U
Di-n-Butylphthalate	84-74-2	1	0.05	0.2	ND	ug/L	U
Fluoranthene	206-44-0	1	0.03	0.2	ND	ug/L	U
Pyrene	129-00-0	1	0.03	0.2	ND	ug/L	U
Butylbenzylphthalate	85-68-7	1	0.07	0.2	ND	ug/L	U
Benzo(a)anthracene	56-55-3	1	0.04	0.2	ND	ug/L	U
3,3'-Dichlorobenzidine	91-94-1	1	0.3	1.0	ND	ug/L	U
Chrysene	218-01-9	1	0.04	0.2	ND	ug/L	U
bis(2-Ethylhexyl)phthalate	117-81-7	1	0.2	0.2	ND	ug/L	U
Di-n-Octylphthalate	117-84-0	1	0.05	0.2	ND	ug/L	U
Benzo(a)fluoranthene, Total		1	0.08	0.4	ND	ug/L	U
Benzo(a)pyrene	50-32-8	1	0.05	0.2	ND	ug/L	U
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.06	0.2	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	1	0.07	0.2	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	1	0.04	0.2	ND	ug/L	U
1-Methylnaphthalene	90-12-0	1	0.03	0.2	ND	ug/L	U
Surrogate: 2-Fluorophenol					30-160 %	39.3 %	
Surrogate: Phenol-d5					30-160 %	25.5 %	*
Surrogate: 2-Chlorophenol-d4					30-160 %	72.4 %	
Surrogate: 1,2-Dichlorobenzene-d4					30-160 %	67.5 %	
Surrogate: Nitrobenzene-d5					30-160 %	70.7 %	



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
04-Dec-2021 12:32

MW-76-20211811

21K0322-01 (Water)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 11/18/2021 09:34

Instrument: NT10 Analyst: VTS

Analyzed: 12/01/2021 17:23

Analysis by: Analytical Resources, LLC

Analyte	CAS Number	Recovery	Recovery	Units	Notes
		Limits			
Surrogate: 2-Fluorobiphenyl		30-160 %	78.6	%	
Surrogate: 2,4,6-Tribromophenol		30-160 %	76.0	%	
Surrogate: p-Terphenyl-d14		30-160 %	87.3	%	Q


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 04-Dec-2021 12:32

MW-76-20211811
21K0322-01 (Water)
Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM

Sampled: 11/18/2021 09:34

Instrument: NT11 Analyst: VTS

Analyzed: 11/27/2021 12:09

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJK0539 Prepared: 11/23/2021	Sample Size: 460 mL Final Volume: 0.5 mL	Extract ID: 21K0322-01 D 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJK0280 Cleaned: 26-Nov-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21K0322-01 D 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	1	0.001	0.011	0.003	ug/L	J
2-Methylnaphthalene	91-57-6	1	0.001	0.011	0.002	ug/L	J
1-Methylnaphthalene	90-12-0	1	0.001	0.011	0.002	ug/L	J
Acenaphthylene	208-96-8	1	0.002	0.011	0.003	ug/L	J
Acenaphthene	83-32-9	1	0.003	0.011	0.658	ug/L	
Dibenzofuran	132-64-9	1	0.002	0.011	0.003	ug/L	J
Fluorene	86-73-7	1	0.002	0.011	0.019	ug/L	
Phenanthrene	85-01-8	1	0.001	0.011	0.442	ug/L	
Anthracene	120-12-7	1	0.001	0.011	0.023	ug/L	
Carbazole	86-74-8	1	0.001	0.011	ND	ug/L	U
Fluoranthene	206-44-0	1	0.002	0.011	0.010	ug/L	J
Pyrene	129-00-0	1	0.001	0.011	0.005	ug/L	J
Benzo(a)anthracene	56-55-3	1	0.0008	0.011	ND	ug/L	U
Chrysene	218-01-9	1	0.001	0.011	ND	ug/L	U
Benzo(b)fluoranthene	205-99-2	1	0.0005	0.011	ND	ug/L	U
Benzo(k)fluoranthene	207-08-9	1	0.003	0.011	ND	ug/L	U
Benzo(j)fluoranthene	205-82-3	1	0.002	0.011	ND	ug/L	U
Benzo(a)fluoranthene, Total		1	0.004	0.011	ND	ug/L	U
Benzo(a)pyrene	50-32-8	1	0.003	0.011	ND	ug/L	U
Perylene	1985-5-0	1	0.006	0.011	ND	ug/L	U
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.001	0.011	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	1	0.001	0.011	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	1	0.002	0.011	ND	ug/L	U
<i>Surrogate: 2-Methylnaphthalene-d10</i>					42-120 %	86.0 %	
<i>Surrogate: Dibenzo[a,h]anthracene-d14</i>					29-120 %	73.4 %	
<i>Surrogate: Fluoranthene-d10</i>					57-120 %	97.1 %	


 Shannon & Wilson, Inc
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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
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MW-76-20211811
21K0322-01 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 11/18/2021 09:34

Instrument: FID4 Analyst: TWC

Analyzed: 11/27/2021 05:28

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21K0322-01 B 01

Preparation Batch: BJK0537

Sample Size: 475 mL

Prepared: 11/22/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	0.105	ND	mg/L	U
Motor Oil Range Organics (C24-C38)	RRO	1	0.211	ND	mg/L	U
<i>Surrogate: o-Terphenyl</i>			<i>50-150 %</i>	<i>97.7</i>	<i>%</i>	


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
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MW-76-20211811
21K0322-01 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 11/18/2021 09:34

Instrument: ICPMS1 Analyst: MCB

Analyzed: 12/02/2021 18:04

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21K0322-01 A 01

Preparation Batch: BJL0067

Sample Size: 25 mL

Prepared: 12/02/2021

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Barium	7440-39-3	1	0.114	0.500	4.18	ug/L	
Chromium	7440-47-3	1	0.260	0.500	0.297	ug/L	J
Iron	7439-89-6	1	18.2	36.0	18600	ug/L	
Lead	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Silver	7440-22-4	1	0.0220	0.200	ND	ug/L	U
Vanadium	7440-62-2	1	0.0556	0.200	1.07	ug/L	


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 Project Manager: Meg Strong

Reported:
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MW-76-20211811
21K0322-01 (Water)
Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 11/18/2021 09:34

Instrument: ICPMS1 Analyst: MCB

Analyzed: 12/02/2021 18:04

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJL0067 Sample Size: 25 mL
 Prepared: 12/02/2021 Final Volume: 25 mL

Extract ID: 21K0322-01 A 01

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	1	0.0373	0.200	0.808	ug/L	
Cadmium	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Cobalt	7440-48-4	1	0.0178	0.200	0.110	ug/L	J
Copper	7440-50-8	1	0.173	0.500	ND	ug/L	U
Nickel	7440-02-0	1	0.0792	0.500	ND	ug/L	U
Selenium	7782-49-2	1	0.179	0.500	ND	ug/L	U
Zinc	7440-66-6	1	2.92	6.00	ND	ug/L	U



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
04-Dec-2021 12:32

MW-76-20211811

21K0322-01 (Water)

Metals and Metallic Compounds

Method: EPA 7470A

Sampled: 11/18/2021 09:34

Instrument: HYDRA Analyst: SKD

Analyzed: 12/02/2021 16:48

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21K0322-01 A

Preparation Batch: BJL0018

Sample Size: 20 mL

Prepared: 12/01/2021

Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000013	0.000100	ND	mg/L	U


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 Project: Lower Duwamish Q4
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 Project Manager: Meg Strong

Reported:
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MW-76-20211811
21K0322-01RE1 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 11/18/2021 09:34

Instrument: ICPMS1 Analyst: MCB

Analyzed: 12/02/2021 19:21

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJL0067 Sample Size: 25 mL
 Prepared: 12/02/2021 Final Volume: 25 mL

Extract ID: 21K0322-01RE1 A 01

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Manganese	7439-96-5	10	1.42	5.00	601	ug/L	D


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 Project Manager: Meg Strong

Reported:
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MW-76-20211811
21K0322-02 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 11/18/2021 09:34

Instrument: ICPMS1 Analyst: MCB

Analyzed: 12/01/2021 01:58

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21K0322-02 A 02

Preparation Batch: BJK0733

Sample Size: 25 mL

Filtration Batch: BJK0502

Prepared: 11/30/2021

Final Volume: 25 mL

Filtration Date: 11/18/2021 16:08

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Barium, Dissolved	7440-39-3	1	0.114	0.500	0.532	ug/L	
Chromium, Dissolved	7440-47-3	2	0.520	1.00	ND	ug/L	U
Iron, Dissolved	7439-89-6	2	36.4	72.0	13100	ug/L	D
Lead, Dissolved	7439-92-1	2	0.103	0.200	ND	ug/L	U
Silver, Dissolved	7440-22-4	2	0.0440	0.400	ND	ug/L	U
Vanadium, Dissolved	7440-62-2	2	0.111	0.400	0.192	ug/L	J, D


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 Project Manager: Meg Strong

Reported:
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MW-76-20211811
21K0322-02 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 11/18/2021 09:34

Instrument: ICPMS1 Analyst: MCB

Analyzed: 12/01/2021 01:58

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21K0322-02 A 02
	Preparation Batch: BJK0733	Filtration Batch: BJK0502
	Sample Size: 25 mL	
	Prepared: 11/30/2021	Filtration Date: 11/18/2021 16:08
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic, Dissolved	7440-38-2	1	0.0373	0.200	0.611	ug/L	
Cadmium, Dissolved	7440-43-9	2	0.0600	0.200	ND	ug/L	U
Cobalt, Dissolved	7440-48-4	1	0.0178	0.200	0.0940	ug/L	J
Copper, Dissolved	7440-50-8	2	0.346	1.00	ND	ug/L	U
Nickel, Dissolved	7440-02-0	1	0.0792	0.500	ND	ug/L	U
Selenium, Dissolved	7782-49-2	1	0.179	0.500	ND	ug/L	U
Zinc, Dissolved	7440-66-6	2	5.84	12.0	ND	ug/L	U


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 Project Manager: Meg Strong

Reported:
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MW-76-20211811
21K0322-02 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 7470A

Sampled: 11/18/2021 09:34

Instrument: HYDRA Analyst: SKD

Analyzed: 12/02/2021 17:41

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21K0322-02 A 01

Preparation Batch: BJL0061

Sample Size: 20 mL

Filtration Batch: BJK0502

Prepared: 12/02/2021

Final Volume: 20 mL

Filtration Date: 11/18/2021 16:08

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury, Dissolved	7439-97-6	1	0.000013	0.000100	ND	mg/L	U


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Reported:
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MW-76-20211811
21K0322-02RE1 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 11/18/2021 09:34

Instrument: ICPMS1 Analyst: MCB

Analyzed: 12/01/2021 23:21

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21K0322-02RE1 A 01
	Preparation Batch: BJK0733	Filtration Batch: BJK0502
	Prepared: 11/30/2021	Filtration Date: 11/18/2021 16:08
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Manganese, Dissolved	7439-96-5	10	1.42	5.00	638	ug/L	D



Analytical Report

Shannon & Wilson, Inc
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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
04-Dec-2021 12:32

MW-45-20211811

21K0322-03 (Water)

Volatile Organic Compounds

Method: EPA 8260D

Sampled: 11/18/2021 09:34

Instrument: NT3 Analyst: PKC

Analyzed: 11/22/2021 15:12

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0322-03 H

Preparation Batch: BJK0565

Sample Size: 10 mL

Prepared: 11/22/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	0.10	ug/L	J
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	0.12	ug/L	J
Benzene	71-43-2	1	0.05	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.05	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.05	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.14	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.08	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.22	0.60	ND	ug/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>					<i>80-129 %</i>	<i>96.4 %</i>	
<i>Surrogate: Toluene-d8</i>					<i>80-120 %</i>	<i>103 %</i>	
<i>Surrogate: 4-Bromofluorobenzene</i>					<i>80-120 %</i>	<i>106 %</i>	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>					<i>80-120 %</i>	<i>99.7 %</i>	


 Shannon & Wilson, Inc
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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
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MW-45-20211811
21K0322-03 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 11/18/2021 09:34

Instrument: FID4 Analyst: TWC

Analyzed: 11/27/2021 05:47

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21K0322-03 D 01

Preparation Batch: BJK0537

Sample Size: 475 mL

Prepared: 11/22/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	0.105	0.579	mg/L	
HC ID: DRO						
Motor Oil Range Organics (C24-C38)	RRO	1	0.211	ND	mg/L	U
Surrogate: o-Terphenyl			50-150 %	98.4	%	


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 Project Number: 21-1-12596-012
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Reported:
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MW-45-20211811
21K0322-03 (Water)
Aroclor PCB

Method: EPA 8082A

Sampled: 11/18/2021 09:34

Instrument: ECD7 Analyst: JGR

Analyzed: 12/01/2021 00:21

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJK0538 Prepared: 11/23/2021	Sample Size: 1000 mL Final Volume: 0.5 mL	Extract ID: 21K0322-03 A 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJK0302 Cleaned: 29-Nov-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21K0322-03 A 01
Sample Cleanup:	Cleanup Method: Sulfuric Acid Cleanup Batch: CJK0300 Cleaned: 29-Nov-2021	Initial Volume: 0.5 uL Final Volume: 0.5 uL	Extract ID: 21K0322-03 A 01
Sample Cleanup:	Cleanup Method: Sulfur Cleanup Batch: CJK0301 Cleaned: 29-Nov-2021	Initial Volume: 0.5 uL Final Volume: 0.5 uL	Extract ID: 21K0322-03 A 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Aroclor 1016	12674-11-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1221	11104-28-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1232	11141-16-5	1	0.002	0.010	ND	ug/L	U
Aroclor 1242	53469-21-9	1	0.002	0.010	ND	ug/L	U
Aroclor 1248	12672-29-6	1	0.002	0.010	ND	ug/L	U
Aroclor 1254	11097-69-1	1	0.002	0.010	ND	ug/L	U
Aroclor 1260	11096-82-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1262	37324-23-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1268	11100-14-4	1	0.003	0.010	ND	ug/L	U
<i>Surrogate: Decachlorobiphenyl</i>				29-120 %	62.1	%	
<i>Surrogate: Tetrachlorometaxylene</i>				32-120 %	74.5	%	
<i>Surrogate: Decachlorobiphenyl [2C]</i>				29-120 %	63.2	%	
<i>Surrogate: Tetrachlorometaxylene [2C]</i>				32-120 %	73.9	%	


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 Project Manager: Meg Strong

Reported:
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MW-45-20211811
21K0322-03 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 11/18/2021 09:34

Instrument: ICPMS1 Analyst: MCB

Analyzed: 12/02/2021 19:14

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJL0067 Sample Size: 25 mL
 Prepared: 12/02/2021 Final Volume: 25 mL

Extract ID: 21K0322-03 C 01

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Manganese	7439-96-5	10	1.42	5.00	611	ug/L	D


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
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MW-45-20211811
21K0322-04 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 11/18/2021 10:40

Instrument: ICPMS1 Analyst: MCB

Analyzed: 12/01/2021 22:32

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21K0322-04 A 02

Preparation Batch: BJK0733

Sample Size: 25 mL

Filtration Batch: BJK0502

Prepared: 11/30/2021

Final Volume: 25 mL

Filtration Date: 11/18/2021 16:08

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Manganese, Dissolved	7439-96-5	10	1.42	5.00	679	ug/L	D



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
04-Dec-2021 12:32

MW-31-20211811

21K0322-05 (Water)

Volatile Organic Compounds

Method: EPA 8260D

Sampled: 11/18/2021 12:12

Instrument: NT3 Analyst: PKC

Analyzed: 11/22/2021 15:38

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0322-05 I

Preparation Batch: BJK0565

Sample Size: 10 mL

Prepared: 11/22/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				80-129 %	97.2	%	
<i>Surrogate: Toluene-d8</i>				80-120 %	101	%	
<i>Surrogate: 4-Bromofluorobenzene</i>				80-120 %	108	%	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				80-120 %	101	%	


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
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MW-31-20211811
21K0322-05 (Water)
Volatile Organic Compounds - SIM

Method: EPA 8260D-SIM

Sampled: 11/18/2021 12:12

Instrument: NT7 Analyst: PB

Analyzed: 11/29/2021 17:44

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0322-05 H

Preparation Batch: BJK0712

Sample Size: 10 mL

Prepared: 11/29/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	5.01	20.0	47.7	ng/L	M
<i>Surrogate: 1,2-Dichloroethane-d4</i>				80-129 %	105	%	
<i>Surrogate: Toluene-d8</i>				80-120 %	96.6	%	



Analytical Report

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Project: Lower Duwamish Q4
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Project Manager: Meg Strong

Reported:
04-Dec-2021 12:32

MW-31-20211811

21K0322-05 (Water)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 11/18/2021 12:12

Instrument: NT10 Analyst: VTS

Analyzed: 12/01/2021 18:01

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 3510C SepF
Preparation Batch: BJK0540
Prepared: 11/23/2021

Sample Size: 1000 mL
Final Volume: 1 mL

Extract ID: 21K0322-05 C 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
1,4-Dichlorobenzene	106-46-7	1	0.03	0.2	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.03	0.2	ND	ug/L	U
2,4-Dimethylphenol	105-67-9	1	0.3	1.0	ND	ug/L	U
Benzoic acid	65-85-0	1	0.1	2.0	ND	ug/L	U
N-Nitrosodiphenylamine	86-30-6	1	0.03	0.2	ND	ug/L	U
Pentachlorophenol	87-86-5	1	0.1	1.0	ND	ug/L	U
Di-n-Butylphthalate	84-74-2	1	0.05	0.2	ND	ug/L	U
Butylbenzylphthalate	85-68-7	1	0.07	0.2	ND	ug/L	U
bis(2-Ethylhexyl)phthalate	117-81-7	1	0.2	0.2	ND	ug/L	U

Surrogate: 2-Fluorophenol

30-160 % 44.7 %

Surrogate: Phenol-d5

30-160 % 30.1 %

Surrogate: 2-Chlorophenol-d4

30-160 % 76.2 %

Surrogate: 1,2-Dichlorobenzene-d4

30-160 % 66.3 %

Surrogate: Nitrobenzene-d5

30-160 % 79.3 %

Surrogate: 2-Fluorobiphenyl

30-160 % 87.4 %

Surrogate: 2,4,6-Tribromophenol

30-160 % 82.8 %

Surrogate: p-Terphenyl-d14

30-160 % 87.5 % Q


 Shannon & Wilson, Inc
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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 04-Dec-2021 12:32

MW-31-20211811
21K0322-05 (Water)
Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM

Sampled: 11/18/2021 12:12

Instrument: NT11 Analyst: VTS

Analyzed: 11/27/2021 12:39

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJK0539 Prepared: 11/23/2021	Sample Size: 455 mL Final Volume: 0.5 mL	Extract ID: 21K0322-05 B 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJK0280 Cleaned: 26-Nov-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21K0322-05 B 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	1	0.001	0.011	0.005	ug/L	J
2-Methylnaphthalene	91-57-6	1	0.001	0.011	0.009	ug/L	J
1-Methylnaphthalene	90-12-0	1	0.001	0.011	0.013	ug/L	
Acenaphthylene	208-96-8	1	0.002	0.011	0.059	ug/L	
Acenaphthene	83-32-9	1	0.003	0.011	2.71	ug/L	E
Dibenzofuran	132-64-9	1	0.002	0.011	0.009	ug/L	J
Fluorene	86-73-7	1	0.002	0.011	0.040	ug/L	
Phenanthrene	85-01-8	1	0.001	0.011	1.65	ug/L	E
Anthracene	120-12-7	1	0.001	0.011	0.203	ug/L	
Carbazole	86-74-8	1	0.001	0.011	0.004	ug/L	J
Fluoranthene	206-44-0	1	0.002	0.011	0.110	ug/L	
Pyrene	129-00-0	1	0.001	0.011	0.035	ug/L	
Benzo(a)anthracene	56-55-3	1	0.0008	0.011	ND	ug/L	U
Chrysene	218-01-9	1	0.001	0.011	ND	ug/L	U
Benzo(b)fluoranthene	205-99-2	1	0.0005	0.011	ND	ug/L	U
Benzo(k)fluoranthene	207-08-9	1	0.004	0.011	ND	ug/L	U
Benzo(j)fluoranthene	205-82-3	1	0.002	0.011	ND	ug/L	U
Benzo(a)pyrene	50-32-8	1	0.003	0.011	ND	ug/L	U
Perylene	1985-5-0	1	0.006	0.011	ND	ug/L	U
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.001	0.011	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	1	0.001	0.011	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	1	0.002	0.011	ND	ug/L	U
<i>Surrogate: 2-Methylnaphthalene-d10</i>					42-120 %	88.4 %	
<i>Surrogate: Dibenzo[a,h]anthracene-d14</i>					29-120 %	73.5 %	
<i>Surrogate: Fluoranthene-d10</i>					57-120 %	99.6 %	


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 04-Dec-2021 12:32

MW-31-20211811
21K0322-05 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 11/18/2021 12:12

Instrument: FID4 Analyst: TWC

Analyzed: 11/27/2021 06:06

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21K0322-05 A 01

Preparation Batch: BJK0537

Sample Size: 475 mL

Prepared: 11/22/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	0.105	1.20	mg/L	
HC ID: DRO						
Motor Oil Range Organics (C24-C38)	RRO	1	0.211	ND	mg/L	U
Surrogate: o-Terphenyl			50-150 %	96.2	%	


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 04-Dec-2021 12:32

MW-31-20211811
21K0322-05 (Water)
Aroclor PCB

Method: EPA 8082A

Sampled: 11/18/2021 12:12

Instrument: ECD7 Analyst: JGR

Analyzed: 12/01/2021 00:42

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJK0538 Prepared: 11/23/2021	Sample Size: 1000 mL Final Volume: 0.5 mL	Extract ID: 21K0322-05 E 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJK0302 Cleaned: 29-Nov-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21K0322-05 E 01
Sample Cleanup:	Cleanup Method: Sulfuric Acid Cleanup Batch: CJK0300 Cleaned: 29-Nov-2021	Initial Volume: 0.5 uL Final Volume: 0.5 uL	Extract ID: 21K0322-05 E 01
Sample Cleanup:	Cleanup Method: Sulfur Cleanup Batch: CJK0301 Cleaned: 29-Nov-2021	Initial Volume: 0.5 uL Final Volume: 0.5 uL	Extract ID: 21K0322-05 E 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Aroclor 1016	12674-11-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1221	11104-28-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1232	11141-16-5	1	0.002	0.010	ND	ug/L	U
Aroclor 1242	53469-21-9	1	0.002	0.010	ND	ug/L	U
Aroclor 1248	12672-29-6	1	0.002	0.010	ND	ug/L	U
Aroclor 1254	11097-69-1	1	0.002	0.010	ND	ug/L	U
Aroclor 1260	11096-82-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1262	37324-23-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1268	11100-14-4	1	0.003	0.010	ND	ug/L	U
<i>Surrogate: Decachlorobiphenyl</i>				29-120 %	76.2	%	
<i>Surrogate: Tetrachlorometaxylene</i>				32-120 %	64.7	%	
<i>Surrogate: Decachlorobiphenyl [2C]</i>				29-120 %	77.2	%	
<i>Surrogate: Tetrachlorometaxylene [2C]</i>				32-120 %	73.1	%	



Analytical Report

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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
04-Dec-2021 12:32

MW-31-20211811 21K0322-05RE1 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM

Sampled: 11/18/2021 12:12

Instrument: NT11 Analyst: VTS

Analyzed: 11/30/2021 13:24

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJK0539 Prepared: 11/23/2021	Sample Size: 455 mL Final Volume: 0.5 mL	Extract ID: 21K0322-05RE1 B 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJK0280 Cleaned: 26-Nov-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21K0322-05RE1 B 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	10	0.014	0.110	ND	ug/L	U
2-Methylnaphthalene	91-57-6	10	0.011	0.110	ND	ug/L	U
1-Methylnaphthalene	90-12-0	10	0.010	0.110	ND	ug/L	U
Acenaphthylene	208-96-8	10	0.020	0.110	0.041	ug/L	J, D
Acenaphthene	83-32-9	10	0.032	0.110	5.50	ug/L	D
Dibenzofuran	132-64-9	10	0.017	0.110	ND	ug/L	U
Fluorene	86-73-7	10	0.017	0.110	0.036	ug/L	J, D
Phenanthrene	85-01-8	10	0.014	0.110	2.99	ug/L	D
Anthracene	120-12-7	10	0.013	0.110	0.252	ug/L	D
Carbazole	86-74-8	10	0.013	0.110	ND	ug/L	U
Fluoranthene	206-44-0	10	0.019	0.110	0.091	ug/L	J, D
Pyrene	129-00-0	10	0.013	0.110	0.029	ug/L	J, D
Benzo(a)anthracene	56-55-3	10	0.008	0.110	ND	ug/L	U
Chrysene	218-01-9	10	0.010	0.110	ND	ug/L	U
Benzo(b)fluoranthene	205-99-2	10	0.005	0.110	ND	ug/L	U
Benzo(k)fluoranthene	207-08-9	10	0.035	0.110	ND	ug/L	U
Benzo(j)fluoranthene	205-82-3	10	0.021	0.110	ND	ug/L	U
Benzofluoranthenes, Total		10	0.039	0.110	ND	ug/L	U
Benzo(a)pyrene	50-32-8	10	0.027	0.110	ND	ug/L	U
Perylene	1985-5-0	10	0.064	0.110	ND	ug/L	U
Indeno(1,2,3-cd)pyrene	193-39-5	10	0.011	0.110	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	10	0.015	0.110	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	10	0.016	0.110	ND	ug/L	U
Surrogate: 2-Methylnaphthalene-d10				42-120 %	83.1	%	
Surrogate: Dibenzo[a,h]anthracene-d14				29-120 %	42.2	%	
Surrogate: Fluoranthene-d10				57-120 %	84.2	%	



Analytical Report

Shannon & Wilson, Inc
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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
04-Dec-2021 12:32

MW-55-20211811

21K0322-06 (Water)

Volatile Organic Compounds

Method: EPA 8260D

Sampled: 11/18/2021 13:36

Instrument: NT3 Analyst: PKC

Analyzed: 11/22/2021 16:03

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0322-06 H

Preparation Batch: BJK0565

Sample Size: 10 mL

Prepared: 11/22/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.05	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.05	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.05	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.14	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.08	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.22	0.60	ND	ug/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				80-129 %	99.0	%	
<i>Surrogate: Toluene-d8</i>				80-120 %	103	%	
<i>Surrogate: 4-Bromofluorobenzene</i>				80-120 %	107	%	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				80-120 %	103	%	


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 04-Dec-2021 12:32

MW-55-20211811
21K0322-06 (Water)
Volatile Organic Compounds - SIM

Method: EPA 8260D-SIM

Sampled: 11/18/2021 13:36

Instrument: NT7 Analyst: PB

Analyzed: 11/29/2021 18:12

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0322-06 K

Preparation Batch: BJK0712

Sample Size: 10 mL

Prepared: 11/29/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	5.01	20.0	ND	ng/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				80-129 %	107	%	
<i>Surrogate: Toluene-d8</i>				80-120 %	97.8	%	


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 04-Dec-2021 12:32

MW-55-20211811
21K0322-06 (Water)
Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM

Sampled: 11/18/2021 13:36

Instrument: NT11 Analyst: VTS

Analyzed: 11/27/2021 13:09

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJK0539 Prepared: 11/23/2021	Sample Size: 445 mL Final Volume: 0.5 mL	Extract ID: 21K0322-06 D 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJK0280 Cleaned: 26-Nov-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21K0322-06 D 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	1	0.001	0.011	0.004	ug/L	J
2-Methylnaphthalene	91-57-6	1	0.001	0.011	0.003	ug/L	J
1-Methylnaphthalene	90-12-0	1	0.001	0.011	0.002	ug/L	J
Acenaphthylene	208-96-8	1	0.002	0.011	ND	ug/L	U
Acenaphthene	83-32-9	1	0.003	0.011	0.207	ug/L	
Dibenzofuran	132-64-9	1	0.002	0.011	ND	ug/L	U
Fluorene	86-73-7	1	0.002	0.011	0.009	ug/L	J
Phenanthrene	85-01-8	1	0.001	0.011	0.031	ug/L	
Anthracene	120-12-7	1	0.001	0.011	0.004	ug/L	J
Carbazole	86-74-8	1	0.001	0.011	0.056	ug/L	
Fluoranthene	206-44-0	1	0.002	0.011	0.013	ug/L	
Pyrene	129-00-0	1	0.001	0.011	0.008	ug/L	J
Benzo(a)anthracene	56-55-3	1	0.0008	0.011	ND	ug/L	U
Chrysene	218-01-9	1	0.001	0.011	0.001	ug/L	J
Benzo(b)fluoranthene	205-99-2	1	0.0005	0.011	ND	ug/L	U
Benzo(k)fluoranthene	207-08-9	1	0.004	0.011	ND	ug/L	U
Benzo(j)fluoranthene	205-82-3	1	0.002	0.011	ND	ug/L	U
Benzo(a)pyrene	50-32-8	1	0.003	0.011	ND	ug/L	U
Perylene	1985-5-0	1	0.007	0.011	0.014	ug/L	
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.001	0.011	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	1	0.002	0.011	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	1	0.002	0.011	ND	ug/L	U
<i>Surrogate: 2-Methylnaphthalene-d10</i>					42-120 %	82.2 %	
<i>Surrogate: Dibenzo[a,h]anthracene-d14</i>					29-120 %	76.8 %	
<i>Surrogate: Fluoranthene-d10</i>					57-120 %	97.7 %	


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 04-Dec-2021 12:32

MW-55-20211811
21K0322-06 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 11/18/2021 13:36

Instrument: FID4 Analyst: TWC

Analyzed: 11/27/2021 06:26

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21K0322-06 B 01

Preparation Batch: BJK0537

Sample Size: 470 mL

Prepared: 11/22/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	0.106	ND	mg/L	U
Motor Oil Range Organics (C24-C38)	RRO	1	0.213	ND	mg/L	U
<i>Surrogate: o-Terphenyl</i>			<i>50-150 %</i>	<i>92.0</i>	<i>%</i>	


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 04-Dec-2021 12:32

MW-55-20211811
21K0322-06 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 11/18/2021 13:36

Instrument: ICPMS1 Analyst: MCB

Analyzed: 12/02/2021 17:58

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJL0067 Sample Size: 25 mL
 Prepared: 12/02/2021 Final Volume: 25 mL

Extract ID: 21K0322-06 A 01

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Barium	7440-39-3	1	0.114	0.500	4.64	ug/L	
Chromium	7440-47-3	1	0.260	0.500	ND	ug/L	U
Iron	7439-89-6	1	18.2	36.0	5360	ug/L	
Lead	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Manganese	7439-96-5	1	0.142	0.500	237	ug/L	
Silver	7440-22-4	1	0.0220	0.200	ND	ug/L	U
Vanadium	7440-62-2	1	0.0556	0.200	3.44	ug/L	


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 04-Dec-2021 12:32

MW-55-20211811
21K0322-06 (Water)
Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 11/18/2021 13:36

Instrument: ICPMS1 Analyst: MCB

Analyzed: 12/02/2021 17:58

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJL0067 Sample Size: 25 mL
 Prepared: 12/02/2021 Final Volume: 25 mL

Extract ID: 21K0322-06 A 01

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	1	0.0373	0.200	0.775	ug/L	
Cadmium	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Cobalt	7440-48-4	1	0.0178	0.200	0.120	ug/L	J
Copper	7440-50-8	1	0.173	0.500	0.612	ug/L	
Nickel	7440-02-0	1	0.0792	0.500	0.232	ug/L	J
Selenium	7782-49-2	1	0.179	0.500	0.381	ug/L	J
Zinc	7440-66-6	1	2.92	6.00	ND	ug/L	U


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 04-Dec-2021 12:32

MW-55-20211811
21K0322-06 (Water)
Metals and Metallic Compounds

Method: EPA 7470A

Sampled: 11/18/2021 13:36

Instrument: HYDRA Analyst: SKD

Analyzed: 12/02/2021 17:53

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21K0322-06 A

Preparation Batch: BJL0018

Sample Size: 20 mL

Prepared: 12/01/2021

Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000013	0.000100	ND	mg/L	U


 Shannon & Wilson, Inc
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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 04-Dec-2021 12:32

MW-55-20211811
21K0322-06 (Water)
Wet Chemistry

Method: SM 3500-Cr B-09

Sampled: 11/18/2021 13:36

Instrument: UV1800-1 Analyst: CKI

Analyzed: 11/19/2021 11:40

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: SM 5310 A-00, 0.45um filtration

Extract ID: 21K0322-06 F 01

Preparation Batch: BJK0526

Sample Size: 40 mL

Prepared: 11/19/2021

Final Volume: 50 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Hexavalent Chromium	1854-02-99	1.25	0.013	0.013	ND	mg/L	U


 Shannon & Wilson, Inc
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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 04-Dec-2021 12:32

MW-55-20211811
21K0322-07 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 11/18/2021 13:36

Instrument: ICPMS1 Analyst: MCB

Analyzed: 12/01/2021 01:54

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21K0322-07 A 02
	Preparation Batch: BJK0733	Filtration Batch: BJK0502
	Prepared: 11/30/2021	Filtration Date: 11/18/2021 16:08
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Barium, Dissolved	7440-39-3	1	0.114	0.500	3.22	ug/L	
Chromium, Dissolved	7440-47-3	1	0.260	0.500	ND	ug/L	U
Iron, Dissolved	7439-89-6	1	18.2	36.0	2000	ug/L	
Lead, Dissolved	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Manganese, Dissolved	7439-96-5	1	0.142	0.500	196	ug/L	
Silver, Dissolved	7440-22-4	1	0.0220	0.200	ND	ug/L	U
Vanadium, Dissolved	7440-62-2	1	0.0556	0.200	0.0660	ug/L	J


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 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 04-Dec-2021 12:32

MW-55-20211811
21K0322-07 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 11/18/2021 13:36

Instrument: ICPMS1 Analyst: MCB

Analyzed: 12/01/2021 01:54

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21K0322-07 A 02

Preparation Batch: BJK0733

Sample Size: 25 mL

Filtration Batch: BJK0502

Prepared: 11/30/2021

Final Volume: 25 mL

Filtration Date: 11/18/2021 16:08

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic, Dissolved	7440-38-2	1	0.0373	0.200	0.422	ug/L	
Cadmium, Dissolved	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Cobalt, Dissolved	7440-48-4	1	0.0178	0.200	0.103	ug/L	J
Copper, Dissolved	7440-50-8	1	0.173	0.500	ND	ug/L	U
Nickel, Dissolved	7440-02-0	1	0.0792	0.500	0.182	ug/L	J
Selenium, Dissolved	7782-49-2	1	0.179	0.500	0.240	ug/L	J
Zinc, Dissolved	7440-66-6	1	2.92	6.00	ND	ug/L	U


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 04-Dec-2021 12:32

MW-55-20211811
21K0322-07 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 7470A

Sampled: 11/18/2021 13:36

Instrument: HYDRA Analyst: SKD

Analyzed: 12/02/2021 18:09

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21K0322-07 A 01

Preparation Batch: BJJ0061

Sample Size: 20 mL

Filtration Batch: BJK0502

Prepared: 12/02/2021

Final Volume: 20 mL

Filtration Date: 11/18/2021 16:08

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury, Dissolved	7439-97-6	1	0.000013	0.000100	ND	mg/L	U



Analytical Report

Shannon & Wilson, Inc
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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
04-Dec-2021 12:32

TB-7-20211811
21K0322-08 (Water)

Volatile Organic Compounds

Method: EPA 8260D

Sampled: 11/18/2021 13:38

Instrument: NT3 Analyst: PKC

Analyzed: 11/19/2021 18:34

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0322-08 A

Preparation Batch: BJK0547

Sample Size: 10 mL

Prepared: 11/19/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.05	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.05	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.05	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.14	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.08	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.22	0.60	ND	ug/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				80-129 %	97.0	%	
<i>Surrogate: Toluene-d8</i>				80-120 %	104	%	
<i>Surrogate: 4-Bromofluorobenzene</i>				80-120 %	102	%	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				80-120 %	99.2	%	


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 Project Manager: Meg Strong

Reported:
 04-Dec-2021 12:32

TB-7-20211811
21K0322-08 (Water)
Volatile Organic Compounds - SIM

Method: EPA 8260D-SIM

Sampled: 11/18/2021 13:38

Instrument: NT7 Analyst: PB

Analyzed: 11/29/2021 18:41

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0322-08 E

Preparation Batch: BJK0712

Sample Size: 10 mL

Prepared: 11/29/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	5.01	20.0	ND	ng/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				<i>80-129 %</i>	<i>102</i>	<i>%</i>	
<i>Surrogate: Toluene-d8</i>				<i>80-120 %</i>	<i>99.3</i>	<i>%</i>	



Analytical Report

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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
04-Dec-2021 12:32

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - Quality Control

Batch BJK0547 - EPA 5030C (Purge and Trap)

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0547-BLK2)						Prepared: 19-Nov-2021 Analyzed: 19-Nov-2021 18:09					
Vinyl Chloride	ND	0.08	0.20	ug/L							U
1,1-Dichloroethene	ND	0.08	0.20	ug/L							U
trans-1,2-Dichloroethene	ND	0.07	0.20	ug/L							U
cis-1,2-Dichloroethene	ND	0.08	0.20	ug/L							U
Benzene	ND	0.05	0.20	ug/L							U
Trichloroethene	ND	0.07	0.20	ug/L							U
Toluene	ND	0.05	0.20	ug/L							U
Tetrachloroethene	ND	0.09	0.20	ug/L							U
Ethylbenzene	ND	0.05	0.20	ug/L							U
m,p-Xylene	ND	0.14	0.40	ug/L							U
o-Xylene	ND	0.08	0.20	ug/L							U
Xylenes, total	ND	0.22	0.60	ug/L							U
<i>Surrogate: 1,2-Dichloroethane-d4</i>	4.77			ug/L	5.00		95.3	80-129			
<i>Surrogate: Toluene-d8</i>	5.20			ug/L	5.00		104	80-120			
<i>Surrogate: 4-Bromofluorobenzene</i>	5.28			ug/L	5.00		106	80-120			
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	5.10			ug/L	5.00		102	80-120			
LCS (BJK0547-BS2)						Prepared: 19-Nov-2021 Analyzed: 19-Nov-2021 16:28					
Vinyl Chloride	9.98	0.08	0.20	ug/L	10.0		99.8	66-133			
1,1-Dichloroethene	9.28	0.08	0.20	ug/L	10.0		92.8	69-135			
trans-1,2-Dichloroethene	9.93	0.07	0.20	ug/L	10.0		99.3	78-128			
cis-1,2-Dichloroethene	10.0	0.08	0.20	ug/L	10.0		100	80-121			
Benzene	10.7	0.05	0.20	ug/L	10.0		107	80-120			
Trichloroethene	10.6	0.07	0.20	ug/L	10.0		106	80-120			
Toluene	10.9	0.05	0.20	ug/L	10.0		109	80-120			
Tetrachloroethene	11.0	0.09	0.20	ug/L	10.0		110	80-120			
Ethylbenzene	10.3	0.05	0.20	ug/L	10.0		103	80-120			
m,p-Xylene	21.0	0.14	0.40	ug/L	20.0		105	80-121			
o-Xylene	10.5	0.08	0.20	ug/L	10.0		105	80-121			
Xylenes, total	31.5	0.22	0.60	ug/L	30.0		105	76-127			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	4.60			ug/L	5.00		91.9	80-129			
<i>Surrogate: Toluene-d8</i>	5.28			ug/L	5.00		106	80-120			
<i>Surrogate: 4-Bromofluorobenzene</i>	5.46			ug/L	5.00		109	80-120			
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	5.12			ug/L	5.00		102	80-120			


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 04-Dec-2021 12:32

Analysis by: Analytical Resources, LLC
Volatile Organic Compounds - Quality Control
Batch BJK0547 - EPA 5030C (Purge and Trap)

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BJK0547-BSD2)						Prepared: 19-Nov-2021 Analyzed: 19-Nov-2021 17:19					
Vinyl Chloride	10.2	0.08	0.20	ug/L	10.0		102	66-133	2.40	30	
1,1-Dichloroethene	9.75	0.08	0.20	ug/L	10.0		97.5	69-135	4.91	30	
trans-1,2-Dichloroethene	10.3	0.07	0.20	ug/L	10.0		103	78-128	3.22	30	
cis-1,2-Dichloroethene	10.2	0.08	0.20	ug/L	10.0		102	80-121	1.34	30	
Benzene	10.7	0.05	0.20	ug/L	10.0		107	80-120	0.53	30	
Trichloroethene	10.8	0.07	0.20	ug/L	10.0		108	80-120	1.50	30	
Toluene	10.8	0.05	0.20	ug/L	10.0		108	80-120	1.01	30	
Tetrachloroethene	11.2	0.09	0.20	ug/L	10.0		112	80-120	1.86	30	
Ethylbenzene	10.8	0.05	0.20	ug/L	10.0		108	80-120	4.26	30	
m,p-Xylene	21.7	0.14	0.40	ug/L	20.0		108	80-121	3.12	30	
o-Xylene	10.5	0.08	0.20	ug/L	10.0		105	80-121	0.33	30	
Xylenes, total	32.2	0.22	0.60	ug/L	30.0		107	76-127	2.20	30	
<i>Surrogate: 1,2-Dichloroethane-d4</i>	4.68			ug/L	5.00		93.6	80-129			
<i>Surrogate: Toluene-d8</i>	5.26			ug/L	5.00		105	80-120			
<i>Surrogate: 4-Bromofluorobenzene</i>	5.40			ug/L	5.00		108	80-120			
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	4.95			ug/L	5.00		99.0	80-120			



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
04-Dec-2021 12:32

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - Quality Control

Batch BJK0565 - EPA 5030C (Purge and Trap)

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0565-BLK2)											
						Prepared: 22-Nov-2021 Analyzed: 22-Nov-2021 10:12					
Vinyl Chloride	ND	0.08	0.20	ug/L							U
1,1-Dichloroethene	ND	0.08	0.20	ug/L							U
trans-1,2-Dichloroethene	ND	0.07	0.20	ug/L							U
cis-1,2-Dichloroethene	ND	0.08	0.20	ug/L							U
Benzene	ND	0.05	0.20	ug/L							U
Trichloroethene	ND	0.07	0.20	ug/L							U
Toluene	ND	0.05	0.20	ug/L							U
Tetrachloroethene	ND	0.09	0.20	ug/L							U
Ethylbenzene	ND	0.05	0.20	ug/L							U
m,p-Xylene	ND	0.14	0.40	ug/L							U
o-Xylene	ND	0.08	0.20	ug/L							U
Xylenes, total	ND	0.22	0.60	ug/L							U
<i>Surrogate: 1,2-Dichloroethane-d4</i>	4.80			ug/L	5.00		95.9	80-129			
<i>Surrogate: Toluene-d8</i>	5.17			ug/L	5.00		103	80-120			
<i>Surrogate: 4-Bromofluorobenzene</i>	5.16			ug/L	5.00		103	80-120			
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	5.11			ug/L	5.00		102	80-120			
LCS (BJK0565-BS2)											
						Prepared: 22-Nov-2021 Analyzed: 22-Nov-2021 08:31					
Vinyl Chloride	9.76	0.08	0.20	ug/L	10.0		97.6	66-133			
1,1-Dichloroethene	9.57	0.08	0.20	ug/L	10.0		95.7	69-135			
trans-1,2-Dichloroethene	9.35	0.07	0.20	ug/L	10.0		93.5	78-128			
cis-1,2-Dichloroethene	10.1	0.08	0.20	ug/L	10.0		101	80-121			
Benzene	10.5	0.05	0.20	ug/L	10.0		105	80-120			
Trichloroethene	10.5	0.07	0.20	ug/L	10.0		105	80-120			
Toluene	10.7	0.05	0.20	ug/L	10.0		107	80-120			
Tetrachloroethene	11.1	0.09	0.20	ug/L	10.0		111	80-120			
Ethylbenzene	10.5	0.05	0.20	ug/L	10.0		105	80-120			
m,p-Xylene	21.1	0.14	0.40	ug/L	20.0		105	80-121			
o-Xylene	10.3	0.08	0.20	ug/L	10.0		103	80-121			
Xylenes, total	31.4	0.22	0.60	ug/L	30.0		105	76-127			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	4.71			ug/L	5.00		94.2	80-129			
<i>Surrogate: Toluene-d8</i>	5.29			ug/L	5.00		106	80-120			
<i>Surrogate: 4-Bromofluorobenzene</i>	5.60			ug/L	5.00		112	80-120			
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	5.12			ug/L	5.00		102	80-120			


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 04-Dec-2021 12:32

Analysis by: Analytical Resources, LLC
Volatile Organic Compounds - Quality Control
Batch BJK0565 - EPA 5030C (Purge and Trap)

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BJK0565-BSD2)						Prepared: 22-Nov-2021 Analyzed: 22-Nov-2021 09:22					
Vinyl Chloride	9.79	0.08	0.20	ug/L	10.0		97.9	66-133	0.25	30	
1,1-Dichloroethene	9.40	0.08	0.20	ug/L	10.0		94.0	69-135	1.74	30	
trans-1,2-Dichloroethene	9.99	0.07	0.20	ug/L	10.0		99.9	78-128	6.62	30	
cis-1,2-Dichloroethene	9.87	0.08	0.20	ug/L	10.0		98.7	80-121	1.97	30	
Benzene	10.6	0.05	0.20	ug/L	10.0		106	80-120	0.55	30	
Trichloroethene	10.4	0.07	0.20	ug/L	10.0		104	80-120	0.90	30	
Toluene	10.6	0.05	0.20	ug/L	10.0		106	80-120	0.98	30	
Tetrachloroethene	11.0	0.09	0.20	ug/L	10.0		110	80-120	0.44	30	
Ethylbenzene	10.1	0.05	0.20	ug/L	10.0		101	80-120	3.86	30	
m,p-Xylene	20.9	0.14	0.40	ug/L	20.0		105	80-121	0.69	30	
o-Xylene	10.2	0.08	0.20	ug/L	10.0		102	80-121	0.68	30	
Xylenes, total	31.2	0.22	0.60	ug/L	30.0		104	76-127	0.69	30	
<i>Surrogate: 1,2-Dichloroethane-d4</i>	4.75			ug/L	5.00		94.9	80-129			
<i>Surrogate: Toluene-d8</i>	5.14			ug/L	5.00		103	80-120			
<i>Surrogate: 4-Bromofluorobenzene</i>	5.33			ug/L	5.00		107	80-120			
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	5.11			ug/L	5.00		102	80-120			


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 04-Dec-2021 12:32

Analysis by: Analytical Resources, LLC
Volatile Organic Compounds - SIM - Quality Control
Batch BJK0712 - EPA 5030C (Purge and Trap)

Instrument: NT7 Analyst: PB

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0712-BLK1)					Prepared: 29-Nov-2021 Analyzed: 29-Nov-2021 11:54						
Vinyl chloride	ND	5.01	20.0	ng/L							U
Surrogate: 1,2-Dichloroethane-d4	6130			ng/L	5000		123	80-129			
Surrogate: Toluene-d8	4780			ng/L	5000		95.5	80-120			
LCS (BJK0712-BS1)					Prepared: 29-Nov-2021 Analyzed: 29-Nov-2021 09:33						
Vinyl chloride	410	5.01	20.0	ng/L	500		82.0	62-141			
Surrogate: 1,2-Dichloroethane-d4	4850			ng/L	5000		97.0	80-129			
Surrogate: Toluene-d8	4810			ng/L	5000		96.2	80-120			
LCS Dup (BJK0712-BSD1)					Prepared: 29-Nov-2021 Analyzed: 29-Nov-2021 10:28						
Vinyl chloride	415	5.01	20.0	ng/L	500		83.1	62-141	1.33	30	
Surrogate: 1,2-Dichloroethane-d4	4630			ng/L	5000		92.7	80-129			
Surrogate: Toluene-d8	4900			ng/L	5000		98.1	80-120			


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 04-Dec-2021 12:32

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - Quality Control
Batch BJK0540 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0540-BLK1)						Prepared: 23-Nov-2021 Analyzed: 01-Dec-2021 12:57					
Phenol	ND	0.01	0.2	ug/L							U
bis(2-chloroethyl) ether	ND	0.03	0.2	ug/L							U
2-Chlorophenol	ND	0.03	0.2	ug/L							U
1,3-Dichlorobenzene	ND	0.03	0.2	ug/L							U
1,4-Dichlorobenzene	ND	0.03	0.2	ug/L							U
1,2-Dichlorobenzene	ND	0.03	0.2	ug/L							U
Benzyl Alcohol	ND	0.02	0.2	ug/L							U
2,2'-Oxybis(1-chloropropane)	ND	0.03	0.2	ug/L							U
2-Methylphenol	ND	0.03	0.2	ug/L							U
Hexachloroethane	ND	0.04	0.2	ug/L							U
N-Nitroso-di-n-Propylamine	ND	0.04	0.2	ug/L							U
4-Methylphenol	ND	0.03	0.2	ug/L							U
Nitrobenzene	ND	0.03	0.2	ug/L							U
Isophorone	ND	0.03	0.2	ug/L							U
2-Nitrophenol	ND	0.04	1.0	ug/L							U
2,4-Dimethylphenol	ND	0.3	1.0	ug/L							U
Bis(2-Chloroethoxy)methane	ND	0.03	0.2	ug/L							U
2,4-Dichlorophenol	ND	0.1	1.0	ug/L							U
1,2,4-Trichlorobenzene	ND	0.03	0.2	ug/L							U
Naphthalene	ND	0.03	0.2	ug/L							U
Benzoic acid	ND	0.1	2.0	ug/L							U
4-Chloroaniline	ND	0.04	1.0	ug/L							U
Hexachlorobutadiene	ND	0.04	0.2	ug/L							U
4-Chloro-3-Methylphenol	ND	0.1	1.0	ug/L							U
2-Methylnaphthalene	ND	0.03	0.2	ug/L							U
Hexachlorocyclopentadiene	ND	0.1	1.0	ug/L							U
2,4,6-Trichlorophenol	ND	0.2	1.0	ug/L							U
2,4,5-Trichlorophenol	ND	0.1	1.0	ug/L							U
2-Chloronaphthalene	ND	0.03	0.2	ug/L							U
2-Nitroaniline	ND	0.2	1.0	ug/L							U
Acenaphthylene	ND	0.02	0.2	ug/L							U
Dimethylphthalate	ND	0.04	0.2	ug/L							U
2,6-Dinitrotoluene	ND	0.2	1.0	ug/L							U
Acenaphthene	ND	0.03	0.2	ug/L							U
3-Nitroaniline	ND	0.2	1.0	ug/L							U


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 04-Dec-2021 12:32

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - Quality Control
Batch BJK0540 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0540-BLK1)						Prepared: 23-Nov-2021 Analyzed: 01-Dec-2021 12:57					
2,4-Dinitrophenol	ND	0.2	2.0	ug/L							U
Dibenzofuran	ND	0.02	0.2	ug/L							U
4-Nitrophenol	ND	0.06	1.0	ug/L							U
2,4-Dinitrotoluene	ND	0.1	1.0	ug/L							U
Fluorene	ND	0.02	0.2	ug/L							U
4-Chlorophenylphenyl ether	ND	0.02	0.2	ug/L							U
Diethyl phthalate	ND	0.06	0.2	ug/L							U
4-Nitroaniline	ND	0.2	1.0	ug/L							U
4,6-Dinitro-2-methylphenol	ND	0.4	2.0	ug/L							U
N-Nitrosodiphenylamine	ND	0.03	0.2	ug/L							U
4-Bromophenyl phenyl ether	ND	0.02	0.2	ug/L							U
Hexachlorobenzene	ND	0.04	0.2	ug/L							U
Pentachlorophenol	ND	0.1	1.0	ug/L							U
Phenanthrene	ND	0.02	0.2	ug/L							U
Anthracene	ND	0.03	0.2	ug/L							U
Carbazole	ND	0.04	0.2	ug/L							U
Di-n-Butylphthalate	ND	0.05	0.2	ug/L							U
Fluoranthene	ND	0.03	0.2	ug/L							U
Pyrene	ND	0.03	0.2	ug/L							U
Butylbenzylphthalate	ND	0.07	0.2	ug/L							U
Benzo(a)anthracene	ND	0.04	0.2	ug/L							U
3,3'-Dichlorobenzidine	ND	0.3	1.0	ug/L							U
Chrysene	ND	0.04	0.2	ug/L							U
bis(2-Ethylhexyl)phthalate	ND	0.2	0.2	ug/L							U
Di-n-Octylphthalate	ND	0.05	0.2	ug/L							U
Benzo(a)fluoranthene, Total	ND	0.08	0.4	ug/L							U
Benzo(a)pyrene	ND	0.05	0.2	ug/L							U
Indeno(1,2,3-cd)pyrene	ND	0.06	0.2	ug/L							U
Dibenzo(a,h)anthracene	ND	0.07	0.2	ug/L							U
Benzo(g,h,i)perylene	ND	0.04	0.2	ug/L							U
1-Methylnaphthalene	ND	0.03	0.2	ug/L							U
Surrogate: 2-Fluorophenol	3.77			ug/L	7.50		50.2	30-160			
Surrogate: Phenol-d5	2.43			ug/L	7.50		32.4	30-160			
Surrogate: 2-Chlorophenol-d4	6.72			ug/L	7.50		89.5	30-160			


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Reported:
 04-Dec-2021 12:32

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - Quality Control
Batch BJK0540 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0540-BLK1)						Prepared: 23-Nov-2021	Analyzed: 01-Dec-2021 12:57				
Surrogate: 1,2-Dichlorobenzene-d4	4.13			ug/L	5.00		82.7	30-160			
Surrogate: Nitrobenzene-d5	4.28			ug/L	5.00		85.5	30-160			
Surrogate: 2-Fluorobiphenyl	4.83			ug/L	5.00		96.7	30-160			
Surrogate: 2,4,6-Tribromophenol	7.27			ug/L	7.50		96.9	30-160			
Surrogate: p-Terphenyl-d14	5.34			ug/L	5.00		107	30-160			Q
LCS (BJK0540-BS1)						Prepared: 23-Nov-2021	Analyzed: 01-Dec-2021 13:35				
Phenol	1.6	0.01	0.2	ug/L	5.00		31.7	30-160			
bis(2-chloroethyl) ether	3.8	0.03	0.2	ug/L	5.00		75.1	30-160			
2-Chlorophenol	3.2	0.03	0.2	ug/L	5.00		64.1	30-160			
1,3-Dichlorobenzene	2.9	0.03	0.2	ug/L	5.00		57.4	30-160			
1,4-Dichlorobenzene	3.2	0.03	0.2	ug/L	5.00		64.0	30-160			
1,2-Dichlorobenzene	3.0	0.03	0.2	ug/L	5.00		59.4	30-160			
Benzyl Alcohol	2.3	0.02	0.2	ug/L	5.00		46.1	30-160			
2,2'-Oxybis(1-chloropropane)	3.5	0.03	0.2	ug/L	5.00		70.7	30-160			
2-Methylphenol	2.9	0.03	0.2	ug/L	5.00		57.8	30-160			
Hexachloroethane	2.8	0.04	0.2	ug/L	5.00		56.3	30-160			
N-Nitroso-di-n-Propylamine	3.3	0.04	0.2	ug/L	5.00		66.5	30-160			
4-Methylphenol	2.6	0.03	0.2	ug/L	5.00		52.9	30-160			
Nitrobenzene	3.6	0.03	0.2	ug/L	5.00		71.3	30-160			
Isophorone	5.2	0.03	0.2	ug/L	5.00		104	30-160			
2-Nitrophenol	4.1	0.04	1.0	ug/L	5.00		82.1	30-160			Q
2,4-Dimethylphenol	8.8	0.3	1.0	ug/L	13.0		67.8	30-160			
Bis(2-Chloroethoxy)methane	4.3	0.03	0.2	ug/L	5.00		86.7	30-160			
2,4-Dichlorophenol	10.3	0.1	1.0	ug/L	13.0		79.2	30-160			
1,2,4-Trichlorobenzene	2.9	0.03	0.2	ug/L	5.00		58.0	30-160			
Naphthalene	3.2	0.03	0.2	ug/L	5.00		63.7	30-160			
Benzoic acid	6.7	0.1	2.0	ug/L	23.0		28.9	30-160			*
4-Chloroaniline	1.9	0.04	1.0	ug/L	13.0		14.2	30-160			*
Hexachlorobutadiene	2.4	0.04	0.2	ug/L	5.00		48.3	30-160			
4-Chloro-3-Methylphenol	11.6	0.1	1.0	ug/L	13.0		89.0	30-160			
2-Methylnaphthalene	3.5	0.03	0.2	ug/L	5.00		70.6	30-160			
Hexachlorocyclopentadiene	2.8	0.1	1.0	ug/L	13.0		21.6	30-160			*, Q
2,4,6-Trichlorophenol	11.6	0.2	1.0	ug/L	13.0		89.4	30-160			
2,4,5-Trichlorophenol	11.3	0.1	1.0	ug/L	13.0		86.9	30-160			


 Shannon & Wilson, Inc
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Reported:
 04-Dec-2021 12:32

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - Quality Control
Batch BJK0540 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJK0540-BS1)						Prepared: 23-Nov-2021 Analyzed: 01-Dec-2021 13:35					
2-Chloronaphthalene	3.8	0.03	0.2	ug/L	5.00		75.8	30-160			
2-Nitroaniline	12.7	0.2	1.0	ug/L	13.0		97.7	30-160			
Acenaphthylene	3.2	0.02	0.2	ug/L	5.00		63.2	30-160			
Dimethylphthalate	3.8	0.04	0.2	ug/L	5.00		76.3	30-160			
2,6-Dinitrotoluene	13.3	0.2	1.0	ug/L	13.0		102	30-160			
Acenaphthene	3.4	0.03	0.2	ug/L	5.00		67.9	30-160			
3-Nitroaniline	11.2	0.2	1.0	ug/L	13.0		86.3	30-160			
2,4-Dinitrophenol	17.3	0.2	2.0	ug/L	23.0		75.4	30-160			
Dibenzofuran	4.0	0.02	0.2	ug/L	5.00		79.2	30-160			
4-Nitrophenol	3.5	0.06	1.0	ug/L	13.0		26.9	30-160			*
2,4-Dinitrotoluene	13.4	0.1	1.0	ug/L	13.0		103	30-160			Q
Fluorene	2.6	0.02	0.2	ug/L	5.00		51.1	30-160			Q
4-Chlorophenylphenyl ether	2.3	0.02	0.2	ug/L	5.00		46.8	30-160			Q
Diethyl phthalate	3.7	0.06	0.2	ug/L	5.00		74.3	30-160			
4-Nitroaniline	13.4	0.2	1.0	ug/L	13.0		103	30-160			
4,6-Dinitro-2-methylphenol	21.4	0.4	2.0	ug/L	23.0		92.9	30-160			
N-Nitrosodiphenylamine	3.8	0.03	0.2	ug/L	5.00		75.8	30-160			
4-Bromophenyl phenyl ether	4.1	0.02	0.2	ug/L	5.00		81.3	30-160			
Hexachlorobenzene	3.5	0.04	0.2	ug/L	5.00		70.7	30-160			
Pentachlorophenol	4.5	0.1	1.0	ug/L	13.0		34.9	30-160			Q
Phenanthrene	3.8	0.02	0.2	ug/L	5.00		75.1	30-160			
Anthracene	3.5	0.03	0.2	ug/L	5.00		69.5	30-160			
Carbazole	3.9	0.04	0.2	ug/L	5.00		77.5	30-160			
Di-n-Butylphthalate	4.2	0.05	0.2	ug/L	5.00		83.7	30-160			
Fluoranthene	5.1	0.03	0.2	ug/L	5.00		101	30-160			Q
Pyrene	4.9	0.03	0.2	ug/L	5.00		98.9	30-160			Q
Butylbenzylphthalate	4.6	0.07	0.2	ug/L	5.00		92.4	30-160			Q
Benzo(a)anthracene	4.1	0.04	0.2	ug/L	5.00		81.2	30-160			
3,3'-Dichlorobenzidine	12.3	0.3	1.0	ug/L	13.0		94.2	30-160			
Chrysene	3.7	0.04	0.2	ug/L	5.00		74.5	30-160			
bis(2-Ethylhexyl)phthalate	4.3	0.2	0.2	ug/L	5.00		86.2	30-160			
Di-n-Octylphthalate	3.9	0.05	0.2	ug/L	5.00		77.9	30-160			
Benzo(a)fluoranthene, Total	8.3	0.08	0.4	ug/L	10.0		82.5	30-160			
Benzo(a)pyrene	3.8	0.05	0.2	ug/L	5.00		75.2	30-160			
Indeno(1,2,3-cd)pyrene	3.6	0.06	0.2	ug/L	5.00		71.4	30-160			



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
04-Dec-2021 12:32

Analysis by: Analytical Resources, LLC

Semivolatile Organic Compounds - Quality Control

Batch BJK0540 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJK0540-BS1)						Prepared: 23-Nov-2021 Analyzed: 01-Dec-2021 13:35					
Dibenzo(a,h)anthracene	3.4	0.07	0.2	ug/L	5.00		68.5	30-160			
Benzo(g,h,i)perylene	3.3	0.04	0.2	ug/L	5.00		66.7	30-160			
1-Methylnaphthalene	3.8	0.03	0.2	ug/L	5.00		76.9	30-160			
Surrogate: 2-Fluorophenol	3.52			ug/L	7.50		46.9	30-160			
Surrogate: Phenol-d5	2.43			ug/L	7.50		32.3	30-160			
Surrogate: 2-Chlorophenol-d4	5.57			ug/L	7.50		74.3	30-160			
Surrogate: 1,2-Dichlorobenzene-d4	3.29			ug/L	5.00		65.7	30-160			
Surrogate: Nitrobenzene-d5	3.78			ug/L	5.00		75.7	30-160			
Surrogate: 2-Fluorobiphenyl	3.99			ug/L	5.00		79.7	30-160			
Surrogate: 2,4,6-Tribromophenol	6.25			ug/L	7.50		83.4	30-160			
Surrogate: p-Terphenyl-d14	5.14			ug/L	5.00		103	30-160			Q
LCS Dup (BJK0540-BSD1)						Prepared: 23-Nov-2021 Analyzed: 01-Dec-2021 14:13					
Phenol	2.0	0.01	0.2	ug/L	5.00		39.2	30-160	21.20	30	
bis(2-chloroethyl) ether	4.8	0.03	0.2	ug/L	5.00		95.9	30-160	24.40	30	
2-Chlorophenol	4.0	0.03	0.2	ug/L	5.00		79.6	30-160	21.60	30	
1,3-Dichlorobenzene	3.6	0.03	0.2	ug/L	5.00		72.3	30-160	22.90	30	
1,4-Dichlorobenzene	4.1	0.03	0.2	ug/L	5.00		83.0	30-160	25.80	30	
1,2-Dichlorobenzene	3.8	0.03	0.2	ug/L	5.00		75.1	30-160	23.20	30	
Benzyl Alcohol	2.9	0.02	0.2	ug/L	5.00		57.2	30-160	21.60	30	
2,2'-Oxybis(1-chloropropane)	4.5	0.03	0.2	ug/L	5.00		89.4	30-160	23.30	30	
2-Methylphenol	3.6	0.03	0.2	ug/L	5.00		71.6	30-160	21.30	30	
Hexachloroethane	3.6	0.04	0.2	ug/L	5.00		72.2	30-160	24.80	30	
N-Nitroso-di-n-Propylamine	4.1	0.04	0.2	ug/L	5.00		82.3	30-160	21.30	30	
4-Methylphenol	3.2	0.03	0.2	ug/L	5.00		64.4	30-160	19.50	30	
Nitrobenzene	4.5	0.03	0.2	ug/L	5.00		90.7	30-160	24.00	30	
Isophorone	6.5	0.03	0.2	ug/L	5.00		129	30-160	21.70	30	
2-Nitrophenol	5.4	0.04	1.0	ug/L	5.00		109	30-160	27.80	30	Q
2,4-Dimethylphenol	10.9	0.3	1.0	ug/L	13.0		83.9	30-160	21.20	30	
Bis(2-Chloroethoxy)methane	5.5	0.03	0.2	ug/L	5.00		110	30-160	24.10	30	
2,4-Dichlorophenol	13.9	0.1	1.0	ug/L	13.0		107	30-160	29.40	30	
1,2,4-Trichlorobenzene	3.5	0.03	0.2	ug/L	5.00		70.8	30-160	20.00	30	
Naphthalene	4.0	0.03	0.2	ug/L	5.00		79.7	30-160	22.40	30	
Benzoic acid	8.6	0.1	2.0	ug/L	23.0		37.2	30-160	25.10	30	
4-Chloroaniline	2.3	0.04	1.0	ug/L	13.0		17.8	30-160	22.40	30	*


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Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - Quality Control
Batch BJK0540 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BJK0540-BS01)						Prepared: 23-Nov-2021 Analyzed: 01-Dec-2021 14:13					
Hexachlorobutadiene	3.1	0.04	0.2	ug/L	5.00		61.8	30-160	24.40	30	
4-Chloro-3-Methylphenol	14.5	0.1	1.0	ug/L	13.0		112	30-160	22.80	30	
2-Methylnaphthalene	4.5	0.03	0.2	ug/L	5.00		90.3	30-160	24.50	30	
Hexachlorocyclopentadiene	4.3	0.1	1.0	ug/L	13.0		33.2	30-160	42.40	30	*, Q
2,4,6-Trichlorophenol	14.7	0.2	1.0	ug/L	13.0		113	30-160	23.20	30	
2,4,5-Trichlorophenol	14.0	0.1	1.0	ug/L	13.0		108	30-160	21.60	30	
2-Chloronaphthalene	4.8	0.03	0.2	ug/L	5.00		95.2	30-160	22.70	30	
2-Nitroaniline	16.3	0.2	1.0	ug/L	13.0		125	30-160	24.60	30	
Acenaphthylene	3.9	0.02	0.2	ug/L	5.00		78.0	30-160	20.80	30	
Dimethylphthalate	4.6	0.04	0.2	ug/L	5.00		91.4	30-160	18.00	30	
2,6-Dinitrotoluene	16.8	0.2	1.0	ug/L	13.0		129	30-160	23.30	30	
Acenaphthene	4.3	0.03	0.2	ug/L	5.00		86.6	30-160	24.30	30	
3-Nitroaniline	13.6	0.2	1.0	ug/L	13.0		105	30-160	19.10	30	
2,4-Dinitrophenol	23.8	0.2	2.0	ug/L	23.0		103	30-160	31.30	30	*
Dibenzofuran	4.9	0.02	0.2	ug/L	5.00		98.3	30-160	21.50	30	
4-Nitrophenol	4.3	0.06	1.0	ug/L	13.0		32.8	30-160	19.70	30	
2,4-Dinitrotoluene	16.9	0.1	1.0	ug/L	13.0		130	30-160	23.20	30	Q
Fluorene	3.1	0.02	0.2	ug/L	5.00		62.6	30-160	20.30	30	Q
4-Chlorophenylphenyl ether	3.3	0.02	0.2	ug/L	5.00		65.6	30-160	33.40	30	*, Q
Diethyl phthalate	4.4	0.06	0.2	ug/L	5.00		88.8	30-160	17.90	30	
4-Nitroaniline	16.2	0.2	1.0	ug/L	13.0		125	30-160	19.20	30	
4,6-Dinitro-2-methylphenol	26.6	0.4	2.0	ug/L	23.0		116	30-160	21.90	30	
N-Nitrosodiphenylamine	4.7	0.03	0.2	ug/L	5.00		93.8	30-160	21.20	30	
4-Bromophenyl phenyl ether	5.0	0.02	0.2	ug/L	5.00		99.5	30-160	20.20	30	
Hexachlorobenzene	4.4	0.04	0.2	ug/L	5.00		87.8	30-160	21.60	30	
Pentachlorophenol	5.9	0.1	1.0	ug/L	13.0		45.6	30-160	26.40	30	Q
Phenanthrene	4.4	0.02	0.2	ug/L	5.00		87.9	30-160	15.70	30	
Anthracene	4.3	0.03	0.2	ug/L	5.00		85.2	30-160	20.30	30	
Carbazole	4.8	0.04	0.2	ug/L	5.00		95.9	30-160	21.20	30	
Di-n-Butylphthalate	5.1	0.05	0.2	ug/L	5.00		103	30-160	20.40	30	
Fluoranthene	6.1	0.03	0.2	ug/L	5.00		123	30-160	19.20	30	Q
Pyrene	6.1	0.03	0.2	ug/L	5.00		123	30-160	21.40	30	Q
Butylbenzylphthalate	5.5	0.07	0.2	ug/L	5.00		111	30-160	18.00	30	Q
Benzo(a)anthracene	4.9	0.04	0.2	ug/L	5.00		97.9	30-160	18.60	30	
3,3'-Dichlorobenzidine	14.6	0.3	1.0	ug/L	13.0		112	30-160	17.20	30	


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Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - Quality Control
Batch BJK0540 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BJK0540-BSD1)						Prepared: 23-Nov-2021 Analyzed: 01-Dec-2021 14:13					
Chrysene	4.6	0.04	0.2	ug/L	5.00		91.9	30-160	20.90	30	
bis(2-Ethylhexyl)phthalate	5.2	0.2	0.2	ug/L	5.00		103	30-160	18.00	30	
Di-n-Octylphthalate	4.7	0.05	0.2	ug/L	5.00		94.3	30-160	19.00	30	
Benzo(a)fluoranthenes, Total	9.9	0.08	0.4	ug/L	10.0		99.2	30-160	18.40	30	
Benzo(a)pyrene	4.6	0.05	0.2	ug/L	5.00		91.7	30-160	19.80	30	
Indeno(1,2,3-cd)pyrene	4.4	0.06	0.2	ug/L	5.00		87.4	30-160	20.10	30	
Dibenzo(a,h)anthracene	4.2	0.07	0.2	ug/L	5.00		84.6	30-160	21.10	30	
Benzo(g,h,i)perylene	4.2	0.04	0.2	ug/L	5.00		83.4	30-160	22.30	30	
1-Methylnaphthalene	4.8	0.03	0.2	ug/L	5.00		97.0	30-160	23.10	30	
Surrogate: 2-Fluorophenol	4.20			ug/L	7.50		56.0	30-160			
Surrogate: Phenol-d5	2.93			ug/L	7.50		39.0	30-160			
Surrogate: 2-Chlorophenol-d4	6.68			ug/L	7.50		89.0	30-160			
Surrogate: 1,2-Dichlorobenzene-d4	3.97			ug/L	5.00		79.4	30-160			
Surrogate: Nitrobenzene-d5	4.62			ug/L	5.00		92.5	30-160			
Surrogate: 2-Fluorobiphenyl	4.87			ug/L	5.00		97.4	30-160			
Surrogate: 2,4,6-Tribromophenol	7.53			ug/L	7.50		100	30-160			
Surrogate: p-Terphenyl-d14	5.88			ug/L	5.00		118	30-160			Q


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 04-Dec-2021 12:32

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - SIM - Quality Control
Batch BJK0539 - EPA 3510C SepF

Instrument: NT11 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0539-BLK1)						Prepared: 23-Nov-2021 Analyzed: 27-Nov-2021 08:32					
Naphthalene	0.002	0.001	0.010	ug/L							J
2-Methylnaphthalene	0.001	0.001	0.010	ug/L							J
1-Methylnaphthalene	ND	0.0009	0.010	ug/L							U
Acenaphthylene	ND	0.002	0.010	ug/L							U
Acenaphthene	ND	0.003	0.010	ug/L							U
Dibenzofuran	ND	0.002	0.010	ug/L							U
Fluorene	ND	0.002	0.010	ug/L							U
Phenanthrene	ND	0.001	0.010	ug/L							U
Anthracene	ND	0.001	0.010	ug/L							U
Carbazole	ND	0.001	0.010	ug/L							U
Fluoranthene	ND	0.002	0.010	ug/L							U
Pyrene	ND	0.001	0.010	ug/L							U
Benzo(a)anthracene	ND	0.0008	0.010	ug/L							U
Chrysene	ND	0.0009	0.010	ug/L							U
Benzo(b)fluoranthene	ND	0.0005	0.010	ug/L							U
Benzo(k)fluoranthene	ND	0.003	0.010	ug/L							U
Benzo(j)fluoranthene	ND	0.002	0.010	ug/L							U
Benzofluoranthenes, Total	ND	0.004	0.010	ug/L							U
Benzo(a)pyrene	ND	0.002	0.010	ug/L							U
Perylene	ND	0.006	0.010	ug/L							U
Indeno(1,2,3-cd)pyrene	ND	0.001	0.010	ug/L							U
Dibenzo(a,h)anthracene	ND	0.001	0.010	ug/L							U
Benzo(g,h,i)perylene	ND	0.001	0.010	ug/L							U
<i>Surrogate: 2-Methylnaphthalene-d10</i>	0.253			ug/L	0.300		84.3	42-120			
<i>Surrogate: Dibenzo[a,h]anthracene-d14</i>	0.200			ug/L	0.300		66.7	29-120			
<i>Surrogate: Fluoranthene-d10</i>	0.293			ug/L	0.300		97.6	57-120			

LCS (BJK0539-BS1)						Prepared: 23-Nov-2021 Analyzed: 27-Nov-2021 09:02					
Naphthalene	0.235	0.001	0.010	ug/L	0.300		78.4	37-120			
2-Methylnaphthalene	0.253	0.001	0.010	ug/L	0.300		84.2	37-120			
1-Methylnaphthalene	0.251	0.0009	0.010	ug/L	0.300		83.8	29-120			
Acenaphthylene	0.266	0.002	0.010	ug/L	0.300		88.5	41-120			
Acenaphthene	0.269	0.003	0.010	ug/L	0.300		89.6	41-120			
Dibenzofuran	0.252	0.002	0.010	ug/L	0.300		84.1	38-120			
Fluorene	0.265	0.002	0.010	ug/L	0.300		88.3	43-120			


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 Project Number: 21-1-12596-012
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Reported:
 04-Dec-2021 12:32

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - SIM - Quality Control
Batch BJK0539 - EPA 3510C SepF

Instrument: NT11 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJK0539-BS1)						Prepared: 23-Nov-2021 Analyzed: 27-Nov-2021 09:02					
Phenanthrene	0.261	0.001	0.010	ug/L	0.300		87.1	41-120			
Anthracene	0.259	0.001	0.010	ug/L	0.300		86.3	40-120			
Carbazole	0.266	0.001	0.010	ug/L	0.300		88.6	30-160			
Fluoranthene	0.272	0.002	0.010	ug/L	0.300		90.6	45-120			
Pyrene	0.268	0.001	0.010	ug/L	0.300		89.2	41-120			
Benzo(a)anthracene	0.270	0.0008	0.010	ug/L	0.300		90.1	42-120			
Chrysene	0.256	0.0009	0.010	ug/L	0.300		85.4	44-120			
Benzo(b)fluoranthene	0.238	0.0005	0.010	ug/L	0.300		79.3	44-120			
Benzo(k)fluoranthene	0.251	0.003	0.010	ug/L	0.300		83.8	50-120			
Benzo(j)fluoranthene	0.269	0.002	0.010	ug/L	0.300		89.8	39-160			
Benzofluoranthenes, Total	0.759	0.004	0.010	ug/L	0.900		84.3	46-120			
Benzo(a)pyrene	0.249	0.002	0.010	ug/L	0.300		82.9	35-120			
Perylene	0.236	0.006	0.010	ug/L	0.300		78.5	30-160			
Indeno(1,2,3-cd)pyrene	0.225	0.001	0.010	ug/L	0.300		75.0	37-120			
Dibenzo(a,h)anthracene	0.223	0.001	0.010	ug/L	0.300		74.3	34-120			
Benzo(g,h,i)perylene	0.191	0.001	0.010	ug/L	0.300		63.6	38-120			
Surrogate: 2-Methylnaphthalene-d10	0.282			ug/L	0.300		94.0	42-120			
Surrogate: Dibenzo[a,h]anthracene-d14	0.227			ug/L	0.300		75.6	29-120			
Surrogate: Fluoranthene-d10	0.300			ug/L	0.300		100	57-120			
LCS Dup (BJK0539-BS1)						Prepared: 23-Nov-2021 Analyzed: 27-Nov-2021 09:39					
Naphthalene	0.243	0.001	0.010	ug/L	0.300		80.9	37-120	3.14	30	
2-Methylnaphthalene	0.261	0.001	0.010	ug/L	0.300		87.0	37-120	3.28	30	
1-Methylnaphthalene	0.259	0.0009	0.010	ug/L	0.300		86.2	29-120	2.87	30	
Acenaphthylene	0.267	0.002	0.010	ug/L	0.300		89.0	41-120	0.54	30	
Acenaphthene	0.271	0.003	0.010	ug/L	0.300		90.4	41-120	0.88	30	
Dibenzofuran	0.254	0.002	0.010	ug/L	0.300		84.8	38-120	0.83	30	
Fluorene	0.268	0.002	0.010	ug/L	0.300		89.4	43-120	1.22	30	
Phenanthrene	0.271	0.001	0.010	ug/L	0.300		90.3	41-120	3.54	30	
Anthracene	0.271	0.001	0.010	ug/L	0.300		90.5	40-120	4.74	30	
Carbazole	0.277	0.001	0.010	ug/L	0.300		92.2	30-160	4.01	30	
Fluoranthene	0.281	0.002	0.010	ug/L	0.300		93.6	45-120	3.25	30	
Pyrene	0.275	0.001	0.010	ug/L	0.300		91.6	41-120	2.70	30	
Benzo(a)anthracene	0.277	0.0008	0.010	ug/L	0.300		92.2	42-120	2.33	30	
Chrysene	0.268	0.0009	0.010	ug/L	0.300		89.4	44-120	4.63	30	


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 04-Dec-2021 12:32

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - SIM - Quality Control
Batch BJK0539 - EPA 3510C SepF

Instrument: NT11 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BJK0539-BS1)						Prepared: 23-Nov-2021 Analyzed: 27-Nov-2021 09:39					
Benzo(b)fluoranthene	0.244	0.0005	0.010	ug/L	0.300		81.4	44-120	2.61	30	
Benzo(k)fluoranthene	0.266	0.003	0.010	ug/L	0.300		88.6	50-120	5.59	30	
Benzo(j)fluoranthene	0.283	0.002	0.010	ug/L	0.300		94.3	39-160	4.93	30	
Benzo(a)fluoranthene, Total	0.793	0.004	0.010	ug/L	0.900		88.1	46-120	4.43	30	
Benzo(a)pyrene	0.258	0.002	0.010	ug/L	0.300		85.9	35-120	3.44	30	
Perylene	0.243	0.006	0.010	ug/L	0.300		81.1	30-160	3.19	30	
Indeno(1,2,3-cd)pyrene	0.239	0.001	0.010	ug/L	0.300		79.6	37-120	5.87	30	
Dibenzo(a,h)anthracene	0.230	0.001	0.010	ug/L	0.300		76.5	34-120	2.90	30	
Benzo(g,h,i)perylene	0.204	0.001	0.010	ug/L	0.300		68.1	38-120	6.73	30	
Surrogate: 2-Methylnaphthalene-d10	0.273			ug/L	0.300		91.1	42-120			
Surrogate: Dibenzo[a,h]anthracene-d14	0.220			ug/L	0.300		73.2	29-120			
Surrogate: Fluoranthene-d10	0.291			ug/L	0.300		97.1	57-120			


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 04-Dec-2021 12:32

Analysis by: Analytical Resources, LLC
Petroleum Hydrocarbons - Quality Control
Batch BJK0537 - EPA 3510C SepF

Instrument: FID4 Analyst: TWC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0537-BLK1)				Prepared: 22-Nov-2021 Analyzed: 27-Nov-2021 00:37						
Diesel Range Organics (C12-C24)	ND	0.100	mg/L							U
Motor Oil Range Organics (C24-C38)	ND	0.200	mg/L							U
<i>Surrogate: o-Terphenyl</i>	0.199		mg/L	0.225		88.5	50-150			
LCS (BJK0537-BS1)				Prepared: 22-Nov-2021 Analyzed: 27-Nov-2021 00:56						
Diesel Range Organics (C12-C24)	2.22	0.100	mg/L	3.00		74.0	56-120			
<i>Surrogate: o-Terphenyl</i>	0.186		mg/L	0.225		82.7	50-150			
LCS Dup (BJK0537-BSD1)				Prepared: 22-Nov-2021 Analyzed: 27-Nov-2021 01:16						
Diesel Range Organics (C12-C24)	2.63	0.100	mg/L	3.00		87.7	56-120	16.90	30	
<i>Surrogate: o-Terphenyl</i>	0.223		mg/L	0.225		99.0	50-150			



Analytical Report

Shannon & Wilson, Inc
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Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
04-Dec-2021 12:32

Analysis by: Analytical Resources, LLC

Aroclor PCB - Quality Control

Batch BJK0538 - EPA 3510C SepF

Instrument: ECD7 Analyst: JGR/TWC

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0538-BLK1)						Prepared: 23-Nov-2021 Analyzed: 30-Nov-2021 20:07					
Aroclor 1016	ND	0.002	0.010	ug/L							U
Aroclor 1221	ND	0.002	0.010	ug/L							U
Aroclor 1232	ND	0.002	0.010	ug/L							U
Aroclor 1242	ND	0.002	0.010	ug/L							U
Aroclor 1248	ND	0.002	0.010	ug/L							U
Aroclor 1254	ND	0.002	0.010	ug/L							U
Aroclor 1260	ND	0.003	0.010	ug/L							U
Aroclor 1262	ND	0.003	0.010	ug/L							U
Aroclor 1268	ND	0.003	0.010	ug/L							U
Surrogate: Decachlorobiphenyl	0.0135			ug/L	0.0200		67.7	29-120			
Surrogate: Tetrachlorometaxylene	0.0136			ug/L	0.0200		68.2	32-120			
Surrogate: Decachlorobiphenyl [2C]	0.0139			ug/L	0.0200		69.5	29-120			
Surrogate: Tetrachlorometaxylene [2C]	0.0156			ug/L	0.0200		77.8	32-120			
LCS (BJK0538-BS1)						Prepared: 23-Nov-2021 Analyzed: 30-Nov-2021 20:28					
Aroclor 1016	0.047	0.002	0.010	ug/L	0.0500		93.2	54-120			
Aroclor 1260	0.043	0.003	0.010	ug/L	0.0500		85.5	51-128			
Surrogate: Decachlorobiphenyl	0.0144			ug/L	0.0200		72.1	29-120			
Surrogate: Tetrachlorometaxylene	0.0157			ug/L	0.0200		78.5	32-120			
Surrogate: Decachlorobiphenyl [2C]	0.0148			ug/L	0.0200		73.9	29-120			
Surrogate: Tetrachlorometaxylene [2C]	0.0154			ug/L	0.0200		77.0	32-120			
LCS Dup (BJK0538-BSD1)						Prepared: 23-Nov-2021 Analyzed: 30-Nov-2021 20:49					
Aroclor 1016 [2C]	0.046	0.002	0.010	ug/L	0.0500		91.4	54-120	1.62	30	
Aroclor 1260	0.041	0.003	0.010	ug/L	0.0500		82.2	51-128	3.88	30	
Surrogate: Decachlorobiphenyl	0.0141			ug/L	0.0200		70.5	29-120			
Surrogate: Tetrachlorometaxylene	0.0155			ug/L	0.0200		77.5	32-120			
Surrogate: Decachlorobiphenyl [2C]	0.0141			ug/L	0.0200		70.4	29-120			
Surrogate: Tetrachlorometaxylene [2C]	0.0156			ug/L	0.0200		78.2	32-120			


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 04-Dec-2021 12:32

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds - Quality Control
Batch BJL0018 - TWM EPA 7470A

Instrument: HYDRA Analyst: SKD

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJL0018-BLK1)						Prepared: 01-Dec-2021 Analyzed: 02-Dec-2021 16:14					
Mercury	ND	0.000013	0.000100	mg/L							U
LCS (BJL0018-BS1)						Prepared: 01-Dec-2021 Analyzed: 02-Dec-2021 16:16					
Mercury	0.00103	0.000013	0.000100	mg/L	0.00100		103	80-120			
Duplicate (BJL0018-DUP1)						Source: 21K0322-01 Prepared: 01-Dec-2021 Analyzed: 02-Dec-2021 16:50					
Mercury	ND	0.000013	0.000100	mg/L		ND					U
Matrix Spike (BJL0018-MS1)						Source: 21K0322-01 Prepared: 01-Dec-2021 Analyzed: 02-Dec-2021 16:52					
Mercury	0.00189	0.000013	0.000100	mg/L	0.00200	ND	94.7	75-125			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Matrix Spike Dup (BJL0018-MSD1)						Source: 21K0322-01 Prepared: 01-Dec-2021 Analyzed: 02-Dec-2021 16:55					
Mercury	0.00206	0.000013	0.000100	mg/L	0.00200	ND	103	75-125	8.59	20	
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 04-Dec-2021 12:32

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds - Quality Control
Batch BJL0067 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJL0067-BLK1)						Prepared: 02-Dec-2021 Analyzed: 02-Dec-2021 16:34						
Barium	135	ND	0.114	0.500	ug/L							U
Barium	137	ND	0.0765	0.500	ug/L							U
Chromium	52	ND	0.260	0.500	ug/L							U
Chromium	53	ND	0.239	0.500	ug/L							U
Iron	54	ND	18.2	36.0	ug/L							U
Iron	57	ND	6.63	36.0	ug/L							U
Lead	208	ND	0.0513	0.100	ug/L							U
Manganese	55	ND	0.142	0.500	ug/L							U
Silver	107	ND	0.0220	0.200	ug/L							U
Vanadium	51a	ND	0.0556	0.200	ug/L							U
Vanadium	51b	ND	0.0521	0.200	ug/L							U
Arsenic	75a	ND	0.0373	0.200	ug/L							U
Cadmium	111	ND	0.0300	0.100	ug/L							U
Cadmium	114	ND	0.0400	0.100	ug/L							U
Cobalt	59	ND	0.0178	0.200	ug/L							U
Copper	63	ND	0.173	0.500	ug/L							U
Copper	65	ND	0.350	0.500	ug/L							U
Nickel	60	ND	0.0792	0.500	ug/L							U
Nickel	62	ND	0.220	0.500	ug/L							U
Selenium	78	ND	0.179	0.500	ug/L							U
Zinc	66	ND	2.92	6.00	ug/L							U
Zinc	67	ND	0.940	6.00	ug/L							U

LCS (BJL0067-BS1)						Prepared: 02-Dec-2021 Analyzed: 02-Dec-2021 16:39						
Barium	135	23.6	0.114	0.500	ug/L	25.0		94.5	80-120			
Barium	137	23.7	0.0765	0.500	ug/L	25.0		94.7	80-120			
Chromium	52	23.6	0.260	0.500	ug/L	25.0		94.3	80-120			
Chromium	53	24.5	0.239	0.500	ug/L	25.0		98.2	80-120			
Iron	54	4990	18.2	36.0	ug/L	5000		99.8	80-120			
Iron	57	4940	6.63	36.0	ug/L	5000		98.7	80-120			
Lead	208	25.3	0.0513	0.100	ug/L	25.0		101	80-120			
Manganese	55	24.3	0.142	0.500	ug/L	25.0		97.0	80-120			
Silver	107	25.9	0.0220	0.200	ug/L	25.0		104	80-120			
Vanadium	51a	23.8	0.0556	0.200	ug/L	25.0		95.1	80-120			
Vanadium	51b	24.1	0.0521	0.200	ug/L	25.0		96.3	80-120			


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 04-Dec-2021 12:32

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds - Quality Control
Batch BJL0067 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJL0067-BS1)						Prepared: 02-Dec-2021 Analyzed: 02-Dec-2021 16:39						
Arsenic	75a	24.6	0.0373	0.200	ug/L	25.0		98.5	80-120			
Cadmium	111	25.5	0.0300	0.100	ug/L	25.0		102	80-120			
Cadmium	114	25.6	0.0400	0.100	ug/L	25.0		102	80-120			
Cobalt	59	25.0	0.0178	0.200	ug/L	25.0		100	80-120			
Copper	63	28.5	0.173	0.500	ug/L	25.0		114	80-120			
Copper	65	28.4	0.350	0.500	ug/L	25.0		114	80-120			
Nickel	60	25.1	0.0792	0.500	ug/L	25.0		100	80-120			
Nickel	62	25.1	0.220	0.500	ug/L	25.0		100	80-120			
Selenium	78	77.7	0.179	0.500	ug/L	80.0		97.2	80-120			
Zinc	66	82.1	2.92	6.00	ug/L	80.0		103	80-120			
Zinc	67	79.4	0.940	6.00	ug/L	80.0		99.3	80-120			
Duplicate (BJL0067-DUP1)						Source: 21K0322-01 Prepared: 02-Dec-2021 Analyzed: 02-Dec-2021 18:10						
Barium	135	4.32	0.114	0.500	ug/L		4.18			3.34	20	
Chromium	52	0.312	0.260	0.500	ug/L		0.297			4.93	20	J
Iron	54	19400	18.2	36.0	ug/L		18600			4.15	20	
Lead	208	ND	0.0513	0.100	ug/L		ND					U
Silver	107	ND	0.0220	0.200	ug/L		ND					U
Vanadium	51a	1.13	0.0556	0.200	ug/L		1.07			4.92	20	
Arsenic	75a	0.806	0.0373	0.200	ug/L		0.808			0.25	20	
Cadmium	111	ND	0.0300	0.100	ug/L		ND					U
Cobalt	59	0.114	0.0178	0.200	ug/L		0.110			3.57	20	J
Copper	63	ND	0.173	0.500	ug/L		ND					U
Nickel	60	ND	0.0792	0.500	ug/L		ND					U
Selenium	78	ND	0.179	0.500	ug/L		ND					U
Zinc	66	ND	2.92	6.00	ug/L		ND					U
Duplicate (BJL0067-DUP2)						Source: 21K0322-01RE1 Prepared: 02-Dec-2021 Analyzed: 02-Dec-2021 19:25						
Manganese	55	598	1.42	5.00	ug/L		601			0.42	20	D
Matrix Spike (BJL0067-MS1)						Source: 21K0322-01 Prepared: 02-Dec-2021 Analyzed: 02-Dec-2021 18:14						
Barium	135	27.2	0.114	0.500	ug/L	25.0	4.18	92.1	75-125			
Chromium	52	19.3	0.260	0.500	ug/L	25.0	0.297	76.0	75-125			
Iron	54	22900	18.2	36.0	ug/L	5000	18600	85.1	75-125			
Lead	208	27.0	0.0513	0.100	ug/L	25.0	ND	108	75-125			



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
04-Dec-2021 12:32

Analysis by: Analytical Resources, LLC

Metals and Metallic Compounds - Quality Control

Batch BJL0067 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike (BJL0067-MS1)		Source: 21K0322-01		Prepared: 02-Dec-2021 Analyzed: 02-Dec-2021 18:14								
Silver	107	26.2	0.0220	0.200	ug/L	25.0	ND	105	75-125			
Vanadium	51a	20.5	0.0556	0.200	ug/L	25.0	1.07	77.8	75-125			
Arsenic	75a	24.6	0.0373	0.200	ug/L	25.0	0.808	95.0	75-125			
Cadmium	111	24.7	0.0300	0.100	ug/L	25.0	ND	98.9	75-125			
Cobalt	59	24.8	0.0178	0.200	ug/L	25.0	0.110	98.6	75-125			
Copper	63	24.6	0.173	0.500	ug/L	25.0	ND	98.4	75-125			
Nickel	60	24.5	0.0792	0.500	ug/L	25.0	ND	97.8	75-125			
Selenium	78	72.9	0.179	0.500	ug/L	80.0	ND	91.1	75-125			
Zinc	66	74.5	2.92	6.00	ug/L	80.0	ND	93.1	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike (BJL0067-MS2)		Source: 21K0322-01RE1		Prepared: 02-Dec-2021 Analyzed: 02-Dec-2021 19:30								
Manganese	55	622	1.42	5.00	ug/L	25.0	601	85.9	75-125			HC, D

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BJL0067-MSD1)		Source: 21K0322-01		Prepared: 02-Dec-2021 Analyzed: 02-Dec-2021 18:19								
Barium	135	27.3	0.114	0.500	ug/L	25.0	4.18	92.4	75-125	0.25	20	
Chromium	52	19.5	0.260	0.500	ug/L	25.0	0.297	76.8	75-125	1.02	20	
Iron	54	22100	18.2	36.0	ug/L	5000	18600	69.4	75-125	3.49	20	*
Lead	208	28.1	0.0513	0.100	ug/L	25.0	ND	112	75-125	4.04	20	
Silver	107	27.0	0.0220	0.200	ug/L	25.0	ND	108	75-125	2.97	20	
Vanadium	51a	20.6	0.0556	0.200	ug/L	25.0	1.07	78.2	75-125	0.47	20	
Arsenic	75a	25.2	0.0373	0.200	ug/L	25.0	0.808	97.5	75-125	2.48	20	
Cadmium	111	25.5	0.0300	0.100	ug/L	25.0	ND	102	75-125	3.18	20	
Cobalt	59	25.6	0.0178	0.200	ug/L	25.0	0.110	102	75-125	3.30	20	
Copper	63	25.3	0.173	0.500	ug/L	25.0	ND	101	75-125	2.65	20	
Nickel	60	25.5	0.0792	0.500	ug/L	25.0	ND	102	75-125	4.01	20	
Selenium	78	74.8	0.179	0.500	ug/L	80.0	ND	93.5	75-125	2.61	20	
Zinc	66	77.6	2.92	6.00	ug/L	80.0	ND	97.0	75-125	4.07	20	

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BJL0067-MSD2)		Source: 21K0322-01RE1		Prepared: 02-Dec-2021 Analyzed: 02-Dec-2021 19:35								
Manganese	55	612	1.42	5.00	ug/L	25.0	601	43.5	75-125	1.72	20	HC, D

Recovery limits for target analytes in MS/MSD QC samples are advisory only.


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 04-Dec-2021 12:32

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds (dissolved) - Quality Control
Batch BJK0733 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0733-BLK1)						Prepared: 30-Nov-2021 Analyzed: 01-Dec-2021 00:59						
Barium, Dissolved	135	ND	0.114	0.500	ug/L							U
Barium, Dissolved	137	ND	0.0765	0.500	ug/L							U
Iron, Dissolved	54	ND	18.2	36.0	ug/L							U
Iron, Dissolved	57	ND	18.2	36.0	ug/L							U
Manganese, Dissolved	55	ND	0.142	0.500	ug/L							U
Vanadium, Dissolved	51a	ND	0.0556	0.200	ug/L							U
Vanadium, Dissolved	51b	ND	0.0521	0.200	ug/L							U
Arsenic, Dissolved	75a	ND	0.0373	0.200	ug/L							U
Cobalt, Dissolved	59	ND	0.0178	0.200	ug/L							U
Nickel, Dissolved	60	ND	0.0792	0.500	ug/L							U
Nickel, Dissolved	62	ND	0.220	0.500	ug/L							U
Selenium, Dissolved	78	ND	0.179	0.500	ug/L							U
Blank (BJK0733-BLK2)						Prepared: 30-Nov-2021 Analyzed: 01-Dec-2021 22:23						
Chromium, Dissolved	52	ND	0.260	0.500	ug/L							U
Chromium, Dissolved	53	ND	0.239	0.500	ug/L							U
Lead, Dissolved	208	ND	0.0513	0.100	ug/L							U
Silver, Dissolved	107	ND	0.0220	0.200	ug/L							U
Cadmium, Dissolved	111	ND	0.0300	0.100	ug/L							U
Cadmium, Dissolved	114	ND	0.0400	0.100	ug/L							U
Copper, Dissolved	63	ND	0.173	0.500	ug/L							U
Copper, Dissolved	65	ND	0.350	0.500	ug/L							U
Zinc, Dissolved	66	ND	2.92	6.00	ug/L							U
Zinc, Dissolved	67	ND	0.940	6.00	ug/L							U
LCS (BJK0733-BS1)						Prepared: 30-Nov-2021 Analyzed: 01-Dec-2021 01:02						
Barium, Dissolved	135	22.8	0.114	0.500	ug/L	25.0		91.4	80-120			
Barium, Dissolved	137	22.7	0.0765	0.500	ug/L	25.0		90.9	80-120			
Iron, Dissolved	54	4910	18.2	36.0	ug/L	5000		98.2	80-120			
Iron, Dissolved	57	4800	18.2	36.0	ug/L	5000		96.1	80-120			
Manganese, Dissolved	55	22.0	0.142	0.500	ug/L	25.0		88.0	80-120			
Vanadium, Dissolved	51a	22.3	0.0556	0.200	ug/L	25.0		89.2	80-120			
Vanadium, Dissolved	51b	22.3	0.0521	0.200	ug/L	25.0		89.1	80-120			
Arsenic, Dissolved	75a	24.5	0.0373	0.200	ug/L	25.0		97.8	80-120			
Cobalt, Dissolved	59	26.0	0.0178	0.200	ug/L	25.0		104	80-120			


 Shannon & Wilson, Inc
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 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 04-Dec-2021 12:32

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds (dissolved) - Quality Control
Batch BJK0733 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit	Notes
LCS (BJK0733-BS1)						Prepared: 30-Nov-2021 Analyzed: 01-Dec-2021 01:02					
Nickel, Dissolved	60	26.5	0.0792	0.500	ug/L	25.0		106	80-120		
Nickel, Dissolved	62	26.7	0.220	0.500	ug/L	25.0		107	80-120		
Selenium, Dissolved	78	75.6	0.179	0.500	ug/L	80.0		94.5	80-120		
LCS (BJK0733-BS2)						Prepared: 30-Nov-2021 Analyzed: 01-Dec-2021 22:27					
Chromium, Dissolved	52	26.8	0.260	0.500	ug/L	25.0		107	80-120		
Chromium, Dissolved	53	27.1	0.239	0.500	ug/L	25.0		109	80-120		
Lead, Dissolved	208	25.2	0.0513	0.100	ug/L	25.0		101	80-120		
Silver, Dissolved	107	22.1	0.0220	0.200	ug/L	25.0		88.4	80-120		
Cadmium, Dissolved	111	23.5	0.0300	0.100	ug/L	25.0		93.9	80-120		
Cadmium, Dissolved	114	23.3	0.0400	0.100	ug/L	25.0		93.1	80-120		
Copper, Dissolved	63	23.8	0.173	0.500	ug/L	25.0		95.3	80-120		
Copper, Dissolved	65	23.7	0.350	0.500	ug/L	25.0		95.0	80-120		
Zinc, Dissolved	66	74.7	2.92	6.00	ug/L	80.0		93.4	80-120		
Zinc, Dissolved	67	69.9	0.940	6.00	ug/L	80.0		87.4	80-120		
Duplicate (BJK0733-DUP1)						Source: 21K0322-02 Prepared: 30-Nov-2021 Analyzed: 01-Dec-2021 02:02					
Barium, Dissolved	135	0.519	0.114	0.500	ug/L		0.532		2.47	20	
Arsenic, Dissolved	75a	0.628	0.0373	0.200	ug/L		0.611		2.74	20	
Cobalt, Dissolved	59	0.0980	0.0178	0.200	ug/L		0.0940		4.17	20	J
Nickel, Dissolved	60	ND	0.0792	0.500	ug/L		ND				U
Selenium, Dissolved	78	ND	0.179	0.500	ug/L		ND				U
Duplicate (BJK0733-DUP2)						Source: 21K0322-02 Prepared: 30-Nov-2021 Analyzed: 01-Dec-2021 23:50					
Chromium, Dissolved	52	ND	0.520	1.00	ug/L		ND				U
Iron, Dissolved	57	13200	36.4	72.0	ug/L		13100		1.04	20	D
Lead, Dissolved	208	ND	0.103	0.200	ug/L		ND				U
Silver, Dissolved	107	ND	0.0440	0.400	ug/L		ND				U
Vanadium, Dissolved	51a	0.212	0.111	0.400	ug/L		0.192		9.90	20	J, D
Cadmium, Dissolved	111	ND	0.0600	0.200	ug/L		ND				U
Copper, Dissolved	63	ND	0.346	1.00	ug/L		ND				U
Zinc, Dissolved	66	ND	5.84	12.0	ug/L		ND				U
Duplicate (BJK0733-DUP3)						Source: 21K0322-02RE1 Prepared: 30-Nov-2021 Analyzed: 01-Dec-2021 23:26					
Manganese, Dissolved	55	627	1.42	5.00	ug/L		638		1.71	20	D


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 04-Dec-2021 12:32

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds (dissolved) - Quality Control
Batch BJK0733 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike (BJK0733-MS1)		Source: 21K0322-02		Prepared: 30-Nov-2021		Analyzed: 01-Dec-2021 02:06						
Barium, Dissolved	135	24.7	0.114	0.500	ug/L	25.0	0.532	96.5	75-125			
Arsenic, Dissolved	75a	25.0	0.0373	0.200	ug/L	25.0	0.611	97.7	75-125			
Cobalt, Dissolved	59	26.6	0.0178	0.200	ug/L	25.0	0.0940	106	75-125			
Nickel, Dissolved	60	26.6	0.0792	0.500	ug/L	25.0	ND	106	75-125			
Selenium, Dissolved	78	73.8	0.179	0.500	ug/L	80.0	ND	92.3	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike (BJK0733-MS2)		Source: 21K0322-02		Prepared: 30-Nov-2021		Analyzed: 01-Dec-2021 23:55						
Chromium, Dissolved	52	23.9	0.520	1.00	ug/L	25.0	ND	95.6	75-125			D
Iron, Dissolved	57	17600	36.4	72.0	ug/L	5000	13100	89.3	75-125			D
Lead, Dissolved	208	25.4	0.103	0.200	ug/L	25.0	ND	102	75-125			D
Silver, Dissolved	107	23.6	0.0440	0.400	ug/L	25.0	ND	94.3	75-125			D
Vanadium, Dissolved	51a	23.4	0.111	0.400	ug/L	25.0	0.192	92.7	75-125			D
Cadmium, Dissolved	111	24.8	0.0600	0.200	ug/L	25.0	ND	99.1	75-125			D
Copper, Dissolved	63	24.8	0.346	1.00	ug/L	25.0	ND	99.3	75-125			D
Zinc, Dissolved	66	79.7	5.84	12.0	ug/L	80.0	ND	99.6	75-125			D

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike (BJK0733-MS3)		Source: 21K0322-02RE1		Prepared: 30-Nov-2021		Analyzed: 01-Dec-2021 23:30						
Manganese, Dissolved	55	656	1.42	5.00	ug/L	25.0	638	70.9	75-125			HC, D

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BJK0733-MSD1)		Source: 21K0322-02		Prepared: 30-Nov-2021		Analyzed: 01-Dec-2021 02:11						
Barium, Dissolved	135	24.3	0.114	0.500	ug/L	25.0	0.532	95.3	75-125	1.30	20	
Arsenic, Dissolved	75a	25.6	0.0373	0.200	ug/L	25.0	0.611	99.8	75-125	2.04	20	
Cobalt, Dissolved	59	26.6	0.0178	0.200	ug/L	25.0	0.0940	106	75-125	0.20	20	
Nickel, Dissolved	60	27.1	0.0792	0.500	ug/L	25.0	ND	108	75-125	1.67	20	
Selenium, Dissolved	78	75.1	0.179	0.500	ug/L	80.0	ND	93.9	75-125	1.68	20	

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BJK0733-MSD2)		Source: 21K0322-02		Prepared: 30-Nov-2021		Analyzed: 02-Dec-2021 00:00						
Chromium, Dissolved	52	24.2	0.520	1.00	ug/L	25.0	ND	97.0	75-125	1.40	20	D
Iron, Dissolved	57	17300	36.4	72.0	ug/L	5000	13100	83.9	75-125	1.56	20	D
Lead, Dissolved	208	26.0	0.103	0.200	ug/L	25.0	ND	104	75-125	2.46	20	D
Silver, Dissolved	107	23.8	0.0440	0.400	ug/L	25.0	ND	95.1	75-125	0.87	20	D


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 04-Dec-2021 12:32

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds (dissolved) - Quality Control
Batch BJK0733 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (BJK0733-MSD2)		Source: 21K0322-02		Prepared: 30-Nov-2021		Analyzed: 02-Dec-2021 00:00						
Vanadium, Dissolved	51a	24.0	0.111	0.400	ug/L	25.0	0.192	95.1	75-125	2.55	20	D
Cadmium, Dissolved	111	25.8	0.0600	0.200	ug/L	25.0	ND	103	75-125	3.93	20	D
Copper, Dissolved	63	25.1	0.346	1.00	ug/L	25.0	ND	101	75-125	1.27	20	D
Zinc, Dissolved	66	80.3	5.84	12.0	ug/L	80.0	ND	100	75-125	0.68	20	D

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BJK0733-MSD3)		Source: 21K0322-02RE1		Prepared: 30-Nov-2021		Analyzed: 01-Dec-2021 23:34						
Manganese, Dissolved	55	644	1.42	5.00	ug/L	25.0	638	23.3	75-125	1.83	20	HC, D

Recovery limits for target analytes in MS/MSD QC samples are advisory only.


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 04-Dec-2021 12:32

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds (dissolved) - Quality Control
Batch BJL0061 - TWM EPA 7470A

Instrument: HYDRA Analyst: SKD

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJL0061-BLK1)						Prepared: 02-Dec-2021 Analyzed: 02-Dec-2021 17:30					
Mercury, Dissolved	ND	0.000013	0.000100	mg/L							U
LCS (BJL0061-BS1)						Prepared: 02-Dec-2021 Analyzed: 02-Dec-2021 17:32					
Mercury, Dissolved	0.00202	0.000013	0.000100	mg/L	0.00200		101	80-120			
Duplicate (BJL0061-DUP1)						Source: 21K0322-07 Prepared: 02-Dec-2021 Analyzed: 02-Dec-2021 18:12					
Mercury, Dissolved	ND	0.000013	0.000100	mg/L		ND					U
Matrix Spike (BJL0061-MS1)						Source: 21K0322-07 Prepared: 02-Dec-2021 Analyzed: 02-Dec-2021 18:14					
Mercury, Dissolved	0.00107	0.000013	0.000100	mg/L	0.00100	ND	107	75-125			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Matrix Spike Dup (BJL0061-MSD1)						Source: 21K0322-07 Prepared: 02-Dec-2021 Analyzed: 02-Dec-2021 18:21					
Mercury, Dissolved	0.00107	0.000013	0.000100	mg/L	0.00100	ND	107	75-125	0.29	20	
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 04-Dec-2021 12:32

Analysis by: Analytical Resources, LLC
Wet Chemistry - Quality Control
Batch BJK0526 - SM 5310 A-00, 0.45um filtration

Instrument: UV1800-1 Analyst: CKI

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0526-BLK1)						Prepared: 19-Nov-2021 Analyzed: 19-Nov-2021 11:38					
Hexavalent Chromium	ND	0.013	0.013	mg/L							U
LCS (BJK0526-BS1)						Prepared: 19-Nov-2021 Analyzed: 19-Nov-2021 11:39					
Hexavalent Chromium	0.613	0.013	0.013	mg/L	0.626		97.9	85-115			D
Duplicate (BJK0526-DUP1)						Source: 21K0322-06 Prepared: 19-Nov-2021 Analyzed: 19-Nov-2021 11:41					
Hexavalent Chromium	ND	0.013	0.013	mg/L		ND					U
Matrix Spike (BJK0526-MS1)						Source: 21K0322-06 Prepared: 19-Nov-2021 Analyzed: 19-Nov-2021 11:42					
Hexavalent Chromium	0.062	0.013	0.013	mg/L	0.0626	ND	99.0	85-115			D

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
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Certified Analyses included in this Report

Analyte	Certifications
<i>EPA 6020B in Water</i>	
Silver-107	WADOE,WA-DW,DoD-ELAP,NELAP
Barium-135	NELAP,WADOE,DoD-ELAP,ADEC
Barium-137	NELAP,WADOE,DoD-ELAP,ADEC
Chromium-52	NELAP,WADOE,DoD-ELAP,ADEC
Chromium-53	NELAP,WADOE,DoD-ELAP,ADEC
Iron-54	NELAP,WADOE,DoD-ELAP
Iron-57	NELAP,WADOE,DoD-ELAP
Manganese-55	NELAP,WADOE,DoD-ELAP
Lead-208	NELAP,WADOE,DoD-ELAP,ADEC
Vanadium-51a	NELAP,DoD-ELAP,WADOE,ADEC
Vanadium-51b	NELAP,DoD-ELAP,WADOE,ADEC
Silver-107	WA-DW,DoD-ELAP,NELAP
Barium-135	NELAP,WADOE,DoD-ELAP,ADEC
Barium-137	NELAP,WADOE,DoD-ELAP,ADEC
Chromium-52	NELAP,WADOE,DoD-ELAP,ADEC
Chromium-53	NELAP,WADOE,DoD-ELAP,ADEC
Iron-54	NELAP,WADOE,DoD-ELAP
Iron-57	NELAP,WADOE,DoD-ELAP
Manganese-55	NELAP,WADOE,DoD-ELAP
Lead-208	NELAP,WADOE,DoD-ELAP,ADEC
Vanadium-51a	NELAP,DoD-ELAP,WADOE,ADEC
Vanadium-51b	NELAP,DoD-ELAP,WADOE,ADEC
<i>EPA 6020B UCT-KED in Water</i>	
Arsenic-75a	WADOE,WA-DW,DoD-ELAP,ADEC,NELAP
Cadmium-111	NELAP,WADOE,DoD-ELAP,ADEC
Cadmium-114	NELAP,WADOE,DoD-ELAP,ADEC
Cobalt-59	NELAP,DoD-ELAP,WADOE
Copper-63	NELAP,WADOE,DoD-ELAP
Copper-65	NELAP,WADOE,DoD-ELAP
Nickel-60	NELAP,WADOE,DoD-ELAP,ADEC
Nickel-62	NELAP,WADOE,DoD-ELAP,ADEC
Selenium-78	NELAP,WADOE,DoD-ELAP
Zinc-66	WADOE,WA-DW,DoD-ELAP
Zinc-67	WADOE,WA-DW,DoD-ELAP
Arsenic-75a	NELAP,WADOE,DoD-ELAP,ADEC


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Cadmium-111	NELAP,WADOE,DoD-ELAP,ADEC
Cadmium-114	NELAP,WADOE,DoD-ELAP,ADEC
Cobalt-59	DoD-ELAP,NELAP,WADOE
Copper-63	NELAP,WADOE,DoD-ELAP
Copper-65	NELAP,WADOE,DoD-ELAP
Nickel-60	NELAP,WADOE,DoD-ELAP,ADEC
Nickel-62	NELAP,WADOE,DoD-ELAP,ADEC
Selenium-78	NELAP,WADOE,DoD-ELAP
Zinc-66	NELAP,WADOE,DoD-ELAP
Zinc-67	NELAP,WADOE,DoD-ELAP

EPA 7470A in Water

Mercury	WADOE,NELAP,DoD-ELAP
Mercury	WADOE,NELAP,DoD-ELAP

EPA 8082A in Water

Aroclor 1016	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1016 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1221	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1221 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1232	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1232 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1242	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1242 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1248	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1248 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1254	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1254 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1260	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1260 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1262	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1262 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1268	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1268 [2C]	WADOE,DoD-ELAP,NELAP,ADEC

EPA 8260D in Water

Chloromethane	DoD-ELAP,ADEC,NELAP,WADOE
Vinyl Chloride	DoD-ELAP,ADEC,NELAP,WADOE
Bromomethane	DoD-ELAP,ADEC,NELAP,WADOE
Chloroethane	DoD-ELAP,ADEC,NELAP,WADOE
Trichlorofluoromethane	DoD-ELAP,ADEC,NELAP,WADOE


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Acrolein	DoD-ELAP,NELAP,WADOE
1,1,2-Trichloro-1,2,2-Trifluoroethane	DoD-ELAP,ADEC,NELAP,WADOE
Acetone	DoD-ELAP,ADEC,NELAP,WADOE
1,1-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Iodomethane	DoD-ELAP,NELAP,WADOE
Methylene Chloride	DoD-ELAP,ADEC,NELAP,WADOE
Acrylonitrile	DoD-ELAP,NELAP,WADOE
Carbon Disulfide	DoD-ELAP,NELAP,WADOE
trans-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Vinyl Acetate	DoD-ELAP,NELAP,WADOE
1,1-Dichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
2-Butanone	DoD-ELAP,NELAP,WADOE
2,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
cis-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Chloroform	DoD-ELAP,ADEC,NELAP,WADOE
Bromochloromethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1,1-Trichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
Carbon tetrachloride	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
Benzene	DoD-ELAP,ADEC,NELAP,WADOE
Trichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
Bromodichloromethane	DoD-ELAP,ADEC,NELAP,WADOE
Dibromomethane	DoD-ELAP,ADEC,NELAP,WADOE
2-Chloroethyl vinyl ether	DoD-ELAP,ADEC,NELAP,WADOE
4-Methyl-2-Pentanone	DoD-ELAP,NELAP,WADOE
cis-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
Toluene	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
2-Hexanone	DoD-ELAP,NELAP,WADOE
1,1,2-Trichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,3-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
Tetrachloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Dibromochloromethane	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dibromoethane	DoD-ELAP,NELAP,WADOE
Chlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Ethylbenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,1,1,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,WADOE


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m,p-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
o-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
Styrene	DoD-ELAP,NELAP,WADOE
Bromoform	DoD-ELAP,NELAP,WADOE
1,1,2,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,2,3-Trichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,4-Dichloro 2-Butene	DoD-ELAP,ADEC,NELAP,WADOE
n-Propylbenzene	DoD-ELAP,NELAP,WADOE
Bromobenzene	DoD-ELAP,NELAP,WADOE
Isopropyl Benzene	DoD-ELAP,NELAP,WADOE
2-Chlorotoluene	DoD-ELAP,ADEC,NELAP,WADOE
4-Chlorotoluene	DoD-ELAP,ADEC,NELAP,WADOE
t-Butylbenzene	DoD-ELAP,NELAP,WADOE
1,3,5-Trimethylbenzene	DoD-ELAP,NELAP,WADOE
1,2,4-Trimethylbenzene	DoD-ELAP,NELAP,WADOE
s-Butylbenzene	DoD-ELAP,NELAP,WADOE
4-Isopropyl Toluene	DoD-ELAP,NELAP,WADOE
1,3-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,4-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
n-Butylbenzene	DoD-ELAP,NELAP,WADOE
1,2-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dibromo-3-chloropropane	DoD-ELAP,ADEC,NELAP,WADOE
1,2,4-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Hexachloro-1,3-Butadiene	DoD-ELAP,ADEC,NELAP,WADOE
Naphthalene	DoD-ELAP,ADEC,NELAP,WADOE
1,2,3-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Dichlorodifluoromethane	DoD-ELAP,ADEC,NELAP,WADOE
Methyl tert-butyl Ether	DoD-ELAP,ADEC,NELAP,WADOE
n-Hexane	WADOE
2-Pentanone	WADOE

EPA 8260D-SIM in Water

Acrylonitrile	NELAP,WADOE
Vinyl chloride	NELAP,WADOE
1,1-Dichloroethene	NELAP,WADOE
cis-1,2-Dichloroethene	NELAP,WADOE
trans-1,2-Dichloroethene	NELAP,WADOE
Trichloroethene	NELAP,WADOE
Tetrachloroethene	NELAP,WADOE
1,1,2,2-Tetrachloroethane	NELAP,WADOE


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1,2-Dichloroethane

NELAP,WADOE

Benzene

NELAP,WADOE

EPA 8270E in Water

Phenol

NELAP,DoD-ELAP

bis(2-chloroethyl) ether

NELAP,DoD-ELAP

2-Chlorophenol

NELAP,DoD-ELAP

1,3-Dichlorobenzene

NELAP,DoD-ELAP

1,4-Dichlorobenzene

NELAP,DoD-ELAP

1,2-Dichlorobenzene

NELAP,DoD-ELAP

Benzyl Alcohol

NELAP,DoD-ELAP

2,2'-Oxybis(1-chloropropane)

NELAP,DoD-ELAP

2-Methylphenol

NELAP,DoD-ELAP

Hexachloroethane

NELAP,DoD-ELAP

N-Nitroso-di-n-Propylamine

NELAP,DoD-ELAP

4-Methylphenol

NELAP,DoD-ELAP

Nitrobenzene

NELAP,DoD-ELAP

Isophorone

NELAP,DoD-ELAP

2-Nitrophenol

NELAP,DoD-ELAP

2,4-Dimethylphenol

NELAP,DoD-ELAP

Bis(2-Chloroethoxy)methane

NELAP,DoD-ELAP

2,4-Dichlorophenol

NELAP,DoD-ELAP

1,2,4-Trichlorobenzene

NELAP,DoD-ELAP

Naphthalene

NELAP,DoD-ELAP

Benzoic acid

NELAP,DoD-ELAP

4-Chloroaniline

NELAP,DoD-ELAP

Hexachlorobutadiene

NELAP,DoD-ELAP

4-Chloro-3-Methylphenol

NELAP,DoD-ELAP

2-Methylnaphthalene

NELAP,DoD-ELAP

Hexachlorocyclopentadiene

NELAP,DoD-ELAP

2,4,6-Trichlorophenol

NELAP,DoD-ELAP

2,4,5-Trichlorophenol

NELAP,DoD-ELAP

2-Chloronaphthalene

NELAP,DoD-ELAP

2-Nitroaniline

NELAP,DoD-ELAP

Acenaphthylene

NELAP,DoD-ELAP

Dimethylphthalate

NELAP,DoD-ELAP

2,6-Dinitrotoluene

NELAP,DoD-ELAP

Acenaphthene

NELAP,DoD-ELAP

3-Nitroaniline

NELAP,DoD-ELAP

2,4-Dinitrophenol

NELAP,DoD-ELAP


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Dibenzofuran	NELAP,DoD-ELAP
4-Nitrophenol	NELAP,DoD-ELAP
2,4-Dinitrotoluene	NELAP,DoD-ELAP
Fluorene	NELAP,DoD-ELAP
4-Chlorophenylphenyl ether	NELAP,DoD-ELAP
Diethyl phthalate	NELAP,DoD-ELAP
4-Nitroaniline	NELAP,DoD-ELAP
4,6-Dinitro-2-methylphenol	NELAP,DoD-ELAP
N-Nitrosodiphenylamine	NELAP,DoD-ELAP
4-Bromophenyl phenyl ether	NELAP,DoD-ELAP
Hexachlorobenzene	NELAP,DoD-ELAP
Pentachlorophenol	NELAP,DoD-ELAP
Phenanthrene	NELAP,DoD-ELAP
Anthracene	NELAP,DoD-ELAP
Carbazole	NELAP,DoD-ELAP
Di-n-Butylphthalate	NELAP,DoD-ELAP
Fluoranthene	NELAP,DoD-ELAP
Pyrene	NELAP,DoD-ELAP
Butylbenzylphthalate	NELAP,DoD-ELAP
Benzo(a)anthracene	NELAP,DoD-ELAP
3,3'-Dichlorobenzidine	NELAP,DoD-ELAP
Chrysene	NELAP,DoD-ELAP
bis(2-Ethylhexyl)phthalate	NELAP,DoD-ELAP
Di-n-Octylphthalate	NELAP,DoD-ELAP
Benzo(b)fluoranthene	NELAP,DoD-ELAP
Benzo(k)fluoranthene	NELAP,DoD-ELAP
Benzo(a)fluoranthene, Total	NELAP
Benzo(a)pyrene	NELAP,DoD-ELAP
Indeno(1,2,3-cd)pyrene	NELAP,DoD-ELAP
Dibenzo(a,h)anthracene	NELAP,DoD-ELAP
Benzo(g,h,i)perylene	NELAP,DoD-ELAP
N-Nitrosodimethylamine	NELAP,DoD-ELAP
1-Methylnaphthalene	NELAP,DoD-ELAP

EPA 8270E-SIM in Water

Naphthalene	ADEC,DoD-ELAP,NELAP,WADOE
2-Methylnaphthalene	ADEC,DoD-ELAP,NELAP
1-Methylnaphthalene	ADEC,DoD-ELAP,NELAP,WADOE
Biphenyl	NELAP
Acenaphthylene	ADEC,DoD-ELAP,NELAP,WADOE


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Acenaphthene	ADEC, DoD-ELAP, NELAP, WADOE
Dibenzofuran	ADEC, DoD-ELAP, NELAP
Fluorene	ADEC, DoD-ELAP, NELAP, WADOE
Phenanthrene	ADEC, DoD-ELAP, NELAP, WADOE
Anthracene	ADEC, DoD-ELAP, NELAP, WADOE
Carbazole	NELAP
Fluoranthene	ADEC, DoD-ELAP, NELAP, WADOE
Pyrene	ADEC, DoD-ELAP, NELAP, WADOE
Benzo(a)anthracene	ADEC, DoD-ELAP, NELAP, WADOE
Chrysene	ADEC, DoD-ELAP, NELAP, WADOE
Benzo(b)fluoranthene	ADEC, DoD-ELAP, NELAP, WADOE
Benzo(k)fluoranthene	ADEC, DoD-ELAP, NELAP, WADOE
Benzo(j)fluoranthene	ADEC, DoD-ELAP, NELAP, WADOE
Benzo(e)pyrene	NELAP
Benzo(a)pyrene	ADEC, DoD-ELAP, NELAP, WADOE
Perylene	ADEC, NELAP
Indeno(1,2,3-cd)pyrene	ADEC, DoD-ELAP, NELAP, WADOE
Dibenzo(a,h)anthracene	ADEC, DoD-ELAP, NELAP, WADOE
Benzo(g,h,i)perylene	ADEC, DoD-ELAP, NELAP, WADOE

NWTPH-Dx in Water

Diesel Range Organics (C12-C24)	DoD-ELAP, NELAP, WADOE
Diesel Range Organics (C10-C25)	DoD-ELAP, NELAP, WADOE
Diesel Range Organics (Tol-C18)	DoD-ELAP, NELAP, WADOE
Diesel Range Organics (C10-C24)	DoD-ELAP, NELAP, WADOE
Diesel Range Organics (C10-C28)	DoD-ELAP, NELAP, WADOE
Diesel Range Organics (C12-C22)	DoD-ELAP
Diesel Range Organics (C12-C25)	DoD-ELAP
Motor Oil Range Organics (C24-C38)	DoD-ELAP, NELAP, WADOE
Motor Oil Range Organics (C25-C36)	DoD-ELAP, NELAP, WADOE
Motor Oil Range Organics (C24-C40)	DoD-ELAP, NELAP, WADOE
Residual Range Organics (C23-C32)	DoD-ELAP
Mineral Spirits Range Organics (Tol-C12)	DoD-ELAP, NELAP, WADOE
Mineral Oil Range Organics (C16-C28)	DoD-ELAP, NELAP, WADOE
Kerosene Range Organics (Tol-C18)	DoD-ELAP, NELAP, WADOE
JP8 Range Organics (C8-C18)	DoD-ELAP, NELAP, WADOE
JP5 Range Organics (C10-C16)	DoD-ELAP, NELAP, WADOE
JP4 Range Organics (Tol-C14)	DoD-ELAP, NELAP, WADOE
Jet-A Range Organics (C10-C18)	DoD-ELAP, NELAP, WADOE
Creosote Range Organics (C12-C22)	DoD-ELAP, NELAP, WADOE


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Bunker C Range Organics (C10-C38)

DoD-ELAP,NELAP,WADOE

Stoddard Range Organics (C8-C12)

DoD-ELAP,NELAP,WADOE

Transformer Oil Range Organics (C12-C28)

DoD-ELAP,NELAP,WADOE

SM 3500-Cr B-09 in Water

Hexavalent Chromium

WADOE,NELAP

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	17-015	03/28/2023
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	02/28/2022
NELAP	ORELAP - Oregon Laboratory Accreditation Program	WA100006-012	05/12/2022
WADOE	WA Dept of Ecology	C558	06/30/2022
WA-DW	Ecology - Drinking Water	C558	06/30/2022


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Notes and Definitions

*	Flagged value is not within established control limits.
B	This analyte was detected in the method blank.
D	The reported value is from a dilution
D1	Surrogate was not detected due to sample extract dilution
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL)
HC	The natural concentration of the spiked analyte is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
J	Estimated concentration value detected below the reporting limit.
M	Estimated value for a GC/MS analyte detected and confirmed by an analyst but with low spectral match parameters.
P1	The reported value is greater than 40% difference between the concentrations determined on two GC columns where applicable.
Q	Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20% RSD, <20% drift or minimum RRF)
U	This analyte is not detected above the reporting limit (RL) or if noted, not detected above the limit of detection (LOD).
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
[2C]	Indicates this result was quantified on the second column on a dual column analysis.



Analytical Resources, LLC
Analytical Chemists and Consultants

17 December 2021

Meg Strong
Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle, WA 98103-8636

RE: Lower Duwamish Q4

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)
21K0343

Associated SDG ID(s)
N/A

Digitally signed by Shelly
Shelly Fishel Fishel
Date: 2021.12.17 18:41:23
-08'00'

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, LLC

Shelly Fishel, Project Manager

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



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www.arilabs.com

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, notwithstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

RE: Sample Receipt 21K0343

Shoshana Howard <Shoshana.Howard@shanwil.com>

Mon 11/22/2021 7:09 PM

To: Shelly Fishel <shelly.fishel@arilabs.com>; Meg Strong <Meg.Strong@shanwil.com>

Hi Shelly,

In addition to the response to your specific questions below, the log in looks good. One thing though, they marked hardness for MW-23 and MW-47, but that was not part of our sampling schedule (perhaps they marked hardness instead of the ones they missed??). Can you remove hardness for those two (unless it's too late)?

Thanks!

Shoshana Howard, PE

SENIOR ENGINEER

SHANNON & WILSON

400 N 34th Street, Suite 100

Seattle, WA 98103

shannonwilson.com

Phone: **(206) 632-8020**Direct: **(206) 695-6811**Mobile: **(206) 900-2720**Shoshana.Howard@shanwil.com***Please note, my email address has been updated. You can still reach me at the old address.***

From: Shoshana Howard**Sent:** Monday, November 22, 2021 6:45 PM**To:** Shelly Fishel <shelly.fishel@arilabs.com>; Meg Strong <Meg.Strong@shanwil.com>**Subject:** RE: Sample Receipt 21K0343

Hi Shelly,

The MW-23 sample should be analyzed for attenuation parameters. The MW-47 sample should be analyzed for hex chrome and PCBs.

Thanks for logging those short hold times in and getting them going!

-Shoshana

Shoshana Howard, PE

SENIOR ENGINEER

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Shoshana.Howard@shanwil.com

Please note, my email address has been updated. You can still reach me at the old address.

From: Shelly Fishel <shelly.fishel@arilabs.com>

Sent: Monday, November 22, 2021 11:34 AM

To: Shoshana Howard <Shoshana.Howard@shanwil.com>; Meg Strong <Meg.Strong@shanwil.com>

Subject: Sample Receipt 21K0343

Importance: High

Hello Shoshana and Meg,

ARI received samples Friday 11/19 for analysis. The samples were intact and within temperature compliance. We received extra bottles which were labeled for NAP parameters for samole 21K0343-01 MW-23-20211911 and an extra bottle for Cr+6 for sample 21K0343-08 MW-47-20211911. As these are short hold parameters we went ahead and logged and analyzed the short holds. Additionally, for sample -08 we received PCB containers this has not been logged. Please let me know if this was an error on the COC or sample collection.

Please advise.

Be safe and stay healthy!

Regards,

Shelly L Fishel, Project Manager

She/Her/Hers

Analytical Resources, LLC

Analytical Chemists and Consultants

4611 South 134th Place, Suite 100

Tukwila, WA 98168

(206) 695-6210 office

Email: shelly.fishel@arilabs.com

I will be out the afternoon of November 11th.

The lab will be closed Thursday November 25th in observation of Thanksgiving. We will be closing early on Wednesday and will have a skeleton staff on Friday. We will not be accepting:



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 18:02

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-23-20211911	21K0343-01	Water	19-Nov-2021 09:26	19-Nov-2021 14:48
MW-23-20211911	21K0343-02	Water	19-Nov-2021 09:26	19-Nov-2021 14:48
MW-15-20211911	21K0343-03	Water	19-Nov-2021 10:42	19-Nov-2021 14:48
MW-15-20211911	21K0343-04	Water	19-Nov-2021 10:42	19-Nov-2021 14:48
TB-8-202111911	21K0343-05	Water	19-Nov-2021 11:27	19-Nov-2021 14:48
MW-7-20211911	21K0343-06	Water	19-Nov-2021 11:57	19-Nov-2021 14:48
MW-7-20211911	21K0343-07	Water	19-Nov-2021 11:57	19-Nov-2021 14:48
MW-47-20211911	21K0343-08	Water	19-Nov-2021 13:45	19-Nov-2021 14:48
MW-47-20211911	21K0343-09	Water	19-Nov-2021 13:47	19-Nov-2021 14:48



Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 18:02

Work Order Case Narrative

Client: Shannon & Wilson, Inc
Project: Lower Duwamish Q4
Work Order: 21K0343

Sample receipt

Samples as listed on the preceding page were received 19-Nov-2021 14:48 under ARI work order 21K0343. For details regarding sample receipt, please refer to the Cooler Receipt Form.

PCB Aroclors - EPA Method SW8082A

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Gasoline by NWTPH-q (GC/MS)

The sample(s) were analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within control limits.

Volatiles - EPA Method SW8260D

The sample(s) were analyzed within the recommended holding times.



Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 18:02

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within control limits.

The matrix spike/matrix spike duplicate (MS/MSD) spike recoveries and relative percent difference (RPD) were within advisory control limits.

Volatiles - EPA Method 8260D-SIM (Selected Ion Monitoring)

The sample(s) were analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within control limits.

Semivolatiles - EPA Method SW8270E

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements except as follows. 4-Chlorophenylphenyl ether, Fluorene, Hexachlorocyclopentadiene and Pentachlorophenol which were out of control low and 2-Nitrophenol, Butylbenzylphthalate, Fluoranthene, Pyrene and surrogate p-Terphenyl-d14 which were out of control high in the initial calibration verification SJL0050-ICV1. All samples which contain analyte have been flagged with a "Q" qualifier. Hexachlorocyclopentadiene and Pentachlorophenol which were out of control low and Fluoranthene and Pyrene which were out of control high in the continuing calibration verification SJL0050-CCV1. 2,4-Dinitro-2-methylphenol, 2,4-Dinitrophenol, Benzo(g,h,i)perylene, Benzoic Acid, Hexachlorocyclopentadiene and Pentachlorophenol which were out of control low in the low concentration calibration verification SJL0050-LCV1. 4,6-Dinitro-2-methylphenol, Hexachlorocyclopentadiene, Benzoic Acid, Pentachlorophenol and internal standard Chrysene-d12 which were out of control low in the low concentration calibration verification SJL0050-LCV2.


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 17-Dec-2021 18:02

Internal standard areas were within limits except Chrysene which was out of control low in the low concentration calibration verification SJL0050-LCV2 and in the method blank BJK0625-BLK1.

The surrogate percent recoveries were within control limits except Phenol-d5 which was out of control low in the method blank BJK0625-BLK1 and has been flagged.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within control limits except Chloroaniline and 4-Nitrophenol which were out of control low and have been flagged.

Total and Dissolved Metals - EPA Method 6020B

The sample(s) were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Sample specific QC was performed in association with sample 21K0343-02 in batch BJK0584. The duplicate (DUP) relative percent difference (RPD) were within advisory control limits. The matrix spike/matrix spike duplicate (MS/MSD) spike recoveries and relative percent difference (RPD) were within advisory control limits.

Wet Chemistry

The sample(s) were prepared and analyzed within the recommended holding times except Sulfite. The Sulfite holding time was exceeded upon sample receipt.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Sample specific QC was performed in association with sample 21K0343-01 in Sulfite batch BJK0556, Hexavalent Chromium batch BJK0550 and Ferrous Iron batch BJK0551 and in association with sample 21K0343-03 in Anions batch BJK0548. The matrix spike (MS) percent recoveries and the duplicate (DUP) relative percent difference (RPD) were within advisory control limits.

Total and Dissolved Mercury - EPA Method 7470/7471

The sample(s) were digested and analyzed within the recommended holding times.



Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 18:02

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Diesel/Heavy Oil Range Organics - WA-Ecology Method NW-TPHDx

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within control limits.

Sample specific QC was performed in association with sample 21K0343-1 in batch BJK0583. The matrix spike (MS) percent recoveries and the duplicate (DUP) relative percent difference (RPD) were within advisory control limits.

Volatile Gases - MEE by RSK175

The sample(s) were analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within control limits.



Printed: 11/19/2021 05:29:47PM

WORK ORDER

21K0343

Samples will be discarded 90 days after submission of a final report unless other instructions are received.

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish Q4

Project Number: 21-1-12596-012

Preservation Confirmation

Container ID	Container Type	pH
21K0343-01 A	Glass NM, Amber, 1000 mL	
21K0343-01 B	Glass NM, Amber, 1000 mL	
21K0343-01 C	HDPE NM, 500 mL, 1:1 HNO3	22 Pass (P)
21K0343-01 D	HDPE NM, 500 mL, 1:1 HNO3	22 P
21K0343-01 E	Small OJ, 500 mL, EDTA	
21K0343-01 F	HDPE NM, 500 mL	
21K0343-01 G	HDPE NM, 500 mL	
21K0343-01 H	Glass NM, Amber, 500 mL, HCl	
21K0343-01 I	Glass NM, Amber, 500 mL	lab to determine preservation
21K0343-01 J	Glass NM, Amber, 500 mL	
21K0343-01 K	Glass NM, Amber, 250 mL	
21K0343-01 K 01	Glass NM, Amber, 250 mL	
21K0343-01 L	VOA Vial, Clear, 40 mL, HCL	
21K0343-01 M	VOA Vial, Clear, 40 mL, HCL	
21K0343-01 N	VOA Vial, Clear, 40 mL, HCL	
21K0343-01 O	VOA Vial, Clear, 40 mL, HCL	
21K0343-01 P	VOA Vial, Clear, 40 mL, HCL	
21K0343-01 Q	VOA Vial, Clear, 40 mL, HCL	
21K0343-01 R	VOA Vial, Clear, 40 mL, HCL	Bubble
21K0343-02 A	HDPE NM, 500 mL	22 Fail (F)
21K0343-03 A	HDPE NM, 500 mL, 1:1 HNO3	22 P
21K0343-03 B	Small OJ, 500 mL, EDTA	
21K0343-03 C	HDPE NM, 500 mL	
21K0343-03 D	HDPE NM, 500 mL	
21K0343-03 E	Glass NM, Amber, 500 mL, HCl	
21K0343-03 F	Glass NM, Amber, 500 mL	lab to determine preservation
21K0343-03 G	Glass NM, Amber, 500 mL	
21K0343-03 H	VOA Vial, Clear, 40 mL, HCL	
21K0343-03 I	VOA Vial, Clear, 40 mL, HCL	
21K0343-03 J	VOA Vial, Clear, 40 mL, HCL	
21K0343-03 K	VOA Vial, Clear, 40 mL, HCL	
21K0343-03 L	VOA Vial, Clear, 40 mL, HCL	
21K0343-03 M	VOA Vial, Clear, 40 mL, HCL	
21K0343-03 N	VOA Vial, Clear, 40 mL, HCL	

Reviewed By

Date



WORK ORDER

21K0343

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Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish Q4

Project Number: 21-1-12596-012

21K0343-03 O	VOA Vial, Clear, 40 mL, HCL	
21K0343-03 P	VOA Vial, Clear, 40 mL, HCL	
21K0343-04 A	HDPE NM, 500 mL	>2 Fail
21K0343-04 B	HDPE NM, 500 mL	>2 Fail
21K0343-05 A	VOA Vial, Clear, 40 mL, HCL	
21K0343-05 B	VOA Vial, Clear, 40 mL, HCL	Bubble
21K0343-05 C	VOA Vial, Clear, 40 mL, HCL	Bubble
21K0343-05 D	VOA Vial, Clear, 40 mL, HCL	Bubble
21K0343-05 E	VOA Vial, Clear, 40 mL, HCL	Bubble
21K0343-06 A	HDPE NM, 500 mL, 1:1 HNO3	<2 P
21K0343-06 B	Glass NM, Amber, 250 mL	
21K0343-06 B 01	Glass NM, Amber, 250 mL	
21K0343-07 A	HDPE NM, 500 mL	>2 F
21K0343-08 A	Glass NM, Amber, 1000 mL	
21K0343-08 B	Glass NM, Amber, 1000 mL	
21K0343-08 C	HDPE NM, 500 mL, 1:1 HNO3	<2 P
21K0343-08 D	Glass NM, Amber, 500 mL	
21K0343-08 E	Glass NM, Amber, 500 mL	
21K0343-08 F	Glass NM, Amber, 250 mL	
21K0343-08 F 01	Glass NM, Amber, 250 mL	
21K0343-08 G	VOA Vial, Clear, 40 mL, HCL	
21K0343-08 H	VOA Vial, Clear, 40 mL, HCL	
21K0343-08 I	VOA Vial, Clear, 40 mL, HCL	
21K0343-08 J	VOA Vial, Clear, 40 mL, HCL	
21K0343-08 K	VOA Vial, Clear, 40 mL, HCL	
21K0343-09 A	HDPE NM, 500 mL	>2 F

DL
Preservation Confirmed By

11/19/21
Date

Reviewed By

Date



Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: S & W

Project Name: LDW

COC No(s): _____ NA

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Assigned ARI Job No: 21100349

Tracking No: _____ NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of the cooler? _____

YES NO

Were custody papers included with the cooler? _____

YES NO

Were custody papers properly filled out (ink, signed, etc.) _____

YES NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)

Time 1448

4.2 2.9

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: DOO 7565

Cooler Accepted by: DL Date: 11/19/21 Time: 1448

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler? _____

DL 11/19/21
YES NO

What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: _____

Was sufficient ice used (if appropriate)? _____

NA YES NO

How were bottles sealed in plastic bags? _____

Individually Grouped Not

Did all bottles arrive in good condition (unbroken)? _____

YES NO

Were all bottle labels complete and legible? _____

YES NO

Did the number of containers listed on COC match with the number of containers received? _____

YES NO

Did all bottle labels and tags agree with custody papers? _____

YES NO

Were all bottles used correct for the requested analyses? _____

YES NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs) ...

YES NO

Were all VOC vials free of air bubbles? _____

NA YES NO

Was sufficient amount of sample sent in each bottle? _____

NA YES NO

Date VOC Trip Blank was made at ARI _____

YES NO

Were the sample(s) split by ARI? NA YES

Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: DL Date: 11/19/21 Time: 1556 Labels checked by: _____

**** Notify Project Manager of discrepancies or concerns ****

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: _____ Date: _____



Analytical Resources, LLC
Analytical Chemists and Consultants

Printed: 11/19/2021 05:29:47PM

WORK ORDER

21K0343

Samples will be discarded 90 days after submission of a final report unless other instructions are received.

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish Q4

Project Number: 21-1-12596-012

Preservation Confirmation

Container ID	Container Type	pH
21K0343-01 A	Glass NM, Amber, 1000 mL	
21K0343-01 B	Glass NM, Amber, 1000 mL	
21K0343-01 C	HDPE NM, 500 mL, 1:1 HNO ₃	22 Pass (P)
21K0343-01 D	HDPE NM, 500 mL, 1:1 HNO ₃	22 P
21K0343-01 E	Small OJ, 500 mL, EDTA	
21K0343-01 F	HDPE NM, 500 mL	
21K0343-01 G	HDPE NM, 500 mL	
21K0343-01 H	Glass NM, Amber, 500 mL, HCl	lab to determine preservation
21K0343-01 I	Glass NM, Amber, 500 mL	
21K0343-01 J	Glass NM, Amber, 500 mL	
21K0343-01 K	Glass NM, Amber, 250 mL	
21K0343-01 K 01	Glass NM, Amber, 250 mL	
21K0343-01 L	VOA Vial, Clear, 40 mL, HCL	
21K0343-01 M	VOA Vial, Clear, 40 mL, HCL	
21K0343-01 N	VOA Vial, Clear, 40 mL, HCL	
21K0343-01 O	VOA Vial, Clear, 40 mL, HCL	
21K0343-01 P	VOA Vial, Clear, 40 mL, HCL	
21K0343-01 Q	VOA Vial, Clear, 40 mL, HCL	
21K0343-01 R	VOA Vial, Clear, 40 mL, HCL	Bubble
21K0343-02 A	HDPE NM, 500 mL	22 Fail (F)
21K0343-03 A	HDPE NM, 500 mL, 1:1 HNO ₃	22 P
21K0343-03 B	Small OJ, 500 mL, EDTA	
21K0343-03 C	HDPE NM, 500 mL	
21K0343-03 D	HDPE NM, 500 mL	
21K0343-03 E	Glass NM, Amber, 500 mL, HCl	lab to determine preservation
21K0343-03 F	Glass NM, Amber, 500 mL	
21K0343-03 G	Glass NM, Amber, 500 mL	
21K0343-03 H	VOA Vial, Clear, 40 mL, HCL	
21K0343-03 I	VOA Vial, Clear, 40 mL, HCL	
21K0343-03 J	VOA Vial, Clear, 40 mL, HCL	
21K0343-03 K	VOA Vial, Clear, 40 mL, HCL	
21K0343-03 L	VOA Vial, Clear, 40 mL, HCL	
21K0343-03 M	VOA Vial, Clear, 40 mL, HCL	
21K0343-03 N	VOA Vial, Clear, 40 mL, HCL	

Reviewed By

Date



Analytical Resources, LLC
Analytical Chemists and Consultants

Printed: 11/19/2021 05:29:47PM

WORK ORDER

21K0343

Samples will be discarded 90 days after submission of a final report unless other instructions are received.

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish Q4

Project Number: 21-1-12596-012

21K0343-03 O	VOA Vial, Clear, 40 mL, HCL		
21K0343-03 P	VOA Vial, Clear, 40 mL, HCL		
21K0343-04 A	HDPE NM, 500 mL	52 Fail	①
21K0343-04 B	HDPE NM, 500 mL	22 Fail	
21K0343-05 A	VOA Vial, Clear, 40 mL, HCL		
21K0343-05 B	VOA Vial, Clear, 40 mL, HCL	Bubble	
21K0343-05 C	VOA Vial, Clear, 40 mL, HCL	Bubble	
21K0343-05 D	VOA Vial, Clear, 40 mL, HCL	Bubble	
21K0343-05 E	VOA Vial, Clear, 40 mL, HCL	Bubble	
21K0343-06 A	HDPE NM, 500 mL, 1:1 HNO ₃	22 P	
21K0343-06 B	Glass NM, Amber, 250 mL		
21K0343-06 B 01	Glass NM, Amber, 250 mL		
21K0343-07 A	HDPE NM, 500 mL	52 F	①
21K0343-08 A	Glass NM, Amber, 1000 mL		
21K0343-08 B	Glass NM, Amber, 1000 mL		
21K0343-08 C	HDPE NM, 500 mL, 1:1 HNO ₃	22 P	
21K0343-08 D	Glass NM, Amber, 500 mL		
21K0343-08 E	Glass NM, Amber, 500 mL		
21K0343-08 F	Glass NM, Amber, 250 mL		
21K0343-08 F 01	Glass NM, Amber, 250 mL		
21K0343-08 G	VOA Vial, Clear, 40 mL, HCL		
21K0343-08 H	VOA Vial, Clear, 40 mL, HCL		
21K0343-08 I	VOA Vial, Clear, 40 mL, HCL		
21K0343-08 J	VOA Vial, Clear, 40 mL, HCL		
21K0343-08 K	VOA Vial, Clear, 40 mL, HCL		
21K0343-09 A	HDPE NM, 500 mL	52 F	①

DL
Preservation Confirmed By

11/19/21
Date

① Filtered at 0.45 microns
Preserved to pH < 2
with 0.75 mL conc. HNO₃
(510414) mm 11/14/21

Reviewed By

Date



Analytical Resources, LLC
Analytical Chemists and Consultants

Printed: 11/19/2021 05:29:47PM

WORK ORDER

21K0343

Samples will be discarded 90 days after submission of a final report unless other instructions are received.

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish Q4

Project Number: 21-1-12596-012

Preservation Confirmation

Container ID	Container Type	pH
21K0343-01 A	Glass NM, Amber, 1000 mL	
21K0343-01 B	Glass NM, Amber, 1000 mL	
21K0343-01 C	HDPE NM, 500 mL, 1:1 HNO ₃	22 Pass (P)
21K0343-01 D	HDPE NM, 500 mL, 1:1 HNO ₃	22 P
21K0343-01 E	Small OJ, 500 mL, EDTA	
21K0343-01 F	HDPE NM, 500 mL	
21K0343-01 G	HDPE NM, 500 mL	
21K0343-01 H	Glass NM, Amber, 500 mL, HCl	① lab to determine preservation
21K0343-01 I	Glass NM, Amber, 500 mL	
21K0343-01 J	Glass NM, Amber, 500 mL	
21K0343-01 K	Glass NM, Amber, 250 mL	
21K0343-01 K 01	Glass NM, Amber, 250 mL	
21K0343-01 L	VOA Vial, Clear, 40 mL, HCL	
21K0343-01 M	VOA Vial, Clear, 40 mL, HCL	
21K0343-01 N	VOA Vial, Clear, 40 mL, HCL	
21K0343-01 O	VOA Vial, Clear, 40 mL, HCL	
21K0343-01 P	VOA Vial, Clear, 40 mL, HCL	
21K0343-01 Q	VOA Vial, Clear, 40 mL, HCL	
21K0343-01 R	VOA Vial, Clear, 40 mL, HCL	
21K0343-02 A	HDPE NM, 500 mL	Bubble
21K0343-03 A	HDPE NM, 500 mL, 1:1 HNO ₃	22 Fail (F)
21K0343-03 B	Small OJ, 500 mL, EDTA	22 P
21K0343-03 C	HDPE NM, 500 mL	
21K0343-03 D	HDPE NM, 500 mL	
21K0343-03 E	Glass NM, Amber, 500 mL, HCl	
21K0343-03 F	Glass NM, Amber, 500 mL	① lab to determine Preservation
21K0343-03 G	Glass NM, Amber, 500 mL	
21K0343-03 H	VOA Vial, Clear, 40 mL, HCL	
21K0343-03 I	VOA Vial, Clear, 40 mL, HCL	
21K0343-03 J	VOA Vial, Clear, 40 mL, HCL	
21K0343-03 K	VOA Vial, Clear, 40 mL, HCL	
21K0343-03 L	VOA Vial, Clear, 40 mL, HCL	
21K0343-03 M	VOA Vial, Clear, 40 mL, HCL	
21K0343-03 N	VOA Vial, Clear, 40 mL, HCL	

Reviewed By

Date



Analytical Resources, LLC
Analytical Chemists and Consultants

Printed: 11/19/2021 05:29:47PM

WORK ORDER

21K0343

Samples will be discarded 90 days after submission of a final report unless other instructions are received.

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish Q4

Project Number: 21-1-12596-012

21K0343-03 O	VOA Vial, Clear, 40 mL, HCL	
21K0343-03 P	VOA Vial, Clear, 40 mL, HCL	
21K0343-04 A	HDPE NM, 500 mL	22 Fail
21K0343-04 B	HDPE NM, 500 mL	22 Fail
21K0343-05 A	VOA Vial, Clear, 40 mL, HCL	
21K0343-05 B	VOA Vial, Clear, 40 mL, HCL	Bubble
21K0343-05 C	VOA Vial, Clear, 40 mL, HCL	Bubble
21K0343-05 D	VOA Vial, Clear, 40 mL, HCL	Bubble
21K0343-05 E	VOA Vial, Clear, 40 mL, HCL	Bubble
21K0343-06 A	HDPE NM, 500 mL, 1:1 HNO3	22 P
21K0343-06 B	Glass NM, Amber, 250 mL	
21K0343-06 B 01	Glass NM, Amber, 250 mL	
21K0343-07 A	HDPE NM, 500 mL	22 F
21K0343-08 A	Glass NM, Amber, 1000 mL	
21K0343-08 B	Glass NM, Amber, 1000 mL	
21K0343-08 C	HDPE NM, 500 mL, 1:1 HNO3	22 P
21K0343-08 D	Glass NM, Amber, 500 mL	
21K0343-08 E	Glass NM, Amber, 500 mL	
21K0343-08 F	Glass NM, Amber, 250 mL	
21K0343-08 F 01	Glass NM, Amber, 250 mL	
21K0343-08 G	VOA Vial, Clear, 40 mL, HCL	
21K0343-08 H	VOA Vial, Clear, 40 mL, HCL	
21K0343-08 I	VOA Vial, Clear, 40 mL, HCL	
21K0343-08 J	VOA Vial, Clear, 40 mL, HCL	
21K0343-08 K	VOA Vial, Clear, 40 mL, HCL	
21K0343-09 A	HDPE NM, 500 mL	22 F

DL
Preservation Confirmed By

11/19/21
Date

① pH < 2, significant headspace
CHI 11/19/21 19:05

Reviewed By

Date



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 18:02

MW-23-20211911

21K0343-01 (Water)

Volatile Organic Compounds

Method: EPA 8260D

Sampled: 11/19/2021 09:26

Instrument: NT3 Analyst: LH

Analyzed: 11/26/2021 14:47

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0343-01 M

Preparation Batch: BJK0684

Sample Size: 10 mL

Prepared: 11/26/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	0.71	ug/L	
Trichloroethene	79-01-6	1	0.07	0.20	0.64	ug/L	
Tetrachloroethene	127-18-4	1	0.09	0.20	2.67	ug/L	
Surrogate: 1,2-Dichloroethane-d4				80-129 %	98.6	%	
Surrogate: Toluene-d8				80-120 %	99.5	%	
Surrogate: 4-Bromofluorobenzene				80-120 %	96.5	%	
Surrogate: 1,2-Dichlorobenzene-d4				80-120 %	99.1	%	



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 18:02

MW-23-20211911

21K0343-01 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260D-SIM

Sampled: 11/19/2021 09:26

Instrument: NT7 Analyst: PB

Analyzed: 11/29/2021 19:10

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0343-01 N

Preparation Batch: BJK0712

Sample Size: 10 mL

Prepared: 11/29/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	5.01	20.0	ND	ng/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				80-129 %	101	%	
<i>Surrogate: Toluene-d8</i>				80-120 %	98.2	%	



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 18:02

MW-23-20211911

21K0343-01 (Water)

Dissolved Gases

Method: EPA RSK-175

Sampled: 11/19/2021 09:26

Instrument: FID6 Analyst: LH

Analyzed: 11/22/2021 11:26

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0343-01 P

Preparation Batch: BJK0560

Sample Size: 10 mL

Prepared: 11/22/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Methane	74-82-8	1	0.65	55.7	ug/L	
Ethane	74-84-0	1	1.23	ND	ug/L	U
Ethene	74-85-1	1	1.14	ND	ug/L	U
Acetylene	74-86-2	1	1.06	ND	ug/L	U
<i>Surrogate: Propane</i>			72-122 %	86.2	%	



Analytical Resources, LLC
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Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 18:02

MW-23-20211911

21K0343-01 (Water)

Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 11/19/2021 09:26

Instrument: FID4 Analyst: TWC

Analyzed: 11/24/2021 19:03

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21K0343-01 A 01

Preparation Batch: BJK0583

Sample Size: 500 mL

Prepared: 11/24/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	0.100	ND	mg/L	U
Motor Oil Range Organics (C24-C38)	RRO	1	0.200	ND	mg/L	U
<i>Surrogate: o-Terphenyl</i>			<i>50-150 %</i>	<i>99.6</i>	<i>%</i>	


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 17-Dec-2021 18:02

MW-23-20211911
21K0343-01 (Water)
Aroclor PCB

Method: EPA 8082A

Sampled: 11/19/2021 09:26

Instrument: ECD7 Analyst: JGR

Analyzed: 11/27/2021 18:04

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJK0623 Prepared: 11/26/2021	Sample Size: 1000 mL Final Volume: 0.5 mL	Extract ID: 21K0343-01 I 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJK0291 Cleaned: 26-Nov-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21K0343-01 I 01
Sample Cleanup:	Cleanup Method: Sulfuric Acid Cleanup Batch: CJK0289 Cleaned: 26-Nov-2021	Initial Volume: 0.5 uL Final Volume: 0.5 uL	Extract ID: 21K0343-01 I 01
Sample Cleanup:	Cleanup Method: Sulfur Cleanup Batch: CJK0290 Cleaned: 26-Nov-2021	Initial Volume: 0.5 uL Final Volume: 0.5 uL	Extract ID: 21K0343-01 I 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Aroclor 1016	12674-11-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1221	11104-28-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1232	11141-16-5	1	0.002	0.010	ND	ug/L	U
Aroclor 1242	53469-21-9	1	0.002	0.010	ND	ug/L	U
Aroclor 1248	12672-29-6	1	0.002	0.010	ND	ug/L	U
Aroclor 1254	11097-69-1	1	0.002	0.010	ND	ug/L	U
Aroclor 1260	11096-82-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1262	37324-23-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1268	11100-14-4	1	0.003	0.010	ND	ug/L	U
<i>Surrogate: Decachlorobiphenyl</i>				29-120 %	80.3	%	
<i>Surrogate: Tetrachlorometaxylene</i>				32-120 %	72.7	%	
<i>Surrogate: Decachlorobiphenyl [2C]</i>				29-120 %	83.0	%	
<i>Surrogate: Tetrachlorometaxylene [2C]</i>				32-120 %	73.2	%	



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Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 18:02

MW-23-20211911

21K0343-01 (Water)

Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 11/19/2021 09:26

Instrument: ICPMS2 Analyst: SKD

Analyzed: 12/03/2021 19:34

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21K0343-01 D 01

Preparation Batch: BJL0067

Sample Size: 25 mL

Prepared: 12/02/2021

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Chromium	7440-47-3	5	1.30	2.50	ND	ug/L	U
Manganese	7439-96-5	10	1.42	5.00	526	ug/L	D



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 18:02

MW-23-20211911

21K0343-01 (Water)

Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 11/19/2021 09:26

Instrument: ICPMS1 Analyst: MCB

Analyzed: 12/03/2021 01:18

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO₃ matrix
Preparation Batch: BJL0067 Sample Size: 25 mL
Prepared: 12/02/2021 Final Volume: 25 mL

Extract ID: 21K0343-01 D

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	2	0.0746	0.400	13.3	ug/L	D



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 18:02

MW-23-20211911

21K0343-01 (Water)

Wet Chemistry

Method: EPA 300.0

Sampled: 11/19/2021 09:26

Instrument: IC930 Analyst: BF

Analyzed: 11/19/2021 20:36

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 21K0343-01 F

Preparation Batch: BJK0548

Sample Size: 10 mL

Prepared: 11/19/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrate-N	14797-55-8	1	0.100	0.100	ND	mg/L	U

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrite-N	14797-65-0	1	0.100	0.100	ND	mg/L	U



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Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 18:02

MW-23-20211911

21K0343-01 (Water)

Wet Chemistry

Method: SM 3500-Cr B-09

Sampled: 11/19/2021 09:26

Instrument: UV1800-2 Analyst: RMS

Analyzed: 11/19/2021 18:17

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 21K0343-01 K 01

Preparation Batch: BJK0550

Sample Size: 40 mL

Prepared: 11/19/2021

Final Volume: 50 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Hexavalent Chromium	1854-02-99	1.25	0.013	0.013	ND	mg/L	U



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 18:02

MW-23-20211911

21K0343-01 (Water)

Wet Chemistry

Method: SM 3500-Fe B-97

Sampled: 11/19/2021 09:26

Instrument: UV1800-1 Analyst: CKI

Analyzed: 11/19/2021 19:09

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 21K0343-01 A

Preparation Batch: BJK0551

Sample Size: 5 mL

Prepared: 11/19/2021

Final Volume: 5 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ferrous Iron		50	2.00	2.00	16.3	mg/L	D



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 18:02

MW-23-20211911

21K0343-01 (Water)

Wet Chemistry

Method: SM 4500-SO3 B-00
Instrument: N/A Analyst: UW

Sampled: 11/19/2021 09:26
Analyzed: 11/19/2021 18:00

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BJK0556
Prepared: 11/19/2021

Sample Size: 50 mL
Final Volume: 50 mL

Extract ID: 21K0343-01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfite	14265-45-3	1	1.4	1.4	ND	mg/L	H, U



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 18:02

MW-23-20211911
21K0343-01RE2 (Water)

Wet Chemistry

Method: EPA 300.0

Sampled: 11/19/2021 09:26

Instrument: IC930 Analyst: BF

Analyzed: 12/03/2021 01:16

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 21K0343-01RE2 F

Preparation Batch: BJK0548

Sample Size: 10 mL

Prepared: 11/19/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	10	1.00	1.00	30.5	mg/L	D

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	10	1.00	1.00	7.81	mg/L	D



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 18:02

MW-23-20211911

21K0343-02 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 11/19/2021 09:26

Instrument: ICPMS2 Analyst: SKD

Analyzed: 12/03/2021 19:47

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21K0343-02 A 02

Preparation Batch: BJK0584

Sample Size: 25 mL

Filtration Batch: BJK0544

Prepared: 11/22/2021

Final Volume: 25 mL

Filtration Date: 11/19/2021 16:08

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Chromium, Dissolved	7440-47-3	5	1.30	2.50	ND	ug/L	U
Manganese, Dissolved	7439-96-5	10	1.42	5.00	527	ug/L	D



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

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400 N 34th St., Suite 100
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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 18:02

MW-23-20211911

21K0343-02 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 11/19/2021 09:26

Instrument: ICPMS1 Analyst: MCB

Analyzed: 11/30/2021 01:39

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO₃ matrix

Extract ID: 21K0343-02 A 02

Preparation Batch: BJK0584

Sample Size: 25 mL

Filtration Batch: BJK0544

Prepared: 11/22/2021

Final Volume: 25 mL

Filtration Date: 11/19/2021 16:08

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic, Dissolved	7440-38-2	1	0.0373	0.200	14.0	ug/L	



Analytical Report

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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 18:02

MW-15-20211911

21K0343-03 (Water)

Volatile Organic Compounds

Method: EPA 8260D

Sampled: 11/19/2021 10:42

Instrument: NT3 Analyst: LH

Analyzed: 11/26/2021 15:12

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0343-03 M

Preparation Batch: BJK0684

Sample Size: 10 mL

Prepared: 11/26/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4				80-129 %	109	%	
Surrogate: Toluene-d8				80-120 %	99.5	%	
Surrogate: 4-Bromofluorobenzene				80-120 %	95.7	%	
Surrogate: 1,2-Dichlorobenzene-d4				80-120 %	103	%	



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 18:02

MW-15-20211911

21K0343-03 (Water)

Volatile Organic Compounds

Method: NWTPHg

Sampled: 11/19/2021 10:42

Instrument: NT3 Analyst: PKC

Analyzed: 11/30/2021 15:01

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0343-03 P

Preparation Batch: BJK0727

Sample Size: 10 mL

Prepared: 11/30/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Gasoline Range Organics (Tol-Nap)	GRO	1	100	ND	ug/L	U
<i>Surrogate: Toluene-d8</i>			80-120 %	102	%	
<i>Surrogate: 4-Bromofluorobenzene</i>			80-120 %	97.2	%	



Analytical Resources, LLC
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Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 18:02

MW-15-20211911

21K0343-03 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260D-SIM

Sampled: 11/19/2021 10:42

Instrument: NT7 Analyst: PB

Analyzed: 11/29/2021 19:38

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0343-03 I

Preparation Batch: BJK0712

Sample Size: 10 mL

Prepared: 11/29/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	5.01	20.0	ND	ng/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				<i>80-129 %</i>	<i>104</i>	<i>%</i>	
<i>Surrogate: Toluene-d8</i>				<i>80-120 %</i>	<i>93.8</i>	<i>%</i>	



Analytical Resources, LLC
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Analytical Report

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400 N 34th St., Suite 100
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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 18:02

MW-15-20211911

21K0343-03 (Water)

Dissolved Gases

Method: EPA RSK-175

Sampled: 11/19/2021 10:42

Instrument: FID6 Analyst: LH

Analyzed: 11/22/2021 11:44

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0343-03 J

Preparation Batch: BJK0560

Sample Size: 10 mL

Prepared: 11/22/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Methane	74-82-8	1	0.65	1.96	ug/L	
Ethane	74-84-0	1	1.23	ND	ug/L	U
Ethene	74-85-1	1	1.14	ND	ug/L	U
Acetylene	74-86-2	1	1.06	ND	ug/L	U
<i>Surrogate: Propane</i>			72-122 %	90.1	%	



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 18:02

MW-15-20211911

21K0343-03 (Water)

Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 11/19/2021 10:42

Instrument: FID4 Analyst: TWC

Analyzed: 11/24/2021 20:01

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21K0343-03 F 01

Preparation Batch: BJK0583

Sample Size: 500 mL

Prepared: 11/24/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	0.100	ND	mg/L	U
Motor Oil Range Organics (C24-C38)	RRO	1	0.200	ND	mg/L	U
<i>Surrogate: o-Terphenyl</i>			<i>50-150 %</i>	<i>100</i>	<i>%</i>	



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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 18:02

MW-15-20211911

21K0343-03 (Water)

Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 11/19/2021 10:42

Instrument: ICPMS1 Analyst: MCB

Analyzed: 12/02/2021 17:52

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO₃ matrix

Extract ID: 21K0343-03 A 01

Preparation Batch: BJL0067

Sample Size: 25 mL

Prepared: 12/02/2021

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Cobalt	7440-48-4	1	0.0178	0.200	1.21	ug/L	


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 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 17-Dec-2021 18:02

MW-15-20211911
21K0343-03 (Water)
Wet Chemistry

Method: EPA 300.0

Sampled: 11/19/2021 10:42

Instrument: IC930 Analyst: BF

Analyzed: 11/19/2021 20:56

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 21K0343-03 C

Preparation Batch: BJK0548

Sample Size: 10 mL

Prepared: 11/19/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	1	0.100	0.100	0.787	mg/L	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrate-N	14797-55-8	1	0.100	0.100	0.387	mg/L	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrite-N	14797-65-0	1	0.100	0.100	ND	mg/L	U



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Analytical Report

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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 18:02

MW-15-20211911

21K0343-03 (Water)

Wet Chemistry

Method: SM 3500-Fe B-97

Sampled: 11/19/2021 10:42

Instrument: UV1800-1 Analyst: CKI

Analyzed: 11/19/2021 19:13

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 21K0343-03 B

Preparation Batch: BJK0551

Sample Size: 5 mL

Prepared: 11/19/2021

Final Volume: 5 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ferrous Iron		1	0.040	0.040	0.050	mg/L	



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Analytical Report

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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 18:02

MW-15-20211911

21K0343-03 (Water)

Wet Chemistry

Method: SM 4500-SO3 B-00
Instrument: N/A Analyst: UW

Sampled: 11/19/2021 10:42
Analyzed: 11/19/2021 18:00

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BJK0556
Prepared: 11/19/2021

Sample Size: 50 mL
Final Volume: 50 mL

Extract ID: 21K0343-03

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfite	14265-45-3	1	1.4	1.4	ND	mg/L	H, U



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Analytical Report

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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 18:02

MW-15-20211911
21K0343-03RE1 (Water)

Wet Chemistry

Method: EPA 300.0

Sampled: 11/19/2021 10:42

Instrument: IC930 Analyst: BF

Analyzed: 12/03/2021 02:16

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 21K0343-03RE1 C

Preparation Batch: BJK0548

Sample Size: 10 mL

Prepared: 11/19/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	1	0.100	0.100	6.48	mg/L	



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Analytical Report

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Project: Lower Duwamish Q4
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Project Manager: Meg Strong

Reported:
17-Dec-2021 18:02

MW-15-20211911

21K0343-04 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 11/19/2021 10:42

Instrument: ICPMS1 Analyst: MCB

Analyzed: 11/30/2021 02:18

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21K0343-04 A 02

Preparation Batch: BJK0584

Sample Size: 25 mL

Filtration Batch: BJK0544

Prepared: 11/22/2021

Final Volume: 25 mL

Filtration Date: 11/19/2021 16:08

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Manganese, Dissolved	7439-96-5	1	0.142	0.500	2.76	ug/L	



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Analytical Report

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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 18:02

MW-15-20211911

21K0343-04 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 11/19/2021 10:42

Instrument: ICPMS1 Analyst: MCB

Analyzed: 11/30/2021 02:18

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21K0343-04 A 02

Preparation Batch: BJK0584

Sample Size: 25 mL

Filtration Batch: BJK0544

Prepared: 11/22/2021

Final Volume: 25 mL

Filtration Date: 11/19/2021 16:08

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Cobalt, Dissolved	7440-48-4	1	0.0178	0.200	0.167	ug/L	J



Analytical Report

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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 18:02

TB-8-202111911
21K0343-05 (Water)

Volatile Organic Compounds

Method: EPA 8260D

Sampled: 11/19/2021 11:27

Instrument: NT3 Analyst: PKC

Analyzed: 11/29/2021 12:54

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)
Preparation Batch: BJK0705
Prepared: 11/29/2021

Sample Size: 10 mL
Final Volume: 10 mL

Extract ID: 21K0343-05 A

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4				80-129 %	110	%	
Surrogate: Toluene-d8				80-120 %	101	%	
Surrogate: 4-Bromofluorobenzene				80-120 %	97.1	%	
Surrogate: 1,2-Dichlorobenzene-d4				80-120 %	104	%	



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Analytical Report

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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 18:02

TB-8-202111911
21K0343-05 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260D-SIM

Sampled: 11/19/2021 11:27

Instrument: NT7 Analyst: PB

Analyzed: 11/29/2021 20:07

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0343-05 C

Preparation Batch: BJK0712

Sample Size: 10 mL

Prepared: 11/29/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	5.01	20.0	ND	ng/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				80-129 %	115	%	
<i>Surrogate: Toluene-d8</i>				80-120 %	98.8	%	



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Analytical Report

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Project: Lower Duwamish Q4
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Project Manager: Meg Strong

Reported:
17-Dec-2021 18:02

MW-7-20211911
21K0343-06 (Water)

Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 11/19/2021 11:57

Instrument: ICPMS2 Analyst: SKD

Analyzed: 12/03/2021 18:36

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO₃ matrix

Extract ID: 21K0343-06 A 01

Preparation Batch: BJL0067

Sample Size: 25 mL

Prepared: 12/02/2021

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Chromium	7440-47-3	2	0.520	1.00	ND	ug/L	U



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Analytical Report

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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 18:02

MW-7-20211911
21K0343-06 (Water)

Wet Chemistry

Method: SM 3500-Cr B-09

Sampled: 11/19/2021 11:57

Instrument: UV1800-2 Analyst: RMS

Analyzed: 11/19/2021 18:24

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 21K0343-06 B 01

Preparation Batch: BJK0550

Sample Size: 40 mL

Prepared: 11/19/2021

Final Volume: 50 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Hexavalent Chromium	1854-02-99	1.25	0.013	0.013	ND	mg/L	U



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Analytical Report

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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 18:02

MW-7-20211911
21K0343-07 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 11/19/2021 11:57

Instrument: ICPMS2 Analyst: SKD

Analyzed: 12/03/2021 18:40

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21K0343-07 A 02

Preparation Batch: BJK0584

Sample Size: 25 mL

Filtration Batch: BJK0544

Prepared: 11/22/2021

Final Volume: 25 mL

Filtration Date: 11/19/2021 16:08

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Chromium, Dissolved	7440-47-3	2	0.520	1.00	ND	ug/L	U


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 17-Dec-2021 18:02

MW-47-20211911
21K0343-08 (Water)
Volatile Organic Compounds

Method: EPA 8260D

Sampled: 11/19/2021 13:45

Instrument: NT3 Analyst: LH

Analyzed: 11/26/2021 15:37

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0343-08 G

Preparation Batch: BJK0684

Sample Size: 10 mL

Prepared: 11/26/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.08	0.20	0.36	ug/L	
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	0.09	ug/L	J
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				80-129 %	97.8	%	
<i>Surrogate: Toluene-d8</i>				80-120 %	96.7	%	
<i>Surrogate: 4-Bromofluorobenzene</i>				80-120 %	92.5	%	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				80-120 %	97.0	%	



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Analytical Report

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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 18:02

MW-47-20211911

21K0343-08 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260D-SIM

Sampled: 11/19/2021 13:45

Instrument: NT7 Analyst: PB

Analyzed: 11/29/2021 20:36

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0343-08 H

Preparation Batch: BJK0712

Sample Size: 10 mL

Prepared: 11/29/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	5.01	20.0	ND	ng/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				80-129 %	103	%	
<i>Surrogate: Toluene-d8</i>				80-120 %	97.7	%	



Analytical Report

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Reported:
17-Dec-2021 18:02

MW-47-20211911

21K0343-08 (Water)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 11/19/2021 13:45

Instrument: NT10 Analyst: VTS

Analyzed: 12/01/2021 20:33

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 3510C SepF
Preparation Batch: BJK0625
Prepared: 11/26/2021

Sample Size: 1000 mL
Final Volume: 1 mL

Extract ID: 21K0343-08 B 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Phenol	108-95-2	1	0.01	0.2	ND	ug/L	U
bis(2-chloroethyl) ether	111-44-4	1	0.03	0.2	ND	ug/L	U
2-Chlorophenol	95-57-8	1	0.03	0.2	ND	ug/L	U
1,3-Dichlorobenzene	541-73-1	1	0.03	0.2	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.03	0.2	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.03	0.2	ND	ug/L	U
Benzyl Alcohol	100-51-6	1	0.02	0.2	ND	ug/L	U
2,2'-Oxybis(1-chloropropane)	108-60-1	1	0.03	0.2	ND	ug/L	U
2-Methylphenol	95-48-7	1	0.03	0.2	ND	ug/L	U
Hexachloroethane	67-72-1	1	0.04	0.2	ND	ug/L	U
N-Nitroso-di-n-Propylamine	621-64-7	1	0.04	0.2	ND	ug/L	U
4-Methylphenol	106-44-5	1	0.03	0.2	ND	ug/L	U
Nitrobenzene	98-95-3	1	0.03	0.2	ND	ug/L	U
Isophorone	78-59-1	1	0.03	0.2	ND	ug/L	U
2-Nitrophenol	88-75-5	1	0.04	1.0	ND	ug/L	U
2,4-Dimethylphenol	105-67-9	1	0.3	1.0	ND	ug/L	U
Bis(2-Chloroethoxy)methane	111-91-1	1	0.03	0.2	ND	ug/L	U
2,4-Dichlorophenol	120-83-2	1	0.1	1.0	ND	ug/L	U
1,2,4-Trichlorobenzene	120-82-1	1	0.03	0.2	ND	ug/L	U
Naphthalene	91-20-3	1	0.03	0.2	ND	ug/L	U
Benzoic acid	65-85-0	1	0.1	2.0	ND	ug/L	U
4-Chloroaniline	106-47-8	1	0.04	1.0	ND	ug/L	U
Hexachlorobutadiene	87-68-3	1	0.04	0.2	ND	ug/L	U
4-Chloro-3-Methylphenol	59-50-7	1	0.1	1.0	ND	ug/L	U
2-Methylnaphthalene	91-57-6	1	0.03	0.2	ND	ug/L	U
Hexachlorocyclopentadiene	77-47-4	1	0.1	1.0	ND	ug/L	U
2,4,6-Trichlorophenol	88-06-2	1	0.2	1.0	ND	ug/L	U
2,4,5-Trichlorophenol	95-95-4	1	0.1	1.0	ND	ug/L	U
2-Chloronaphthalene	91-58-7	1	0.03	0.2	ND	ug/L	U
2-Nitroaniline	88-74-4	1	0.2	1.0	ND	ug/L	U
Acenaphthylene	208-96-8	1	0.02	0.2	ND	ug/L	U
Dimethylphthalate	131-11-3	1	0.04	0.2	ND	ug/L	U
2,6-Dinitrotoluene	606-20-2	1	0.2	1.0	ND	ug/L	U
Acenaphthene	83-32-9	1	0.03	0.2	0.1	ug/L	J



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 18:02

MW-47-20211911

21K0343-08 (Water)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 11/19/2021 13:45

Instrument: NT10 Analyst: VTS

Analyzed: 12/01/2021 20:33

Analysis by: Analytical Resources, LLC

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
3-Nitroaniline	99-09-2	1	0.2	1.0	ND	ug/L	U
2,4-Dinitrophenol	51-28-5	1	0.2	2.0	ND	ug/L	U
Dibenzofuran	132-64-9	1	0.02	0.2	ND	ug/L	U
4-Nitrophenol	100-02-7	1	0.06	1.0	ND	ug/L	U
2,4-Dinitrotoluene	121-14-2	1	0.1	1.0	ND	ug/L	U
Fluorene	86-73-7	1	0.02	0.2	ND	ug/L	U
4-Chlorophenylphenyl ether	7005-72-3	1	0.02	0.2	ND	ug/L	U
Diethyl phthalate	84-66-2	1	0.06	0.2	0.08	ug/L	J
4-Nitroaniline	100-01-6	1	0.2	1.0	ND	ug/L	U
4,6-Dinitro-2-methylphenol	534-52-1	1	0.4	2.0	ND	ug/L	U
N-Nitrosodiphenylamine	86-30-6	1	0.03	0.2	ND	ug/L	U
4-Bromophenyl phenyl ether	101-55-3	1	0.02	0.2	ND	ug/L	U
Hexachlorobenzene	118-74-1	1	0.04	0.2	ND	ug/L	U
Pentachlorophenol	87-86-5	1	0.1	1.0	ND	ug/L	U
Phenanthrene	85-01-8	1	0.02	0.2	ND	ug/L	U
Anthracene	120-12-7	1	0.03	0.2	ND	ug/L	U
Carbazole	86-74-8	1	0.04	0.2	ND	ug/L	U
Di-n-Butylphthalate	84-74-2	1	0.05	0.2	ND	ug/L	U
Fluoranthene	206-44-0	1	0.03	0.2	ND	ug/L	U
Pyrene	129-00-0	1	0.03	0.2	ND	ug/L	U
Butylbenzylphthalate	85-68-7	1	0.07	0.2	ND	ug/L	U
Benzo(a)anthracene	56-55-3	1	0.04	0.2	ND	ug/L	U
3,3'-Dichlorobenzidine	91-94-1	1	0.3	1.0	ND	ug/L	U
Chrysene	218-01-9	1	0.04	0.2	ND	ug/L	U
bis(2-Ethylhexyl)phthalate	117-81-7	1	0.2	0.2	ND	ug/L	U
Di-n-Octylphthalate	117-84-0	1	0.05	0.2	ND	ug/L	U
Benzo(a)fluoranthene, Total		1	0.08	0.4	ND	ug/L	U
Benzo(a)pyrene	50-32-8	1	0.05	0.2	ND	ug/L	U
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.06	0.2	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	1	0.07	0.2	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	1	0.04	0.2	ND	ug/L	U
1-Methylnaphthalene	90-12-0	1	0.03	0.2	ND	ug/L	U
Surrogate: 2-Fluorophenol				30-160 %	46.7	%	
Surrogate: Phenol-d5				30-160 %	31.3	%	
Surrogate: 2-Chlorophenol-d4				30-160 %	87.9	%	
Surrogate: 1,2-Dichlorobenzene-d4				30-160 %	72.8	%	
Surrogate: Nitrobenzene-d5				30-160 %	83.4	%	



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 18:02

MW-47-20211911

21K0343-08 (Water)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 11/19/2021 13:45

Instrument: NT10 Analyst: VTS

Analyzed: 12/01/2021 20:33

Analysis by: Analytical Resources, LLC

Analyte	CAS Number	Recovery	Recovery	Units	Notes
		Limits			
<i>Surrogate: 2-Fluorobiphenyl</i>		30-160 %	94.0	%	
<i>Surrogate: 2,4,6-Tribromophenol</i>		30-160 %	100	%	
<i>Surrogate: p-Terphenyl-d14</i>		30-160 %	111	%	Q


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 Project Manager: Meg Strong

Reported:
 17-Dec-2021 18:02

MW-47-20211911
21K0343-08 (Water)
Aroclor PCB

Method: EPA 8082A

Sampled: 11/19/2021 13:45

Instrument: ECD7 Analyst: JGR

Analyzed: 11/27/2021 18:25

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJK0623 Prepared: 11/26/2021	Sample Size: 1000 mL Final Volume: 0.5 mL	Extract ID: 21K0343-08 A 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJK0291 Cleaned: 26-Nov-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21K0343-08 A 01
Sample Cleanup:	Cleanup Method: Sulfuric Acid Cleanup Batch: CJK0289 Cleaned: 26-Nov-2021	Initial Volume: 0.5 uL Final Volume: 0.5 uL	Extract ID: 21K0343-08 A 01
Sample Cleanup:	Cleanup Method: Sulfur Cleanup Batch: CJK0290 Cleaned: 26-Nov-2021	Initial Volume: 0.5 uL Final Volume: 0.5 uL	Extract ID: 21K0343-08 A 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Aroclor 1016	12674-11-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1221	11104-28-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1232	11141-16-5	1	0.002	0.010	ND	ug/L	U
Aroclor 1242	53469-21-9	1	0.002	0.010	ND	ug/L	U
Aroclor 1248	12672-29-6	1	0.002	0.010	ND	ug/L	U
Aroclor 1254	11097-69-1	1	0.002	0.010	ND	ug/L	U
Aroclor 1260	11096-82-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1262	37324-23-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1268	11100-14-4	1	0.003	0.010	ND	ug/L	U
<i>Surrogate: Decachlorobiphenyl</i>				29-120 %	81.5	%	
<i>Surrogate: Tetrachlorometaxylene</i>				32-120 %	71.1	%	
<i>Surrogate: Decachlorobiphenyl [2C]</i>				29-120 %	87.7	%	
<i>Surrogate: Tetrachlorometaxylene [2C]</i>				32-120 %	72.3	%	



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Analytical Report

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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 18:02

MW-47-20211911

21K0343-08 (Water)

Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 11/19/2021 13:45

Instrument: ICPMS2 Analyst: SKD

Analyzed: 12/03/2021 19:38

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO₃ matrix

Extract ID: 21K0343-08 C 01

Preparation Batch: BJL0067

Sample Size: 25 mL

Prepared: 12/02/2021

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Chromium	7440-47-3	5	1.30	2.50	ND	ug/L	U



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 18:02

MW-47-20211911

21K0343-08 (Water)

Wet Chemistry

Method: SM 3500-Cr B-09

Sampled: 11/19/2021 13:45

Instrument: UV1800-2 Analyst: RMS

Analyzed: 11/19/2021 18:25

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 21K0343-08 F 01

Preparation Batch: BJK0550

Sample Size: 40 mL

Prepared: 11/19/2021

Final Volume: 50 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Hexavalent Chromium	1854-02-99	1.25	0.013	0.013	ND	mg/L	U



Analytical Resources, LLC
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Analytical Report

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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 18:02

MW-47-20211911

21K0343-09 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 11/19/2021 13:47

Instrument: ICPMS2 Analyst: SKD

Analyzed: 12/03/2021 19:42

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21K0343-09 A 02

Preparation Batch: BJK0584

Sample Size: 25 mL

Filtration Batch: BJK0544

Prepared: 11/22/2021

Final Volume: 25 mL

Filtration Date: 11/19/2021 16:08

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Chromium, Dissolved	7440-47-3	5	1.30	2.50	ND	ug/L	U



Analytical Report

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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 18:02

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - Quality Control

Batch BJK0684 - EPA 5030C (Purge and Trap)

Instrument: NT3 Analyst: LH

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0684-BLK2)											
						Prepared: 26-Nov-2021 Analyzed: 26-Nov-2021 10:03					
Vinyl Chloride	ND	0.08	0.20	ug/L							U
1,1-Dichloroethene	ND	0.08	0.20	ug/L							U
trans-1,2-Dichloroethene	ND	0.07	0.20	ug/L							U
cis-1,2-Dichloroethene	ND	0.08	0.20	ug/L							U
Trichloroethene	ND	0.07	0.20	ug/L							U
Tetrachloroethene	ND	0.09	0.20	ug/L							U
<i>Surrogate: 1,2-Dichloroethane-d4</i>	4.89			ug/L	5.00		97.7	80-129			
<i>Surrogate: Toluene-d8</i>	5.16			ug/L	5.00		103	80-120			
<i>Surrogate: 4-Bromofluorobenzene</i>	5.13			ug/L	5.00		103	80-120			
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	5.07			ug/L	5.00		101	80-120			
LCS (BJK0684-BS2)											
						Prepared: 26-Nov-2021 Analyzed: 26-Nov-2021 08:22					
Vinyl Chloride	9.19	0.08	0.20	ug/L	10.0		91.9	66-133			
1,1-Dichloroethene	9.77	0.08	0.20	ug/L	10.0		97.7	69-135			
trans-1,2-Dichloroethene	9.81	0.07	0.20	ug/L	10.0		98.1	78-128			
cis-1,2-Dichloroethene	10.0	0.08	0.20	ug/L	10.0		100	80-121			
Trichloroethene	10.2	0.07	0.20	ug/L	10.0		102	80-120			
Tetrachloroethene	10.4	0.09	0.20	ug/L	10.0		104	80-120			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	5.02			ug/L	5.00		100	80-129			
<i>Surrogate: Toluene-d8</i>	5.17			ug/L	5.00		103	80-120			
<i>Surrogate: 4-Bromofluorobenzene</i>	5.13			ug/L	5.00		103	80-120			
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	4.89			ug/L	5.00		97.7	80-120			
LCS Dup (BJK0684-BSD2)											
						Prepared: 26-Nov-2021 Analyzed: 26-Nov-2021 09:12					
Vinyl Chloride	8.83	0.08	0.20	ug/L	10.0		88.3	66-133	3.98	30	
1,1-Dichloroethene	9.48	0.08	0.20	ug/L	10.0		94.8	69-135	3.08	30	
trans-1,2-Dichloroethene	8.75	0.07	0.20	ug/L	10.0		87.5	78-128	11.40	30	
cis-1,2-Dichloroethene	9.29	0.08	0.20	ug/L	10.0		92.9	80-121	7.74	30	
Trichloroethene	9.54	0.07	0.20	ug/L	10.0		95.4	80-120	6.68	30	
Tetrachloroethene	9.86	0.09	0.20	ug/L	10.0		98.6	80-120	5.06	30	
<i>Surrogate: 1,2-Dichloroethane-d4</i>	4.71			ug/L	5.00		94.2	80-129			
<i>Surrogate: Toluene-d8</i>	5.07			ug/L	5.00		101	80-120			
<i>Surrogate: 4-Bromofluorobenzene</i>	5.22			ug/L	5.00		104	80-120			
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	5.20			ug/L	5.00		104	80-120			



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 18:02

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - Quality Control

Batch BJK0705 - EPA 5030C (Purge and Trap)

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0705-BLK2)						Prepared: 29-Nov-2021 Analyzed: 29-Nov-2021 12:29					
Vinyl Chloride	ND	0.08	0.20	ug/L							U
1,1-Dichloroethene	ND	0.08	0.20	ug/L							U
trans-1,2-Dichloroethene	ND	0.07	0.20	ug/L							U
cis-1,2-Dichloroethene	ND	0.08	0.20	ug/L							U
Trichloroethene	ND	0.07	0.20	ug/L							U
Tetrachloroethene	ND	0.09	0.20	ug/L							U
<i>Surrogate: 1,2-Dichloroethane-d4</i>	5.12			ug/L	5.00		102	80-129			
<i>Surrogate: Toluene-d8</i>	5.06			ug/L	5.00		101	80-120			
<i>Surrogate: 4-Bromofluorobenzene</i>	5.04			ug/L	5.00		101	80-120			
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	4.85			ug/L	5.00		97.1	80-120			
LCS (BJK0705-BS2)						Prepared: 29-Nov-2021 Analyzed: 29-Nov-2021 10:48					
Vinyl Chloride	8.40	0.08	0.20	ug/L	10.0		84.0	66-133			
1,1-Dichloroethene	9.78	0.08	0.20	ug/L	10.0		97.8	69-135			
trans-1,2-Dichloroethene	9.08	0.07	0.20	ug/L	10.0		90.8	78-128			
cis-1,2-Dichloroethene	9.53	0.08	0.20	ug/L	10.0		95.3	80-121			
Trichloroethene	9.71	0.07	0.20	ug/L	10.0		97.1	80-120			
Tetrachloroethene	9.65	0.09	0.20	ug/L	10.0		96.5	80-120			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	5.14			ug/L	5.00		103	80-129			
<i>Surrogate: Toluene-d8</i>	5.24			ug/L	5.00		105	80-120			
<i>Surrogate: 4-Bromofluorobenzene</i>	5.04			ug/L	5.00		101	80-120			
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	5.22			ug/L	5.00		104	80-120			
LCS Dup (BJK0705-BSD2)						Prepared: 29-Nov-2021 Analyzed: 29-Nov-2021 11:39					
Vinyl Chloride	9.37	0.08	0.20	ug/L	10.0		93.7	66-133	11.00	30	
1,1-Dichloroethene	9.94	0.08	0.20	ug/L	10.0		99.4	69-135	1.61	30	
trans-1,2-Dichloroethene	9.72	0.07	0.20	ug/L	10.0		97.2	78-128	6.84	30	
cis-1,2-Dichloroethene	10.2	0.08	0.20	ug/L	10.0		102	80-121	6.55	30	
Trichloroethene	10.3	0.07	0.20	ug/L	10.0		103	80-120	5.43	30	
Tetrachloroethene	10.6	0.09	0.20	ug/L	10.0		106	80-120	9.18	30	
<i>Surrogate: 1,2-Dichloroethane-d4</i>	4.86			ug/L	5.00		97.1	80-129			
<i>Surrogate: Toluene-d8</i>	5.01			ug/L	5.00		100	80-120			
<i>Surrogate: 4-Bromofluorobenzene</i>	5.18			ug/L	5.00		104	80-120			
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	4.99			ug/L	5.00		99.7	80-120			


 Shannon & Wilson, Inc
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 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 17-Dec-2021 18:02

Analysis by: Analytical Resources, LLC
Volatile Organic Compounds - Quality Control
Batch BJK0727 - EPA 5030C (Purge and Trap)

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0727-BLK1)		Prepared: 30-Nov-2021 Analyzed: 30-Nov-2021 12:26								
Gasoline Range Organics (Tol-Nap)	ND	100	ug/L							U
Surrogate: Toluene-d8	4.95		ug/L	5.00		99.1	80-120			
Surrogate: 4-Bromofluorobenzene	5.06		ug/L	5.00		101	80-120			
LCS (BJK0727-BS1)		Prepared: 30-Nov-2021 Analyzed: 30-Nov-2021 09:29								
Gasoline Range Organics (Tol-Nap)	945	100	ug/L	1000		94.5	72-128			
Surrogate: Toluene-d8	5.13		ug/L	5.00		103	80-120			
Surrogate: 4-Bromofluorobenzene	5.02		ug/L	5.00		100	80-120			
LCS Dup (BJK0727-BSD1)		Prepared: 30-Nov-2021 Analyzed: 30-Nov-2021 10:20								
Gasoline Range Organics (Tol-Nap)	872	100	ug/L	1000		87.2	72-128	8.00	30	
Surrogate: Toluene-d8	5.10		ug/L	5.00		102	80-120			
Surrogate: 4-Bromofluorobenzene	4.98		ug/L	5.00		99.6	80-120			


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 17-Dec-2021 18:02

Analysis by: Analytical Resources, LLC
Volatile Organic Compounds - SIM - Quality Control
Batch BJK0712 - EPA 5030C (Purge and Trap)

Instrument: NT7 Analyst: PB

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0712-BLK1)					Prepared: 29-Nov-2021 Analyzed: 29-Nov-2021 11:54						
Vinyl chloride	ND	5.01	20.0	ng/L							U
Surrogate: 1,2-Dichloroethane-d4	6130			ng/L	5000		123	80-129			
Surrogate: Toluene-d8	4780			ng/L	5000		95.5	80-120			
LCS (BJK0712-BS1)					Prepared: 29-Nov-2021 Analyzed: 29-Nov-2021 09:33						
Vinyl chloride	410	5.01	20.0	ng/L	500		82.0	62-141			
Surrogate: 1,2-Dichloroethane-d4	4850			ng/L	5000		97.0	80-129			
Surrogate: Toluene-d8	4810			ng/L	5000		96.2	80-120			
LCS Dup (BJK0712-BSD1)					Prepared: 29-Nov-2021 Analyzed: 29-Nov-2021 10:28						
Vinyl chloride	415	5.01	20.0	ng/L	500		83.1	62-141	1.33	30	
Surrogate: 1,2-Dichloroethane-d4	4630			ng/L	5000		92.7	80-129			
Surrogate: Toluene-d8	4900			ng/L	5000		98.1	80-120			


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 17-Dec-2021 18:02

Analysis by: Analytical Resources, LLC
Dissolved Gases - Quality Control
Batch BJK0560 - EPA 5030C (Purge and Trap)

Instrument: FID6 Analyst: LH

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0560-BLK1)		Prepared: 22-Nov-2021 Analyzed: 22-Nov-2021 10:32								
Methane	ND	0.65	ug/L							U
Ethane	ND	1.23	ug/L							U
Ethene	ND	1.14	ug/L							U
Acetylene	ND	1.06	ug/L							U
<i>Surrogate: Propane</i>	1780		ug/L	1800		98.8	72-122			
LCS (BJK0560-BS1)		Prepared: 22-Nov-2021 Analyzed: 22-Nov-2021 09:00								
Methane	348	0.65	ug/L	328		106	80-120			
Ethane	697	1.23	ug/L	615		113	80-120			
Ethene	624	1.14	ug/L	575		109	80-120			
Acetylene	524	1.06	ug/L	530		98.8	73-123			
<i>Surrogate: Propane</i>	1750		ug/L	1800		97.5	62-122			
LCS Dup (BJK0560-BSD1)		Prepared: 22-Nov-2021 Analyzed: 22-Nov-2021 10:14								
Methane	283	0.65	ug/L	328		86.3	80-120	20.60	30	
Ethane	554	1.23	ug/L	615		90.1	80-120	22.80	30	
Ethene	499	1.14	ug/L	575		86.8	80-120	22.30	30	
Acetylene	404	1.06	ug/L	530		76.2	73-123	25.80	30	
<i>Surrogate: Propane</i>	1400		ug/L	1800		77.6	62-122			


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 17-Dec-2021 18:02

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - Quality Control
Batch BJK0625 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0625-BLK1)						Prepared: 26-Nov-2021 Analyzed: 01-Dec-2021 18:39					
Phenol	ND	0.01	0.2	ug/L							U
bis(2-chloroethyl) ether	ND	0.03	0.2	ug/L							U
2-Chlorophenol	ND	0.03	0.2	ug/L							U
1,3-Dichlorobenzene	ND	0.03	0.2	ug/L							U
1,4-Dichlorobenzene	ND	0.03	0.2	ug/L							U
1,2-Dichlorobenzene	ND	0.03	0.2	ug/L							U
Benzyl Alcohol	ND	0.02	0.2	ug/L							U
2,2'-Oxybis(1-chloropropane)	ND	0.03	0.2	ug/L							U
2-Methylphenol	ND	0.03	0.2	ug/L							U
Hexachloroethane	ND	0.04	0.2	ug/L							U
N-Nitroso-di-n-Propylamine	ND	0.04	0.2	ug/L							U
4-Methylphenol	ND	0.03	0.2	ug/L							U
Nitrobenzene	ND	0.03	0.2	ug/L							U
Isophorone	ND	0.03	0.2	ug/L							U
2-Nitrophenol	ND	0.04	1.0	ug/L							U
2,4-Dimethylphenol	ND	0.3	1.0	ug/L							U
Bis(2-Chloroethoxy)methane	ND	0.03	0.2	ug/L							U
2,4-Dichlorophenol	ND	0.1	1.0	ug/L							U
1,2,4-Trichlorobenzene	ND	0.03	0.2	ug/L							U
Naphthalene	ND	0.03	0.2	ug/L							U
Benzoic acid	ND	0.1	2.0	ug/L							U
4-Chloroaniline	ND	0.04	1.0	ug/L							U
Hexachlorobutadiene	ND	0.04	0.2	ug/L							U
4-Chloro-3-Methylphenol	ND	0.1	1.0	ug/L							U
2-Methylnaphthalene	ND	0.03	0.2	ug/L							U
Hexachlorocyclopentadiene	ND	0.1	1.0	ug/L							U
2,4,6-Trichlorophenol	ND	0.2	1.0	ug/L							U
2,4,5-Trichlorophenol	ND	0.1	1.0	ug/L							U
2-Chloronaphthalene	ND	0.03	0.2	ug/L							U
2-Nitroaniline	ND	0.2	1.0	ug/L							U
Acenaphthylene	ND	0.02	0.2	ug/L							U
Dimethylphthalate	ND	0.04	0.2	ug/L							U
2,6-Dinitrotoluene	ND	0.2	1.0	ug/L							U
Acenaphthene	ND	0.03	0.2	ug/L							U
3-Nitroaniline	ND	0.2	1.0	ug/L							U


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 17-Dec-2021 18:02

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - Quality Control
Batch BJK0625 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0625-BLK1)						Prepared: 26-Nov-2021 Analyzed: 01-Dec-2021 18:39					
2,4-Dinitrophenol	ND	0.2	2.0	ug/L							U
Dibenzofuran	ND	0.02	0.2	ug/L							U
4-Nitrophenol	ND	0.06	1.0	ug/L							U
2,4-Dinitrotoluene	ND	0.1	1.0	ug/L							U
Fluorene	ND	0.02	0.2	ug/L							U
4-Chlorophenylphenyl ether	ND	0.02	0.2	ug/L							U
Diethyl phthalate	ND	0.06	0.2	ug/L							U
4-Nitroaniline	ND	0.2	1.0	ug/L							U
4,6-Dinitro-2-methylphenol	ND	0.4	2.0	ug/L							U
N-Nitrosodiphenylamine	ND	0.03	0.2	ug/L							U
4-Bromophenyl phenyl ether	ND	0.02	0.2	ug/L							U
Hexachlorobenzene	ND	0.04	0.2	ug/L							U
Pentachlorophenol	ND	0.1	1.0	ug/L							U
Phenanthrene	ND	0.02	0.2	ug/L							U
Anthracene	ND	0.03	0.2	ug/L							U
Carbazole	ND	0.04	0.2	ug/L							U
Di-n-Butylphthalate	ND	0.05	0.2	ug/L							U
Fluoranthene	ND	0.03	0.2	ug/L							U
Pyrene	ND	0.03	0.2	ug/L							U
Butylbenzylphthalate	ND	0.07	0.2	ug/L							U
Benzo(a)anthracene	ND	0.04	0.2	ug/L							U
3,3'-Dichlorobenzidine	ND	0.3	1.0	ug/L							U
Chrysene	ND	0.04	0.2	ug/L							U
bis(2-Ethylhexyl)phthalate	ND	0.2	0.2	ug/L							U
Di-n-Octylphthalate	ND	0.05	0.2	ug/L							U
Benzo(a)fluoranthene, Total	ND	0.08	0.4	ug/L							U
Benzo(a)pyrene	ND	0.05	0.2	ug/L							U
Indeno(1,2,3-cd)pyrene	ND	0.06	0.2	ug/L							U
Dibenzo(a,h)anthracene	ND	0.07	0.2	ug/L							U
Benzo(g,h,i)perylene	ND	0.04	0.2	ug/L							U
1-Methylnaphthalene	ND	0.03	0.2	ug/L							U
Surrogate: 2-Fluorophenol	3.36			ug/L	7.50		44.7	30-160			
Surrogate: Phenol-d5	2.19			ug/L	7.50		29.2	30-160			*
Surrogate: 2-Chlorophenol-d4	6.18			ug/L	7.50		82.3	30-160			


 Shannon & Wilson, Inc
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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 17-Dec-2021 18:02

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - Quality Control
Batch BJK0625 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0625-BLK1)					Prepared: 26-Nov-2021		Analyzed: 01-Dec-2021 18:39				
Surrogate: 1,2-Dichlorobenzene-d4	3.15			ug/L	5.00		63.0	30-160			
Surrogate: Nitrobenzene-d5	3.86			ug/L	5.00		77.1	30-160			
Surrogate: 2-Fluorobiphenyl	4.00			ug/L	5.00		79.9	30-160			
Surrogate: 2,4,6-Tribromophenol	6.67			ug/L	7.50		88.9	30-160			
Surrogate: p-Terphenyl-d14	4.78			ug/L	5.00		95.7	30-160			Q
LCS (BJK0625-BS1)					Prepared: 26-Nov-2021		Analyzed: 01-Dec-2021 19:17				
Phenol	1.9	0.01	0.2	ug/L	5.00		38.6	30-160			
bis(2-chloroethyl) ether	4.7	0.03	0.2	ug/L	5.00		93.6	30-160			
2-Chlorophenol	4.0	0.03	0.2	ug/L	5.00		79.2	30-160			
1,3-Dichlorobenzene	3.3	0.03	0.2	ug/L	5.00		66.1	30-160			
1,4-Dichlorobenzene	3.7	0.03	0.2	ug/L	5.00		74.6	30-160			
1,2-Dichlorobenzene	3.5	0.03	0.2	ug/L	5.00		69.2	30-160			
Benzyl Alcohol	2.9	0.02	0.2	ug/L	5.00		57.7	30-160			
2,2'-Oxybis(1-chloropropane)	4.3	0.03	0.2	ug/L	5.00		85.7	30-160			
2-Methylphenol	3.6	0.03	0.2	ug/L	5.00		71.1	30-160			
Hexachloroethane	3.4	0.04	0.2	ug/L	5.00		68.9	30-160			
N-Nitroso-di-n-Propylamine	4.0	0.04	0.2	ug/L	5.00		80.1	30-160			
4-Methylphenol	3.2	0.03	0.2	ug/L	5.00		64.7	30-160			
Nitrobenzene	4.4	0.03	0.2	ug/L	5.00		89.0	30-160			
Isophorone	6.2	0.03	0.2	ug/L	5.00		125	30-160			
2-Nitrophenol	5.4	0.04	1.0	ug/L	5.00		107	30-160			Q
2,4-Dimethylphenol	10.9	0.3	1.0	ug/L	13.0		83.5	30-160			
Bis(2-Chloroethoxy)methane	5.4	0.03	0.2	ug/L	5.00		108	30-160			
2,4-Dichlorophenol	14.3	0.1	1.0	ug/L	13.0		110	30-160			
1,2,4-Trichlorobenzene	3.3	0.03	0.2	ug/L	5.00		66.6	30-160			
Naphthalene	3.8	0.03	0.2	ug/L	5.00		76.2	30-160			
Benzoic acid	7.8	0.1	2.0	ug/L	23.0		34.0	30-160			
4-Chloroaniline	2.9	0.04	1.0	ug/L	13.0		22.7	30-160			*
Hexachlorobutadiene	3.0	0.04	0.2	ug/L	5.00		60.3	30-160			
4-Chloro-3-Methylphenol	14.4	0.1	1.0	ug/L	13.0		111	30-160			
2-Methylnaphthalene	4.2	0.03	0.2	ug/L	5.00		84.4	30-160			
Hexachlorocyclopentadiene	4.6	0.1	1.0	ug/L	13.0		35.1	30-160			Q
2,4,6-Trichlorophenol	14.6	0.2	1.0	ug/L	13.0		112	30-160			
2,4,5-Trichlorophenol	13.8	0.1	1.0	ug/L	13.0		106	30-160			



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 18:02

Analysis by: Analytical Resources, LLC

Semivolatile Organic Compounds - Quality Control

Batch BJK0625 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJK0625-BS1)						Prepared: 26-Nov-2021 Analyzed: 01-Dec-2021 19:17					
2-Chloronaphthalene	4.6	0.03	0.2	ug/L	5.00		92.0	30-160			
2-Nitroaniline	16.4	0.2	1.0	ug/L	13.0		126	30-160			
Acenaphthylene	3.8	0.02	0.2	ug/L	5.00		75.9	30-160			
Dimethylphthalate	4.6	0.04	0.2	ug/L	5.00		91.7	30-160			
2,6-Dinitrotoluene	17.0	0.2	1.0	ug/L	13.0		130	30-160			
Acenaphthene	4.2	0.03	0.2	ug/L	5.00		83.7	30-160			
3-Nitroaniline	15.2	0.2	1.0	ug/L	13.0		117	30-160			
2,4-Dinitrophenol	25.1	0.2	2.0	ug/L	23.0		109	30-160			
Dibenzofuran	4.8	0.02	0.2	ug/L	5.00		95.6	30-160			
4-Nitrophenol	4.4	0.06	1.0	ug/L	13.0		34.2	30-160			
2,4-Dinitrotoluene	17.5	0.1	1.0	ug/L	13.0		135	30-160			Q
Fluorene	3.1	0.02	0.2	ug/L	5.00		62.6	30-160			Q
4-Chlorophenylphenyl ether	2.8	0.02	0.2	ug/L	5.00		55.7	30-160			Q
Diethyl phthalate	4.5	0.06	0.2	ug/L	5.00		89.7	30-160			
4-Nitroaniline	17.2	0.2	1.0	ug/L	13.0		132	30-160			
4,6-Dinitro-2-methylphenol	26.8	0.4	2.0	ug/L	23.0		116	30-160			
N-Nitrosodiphenylamine	4.6	0.03	0.2	ug/L	5.00		92.4	30-160			
4-Bromophenyl phenyl ether	4.8	0.02	0.2	ug/L	5.00		95.7	30-160			
Hexachlorobenzene	4.4	0.04	0.2	ug/L	5.00		87.8	30-160			
Pentachlorophenol	5.9	0.1	1.0	ug/L	13.0		45.1	30-160			Q
Phenanthrene	4.4	0.02	0.2	ug/L	5.00		88.0	30-160			
Anthracene	4.3	0.03	0.2	ug/L	5.00		86.5	30-160			
Carbazole	4.9	0.04	0.2	ug/L	5.00		97.6	30-160			
Di-n-Butylphthalate	5.2	0.05	0.2	ug/L	5.00		105	30-160			
Fluoranthene	6.1	0.03	0.2	ug/L	5.00		122	30-160			Q
Pyrene	6.2	0.03	0.2	ug/L	5.00		123	30-160			Q
Butylbenzylphthalate	5.6	0.07	0.2	ug/L	5.00		113	30-160			Q
Benzo(a)anthracene	5.0	0.04	0.2	ug/L	5.00		101	30-160			
3,3'-Dichlorobenzidine	15.8	0.3	1.0	ug/L	13.0		122	30-160			
Chrysene	4.7	0.04	0.2	ug/L	5.00		94.5	30-160			
bis(2-Ethylhexyl)phthalate	5.0	0.2	0.2	ug/L	5.00		100	30-160			
Di-n-Octylphthalate	4.8	0.05	0.2	ug/L	5.00		95.6	30-160			
Benzo(a)fluoranthene, Total	10.2	0.08	0.4	ug/L	10.0		102	30-160			
Benzo(a)pyrene	4.8	0.05	0.2	ug/L	5.00		96.5	30-160			
Indeno(1,2,3-cd)pyrene	4.5	0.06	0.2	ug/L	5.00		90.4	30-160			



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 18:02

Analysis by: Analytical Resources, LLC

Semivolatile Organic Compounds - Quality Control

Batch BJK0625 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJK0625-BS1)						Prepared: 26-Nov-2021 Analyzed: 01-Dec-2021 19:17					
Dibenzo(a,h)anthracene	4.2	0.07	0.2	ug/L	5.00		84.3	30-160			
Benzo(g,h,i)perylene	4.3	0.04	0.2	ug/L	5.00		85.5	30-160			
1-Methylnaphthalene	4.6	0.03	0.2	ug/L	5.00		91.6	30-160			
Surrogate: 2-Fluorophenol	4.46			ug/L	7.50		59.4	30-160			
Surrogate: Phenol-d5	3.09			ug/L	7.50		41.1	30-160			
Surrogate: 2-Chlorophenol-d4	6.93			ug/L	7.50		92.4	30-160			
Surrogate: 1,2-Dichlorobenzene-d4	3.54			ug/L	5.00		70.9	30-160			
Surrogate: Nitrobenzene-d5	4.75			ug/L	5.00		95.0	30-160			
Surrogate: 2-Fluorobiphenyl	4.67			ug/L	5.00		93.5	30-160			
Surrogate: 2,4,6-Tribromophenol	7.74			ug/L	7.50		103	30-160			
Surrogate: p-Terphenyl-d14	6.18			ug/L	5.00		124	30-160			Q
LCS Dup (BJK0625-BSD1)						Prepared: 26-Nov-2021 Analyzed: 01-Dec-2021 19:55					
Phenol	1.8	0.01	0.2	ug/L	5.00		36.6	30-160	5.40	30	
bis(2-chloroethyl) ether	4.5	0.03	0.2	ug/L	5.00		90.9	30-160	2.95	30	
2-Chlorophenol	3.8	0.03	0.2	ug/L	5.00		75.5	30-160	4.76	30	
1,3-Dichlorobenzene	3.3	0.03	0.2	ug/L	5.00		66.4	30-160	0.51	30	
1,4-Dichlorobenzene	3.7	0.03	0.2	ug/L	5.00		74.7	30-160	0.12	30	
1,2-Dichlorobenzene	3.4	0.03	0.2	ug/L	5.00		68.4	30-160	1.03	30	
Benzyl Alcohol	2.7	0.02	0.2	ug/L	5.00		54.2	30-160	6.22	30	
2,2'-Oxybis(1-chloropropane)	4.2	0.03	0.2	ug/L	5.00		83.9	30-160	2.14	30	
2-Methylphenol	3.4	0.03	0.2	ug/L	5.00		67.3	30-160	5.54	30	
Hexachloroethane	3.4	0.04	0.2	ug/L	5.00		67.5	30-160	2.14	30	
N-Nitroso-di-n-Propylamine	3.8	0.04	0.2	ug/L	5.00		76.8	30-160	4.27	30	
4-Methylphenol	3.0	0.03	0.2	ug/L	5.00		60.7	30-160	6.40	30	
Nitrobenzene	4.3	0.03	0.2	ug/L	5.00		86.9	30-160	2.37	30	
Isophorone	6.0	0.03	0.2	ug/L	5.00		121	30-160	3.02	30	
2-Nitrophenol	5.2	0.04	1.0	ug/L	5.00		104	30-160	2.69	30	Q
2,4-Dimethylphenol	10.7	0.3	1.0	ug/L	13.0		82.0	30-160	1.88	30	
Bis(2-Chloroethoxy)methane	5.2	0.03	0.2	ug/L	5.00		104	30-160	4.02	30	
2,4-Dichlorophenol	13.8	0.1	1.0	ug/L	13.0		106	30-160	3.65	30	
1,2,4-Trichlorobenzene	3.3	0.03	0.2	ug/L	5.00		66.5	30-160	0.20	30	
Naphthalene	3.7	0.03	0.2	ug/L	5.00		74.5	30-160	2.23	30	
Benzoic acid	8.2	0.1	2.0	ug/L	23.0		35.8	30-160	5.35	30	
4-Chloroaniline	2.5	0.04	1.0	ug/L	13.0		19.4	30-160	15.90	30	*



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 18:02

Analysis by: Analytical Resources, LLC

Semivolatile Organic Compounds - Quality Control

Batch BJK0625 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BJK0625-BSD1)						Prepared: 26-Nov-2021 Analyzed: 01-Dec-2021 19:55					
Hexachlorobutadiene	3.1	0.04	0.2	ug/L	5.00		62.0	30-160	2.77	30	
4-Chloro-3-Methylphenol	13.8	0.1	1.0	ug/L	13.0		106	30-160	3.95	30	
2-Methylnaphthalene	4.1	0.03	0.2	ug/L	5.00		82.8	30-160	1.82	30	
Hexachlorocyclopentadiene	4.6	0.1	1.0	ug/L	13.0		35.4	30-160	0.66	30	Q
2,4,6-Trichlorophenol	13.8	0.2	1.0	ug/L	13.0		106	30-160	6.07	30	
2,4,5-Trichlorophenol	13.4	0.1	1.0	ug/L	13.0		103	30-160	3.06	30	
2-Chloronaphthalene	4.3	0.03	0.2	ug/L	5.00		85.9	30-160	6.85	30	
2-Nitroaniline	14.9	0.2	1.0	ug/L	13.0		115	30-160	9.13	30	
Acenaphthylene	3.7	0.02	0.2	ug/L	5.00		73.0	30-160	3.85	30	
Dimethylphthalate	4.4	0.04	0.2	ug/L	5.00		87.1	30-160	5.12	30	
2,6-Dinitrotoluene	15.9	0.2	1.0	ug/L	13.0		122	30-160	6.72	30	
Acenaphthene	4.0	0.03	0.2	ug/L	5.00		79.5	30-160	5.05	30	
3-Nitroaniline	13.3	0.2	1.0	ug/L	13.0		102	30-160	13.50	30	
2,4-Dinitrophenol	22.5	0.2	2.0	ug/L	23.0		97.8	30-160	10.90	30	
Dibenzofuran	4.5	0.02	0.2	ug/L	5.00		89.2	30-160	6.98	30	
4-Nitrophenol	3.9	0.06	1.0	ug/L	13.0		29.8	30-160	13.70	30	*
2,4-Dinitrotoluene	16.1	0.1	1.0	ug/L	13.0		124	30-160	8.34	30	Q
Fluorene	2.9	0.02	0.2	ug/L	5.00		58.7	30-160	6.47	30	Q
4-Chlorophenylphenyl ether	2.7	0.02	0.2	ug/L	5.00		53.5	30-160	4.01	30	Q
Diethyl phthalate	4.3	0.06	0.2	ug/L	5.00		86.4	30-160	3.77	30	
4-Nitroaniline	15.5	0.2	1.0	ug/L	13.0		119	30-160	10.20	30	
4,6-Dinitro-2-methylphenol	25.7	0.4	2.0	ug/L	23.0		112	30-160	3.97	30	
N-Nitrosodiphenylamine	4.4	0.03	0.2	ug/L	5.00		87.7	30-160	5.23	30	
4-Bromophenyl phenyl ether	4.6	0.02	0.2	ug/L	5.00		92.3	30-160	3.64	30	
Hexachlorobenzene	4.1	0.04	0.2	ug/L	5.00		82.4	30-160	6.36	30	
Pentachlorophenol	5.4	0.1	1.0	ug/L	13.0		41.7	30-160	7.64	30	Q
Phenanthrene	4.2	0.02	0.2	ug/L	5.00		83.1	30-160	5.73	30	
Anthracene	4.1	0.03	0.2	ug/L	5.00		81.4	30-160	6.10	30	
Carbazole	4.6	0.04	0.2	ug/L	5.00		91.6	30-160	6.30	30	
Di-n-Butylphthalate	4.9	0.05	0.2	ug/L	5.00		98.9	30-160	5.71	30	
Fluoranthene	5.6	0.03	0.2	ug/L	5.00		112	30-160	9.04	30	Q
Pyrene	5.6	0.03	0.2	ug/L	5.00		111	30-160	10.20	30	Q
Butylbenzylphthalate	5.2	0.07	0.2	ug/L	5.00		104	30-160	7.87	30	Q
Benzo(a)anthracene	4.8	0.04	0.2	ug/L	5.00		95.4	30-160	5.38	30	
3,3'-Dichlorobenzidine	14.5	0.3	1.0	ug/L	13.0		111	30-160	8.70	30	


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
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Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - Quality Control
Batch BJK0625 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BJK0625-BSD1)						Prepared: 26-Nov-2021 Analyzed: 01-Dec-2021 19:55					
Chrysene	4.5	0.04	0.2	ug/L	5.00		89.1	30-160	5.87	30	
bis(2-Ethylhexyl)phthalate	4.5	0.2	0.2	ug/L	5.00		90.8	30-160	10.10	30	
Di-n-Octylphthalate	4.5	0.05	0.2	ug/L	5.00		89.7	30-160	6.35	30	
Benzo(a)fluoranthene, Total	9.8	0.08	0.4	ug/L	10.0		97.8	30-160	3.91	30	
Benzo(a)pyrene	4.6	0.05	0.2	ug/L	5.00		92.7	30-160	4.04	30	
Indeno(1,2,3-cd)pyrene	4.2	0.06	0.2	ug/L	5.00		84.5	30-160	6.73	30	
Dibenzo(a,h)anthracene	4.0	0.07	0.2	ug/L	5.00		79.9	30-160	5.37	30	
Benzo(g,h,i)perylene	4.0	0.04	0.2	ug/L	5.00		79.9	30-160	6.82	30	
1-Methylnaphthalene	4.5	0.03	0.2	ug/L	5.00		89.9	30-160	1.86	30	
Surrogate: 2-Fluorophenol	3.99			ug/L	7.50		53.1	30-160			
Surrogate: Phenol-d5	2.73			ug/L	7.50		36.5	30-160			
Surrogate: 2-Chlorophenol-d4	6.56			ug/L	7.50		87.5	30-160			
Surrogate: 1,2-Dichlorobenzene-d4	3.49			ug/L	5.00		69.8	30-160			
Surrogate: Nitrobenzene-d5	4.45			ug/L	5.00		88.9	30-160			
Surrogate: 2-Fluorobiphenyl	4.38			ug/L	5.00		87.7	30-160			
Surrogate: 2,4,6-Tribromophenol	7.20			ug/L	7.50		95.9	30-160			
Surrogate: p-Terphenyl-d14	5.69			ug/L	5.00		114	30-160			Q


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 17-Dec-2021 18:02

Analysis by: Analytical Resources, LLC
Petroleum Hydrocarbons - Quality Control
Batch BJK0583 - EPA 3510C SepF

Instrument: FID4 Analyst: TWC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0583-BLK1)		Prepared: 24-Nov-2021 Analyzed: 24-Nov-2021 18:25								
Diesel Range Organics (C12-C24)	ND	0.100	mg/L							U
Motor Oil Range Organics (C24-C38)	ND	0.200	mg/L							U
<i>Surrogate: o-Terphenyl</i>	0.209		mg/L	0.225		92.8	50-150			
LCS (BJK0583-BS1)		Prepared: 24-Nov-2021 Analyzed: 24-Nov-2021 18:44								
Diesel Range Organics (C12-C24)	2.78	0.100	mg/L	3.00		92.7	56-120			
<i>Surrogate: o-Terphenyl</i>	0.241		mg/L	0.225		107	50-150			
Matrix Spike (BJK0583-MS1)		Source: 21K0343-01		Prepared: 24-Nov-2021 Analyzed: 24-Nov-2021 19:23						
Diesel Range Organics (C12-C24)	2.92	0.114	mg/L	3.41	ND	85.6	56-120			
<i>Surrogate: o-Terphenyl</i>	0.250		mg/L	0.256	0.224	97.9	50-150			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.										
Matrix Spike Dup (BJK0583-MSD1)		Source: 21K0343-01		Prepared: 24-Nov-2021 Analyzed: 24-Nov-2021 19:42						
Diesel Range Organics (C12-C24)	2.86	0.100	mg/L	3.00	ND	95.3	56-120	2.02	30	
<i>Surrogate: o-Terphenyl</i>	0.240		mg/L	0.225	0.224	107	50-150			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.										



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 18:02

Analysis by: Analytical Resources, LLC

Aroclor PCB - Quality Control

Batch BJK0623 - EPA 3510C SepF

Instrument: ECD7 Analyst: JGR

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0623-BLK1)						Prepared: 26-Nov-2021 Analyzed: 27-Nov-2021 17:00					
Aroclor 1016	ND	0.002	0.010	ug/L							U
Aroclor 1221	ND	0.002	0.010	ug/L							U
Aroclor 1232	ND	0.002	0.010	ug/L							U
Aroclor 1242	ND	0.002	0.010	ug/L							U
Aroclor 1248	ND	0.002	0.010	ug/L							U
Aroclor 1254	ND	0.002	0.010	ug/L							U
Aroclor 1260	ND	0.003	0.010	ug/L							U
Aroclor 1262	ND	0.003	0.010	ug/L							U
Aroclor 1268	ND	0.003	0.010	ug/L							U
Surrogate: Decachlorobiphenyl	28.6			ug/L	40.0		71.4	29-120			
Surrogate: Tetrachlorometaxylene	29.3			ug/L	40.0		73.1	32-120			
Surrogate: Decachlorobiphenyl [2C]	30.0			ug/L	40.0		75.1	29-120			
Surrogate: Tetrachlorometaxylene [2C]	29.0			ug/L	40.0		72.5	32-120			
LCS (BJK0623-BS1)						Prepared: 26-Nov-2021 Analyzed: 27-Nov-2021 17:22					
Aroclor 1016	0.044	0.002	0.010	ug/L	0.0500		87.5	54-120			
Aroclor 1260	0.041	0.003	0.010	ug/L	0.0500		81.9	51-128			
Surrogate: Decachlorobiphenyl	28.6			ug/L	40.0		71.5	29-120			
Surrogate: Tetrachlorometaxylene	29.0			ug/L	40.0		72.4	32-120			
Surrogate: Decachlorobiphenyl [2C]	29.7			ug/L	40.0		74.2	29-120			
Surrogate: Tetrachlorometaxylene [2C]	29.1			ug/L	40.0		72.9	32-120			
LCS Dup (BJK0623-BSD1)						Prepared: 26-Nov-2021 Analyzed: 27-Nov-2021 17:43					
Aroclor 1016	0.042	0.002	0.010	ug/L	0.0500		84.6	54-120	3.31	30	
Aroclor 1260	0.042	0.003	0.010	ug/L	0.0500		83.7	51-128	2.16	30	
Surrogate: Decachlorobiphenyl	32.2			ug/L	40.0		80.6	29-120			
Surrogate: Tetrachlorometaxylene	27.9			ug/L	40.0		69.8	32-120			
Surrogate: Decachlorobiphenyl [2C]	33.3			ug/L	40.0		83.1	29-120			
Surrogate: Tetrachlorometaxylene [2C]	27.8			ug/L	40.0		69.5	32-120			


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 17-Dec-2021 18:02

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds - Quality Control
Batch BJL0067 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJL0067-BLK1)			Prepared: 02-Dec-2021 Analyzed: 02-Dec-2021 16:34									
Chromium	52	ND	0.260	0.500	ug/L							U
Chromium	53	ND	0.239	0.500	ug/L							U
Manganese	55	ND	0.142	0.500	ug/L							U
Arsenic	75a	ND	0.0373	0.200	ug/L							U
Cobalt	59	ND	0.0178	0.200	ug/L							U
LCS (BJL0067-BS1)			Prepared: 02-Dec-2021 Analyzed: 02-Dec-2021 16:39									
Chromium	52	23.6	0.260	0.500	ug/L	25.0		94.3	80-120			
Chromium	53	24.5	0.239	0.500	ug/L	25.0		98.2	80-120			
Manganese	55	24.3	0.142	0.500	ug/L	25.0		97.0	80-120			
Arsenic	75a	24.6	0.0373	0.200	ug/L	25.0		98.5	80-120			
Cobalt	59	25.0	0.0178	0.200	ug/L	25.0		100	80-120			



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 18:02

Analysis by: Analytical Resources, LLC

Metals and Metallic Compounds (dissolved) - Quality Control

Batch BJK0584 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: SKD

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0584-BLK2)						Prepared: 22-Nov-2021 Analyzed: 24-Nov-2021 16:53						
Chromium, Dissolved	52	ND	0.260	0.500	ug/L							U
Chromium, Dissolved	53	ND	0.239	0.500	ug/L							U
Manganese, Dissolved	55	ND	0.142	0.500	ug/L							U

Blank (BJK0584-BLK3)						Prepared: 22-Nov-2021 Analyzed: 29-Nov-2021 18:14						
Cobalt, Dissolved	59	ND	0.0178	0.200	ug/L							U

LCS (BJK0584-BS2)						Prepared: 22-Nov-2021 Analyzed: 24-Nov-2021 16:57						
Chromium, Dissolved	52	24.8	0.260	0.500	ug/L	25.0		99.2	80-120			
Chromium, Dissolved	53	25.0	0.239	0.500	ug/L	25.0		99.9	80-120			
Manganese, Dissolved	55	25.5	0.142	0.500	ug/L	25.0		102	80-120			
Cobalt, Dissolved	59	24.3	0.0178	0.200	ug/L	25.0		97.1	80-120			

Duplicate (BJK0584-DUP1)						Source: 21K0343-02 Prepared: 22-Nov-2021 Analyzed: 30-Nov-2021 01:43						
Arsenic, Dissolved	75a	12.9	0.0373	0.200	ug/L		14.0			8.03	20	
Cobalt, Dissolved	59	2.41	0.0178	0.200	ug/L		2.61			7.77	20	

Matrix Spike (BJK0584-MS1)						Source: 21K0343-02 Prepared: 22-Nov-2021 Analyzed: 30-Nov-2021 01:48						
Arsenic, Dissolved	75a	38.3	0.0373	0.200	ug/L	25.0	14.0	97.1	75-125			
Cobalt, Dissolved	59	27.4	0.0178	0.200	ug/L	25.0	2.61	99.4	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BJK0584-MSD1)						Source: 21K0343-02 Prepared: 22-Nov-2021 Analyzed: 30-Nov-2021 01:54						
Arsenic, Dissolved	75a	38.6	0.0373	0.200	ug/L	25.0	14.0	98.4	75-125	0.86	20	
Cobalt, Dissolved	59	27.0	0.0178	0.200	ug/L	25.0	2.61	97.5	75-125	1.73	20	

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Instrument: ICPMS2 Analyst: SKD

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0584-BLK1)						Prepared: 22-Nov-2021 Analyzed: 23-Nov-2021 23:34						
Arsenic, Dissolved	75a	ND	0.0373	0.200	ug/L							U
LCS (BJK0584-BS1)						Prepared: 22-Nov-2021 Analyzed: 23-Nov-2021 23:39						
Arsenic, Dissolved	75a	24.0	0.0373	0.200	ug/L	25.0		95.8	80-120			



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 18:02

Analysis by: Analytical Resources, LLC

Metals and Metallic Compounds (dissolved) - Quality Control

Batch BJK0584 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: SKD

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Duplicate (BJK0584-DUP2)		Source: 21K0343-02		Prepared: 22-Nov-2021		Analyzed: 03-Dec-2021 19:51						
Chromium, Dissolved	52	ND	1.30	2.50	ug/L		ND					U

Duplicate (BJK0584-DUP3)		Source: 21K0343-02		Prepared: 22-Nov-2021		Analyzed: 07-Dec-2021 19:47						
Manganese, Dissolved	55	511	1.42	5.00	ug/L		527			3.11	20	D

Matrix Spike (BJK0584-MS2)		Source: 21K0343-02		Prepared: 22-Nov-2021		Analyzed: 03-Dec-2021 19:55						
Chromium, Dissolved	52	25.8	1.30	2.50	ug/L	25.0	ND	103	75-125			D

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike (BJK0584-MS3)		Source: 21K0343-02		Prepared: 22-Nov-2021		Analyzed: 07-Dec-2021 19:52						
Manganese, Dissolved	55	539	1.42	5.00	ug/L	25.0	527	47.0	75-125			HC, D

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BJK0584-MSD2)		Source: 21K0343-02		Prepared: 22-Nov-2021		Analyzed: 03-Dec-2021 20:04						
Chromium, Dissolved	52	27.6	1.30	2.50	ug/L	25.0	ND	110	75-125	6.97	20	D

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BJK0584-MSD3)		Source: 21K0343-02		Prepared: 22-Nov-2021		Analyzed: 07-Dec-2021 19:57						
Manganese, Dissolved	55	529	1.42	5.00	ug/L	25.0	527	9.04	75-125	1.78	20	HC, D

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 18:02

Analysis by: Analytical Resources, LLC

Wet Chemistry - Quality Control

Batch BJK0548 - No Prep Wet Chem

Instrument: IC930 Analyst: BF

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0548-BLK1)					Prepared: 19-Nov-2021 Analyzed: 19-Nov-2021 19:56						
Chloride	ND	0.100	0.100	mg/L							U
Nitrate-N	ND	0.100	0.100	mg/L							U
Nitrite-N	ND	0.100	0.100	mg/L							U
Blank (BJK0548-BLK2)					Prepared: 19-Nov-2021 Analyzed: 03-Dec-2021 00:16						
Sulfate	ND	0.100	0.100	mg/L							U
LCS (BJK0548-BS1)					Prepared: 19-Nov-2021 Analyzed: 19-Nov-2021 20:16						
Chloride	4.88	0.100	0.100	mg/L	5.00		97.6	90-110			
Nitrate-N	4.97	0.100	0.100	mg/L	5.00		99.4	90-110			
Nitrite-N	5.07	0.100	0.100	mg/L	5.00		101	90-110			
LCS (BJK0548-BS2)					Prepared: 19-Nov-2021 Analyzed: 03-Dec-2021 00:36						
Sulfate	5.13	0.100	0.100	mg/L	5.00		103	90-110			
Duplicate (BJK0548-DUP1)					Source: 21K0343-03 Prepared: 19-Nov-2021 Analyzed: 19-Nov-2021 21:16						
Chloride	0.785	0.100	0.100	mg/L		0.787			0.25	20	
Nitrate-N	0.385	0.100	0.100	mg/L		0.387			0.52	20	
Nitrite-N	ND	0.100	0.100	mg/L		ND					U
Duplicate (BJK0548-DUP2)					Source: 21K0343-03RE1 Prepared: 19-Nov-2021 Analyzed: 03-Dec-2021 02:36						
Sulfate	6.49	0.100	0.100	mg/L		6.48			0.11	20	
Matrix Spike (BJK0548-MS1)					Source: 21K0343-03 Prepared: 19-Nov-2021 Analyzed: 19-Nov-2021 21:36						
Chloride	2.84	0.100	0.100	mg/L	2.00	0.787	103	75-125			
Nitrate-N	2.50	0.100	0.100	mg/L	2.00	0.387	105	75-125			
Nitrite-N	1.83	0.100	0.100	mg/L	2.01	ND	91.3	75-125			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
DL (BJK0548-MS2)					Source: 21K0343-03RE1 Prepared: 19-Nov-2021 Analyzed: 03-Dec-2021 02:56						
Sulfate	8.62	0.100	0.100	mg/L	2.00	6.48	107	75-125			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 17-Dec-2021 18:02

Analysis by: Analytical Resources, LLC
Wet Chemistry - Quality Control
Batch BJK0550 - No Prep Wet Chem

Instrument: UV1800-2 Analyst: RMS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0550-BLK1)						Prepared: 19-Nov-2021 Analyzed: 19-Nov-2021 18:15					
Hexavalent Chromium	ND	0.013	0.013	mg/L							U
LCS (BJK0550-BS1)						Prepared: 19-Nov-2021 Analyzed: 19-Nov-2021 18:16					
Hexavalent Chromium	0.619	0.013	0.013	mg/L	0.626		98.9	85-115			D
Duplicate (BJK0550-DUP1)						Source: 21K0343-01 Prepared: 19-Nov-2021 Analyzed: 19-Nov-2021 18:18					
Hexavalent Chromium	ND	0.013	0.013	mg/L		ND					U
Matrix Spike (BJK0550-MS1)						Source: 21K0343-01 Prepared: 19-Nov-2021 Analyzed: 19-Nov-2021 18:19					
Hexavalent Chromium	ND	0.013	0.013	mg/L	0.0626	ND		85-115			*, K, U
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Post Spike (BJK0550-PS1)						Source: 21K0343-01 Prepared: 19-Nov-2021 Analyzed: 19-Nov-2021 18:29					
Hexavalent Chromium	0.002			mg/L	0.0299	ND	-12.2	85-115			*



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 18:02

Analysis by: Analytical Resources, LLC

Wet Chemistry - Quality Control

Batch BJK0551 - No Prep Wet Chem

Instrument: UV1800-1 Analyst: CKI

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0551-BLK1)						Prepared: 19-Nov-2021 Analyzed: 19-Nov-2021 19:08					
Ferrous Iron	ND	0.040	0.040	mg/L							U
LCS (BJK0551-BS1)						Prepared: 19-Nov-2021 Analyzed: 19-Nov-2021 19:09					
Ferrous Iron	0.488	0.040	0.040	mg/L	0.500		97.7	90-110			
Duplicate (BJK0551-DUP1)						Source: 21K0343-01 Prepared: 19-Nov-2021 Analyzed: 19-Nov-2021 19:10					
Ferrous Iron	16.6	2.00	2.00	mg/L		16.3			2.13	20	D
Matrix Spike (BJK0551-MS1)						Source: 21K0343-01 Prepared: 19-Nov-2021 Analyzed: 19-Nov-2021 19:11					
Ferrous Iron	32.7	4.00	4.00	mg/L	20.0	16.3	82.3	75-125			D

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 18:02

Analysis by: Analytical Resources, LLC

Wet Chemistry - Quality Control

Batch BJK0556 - No Prep Wet Chem

Instrument: N/A

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0556-BLK1)					Prepared: 19-Nov-2021 Analyzed: 19-Nov-2021 18:00					
Sulfite	ND	1.4	1.4	mg/L						U
LCS (BJK0556-BS1)					Prepared: 19-Nov-2021 Analyzed: 19-Nov-2021 18:00					
Sulfite	4.2	1.4	1.4	mg/L	5.02		83.0 75-100			
Duplicate (BJK0556-DUP1)					Source: 21K0343-01 Prepared: 19-Nov-2021 Analyzed: 19-Nov-2021 18:00					
Sulfite	ND	1.4	1.4	mg/L		ND				H, U


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 17-Dec-2021 18:02

Certified Analyses included in this Report

Analyte	Certifications
<i>EPA 300.0 in Water</i>	
Chloride	DoD-ELAP,WADOE,WA-DW,NELAP
Nitrate-N	DoD-ELAP,WADOE,WA-DW,NELAP
Nitrite-N	DoD-ELAP,WADOE,WA-DW,NELAP
Sulfate	DoD-ELAP,WADOE,WA-DW,NELAP
<i>EPA 6020B in Water</i>	
Chromium-52	NELAP,WADOE,DoD-ELAP,ADEC
Chromium-53	NELAP,WADOE,DoD-ELAP,ADEC
Manganese-55	NELAP,WADOE,DoD-ELAP
Chromium-52	NELAP,WADOE,DoD-ELAP,ADEC
Chromium-53	NELAP,WADOE,DoD-ELAP,ADEC
Manganese-55	NELAP,WADOE,DoD-ELAP
<i>EPA 6020B UCT-KED in Water</i>	
Arsenic-75a	WADOE,WA-DW,DoD-ELAP,ADEC,NELAP
Cobalt-59	NELAP,DoD-ELAP,WADOE
Arsenic-75a	NELAP,WADOE,DoD-ELAP,ADEC
Cobalt-59	DoD-ELAP,NELAP,WADOE
<i>EPA 8082A in Water</i>	
Aroclor 1016	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1016 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1221	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1221 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1232	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1232 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1242	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1242 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1248	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1248 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1254	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1254 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1260	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1260 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1262	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1262 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1268	WADOE,DoD-ELAP,NELAP,ADEC


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
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 Project Manager: Meg Strong

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Aroclor 1268 [2C]

WADOE,DoD-ELAP,NELAP,ADEC

EPA 8260D in Water

Chloromethane

DoD-ELAP,ADEC,NELAP,WADOE

Vinyl Chloride

DoD-ELAP,ADEC,NELAP,WADOE

Bromomethane

DoD-ELAP,ADEC,NELAP,WADOE

Chloroethane

DoD-ELAP,ADEC,NELAP,WADOE

Trichlorofluoromethane

DoD-ELAP,ADEC,NELAP,WADOE

Acrolein

DoD-ELAP,NELAP,WADOE

1,1,2-Trichloro-1,2,2-Trifluoroethane

DoD-ELAP,ADEC,NELAP,WADOE

Acetone

DoD-ELAP,ADEC,NELAP,WADOE

1,1-Dichloroethene

DoD-ELAP,ADEC,NELAP,WADOE

Iodomethane

DoD-ELAP,NELAP,WADOE

Methylene Chloride

DoD-ELAP,ADEC,NELAP,WADOE

Acrylonitrile

DoD-ELAP,NELAP,WADOE

Carbon Disulfide

DoD-ELAP,NELAP,WADOE

trans-1,2-Dichloroethene

DoD-ELAP,ADEC,NELAP,WADOE

Vinyl Acetate

DoD-ELAP,NELAP,WADOE

1,1-Dichloroethane

DoD-ELAP,ADEC,NELAP,WADOE

2-Butanone

DoD-ELAP,NELAP,WADOE

2,2-Dichloropropane

DoD-ELAP,ADEC,NELAP,WADOE

cis-1,2-Dichloroethene

DoD-ELAP,ADEC,NELAP,WADOE

Chloroform

DoD-ELAP,ADEC,NELAP,WADOE

Bromochloromethane

DoD-ELAP,ADEC,NELAP,WADOE

1,1,1-Trichloroethane

DoD-ELAP,ADEC,NELAP,WADOE

1,1-Dichloropropene

DoD-ELAP,ADEC,NELAP,WADOE

Carbon tetrachloride

DoD-ELAP,ADEC,NELAP,WADOE

1,2-Dichloroethane

DoD-ELAP,ADEC,NELAP,WADOE

Benzene

DoD-ELAP,ADEC,NELAP,WADOE

Trichloroethene

DoD-ELAP,ADEC,NELAP,WADOE

1,2-Dichloropropane

DoD-ELAP,ADEC,NELAP,WADOE

Bromodichloromethane

DoD-ELAP,ADEC,NELAP,WADOE

Dibromomethane

DoD-ELAP,ADEC,NELAP,WADOE

2-Chloroethyl vinyl ether

DoD-ELAP,ADEC,NELAP,WADOE

4-Methyl-2-Pentanone

DoD-ELAP,NELAP,WADOE

cis-1,3-Dichloropropene

DoD-ELAP,ADEC,NELAP,WADOE

Toluene

DoD-ELAP,ADEC,NELAP,WADOE

trans-1,3-Dichloropropene

DoD-ELAP,ADEC,NELAP,WADOE

2-Hexanone

DoD-ELAP,NELAP,WADOE

1,1,2-Trichloroethane

DoD-ELAP,ADEC,NELAP,WADOE


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1,3-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
Tetrachloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Dibromochloromethane	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dibromoethane	DoD-ELAP,NELAP,WADOE
Chlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Ethylbenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,1,1,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,WADOE
m,p-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
o-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
Styrene	DoD-ELAP,NELAP,WADOE
Bromoform	DoD-ELAP,NELAP,WADOE
1,1,2,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,2,3-Trichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,4-Dichloro 2-Butene	DoD-ELAP,ADEC,NELAP,WADOE
n-Propylbenzene	DoD-ELAP,NELAP,WADOE
Bromobenzene	DoD-ELAP,NELAP,WADOE
Isopropyl Benzene	DoD-ELAP,NELAP,WADOE
2-Chlorotoluene	DoD-ELAP,ADEC,NELAP,WADOE
4-Chlorotoluene	DoD-ELAP,ADEC,NELAP,WADOE
t-Butylbenzene	DoD-ELAP,NELAP,WADOE
1,3,5-Trimethylbenzene	DoD-ELAP,NELAP,WADOE
1,2,4-Trimethylbenzene	DoD-ELAP,NELAP,WADOE
s-Butylbenzene	DoD-ELAP,NELAP,WADOE
4-Isopropyl Toluene	DoD-ELAP,NELAP,WADOE
1,3-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,4-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
n-Butylbenzene	DoD-ELAP,NELAP,WADOE
1,2-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dibromo-3-chloropropane	DoD-ELAP,ADEC,NELAP,WADOE
1,2,4-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Hexachloro-1,3-Butadiene	DoD-ELAP,ADEC,NELAP,WADOE
Naphthalene	DoD-ELAP,ADEC,NELAP,WADOE
1,2,3-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Dichlorodifluoromethane	DoD-ELAP,ADEC,NELAP,WADOE
Methyl tert-butyl Ether	DoD-ELAP,ADEC,NELAP,WADOE
n-Hexane	WADOE
2-Pentanone	WADOE

EPA 8260D-SIM in Water

Acrylonitrile	NELAP,WADOE
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 Seattle WA, 98103-8636

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Vinyl chloride	NELAP,WADOE
1,1-Dichloroethene	NELAP,WADOE
cis-1,2-Dichloroethene	NELAP,WADOE
trans-1,2-Dichloroethene	NELAP,WADOE
Trichloroethene	NELAP,WADOE
Tetrachloroethene	NELAP,WADOE
1,1,2,2-Tetrachloroethane	NELAP,WADOE
1,2-Dichloroethane	NELAP,WADOE
Benzene	NELAP,WADOE

EPA 8270E in Water

Phenol	NELAP,DoD-ELAP
bis(2-chloroethyl) ether	NELAP,DoD-ELAP
2-Chlorophenol	NELAP,DoD-ELAP
1,3-Dichlorobenzene	NELAP,DoD-ELAP
1,4-Dichlorobenzene	NELAP,DoD-ELAP
1,2-Dichlorobenzene	NELAP,DoD-ELAP
Benzyl Alcohol	NELAP,DoD-ELAP
2,2'-Oxybis(1-chloropropane)	NELAP,DoD-ELAP
2-Methylphenol	NELAP,DoD-ELAP
Hexachloroethane	NELAP,DoD-ELAP
N-Nitroso-di-n-Propylamine	NELAP,DoD-ELAP
4-Methylphenol	NELAP,DoD-ELAP
Nitrobenzene	NELAP,DoD-ELAP
Isophorone	NELAP,DoD-ELAP
2-Nitrophenol	NELAP,DoD-ELAP
2,4-Dimethylphenol	NELAP,DoD-ELAP
Bis(2-Chloroethoxy)methane	NELAP,DoD-ELAP
2,4-Dichlorophenol	NELAP,DoD-ELAP
1,2,4-Trichlorobenzene	NELAP,DoD-ELAP
Naphthalene	NELAP,DoD-ELAP
Benzoic acid	NELAP,DoD-ELAP
4-Chloroaniline	NELAP,DoD-ELAP
Hexachlorobutadiene	NELAP,DoD-ELAP
4-Chloro-3-Methylphenol	NELAP,DoD-ELAP
2-Methylnaphthalene	NELAP,DoD-ELAP
Hexachlorocyclopentadiene	NELAP,DoD-ELAP
2,4,6-Trichlorophenol	NELAP,DoD-ELAP
2,4,5-Trichlorophenol	NELAP,DoD-ELAP
2-Chloronaphthalene	NELAP,DoD-ELAP


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2-Nitroaniline	NELAP,DoD-ELAP
Acenaphthylene	NELAP,DoD-ELAP
Dimethylphthalate	NELAP,DoD-ELAP
2,6-Dinitrotoluene	NELAP,DoD-ELAP
Acenaphthene	NELAP,DoD-ELAP
3-Nitroaniline	NELAP,DoD-ELAP
2,4-Dinitrophenol	NELAP,DoD-ELAP
Dibenzofuran	NELAP,DoD-ELAP
4-Nitrophenol	NELAP,DoD-ELAP
2,4-Dinitrotoluene	NELAP,DoD-ELAP
Fluorene	NELAP,DoD-ELAP
4-Chlorophenylphenyl ether	NELAP,DoD-ELAP
Diethyl phthalate	NELAP,DoD-ELAP
4-Nitroaniline	NELAP,DoD-ELAP
4,6-Dinitro-2-methylphenol	NELAP,DoD-ELAP
N-Nitrosodiphenylamine	NELAP,DoD-ELAP
4-Bromophenyl phenyl ether	NELAP,DoD-ELAP
Hexachlorobenzene	NELAP,DoD-ELAP
Pentachlorophenol	NELAP,DoD-ELAP
Phenanthrene	NELAP,DoD-ELAP
Anthracene	NELAP,DoD-ELAP
Carbazole	NELAP,DoD-ELAP
Di-n-Butylphthalate	NELAP,DoD-ELAP
Fluoranthene	NELAP,DoD-ELAP
Pyrene	NELAP,DoD-ELAP
Butylbenzylphthalate	NELAP,DoD-ELAP
Benzo(a)anthracene	NELAP,DoD-ELAP
3,3'-Dichlorobenzidine	NELAP,DoD-ELAP
Chrysene	NELAP,DoD-ELAP
bis(2-Ethylhexyl)phthalate	NELAP,DoD-ELAP
Di-n-Octylphthalate	NELAP,DoD-ELAP
Benzo(b)fluoranthene	NELAP,DoD-ELAP
Benzo(k)fluoranthene	NELAP,DoD-ELAP
Benzofluoranthenes, Total	NELAP
Benzo(a)pyrene	NELAP,DoD-ELAP
Indeno(1,2,3-cd)pyrene	NELAP,DoD-ELAP
Dibenzo(a,h)anthracene	NELAP,DoD-ELAP
Benzo(g,h,i)perylene	NELAP,DoD-ELAP
N-Nitrosodimethylamine	NELAP,DoD-ELAP


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1-Methylnaphthalene

NELAP,DoD-ELAP

EPA RSK-175 in Water

Methane

NELAP

Ethane

NELAP

Ethene

NELAP

Acetylene

NELAP

NWTPH-Dx in Water

Diesel Range Organics (C12-C24)

DoD-ELAP,NELAP,WADOE

Diesel Range Organics (C10-C25)

DoD-ELAP,NELAP,WADOE

Diesel Range Organics (Tol-C18)

DoD-ELAP,NELAP,WADOE

Diesel Range Organics (C10-C24)

DoD-ELAP,NELAP,WADOE

Diesel Range Organics (C10-C28)

DoD-ELAP,NELAP,WADOE

Diesel Range Organics (C12-C22)

DoD-ELAP

Diesel Range Organics (C12-C25)

DoD-ELAP

Motor Oil Range Organics (C24-C38)

DoD-ELAP,NELAP,WADOE

Motor Oil Range Organics (C25-C36)

DoD-ELAP,NELAP,WADOE

Motor Oil Range Organics (C24-C40)

DoD-ELAP,NELAP,WADOE

Residual Range Organics (C23-C32)

DoD-ELAP

Mineral Spirits Range Organics (Tol-C12)

DoD-ELAP,NELAP,WADOE

Mineral Oil Range Organics (C16-C28)

DoD-ELAP,NELAP,WADOE

Kerosene Range Organics (Tol-C18)

DoD-ELAP,NELAP,WADOE

JP8 Range Organics (C8-C18)

DoD-ELAP,NELAP,WADOE

JP5 Range Organics (C10-C16)

DoD-ELAP,NELAP,WADOE

JP4 Range Organics (Tol-C14)

DoD-ELAP,NELAP,WADOE

Jet-A Range Organics (C10-C18)

DoD-ELAP,NELAP,WADOE

Creosote Range Organics (C12-C22)

DoD-ELAP,NELAP,WADOE

Bunker C Range Organics (C10-C38)

DoD-ELAP,NELAP,WADOE

Stoddard Range Organics (C8-C12)

DoD-ELAP,NELAP,WADOE

Transformer Oil Range Organics (C12-C28)

DoD-ELAP,NELAP,WADOE

NWTPHg in Water

Gasoline Range Organics (Tol-Nap)

WADOE,DoD-ELAP

Gasoline Range Organics (2MP-TMB)

WADOE,DoD-ELAP

Gasoline Range Organics (Tol-C12)

WADOE,DoD-ELAP

Gasoline Range Organics (C6-C10)

WADOE,ADEC,DoD-ELAP

Gasoline Range Organics (C5-C12)

WADOE,DoD-ELAP

SM 3500-Cr B-09 in Water

Hexavalent Chromium

WADOE,NELAP

SM 3500-Fe B-97 in Water



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Ferrous Iron

WADOE,NELAP

SM 4500-SO3 B-00 in Water

Sulfite

WADOE,NELAP

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	17-015	03/28/2023
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	02/28/2022
NELAP	ORELAP - Oregon Laboratory Accreditation Program	WA100006-012	05/12/2022
WADOE	WA Dept of Ecology	C558	06/30/2022
WA-DW	Ecology - Drinking Water	C558	06/30/2022



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Notes and Definitions

*	Flagged value is not within established control limits.
D	The reported value is from a dilution
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL)
H	Hold time violation - Hold time was exceeded.
HC	The natural concentration of the spiked analyte is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
J	Estimated concentration value detected below the reporting limit.
K	Hexavalent Chromium post spike performed on a pH adjusted sample to verify matrix interference.
Q	Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20% RSD, <20% drift or minimum RRF)
U	This analyte is not detected above the reporting limit (RL) or if noted, not detected above the limit of detection (LOD).
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
[2C]	Indicates this result was quantified on the second column on a dual column analysis.



Analytical Resources, LLC
Analytical Chemists and Consultants

17 December 2021

Meg Strong
Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle, WA 98103-8636

RE: Lower Duwamish Q4

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)
21K0367

Associated SDG ID(s)
N/A

Digitally signed by
Shelly Fishel
Date: 2021.12.17
17:28:02 -08'00'

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, LLC

Shelly Fishel, Project Manager

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



ARI Assigned Number: 21K0367		Turn-around Requested: Standard		Page: of	
ARI Client Company: Shannon + Wilson		Phone:		Date:	Ice Present?
Client Contact: Shoshana Howard				No. of Coolers:	Cooler Temps:
Client Project Name: LDW				Analysis Requested	
Client Project #: 21-1-12596		Samplers: DES, RMV			
Sample ID	Date	Time	Matrix	No. Containers	Notes/Comments
EG-3-20212211	11/22	0952	W	6	TPH-G TPH-Dx BTEX HVOCS MTBE PAHs (Aroclors) Full SVOCs Limited SVOCs PCBs metals Hex, Chroma U.A.P. ① As, Cr, Mn, Ni, Cu, Pb, Hg, Se, Ag, Zn ② As, Ba, Cr, Mn, Ni, Co, Cu, Fe, Pb, Hg, Se, Ag, V, Zn
mw-46-20212211	11/22	1104	GW	16	
mw-56-20212211	11/22	1213	GW	17	
TB-9-20212211	11/22	0944	W	5	
Comments/Special Instructions NAP= Nitrate, Nitrite, chloride, sulfate, sulfite, dissolved ferrous iron, dissolved manganese iron, methane, ethane, ethene	Relinquished by: (Signature) Rose Vogt	Received by: (Signature) Isabelle Neasley		Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: Rose Vogt	Printed Name: Isabelle Neasley		Printed Name:	Printed Name:
	Company: Shannon + Wilson	Company: ARI		Company:	Company:
	Date & Time: 13:49	Date & Time: 11/22/21 13:49		Date & Time:	Date & Time:

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, notwithstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.



Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 17:13

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
EB-3-20212211	21K0367-01	Water	22-Nov-2021 09:52	22-Nov-2021 13:49
EB-3-20212211	21K0367-02	Water	22-Nov-2021 09:52	22-Nov-2021 13:49
MW-46-20212211	21K0367-03	Water	22-Nov-2021 11:04	22-Nov-2021 13:49
MW-46-20212211	21K0367-04	Water	22-Nov-2021 09:52	22-Nov-2021 13:49
MW-56-20212211	21K0367-05	Water	22-Nov-2021 12:13	22-Nov-2021 13:49
MW-56-20212211	21K0367-06	Water	22-Nov-2021 12:13	22-Nov-2021 13:49
TB-9-20212211	21K0367-07	Water	22-Nov-2021 09:44	22-Nov-2021 13:49



Shannon & Wilson, Inc
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Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 17:13

Work Order Case Narrative

Client: Shannon & Wilson, Inc
Project: Lower Duwamish Q4
Work Order: 21K0367

Sample receipt

Samples as listed on the preceding page were received 22-Nov-2021 13:49 under ARI work order 21K0367. For details regarding sample receipt, please refer to the Cooler Receipt Form.

Volatiles - EPA Method SW8260D

The sample(s) were analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within control limits.

Volatiles - EPA Method 8260D-SIM (Selected Ion Monitoring)

The sample(s) were analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within control limits.

Volatile Gases - MEE by RSK175

The sample(s) were analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.


 Shannon & Wilson, Inc
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 Seattle WA, 98103-8636

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Reported:
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The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within control limits.

Sample specific QC was performed in association with sample 21K0367-05 in batch BJJ0076. The duplicate (DUP) relative percent difference (RPD) were within advisory control limits.

Semivolatiles - EPA Method SW8270E

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements except as follows. Pentachlorophenol which was out of control low and Butylbenzylphthalate and surrogate p-Terphenyl-d14 which were out of control high in the initial calibration verification SJL0050-ICV1. All samples which contain analyte have been flagged with a "Q" qualifier. Pentachlorophenol was out of control low in the continuing calibration verification SJL0050-CCV1. Benzoic Acid and Pentachlorophenol were out of control low in the low concentration calibration verification SJL0050-LCV1. Benzoic Acid, Pentachlorophenol and internal standard Chrysene-d12 which were out of control low in the low concentration calibration verification SJL0050-LCV2.

Internal standard areas were within limits except Chrysene-d12 which was out of control high in sample 21K0367-01, low concentration calibration verification SJL0050-LCV2 and method blank BJK0625-BLK1. Due to this failure sample 21K0367-01 was reanalyzed and all recoveries were within control limits.

The surrogate percent recoveries were within control limits except Phenol-d5 which was out of control low in samples 21K0367-01RE1 and 21K0367-03 and the method blank BLK0625-BLK1 and have been flagged.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within control limits.

Total Metals - EPA Method 6020B

The sample(s) were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 17-Dec-2021 17:13

Sample specific QC was performed in association with sample 21K0367-01 in batch BJJ 0112. The duplicate (DUP) relative percent difference (RPD) were within advisory control limits. The matrix spike/matrix spike duplicate (MS/MSD) spike recoveries and relative percent difference (RPD) were within advisory control limits.

Dissolved Metals - EPA Method 6020B

The sample(s) were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within control limits.

Sample specific QC was performed in association with sample 21K0367-02 in batch BJJ0105. The duplicate (DUP) relative percent difference (RPD) were within advisory control limits. The matrix spike/matrix spike duplicate (MS/MSD) spike recoveries and relative percent difference (RPD) were within advisory control limits.

Wet Chemistry

The sample(s) were prepared and analyzed within the recommended holding times except Sulfite. The Sulfite holding time was exceeded upon sample receipt. Deviation has been "H" flagged.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Sample specific QC was performed in association with sample 21K0367-05 in Anions batch BJK0598 in Sulfite batch BJK0596 and Ferrous Iron batch BJK0595. The matrix spike (MS) percent recoveries and the duplicate (DUP) relative percent difference (RPD) were within advisory control limits.

Gasoline by NWTPH-q (GC/MS)

The sample(s) were analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.



Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 17:13

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within control limits.

Diesel/Heavy Oil Range Organics - WA-Ecology Method NW-TPHDx

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within control limits.

Sample specific QC was performed in association with sample 21K0367-05 in batch BJK634. The matrix spike/matrix spike duplicate (MS/MSD) percent recoveries and relative percent difference (RPD) were within advisory control limits.

Polynuclear Aromatic Hydrocarbons (PAH) - EPA Method SW8270E-SIM

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements except Benzo(g,h,i)perylene and surrogate Dibenzo(a,h)anthracene-d14 which were out of control low in the initial calibration verification SJL0008-ICV1. All samples which contain analyte have been flagged with a "Q" qualifier.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits except Dibenzo(a,h)anthracene-d14 which were out of control low in sample 21K367-03RE1 and the initial calibration verification SJL0008-ICV1. Deviations have been flagged

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within control limits.

Total Mercury - EPA Method 7470/7471

The sample(s) were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.



Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 17:13

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Dissolved Mercury - EPA Method 7470/7471

The sample(s) were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Sample specific QC was performed in association with sample 21K0367-04 in batch B JL0108. The duplicate (DUP) relative percent difference (RPD) were within advisory control limits. The matrix spike/matrix spike duplicate (MS/MSD) spike recoveries and relative percent difference (RPD) were within advisory control limits.



WORK ORDER

21K0367

Samples will be discarded 90 days after submission of a final report unless other instructions are received.

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish Q4

Project Number: 21-1-12596-012

Preservation Confirmation

Container ID	Container Type	pH
21K0367-01 A	Glass NM, Amber, 1000 mL	
21K0367-01 B	Glass NM, Amber, 1000 mL	
21K0367-01 C	HDPE NM, 500 mL, 1:1 HNO3	<2 Pass (P)
21K0367-01 D	Glass NM, Amber, 500 mL	
21K0367-01 E	Glass NM, Amber, 500 mL	
21K0367-02 A	HDPE NM, 500 mL	>2 Fail (F)
21K0367-03 A	HDPE NM, 500 mL, 1:1 HNO3	on 11/22/21 → >2 Fail (F) <2 Pass (P)
21K0367-03 B	Glass NM, Amber, 500 mL	
21K0367-03 C	Glass NM, Amber, 500 mL	
21K0367-03 D	Glass NM, Amber, 500 mL	
21K0367-03 E	Glass NM, Amber, 500 mL	
21K0367-03 F	Glass NM, Amber, 500 mL	
21K0367-03 G	Glass NM, Amber, 500 mL	
21K0367-03 H	Glass NM, Amber, 250 mL	
21K0367-03 I	VOA Vial, Clear, 40 mL, HCL	
21K0367-03 J	VOA Vial, Clear, 40 mL, HCL	
21K0367-03 K	VOA Vial, Clear, 40 mL, HCL	
21K0367-03 L	VOA Vial, Clear, 40 mL, HCL	
21K0367-03 M	VOA Vial, Clear, 40 mL, HCL	
21K0367-03 N	VOA Vial, Clear, 40 mL, HCL	
21K0367-03 O	VOA Vial, Clear, 40 mL, HCL	
21K0367-04 A	HDPE NM, 500 mL	>2 F
21K0367-05 A	HDPE NM, 500 mL, 1:1 HNO3	<2 P
21K0367-05 B	Small OJ, 500 mL, EDTA	
21K0367-05 C	HDPE NM, 500 mL	
21K0367-05 D	HDPE NM, 500 mL	
21K0367-05 E	Glass NM, Amber, 500 mL, HCl	lab to determine preservation
21K0367-05 F	Glass NM, Amber, 500 mL	
21K0367-05 G	Glass NM, Amber, 500 mL	
21K0367-05 H	Glass NM, Amber, 500 mL	
21K0367-05 I	Glass NM, Amber, 500 mL	
21K0367-05 J	VOA Vial, Clear, 40 mL, HCL	
21K0367-05 K	VOA Vial, Clear, 40 mL, HCL	
21K0367-05 L	VOA Vial, Clear, 40 mL, HCL	

Reviewed By

Date

Page 1 of 2



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WORK ORDER

21K0367

Samples will be discarded 90 days after submission of a final report unless other instructions are received.

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish Q4

Project Number: 21-1-12596-012

21K0367-05 M	VOA Vial, Clear, 40 mL, HCL
21K0367-05 N	VOA Vial, Clear, 40 mL, HCL
21K0367-05 O	VOA Vial, Clear, 40 mL, HCL
21K0367-05 P	VOA Vial, Clear, 40 mL, HCL
21K0367-06 A	HDPE NM, 500 mL
21K0367-07 A	VOA Vial, Clear, 40 mL, HCL
21K0367-07 B	VOA Vial, Clear, 40 mL, HCL
21K0367-07 C	VOA Vial, Clear, 40 mL, HCL
21K0367-07 D	VOA Vial, Clear, 40 mL, HCL
21K0367-07 E	VOA Vial, Clear, 40 mL, HCL

>2 F

DC
Preservation Confirmed By

11/22/21
Date

Reviewed By

Date

Page 2 of 2



Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Shannon + Wilson

COC No(s): _____ NA

Assigned ARI Job No: 21K0367

Project Name: LDW

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Tracking No: _____ NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of the cooler? _____

Were custody papers included with the cooler? _____

Were custody papers properly filled out (ink, signed, etc.) _____

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) _____

Time: 13:49

If cooler temperature is out of compliance fill out form 00070F

Cooler Accepted by: [Signature] Date: 11/22/21 Time: 13:49 Temp Gun ID#: DOO 9708

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler? _____ YES NO

What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: _____

Was sufficient ice used (if appropriate)? _____ NA YES NO

How were bottles sealed in plastic bags? _____ Individually Grouped Not

Did all bottles arrive in good condition (unbroken)? _____ YES NO

Were all bottle labels complete and legible? _____ YES NO

Did the number of containers listed on COC match with the number of containers received? _____ YES NO

Did all bottle labels and tags agree with custody papers? _____ YES NO

Were all bottles used correct for the requested analyses? _____ YES NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs) ... NA YES NO

Were all VOC vials free of air bubbles? ... NA YES NO

Was sufficient amount of sample sent in each bottle? ... YES NO

Date VOC Trip Blank was made at ARI: ... NA 11/01/21

Were the sample(s) split by ARI? NA YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: DL Date: 11/22/21 Time: 1350 Labels checked by: _____

**** Notify Project Manager of discrepancies or concerns ****

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: _____ Date: _____

0016F
01/17/2018

Cooler Receipt Form

Revision 014A



Analytical Resources, LLC
Analytical Chemists and Consultants

Printed: 11/22/2021 3:55:21PM

WORK ORDER

21K0367

Samples will be discarded 90 days after submission of a final report unless other instructions are received.

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish Q4

Project Number: 21-1-12596-012

Preservation Confirmation

Container ID	Container Type	pH
21K0367-01 A	Glass NM, Amber, 1000 mL	
21K0367-01 B	Glass NM, Amber, 1000 mL	
21K0367-01 C	HDPE NM, 500 mL, 1:1 HNO3	<2 Pass (P)
21K0367-01 D	Glass NM, Amber, 500 mL	
21K0367-01 E	Glass NM, Amber, 500 mL	
21K0367-02 A	HDPE NM, 500 mL	>2 Fail (F)
21K0367-03 A	HDPE NM, 500 mL, 1:1 HNO3	OL 1/22/21 → >2 Fail (F) → <2 Pass (P)
21K0367-03 B	Glass NM, Amber, 500 mL	
21K0367-03 C	Glass NM, Amber, 500 mL	
21K0367-03 D	Glass NM, Amber, 500 mL	
21K0367-03 E	Glass NM, Amber, 500 mL	
21K0367-03 F	Glass NM, Amber, 500 mL	
21K0367-03 G	Glass NM, Amber, 500 mL	
21K0367-03 H	Glass NM, Amber, 250 mL	
21K0367-03 I	VOA Vial, Clear, 40 mL, HCL	
21K0367-03 J	VOA Vial, Clear, 40 mL, HCL	
21K0367-03 K	VOA Vial, Clear, 40 mL, HCL	
21K0367-03 L	VOA Vial, Clear, 40 mL, HCL	
21K0367-03 M	VOA Vial, Clear, 40 mL, HCL	
21K0367-03 N	VOA Vial, Clear, 40 mL, HCL	
21K0367-03 O	VOA Vial, Clear, 40 mL, HCL	
21K0367-04 A	HDPE NM, 500 mL	>2 F
21K0367-05 A	HDPE NM, 500 mL, 1:1 HNO3	<2 P
21K0367-05 B	Small OJ, 500 mL, EDTA	
21K0367-05 C	HDPE NM, 500 mL	
21K0367-05 D	HDPE NM, 500 mL	
21K0367-05 E	Glass NM, Amber, 500 mL, HCL	① lab to determine preservation
21K0367-05 F	Glass NM, Amber, 500 mL	
21K0367-05 G	Glass NM, Amber, 500 mL	
21K0367-05 H	Glass NM, Amber, 500 mL	
21K0367-05 I	Glass NM, Amber, 500 mL	
21K0367-05 J	VOA Vial, Clear, 40 mL, HCL	
21K0367-05 K	VOA Vial, Clear, 40 mL, HCL	
21K0367-05 L	VOA Vial, Clear, 40 mL, HCL	



Analytical Resources, LLC
Analytical Chemists and Consultants

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WORK ORDER

21K0367

Samples will be discarded 90 days after submission of a final report unless other instructions are received.

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish Q4

Project Number: 21-1-12596-012

21K0367-05 M VOA Vial, Clear, 40 mL, HCL

21K0367-05 N VOA Vial, Clear, 40 mL, HCL

21K0367-05 O VOA Vial, Clear, 40 mL, HCL

21K0367-05 P VOA Vial, Clear, 40 mL, HCL

21K0367-06 A HDPE NM, 500 mL

>2 F

21K0367-07 A VOA Vial, Clear, 40 mL, HCL

21K0367-07 B VOA Vial, Clear, 40 mL, HCL

21K0367-07 C VOA Vial, Clear, 40 mL, HCL

21K0367-07 D VOA Vial, Clear, 40 mL, HCL

21K0367-07 E VOA Vial, Clear, 40 mL, HCL

DL

Preservation Confirmed By

11/22/21
Date

① pH < 2, headspace

1645 11/22/21

BF



WORK ORDER

21K0367

Samples will be discarded 90 days after submission of a final report unless other instructions are received.

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish Q4

Project Number: 21-1-12596-012

Preservation Confirmation

Container ID	Container Type	pH
21K0367-01 A	Glass NM, Amber, 1000 mL	
21K0367-01 B	Glass NM, Amber, 1000 mL	
21K0367-01 C	HDPE NM, 500 mL, 1:1 HNO ₃	<2 Pass (P)
21K0367-01 D	Glass NM, Amber, 500 mL	
21K0367-01 E	Glass NM, Amber, 500 mL	
21K0367-02 A	HDPE NM, 500 mL	>2 Fail (F) ①
21K0367-03 A	HDPE NM, 500 mL, 1:1 HNO ₃	OK 11/22/21 → >2 Fail (F) → <2 Pass (P)
21K0367-03 B	Glass NM, Amber, 500 mL	
21K0367-03 C	Glass NM, Amber, 500 mL	
21K0367-03 D	Glass NM, Amber, 500 mL	
21K0367-03 E	Glass NM, Amber, 500 mL	
21K0367-03 F	Glass NM, Amber, 500 mL	
21K0367-03 G	Glass NM, Amber, 500 mL	
21K0367-03 H	Glass NM, Amber, 250 mL	
21K0367-03 I	VOA Vial, Clear, 40 mL, HCL	
21K0367-03 J	VOA Vial, Clear, 40 mL, HCL	
21K0367-03 K	VOA Vial, Clear, 40 mL, HCL	
21K0367-03 L	VOA Vial, Clear, 40 mL, HCL	
21K0367-03 M	VOA Vial, Clear, 40 mL, HCL	
21K0367-03 N	VOA Vial, Clear, 40 mL, HCL	
21K0367-03 O	VOA Vial, Clear, 40 mL, HCL	
21K0367-04 A	HDPE NM, 500 mL	>2 F ①
21K0367-05 A	HDPE NM, 500 mL, 1:1 HNO ₃	<2 P
21K0367-05 B	Small OJ, 500 mL, EDTA	
21K0367-05 C	HDPE NM, 500 mL	
21K0367-05 D	HDPE NM, 500 mL	
21K0367-05 E	Glass NM, Amber, 500 mL, HCL	lab to determine preservation
21K0367-05 F	Glass NM, Amber, 500 mL	
21K0367-05 G	Glass NM, Amber, 500 mL	
21K0367-05 H	Glass NM, Amber, 500 mL	
21K0367-05 I	Glass NM, Amber, 500 mL	
21K0367-05 J	VOA Vial, Clear, 40 mL, HCL	
21K0367-05 K	VOA Vial, Clear, 40 mL, HCL	
21K0367-05 L	VOA Vial, Clear, 40 mL, HCL	



Analytical Resources, LLC
Analytical Chemists and Consultants

Printed: 11/22/2021 3:55:21PM

WORK ORDER

21K0367

Samples will be discarded 90 days after submission of a final report unless other instructions are received.

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish Q4

Project Number: 21-1-12596-012

21K0367-05 M VOA Vial, Clear, 40 mL, HCL

21K0367-05 N VOA Vial, Clear, 40 mL, HCL

21K0367-05 O VOA Vial, Clear, 40 mL, HCL

21K0367-05 P VOA Vial, Clear, 40 mL, HCL

21K0367-06 A HDPE NM, 500 mL

>2 F

(1)

21K0367-07 A VOA Vial, Clear, 40 mL, HCL

21K0367-07 B VOA Vial, Clear, 40 mL, HCL

21K0367-07 C VOA Vial, Clear, 40 mL, HCL

21K0367-07 D VOA Vial, Clear, 40 mL, HCL

21K0367-07 E VOA Vial, Clear, 40 mL, HCL

DL

Preservation Confirmed By

11/22/21
Date

(1) filtered at 0.45 microns
preserves to pH < 2
with 0.75 mL conc. HNO₃
(510414) MM 11/22/21



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 17:13

EB-3-20212211 21K0367-01 (Water)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 11/22/2021 09:52

Instrument: NT10 Analyst: VTS

Analyzed: 12/01/2021 21:10

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 3510C SepF
Preparation Batch: BJK0625
Prepared: 11/26/2021

Sample Size: 1000 mL
Final Volume: 1 mL

Extract ID: 21K0367-01 A 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
1,4-Dichlorobenzene	106-46-7	1	0.03	0.2	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.03	0.2	ND	ug/L	U
2,4-Dimethylphenol	105-67-9	1	0.3	1.0	ND	ug/L	U
Benzoic acid	65-85-0	1	0.1	2.0	ND	ug/L	U
N-Nitrosodiphenylamine	86-30-6	1	0.03	0.2	ND	ug/L	U
Pentachlorophenol	87-86-5	1	0.1	1.0	ND	ug/L	U
Di-n-Butylphthalate	84-74-2	1	0.05	0.2	ND	ug/L	U
Butylbenzylphthalate	85-68-7	1	0.07	0.2	ND	ug/L	U
bis(2-Ethylhexyl)phthalate	117-81-7	1	0.2	0.2	ND	ug/L	U

Surrogate: 2-Fluorophenol

30-160 % 48.8 %

Surrogate: Phenol-d5

30-160 % 31.0 %

Surrogate: 2-Chlorophenol-d4

30-160 % 90.7 %

Surrogate: 1,2-Dichlorobenzene-d4

30-160 % 77.1 %

Surrogate: Nitrobenzene-d5

30-160 % 82.9 %

Surrogate: 2-Fluorobiphenyl

30-160 % 92.6 %

Surrogate: 2,4,6-Tribromophenol

30-160 % 95.2 %

Surrogate: p-Terphenyl-d14

30-160 % 95.4 % Q



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 17:13

EB-3-20212211 21K0367-01 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM

Sampled: 11/22/2021 09:52

Instrument: NT11 Analyst: VTS

Analyzed: 12/01/2021 15:11

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJK0640 Prepared: 11/29/2021	Sample Size: 500 mL Final Volume: 0.5 mL	Extract ID: 21K0367-01 D 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJL0015 Cleaned: 01-Dec-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21K0367-01 D 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	1	0.001	0.010	0.005	ug/L	J
2-Methylnaphthalene	91-57-6	1	0.001	0.010	0.002	ug/L	J
1-Methylnaphthalene	90-12-0	1	0.0009	0.010	0.001	ug/L	J
Acenaphthylene	208-96-8	1	0.002	0.010	ND	ug/L	U
Acenaphthene	83-32-9	1	0.003	0.010	ND	ug/L	U
Dibenzofuran	132-64-9	1	0.002	0.010	ND	ug/L	U
Fluorene	86-73-7	1	0.002	0.010	ND	ug/L	U
Phenanthrene	85-01-8	1	0.001	0.010	ND	ug/L	U
Anthracene	120-12-7	1	0.001	0.010	ND	ug/L	U
Carbazole	86-74-8	1	0.001	0.010	ND	ug/L	U
Fluoranthene	206-44-0	1	0.002	0.010	ND	ug/L	U
Pyrene	129-00-0	1	0.001	0.010	ND	ug/L	U
Benzo(a)anthracene	56-55-3	1	0.0008	0.010	ND	ug/L	U
Chrysene	218-01-9	1	0.0009	0.010	ND	ug/L	U
Benzo(b)fluoranthene	205-99-2	1	0.0005	0.010	ND	ug/L	U
Benzo(k)fluoranthene	207-08-9	1	0.003	0.010	ND	ug/L	U
Benzo(j)fluoranthene	205-82-3	1	0.002	0.010	ND	ug/L	U
Benzo(a)fluoranthene, Total		1	0.004	0.010	ND	ug/L	U
Benzo(a)pyrene	50-32-8	1	0.002	0.010	ND	ug/L	U
Perylene	1985-5-0	1	0.006	0.010	ND	ug/L	U
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.001	0.010	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	1	0.001	0.010	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	1	0.001	0.010	ND	ug/L	U
Surrogate: 2-Methylnaphthalene-d10				42-120 %	88.1	%	
Surrogate: Dibenzo[a,h]anthracene-d14				29-120 %	63.5	%	Q
Surrogate: Fluoranthene-d10				57-120 %	97.2	%	


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 17-Dec-2021 17:13

EB-3-20212211
21K0367-01 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 11/22/2021 09:52

Instrument: FID4 Analyst: TWC

Analyzed: 11/26/2021 18:09

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21K0367-01 E 01

Preparation Batch: BJK0634

Sample Size: 440 mL

Prepared: 11/24/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	0.114	ND	mg/L	U
Motor Oil Range Organics (C24-C38)	RRO	1	0.227	ND	mg/L	U
<i>Surrogate: o-Terphenyl</i>			<i>50-150 %</i>	<i>84.7</i>	<i>%</i>	


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 17-Dec-2021 17:13

EB-3-20212211
21K0367-01 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 11/22/2021 09:52

Instrument: ICPMS2 Analyst: MCB

Analyzed: 12/07/2021 23:22

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJL0112 Sample Size: 25 mL
 Prepared: 12/03/2021 Final Volume: 25 mL

Extract ID: 21K0367-01 C 02

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Barium	7440-39-3	1	0.114	0.500	1.67	ug/L	
Chromium	7440-47-3	1	0.260	0.500	ND	ug/L	U
Iron	7439-89-6	1	18.2	36.0	ND	ug/L	U
Lead	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Manganese	7439-96-5	1	0.142	0.500	0.149	ug/L	J
Silver	7440-22-4	1	0.0220	0.200	ND	ug/L	U
Vanadium	7440-62-2	1	0.0556	0.200	ND	ug/L	U


 Shannon & Wilson, Inc
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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 17-Dec-2021 17:13

EB-3-20212211
21K0367-01 (Water)
Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 11/22/2021 09:52

Instrument: ICPMS2 Analyst: MCB

Analyzed: 12/07/2021 23:22

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJL0112 Sample Size: 25 mL
 Prepared: 12/03/2021 Final Volume: 25 mL

Extract ID: 21K0367-01 C 02

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	1	0.0373	0.200	ND	ug/L	U
Cadmium	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Cobalt	7440-48-4	1	0.0178	0.200	ND	ug/L	U
Copper	7440-50-8	1	0.173	0.500	ND	ug/L	U
Nickel	7440-02-0	1	0.0792	0.500	ND	ug/L	U
Selenium	7782-49-2	1	0.179	0.500	ND	ug/L	U
Zinc	7440-66-6	1	2.92	6.00	ND	ug/L	U



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 17:13

EB-3-20212211
21K0367-01 (Water)

Metals and Metallic Compounds

Method: EPA 7470A

Sampled: 11/22/2021 09:52

Instrument: HYDRA Analyst: SKD

Analyzed: 12/02/2021 18:28

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21K0367-01 C

Preparation Batch: BJL0018

Sample Size: 20 mL

Prepared: 12/01/2021

Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000013	0.000100	ND	mg/L	U


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 17-Dec-2021 17:13

EB-3-20212211
21K0367-01RE1 (Water)
Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 11/22/2021 09:52

Instrument: NT10 Analyst: VTS

Analyzed: 12/06/2021 20:54

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21K0367-01RE1 A 01

Preparation Batch: BJK0625

Sample Size: 1000 mL

Prepared: 11/26/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
1,4-Dichlorobenzene	106-46-7	3	0.08	0.6	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	3	0.1	0.6	ND	ug/L	U
2,4-Dimethylphenol	105-67-9	3	0.8	3.0	ND	ug/L	U
Benzoic acid	65-85-0	3	0.4	6.0	ND	ug/L	U
N-Nitrosodiphenylamine	86-30-6	3	0.08	0.6	ND	ug/L	U
Pentachlorophenol	87-86-5	3	0.4	3.0	ND	ug/L	U
Di-n-Butylphthalate	84-74-2	3	0.2	0.6	ND	ug/L	U
Butylbenzylphthalate	85-68-7	3	0.2	0.6	ND	ug/L	U
bis(2-Ethylhexyl)phthalate	117-81-7	3	0.5	0.6	ND	ug/L	U

Surrogate: 2-Fluorophenol

30-160 %

52.7 %

Surrogate: Phenol-d5

30-160 %

29.6 %

*

Surrogate: 2-Chlorophenol-d4

30-160 %

83.7 %

Surrogate: 1,2-Dichlorobenzene-d4

30-160 %

73.9 %

Surrogate: Nitrobenzene-d5

30-160 %

87.2 %

Surrogate: 2-Fluorobiphenyl

30-160 %

82.7 %

Surrogate: 2,4,6-Tribromophenol

30-160 %

81.8 %

Surrogate: p-Terphenyl-d14

30-160 %

104 %


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 17-Dec-2021 17:13

EB-3-20212211
21K0367-02 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 11/22/2021 09:52

Instrument: ICPMS2 Analyst: MCB

Analyzed: 12/07/2021 21:42

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21K0367-02 A 03
	Preparation Batch: BJL0105	Filtration Batch: BJK0597
	Prepared: 12/03/2021	Filtration Date: 11/22/2021 16:59
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Barium, Dissolved	7440-39-3	1	0.114	0.500	ND	ug/L	U
Chromium, Dissolved	7440-47-3	1	0.260	0.500	ND	ug/L	U
Iron, Dissolved	7439-89-6	1	18.2	36.0	ND	ug/L	U
Lead, Dissolved	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Manganese, Dissolved	7439-96-5	1	0.142	0.500	ND	ug/L	U
Silver, Dissolved	7440-22-4	1	0.0220	0.200	ND	ug/L	U
Vanadium, Dissolved	7440-62-2	1	0.0556	0.200	ND	ug/L	U


 Shannon & Wilson, Inc
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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 17-Dec-2021 17:13

EB-3-20212211
21K0367-02 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 11/22/2021 09:52

Instrument: ICPMS2 Analyst: MCB

Analyzed: 12/07/2021 21:42

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21K0367-02 A 03

Preparation Batch: BJL0105

Sample Size: 25 mL

Filtration Batch: BJK0597

Prepared: 12/03/2021

Final Volume: 25 mL

Filtration Date: 11/22/2021 16:59

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic, Dissolved	7440-38-2	1	0.0373	0.200	ND	ug/L	U
Cadmium, Dissolved	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Cobalt, Dissolved	7440-48-4	1	0.0178	0.200	ND	ug/L	U
Copper, Dissolved	7440-50-8	1	0.173	0.500	ND	ug/L	U
Nickel, Dissolved	7440-02-0	1	0.0792	0.500	ND	ug/L	U
Selenium, Dissolved	7782-49-2	1	0.179	0.500	ND	ug/L	U
Zinc, Dissolved	7440-66-6	1	2.92	6.00	ND	ug/L	U



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 17:13

EB-3-20212211
21K0367-02 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 7470A

Sampled: 11/22/2021 09:52

Instrument: HYDRA Analyst: ML

Analyzed: 12/09/2021 11:17

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21K0367-02 A 01

Preparation Batch: BJJ0108

Sample Size: 20 mL

Filtration Batch: BJK0597

Prepared: 12/03/2021

Final Volume: 20 mL

Filtration Date: 11/22/2021 16:59

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury, Dissolved	7439-97-6	1	0.000013	0.000100	ND	mg/L	U



Analytical Report

Shannon & Wilson, Inc
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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 17:13

MW-46-20212211

21K0367-03 (Water)

Volatile Organic Compounds

Method: EPA 8260D

Sampled: 11/22/2021 11:04

Instrument: NT3 Analyst: LH

Analyzed: 11/26/2021 16:02

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0367-03 K

Preparation Batch: BJK0684

Sample Size: 10 mL

Prepared: 11/26/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	0.12	ug/L	J
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.05	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.05	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.05	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.14	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.08	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.22	0.60	ND	ug/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>					<i>80-129 %</i>	<i>104 %</i>	
<i>Surrogate: Toluene-d8</i>					<i>80-120 %</i>	<i>101 %</i>	
<i>Surrogate: 4-Bromofluorobenzene</i>					<i>80-120 %</i>	<i>96.8 %</i>	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>					<i>80-120 %</i>	<i>98.6 %</i>	


 Shannon & Wilson, Inc
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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 17-Dec-2021 17:13

MW-46-20212211
21K0367-03 (Water)
Volatile Organic Compounds

Method: NWTPHg

Sampled: 11/22/2021 11:04

Instrument: NT3 Analyst: PKC

Analyzed: 11/30/2021 17:08

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0367-03 L

Preparation Batch: BJK0727

Sample Size: 10 mL

Prepared: 11/30/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Gasoline Range Organics (Tol-Nap)	GRO	1	100	ND	ug/L	U
<i>Surrogate: Toluene-d8</i>			80-120 %	103	%	
<i>Surrogate: 4-Bromofluorobenzene</i>			80-120 %	99.7	%	



Analytical Report

Shannon & Wilson, Inc
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Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 17:13

MW-46-20212211

21K0367-03 (Water)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 11/22/2021 11:04

Instrument: NT10 Analyst: VTS

Analyzed: 12/01/2021 21:48

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 3510C SepF
Preparation Batch: BJK0625
Prepared: 11/26/2021

Sample Size: 1000 mL
Final Volume: 1 mL

Extract ID: 21K0367-03 C 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
1,4-Dichlorobenzene	106-46-7	1	0.03	0.2	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.03	0.2	ND	ug/L	U
2,4-Dimethylphenol	105-67-9	1	0.3	1.0	ND	ug/L	U
Benzoic acid	65-85-0	1	0.1	2.0	0.4	ug/L	J
N-Nitrosodiphenylamine	86-30-6	1	0.03	0.2	ND	ug/L	U
Pentachlorophenol	87-86-5	1	0.1	1.0	ND	ug/L	U
Di-n-Butylphthalate	84-74-2	1	0.05	0.2	ND	ug/L	U
Butylbenzylphthalate	85-68-7	1	0.07	0.2	ND	ug/L	U
bis(2-Ethylhexyl)phthalate	117-81-7	1	0.2	0.2	ND	ug/L	U

Surrogate: 2-Fluorophenol

30-160 % 45.7 %

Surrogate: Phenol-d5

30-160 % 29.8 %

*

Surrogate: 2-Chlorophenol-d4

30-160 % 83.4 %

Surrogate: 1,2-Dichlorobenzene-d4

30-160 % 68.3 %

Surrogate: Nitrobenzene-d5

30-160 % 85.4 %

Surrogate: 2-Fluorobiphenyl

30-160 % 90.8 %

Surrogate: 2,4,6-Tribromophenol

30-160 % 103 %

Surrogate: p-Terphenyl-d14

30-160 % 102 % Q



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 17:13

MW-46-20212211

21K0367-03 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM

Sampled: 11/22/2021 11:04

Instrument: NT11 Analyst: VTS

Analyzed: 12/01/2021 15:41

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJK0640 Prepared: 11/29/2021	Sample Size: 500 mL Final Volume: 0.5 mL	Extract ID: 21K0367-03 D 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJL0015 Cleaned: 01-Dec-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21K0367-03 D 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	1	0.001	0.010	0.342	ug/L	
2-Methylnaphthalene	91-57-6	1	0.001	0.010	0.391	ug/L	
1-Methylnaphthalene	90-12-0	1	0.0009	0.010	0.515	ug/L	
Acenaphthylene	208-96-8	1	0.002	0.010	0.045	ug/L	
Acenaphthene	83-32-9	1	0.003	0.010	2.15	ug/L	E
Dibenzofuran	132-64-9	1	0.002	0.010	0.075	ug/L	
Fluorene	86-73-7	1	0.002	0.010	0.807	ug/L	
Phenanthrene	85-01-8	1	0.001	0.010	0.370	ug/L	
Anthracene	120-12-7	1	0.001	0.010	0.048	ug/L	
Carbazole	86-74-8	1	0.001	0.010	0.025	ug/L	
Fluoranthene	206-44-0	1	0.002	0.010	0.049	ug/L	
Pyrene	129-00-0	1	0.001	0.010	0.028	ug/L	
Benzo(a)anthracene	56-55-3	1	0.0008	0.010	0.001	ug/L	J
Chrysene	218-01-9	1	0.0009	0.010	0.002	ug/L	J
Benzo(b)fluoranthene	205-99-2	1	0.0005	0.010	0.0008	ug/L	J
Benzo(k)fluoranthene	207-08-9	1	0.003	0.010	ND	ug/L	U
Benzo(j)fluoranthene	205-82-3	1	0.002	0.010	ND	ug/L	U
Benzo(a)fluoranthene, Total		1	0.004	0.010	ND	ug/L	U
Benzo(a)pyrene	50-32-8	1	0.002	0.010	ND	ug/L	U
Perylene	1985-5-0	1	0.006	0.010	ND	ug/L	U
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.001	0.010	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	1	0.001	0.010	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	1	0.001	0.010	ND	ug/L	U
Surrogate: 2-Methylnaphthalene-d10				42-120 %	92.0	%	
Surrogate: Dibenzo[a,h]anthracene-d14				29-120 %	55.1	%	Q
Surrogate: Fluoranthene-d10				57-120 %	98.1	%	


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 17-Dec-2021 17:13

MW-46-20212211
21K0367-03 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 11/22/2021 11:04

Instrument: FID4 Analyst: TWC

Analyzed: 11/26/2021 18:28

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21K0367-03 E 01

Preparation Batch: BJK0634

Sample Size: 460 mL

Prepared: 11/24/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	0.109	0.533	mg/L	
HC ID: DRO						
Motor Oil Range Organics (C24-C38)	RRO	1	0.217	ND	mg/L	U
Surrogate: o-Terphenyl			50-150 %	80.8	%	


 Shannon & Wilson, Inc
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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 17-Dec-2021 17:13

MW-46-20212211
21K0367-03 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 11/22/2021 11:04

Instrument: ICPMS2 Analyst: MCB

Analyzed: 12/07/2021 23:12

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJL0112 Sample Size: 25 mL
 Prepared: 12/03/2021 Final Volume: 25 mL

Extract ID: 21K0367-03 A 02

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Chromium	7440-47-3	1	0.260	0.500	1.18	ug/L	
Lead	7439-92-1	1	0.0513	0.100	0.245	ug/L	
Manganese	7439-96-5	10	1.42	5.00	874	ug/L	D
Silver	7440-22-4	1	0.0220	0.200	ND	ug/L	U


 Shannon & Wilson, Inc
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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 17-Dec-2021 17:13

MW-46-20212211
21K0367-03 (Water)
Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 11/22/2021 11:04

Instrument: ICPMS2 Analyst: MCB

Analyzed: 12/07/2021 23:12

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21K0367-03 A 02

Preparation Batch: BJL0112

Sample Size: 25 mL

Prepared: 12/03/2021

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	1	0.0373	0.200	7.10	ug/L	
Copper	7440-50-8	1	0.173	0.500	0.746	ug/L	
Nickel	7440-02-0	1	0.0792	0.500	1.45	ug/L	
Selenium	7782-49-2	1	0.179	0.500	0.399	ug/L	J
Zinc	7440-66-6	1	2.92	6.00	ND	ug/L	U



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 17:13

MW-46-20212211

21K0367-03 (Water)

Metals and Metallic Compounds

Method: EPA 7470A

Sampled: 11/22/2021 11:04

Instrument: HYDRA Analyst: SKD

Analyzed: 12/02/2021 18:30

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21K0367-03 A

Preparation Batch: BJL0018

Sample Size: 20 mL

Prepared: 12/01/2021

Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000013	0.000100	ND	mg/L	U


 Shannon & Wilson, Inc
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 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 17-Dec-2021 17:13

MW-46-20212211
21K0367-03 (Water)
Wet Chemistry

Method: SM 3500-Cr B-09

Sampled: 11/22/2021 11:04

Instrument: UV1800-1 Analyst: CKI

Analyzed: 11/23/2021 10:53

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: SM 5310 A-00, 0.45um filtration

Extract ID: 21K0367-03 H 01

Preparation Batch: BJK0616

Sample Size: 40 mL

Prepared: 11/23/2021

Final Volume: 50 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Hexavalent Chromium	1854-02-99	1.25	0.013	0.013	0.013	mg/L	D



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 17:13

MW-46-20212211 21K0367-03RE1 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM

Sampled: 11/22/2021 11:04

Instrument: NT11 Analyst: VTS

Analyzed: 12/03/2021 15:27

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJK0640 Prepared: 11/29/2021	Sample Size: 500 mL Final Volume: 0.5 mL	Extract ID: 21K0367-03RE1 D 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJL0015 Cleaned: 01-Dec-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21K0367-03RE1 D 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	20	0.026	0.200	0.401	ug/L	D
2-Methylnaphthalene	91-57-6	20	0.020	0.200	0.410	ug/L	D
1-Methylnaphthalene	90-12-0	20	0.018	0.200	0.575	ug/L	D
Acenaphthylene	208-96-8	20	0.037	0.200	0.039	ug/L	J, D
Acenaphthene	83-32-9	20	0.058	0.200	4.16	ug/L	D
Dibenzofuran	132-64-9	20	0.030	0.200	0.076	ug/L	J, D
Fluorene	86-73-7	20	0.030	0.200	0.901	ug/L	D
Phenanthrene	85-01-8	20	0.026	0.200	0.421	ug/L	D
Anthracene	120-12-7	20	0.023	0.200	0.045	ug/L	J, D
Carbazole	86-74-8	20	0.024	0.200	ND	ug/L	U
Fluoranthene	206-44-0	20	0.034	0.200	0.038	ug/L	J, D
Pyrene	129-00-0	20	0.024	0.200	ND	ug/L	U
Benzo(a)anthracene	56-55-3	20	0.015	0.200	ND	ug/L	U
Chrysene	218-01-9	20	0.018	0.200	ND	ug/L	U
Benzo(b)fluoranthene	205-99-2	20	0.009	0.200	ND	ug/L	U
Benzo(k)fluoranthene	207-08-9	20	0.064	0.200	ND	ug/L	U
Benzo(j)fluoranthene	205-82-3	20	0.037	0.200	ND	ug/L	U
Benzofluoranthenes, Total		20	0.071	0.200	ND	ug/L	U
Benzo(a)pyrene	50-32-8	20	0.050	0.200	ND	ug/L	U
Perylene	1985-5-0	20	0.117	0.200	ND	ug/L	U
Indeno(1,2,3-cd)pyrene	193-39-5	20	0.020	0.200	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	20	0.027	0.200	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	20	0.028	0.200	ND	ug/L	U
Surrogate: 2-Methylnaphthalene-d10				42-120 %	94.3	%	
Surrogate: Dibenzo[a,h]anthracene-d14				29-120 %	26.0	%	*, Q
Surrogate: Fluoranthene-d10				57-120 %	85.9	%	


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 17-Dec-2021 17:13

MW-46-20212211
21K0367-04 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 11/22/2021 09:52

Instrument: ICPMS2 Analyst: MCB

Analyzed: 12/07/2021 20:37

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21K0367-04 A 03

Preparation Batch: BJL0105

Sample Size: 25 mL

Filtration Batch: BJK0597

Prepared: 12/03/2021

Final Volume: 25 mL

Filtration Date: 11/22/2021 16:59

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Chromium, Dissolved	7440-47-3	1	0.260	0.500	0.805	ug/L	
Lead, Dissolved	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Manganese, Dissolved	7439-96-5	10	1.42	5.00	838	ug/L	D
Silver, Dissolved	7440-22-4	1	0.0220	0.200	ND	ug/L	U


 Shannon & Wilson, Inc
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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 17-Dec-2021 17:13

MW-46-20212211
21K0367-04 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 11/22/2021 09:52

Instrument: ICPMS2 Analyst: MCB

Analyzed: 12/07/2021 20:37

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21K0367-04 A 03

Preparation Batch: BJL0105

Sample Size: 25 mL

Filtration Batch: BJK0597

Prepared: 12/03/2021

Final Volume: 25 mL

Filtration Date: 11/22/2021 16:59

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic, Dissolved	7440-38-2	1	0.0373	0.200	5.52	ug/L	
Copper, Dissolved	7440-50-8	1	0.173	0.500	0.186	ug/L	J
Nickel, Dissolved	7440-02-0	1	0.0792	0.500	1.22	ug/L	
Selenium, Dissolved	7782-49-2	1	0.179	0.500	0.314	ug/L	J
Zinc, Dissolved	7440-66-6	1	2.92	6.00	ND	ug/L	U


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 17-Dec-2021 17:13

MW-46-20212211
21K0367-04 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 7470A

Sampled: 11/22/2021 09:52

Instrument: HYDRA Analyst: ML

Analyzed: 12/09/2021 11:08

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21K0367-04 A 01

Preparation Batch: BJL0108

Sample Size: 20 mL

Filtration Batch: BJK0597

Prepared: 12/03/2021

Final Volume: 20 mL

Filtration Date: 11/22/2021 16:59

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury, Dissolved	7439-97-6	1	0.000013	0.000100	ND	mg/L	U



Analytical Report

Shannon & Wilson, Inc
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Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 17:13

MW-56-20212211

21K0367-05 (Water)

Volatile Organic Compounds

Method: EPA 8260D

Sampled: 11/22/2021 12:13

Instrument: NT3 Analyst: LH

Analyzed: 11/26/2021 16:28

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0367-05 K

Preparation Batch: BJK0684

Sample Size: 10 mL

Prepared: 11/26/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.05	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.05	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.05	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.14	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.08	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.22	0.60	ND	ug/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				<i>80-129 %</i>	<i>102</i>	<i>%</i>	
<i>Surrogate: Toluene-d8</i>				<i>80-120 %</i>	<i>99.6</i>	<i>%</i>	
<i>Surrogate: 4-Bromofluorobenzene</i>				<i>80-120 %</i>	<i>96.6</i>	<i>%</i>	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				<i>80-120 %</i>	<i>105</i>	<i>%</i>	


 Shannon & Wilson, Inc
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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 17-Dec-2021 17:13

MW-56-20212211
21K0367-05 (Water)
Volatile Organic Compounds - SIM

Method: EPA 8260D-SIM

Sampled: 11/22/2021 12:13

Instrument: NT16 Analyst: KOTT

Analyzed: 11/30/2021 15:13

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0367-05 M

Preparation Batch: BJK0740

Sample Size: 10 mL

Prepared: 11/30/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	5.01	20.0	ND	ng/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				80-129 %	106	%	
<i>Surrogate: Toluene-d8</i>				80-120 %	102	%	
<i>Surrogate: 4-Bromofluorobenzene</i>				75-125 %	98.6	%	


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 17-Dec-2021 17:13

MW-56-20212211
21K0367-05 (Water)
Dissolved Gases

Method: EPA RSK-175

Sampled: 11/22/2021 12:13

Instrument: FID6 Analyst: PB

Analyzed: 12/02/2021 14:43

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0367-05 H

Preparation Batch: BJL0076

Sample Size: 10 mL

Prepared: 12/02/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Methane	74-82-8	1	0.65	5020	ug/L	
Ethane	74-84-0	1	1.23	ND	ug/L	U
Ethene	74-85-1	1	1.14	ND	ug/L	U
Acetylene	74-86-2	1	1.06	ND	ug/L	U
<i>Surrogate: Propane</i>			72-122 %	94.1	%	



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 17:13

MW-56-20212211

21K0367-05 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM

Sampled: 11/22/2021 12:13

Instrument: NT11 Analyst: VTS

Analyzed: 12/01/2021 16:11

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJK0640 Prepared: 11/29/2021	Sample Size: 500 mL Final Volume: 0.5 mL	Extract ID: 21K0367-05 101
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJL0015 Cleaned: 01-Dec-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21K0367-05 101

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	1	0.001	0.010	0.005	ug/L	J
2-Methylnaphthalene	91-57-6	1	0.001	0.010	0.002	ug/L	J
1-Methylnaphthalene	90-12-0	1	0.0009	0.010	0.002	ug/L	J
Acenaphthylene	208-96-8	1	0.002	0.010	ND	ug/L	U
Acenaphthene	83-32-9	1	0.003	0.010	0.158	ug/L	
Dibenzofuran	132-64-9	1	0.002	0.010	0.002	ug/L	J
Fluorene	86-73-7	1	0.002	0.010	0.008	ug/L	J
Phenanthrene	85-01-8	1	0.001	0.010	0.006	ug/L	J
Anthracene	120-12-7	1	0.001	0.010	0.001	ug/L	J
Carbazole	86-74-8	1	0.001	0.010	ND	ug/L	U
Fluoranthene	206-44-0	1	0.002	0.010	0.002	ug/L	J
Pyrene	129-00-0	1	0.001	0.010	0.002	ug/L	J
Benzo(a)anthracene	56-55-3	1	0.0008	0.010	ND	ug/L	U
Chrysene	218-01-9	1	0.0009	0.010	0.001	ug/L	J
Benzo(b)fluoranthene	205-99-2	1	0.0005	0.010	ND	ug/L	U
Benzo(k)fluoranthene	207-08-9	1	0.003	0.010	ND	ug/L	U
Benzo(j)fluoranthene	205-82-3	1	0.002	0.010	ND	ug/L	U
Benzo(a)pyrene	50-32-8	1	0.002	0.010	ND	ug/L	U
Perylene	1985-5-0	1	0.006	0.010	ND	ug/L	U
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.001	0.010	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	1	0.001	0.010	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	1	0.001	0.010	ND	ug/L	U
Surrogate: 2-Methylnaphthalene-d10				42-120 %	83.1	%	
Surrogate: Dibenzo[a,h]anthracene-d14				29-120 %	62.9	%	Q
Surrogate: Fluoranthene-d10				57-120 %	91.8	%	


 Shannon & Wilson, Inc
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 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 17-Dec-2021 17:13

MW-56-20212211
21K0367-05 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 11/22/2021 12:13

Instrument: FID4 Analyst: TWC

Analyzed: 11/26/2021 18:48

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21K0367-05 F 01

Preparation Batch: BJK0634

Sample Size: 450 mL

Prepared: 11/24/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	0.111	ND	mg/L	U
Motor Oil Range Organics (C24-C38)	RRO	1	0.222	ND	mg/L	U
<i>Surrogate: o-Terphenyl</i>			<i>50-150 %</i>	<i>78.1</i>	<i>%</i>	


 Shannon & Wilson, Inc
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 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 17-Dec-2021 17:13

MW-56-20212211
21K0367-05 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 11/22/2021 12:13

Instrument: ICPMS2 Analyst: MCB

Analyzed: 12/07/2021 23:17

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJL0112 Sample Size: 25 mL
 Prepared: 12/03/2021 Final Volume: 25 mL

Extract ID: 21K0367-05 A 02

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Barium	7440-39-3	1	0.114	0.500	5.07	ug/L	
Chromium	7440-47-3	1	0.260	0.500	0.461	ug/L	J
Iron	7439-89-6	1	18.2	36.0	19100	ug/L	
Lead	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Manganese	7439-96-5	10	1.42	5.00	473	ug/L	D
Silver	7440-22-4	1	0.0220	0.200	ND	ug/L	U
Vanadium	7440-62-2	1	0.0556	0.200	1.36	ug/L	


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 17-Dec-2021 17:13

MW-56-20212211
21K0367-05 (Water)
Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 11/22/2021 12:13

Instrument: ICPMS2 Analyst: MCB

Analyzed: 12/07/2021 23:17

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJL0112 Sample Size: 25 mL
 Prepared: 12/03/2021 Final Volume: 25 mL

Extract ID: 21K0367-05 A 02

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	1	0.0373	0.200	0.553	ug/L	
Cadmium	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Cobalt	7440-48-4	1	0.0178	0.200	0.111	ug/L	J
Copper	7440-50-8	1	0.173	0.500	0.333	ug/L	J
Nickel	7440-02-0	1	0.0792	0.500	0.120	ug/L	J
Selenium	7782-49-2	1	0.179	0.500	ND	ug/L	U
Zinc	7440-66-6	1	2.92	6.00	ND	ug/L	U


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 17-Dec-2021 17:13

MW-56-20212211
21K0367-05 (Water)
Metals and Metallic Compounds

Method: EPA 7470A

Sampled: 11/22/2021 12:13

Instrument: HYDRA Analyst: SKD

Analyzed: 12/02/2021 18:33

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21K0367-05 A

Preparation Batch: BJL0018

Sample Size: 20 mL

Prepared: 12/01/2021

Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000013	0.000100	ND	mg/L	U


 Shannon & Wilson, Inc
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 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 17-Dec-2021 17:13

MW-56-20212211
21K0367-05 (Water)
Wet Chemistry

Method: EPA 300.0

Sampled: 11/22/2021 12:13

Instrument: IC930 Analyst: BF

Analyzed: 11/23/2021 02:26

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 21K0367-05 C

Preparation Batch: BJK0598

Sample Size: 10 mL

Prepared: 11/22/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	1	0.100	0.100	2.73	mg/L	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrate-N	14797-55-8	1	0.100	0.100	ND	mg/L	U

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrite-N	14797-65-0	1	0.100	0.100	ND	mg/L	U


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 17-Dec-2021 17:13

MW-56-20212211
21K0367-05 (Water)
Wet Chemistry

Method: SM 3500-Fe B-97

Sampled: 11/22/2021 12:13

Instrument: UV1800-2 Analyst: BF

Analyzed: 11/22/2021 17:02

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 21K0367-05 E

Preparation Batch: BJK0595

Sample Size: 5 mL

Prepared: 11/22/2021

Final Volume: 5 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ferrous Iron		20	0.800	0.800	21.7	mg/L	D



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 17:13

MW-56-20212211

21K0367-05 (Water)

Wet Chemistry

Method: SM 4500-SO3 B-00

Sampled: 11/22/2021 12:13

Instrument: N/A Analyst: UW

Analyzed: 11/22/2021 16:50

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 21K0367-05

Preparation Batch: BJK0596

Sample Size: 50 mL

Prepared: 11/22/2021

Final Volume: 50 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfite	14265-45-3	1	1.4	1.4	ND	mg/L	H, U


 Shannon & Wilson, Inc
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 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 17-Dec-2021 17:13

MW-56-20212211
21K0367-05RE3 (Water)
Wet Chemistry

Method: EPA 300.0

Sampled: 11/22/2021 12:13

Instrument: IC930 Analyst: BF

Analyzed: 12/12/2021 04:10

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 21K0367-05RE3 C

Preparation Batch: BJK0598

Sample Size: 10 mL

Prepared: 11/22/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	1	0.100	0.100	0.353	mg/L	


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 17-Dec-2021 17:13

MW-56-20212211
21K0367-06 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 11/22/2021 12:13

Instrument: ICPMS2 Analyst: MCB

Analyzed: 12/07/2021 20:42

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21K0367-06 A 03

Preparation Batch: BJL0105

Sample Size: 25 mL

Filtration Batch: BJK0597

Prepared: 12/03/2021

Final Volume: 25 mL

Filtration Date: 11/22/2021 16:59

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Barium, Dissolved	7440-39-3	1	0.114	0.500	0.312	ug/L	J
Chromium, Dissolved	7440-47-3	1	0.260	0.500	0.261	ug/L	J
Iron, Dissolved	7439-89-6	1	18.2	36.0	11800	ug/L	
Lead, Dissolved	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Manganese, Dissolved	7439-96-5	10	1.42	5.00	448	ug/L	D
Silver, Dissolved	7440-22-4	1	0.0220	0.200	ND	ug/L	U
Vanadium, Dissolved	7440-62-2	1	0.0556	0.200	0.448	ug/L	


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 17-Dec-2021 17:13

MW-56-20212211
21K0367-06 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 11/22/2021 12:13

Instrument: ICPMS2 Analyst: MCB

Analyzed: 12/07/2021 20:42

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21K0367-06 A 03

Preparation Batch: BJL0105

Sample Size: 25 mL

Filtration Batch: BJK0597

Prepared: 12/03/2021

Final Volume: 25 mL

Filtration Date: 11/22/2021 16:59

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic, Dissolved	7440-38-2	1	0.0373	0.200	0.509	ug/L	
Cadmium, Dissolved	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Cobalt, Dissolved	7440-48-4	1	0.0178	0.200	0.0970	ug/L	J
Copper, Dissolved	7440-50-8	1	0.173	0.500	ND	ug/L	U
Nickel, Dissolved	7440-02-0	1	0.0792	0.500	ND	ug/L	U
Selenium, Dissolved	7782-49-2	1	0.179	0.500	ND	ug/L	U
Zinc, Dissolved	7440-66-6	1	2.92	6.00	ND	ug/L	U


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 Project Manager: Meg Strong

Reported:
 17-Dec-2021 17:13

MW-56-20212211
21K0367-06 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 7470A

Sampled: 11/22/2021 12:13

Instrument: HYDRA Analyst: ML

Analyzed: 12/09/2021 11:19

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21K0367-06 A 01

Preparation Batch: BJL0108

Sample Size: 20 mL

Filtration Batch: BJK0597

Prepared: 12/03/2021

Final Volume: 20 mL

Filtration Date: 11/22/2021 16:59

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury, Dissolved	7439-97-6	1	0.000013	0.000100	ND	mg/L	U


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 17-Dec-2021 17:13

TB-9-20212211
21K0367-07 (Water)
Volatile Organic Compounds

Method: EPA 8260D

Sampled: 11/22/2021 09:44

Instrument: NT3 Analyst: PKC

Analyzed: 11/29/2021 13:19

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0367-07 C

Preparation Batch: BJK0705

Sample Size: 10 mL

Prepared: 11/29/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.05	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.05	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.05	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.14	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.08	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.22	0.60	ND	ug/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				80-129 %	111	%	
<i>Surrogate: Toluene-d8</i>				80-120 %	99.0	%	
<i>Surrogate: 4-Bromofluorobenzene</i>				80-120 %	99.3	%	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				80-120 %	99.6	%	


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 17-Dec-2021 17:13

TB-9-20212211
21K0367-07 (Water)
Volatile Organic Compounds - SIM

Method: EPA 8260D-SIM

Sampled: 11/22/2021 09:44

Instrument: NT16 Analyst: KOTT

Analyzed: 11/30/2021 15:34

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0367-07 E

Preparation Batch: BJK0740

Sample Size: 10 mL

Prepared: 11/30/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	5.01	20.0	ND	ng/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				80-129 %	107	%	
<i>Surrogate: Toluene-d8</i>				80-120 %	101	%	
<i>Surrogate: 4-Bromofluorobenzene</i>				75-125 %	98.3	%	



Analytical Report

Shannon & Wilson, Inc
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Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 17:13

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - Quality Control

Batch BJK0684 - EPA 5030C (Purge and Trap)

Instrument: NT3 Analyst: LH

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0684-BLK2)						Prepared: 26-Nov-2021 Analyzed: 26-Nov-2021 10:03					
Vinyl Chloride	ND	0.08	0.20	ug/L							U
1,1-Dichloroethene	ND	0.08	0.20	ug/L							U
trans-1,2-Dichloroethene	ND	0.07	0.20	ug/L							U
cis-1,2-Dichloroethene	ND	0.08	0.20	ug/L							U
Benzene	ND	0.05	0.20	ug/L							U
Trichloroethene	ND	0.07	0.20	ug/L							U
Toluene	ND	0.05	0.20	ug/L							U
Tetrachloroethene	ND	0.09	0.20	ug/L							U
Ethylbenzene	ND	0.05	0.20	ug/L							U
m,p-Xylene	ND	0.14	0.40	ug/L							U
o-Xylene	ND	0.08	0.20	ug/L							U
Xylenes, total	ND	0.22	0.60	ug/L							U
<i>Surrogate: 1,2-Dichloroethane-d4</i>	4.89			ug/L	5.00		97.7	80-129			
<i>Surrogate: Toluene-d8</i>	5.16			ug/L	5.00		103	80-120			
<i>Surrogate: 4-Bromofluorobenzene</i>	5.13			ug/L	5.00		103	80-120			
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	5.07			ug/L	5.00		101	80-120			
LCS (BJK0684-BS2)						Prepared: 26-Nov-2021 Analyzed: 26-Nov-2021 08:22					
Vinyl Chloride	9.19	0.08	0.20	ug/L	10.0		91.9	66-133			
1,1-Dichloroethene	9.77	0.08	0.20	ug/L	10.0		97.7	69-135			
trans-1,2-Dichloroethene	9.81	0.07	0.20	ug/L	10.0		98.1	78-128			
cis-1,2-Dichloroethene	10.0	0.08	0.20	ug/L	10.0		100	80-121			
Benzene	10.2	0.05	0.20	ug/L	10.0		102	80-120			
Trichloroethene	10.2	0.07	0.20	ug/L	10.0		102	80-120			
Toluene	10.2	0.05	0.20	ug/L	10.0		102	80-120			
Tetrachloroethene	10.4	0.09	0.20	ug/L	10.0		104	80-120			
Ethylbenzene	10.2	0.05	0.20	ug/L	10.0		102	80-120			
m,p-Xylene	20.6	0.14	0.40	ug/L	20.0		103	80-121			
o-Xylene	10.0	0.08	0.20	ug/L	10.0		100	80-121			
Xylenes, total	30.7	0.22	0.60	ug/L	30.0		102	76-127			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	5.02			ug/L	5.00		100	80-129			
<i>Surrogate: Toluene-d8</i>	5.17			ug/L	5.00		103	80-120			
<i>Surrogate: 4-Bromofluorobenzene</i>	5.13			ug/L	5.00		103	80-120			
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	4.89			ug/L	5.00		97.7	80-120			


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 17-Dec-2021 17:13

Analysis by: Analytical Resources, LLC
Volatile Organic Compounds - Quality Control
Batch BJK0684 - EPA 5030C (Purge and Trap)

Instrument: NT3 Analyst: LH

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BJK0684-BSD2)						Prepared: 26-Nov-2021 Analyzed: 26-Nov-2021 09:12					
Vinyl Chloride	8.83	0.08	0.20	ug/L	10.0		88.3	66-133	3.98	30	
1,1-Dichloroethene	9.48	0.08	0.20	ug/L	10.0		94.8	69-135	3.08	30	
trans-1,2-Dichloroethene	8.75	0.07	0.20	ug/L	10.0		87.5	78-128	11.40	30	
cis-1,2-Dichloroethene	9.29	0.08	0.20	ug/L	10.0		92.9	80-121	7.74	30	
Benzene	9.71	0.05	0.20	ug/L	10.0		97.1	80-120	5.43	30	
Trichloroethene	9.54	0.07	0.20	ug/L	10.0		95.4	80-120	6.68	30	
Toluene	9.70	0.05	0.20	ug/L	10.0		97.0	80-120	4.96	30	
Tetrachloroethene	9.86	0.09	0.20	ug/L	10.0		98.6	80-120	5.06	30	
Ethylbenzene	9.74	0.05	0.20	ug/L	10.0		97.4	80-120	4.44	30	
m,p-Xylene	19.7	0.14	0.40	ug/L	20.0		98.6	80-121	4.58	30	
o-Xylene	9.66	0.08	0.20	ug/L	10.0		96.6	80-121	3.65	30	
Xylenes, total	29.4	0.22	0.60	ug/L	30.0		97.9	76-127	4.27	30	
<i>Surrogate: 1,2-Dichloroethane-d4</i>	4.71			ug/L	5.00		94.2	80-129			
<i>Surrogate: Toluene-d8</i>	5.07			ug/L	5.00		101	80-120			
<i>Surrogate: 4-Bromofluorobenzene</i>	5.22			ug/L	5.00		104	80-120			
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	5.20			ug/L	5.00		104	80-120			



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 17:13

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - Quality Control

Batch BJK0705 - EPA 5030C (Purge and Trap)

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0705-BLK2)						Prepared: 29-Nov-2021 Analyzed: 29-Nov-2021 12:29					
Vinyl Chloride	ND	0.08	0.20	ug/L							U
1,1-Dichloroethene	ND	0.08	0.20	ug/L							U
trans-1,2-Dichloroethene	ND	0.07	0.20	ug/L							U
cis-1,2-Dichloroethene	ND	0.08	0.20	ug/L							U
Benzene	ND	0.05	0.20	ug/L							U
Trichloroethene	ND	0.07	0.20	ug/L							U
Toluene	ND	0.05	0.20	ug/L							U
Tetrachloroethene	ND	0.09	0.20	ug/L							U
Ethylbenzene	ND	0.05	0.20	ug/L							U
m,p-Xylene	ND	0.14	0.40	ug/L							U
o-Xylene	ND	0.08	0.20	ug/L							U
Xylenes, total	ND	0.22	0.60	ug/L							U
Surrogate: 1,2-Dichloroethane-d4	5.12			ug/L	5.00		102	80-129			
Surrogate: Toluene-d8	5.06			ug/L	5.00		101	80-120			
Surrogate: 4-Bromofluorobenzene	5.04			ug/L	5.00		101	80-120			
Surrogate: 1,2-Dichlorobenzene-d4	4.85			ug/L	5.00		97.1	80-120			
LCS (BJK0705-BS2)						Prepared: 29-Nov-2021 Analyzed: 29-Nov-2021 10:48					
Vinyl Chloride	8.40	0.08	0.20	ug/L	10.0		84.0	66-133			
1,1-Dichloroethene	9.78	0.08	0.20	ug/L	10.0		97.8	69-135			
trans-1,2-Dichloroethene	9.08	0.07	0.20	ug/L	10.0		90.8	78-128			
cis-1,2-Dichloroethene	9.53	0.08	0.20	ug/L	10.0		95.3	80-121			
Benzene	9.85	0.05	0.20	ug/L	10.0		98.5	80-120			
Trichloroethene	9.71	0.07	0.20	ug/L	10.0		97.1	80-120			
Toluene	9.78	0.05	0.20	ug/L	10.0		97.8	80-120			
Tetrachloroethene	9.65	0.09	0.20	ug/L	10.0		96.5	80-120			
Ethylbenzene	9.45	0.05	0.20	ug/L	10.0		94.5	80-120			
m,p-Xylene	19.5	0.14	0.40	ug/L	20.0		97.5	80-121			
o-Xylene	9.53	0.08	0.20	ug/L	10.0		95.3	80-121			
Xylenes, total	29.0	0.22	0.60	ug/L	30.0		96.8	76-127			
Surrogate: 1,2-Dichloroethane-d4	5.14			ug/L	5.00		103	80-129			
Surrogate: Toluene-d8	5.24			ug/L	5.00		105	80-120			
Surrogate: 4-Bromofluorobenzene	5.04			ug/L	5.00		101	80-120			
Surrogate: 1,2-Dichlorobenzene-d4	5.22			ug/L	5.00		104	80-120			


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 17-Dec-2021 17:13

Analysis by: Analytical Resources, LLC
Volatile Organic Compounds - Quality Control
Batch BJK0705 - EPA 5030C (Purge and Trap)

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BJK0705-BSD2)						Prepared: 29-Nov-2021 Analyzed: 29-Nov-2021 11:39					
Vinyl Chloride	9.37	0.08	0.20	ug/L	10.0		93.7	66-133	11.00	30	
1,1-Dichloroethene	9.94	0.08	0.20	ug/L	10.0		99.4	69-135	1.61	30	
trans-1,2-Dichloroethene	9.72	0.07	0.20	ug/L	10.0		97.2	78-128	6.84	30	
cis-1,2-Dichloroethene	10.2	0.08	0.20	ug/L	10.0		102	80-121	6.55	30	
Benzene	10.3	0.05	0.20	ug/L	10.0		103	80-120	4.13	30	
Trichloroethene	10.3	0.07	0.20	ug/L	10.0		103	80-120	5.43	30	
Toluene	10.2	0.05	0.20	ug/L	10.0		102	80-120	4.26	30	
Tetrachloroethene	10.6	0.09	0.20	ug/L	10.0		106	80-120	9.18	30	
Ethylbenzene	10.4	0.05	0.20	ug/L	10.0		104	80-120	9.73	30	
m,p-Xylene	21.4	0.14	0.40	ug/L	20.0		107	80-121	9.14	30	
o-Xylene	10.2	0.08	0.20	ug/L	10.0		102	80-121	6.90	30	
Xylenes, total	31.6	0.22	0.60	ug/L	30.0		105	76-127	8.41	30	
Surrogate: 1,2-Dichloroethane-d4	4.86			ug/L	5.00		97.1	80-129			
Surrogate: Toluene-d8	5.01			ug/L	5.00		100	80-120			
Surrogate: 4-Bromofluorobenzene	5.18			ug/L	5.00		104	80-120			
Surrogate: 1,2-Dichlorobenzene-d4	4.99			ug/L	5.00		99.7	80-120			


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 17-Dec-2021 17:13

Analysis by: Analytical Resources, LLC
Volatile Organic Compounds - Quality Control
Batch BJK0727 - EPA 5030C (Purge and Trap)

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0727-BLK1)		Prepared: 30-Nov-2021 Analyzed: 30-Nov-2021 12:26								
Gasoline Range Organics (Tol-Nap)	ND	100	ug/L							U
Surrogate: Toluene-d8	4.95		ug/L	5.00		99.1	80-120			
Surrogate: 4-Bromofluorobenzene	5.06		ug/L	5.00		101	80-120			
LCS (BJK0727-BS1)		Prepared: 30-Nov-2021 Analyzed: 30-Nov-2021 09:29								
Gasoline Range Organics (Tol-Nap)	945	100	ug/L	1000		94.5	72-128			
Surrogate: Toluene-d8	5.13		ug/L	5.00		103	80-120			
Surrogate: 4-Bromofluorobenzene	5.02		ug/L	5.00		100	80-120			
LCS Dup (BJK0727-BSD1)		Prepared: 30-Nov-2021 Analyzed: 30-Nov-2021 10:20								
Gasoline Range Organics (Tol-Nap)	872	100	ug/L	1000		87.2	72-128	8.00	30	
Surrogate: Toluene-d8	5.10		ug/L	5.00		102	80-120			
Surrogate: 4-Bromofluorobenzene	4.98		ug/L	5.00		99.6	80-120			


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 17-Dec-2021 17:13

Analysis by: Analytical Resources, LLC
Volatile Organic Compounds - SIM - Quality Control
Batch BJK0740 - EPA 5030C (Purge and Trap)

Instrument: NT16 Analyst: KOTT

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0740-BLK1)						Prepared: 30-Nov-2021 Analyzed: 30-Nov-2021 14:31					
Vinyl chloride	ND	5.01	20.0	ng/L							U
Surrogate: 1,2-Dichloroethane-d4	5060			ng/L	5000		101	80-129			
Surrogate: Toluene-d8	5110			ng/L	5000		102	80-120			
Surrogate: 4-Bromofluorobenzene	4980			ng/L	5000		99.7	75-125			
LCS (BJK0740-BS1)						Prepared: 30-Nov-2021 Analyzed: 30-Nov-2021 12:32					
Vinyl chloride	2100	5.01	20.0	ng/L	2000		105	62-141			
Surrogate: 1,2-Dichloroethane-d4	5250			ng/L	5000		105	80-129			
Surrogate: Toluene-d8	5250			ng/L	5000		105	80-120			
Surrogate: 4-Bromofluorobenzene	5190			ng/L	5000		104	75-125			
LCS Dup (BJK0740-BSD1)						Prepared: 30-Nov-2021 Analyzed: 30-Nov-2021 13:35					
Vinyl chloride	2090	5.01	20.0	ng/L	2000		104	62-141	0.60	30	
Surrogate: 1,2-Dichloroethane-d4	5170			ng/L	5000		103	80-129			
Surrogate: Toluene-d8	5250			ng/L	5000		105	80-120			
Surrogate: 4-Bromofluorobenzene	5190			ng/L	5000		104	75-125			


 Shannon & Wilson, Inc
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 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 17-Dec-2021 17:13

Analysis by: Analytical Resources, LLC
Dissolved Gases - Quality Control
Batch BJL0076 - EPA 5030C (Purge and Trap)

Instrument: FID6 Analyst: PB

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJL0076-BLK1)		Prepared: 02-Dec-2021 Analyzed: 02-Dec-2021 12:45								
Methane	ND	0.65	ug/L							U
Ethane	ND	1.23	ug/L							U
Ethene	ND	1.14	ug/L							U
Acetylene	ND	1.06	ug/L							U
Surrogate: Propane	1480		ug/L	1800		82.3	72-122			
LCS (BJL0076-BS1)		Prepared: 02-Dec-2021 Analyzed: 02-Dec-2021 12:27								
Methane	331	0.65	ug/L	328		101	80-120			
Ethane	662	1.23	ug/L	615		108	80-120			
Ethene	598	1.14	ug/L	575		104	80-120			
Acetylene	539	1.06	ug/L	530		102	73-123			
Surrogate: Propane	1540		ug/L	1800		85.8	62-122			
LCS Dup (BJL0076-BSD1)		Prepared: 02-Dec-2021 Analyzed: 02-Dec-2021 13:20								
Methane	304	0.65	ug/L	328		92.7	80-120	8.39	30	
Ethane	604	1.23	ug/L	615		98.2	80-120	9.13	30	
Ethene	549	1.14	ug/L	575		95.5	80-120	8.45	30	
Acetylene	488	1.06	ug/L	530		92.2	73-123	9.89	30	
Surrogate: Propane	1360		ug/L	1800		75.6	62-122			
Duplicate (BJL0076-DUP1)		Source: 21K0367-05		Prepared: 02-Dec-2021 Analyzed: 02-Dec-2021 15:01						
Methane	5030	0.65	ug/L		5020			0.13	30	
Ethane	ND	1.23	ug/L		ND					U
Ethene	ND	1.14	ug/L		ND					U
Acetylene	ND	1.06	ug/L		ND					U
Surrogate: Propane	1700		ug/L	1800	1690	94.3	72-122			


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 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 17-Dec-2021 17:13

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - Quality Control
Batch BJK0625 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0625-BLK1)						Prepared: 26-Nov-2021 Analyzed: 01-Dec-2021 18:39					
1,4-Dichlorobenzene	ND	0.03	0.2	ug/L							U
1,2-Dichlorobenzene	ND	0.03	0.2	ug/L							U
2,4-Dimethylphenol	ND	0.3	1.0	ug/L							U
Benzoic acid	ND	0.1	2.0	ug/L							U
N-Nitrosodiphenylamine	ND	0.03	0.2	ug/L							U
Pentachlorophenol	ND	0.1	1.0	ug/L							U
Di-n-Butylphthalate	ND	0.05	0.2	ug/L							U
Butylbenzylphthalate	ND	0.07	0.2	ug/L							U
bis(2-Ethylhexyl)phthalate	ND	0.2	0.2	ug/L							U
<i>Surrogate: 2-Fluorophenol</i>	3.36			ug/L	7.50		44.7	30-160			
<i>Surrogate: Phenol-d5</i>	2.19			ug/L	7.50		29.2	30-160			*
<i>Surrogate: 2-Chlorophenol-d4</i>	6.18			ug/L	7.50		82.3	30-160			
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	3.15			ug/L	5.00		63.0	30-160			
<i>Surrogate: Nitrobenzene-d5</i>	3.86			ug/L	5.00		77.1	30-160			
<i>Surrogate: 2-Fluorobiphenyl</i>	4.00			ug/L	5.00		79.9	30-160			
<i>Surrogate: 2,4,6-Tribromophenol</i>	6.67			ug/L	7.50		88.9	30-160			
<i>Surrogate: p-Terphenyl-d14</i>	4.78			ug/L	5.00		95.7	30-160			Q
LCS (BJK0625-BS1)						Prepared: 26-Nov-2021 Analyzed: 01-Dec-2021 19:17					
1,4-Dichlorobenzene	3.7	0.03	0.2	ug/L	5.00		74.6	30-160			
1,2-Dichlorobenzene	3.5	0.03	0.2	ug/L	5.00		69.2	30-160			
2,4-Dimethylphenol	10.9	0.3	1.0	ug/L	13.0		83.5	30-160			
Benzoic acid	7.8	0.1	2.0	ug/L	23.0		34.0	30-160			
N-Nitrosodiphenylamine	4.6	0.03	0.2	ug/L	5.00		92.4	30-160			
Pentachlorophenol	5.9	0.1	1.0	ug/L	13.0		45.1	30-160			Q
Di-n-Butylphthalate	5.2	0.05	0.2	ug/L	5.00		105	30-160			
Butylbenzylphthalate	5.6	0.07	0.2	ug/L	5.00		113	30-160			Q
bis(2-Ethylhexyl)phthalate	5.0	0.2	0.2	ug/L	5.00		100	30-160			
<i>Surrogate: 2-Fluorophenol</i>	4.46			ug/L	7.50		59.4	30-160			
<i>Surrogate: Phenol-d5</i>	3.09			ug/L	7.50		41.1	30-160			
<i>Surrogate: 2-Chlorophenol-d4</i>	6.93			ug/L	7.50		92.4	30-160			
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	3.54			ug/L	5.00		70.9	30-160			
<i>Surrogate: Nitrobenzene-d5</i>	4.75			ug/L	5.00		95.0	30-160			
<i>Surrogate: 2-Fluorobiphenyl</i>	4.67			ug/L	5.00		93.5	30-160			


 Shannon & Wilson, Inc
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 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 17-Dec-2021 17:13

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - Quality Control
Batch BJK0625 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJK0625-BS1)						Prepared: 26-Nov-2021 Analyzed: 01-Dec-2021 19:17					
Surrogate: 2,4,6-Tribromophenol	7.74			ug/L	7.50		103	30-160			
Surrogate: p-Terphenyl-d14	6.18			ug/L	5.00		124	30-160			Q
LCS Dup (BJK0625-BSD1)						Prepared: 26-Nov-2021 Analyzed: 01-Dec-2021 19:55					
1,4-Dichlorobenzene	3.7	0.03	0.2	ug/L	5.00		74.7	30-160	0.12	30	
1,2-Dichlorobenzene	3.4	0.03	0.2	ug/L	5.00		68.4	30-160	1.03	30	
2,4-Dimethylphenol	10.7	0.3	1.0	ug/L	13.0		82.0	30-160	1.88	30	
Benzoic acid	8.2	0.1	2.0	ug/L	23.0		35.8	30-160	5.35	30	
N-Nitrosodiphenylamine	4.4	0.03	0.2	ug/L	5.00		87.7	30-160	5.23	30	
Pentachlorophenol	5.4	0.1	1.0	ug/L	13.0		41.7	30-160	7.64	30	Q
Di-n-Butylphthalate	4.9	0.05	0.2	ug/L	5.00		98.9	30-160	5.71	30	
Butylbenzylphthalate	5.2	0.07	0.2	ug/L	5.00		104	30-160	7.87	30	Q
bis(2-Ethylhexyl)phthalate	4.5	0.2	0.2	ug/L	5.00		90.8	30-160	10.10	30	
Surrogate: 2-Fluorophenol	3.99			ug/L	7.50		53.1	30-160			
Surrogate: Phenol-d5	2.73			ug/L	7.50		36.5	30-160			
Surrogate: 2-Chlorophenol-d4	6.56			ug/L	7.50		87.5	30-160			
Surrogate: 1,2-Dichlorobenzene-d4	3.49			ug/L	5.00		69.8	30-160			
Surrogate: Nitrobenzene-d5	4.45			ug/L	5.00		88.9	30-160			
Surrogate: 2-Fluorobiphenyl	4.38			ug/L	5.00		87.7	30-160			
Surrogate: 2,4,6-Tribromophenol	7.20			ug/L	7.50		95.9	30-160			
Surrogate: p-Terphenyl-d14	5.69			ug/L	5.00		114	30-160			Q


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 17-Dec-2021 17:13

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - SIM - Quality Control
Batch BJK0640 - EPA 3510C SepF

Instrument: NT11 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0640-BLK1)						Prepared: 29-Nov-2021 Analyzed: 01-Dec-2021 13:40					
Naphthalene	0.002	0.001	0.010	ug/L							J
2-Methylnaphthalene	0.001	0.001	0.010	ug/L							J
1-Methylnaphthalene	ND	0.0009	0.010	ug/L							U
Acenaphthylene	ND	0.002	0.010	ug/L							U
Acenaphthene	ND	0.003	0.010	ug/L							U
Dibenzofuran	ND	0.002	0.010	ug/L							U
Fluorene	ND	0.002	0.010	ug/L							U
Phenanthrene	ND	0.001	0.010	ug/L							U
Anthracene	ND	0.001	0.010	ug/L							U
Carbazole	ND	0.001	0.010	ug/L							U
Fluoranthene	ND	0.002	0.010	ug/L							U
Pyrene	ND	0.001	0.010	ug/L							U
Benzo(a)anthracene	ND	0.0008	0.010	ug/L							U
Chrysene	ND	0.0009	0.010	ug/L							U
Benzo(b)fluoranthene	ND	0.0005	0.010	ug/L							U
Benzo(k)fluoranthene	ND	0.003	0.010	ug/L							U
Benzo(j)fluoranthene	ND	0.002	0.010	ug/L							U
Benzo(a)fluoranthene, Total	ND	0.004	0.010	ug/L							U
Benzo(a)pyrene	ND	0.002	0.010	ug/L							U
Perylene	ND	0.006	0.010	ug/L							U
Indeno(1,2,3-cd)pyrene	ND	0.001	0.010	ug/L							U
Dibenzo(a,h)anthracene	ND	0.001	0.010	ug/L							U
Benzo(g,h,i)perylene	ND	0.001	0.010	ug/L							U
Surrogate: 2-Methylnaphthalene-d10	0.242			ug/L	0.300		80.6	42-120			
Surrogate: Dibenzo[a,h]anthracene-d14	0.163			ug/L	0.300		54.5	29-120			Q
Surrogate: Fluoranthene-d10	0.276			ug/L	0.300		92.0	57-120			

LCS (BJK0640-BS1)						Prepared: 29-Nov-2021 Analyzed: 01-Dec-2021 14:10					
Naphthalene	0.245	0.001	0.010	ug/L	0.300		81.7	37-120			
2-Methylnaphthalene	0.264	0.001	0.010	ug/L	0.300		87.9	37-120			
1-Methylnaphthalene	0.268	0.0009	0.010	ug/L	0.300		89.4	29-120			
Acenaphthylene	0.275	0.002	0.010	ug/L	0.300		91.6	41-120			
Acenaphthene	0.281	0.003	0.010	ug/L	0.300		93.6	41-120			
Dibenzofuran	0.267	0.002	0.010	ug/L	0.300		89.1	38-120			
Fluorene	0.277	0.002	0.010	ug/L	0.300		92.2	43-120			


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 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 17-Dec-2021 17:13

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - SIM - Quality Control
Batch BJK0640 - EPA 3510C SepF

Instrument: NT11 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJK0640-BS1)						Prepared: 29-Nov-2021 Analyzed: 01-Dec-2021 14:10					
Phenanthrene	0.280	0.001	0.010	ug/L	0.300		93.3	41-120			
Anthracene	0.270	0.001	0.010	ug/L	0.300		90.0	40-120			
Carbazole	0.279	0.001	0.010	ug/L	0.300		92.9	30-160			
Fluoranthene	0.286	0.002	0.010	ug/L	0.300		95.5	45-120			
Pyrene	0.284	0.001	0.010	ug/L	0.300		94.8	41-120			
Benzo(a)anthracene	0.278	0.0008	0.010	ug/L	0.300		92.8	42-120			
Chrysene	0.273	0.0009	0.010	ug/L	0.300		90.9	44-120			
Benzo(b)fluoranthene	0.255	0.0005	0.010	ug/L	0.300		85.1	44-120			
Benzo(k)fluoranthene	0.274	0.003	0.010	ug/L	0.300		91.4	50-120			
Benzo(j)fluoranthene	0.279	0.002	0.010	ug/L	0.300		92.8	39-160			
Benzofluoranthenes, Total	0.808	0.004	0.010	ug/L	0.900		89.8	46-120			
Benzo(a)pyrene	0.263	0.002	0.010	ug/L	0.300		87.8	35-120			
Perylene	0.235	0.006	0.010	ug/L	0.300		78.3	30-160			
Indeno(1,2,3-cd)pyrene	0.224	0.001	0.010	ug/L	0.300		74.7	37-120			
Dibenzo(a,h)anthracene	0.221	0.001	0.010	ug/L	0.300		73.5	34-120			
Benzo(g,h,i)perylene	0.187	0.001	0.010	ug/L	0.300		62.4	38-120			Q
Surrogate: 2-Methylnaphthalene-d10	0.272			ug/L	0.300		90.8	42-120			
Surrogate: Dibenzo[a,h]anthracene-d14	0.203			ug/L	0.300		67.8	29-120			Q
Surrogate: Fluoranthene-d10	0.289			ug/L	0.300		96.3	57-120			
LCS Dup (BJK0640-BSD1)						Prepared: 29-Nov-2021 Analyzed: 01-Dec-2021 14:41					
Naphthalene	0.245	0.001	0.010	ug/L	0.300		81.7	37-120	0.03	30	
2-Methylnaphthalene	0.265	0.001	0.010	ug/L	0.300		88.3	37-120	0.49	30	
1-Methylnaphthalene	0.261	0.0009	0.010	ug/L	0.300		87.1	29-120	2.54	30	
Acenaphthylene	0.273	0.002	0.010	ug/L	0.300		90.9	41-120	0.67	30	
Acenaphthene	0.280	0.003	0.010	ug/L	0.300		93.4	41-120	0.26	30	
Dibenzofuran	0.263	0.002	0.010	ug/L	0.300		87.6	38-120	1.69	30	
Fluorene	0.277	0.002	0.010	ug/L	0.300		92.3	43-120	0.09	30	
Phenanthrene	0.277	0.001	0.010	ug/L	0.300		92.3	41-120	1.08	30	
Anthracene	0.272	0.001	0.010	ug/L	0.300		90.6	40-120	0.63	30	
Carbazole	0.277	0.001	0.010	ug/L	0.300		92.5	30-160	0.51	30	
Fluoranthene	0.285	0.002	0.010	ug/L	0.300		95.0	45-120	0.53	30	
Pyrene	0.281	0.001	0.010	ug/L	0.300		93.8	41-120	1.05	30	
Benzo(a)anthracene	0.279	0.0008	0.010	ug/L	0.300		93.1	42-120	0.29	30	
Chrysene	0.272	0.0009	0.010	ug/L	0.300		90.7	44-120	0.26	30	


 Shannon & Wilson, Inc
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 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 17-Dec-2021 17:13

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - SIM - Quality Control
Batch BJK0640 - EPA 3510C SepF

Instrument: NT11 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BJK0640-BS01)						Prepared: 29-Nov-2021 Analyzed: 01-Dec-2021 14:41					
Benzo(b)fluoranthene	0.251	0.0005	0.010	ug/L	0.300		83.8	44-120	1.56	30	
Benzo(k)fluoranthene	0.274	0.003	0.010	ug/L	0.300		91.3	50-120	0.16	30	
Benzo(j)fluoranthene	0.293	0.002	0.010	ug/L	0.300		97.7	39-160	5.09	30	
Benzo(a)fluoranthene, Total	0.818	0.004	0.010	ug/L	0.900		90.9	46-120	1.25	30	
Benzo(a)pyrene	0.265	0.002	0.010	ug/L	0.300		88.2	35-120	0.54	30	
Perylene	0.248	0.006	0.010	ug/L	0.300		82.6	30-160	5.40	30	
Indeno(1,2,3-cd)pyrene	0.230	0.001	0.010	ug/L	0.300		76.6	37-120	2.61	30	
Dibenzo(a,h)anthracene	0.226	0.001	0.010	ug/L	0.300		75.5	34-120	2.63	30	
Benzo(g,h,i)perylene	0.193	0.001	0.010	ug/L	0.300		64.4	38-120	3.24	30	Q
Surrogate: 2-Methylnaphthalene-d10	0.271			ug/L	0.300		90.4	42-120			
Surrogate: Dibenzo[a,h]anthracene-d14	0.207			ug/L	0.300		69.1	29-120			Q
Surrogate: Fluoranthene-d10	0.290			ug/L	0.300		96.6	57-120			


 Shannon & Wilson, Inc
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 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 17-Dec-2021 17:13

Analysis by: Analytical Resources, LLC
Petroleum Hydrocarbons - Quality Control
Batch BJK0634 - EPA 3510C SepF

Instrument: FID4 Analyst: TWC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0634-BLK1)		Prepared: 24-Nov-2021 Analyzed: 26-Nov-2021 17:11								
Diesel Range Organics (C12-C24)	ND	0.100	mg/L							U
Motor Oil Range Organics (C24-C38)	ND	0.200	mg/L							U
<i>Surrogate: o-Terphenyl</i>	103		mg/L	113		91.6	50-150			
LCS (BJK0634-BS1)		Prepared: 24-Nov-2021 Analyzed: 26-Nov-2021 17:30								
Diesel Range Organics (C12-C24)	2.16	0.100	mg/L	3.00		72.0	56-120			
<i>Surrogate: o-Terphenyl</i>	103		mg/L	113		91.3	50-150			
LCS Dup (BJK0634-BSD1)		Prepared: 24-Nov-2021 Analyzed: 26-Nov-2021 17:50								
Diesel Range Organics (C12-C24)	2.58	0.100	mg/L	3.00		86.1	56-120	17.90	30	
<i>Surrogate: o-Terphenyl</i>	113		mg/L	113		100	50-150			
Matrix Spike (BJK0634-MS1)		Source: 21K0367-05		Prepared: 24-Nov-2021 Analyzed: 26-Nov-2021 19:07						
Diesel Range Organics (C12-C24)	2.44	0.112	mg/L	3.37	ND	71.2	56-120			
<i>Surrogate: o-Terphenyl</i>	88.8		mg/L	113	87.9	78.9	50-150			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.										
Matrix Spike Dup (BJK0634-MSD1)		Source: 21K0367-05		Prepared: 24-Nov-2021 Analyzed: 26-Nov-2021 19:27						
Diesel Range Organics (C12-C24)	2.21	0.111	mg/L	3.33	ND	65.1	56-120	9.90	30	
<i>Surrogate: o-Terphenyl</i>	86.8		mg/L	113	87.9	77.2	50-150			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.										



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 17:13

Analysis by: Analytical Resources, LLC

Metals and Metallic Compounds - Quality Control

Batch BJL0018 - TWM EPA 7470A

Instrument: HYDRA Analyst: SKD

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJL0018-BLK1)						Prepared: 01-Dec-2021 Analyzed: 02-Dec-2021 16:14					
Mercury	ND	0.000013	0.000100	mg/L							U
LCS (BJL0018-BS1)						Prepared: 01-Dec-2021 Analyzed: 02-Dec-2021 16:16					
Mercury	0.00103	0.000013	0.000100	mg/L	0.00100		103	80-120			


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 17-Dec-2021 17:13

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds - Quality Control
Batch BJL0112 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJL0112-BLK1)						Prepared: 03-Dec-2021 Analyzed: 07-Dec-2021 20:27						
Barium	135	ND	0.114	0.500	ug/L							U
Barium	137	ND	0.0765	0.500	ug/L							U
Chromium	52	ND	0.260	0.500	ug/L							U
Chromium	53	ND	0.239	0.500	ug/L							U
Iron	54	ND	18.2	36.0	ug/L							U
Iron	57	ND	6.63	36.0	ug/L							U
Lead	208	ND	0.0513	0.100	ug/L							U
Manganese	55	ND	0.142	0.500	ug/L							U
Silver	107	ND	0.0220	0.200	ug/L							U
Vanadium	51a	ND	0.0556	0.200	ug/L							U
Vanadium	51b	ND	0.0521	0.200	ug/L							U
Arsenic	75a	ND	0.0373	0.200	ug/L							U
Cadmium	111	ND	0.0300	0.100	ug/L							U
Cadmium	114	ND	0.0400	0.100	ug/L							U
Cobalt	59	ND	0.0178	0.200	ug/L							U
Copper	63	ND	0.173	0.500	ug/L							U
Copper	65	ND	0.350	0.500	ug/L							U
Nickel	60	ND	0.0792	0.500	ug/L							U
Nickel	62	ND	0.220	0.500	ug/L							U
Selenium	78	ND	0.179	0.500	ug/L							U
Zinc	66	ND	2.92	6.00	ug/L							U
Zinc	67	ND	0.940	6.00	ug/L							U
LCS (BJL0112-BS1)						Prepared: 03-Dec-2021 Analyzed: 07-Dec-2021 20:32						
Barium	135	25.2	0.114	0.500	ug/L	25.0		101	80-120			
Barium	137	25.2	0.0765	0.500	ug/L	25.0		101	80-120			
Chromium	52	25.0	0.260	0.500	ug/L	25.0		100	80-120			
Chromium	53	24.7	0.239	0.500	ug/L	25.0		98.8	80-120			
Iron	54	5110	18.2	36.0	ug/L	5000		102	80-120			
Iron	57	5060	6.63	36.0	ug/L	5000		101	80-120			
Lead	208	24.9	0.0513	0.100	ug/L	25.0		99.7	80-120			
Manganese	55	25.3	0.142	0.500	ug/L	25.0		101	80-120			
Silver	107	25.5	0.0220	0.200	ug/L	25.0		102	80-120			
Vanadium	51a	25.2	0.0556	0.200	ug/L	25.0		101	80-120			
Vanadium	51b	25.1	0.0521	0.200	ug/L	25.0		100	80-120			


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 17-Dec-2021 17:13

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds - Quality Control
Batch BJL0112 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJL0112-BS1)						Prepared: 03-Dec-2021 Analyzed: 07-Dec-2021 20:32						
Arsenic	75a	24.2	0.0373	0.200	ug/L	25.0		96.8	80-120			
Cadmium	111	25.2	0.0300	0.100	ug/L	25.0		101	80-120			
Cadmium	114	25.2	0.0400	0.100	ug/L	25.0		101	80-120			
Cobalt	59	23.9	0.0178	0.200	ug/L	25.0		95.8	80-120			
Copper	63	24.7	0.173	0.500	ug/L	25.0		98.7	80-120			
Copper	65	24.3	0.350	0.500	ug/L	25.0		97.3	80-120			
Nickel	60	23.7	0.0792	0.500	ug/L	25.0		94.9	80-120			
Nickel	62	24.7	0.220	0.500	ug/L	25.0		99.0	80-120			
Selenium	78	79.7	0.179	0.500	ug/L	80.0		99.7	80-120			
Zinc	66	76.7	2.92	6.00	ug/L	80.0		95.8	80-120			
Zinc	67	72.9	0.940	6.00	ug/L	80.0		91.1	80-120			
Duplicate (BJL0112-DUP1)						Source: 21K0367-01 Prepared: 03-Dec-2021 Analyzed: 07-Dec-2021 23:27						
Barium	135	ND	0.114	0.500	ug/L		1.67					U
Chromium	52	ND	0.260	0.500	ug/L		ND					U
Iron	54	ND	18.2	36.0	ug/L		ND					U
Lead	208	ND	0.0513	0.100	ug/L		ND					U
Manganese	55	ND	0.142	0.500	ug/L		0.149					U
Silver	107	ND	0.0220	0.200	ug/L		ND					U
Vanadium	51a	ND	0.0556	0.200	ug/L		ND					U
Arsenic	75a	ND	0.0373	0.200	ug/L		ND					U
Cadmium	111	ND	0.0300	0.100	ug/L		ND					U
Cobalt	59	ND	0.0178	0.200	ug/L		ND					U
Copper	63	ND	0.173	0.500	ug/L		ND					U
Nickel	60	ND	0.0792	0.500	ug/L		ND					U
Selenium	78	ND	0.179	0.500	ug/L		ND					U
Zinc	66	ND	2.92	6.00	ug/L		ND					U
Matrix Spike (BJL0112-MS1)						Source: 21K0367-01 Prepared: 03-Dec-2021 Analyzed: 07-Dec-2021 23:32						
Barium	135	24.8	0.114	0.500	ug/L	25.0	1.67	92.5	75-125			
Chromium	52	24.8	0.260	0.500	ug/L	25.0	ND	99.1	75-125			
Iron	54	5040	18.2	36.0	ug/L	5000	ND	101	75-125			
Lead	208	25.5	0.0513	0.100	ug/L	25.0	ND	102	75-125			
Manganese	55	25.0	0.142	0.500	ug/L	25.0	0.149	99.6	75-125			
Silver	107	25.8	0.0220	0.200	ug/L	25.0	ND	103	75-125			


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 17-Dec-2021 17:13

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds - Quality Control
Batch BJL0112 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike (BJL0112-MS1)		Source: 21K0367-01		Prepared: 03-Dec-2021 Analyzed: 07-Dec-2021 23:32								
Vanadium	51a	24.8	0.0556	0.200	ug/L	25.0	ND	99.4	75-125			
Arsenic	75a	23.9	0.0373	0.200	ug/L	25.0	ND	95.6	75-125			
Cadmium	111	25.0	0.0300	0.100	ug/L	25.0	ND	100	75-125			
Cobalt	59	25.4	0.0178	0.200	ug/L	25.0	ND	102	75-125			
Copper	63	25.5	0.173	0.500	ug/L	25.0	ND	102	75-125			
Nickel	60	24.7	0.0792	0.500	ug/L	25.0	ND	98.9	75-125			
Selenium	78	74.6	0.179	0.500	ug/L	80.0	ND	93.3	75-125			
Zinc	66	76.2	2.92	6.00	ug/L	80.0	ND	95.3	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BJL0112-MSD1)		Source: 21K0367-01		Prepared: 03-Dec-2021 Analyzed: 07-Dec-2021 23:39								
Barium	135	25.0	0.114	0.500	ug/L	25.0	1.67	93.2	75-125	0.68	20	
Chromium	52	24.8	0.260	0.500	ug/L	25.0	ND	99.2	75-125	0.07	20	
Iron	54	5040	18.2	36.0	ug/L	5000	ND	101	75-125	0.05	20	
Lead	208	25.4	0.0513	0.100	ug/L	25.0	ND	101	75-125	0.44	20	
Manganese	55	24.9	0.142	0.500	ug/L	25.0	0.149	99.0	75-125	0.59	20	
Silver	107	25.4	0.0220	0.200	ug/L	25.0	ND	101	75-125	1.75	20	
Vanadium	51a	24.6	0.0556	0.200	ug/L	25.0	ND	98.3	75-125	1.10	20	
Arsenic	75a	23.9	0.0373	0.200	ug/L	25.0	ND	95.6	75-125	0.05	20	
Cadmium	111	24.4	0.0300	0.100	ug/L	25.0	ND	97.5	75-125	2.59	20	
Cobalt	59	25.4	0.0178	0.200	ug/L	25.0	ND	101	75-125	0.37	20	
Copper	63	25.3	0.173	0.500	ug/L	25.0	ND	101	75-125	0.73	20	
Nickel	60	24.6	0.0792	0.500	ug/L	25.0	ND	98.4	75-125	0.55	20	
Selenium	78	72.5	0.179	0.500	ug/L	80.0	ND	90.6	75-125	2.87	20	
Zinc	66	77.5	2.92	6.00	ug/L	80.0	ND	96.9	75-125	1.65	20	

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 17:13

Analysis by: Analytical Resources, LLC

Metals and Metallic Compounds (dissolved) - Quality Control

Batch BJJ0105 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJL0105-BLK1)						Prepared: 03-Dec-2021 Analyzed: 07-Dec-2021 20:17						
Barium, Dissolved	135	ND	0.114	0.500	ug/L							U
Barium, Dissolved	137	ND	0.0765	0.500	ug/L							U
Chromium, Dissolved	52	ND	0.260	0.500	ug/L							U
Chromium, Dissolved	53	ND	0.239	0.500	ug/L							U
Iron, Dissolved	54	ND	18.2	36.0	ug/L							U
Iron, Dissolved	57	ND	18.2	36.0	ug/L							U
Lead, Dissolved	208	ND	0.0513	0.100	ug/L							U
Manganese, Dissolved	55	ND	0.142	0.500	ug/L							U
Silver, Dissolved	107	ND	0.0220	0.200	ug/L							U
Vanadium, Dissolved	51a	ND	0.0556	0.200	ug/L							U
Vanadium, Dissolved	51b	ND	0.0521	0.200	ug/L							U
Cadmium, Dissolved	111	ND	0.0300	0.100	ug/L							U
Cadmium, Dissolved	114	ND	0.0400	0.100	ug/L							U

Blank (BJL0105-BLK2)						Prepared: 03-Dec-2021 Analyzed: 08-Dec-2021 17:27						
Arsenic, Dissolved	75a	ND	0.0373	0.200	ug/L							U
Cobalt, Dissolved	59	ND	0.0178	0.200	ug/L							U
Copper, Dissolved	63	ND	0.173	0.500	ug/L							U
Copper, Dissolved	65	ND	0.350	0.500	ug/L							U
Nickel, Dissolved	60	ND	0.0792	0.500	ug/L							U
Nickel, Dissolved	62	ND	0.220	0.500	ug/L							U
Selenium, Dissolved	78	ND	0.179	0.500	ug/L							U
Zinc, Dissolved	66	ND	2.92	6.00	ug/L							U
Zinc, Dissolved	67	ND	0.940	6.00	ug/L							U

LCS (BJL0105-BS1)						Prepared: 03-Dec-2021 Analyzed: 07-Dec-2021 20:22						
Barium, Dissolved	135	25.0	0.114	0.500	ug/L	25.0		99.8	80-120			
Barium, Dissolved	137	25.1	0.0765	0.500	ug/L	25.0		100	80-120			
Chromium, Dissolved	52	24.8	0.260	0.500	ug/L	25.0		99.2	80-120			
Chromium, Dissolved	53	24.2	0.239	0.500	ug/L	25.0		97.0	80-120			
Iron, Dissolved	54	5050	18.2	36.0	ug/L	5000		101	80-120			
Iron, Dissolved	57	5000	18.2	36.0	ug/L	5000		100	80-120			
Lead, Dissolved	208	24.6	0.0513	0.100	ug/L	25.0		98.5	80-120			
Manganese, Dissolved	55	24.5	0.142	0.500	ug/L	25.0		98.0	80-120			
Silver, Dissolved	107	25.6	0.0220	0.200	ug/L	25.0		102	80-120			


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 17-Dec-2021 17:13

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds (dissolved) - Quality Control
Batch BJL0105 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJL0105-BS1)						Prepared: 03-Dec-2021 Analyzed: 07-Dec-2021 20:22						
Vanadium, Dissolved	51a	25.0	0.0556	0.200	ug/L	25.0		99.8	80-120			
Vanadium, Dissolved	51b	24.8	0.0521	0.200	ug/L	25.0		99.1	80-120			
Arsenic, Dissolved	75a	23.9	0.0373	0.200	ug/L	25.0		95.6	80-120			
Cadmium, Dissolved	111	24.3	0.0300	0.100	ug/L	25.0		97.4	80-120			
Cadmium, Dissolved	114	24.4	0.0400	0.100	ug/L	25.0		97.7	80-120			
Cobalt, Dissolved	59	24.8	0.0178	0.200	ug/L	25.0		99.3	80-120			
Copper, Dissolved	63	24.8	0.173	0.500	ug/L	25.0		99.3	80-120			
Copper, Dissolved	65	25.6	0.350	0.500	ug/L	25.0		102	80-120			
Nickel, Dissolved	60	23.9	0.0792	0.500	ug/L	25.0		95.7	80-120			
Nickel, Dissolved	62	24.3	0.220	0.500	ug/L	25.0		97.3	80-120			
Selenium, Dissolved	78	76.0	0.179	0.500	ug/L	80.0		95.0	80-120			
Zinc, Dissolved	66	75.7	2.92	6.00	ug/L	80.0		94.7	80-120			
Zinc, Dissolved	67	72.7	0.940	6.00	ug/L	80.0		90.9	80-120			
Duplicate (BJL0105-DUP1)						Source: 21K0367-02 Prepared: 03-Dec-2021 Analyzed: 07-Dec-2021 21:47						
Barium, Dissolved	135	ND	0.114	0.500	ug/L		ND					U
Chromium, Dissolved	52	ND	0.260	0.500	ug/L		ND					U
Iron, Dissolved	54	ND	18.2	36.0	ug/L		ND					U
Lead, Dissolved	208	ND	0.0513	0.100	ug/L		ND					U
Manganese, Dissolved	55	ND	0.142	0.500	ug/L		ND					U
Silver, Dissolved	107	ND	0.0220	0.200	ug/L		ND					U
Vanadium, Dissolved	51a	ND	0.0556	0.200	ug/L		ND					U
Arsenic, Dissolved	75a	ND	0.0373	0.200	ug/L		ND					U
Cadmium, Dissolved	111	ND	0.0300	0.100	ug/L		ND					U
Cobalt, Dissolved	59	ND	0.0178	0.200	ug/L		ND					U
Copper, Dissolved	63	0.220	0.173	0.500	ug/L		ND					J
Nickel, Dissolved	60	ND	0.0792	0.500	ug/L		ND					U
Selenium, Dissolved	78	ND	0.179	0.500	ug/L		ND					U
Zinc, Dissolved	66	ND	2.92	6.00	ug/L		ND					U
Matrix Spike (BJL0105-MS1)						Source: 21K0367-02 Prepared: 03-Dec-2021 Analyzed: 07-Dec-2021 21:53						
Barium, Dissolved	135	25.2	0.114	0.500	ug/L	25.0	ND	101	75-125			
Chromium, Dissolved	52	24.7	0.260	0.500	ug/L	25.0	ND	98.8	75-125			
Iron, Dissolved	54	5080	18.2	36.0	ug/L	5000	ND	102	75-125			
Lead, Dissolved	208	24.6	0.0513	0.100	ug/L	25.0	ND	98.6	75-125			


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 17-Dec-2021 17:13

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds (dissolved) - Quality Control
Batch BJL0105 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike (BJL0105-MS1)		Source: 21K0367-02			Prepared: 03-Dec-2021 Analyzed: 07-Dec-2021 21:53							
Manganese, Dissolved	55	25.1	0.142	0.500	ug/L	25.0	ND	101	75-125			
Silver, Dissolved	107	25.7	0.0220	0.200	ug/L	25.0	ND	103	75-125			
Vanadium, Dissolved	51a	25.0	0.0556	0.200	ug/L	25.0	ND	99.9	75-125			
Arsenic, Dissolved	75a	24.5	0.0373	0.200	ug/L	25.0	ND	97.9	75-125			
Cadmium, Dissolved	111	24.7	0.0300	0.100	ug/L	25.0	ND	98.8	75-125			
Cobalt, Dissolved	59	25.2	0.0178	0.200	ug/L	25.0	ND	101	75-125			
Copper, Dissolved	63	25.5	0.173	0.500	ug/L	25.0	ND	102	75-125			
Nickel, Dissolved	60	24.8	0.0792	0.500	ug/L	25.0	ND	99.0	75-125			
Selenium, Dissolved	78	74.2	0.179	0.500	ug/L	80.0	ND	92.8	75-125			
Zinc, Dissolved	66	77.1	2.92	6.00	ug/L	80.0	ND	96.4	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BJL0105-MSD1)		Source: 21K0367-02			Prepared: 03-Dec-2021 Analyzed: 07-Dec-2021 21:59							
Barium, Dissolved	135	25.1	0.114	0.500	ug/L	25.0	ND	100	75-125	0.73	20	
Chromium, Dissolved	52	24.9	0.260	0.500	ug/L	25.0	ND	99.5	75-125	0.66	20	
Iron, Dissolved	54	5100	18.2	36.0	ug/L	5000	ND	102	75-125	0.43	20	
Lead, Dissolved	208	24.9	0.0513	0.100	ug/L	25.0	ND	99.7	75-125	1.10	20	
Manganese, Dissolved	55	25.2	0.142	0.500	ug/L	25.0	ND	101	75-125	0.14	20	
Silver, Dissolved	107	25.2	0.0220	0.200	ug/L	25.0	ND	101	75-125	2.22	20	
Vanadium, Dissolved	51a	24.9	0.0556	0.200	ug/L	25.0	ND	99.6	75-125	0.31	20	
Arsenic, Dissolved	75a	24.2	0.0373	0.200	ug/L	25.0	ND	96.9	75-125	0.98	20	
Cadmium, Dissolved	111	24.6	0.0300	0.100	ug/L	25.0	ND	98.5	75-125	0.28	20	
Cobalt, Dissolved	59	25.0	0.0178	0.200	ug/L	25.0	ND	100	75-125	0.62	20	
Copper, Dissolved	63	25.4	0.173	0.500	ug/L	25.0	ND	101	75-125	0.60	20	
Nickel, Dissolved	60	24.6	0.0792	0.500	ug/L	25.0	ND	98.2	75-125	0.83	20	
Selenium, Dissolved	78	75.5	0.179	0.500	ug/L	80.0	ND	94.4	75-125	1.70	20	
Zinc, Dissolved	66	78.3	2.92	6.00	ug/L	80.0	ND	97.9	75-125	1.51	20	

Recovery limits for target analytes in MS/MSD QC samples are advisory only.


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 17-Dec-2021 17:13

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds (dissolved) - Quality Control
Batch BJL0108 - TWM EPA 7470A

Instrument: HYDRA Analyst: ML

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJL0108-BLK1)						Prepared: 03-Dec-2021 Analyzed: 09-Dec-2021 11:03					
Mercury, Dissolved	ND	0.000013	0.000100	mg/L							U
LCS (BJL0108-BS1)						Prepared: 03-Dec-2021 Analyzed: 09-Dec-2021 11:05					
Mercury, Dissolved	0.00222	0.000013	0.000100	mg/L	0.00200		111	80-120			
Duplicate (BJL0108-DUP1)						Source: 21K0367-04 Prepared: 03-Dec-2021 Analyzed: 09-Dec-2021 11:10					
Mercury, Dissolved	ND	0.000013	0.000100	mg/L		ND					U
Matrix Spike (BJL0108-MS1)						Source: 21K0367-04 Prepared: 03-Dec-2021 Analyzed: 09-Dec-2021 11:12					
Mercury, Dissolved	0.00112	0.000013	0.000100	mg/L	0.00100	ND	112	75-125			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Matrix Spike Dup (BJL0108-MSD1)						Source: 21K0367-04 Prepared: 03-Dec-2021 Analyzed: 09-Dec-2021 11:15					
Mercury, Dissolved	0.00102	0.000013	0.000100	mg/L	0.00100	ND	102	75-125	9.32	20	
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											


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 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
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Analysis by: Analytical Resources, LLC
Wet Chemistry - Quality Control
Batch BJK0595 - No Prep Wet Chem

Instrument: UV1800-2 Analyst: BF

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0595-BLK1)						Prepared: 22-Nov-2021 Analyzed: 22-Nov-2021 17:01					
Ferrous Iron	ND	0.040	0.040	mg/L							U
LCS (BJK0595-BS1)						Prepared: 22-Nov-2021 Analyzed: 22-Nov-2021 17:01					
Ferrous Iron	0.536	0.040	0.040	mg/L	0.500		107	90-110			
Duplicate (BJK0595-DUP1)						Source: 21K0367-05 Prepared: 22-Nov-2021 Analyzed: 22-Nov-2021 17:03					
Ferrous Iron	22.5	0.800	0.800	mg/L		21.7			3.71	20	D
Matrix Spike (BJK0595-MS1)						Source: 21K0367-05 Prepared: 22-Nov-2021 Analyzed: 22-Nov-2021 17:04					
Ferrous Iron	40.1	0.800	0.800	mg/L	20.0	21.7	92.1	75-125			E, D

Recovery limits for target analytes in MS/MSD QC samples are advisory only.


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
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Analysis by: Analytical Resources, LLC
Wet Chemistry - Quality Control
Batch BJK0596 - No Prep Wet Chem

Instrument: N/A

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0596-BLK1)					Prepared: 22-Nov-2021 Analyzed: 22-Nov-2021 16:50					
Sulfite	ND	1.4	1.4	mg/L						U
LCS (BJK0596-BS1)					Prepared: 22-Nov-2021 Analyzed: 22-Nov-2021 16:50					
Sulfite	4.0	1.4	1.4	mg/L	5.02		80.3 75-100			
Duplicate (BJK0596-DUP1)					Source: 21K0367-05 Prepared: 22-Nov-2021 Analyzed: 22-Nov-2021 16:50					
Sulfite	ND	1.4	1.4	mg/L		ND				H, U


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 Project: Lower Duwamish Q4
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 Project Manager: Meg Strong

Reported:
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Analysis by: Analytical Resources, LLC
Wet Chemistry - Quality Control
Batch BJK0598 - No Prep Wet Chem

Instrument: IC930 Analyst: BF

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0598-BLK1)						Prepared: 22-Nov-2021 Analyzed: 23-Nov-2021 01:46					
Chloride	ND	0.100	0.100	mg/L							U
Nitrate-N	ND	0.100	0.100	mg/L							U
Nitrite-N	ND	0.100	0.100	mg/L							U
Blank (BJK0598-BLK3)						Prepared: 22-Nov-2021 Analyzed: 12-Dec-2021 03:30					
Sulfate	ND	0.100	0.100	mg/L							U
LCS (BJK0598-BS1)						Prepared: 22-Nov-2021 Analyzed: 23-Nov-2021 02:06					
Chloride	4.93	0.100	0.100	mg/L	5.00		98.5	90-110			
Nitrate-N	5.01	0.100	0.100	mg/L	5.00		100	90-110			
Nitrite-N	5.09	0.100	0.100	mg/L	5.00		102	90-110			
LCS (BJK0598-BS3)						Prepared: 22-Nov-2021 Analyzed: 12-Dec-2021 03:50					
Sulfate	5.02	0.100	0.100	mg/L	5.00		100	90-110			
Duplicate (BJK0598-DUP1)						Source: 21K0367-05 Prepared: 22-Nov-2021 Analyzed: 23-Nov-2021 03:46					
Chloride	2.89	0.100	0.100	mg/L		2.73			5.58	20	
Nitrate-N	ND	0.100	0.100	mg/L		ND					U
Nitrite-N	ND	0.100	0.100	mg/L		ND					U
Duplicate (BJK0598-DUP2)						Source: 21K0367-05RE3 Prepared: 22-Nov-2021 Analyzed: 12-Dec-2021 04:30					
Sulfate	0.377	0.100	0.100	mg/L		0.353			6.58	20	
Matrix Spike (BJK0598-MS1)						Source: 21K0367-05 Prepared: 22-Nov-2021 Analyzed: 23-Nov-2021 04:06					
Chloride	4.84	0.100	0.100	mg/L	2.00	2.73	105	75-125			
Nitrate-N	1.96	0.100	0.100	mg/L	2.00	ND	97.7	75-125			
Nitrite-N	1.76	0.100	0.100	mg/L	2.01	ND	87.5	75-125			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Matrix Spike (BJK0598-MS2)						Source: 21K0367-05RE3 Prepared: 22-Nov-2021 Analyzed: 12-Dec-2021 04:50					
Sulfate	2.15	0.100	0.100	mg/L	2.00	0.353	89.9	75-125			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											


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 Project Number: 21-1-12596-012
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Analysis by: Analytical Resources, LLC
Wet Chemistry - Quality Control
Batch BJK0616 - SM 5310 A-00, 0.45um filtration

Instrument: UV1800-1 Analyst: CKI

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0616-BLK1)						Prepared: 23-Nov-2021 Analyzed: 23-Nov-2021 10:50					
Hexavalent Chromium	ND	0.013	0.013	mg/L							U
LCS (BJK0616-BS1)						Prepared: 23-Nov-2021 Analyzed: 23-Nov-2021 10:50					
Hexavalent Chromium	0.607	0.013	0.013	mg/L	0.626		97.0	85-115			D


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Certified Analyses included in this Report

Analyte	Certifications
EPA 300.0 in Water	
Chloride	DoD-ELAP,WADOE,WA-DW,NELAP
Nitrate-N	DoD-ELAP,WADOE,WA-DW,NELAP
Nitrite-N	DoD-ELAP,WADOE,WA-DW,NELAP
Sulfate	DoD-ELAP,WADOE,WA-DW,NELAP
EPA 6020B in Water	
Silver-107	WADOE,WA-DW,DoD-ELAP,NELAP
Barium-135	NELAP,WADOE,DoD-ELAP,ADEC
Barium-137	NELAP,WADOE,DoD-ELAP,ADEC
Chromium-52	NELAP,WADOE,DoD-ELAP,ADEC
Chromium-53	NELAP,WADOE,DoD-ELAP,ADEC
Iron-54	NELAP,WADOE,DoD-ELAP
Iron-57	NELAP,WADOE,DoD-ELAP
Manganese-55	NELAP,WADOE,DoD-ELAP
Lead-208	NELAP,WADOE,DoD-ELAP,ADEC
Vanadium-51a	NELAP,DoD-ELAP,WADOE,ADEC
Vanadium-51b	NELAP,DoD-ELAP,WADOE,ADEC
Silver-107	WA-DW,DoD-ELAP,NELAP
Barium-135	NELAP,WADOE,DoD-ELAP,ADEC
Barium-137	NELAP,WADOE,DoD-ELAP,ADEC
Chromium-52	NELAP,WADOE,DoD-ELAP,ADEC
Chromium-53	NELAP,WADOE,DoD-ELAP,ADEC
Iron-54	NELAP,WADOE,DoD-ELAP
Iron-57	NELAP,WADOE,DoD-ELAP
Manganese-55	NELAP,WADOE,DoD-ELAP
Lead-208	NELAP,WADOE,DoD-ELAP,ADEC
Vanadium-51a	NELAP,DoD-ELAP,WADOE,ADEC
Vanadium-51b	NELAP,DoD-ELAP,WADOE,ADEC
EPA 6020B UCT-KED in Water	
Arsenic-75a	WADOE,WA-DW,DoD-ELAP,ADEC,NELAP
Cadmium-111	NELAP,WADOE,DoD-ELAP,ADEC
Cadmium-114	NELAP,WADOE,DoD-ELAP,ADEC
Cobalt-59	NELAP,DoD-ELAP,WADOE
Copper-63	NELAP,WADOE,DoD-ELAP
Copper-65	NELAP,WADOE,DoD-ELAP


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Nickel-60	NELAP,WADOE,DoD-ELAP,ADEC
Nickel-62	NELAP,WADOE,DoD-ELAP,ADEC
Selenium-78	NELAP,WADOE,DoD-ELAP
Zinc-66	WADOE,WA-DW,DoD-ELAP
Zinc-67	WADOE,WA-DW,DoD-ELAP
Arsenic-75a	NELAP,WADOE,DoD-ELAP,ADEC
Cadmium-111	NELAP,WADOE,DoD-ELAP,ADEC
Cadmium-114	NELAP,WADOE,DoD-ELAP,ADEC
Cobalt-59	DoD-ELAP,NELAP,WADOE
Copper-63	NELAP,WADOE,DoD-ELAP
Copper-65	NELAP,WADOE,DoD-ELAP
Nickel-60	NELAP,WADOE,DoD-ELAP,ADEC
Nickel-62	NELAP,WADOE,DoD-ELAP,ADEC
Selenium-78	NELAP,WADOE,DoD-ELAP
Zinc-66	NELAP,WADOE,DoD-ELAP
Zinc-67	NELAP,WADOE,DoD-ELAP

EPA 7470A in Water

Mercury	WADOE,NELAP,DoD-ELAP
Mercury	WADOE,NELAP,DoD-ELAP

EPA 8260D in Water

Chloromethane	DoD-ELAP,ADEC,NELAP,WADOE
Vinyl Chloride	DoD-ELAP,ADEC,NELAP,WADOE
Bromomethane	DoD-ELAP,ADEC,NELAP,WADOE
Chloroethane	DoD-ELAP,ADEC,NELAP,WADOE
Trichlorofluoromethane	DoD-ELAP,ADEC,NELAP,WADOE
Acrolein	DoD-ELAP,NELAP,WADOE
1,1,2-Trichloro-1,2,2-Trifluoroethane	DoD-ELAP,ADEC,NELAP,WADOE
Acetone	DoD-ELAP,ADEC,NELAP,WADOE
1,1-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Iodomethane	DoD-ELAP,NELAP,WADOE
Methylene Chloride	DoD-ELAP,ADEC,NELAP,WADOE
Acrylonitrile	DoD-ELAP,NELAP,WADOE
Carbon Disulfide	DoD-ELAP,NELAP,WADOE
trans-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Vinyl Acetate	DoD-ELAP,NELAP,WADOE
1,1-Dichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
2-Butanone	DoD-ELAP,NELAP,WADOE
2,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE



Analytical Report

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cis-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Chloroform	DoD-ELAP,ADEC,NELAP,WADOE
Bromochloromethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1,1-Trichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
Carbon tetrachloride	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
Benzene	DoD-ELAP,ADEC,NELAP,WADOE
Trichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
Bromodichloromethane	DoD-ELAP,ADEC,NELAP,WADOE
Dibromomethane	DoD-ELAP,ADEC,NELAP,WADOE
2-Chloroethyl vinyl ether	DoD-ELAP,ADEC,NELAP,WADOE
4-Methyl-2-Pentanone	DoD-ELAP,NELAP,WADOE
cis-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
Toluene	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
2-Hexanone	DoD-ELAP,NELAP,WADOE
1,1,2-Trichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,3-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
Tetrachloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Dibromochloromethane	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dibromoethane	DoD-ELAP,NELAP,WADOE
Chlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Ethylbenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,1,1,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,WADOE
m,p-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
o-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
Styrene	DoD-ELAP,NELAP,WADOE
Bromoform	DoD-ELAP,NELAP,WADOE
1,1,2,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,2,3-Trichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,4-Dichloro 2-Butene	DoD-ELAP,ADEC,NELAP,WADOE
n-Propylbenzene	DoD-ELAP,NELAP,WADOE
Bromobenzene	DoD-ELAP,NELAP,WADOE
Isopropyl Benzene	DoD-ELAP,NELAP,WADOE
2-Chlorotoluene	DoD-ELAP,ADEC,NELAP,WADOE
4-Chlorotoluene	DoD-ELAP,ADEC,NELAP,WADOE
t-Butylbenzene	DoD-ELAP,NELAP,WADOE


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1,3,5-Trimethylbenzene	DoD-ELAP,NELAP,WADOE
1,2,4-Trimethylbenzene	DoD-ELAP,NELAP,WADOE
s-Butylbenzene	DoD-ELAP,NELAP,WADOE
4-Isopropyl Toluene	DoD-ELAP,NELAP,WADOE
1,3-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,4-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
n-Butylbenzene	DoD-ELAP,NELAP,WADOE
1,2-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dibromo-3-chloropropane	DoD-ELAP,ADEC,NELAP,WADOE
1,2,4-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Hexachloro-1,3-Butadiene	DoD-ELAP,ADEC,NELAP,WADOE
Naphthalene	DoD-ELAP,ADEC,NELAP,WADOE
1,2,3-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Dichlorodifluoromethane	DoD-ELAP,ADEC,NELAP,WADOE
Methyl tert-butyl Ether	DoD-ELAP,ADEC,NELAP,WADOE
n-Hexane	WADOE
2-Pentanone	WADOE

EPA 8260D-SIM in Water

Acrylonitrile	NELAP,WADOE
Vinyl chloride	NELAP,WADOE
1,1-Dichloroethene	NELAP,WADOE
cis-1,2-Dichloroethene	NELAP,WADOE
trans-1,2-Dichloroethene	NELAP,WADOE
Trichloroethene	NELAP,WADOE
Tetrachloroethene	NELAP,WADOE
1,1,2,2-Tetrachloroethane	NELAP,WADOE
1,2-Dichloroethane	NELAP,WADOE
Benzene	NELAP,WADOE

EPA 8270E in Water

Phenol	NELAP,DoD-ELAP
bis(2-chloroethyl) ether	NELAP,DoD-ELAP
2-Chlorophenol	NELAP,DoD-ELAP
1,3-Dichlorobenzene	NELAP,DoD-ELAP
1,4-Dichlorobenzene	NELAP,DoD-ELAP
1,2-Dichlorobenzene	NELAP,DoD-ELAP
Benzyl Alcohol	NELAP,DoD-ELAP
2,2'-Oxybis(1-chloropropane)	NELAP,DoD-ELAP
2-Methylphenol	NELAP,DoD-ELAP


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Hexachloroethane	NELAP,DoD-ELAP
N-Nitroso-di-n-Propylamine	NELAP,DoD-ELAP
4-Methylphenol	NELAP,DoD-ELAP
Nitrobenzene	NELAP,DoD-ELAP
Isophorone	NELAP,DoD-ELAP
2-Nitrophenol	NELAP,DoD-ELAP
2,4-Dimethylphenol	NELAP,DoD-ELAP
Bis(2-Chloroethoxy)methane	NELAP,DoD-ELAP
2,4-Dichlorophenol	NELAP,DoD-ELAP
1,2,4-Trichlorobenzene	NELAP,DoD-ELAP
Naphthalene	NELAP,DoD-ELAP
Benzoic acid	NELAP,DoD-ELAP
4-Chloroaniline	NELAP,DoD-ELAP
Hexachlorobutadiene	NELAP,DoD-ELAP
4-Chloro-3-Methylphenol	NELAP,DoD-ELAP
2-Methylnaphthalene	NELAP,DoD-ELAP
Hexachlorocyclopentadiene	NELAP,DoD-ELAP
2,4,6-Trichlorophenol	NELAP,DoD-ELAP
2,4,5-Trichlorophenol	NELAP,DoD-ELAP
2-Chloronaphthalene	NELAP,DoD-ELAP
2-Nitroaniline	NELAP,DoD-ELAP
Acenaphthylene	NELAP,DoD-ELAP
Dimethylphthalate	NELAP,DoD-ELAP
2,6-Dinitrotoluene	NELAP,DoD-ELAP
Acenaphthene	NELAP,DoD-ELAP
3-Nitroaniline	NELAP,DoD-ELAP
2,4-Dinitrophenol	NELAP,DoD-ELAP
Dibenzofuran	NELAP,DoD-ELAP
4-Nitrophenol	NELAP,DoD-ELAP
2,4-Dinitrotoluene	NELAP,DoD-ELAP
Fluorene	NELAP,DoD-ELAP
4-Chlorophenylphenyl ether	NELAP,DoD-ELAP
Diethyl phthalate	NELAP,DoD-ELAP
4-Nitroaniline	NELAP,DoD-ELAP
4,6-Dinitro-2-methylphenol	NELAP,DoD-ELAP
N-Nitrosodiphenylamine	NELAP,DoD-ELAP
4-Bromophenyl phenyl ether	NELAP,DoD-ELAP
Hexachlorobenzene	NELAP,DoD-ELAP
Pentachlorophenol	NELAP,DoD-ELAP


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Phenanthrene	NELAP,DoD-ELAP
Anthracene	NELAP,DoD-ELAP
Carbazole	NELAP,DoD-ELAP
Di-n-Butylphthalate	NELAP,DoD-ELAP
Fluoranthene	NELAP,DoD-ELAP
Pyrene	NELAP,DoD-ELAP
Butylbenzylphthalate	NELAP,DoD-ELAP
Benzo(a)anthracene	NELAP,DoD-ELAP
3,3'-Dichlorobenzidine	NELAP,DoD-ELAP
Chrysene	NELAP,DoD-ELAP
bis(2-Ethylhexyl)phthalate	NELAP,DoD-ELAP
Di-n-Octylphthalate	NELAP,DoD-ELAP
Benzo(b)fluoranthene	NELAP,DoD-ELAP
Benzo(k)fluoranthene	NELAP,DoD-ELAP
Benzo(a)pyrene	NELAP,DoD-ELAP
Indeno(1,2,3-cd)pyrene	NELAP,DoD-ELAP
Dibenzo(a,h)anthracene	NELAP,DoD-ELAP
Benzo(g,h,i)perylene	NELAP,DoD-ELAP
N-Nitrosodimethylamine	NELAP,DoD-ELAP
1-Methylnaphthalene	NELAP,DoD-ELAP

EPA 8270E-SIM in Water

Naphthalene	ADEC,DoD-ELAP,NELAP,WADOE
2-Methylnaphthalene	ADEC,DoD-ELAP,NELAP
1-Methylnaphthalene	ADEC,DoD-ELAP,NELAP,WADOE
Biphenyl	NELAP
Acenaphthylene	ADEC,DoD-ELAP,NELAP,WADOE
Acenaphthene	ADEC,DoD-ELAP,NELAP,WADOE
Dibenzofuran	ADEC,DoD-ELAP,NELAP
Fluorene	ADEC,DoD-ELAP,NELAP,WADOE
Phenanthrene	ADEC,DoD-ELAP,NELAP,WADOE
Anthracene	ADEC,DoD-ELAP,NELAP,WADOE
Carbazole	NELAP
Fluoranthene	ADEC,DoD-ELAP,NELAP,WADOE
Pyrene	ADEC,DoD-ELAP,NELAP,WADOE
Benzo(a)anthracene	ADEC,DoD-ELAP,NELAP,WADOE
Chrysene	ADEC,DoD-ELAP,NELAP,WADOE
Benzo(b)fluoranthene	ADEC,DoD-ELAP,NELAP,WADOE
Benzo(k)fluoranthene	ADEC,DoD-ELAP,NELAP,WADOE


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Benzo(j)fluoranthene	ADEC, DoD-ELAP, NELAP, WADOE
Benzo(e)pyrene	NELAP
Benzo(a)pyrene	ADEC, DoD-ELAP, NELAP, WADOE
Perylene	ADEC, NELAP
Indeno(1,2,3-cd)pyrene	ADEC, DoD-ELAP, NELAP, WADOE
Dibenzo(a,h)anthracene	ADEC, DoD-ELAP, NELAP, WADOE
Benzo(g,h,i)perylene	ADEC, DoD-ELAP, NELAP, WADOE

EPA RSK-175 in Water

Methane	NELAP
Ethane	NELAP
Ethene	NELAP
Acetylene	NELAP

NWTPH-Dx in Water

Diesel Range Organics (C12-C24)	DoD-ELAP, NELAP, WADOE
Diesel Range Organics (C10-C25)	DoD-ELAP, NELAP, WADOE
Diesel Range Organics (Tol-C18)	DoD-ELAP, NELAP, WADOE
Diesel Range Organics (C10-C24)	DoD-ELAP, NELAP, WADOE
Diesel Range Organics (C10-C28)	DoD-ELAP, NELAP, WADOE
Diesel Range Organics (C12-C22)	DoD-ELAP
Diesel Range Organics (C12-C25)	DoD-ELAP
Motor Oil Range Organics (C24-C38)	DoD-ELAP, NELAP, WADOE
Motor Oil Range Organics (C25-C36)	DoD-ELAP, NELAP, WADOE
Motor Oil Range Organics (C24-C40)	DoD-ELAP, NELAP, WADOE
Residual Range Organics (C23-C32)	DoD-ELAP
Mineral Spirits Range Organics (Tol-C12)	DoD-ELAP, NELAP, WADOE
Mineral Oil Range Organics (C16-C28)	DoD-ELAP, NELAP, WADOE
Kerosene Range Organics (Tol-C18)	DoD-ELAP, NELAP, WADOE
JP8 Range Organics (C8-C18)	DoD-ELAP, NELAP, WADOE
JP5 Range Organics (C10-C16)	DoD-ELAP, NELAP, WADOE
JP4 Range Organics (Tol-C14)	DoD-ELAP, NELAP, WADOE
Jet-A Range Organics (C10-C18)	DoD-ELAP, NELAP, WADOE
Creosote Range Organics (C12-C22)	DoD-ELAP, NELAP, WADOE
Bunker C Range Organics (C10-C38)	DoD-ELAP, NELAP, WADOE
Stoddard Range Organics (C8-C12)	DoD-ELAP, NELAP, WADOE
Transformer Oil Range Organics (C12-C28)	DoD-ELAP, NELAP, WADOE

NWTPHg in Water

Gasoline Range Organics (Tol-Nap)	WADOE, DoD-ELAP
Gasoline Range Organics (2MP-TMB)	WADOE, DoD-ELAP


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

Project: Lower Duwamish Q4

Project Number: 21-1-12596-012

Project Manager: Meg Strong

Reported:

17-Dec-2021 17:13

Gasoline Range Organics (Tol-C12)

WADOE,DoD-ELAP

Gasoline Range Organics (C6-C10)

WADOE,ADEC,DoD-ELAP

Gasoline Range Organics (C5-C12)

WADOE,DoD-ELAP

SM 3500-Cr B-09 in Water

Hexavalent Chromium

WADOE,NELAP

SM 3500-Fe B-97 in Water

Ferrous Iron

WADOE,NELAP

SM 4500-SO3 B-00 in Water

Sulfite

WADOE,NELAP

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	17-015	03/28/2023
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	02/28/2022
NELAP	ORELAP - Oregon Laboratory Accreditation Program	WA100006-012	05/12/2022
WADOE	WA Dept of Ecology	C558	06/30/2022
WA-DW	Ecology - Drinking Water	C558	06/30/2022



Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
17-Dec-2021 17:13

Notes and Definitions

*	Flagged value is not within established control limits.
D	The reported value is from a dilution
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL)
H	Hold time violation - Hold time was exceeded.
J	Estimated concentration value detected below the reporting limit.
Q	Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20% RSD, <20% drift or minimum RRF)
U	This analyte is not detected above the reporting limit (RL) or if noted, not detected above the limit of detection (LOD).
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
[2C]	Indicates this result was quantified on the second column on a dual column analysis.



Analytical Resources, LLC
Analytical Chemists and Consultants

10 December 2021

Meg Strong
Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle, WA 98103-8636

RE: Lower Duwamish Q4

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)
21K0382

Associated SDG ID(s)
N/A

Shelly
Fishel

Digitally signed by
Shelly Fishel
Date: 2021.12.10
17:44:58 -08'00'

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, LLC

Shelly Fishel, Project Manager

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



Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

ARI Assigned Number:
21K0382

Turn-around Requested:
standard

ARI Client Company:
Shannon + Wilson

Client Contact:
Sheshana Howard

Client Project Name:
LDW

Client Project #:
21-H2596

Samplers:
DES, RMV

Sample ID

Date

Time

Matrix

No. Containers

TB-10-20212311

11/23

0841

W

5

MW-14-20212311

11/23

0924

GW

18

MW-102-20212311

11/23

1100

GW

13

MW-11-20212311

11/23

1246

GW

9

Comments/Special Instructions
NAP= Nitrate, Nitrite,
Chloride, sulfate, sulfide
diss. Ferrrous iron, diss.
manganese iron, methane,
ethane, ethene

Relinquished by:
(Signature) [Signature]
Printed Name:
Rose Vogt
Company:
Shannon + Wilson
Date & Time:
11/23/2021 1345

Received by:
(Signature) [Signature]
Printed Name:
Dimitri Komnatev
Company:
ARI
Date & Time:
11/23/2021 1348

Page: of

Date:

No. of Coolers:

Ice Present?

Cooler Temps: 5.2, 0.6

Analysis Requested

Notes/Comments

TPH-G

TPH-Dx

BTEX

HVOCs

MTBE

PAHs

Full SVOCs

Limited SVOCs

PCBs (concentrations)

metals

Hex. Chrom

N, A, P

① As, Cr, Mn, Ni, Cd, Co, Cu, Pb, Hg, Se, Ag, Zn

② As, Ba, Cr, Mn, Ni, Cd, Co, Cu, Fe, Pb, Hg, Se, Ag, V, Zn

③ As, Mn,

Analytical Resources, Incorporated

Analytical Chemists and Consultants

4611 South 134th Place, Suite 100

Tukwila, WA 98168

206-695-6200 206-695-6201 (fax)

www.arilabs.com

Limits of Liability: ARI will perform all requested services in accordance with appropriate...

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, notwithstanding any provision to the contrary in any contract, purchase order or co-

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
10-Dec-2021 17:23

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
TB-10-20212311	21K0382-01	Water	23-Nov-2021 08:41	23-Nov-2021 13:48
MW-14-20212311	21K0382-02	Water	23-Nov-2021 09:24	23-Nov-2021 13:48
MW-14-20212311	21K0382-03	Water	23-Nov-2021 09:24	23-Nov-2021 13:48
MW-10R-20212311	21K0382-04	Water	23-Nov-2021 11:00	23-Nov-2021 13:48
MW-10R-20212311	21K0382-05	Water	23-Nov-2021 11:00	23-Nov-2021 13:48
MW-11-20212311	21K0382-06	Water	23-Nov-2021 12:46	23-Nov-2021 13:48
MW-11-20212311	21K0382-07	Water	23-Nov-2021 12:46	23-Nov-2021 13:48



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
10-Dec-2021 17:23

Work Order Case Narrative

Client: Shannon & Wilson, Inc
Project: Lower Duwamish Q4
Work Order: 21K0382

Sample receipt

Samples as listed on the preceding page were received 23-Nov-2021 13:48 under ARI work order 21K0382. For details regarding sample receipt, please refer to the Cooler Receipt Form.

PCB Aroclors - EPA Method SW8082A

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements except surrogate Decachlorobiphenyl which was out of control high in the initial calibration verification SJL0030-ICV1 on column zb-5. Data reported from passing column zb-35.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within control limits.

Gasoline by NWTPH-g (GC/MS)

The sample(s) were analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within control limits.

Volatiles - EPA Method SW8260D


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 10-Dec-2021 17:23

The sample(s) were analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within control limits.

Volatiles - EPA Method 8260D-SIM (Selected Ion Monitoring)

The sample(s) were analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within control limits.

Polynuclear Aromatic Hydrocarbons (PAH) - EPA Method SW8270E-SIM

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements except Benzo(g,h,i)perylene and surrogate Dibenzo(a,h)anthracene-d14 which were out of control low in the initial calibration verification. All samples which contain analyte have been flagged with a "Q" qualifier.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits except Dibenzo(a,h)anthracene-d14 which were out of control low in the initial calibration verification. All samples which contain analyte have been flagged with a "Q" qualifier.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD)



Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
10-Dec-2021 17:23

were within control limits.

Total and Dissolved Mercury - EPA Method 7470/7471

The sample(s) were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Sample specific QC was performed in association with sample 21K0382-02 in Total Mercury batch BJL0135 and in association with sample 21K0382-03 in Dissolved Mercury batch BJL0134. The duplicate (DUP) relative percent difference (RPD) were within advisory control limits. The matrix spike/matrix spike duplicate (MS/MSD) percent recoveries and relative percent difference (RPD) were within advisory control limits.

Total and Dissolved Metals - EPA Method 6020B

The sample(s) were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Sample specific QC was performed in association with sample 21K0382-07 in Dissolved Metals batch BJL0138. The duplicate (DUP) relative percent difference (RPD) were within advisory control limits. The matrix spike/matrix spike duplicate (MS/MSD) percent recoveries and relative percent difference (RPD) were within advisory control limits.

Wet Chemistry

The sample(s) were prepared and analyzed within the recommended holding times except Sulfite. The Sulfite hold time was exceeded upon sample receipt.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Sample specific QC was performed in association with sample 21K0382-02 in Sulfite batch BJK0626, Ferrous Iron batch BJK0631 and Anions batch BJK0657. The matrix spike (MS) percent recoveries and the duplicate (DUP) relative percent



Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
10-Dec-2021 17:23

difference (RPD) were within advisory control limits.

Diesel/Heavy Oil Range Organics - WA-Ecology Method NW-TPHDx

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Sample specific QC was performed in association with sample 21K0382-04 in batch BJK0663. The matrix spike/matrix spike duplicate (MS/MSD) percent recoveries and relative percent difference (RPD) were within advisory control limits.



WORK ORDER

21K0382

Samples will be discarded 90 days after submission of a final report unless other instructions are received.

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish Q4

Project Number: 21-1-12596-012

Preservation Confirmation

Container ID	Container Type	pH
21K0382-01 A	VOA Vial, Clear, 40 mL, HCL	
21K0382-01 B	VOA Vial, Clear, 40 mL, HCL	
21K0382-01 C	VOA Vial, Clear, 40 mL, HCL	
21K0382-01 D	VOA Vial, Clear, 40 mL, HCL	Bubble
21K0382-01 E	VOA Vial, Clear, 40 mL, HCL	Bubble
21K0382-02 A	HDPE NM, 500 mL, 1:1 HNO3	<2 Pass
21K0382-02 B	Small OJ, 500 mL, EDTA	
21K0382-02 C	HDPE NM, 500 mL	
21K0382-02 D	HDPE NM, 500 mL	
21K0382-02 E	Glass NM, Amber, 500 mL, HCL	106 to determine preservation
21K0382-02 F	Glass NM, Amber, 500 mL	
21K0382-02 G	Glass NM, Amber, 500 mL	
21K0382-02 H	VOA Vial, Clear, 40 mL, HCL	
21K0382-02 I	VOA Vial, Clear, 40 mL, HCL	
21K0382-02 J	VOA Vial, Clear, 40 mL, HCL	
21K0382-02 K	VOA Vial, Clear, 40 mL, HCL	
21K0382-02 L	VOA Vial, Clear, 40 mL, HCL	
21K0382-02 M	VOA Vial, Clear, 40 mL, HCL	
21K0382-02 N	VOA Vial, Clear, 40 mL, HCL	
21K0382-02 O	VOA Vial, Clear, 40 mL, HCL	
21K0382-02 P	VOA Vial, Clear, 40 mL, HCL	
21K0382-03 A	HDPE NM, 500 mL	>2 Fail
21K0382-03 B	HDPE NM, 500 mL	>2 Fail
21K0382-04 A	Glass NM, Amber, 1000 mL	
21K0382-04 B	Glass NM, Amber, 1000 mL	
21K0382-04 C	HDPE NM, 500 mL, 1:1 HNO3	<2 Pass
21K0382-04 D	Glass NM, Amber, 500 mL	
21K0382-04 E	Glass NM, Amber, 500 mL	
21K0382-04 F	Glass NM, Amber, 500 mL	
21K0382-04 G	Glass NM, Amber, 500 mL	
21K0382-04 H	VOA Vial, Clear, 40 mL, HCL	
21K0382-04 I	VOA Vial, Clear, 40 mL, HCL	
21K0382-04 J	VOA Vial, Clear, 40 mL, HCL	
21K0382-04 K	VOA Vial, Clear, 40 mL, HCL	



WORK ORDER

21K0382

Samples will be discarded 90 days after submission of a final report unless other instructions are received.

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish Q4

Project Number: 21-1-12596-012

21K0382-04 L	VOA Vial, Clear, 40 mL, HCL	
21K0382-05 A	HDPE NM, 500 mL	>2 Fail
21K0382-06 A	HDPE NM, 500 mL, 1:1 HNO3	<2 Pass
21K0382-06 B	Glass NM, Amber, 500 mL	
21K0382-06 C	Glass NM, Amber, 500 mL	
21K0382-06 D	VOA Vial, Clear, 40 mL, HCL	
21K0382-06 E	VOA Vial, Clear, 40 mL, HCL	
21K0382-06 F	VOA Vial, Clear, 40 mL, HCL	
21K0382-06 G	VOA Vial, Clear, 40 mL, HCL	
21K0382-06 H	VOA Vial, Clear, 40 mL, HCL	Bubble
21K0382-07 A	HDPE NM, 500 mL	>2 Fail

DL

Preservation Confirmed By

11/23/24

Date



Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Shannon & Wilson

Project Name: LDL

COC No(s): _____ NA

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Assigned ARI Job No: 2140382

Tracking No: _____ NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of the cooler? YES NO

Were custody papers included with the cooler? YES YES NO

Were custody papers properly filled out (ink, signed, etc.) YES YES NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)

Time 1348 5.2 0.6

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: DOO 2565

Cooler Accepted by: DL Date: 11/23/21 Time: 1348

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler? YES YES NO

What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: _____

Was sufficient ice used (if appropriate)? NA YES NO

How were bottles sealed in plastic bags? Individually Grouped Not

Did all bottles arrive in good condition (unbroken)? YES NO

Were all bottle labels complete and legible? YES NO

Did the number of containers listed on COC match with the number of containers received? YES NO

Did all bottle labels and tags agree with custody papers? YES NO

Were all bottles used correct for the requested analyses? YES NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs) ... NA YES NO

Were all VOC vials free of air bubbles? NA YES NO

Was sufficient amount of sample sent in each bottle? YES NO

Date VOC Trip Blank was made at ARI..... NA 11/01/21

Were the sample(s) split by ARI? NA YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: DL Date: 11/23/21 Time: 1428 Labels checked by: _____

**** Notify Project Manager of discrepancies or concerns ****

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: _____ Date: _____



WORK ORDER

21K0382

Samples will be discarded 90 days after submission of a final report unless other instructions are received.

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish Q4

Project Number: 21-1-12596-012

Preservation Confirmation

Container ID	Container Type	pH
21K0382-01 A	VOA Vial, Clear, 40 mL, HCL	
21K0382-01 B	VOA Vial, Clear, 40 mL, HCL	
21K0382-01 C	VOA Vial, Clear, 40 mL, HCL	
21K0382-01 D	VOA Vial, Clear, 40 mL, HCL	Bubble
21K0382-01 E	VOA Vial, Clear, 40 mL, HCL	Bubble
21K0382-02 A	HDPE NM, 500 mL, 1:1 HNO3	<2 Pass
21K0382-02 B	Small OJ, 500 mL, EDTA	
21K0382-02 C	HDPE NM, 500 mL	
21K0382-02 D	HDPE NM, 500 mL	
21K0382-02 E	Glass NM, Amber, 500 mL, HCL	lab to determine preservation
21K0382-02 F	Glass NM, Amber, 500 mL	
21K0382-02 G	Glass NM, Amber, 500 mL	
21K0382-02 H	VOA Vial, Clear, 40 mL, HCL	
21K0382-02 I	VOA Vial, Clear, 40 mL, HCL	
21K0382-02 J	VOA Vial, Clear, 40 mL, HCL	
21K0382-02 K	VOA Vial, Clear, 40 mL, HCL	
21K0382-02 L	VOA Vial, Clear, 40 mL, HCL	
21K0382-02 M	VOA Vial, Clear, 40 mL, HCL	
21K0382-02 N	VOA Vial, Clear, 40 mL, HCL	
21K0382-02 O	VOA Vial, Clear, 40 mL, HCL	
21K0382-02 P	VOA Vial, Clear, 40 mL, HCL	
21K0382-03 A	HDPE NM, 500 mL	>2 Fail (1)
21K0382-03 B	HDPE NM, 500 mL	>2 Fail
21K0382-04 A	Glass NM, Amber, 1000 mL	
21K0382-04 B	Glass NM, Amber, 1000 mL	
21K0382-04 C	HDPE NM, 500 mL, 1:1 HNO3	<2 Pass
21K0382-04 D	Glass NM, Amber, 500 mL	
21K0382-04 E	Glass NM, Amber, 500 mL	
21K0382-04 F	Glass NM, Amber, 500 mL	
21K0382-04 G	Glass NM, Amber, 500 mL	
21K0382-04 H	VOA Vial, Clear, 40 mL, HCL	
21K0382-04 I	VOA Vial, Clear, 40 mL, HCL	
21K0382-04 J	VOA Vial, Clear, 40 mL, HCL	
21K0382-04 K	VOA Vial, Clear, 40 mL, HCL	



WORK ORDER

21K0382

Samples will be discarded 90 days after submission of a final report unless other instructions are received.

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish Q4

Project Number: 21-1-12596-012

21K0382-04 L	VOA Vial, Clear, 40 mL, HCL		
21K0382-05 A	HDPE NM, 500 mL	52 Fail	①
21K0382-06 A	HDPE NM, 500 mL, 1:1 HNO ₃	22 Pass	
21K0382-06 B	Glass NM, Amber, 500 mL		
21K0382-06 C	Glass NM, Amber, 500 mL		
21K0382-06 D	VOA Vial, Clear, 40 mL, HCL		
21K0382-06 E	VOA Vial, Clear, 40 mL, HCL		
21K0382-06 F	VOA Vial, Clear, 40 mL, HCL		
21K0382-06 G	VOA Vial, Clear, 40 mL, HCL		
21K0382-06 H	VOA Vial, Clear, 40 mL, HCL	Bubble	
21K0382-07 A	HDPE NM, 500 mL	52 Fail	①

DL
Preservation Confirmed By

11/23/21
Date

① Filtered at 0.45 microns
& preserved to pH < 2
with 0.75 mL conc. HNO₃
(510414) MM 11/23/21



WORK ORDER

21K0382

Samples will be discarded 90 days after submission of a final report unless other instructions are received.

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish Q4

Project Number: 21-1-12596-012

Preservation Confirmation

Container ID	Container Type	pH
21K0382-01 A	VOA Vial, Clear, 40 mL, HCL	
21K0382-01 B	VOA Vial, Clear, 40 mL, HCL	
21K0382-01 C	VOA Vial, Clear, 40 mL, HCL	
21K0382-01 D	VOA Vial, Clear, 40 mL, HCL	Bubble
21K0382-01 E	VOA Vial, Clear, 40 mL, HCL	Bubble
21K0382-02 A	HDPE NM, 500 mL, 1:1 HNO3	<2 Pass
21K0382-02 B	Small OJ, 500 mL, EDTA	
21K0382-02 C	HDPE NM, 500 mL	
21K0382-02 D	HDPE NM, 500 mL	
21K0382-02 E	Glass NM, Amber, 500 mL, HCl	① lab to determine preservation
21K0382-02 F	Glass NM, Amber, 500 mL	
21K0382-02 G	Glass NM, Amber, 500 mL	
21K0382-02 H	VOA Vial, Clear, 40 mL, HCL	
21K0382-02 I	VOA Vial, Clear, 40 mL, HCL	
21K0382-02 J	VOA Vial, Clear, 40 mL, HCL	
21K0382-02 K	VOA Vial, Clear, 40 mL, HCL	
21K0382-02 L	VOA Vial, Clear, 40 mL, HCL	
21K0382-02 M	VOA Vial, Clear, 40 mL, HCL	
21K0382-02 N	VOA Vial, Clear, 40 mL, HCL	
21K0382-02 O	VOA Vial, Clear, 40 mL, HCL	
21K0382-02 P	VOA Vial, Clear, 40 mL, HCL	
21K0382-03 A	HDPE NM, 500 mL	>2 Fail
21K0382-03 B	HDPE NM, 500 mL	>2 Fail
21K0382-04 A	Glass NM, Amber, 1000 mL	
21K0382-04 B	Glass NM, Amber, 1000 mL	
21K0382-04 C	HDPE NM, 500 mL, 1:1 HNO3	<2 Pass
21K0382-04 D	Glass NM, Amber, 500 mL	
21K0382-04 E	Glass NM, Amber, 500 mL	
21K0382-04 F	Glass NM, Amber, 500 mL	
21K0382-04 G	Glass NM, Amber, 500 mL	
21K0382-04 H	VOA Vial, Clear, 40 mL, HCL	
21K0382-04 I	VOA Vial, Clear, 40 mL, HCL	
21K0382-04 J	VOA Vial, Clear, 40 mL, HCL	
21K0382-04 K	VOA Vial, Clear, 40 mL, HCL	



WORK ORDER

21K0382

Samples will be discarded 90 days after submission of a final report unless other instructions are received.

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish Q4

Project Number: 21-1-12596-012

21K0382-04 L	VOA Vial, Clear, 40 mL, HCL	
21K0382-05 A	HDPE NM, 500 mL	52 Fail
21K0382-06 A	HDPE NM, 500 mL, 1:1 HNO3	22 Pass
21K0382-06 B	Glass NM, Amber, 500 mL	
21K0382-06 C	Glass NM, Amber, 500 mL	
21K0382-06 D	VOA Vial, Clear, 40 mL, HCL	
21K0382-06 E	VOA Vial, Clear, 40 mL, HCL	
21K0382-06 F	VOA Vial, Clear, 40 mL, HCL	
21K0382-06 G	VOA Vial, Clear, 40 mL, HCL	
21K0382-06 H	VOA Vial, Clear, 40 mL, HCL	Bubble
21K0382-07 A	HDPE NM, 500 mL	72 Fail

DL

Preservation Confirmed By

11/23/21

Date

① pH < 2, headspace

BF 11/23/21 1605



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
10-Dec-2021 17:23

TB-10-20212311
21K0382-01 (Water)

Volatile Organic Compounds

Method: EPA 8260D

Sampled: 11/23/2021 08:41

Instrument: NT3 Analyst: PKC

Analyzed: 11/29/2021 13:44

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0382-01 C

Preparation Batch: BJK0705

Sample Size: 10 mL

Prepared: 11/29/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.05	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.05	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.05	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.14	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.08	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.22	0.60	ND	ug/L	U
Methyl tert-butyl Ether	1634-04-4	1	0.14	0.50	ND	ug/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				<i>80-129 %</i>	<i>109</i>	<i>%</i>	
<i>Surrogate: Toluene-d8</i>				<i>80-120 %</i>	<i>101</i>	<i>%</i>	
<i>Surrogate: 4-Bromofluorobenzene</i>				<i>80-120 %</i>	<i>103</i>	<i>%</i>	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				<i>80-120 %</i>	<i>100</i>	<i>%</i>	



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
10-Dec-2021 17:23

TB-10-20212311
21K0382-01 (Water)

Volatile Organic Compounds

Method: NWTPHg

Sampled: 11/23/2021 08:41

Instrument: NT3 Analyst: PKC

Analyzed: 11/29/2021 13:44

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0382-01 C

Preparation Batch: BJK0705

Sample Size: 10 mL

Prepared: 11/29/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Gasoline Range Organics (Tol-Nap)	GRO	1	100	ND	ug/L	U
<i>Surrogate: Toluene-d8</i>			80-120 %	101	%	
<i>Surrogate: 4-Bromofluorobenzene</i>			80-120 %	103	%	



Analytical Resources, LLC
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Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
10-Dec-2021 17:23

TB-10-20212311
21K0382-01 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260D-SIM

Sampled: 11/23/2021 08:41

Instrument: NT16 Analyst: KOTT

Analyzed: 11/30/2021 15:55

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0382-01 E

Preparation Batch: BJK0740

Sample Size: 10 mL

Prepared: 11/30/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	5.01	20.0	ND	ng/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				80-129 %	107	%	
<i>Surrogate: Toluene-d8</i>				80-120 %	101	%	
<i>Surrogate: 4-Bromofluorobenzene</i>				75-125 %	98.5	%	



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
10-Dec-2021 17:23

MW-14-20212311

21K0382-02 (Water)

Volatile Organic Compounds

Method: EPA 8260D

Sampled: 11/23/2021 09:24

Instrument: NT3 Analyst: PKC

Analyzed: 11/29/2021 19:14

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0382-02 J

Preparation Batch: BJK0705

Sample Size: 10 mL

Prepared: 11/29/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.05	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.05	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.05	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.14	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.08	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.22	0.60	ND	ug/L	U
Methyl tert-butyl Ether	1634-04-4	1	0.14	0.50	ND	ug/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				80-129 %	117	%	
<i>Surrogate: Toluene-d8</i>				80-120 %	101	%	
<i>Surrogate: 4-Bromofluorobenzene</i>				80-120 %	96.0	%	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				80-120 %	100	%	



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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
10-Dec-2021 17:23

MW-14-20212311

21K0382-02 (Water)

Volatile Organic Compounds

Method: NWTPHg

Sampled: 11/23/2021 09:24

Instrument: NT3 Analyst: PKC

Analyzed: 11/29/2021 19:14

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0382-02 J

Preparation Batch: BJK0705

Sample Size: 10 mL

Prepared: 11/29/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Gasoline Range Organics (Tol-Nap)	GRO	1	100	ND	ug/L	U
<i>Surrogate: Toluene-d8</i>			80-120 %	101	%	
<i>Surrogate: 4-Bromofluorobenzene</i>			80-120 %	96.0	%	



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
10-Dec-2021 17:23

MW-14-20212311

21K0382-02 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260D-SIM

Sampled: 11/23/2021 09:24

Instrument: NT16 Analyst: KOTT

Analyzed: 11/30/2021 16:16

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0382-02 H

Preparation Batch: BJK0740

Sample Size: 10 mL

Prepared: 11/30/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	5.01	20.0	20.7	ng/L	
<i>Surrogate: 1,2-Dichloroethane-d4</i>				80-129 %	102	%	
<i>Surrogate: Toluene-d8</i>				80-120 %	100	%	
<i>Surrogate: 4-Bromofluorobenzene</i>				75-125 %	97.6	%	



Analytical Resources, LLC
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Analytical Report

Shannon & Wilson, Inc
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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
10-Dec-2021 17:23

MW-14-20212311

21K0382-02 (Water)

Dissolved Gases

Method: EPA RSK-175

Sampled: 11/23/2021 09:24

Instrument: FID6 Analyst: PB

Analyzed: 12/02/2021 15:19

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0382-02 I

Preparation Batch: BJL0076

Sample Size: 10 mL

Prepared: 12/02/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Methane	74-82-8	1	0.65	746	ug/L	
Ethane	74-84-0	1	1.23	ND	ug/L	U
Ethene	74-85-1	1	1.14	ND	ug/L	U
Acetylene	74-86-2	1	1.06	ND	ug/L	U
<i>Surrogate: Propane</i>			72-122 %	84.2	%	



Analytical Resources, LLC
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Analytical Report

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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
10-Dec-2021 17:23

MW-14-20212311

21K0382-02 (Water)

Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 11/23/2021 09:24

Instrument: FID4 Analyst: TWC

Analyzed: 11/26/2021 20:44

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21K0382-02 F 01

Preparation Batch: BJK0663

Sample Size: 500 mL

Prepared: 11/26/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	0.100	0.790	mg/L	
HC ID: DRO						
Motor Oil Range Organics (C24-C38)	RRO	1	0.200	0.538	mg/L	
HC ID: MOTOR OIL						
Surrogate: o-Terphenyl			50-150 %	111	%	



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Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
10-Dec-2021 17:23

MW-14-20212311

21K0382-02 (Water)

Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 11/23/2021 09:24

Instrument: ICPMS2 Analyst: MCB

Analyzed: 12/07/2021 23:01

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21K0382-02 A 01

Preparation Batch: BJL0102

Sample Size: 25 mL

Prepared: 12/03/2021

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Chromium	7440-47-3	1	0.260	0.500	0.664	ug/L	
Lead	7439-92-1	1	0.0513	0.100	0.0820	ug/L	J
Manganese	7439-96-5	10	1.42	5.00	591	ug/L	D
Silver	7440-22-4	1	0.0220	0.200	ND	ug/L	U



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
10-Dec-2021 17:23

MW-14-20212311

21K0382-02 (Water)

Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 11/23/2021 09:24

Instrument: ICPMS2 Analyst: MCB

Analyzed: 12/07/2021 23:01

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BJL0102 Sample Size: 25 mL
Prepared: 12/03/2021 Final Volume: 25 mL

Extract ID: 21K0382-02 A 01

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	1	0.0373	0.200	4.19	ug/L	
Cadmium	7440-43-9	1	0.0300	0.100	0.0360	ug/L	J
Cobalt	7440-48-4	1	0.0178	0.200	0.651	ug/L	
Copper	7440-50-8	1	0.173	0.500	1.12	ug/L	
Nickel	7440-02-0	1	0.0792	0.500	1.63	ug/L	
Selenium	7782-49-2	1	0.179	0.500	0.385	ug/L	J
Zinc	7440-66-6	1	2.92	6.00	ND	ug/L	U



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
10-Dec-2021 17:23

MW-14-20212311

21K0382-02 (Water)

Metals and Metallic Compounds

Method: EPA 7470A

Sampled: 11/23/2021 09:24

Instrument: HYDRA Analyst: ML

Analyzed: 12/09/2021 11:47

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21K0382-02 A

Preparation Batch: BJL0135

Sample Size: 20 mL

Prepared: 12/06/2021

Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000013	0.000100	ND	mg/L	U


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 10-Dec-2021 17:23

MW-14-20212311
21K0382-02 (Water)
Wet Chemistry

Method: EPA 300.0

Sampled: 11/23/2021 09:24

Instrument: IC930 Analyst: BF

Analyzed: 11/24/2021 17:48

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 21K0382-02 C

Preparation Batch: BJK0657

Sample Size: 10 mL

Prepared: 11/24/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	1	0.100	0.100	7.89	mg/L	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrate-N	14797-55-8	1	0.100	0.100	0.206	mg/L	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrite-N	14797-65-0	1	0.100	0.100	ND	mg/L	U

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	1	0.100	0.100	6.31	mg/L	



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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
10-Dec-2021 17:23

MW-14-20212311

21K0382-02 (Water)

Wet Chemistry

Method: SM 3500-Fe B-97

Sampled: 11/23/2021 09:24

Instrument: UV1800-2 Analyst: BF

Analyzed: 11/23/2021 16:43

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 21K0382-02 E

Preparation Batch: BJK0631

Sample Size: 5 mL

Prepared: 11/23/2021

Final Volume: 5 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ferrous Iron		20	0.800	0.800	8.96	mg/L	D



Analytical Resources, LLC
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Analytical Report

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400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
10-Dec-2021 17:23

MW-14-20212311

21K0382-02 (Water)

Wet Chemistry

Method: SM 4500-SO3 B-00

Sampled: 11/23/2021 09:24

Instrument: N/A Analyst: UW

Analyzed: 11/23/2021 15:11

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 21K0382-02

Preparation Batch: BJK0626

Sample Size: 50 mL

Prepared: 11/23/2021

Final Volume: 50 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfite	14265-45-3	1	1.4	1.4	ND	mg/L	H, U



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

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400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
10-Dec-2021 17:23

MW-14-20212311

21K0382-03 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 11/23/2021 09:24

Instrument: ICPMS2 Analyst: MCB

Analyzed: 12/06/2021 20:52

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21K0382-03 A 03

Preparation Batch: BJL0138

Sample Size: 25 mL

Filtration Batch: BJK0636

Prepared: 12/06/2021

Final Volume: 25 mL

Filtration Date: 11/23/2021 16:31

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Chromium, Dissolved	7440-47-3	1	0.260	0.500	0.375	ug/L	J
Lead, Dissolved	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Manganese, Dissolved	7439-96-5	5	0.710	2.50	522	ug/L	D
Silver, Dissolved	7440-22-4	1	0.0220	0.200	ND	ug/L	U


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 10-Dec-2021 17:23

MW-14-20212311
21K0382-03 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 11/23/2021 09:24

Instrument: ICPMS2 Analyst: MCB

Analyzed: 12/06/2021 20:52

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21K0382-03 A 03

Preparation Batch: BJL0138

Sample Size: 25 mL

Filtration Batch: BJK0636

Prepared: 12/06/2021

Final Volume: 25 mL

Filtration Date: 11/23/2021 16:31

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic, Dissolved	7440-38-2	1	0.0373	0.200	2.78	ug/L	
Cadmium, Dissolved	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Cobalt, Dissolved	7440-48-4	1	0.0178	0.200	0.566	ug/L	
Copper, Dissolved	7440-50-8	1	0.173	0.500	0.702	ug/L	
Nickel, Dissolved	7440-02-0	1	0.0792	0.500	1.46	ug/L	
Selenium, Dissolved	7782-49-2	1	0.179	0.500	0.445	ug/L	J
Zinc, Dissolved	7440-66-6	1	2.92	6.00	ND	ug/L	U



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400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
10-Dec-2021 17:23

MW-14-20212311

21K0382-03 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 7470A

Sampled: 11/23/2021 09:24

Instrument: HYDRA Analyst: ML

Analyzed: 12/09/2021 11:31

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21K0382-03 A 01

Preparation Batch: BJJ0134

Sample Size: 20 mL

Filtration Batch: BJK0636

Prepared: 12/06/2021

Final Volume: 20 mL

Filtration Date: 11/23/2021 16:31

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury, Dissolved	7439-97-6	1	0.000013	0.000100	ND	mg/L	U



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
10-Dec-2021 17:23

MW-10R-20212311 21K0382-04 (Water)

Volatile Organic Compounds

Method: EPA 8260D

Sampled: 11/23/2021 11:00

Instrument: NT3 Analyst: PKC

Analyzed: 11/29/2021 19:39

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0382-04 I

Preparation Batch: BJK0705

Sample Size: 10 mL

Prepared: 11/29/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.05	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.05	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.05	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.14	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.08	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.22	0.60	ND	ug/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				<i>80-129 %</i>	<i>109</i>	<i>%</i>	
<i>Surrogate: Toluene-d8</i>				<i>80-120 %</i>	<i>100</i>	<i>%</i>	
<i>Surrogate: 4-Bromofluorobenzene</i>				<i>80-120 %</i>	<i>99.1</i>	<i>%</i>	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				<i>80-120 %</i>	<i>103</i>	<i>%</i>	



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Analytical Report

Shannon & Wilson, Inc
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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
10-Dec-2021 17:23

MW-10R-20212311
21K0382-04 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260D-SIM

Sampled: 11/23/2021 11:00

Instrument: NT16 Analyst: KOTT

Analyzed: 11/30/2021 16:50

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0382-04 H

Preparation Batch: BJK0740

Sample Size: 10 mL

Prepared: 11/30/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	5.01	20.0	ND	ng/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				80-129 %	104	%	
<i>Surrogate: Toluene-d8</i>				80-120 %	101	%	
<i>Surrogate: 4-Bromofluorobenzene</i>				75-125 %	98.4	%	


 Shannon & Wilson, Inc
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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 10-Dec-2021 17:23

MW-10R-20212311
21K0382-04 (Water)
Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM

Sampled: 11/23/2021 11:00

Instrument: NT11 Analyst: VTS

Analyzed: 12/01/2021 16:41

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJK0640 Prepared: 11/29/2021	Sample Size: 500 mL Final Volume: 0.5 mL	Extract ID: 21K0382-04 D 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJL0015 Cleaned: 01-Dec-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21K0382-04 D 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	1	0.001	0.010	0.004	ug/L	J
2-Methylnaphthalene	91-57-6	1	0.001	0.010	0.002	ug/L	J
1-Methylnaphthalene	90-12-0	1	0.0009	0.010	0.002	ug/L	J
Acenaphthylene	208-96-8	1	0.002	0.010	ND	ug/L	U
Acenaphthene	83-32-9	1	0.003	0.010	ND	ug/L	U
Dibenzofuran	132-64-9	1	0.002	0.010	0.002	ug/L	J
Fluorene	86-73-7	1	0.002	0.010	ND	ug/L	U
Phenanthrene	85-01-8	1	0.001	0.010	ND	ug/L	U
Anthracene	120-12-7	1	0.001	0.010	ND	ug/L	U
Carbazole	86-74-8	1	0.001	0.010	ND	ug/L	U
Fluoranthene	206-44-0	1	0.002	0.010	ND	ug/L	U
Pyrene	129-00-0	1	0.001	0.010	ND	ug/L	U
Benzo(a)anthracene	56-55-3	1	0.0008	0.010	ND	ug/L	U
Chrysene	218-01-9	1	0.0009	0.010	0.0009	ug/L	J
Benzo(b)fluoranthene	205-99-2	1	0.0005	0.010	ND	ug/L	U
Benzo(k)fluoranthene	207-08-9	1	0.003	0.010	ND	ug/L	U
Benzo(j)fluoranthene	205-82-3	1	0.002	0.010	ND	ug/L	U
Benzo(a)pyrene	50-32-8	1	0.002	0.010	ND	ug/L	U
Perylene	1985-5-0	1	0.006	0.010	ND	ug/L	U
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.001	0.010	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	1	0.001	0.010	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	1	0.001	0.010	ND	ug/L	U
Surrogate: 2-Methylnaphthalene-d10					42-120 %	87.6 %	
Surrogate: Dibenzo[a,h]anthracene-d14					29-120 %	65.1 %	Q
Surrogate: Fluoranthene-d10					57-120 %	97.9 %	



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Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
10-Dec-2021 17:23

MW-10R-20212311
21K0382-04 (Water)

Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 11/23/2021 11:00

Instrument: FID4 Analyst: TWC

Analyzed: 11/26/2021 21:04

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21K0382-04 E 01

Preparation Batch: BJK0663

Sample Size: 500 mL

Prepared: 11/26/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	0.100	ND	mg/L	U
Motor Oil Range Organics (C24-C38)	RRO	1	0.200	ND	mg/L	U
<i>Surrogate: o-Terphenyl</i>			<i>50-150 %</i>	<i>98.5</i>	<i>%</i>	


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 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 10-Dec-2021 17:23

MW-10R-20212311
21K0382-04 (Water)
Aroclor PCB

Method: EPA 8082A

Sampled: 11/23/2021 11:00

Instrument: ECD7 Analyst: JGR

Analyzed: 12/01/2021 21:58

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJK0682 Prepared: 11/29/2021	Sample Size: 1000 mL Final Volume: 0.5 mL	Extract ID: 21K0382-04 A 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJK0320 Cleaned: 30-Nov-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21K0382-04 A 01
Sample Cleanup:	Cleanup Method: Sulfuric Acid Cleanup Batch: CJK0318 Cleaned: 30-Nov-2021	Initial Volume: 0.5 uL Final Volume: 0.5 uL	Extract ID: 21K0382-04 A 01
Sample Cleanup:	Cleanup Method: Sulfur Cleanup Batch: CJK0319 Cleaned: 30-Nov-2021	Initial Volume: 0.5 uL Final Volume: 0.5 uL	Extract ID: 21K0382-04 A 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Aroclor 1016	12674-11-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1221	11104-28-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1232	11141-16-5	1	0.002	0.010	ND	ug/L	U
Aroclor 1242	53469-21-9	1	0.002	0.010	ND	ug/L	U
Aroclor 1248	12672-29-6	1	0.002	0.010	ND	ug/L	U
Aroclor 1254	11097-69-1	1	0.002	0.010	ND	ug/L	U
Aroclor 1260	11096-82-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1262	37324-23-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1268	11100-14-4	1	0.003	0.010	ND	ug/L	U
<i>Surrogate: Decachlorobiphenyl</i>				29-120 %	68.6	%	
<i>Surrogate: Tetrachlorometaxylene</i>				32-120 %	59.4	%	
<i>Surrogate: Decachlorobiphenyl [2C]</i>				29-120 %	67.5	%	
<i>Surrogate: Tetrachlorometaxylene [2C]</i>				32-120 %	59.6	%	



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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
10-Dec-2021 17:23

MW-10R-20212311
21K0382-04 (Water)

Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 11/23/2021 11:00

Instrument: ICPMS2 Analyst: MCB

Analyzed: 12/07/2021 23:06

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO₃ matrix
Preparation Batch: BJL0102 Sample Size: 25 mL
Prepared: 12/03/2021 Final Volume: 25 mL

Extract ID: 21K0382-04 C 01

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Barium	7440-39-3	1	0.114	0.500	2.36	ug/L	
Chromium	7440-47-3	1	0.260	0.500	ND	ug/L	U
Iron	7439-89-6	1	18.2	36.0	832	ug/L	
Lead	7439-92-1	1	0.0513	0.100	0.0580	ug/L	J
Manganese	7439-96-5	1	0.142	0.500	48.4	ug/L	
Silver	7440-22-4	1	0.0220	0.200	ND	ug/L	U
Vanadium	7440-62-2	1	0.0556	0.200	1.60	ug/L	



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Analytical Report

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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
10-Dec-2021 17:23

MW-10R-20212311
21K0382-04 (Water)

Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 11/23/2021 11:00

Instrument: ICPMS2 Analyst: MCB

Analyzed: 12/07/2021 23:06

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21K0382-04 C 01

Preparation Batch: BJL0102

Sample Size: 25 mL

Prepared: 12/03/2021

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	1	0.0373	0.200	0.861	ug/L	
Cadmium	7440-43-9	1	0.0300	0.100	0.0370	ug/L	J
Cobalt	7440-48-4	1	0.0178	0.200	0.467	ug/L	
Copper	7440-50-8	1	0.173	0.500	1.72	ug/L	
Nickel	7440-02-0	1	0.0792	0.500	1.29	ug/L	
Selenium	7782-49-2	1	0.179	0.500	0.296	ug/L	J
Zinc	7440-66-6	1	2.92	6.00	ND	ug/L	U



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Analytical Report

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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
10-Dec-2021 17:23

MW-10R-20212311
21K0382-04 (Water)

Metals and Metallic Compounds

Method: EPA 7470A

Sampled: 11/23/2021 11:00

Instrument: HYDRA Analyst: ML

Analyzed: 12/09/2021 12:01

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21K0382-04 C

Preparation Batch: BJL0135

Sample Size: 20 mL

Prepared: 12/06/2021

Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000013	0.000100	ND	mg/L	U



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
10-Dec-2021 17:23

MW-10R-20212311

21K0382-05 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 11/23/2021 11:00

Instrument: ICPMS2 Analyst: MCB

Analyzed: 12/06/2021 20:56

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21K0382-05 A 03
	Preparation Batch: BJL0138	Filtration Batch: BJK0636
	Prepared: 12/06/2021	Filtration Date: 11/23/2021 16:31
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Barium, Dissolved	7440-39-3	1	0.114	0.500	2.08	ug/L	
Chromium, Dissolved	7440-47-3	1	0.260	0.500	ND	ug/L	U
Iron, Dissolved	7439-89-6	1	18.2	36.0	570	ug/L	
Lead, Dissolved	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Manganese, Dissolved	7439-96-5	1	0.142	0.500	45.5	ug/L	
Silver, Dissolved	7440-22-4	1	0.0220	0.200	ND	ug/L	U
Vanadium, Dissolved	7440-62-2	1	0.0556	0.200	1.35	ug/L	



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Analytical Report

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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
10-Dec-2021 17:23

MW-10R-20212311
21K0382-05 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 11/23/2021 11:00

Instrument: ICPMS2 Analyst: MCB

Analyzed: 12/06/2021 20:56

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21K0382-05 A 03
	Preparation Batch: BJL0138	Filtration Batch: BJK0636
	Prepared: 12/06/2021	Filtration Date: 11/23/2021 16:31
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic, Dissolved	7440-38-2	1	0.0373	0.200	0.675	ug/L	
Cadmium, Dissolved	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Cobalt, Dissolved	7440-48-4	1	0.0178	0.200	0.388	ug/L	
Copper, Dissolved	7440-50-8	1	0.173	0.500	1.45	ug/L	
Nickel, Dissolved	7440-02-0	1	0.0792	0.500	1.09	ug/L	
Selenium, Dissolved	7782-49-2	1	0.179	0.500	0.194	ug/L	J
Zinc, Dissolved	7440-66-6	1	2.92	6.00	ND	ug/L	U



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Analytical Report

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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
10-Dec-2021 17:23

MW-10R-20212311
21K0382-05 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 7470A

Sampled: 11/23/2021 11:00

Instrument: HYDRA Analyst: ML

Analyzed: 12/09/2021 11:40

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21K0382-05 A 01

Preparation Batch: BJL0134

Sample Size: 20 mL

Filtration Batch: BJK0636

Prepared: 12/06/2021

Final Volume: 20 mL

Filtration Date: 11/23/2021 16:31

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury, Dissolved	7439-97-6	1	0.000013	0.000100	ND	mg/L	U



Analytical Report

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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
10-Dec-2021 17:23

MW-11-20212311

21K0382-06 (Water)

Volatile Organic Compounds

Method: EPA 8260D

Sampled: 11/23/2021 12:46

Instrument: NT3 Analyst: PKC

Analyzed: 11/30/2021 17:33

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0382-06 H

Preparation Batch: BJK0727

Sample Size: 10 mL

Prepared: 11/30/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Methyl tert-butyl Ether	1634-04-4	1	0.14	0.50	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4				80-129 %	126	%	
Surrogate: Toluene-d8				80-120 %	100	%	
Surrogate: 4-Bromofluorobenzene				80-120 %	96.8	%	
Surrogate: 1,2-Dichlorobenzene-d4				80-120 %	102	%	



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Analytical Report

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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
10-Dec-2021 17:23

MW-11-20212311

21K0382-06 (Water)

Volatile Organic Compounds

Method: NWTPHg

Sampled: 11/23/2021 12:46

Instrument: NT3 Analyst: PKC

Analyzed: 11/30/2021 17:33

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0382-06 H

Preparation Batch: BJK0727

Sample Size: 10 mL

Prepared: 11/30/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Gasoline Range Organics (Tol-Nap)	GRO	1	100	ND	ug/L	U
<i>Surrogate: Toluene-d8</i>			80-120 %	100	%	
<i>Surrogate: 4-Bromofluorobenzene</i>			80-120 %	96.8	%	



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Analytical Report

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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
10-Dec-2021 17:23

MW-11-20212311

21K0382-06 (Water)

Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 11/23/2021 12:46

Instrument: FID4 Analyst: TWC

Analyzed: 11/26/2021 22:41

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21K0382-06 B 01

Preparation Batch: BJK0663

Sample Size: 450 mL

Prepared: 11/26/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	0.111	1.07	mg/L	
HC ID: DRO						
Motor Oil Range Organics (C24-C38)	RRO	1	0.222	0.312	mg/L	
HC ID: MOTOR OIL						
Surrogate: o-Terphenyl			50-150 %	91.2	%	



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Analytical Report

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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
10-Dec-2021 17:23

MW-11-20212311

21K0382-06 (Water)

Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 11/23/2021 12:46

Instrument: ICPMS2 Analyst: MCB

Analyzed: 12/08/2021 18:16

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21K0382-06 A 01

Preparation Batch: BJL0102

Sample Size: 25 mL

Prepared: 12/03/2021

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Manganese	7439-96-5	10	1.42	5.00	1090	ug/L	D



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
10-Dec-2021 17:23

MW-11-20212311

21K0382-06 (Water)

Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 11/23/2021 12:46

Instrument: ICPMS2 Analyst: MCB

Analyzed: 12/07/2021 22:56

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO₃ matrix

Extract ID: 21K0382-06 A 01

Preparation Batch: BJL0102

Sample Size: 25 mL

Prepared: 12/03/2021

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	1	0.0373	0.200	6.14	ug/L	



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
10-Dec-2021 17:23

MW-11-20212311

21K0382-07 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 11/23/2021 12:46

Instrument: ICPMS2 Analyst: MCB

Analyzed: 12/07/2021 20:50

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21K0382-07 A 02

Preparation Batch: BJL0138

Sample Size: 25 mL

Filtration Batch: BJK0636

Prepared: 12/06/2021

Final Volume: 25 mL

Filtration Date: 11/23/2021 16:31

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Manganese, Dissolved	7439-96-5	10	1.42	5.00	1050	ug/L	D



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
10-Dec-2021 17:23

MW-11-20212311

21K0382-07 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 11/23/2021 12:46

Instrument: ICPMS2 Analyst: MCB

Analyzed: 12/06/2021 21:01

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21K0382-07 A 02

Preparation Batch: BJL0138

Sample Size: 25 mL

Filtration Batch: BJK0636

Prepared: 12/06/2021

Final Volume: 25 mL

Filtration Date: 11/23/2021 16:31

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic, Dissolved	7440-38-2	1	0.0373	0.200	5.41	ug/L	



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
10-Dec-2021 17:23

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - Quality Control

Batch BJK0705 - EPA 5030C (Purge and Trap)

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0705-BLK1)		Prepared: 29-Nov-2021 Analyzed: 29-Nov-2021 12:29								
Gasoline Range Organics (Tol-Nap)	ND	100	ug/L							U
Surrogate: Toluene-d8	5.06		ug/L	5.00		101	80-120			
Surrogate: 4-Bromofluorobenzene	5.04		ug/L	5.00		101	80-120			

Blank (BJK0705-BLK2)		Prepared: 29-Nov-2021 Analyzed: 29-Nov-2021 12:29								
Vinyl Chloride	ND	0.08	0.20	ug/L						U
1,1-Dichloroethene	ND	0.08	0.20	ug/L						U
trans-1,2-Dichloroethene	ND	0.07	0.20	ug/L						U
cis-1,2-Dichloroethene	ND	0.08	0.20	ug/L						U
Benzene	ND	0.05	0.20	ug/L						U
Trichloroethene	ND	0.07	0.20	ug/L						U
Toluene	ND	0.05	0.20	ug/L						U
Tetrachloroethene	ND	0.09	0.20	ug/L						U
Ethylbenzene	ND	0.05	0.20	ug/L						U
m,p-Xylene	ND	0.14	0.40	ug/L						U
o-Xylene	ND	0.08	0.20	ug/L						U
Xylenes, total	ND	0.22	0.60	ug/L						U
Methyl tert-butyl Ether	ND	0.14	0.50	ug/L						U
Surrogate: 1,2-Dichloroethane-d4	5.12		ug/L	5.00		102	80-129			
Surrogate: Toluene-d8	5.06		ug/L	5.00		101	80-120			
Surrogate: 4-Bromofluorobenzene	5.04		ug/L	5.00		101	80-120			
Surrogate: 1,2-Dichlorobenzene-d4	4.85		ug/L	5.00		97.1	80-120			

LCS (BJK0705-BS1)		Prepared: 29-Nov-2021 Analyzed: 29-Nov-2021 10:23								
Gasoline Range Organics (Tol-Nap)	961	100	ug/L	1000		96.1	72-128			
Surrogate: Toluene-d8	5.19		ug/L	5.00		104	80-120			
Surrogate: 4-Bromofluorobenzene	4.98		ug/L	5.00		99.6	80-120			

LCS (BJK0705-BS2)		Prepared: 29-Nov-2021 Analyzed: 29-Nov-2021 10:48								
Vinyl Chloride	8.40	0.08	0.20	ug/L	10.0	84.0	66-133			
1,1-Dichloroethene	9.78	0.08	0.20	ug/L	10.0	97.8	69-135			
trans-1,2-Dichloroethene	9.08	0.07	0.20	ug/L	10.0	90.8	78-128			
cis-1,2-Dichloroethene	9.53	0.08	0.20	ug/L	10.0	95.3	80-121			
Benzene	9.85	0.05	0.20	ug/L	10.0	98.5	80-120			



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
10-Dec-2021 17:23

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - Quality Control

Batch BJK0705 - EPA 5030C (Purge and Trap)

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJK0705-BS2)						Prepared: 29-Nov-2021	Analyzed: 29-Nov-2021 10:48				
Trichloroethene	9.71	0.07	0.20	ug/L	10.0		97.1	80-120			
Toluene	9.78	0.05	0.20	ug/L	10.0		97.8	80-120			
Tetrachloroethene	9.65	0.09	0.20	ug/L	10.0		96.5	80-120			
Ethylbenzene	9.45	0.05	0.20	ug/L	10.0		94.5	80-120			
m,p-Xylene	19.5	0.14	0.40	ug/L	20.0		97.5	80-121			
o-Xylene	9.53	0.08	0.20	ug/L	10.0		95.3	80-121			
Xylenes, total	29.0	0.22	0.60	ug/L	30.0		96.8	76-127			
Methyl tert-butyl Ether	9.77	0.14	0.50	ug/L	10.0		97.7	71-132			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	5.14			ug/L	5.00		103	80-129			
<i>Surrogate: Toluene-d8</i>	5.24			ug/L	5.00		105	80-120			
<i>Surrogate: 4-Bromofluorobenzene</i>	5.04			ug/L	5.00		101	80-120			
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	5.22			ug/L	5.00		104	80-120			
LCS Dup (BJK0705-BSD1)						Prepared: 29-Nov-2021	Analyzed: 29-Nov-2021 11:13				
Gasoline Range Organics (Tol-Nap)	998		100	ug/L	1000		99.8	72-128	3.73	30	
<i>Surrogate: Toluene-d8</i>	5.05			ug/L	5.00		101	80-120			
<i>Surrogate: 4-Bromofluorobenzene</i>	5.09			ug/L	5.00		102	80-120			
LCS Dup (BJK0705-BSD2)						Prepared: 29-Nov-2021	Analyzed: 29-Nov-2021 11:39				
Vinyl Chloride	9.37	0.08	0.20	ug/L	10.0		93.7	66-133	11.00	30	
1,1-Dichloroethene	9.94	0.08	0.20	ug/L	10.0		99.4	69-135	1.61	30	
trans-1,2-Dichloroethene	9.72	0.07	0.20	ug/L	10.0		97.2	78-128	6.84	30	
cis-1,2-Dichloroethene	10.2	0.08	0.20	ug/L	10.0		102	80-121	6.55	30	
Benzene	10.3	0.05	0.20	ug/L	10.0		103	80-120	4.13	30	
Trichloroethene	10.3	0.07	0.20	ug/L	10.0		103	80-120	5.43	30	
Toluene	10.2	0.05	0.20	ug/L	10.0		102	80-120	4.26	30	
Tetrachloroethene	10.6	0.09	0.20	ug/L	10.0		106	80-120	9.18	30	
Ethylbenzene	10.4	0.05	0.20	ug/L	10.0		104	80-120	9.73	30	
m,p-Xylene	21.4	0.14	0.40	ug/L	20.0		107	80-121	9.14	30	
o-Xylene	10.2	0.08	0.20	ug/L	10.0		102	80-121	6.90	30	
Xylenes, total	31.6	0.22	0.60	ug/L	30.0		105	76-127	8.41	30	
Methyl tert-butyl Ether	10.2	0.14	0.50	ug/L	10.0		102	71-132	4.69	30	
<i>Surrogate: 1,2-Dichloroethane-d4</i>	4.86			ug/L	5.00		97.1	80-129			
<i>Surrogate: Toluene-d8</i>	5.01			ug/L	5.00		100	80-120			



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
10-Dec-2021 17:23

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - Quality Control

Batch BJK0705 - EPA 5030C (Purge and Trap)

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BJK0705-BSD2)					Prepared: 29-Nov-2021		Analyzed: 29-Nov-2021 11:39				
Surrogate: 4-Bromofluorobenzene	5.18			ug/L	5.00	104		80-120			
Surrogate: 1,2-Dichlorobenzene-d4	4.99			ug/L	5.00	99.7		80-120			



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
10-Dec-2021 17:23

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - Quality Control

Batch BJK0727 - EPA 5030C (Purge and Trap)

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0727-BLK1)		Prepared: 30-Nov-2021 Analyzed: 30-Nov-2021 12:26								
Gasoline Range Organics (Tol-Nap)	ND	100	ug/L							U
Surrogate: Toluene-d8	4.95		ug/L	5.00		99.1	80-120			
Surrogate: 4-Bromofluorobenzene	5.06		ug/L	5.00		101	80-120			
Blank (BJK0727-BLK2)		Prepared: 30-Nov-2021 Analyzed: 30-Nov-2021 12:26								
Methyl tert-butyl Ether	ND	0.14	0.50	ug/L						U
Surrogate: 1,2-Dichloroethane-d4	5.55		ug/L	5.00		111	80-129			
Surrogate: Toluene-d8	4.95		ug/L	5.00		99.1	80-120			
Surrogate: 4-Bromofluorobenzene	5.06		ug/L	5.00		101	80-120			
Surrogate: 1,2-Dichlorobenzene-d4	4.93		ug/L	5.00		98.6	80-120			
LCS (BJK0727-BS1)		Prepared: 30-Nov-2021 Analyzed: 30-Nov-2021 09:29								
Gasoline Range Organics (Tol-Nap)	945	100	ug/L	1000		94.5	72-128			
Surrogate: Toluene-d8	5.13		ug/L	5.00		103	80-120			
Surrogate: 4-Bromofluorobenzene	5.02		ug/L	5.00		100	80-120			
LCS (BJK0727-BS2)		Prepared: 30-Nov-2021 Analyzed: 30-Nov-2021 09:54								
Methyl tert-butyl Ether	9.29	0.14	0.50	ug/L	10.0	92.9	71-132			
Surrogate: 1,2-Dichloroethane-d4	5.41		ug/L	5.00		108	80-129			
Surrogate: Toluene-d8	4.96		ug/L	5.00		99.1	80-120			
Surrogate: 4-Bromofluorobenzene	5.05		ug/L	5.00		101	80-120			
Surrogate: 1,2-Dichlorobenzene-d4	5.02		ug/L	5.00		100	80-120			
LCS Dup (BJK0727-BSD1)		Prepared: 30-Nov-2021 Analyzed: 30-Nov-2021 10:20								
Gasoline Range Organics (Tol-Nap)	872	100	ug/L	1000		87.2	72-128	8.00	30	
Surrogate: Toluene-d8	5.10		ug/L	5.00		102	80-120			
Surrogate: 4-Bromofluorobenzene	4.98		ug/L	5.00		99.6	80-120			
LCS Dup (BJK0727-BSD2)		Prepared: 30-Nov-2021 Analyzed: 30-Nov-2021 10:45								
Methyl tert-butyl Ether	11.2	0.14	0.50	ug/L	10.0	112	71-132	18.50	30	
Surrogate: 1,2-Dichloroethane-d4	5.71		ug/L	5.00		114	80-129			
Surrogate: Toluene-d8	5.11		ug/L	5.00		102	80-120			
Surrogate: 4-Bromofluorobenzene	5.09		ug/L	5.00		102	80-120			
Surrogate: 1,2-Dichlorobenzene-d4	5.02		ug/L	5.00		100	80-120			



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
10-Dec-2021 17:23

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - Quality Control

Batch BJK0727 - EPA 5030C (Purge and Trap)

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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LCS Dup (BJK0727-BSD2)

Prepared: 30-Nov-2021 Analyzed: 30-Nov-2021 10:45


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 10-Dec-2021 17:23

Analysis by: Analytical Resources, LLC
Volatile Organic Compounds - SIM - Quality Control
Batch BJK0740 - EPA 5030C (Purge and Trap)

Instrument: NT16 Analyst: KOTT

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0740-BLK1)						Prepared: 30-Nov-2021 Analyzed: 30-Nov-2021 14:31					
Vinyl chloride	ND	5.01	20.0	ng/L							U
Surrogate: 1,2-Dichloroethane-d4	5060			ng/L	5000		101	80-129			
Surrogate: Toluene-d8	5110			ng/L	5000		102	80-120			
Surrogate: 4-Bromofluorobenzene	4980			ng/L	5000		99.7	75-125			
LCS (BJK0740-BS1)						Prepared: 30-Nov-2021 Analyzed: 30-Nov-2021 12:32					
Vinyl chloride	2100	5.01	20.0	ng/L	2000		105	62-141			
Surrogate: 1,2-Dichloroethane-d4	5250			ng/L	5000		105	80-129			
Surrogate: Toluene-d8	5250			ng/L	5000		105	80-120			
Surrogate: 4-Bromofluorobenzene	5190			ng/L	5000		104	75-125			
LCS Dup (BJK0740-BSD1)						Prepared: 30-Nov-2021 Analyzed: 30-Nov-2021 13:35					
Vinyl chloride	2090	5.01	20.0	ng/L	2000		104	62-141	0.60	30	
Surrogate: 1,2-Dichloroethane-d4	5170			ng/L	5000		103	80-129			
Surrogate: Toluene-d8	5250			ng/L	5000		105	80-120			
Surrogate: 4-Bromofluorobenzene	5190			ng/L	5000		104	75-125			


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 10-Dec-2021 17:23

Analysis by: Analytical Resources, LLC
Dissolved Gases - Quality Control
Batch BJL0076 - EPA 5030C (Purge and Trap)

Instrument: FID6 Analyst: PB

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit	Notes
Blank (BJL0076-BLK1)		Prepared: 02-Dec-2021 Analyzed: 02-Dec-2021 12:45							
Methane	ND	0.65	ug/L						U
Ethane	ND	1.23	ug/L						U
Ethene	ND	1.14	ug/L						U
Acetylene	ND	1.06	ug/L						U
<i>Surrogate: Propane</i>	1480		ug/L	1800		82.3	72-122		
LCS (BJL0076-BS1)		Prepared: 02-Dec-2021 Analyzed: 02-Dec-2021 12:27							
Methane	331	0.65	ug/L	328		101	80-120		
Ethane	662	1.23	ug/L	615		108	80-120		
Ethene	598	1.14	ug/L	575		104	80-120		
Acetylene	539	1.06	ug/L	530		102	73-123		
<i>Surrogate: Propane</i>	1540		ug/L	1800		85.8	62-122		
LCS Dup (BJL0076-BSD1)		Prepared: 02-Dec-2021 Analyzed: 02-Dec-2021 13:20							
Methane	304	0.65	ug/L	328		92.7	80-120	8.39	30
Ethane	604	1.23	ug/L	615		98.2	80-120	9.13	30
Ethene	549	1.14	ug/L	575		95.5	80-120	8.45	30
Acetylene	488	1.06	ug/L	530		92.2	73-123	9.89	30
<i>Surrogate: Propane</i>	1360		ug/L	1800		75.6	62-122		



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
10-Dec-2021 17:23

Analysis by: Analytical Resources, LLC

Semivolatile Organic Compounds - SIM - Quality Control

Batch BJK0640 - EPA 3510C SepF

Instrument: NT11 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0640-BLK1)						Prepared: 29-Nov-2021 Analyzed: 01-Dec-2021 13:40					
Naphthalene	0.002	0.001	0.010	ug/L							J
2-Methylnaphthalene	0.001	0.001	0.010	ug/L							J
1-Methylnaphthalene	ND	0.0009	0.010	ug/L							U
Acenaphthylene	ND	0.002	0.010	ug/L							U
Acenaphthene	ND	0.003	0.010	ug/L							U
Dibenzofuran	ND	0.002	0.010	ug/L							U
Fluorene	ND	0.002	0.010	ug/L							U
Phenanthrene	ND	0.001	0.010	ug/L							U
Anthracene	ND	0.001	0.010	ug/L							U
Carbazole	ND	0.001	0.010	ug/L							U
Fluoranthene	ND	0.002	0.010	ug/L							U
Pyrene	ND	0.001	0.010	ug/L							U
Benzo(a)anthracene	ND	0.0008	0.010	ug/L							U
Chrysene	ND	0.0009	0.010	ug/L							U
Benzo(b)fluoranthene	ND	0.0005	0.010	ug/L							U
Benzo(k)fluoranthene	ND	0.003	0.010	ug/L							U
Benzo(j)fluoranthene	ND	0.002	0.010	ug/L							U
Benzofluoranthenes, Total	ND	0.004	0.010	ug/L							U
Benzo(a)pyrene	ND	0.002	0.010	ug/L							U
Perylene	ND	0.006	0.010	ug/L							U
Indeno(1,2,3-cd)pyrene	ND	0.001	0.010	ug/L							U
Dibenzo(a,h)anthracene	ND	0.001	0.010	ug/L							U
Benzo(g,h,i)perylene	ND	0.001	0.010	ug/L							U
<i>Surrogate: 2-Methylnaphthalene-d10</i>	0.242			ug/L	0.300		80.6	42-120			
<i>Surrogate: Dibenzo[a,h]anthracene-d14</i>	0.163			ug/L	0.300		54.5	29-120			Q
<i>Surrogate: Fluoranthene-d10</i>	0.276			ug/L	0.300		92.0	57-120			
LCS (BJK0640-BS1)						Prepared: 29-Nov-2021 Analyzed: 01-Dec-2021 14:10					
Naphthalene	0.245	0.001	0.010	ug/L	0.300		81.7	37-120			
2-Methylnaphthalene	0.264	0.001	0.010	ug/L	0.300		87.9	37-120			
1-Methylnaphthalene	0.268	0.0009	0.010	ug/L	0.300		89.4	29-120			
Acenaphthylene	0.275	0.002	0.010	ug/L	0.300		91.6	41-120			
Acenaphthene	0.281	0.003	0.010	ug/L	0.300		93.6	41-120			
Dibenzofuran	0.267	0.002	0.010	ug/L	0.300		89.1	38-120			
Fluorene	0.277	0.002	0.010	ug/L	0.300		92.2	43-120			



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
10-Dec-2021 17:23

Analysis by: Analytical Resources, LLC

Semivolatile Organic Compounds - SIM - Quality Control

Batch BJK0640 - EPA 3510C SepF

Instrument: NT11 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJK0640-BS1)						Prepared: 29-Nov-2021	Analyzed: 01-Dec-2021 14:10				
Phenanthrene	0.280	0.001	0.010	ug/L	0.300		93.3	41-120			
Anthracene	0.270	0.001	0.010	ug/L	0.300		90.0	40-120			
Carbazole	0.279	0.001	0.010	ug/L	0.300		92.9	30-160			
Fluoranthene	0.286	0.002	0.010	ug/L	0.300		95.5	45-120			
Pyrene	0.284	0.001	0.010	ug/L	0.300		94.8	41-120			
Benzo(a)anthracene	0.278	0.0008	0.010	ug/L	0.300		92.8	42-120			
Chrysene	0.273	0.0009	0.010	ug/L	0.300		90.9	44-120			
Benzo(b)fluoranthene	0.255	0.0005	0.010	ug/L	0.300		85.1	44-120			
Benzo(k)fluoranthene	0.274	0.003	0.010	ug/L	0.300		91.4	50-120			
Benzo(j)fluoranthene	0.279	0.002	0.010	ug/L	0.300		92.8	39-160			
Benzofluoranthenes, Total	0.808	0.004	0.010	ug/L	0.900		89.8	46-120			
Benzo(a)pyrene	0.263	0.002	0.010	ug/L	0.300		87.8	35-120			
Perylene	0.235	0.006	0.010	ug/L	0.300		78.3	30-160			
Indeno(1,2,3-cd)pyrene	0.224	0.001	0.010	ug/L	0.300		74.7	37-120			
Dibenzo(a,h)anthracene	0.221	0.001	0.010	ug/L	0.300		73.5	34-120			
Benzo(g,h,i)perylene	0.187	0.001	0.010	ug/L	0.300		62.4	38-120			Q
Surrogate: 2-Methylnaphthalene-d10	0.272			ug/L	0.300		90.8	42-120			
Surrogate: Dibenzo[a,h]anthracene-d14	0.203			ug/L	0.300		67.8	29-120			Q
Surrogate: Fluoranthene-d10	0.289			ug/L	0.300		96.3	57-120			
LCS Dup (BJK0640-BSD1)						Prepared: 29-Nov-2021	Analyzed: 01-Dec-2021 14:41				
Naphthalene	0.245	0.001	0.010	ug/L	0.300		81.7	37-120	0.03	30	
2-Methylnaphthalene	0.265	0.001	0.010	ug/L	0.300		88.3	37-120	0.49	30	
1-Methylnaphthalene	0.261	0.0009	0.010	ug/L	0.300		87.1	29-120	2.54	30	
Acenaphthylene	0.273	0.002	0.010	ug/L	0.300		90.9	41-120	0.67	30	
Acenaphthene	0.280	0.003	0.010	ug/L	0.300		93.4	41-120	0.26	30	
Dibenzofuran	0.263	0.002	0.010	ug/L	0.300		87.6	38-120	1.69	30	
Fluorene	0.277	0.002	0.010	ug/L	0.300		92.3	43-120	0.09	30	
Phenanthrene	0.277	0.001	0.010	ug/L	0.300		92.3	41-120	1.08	30	
Anthracene	0.272	0.001	0.010	ug/L	0.300		90.6	40-120	0.63	30	
Carbazole	0.277	0.001	0.010	ug/L	0.300		92.5	30-160	0.51	30	
Fluoranthene	0.285	0.002	0.010	ug/L	0.300		95.0	45-120	0.53	30	
Pyrene	0.281	0.001	0.010	ug/L	0.300		93.8	41-120	1.05	30	
Benzo(a)anthracene	0.279	0.0008	0.010	ug/L	0.300		93.1	42-120	0.29	30	
Chrysene	0.272	0.0009	0.010	ug/L	0.300		90.7	44-120	0.26	30	


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Reported:
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Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - SIM - Quality Control
Batch BJK0640 - EPA 3510C SepF

Instrument: NT11 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BJK0640-BSD1)						Prepared: 29-Nov-2021 Analyzed: 01-Dec-2021 14:41					
Benzo(b)fluoranthene	0.251	0.0005	0.010	ug/L	0.300		83.8	44-120	1.56	30	
Benzo(k)fluoranthene	0.274	0.003	0.010	ug/L	0.300		91.3	50-120	0.16	30	
Benzo(j)fluoranthene	0.293	0.002	0.010	ug/L	0.300		97.7	39-160	5.09	30	
Benzofluoranthenes, Total	0.818	0.004	0.010	ug/L	0.900		90.9	46-120	1.25	30	
Benzo(a)pyrene	0.265	0.002	0.010	ug/L	0.300		88.2	35-120	0.54	30	
Perylene	0.248	0.006	0.010	ug/L	0.300		82.6	30-160	5.40	30	
Indeno(1,2,3-cd)pyrene	0.230	0.001	0.010	ug/L	0.300		76.6	37-120	2.61	30	
Dibenzo(a,h)anthracene	0.226	0.001	0.010	ug/L	0.300		75.5	34-120	2.63	30	
Benzo(g,h,i)perylene	0.193	0.001	0.010	ug/L	0.300		64.4	38-120	3.24	30	Q
Surrogate: 2-Methylnaphthalene-d10	0.271			ug/L	0.300		90.4	42-120			
Surrogate: Dibenzo[a,h]anthracene-d14	0.207			ug/L	0.300		69.1	29-120			Q
Surrogate: Fluoranthene-d10	0.290			ug/L	0.300		96.6	57-120			


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Reported:
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Analysis by: Analytical Resources, LLC
Petroleum Hydrocarbons - Quality Control
Batch BJK0663 - EPA 3510C SepF

Instrument: FID4 Analyst: TWC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0663-BLK1)		Prepared: 26-Nov-2021 Analyzed: 26-Nov-2021 20:05								
Diesel Range Organics (C12-C24)	ND	0.100	mg/L							U
Motor Oil Range Organics (C24-C38)	ND	0.200	mg/L							U
<i>Surrogate: o-Terphenyl</i>	112		mg/L	113		99.8	50-150			
LCS (BJK0663-BS1)		Prepared: 26-Nov-2021 Analyzed: 26-Nov-2021 20:25								
Diesel Range Organics (C12-C24)	2.62	0.100	mg/L	3.00		87.3	56-120			
<i>Surrogate: o-Terphenyl</i>	110		mg/L	113		97.9	50-150			
Matrix Spike (BJK0663-MS1)		Source: 21K0382-04	Prepared: 26-Nov-2021 Analyzed: 26-Nov-2021 21:23							
Diesel Range Organics (C12-C24)	2.85	0.105	mg/L	3.16	ND	87.9	56-120			
<i>Surrogate: o-Terphenyl</i>	113		mg/L	113	111	100	50-150			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.										
Matrix Spike Dup (BJK0663-MSD1)		Source: 21K0382-04	Prepared: 26-Nov-2021 Analyzed: 26-Nov-2021 21:42							
Diesel Range Organics (C12-C24)	2.95	0.105	mg/L	3.16	ND	91.1	56-120	3.47	30	
<i>Surrogate: o-Terphenyl</i>	115		mg/L	113	111	102	50-150			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.										



Analytical Report

Shannon & Wilson, Inc
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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
10-Dec-2021 17:23

Analysis by: Analytical Resources, LLC

Aroclor PCB - Quality Control

Batch BJK0682 - EPA 3510C SepF

Instrument: ECD7 Analyst: JGR

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0682-BLK1)						Prepared: 29-Nov-2021 Analyzed: 01-Dec-2021 20:54					
Aroclor 1016	ND	0.002	0.010	ug/L							U
Aroclor 1221	ND	0.002	0.010	ug/L							U
Aroclor 1232	ND	0.002	0.010	ug/L							U
Aroclor 1242	ND	0.002	0.010	ug/L							U
Aroclor 1248	ND	0.002	0.010	ug/L							U
Aroclor 1254	ND	0.002	0.010	ug/L							U
Aroclor 1260	ND	0.003	0.010	ug/L							U
Aroclor 1262	ND	0.003	0.010	ug/L							U
Aroclor 1268	ND	0.003	0.010	ug/L							U
Surrogate: Decachlorobiphenyl	0.0137			ug/L	0.0200	68.4		29-120			
Surrogate: Tetrachlorometaxylene	0.0141			ug/L	0.0200	70.4		32-120			
Surrogate: Decachlorobiphenyl [2C]	0.0137			ug/L	0.0200	68.3		29-120			
Surrogate: Tetrachlorometaxylene [2C]	0.0142			ug/L	0.0200	71.2		32-120			
LCS (BJK0682-BS1)						Prepared: 29-Nov-2021 Analyzed: 01-Dec-2021 21:15					
Aroclor 1016 [2C]	0.040	0.002	0.010	ug/L	0.0500	80.2		54-120			
Aroclor 1260	0.037	0.003	0.010	ug/L	0.0500	74.2		51-128			
Surrogate: Decachlorobiphenyl	0.0148			ug/L	0.0200	74.0		29-120			
Surrogate: Tetrachlorometaxylene	0.0140			ug/L	0.0200	70.1		32-120			
Surrogate: Decachlorobiphenyl [2C]	0.0145			ug/L	0.0200	72.7		29-120			
Surrogate: Tetrachlorometaxylene [2C]	0.0139			ug/L	0.0200	69.4		32-120			
LCS Dup (BJK0682-BSD1)						Prepared: 29-Nov-2021 Analyzed: 01-Dec-2021 21:37					
Aroclor 1016 [2C]	0.040	0.002	0.010	ug/L	0.0500	79.3		54-120	1.18	30	
Aroclor 1260	0.035	0.003	0.010	ug/L	0.0500	70.1		51-128	5.67	30	
Surrogate: Decachlorobiphenyl	0.0121			ug/L	0.0200	60.7		29-120			
Surrogate: Tetrachlorometaxylene	0.0135			ug/L	0.0200	67.5		32-120			
Surrogate: Decachlorobiphenyl [2C]	0.0114			ug/L	0.0200	56.8		29-120			
Surrogate: Tetrachlorometaxylene [2C]	0.0133			ug/L	0.0200	66.7		32-120			


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Reported:
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Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds - Quality Control
Batch BJL0102 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: SKD

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit	Notes
Blank (BJL0102-BLK1)						Prepared: 03-Dec-2021 Analyzed: 03-Dec-2021 16:55					
Lead	208	ND	0.0513	0.100	ug/L						U
Silver	107	ND	0.0220	0.200	ug/L						U
Arsenic	75a	ND	0.0373	0.200	ug/L						U
Blank (BJL0102-BLK2)						Prepared: 03-Dec-2021 Analyzed: 06-Dec-2021 19:25					
Chromium	52	ND	0.260	0.500	ug/L						U
Chromium	53	ND	0.239	0.500	ug/L						U
LCS (BJL0102-BS1)						Prepared: 03-Dec-2021 Analyzed: 03-Dec-2021 16:59					
Lead	208	26.3	0.0513	0.100	ug/L	25.0		105	80-120		
Silver	107	26.2	0.0220	0.200	ug/L	25.0		105	80-120		
Arsenic	75a	24.7	0.0373	0.200	ug/L	25.0		98.9	80-120		
LCS (BJL0102-BS2)						Prepared: 03-Dec-2021 Analyzed: 06-Dec-2021 19:31					
Chromium	52	24.7	0.260	0.500	ug/L	25.0		98.6	80-120		
Chromium	53	24.2	0.239	0.500	ug/L	25.0		96.7	80-120		


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 Project Manager: Meg Strong

Reported:
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Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds - Quality Control
Batch BJL0135 - TWM EPA 7470A

Instrument: HYDRA Analyst: ML

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJL0135-BLK1)						Prepared: 06-Dec-2021 Analyzed: 09-Dec-2021 11:42					
Mercury	ND	0.000013	0.000100	mg/L							U
LCS (BJL0135-BS1)						Prepared: 06-Dec-2021 Analyzed: 09-Dec-2021 11:45					
Mercury	0.00199	0.000013	0.000100	mg/L	0.00200		99.4	80-120			
Duplicate (BJL0135-DUP1)						Source: 21K0382-02 Prepared: 06-Dec-2021 Analyzed: 09-Dec-2021 11:49					
Mercury	ND	0.000013	0.000100	mg/L		ND					U
Matrix Spike (BJL0135-MS1)						Source: 21K0382-02 Prepared: 06-Dec-2021 Analyzed: 09-Dec-2021 11:52					
Mercury	0.000977	0.000013	0.000100	mg/L	0.00100	ND	97.7	75-125			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Matrix Spike Dup (BJL0135-MSD1)						Source: 21K0382-02 Prepared: 06-Dec-2021 Analyzed: 09-Dec-2021 11:59					
Mercury	0.000959	0.000013	0.000100	mg/L	0.00100	ND	95.9	75-125	1.89	20	
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
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Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds (dissolved) - Quality Control
Batch BJL0134 - TWM EPA 7470A

Instrument: HYDRA Analyst: ML

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJL0134-BLK1)						Prepared: 06-Dec-2021 Analyzed: 09-Dec-2021 11:22					
Mercury, Dissolved	ND	0.000013	0.000100	mg/L							U
LCS (BJL0134-BS1)						Prepared: 06-Dec-2021 Analyzed: 09-Dec-2021 11:24					
Mercury, Dissolved	0.00212	0.000013	0.000100	mg/L	0.00200		106	80-120			
Duplicate (BJL0134-DUP1)						Source: 21K0382-03 Prepared: 06-Dec-2021 Analyzed: 09-Dec-2021 11:33					
Mercury, Dissolved	ND	0.000013	0.000100	mg/L		ND					U
Matrix Spike (BJL0134-MS1)						Source: 21K0382-03 Prepared: 06-Dec-2021 Analyzed: 09-Dec-2021 11:36					
Mercury, Dissolved	0.000985	0.000013	0.000100	mg/L	0.00100	ND	98.5	75-125			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Matrix Spike Dup (BJL0134-MSD1)						Source: 21K0382-03 Prepared: 06-Dec-2021 Analyzed: 09-Dec-2021 11:38					
Mercury, Dissolved	0.000992	0.000013	0.000100	mg/L	0.00100	ND	99.2	75-125	0.73	20	
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											


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Reported:
 10-Dec-2021 17:23

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds (dissolved) - Quality Control
Batch BJL0138 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJL0138-BLK1)						Prepared: 06-Dec-2021 Analyzed: 06-Dec-2021 19:46						
Barium, Dissolved	135	ND	0.114	0.500	ug/L							U
Barium, Dissolved	137	ND	0.0765	0.500	ug/L							U
Chromium, Dissolved	52	ND	0.260	0.500	ug/L							U
Chromium, Dissolved	53	ND	0.239	0.500	ug/L							U
Lead, Dissolved	208	ND	0.0513	0.100	ug/L							U
Silver, Dissolved	107	ND	0.0220	0.200	ug/L							U
Arsenic, Dissolved	75a	ND	0.0373	0.200	ug/L							U
Cadmium, Dissolved	111	ND	0.0300	0.100	ug/L							U
Cadmium, Dissolved	114	ND	0.0400	0.100	ug/L							U
Cobalt, Dissolved	59	ND	0.0178	0.200	ug/L							U
Copper, Dissolved	63	ND	0.173	0.500	ug/L							U
Copper, Dissolved	65	ND	0.350	0.500	ug/L							U
Nickel, Dissolved	60	ND	0.0792	0.500	ug/L							U
Nickel, Dissolved	62	ND	0.220	0.500	ug/L							U
Selenium, Dissolved	78	ND	0.179	0.500	ug/L							U
Zinc, Dissolved	66	ND	2.92	6.00	ug/L							U
Zinc, Dissolved	67	ND	0.940	6.00	ug/L							U
Blank (BJL0138-BLK2)						Prepared: 06-Dec-2021 Analyzed: 07-Dec-2021 19:08						
Iron, Dissolved	54	ND	18.2	36.0	ug/L							U
Iron, Dissolved	57	ND	18.2	36.0	ug/L							U
Manganese, Dissolved	55	ND	0.142	0.500	ug/L							U
Vanadium, Dissolved	51a	ND	0.0556	0.200	ug/L							U
Vanadium, Dissolved	51b	ND	0.0521	0.200	ug/L							U
LCS (BJL0138-BS1)						Prepared: 06-Dec-2021 Analyzed: 06-Dec-2021 19:51						
Barium, Dissolved	135	23.4	0.114	0.500	ug/L	25.0		93.5	80-120			
Barium, Dissolved	137	23.8	0.0765	0.500	ug/L	25.0		95.0	80-120			
Chromium, Dissolved	52	24.6	0.260	0.500	ug/L	25.0		98.4	80-120			
Chromium, Dissolved	53	23.5	0.239	0.500	ug/L	25.0		94.2	80-120			
Lead, Dissolved	208	25.7	0.0513	0.100	ug/L	25.0		103	80-120			
Silver, Dissolved	107	24.4	0.0220	0.200	ug/L	25.0		97.8	80-120			
Arsenic, Dissolved	75a	23.3	0.0373	0.200	ug/L	25.0		93.1	80-120			
Cadmium, Dissolved	111	23.6	0.0300	0.100	ug/L	25.0		94.2	80-120			
Cadmium, Dissolved	114	23.5	0.0400	0.100	ug/L	25.0		93.8	80-120			


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Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds (dissolved) - Quality Control
Batch BJL0138 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJL0138-BS1)						Prepared: 06-Dec-2021 Analyzed: 06-Dec-2021 19:51						
Cobalt, Dissolved	59	24.2	0.0178	0.200	ug/L	25.0		96.7	80-120			
Copper, Dissolved	63	23.9	0.173	0.500	ug/L	25.0		95.7	80-120			
Copper, Dissolved	65	24.4	0.350	0.500	ug/L	25.0		97.6	80-120			
Nickel, Dissolved	60	24.0	0.0792	0.500	ug/L	25.0		96.0	80-120			
Nickel, Dissolved	62	24.7	0.220	0.500	ug/L	25.0		98.8	80-120			
Selenium, Dissolved	78	71.8	0.179	0.500	ug/L	80.0		89.7	80-120			
Zinc, Dissolved	66	73.8	2.92	6.00	ug/L	80.0		92.2	80-120			
Zinc, Dissolved	67	71.1	0.940	6.00	ug/L	80.0		88.8	80-120			
LCS (BJL0138-BS2)						Prepared: 06-Dec-2021 Analyzed: 07-Dec-2021 19:13						
Iron, Dissolved	54	4930	18.2	36.0	ug/L	5000		98.5	80-120			
Iron, Dissolved	57	4880	18.2	36.0	ug/L	5000		97.5	80-120			
Manganese, Dissolved	55	24.6	0.142	0.500	ug/L	25.0		98.5	80-120			
Vanadium, Dissolved	51a	24.4	0.0556	0.200	ug/L	25.0		97.6	80-120			
Vanadium, Dissolved	51b	24.3	0.0521	0.200	ug/L	25.0		97.2	80-120			
Duplicate (BJL0138-DUP1)						Source: 21K0382-07 Prepared: 06-Dec-2021 Analyzed: 06-Dec-2021 21:06						
Barium, Dissolved	135	6.01	0.114	0.500	ug/L		5.66			6.08	20	
Chromium, Dissolved	52	0.422	0.260	0.500	ug/L		0.453			7.09	20	J
Lead, Dissolved	208	ND	0.0513	0.100	ug/L		ND					U
Silver, Dissolved	107	ND	0.0220	0.200	ug/L		ND					U
Arsenic, Dissolved	75a	5.68	0.0373	0.200	ug/L		5.41			4.83	20	
Cadmium, Dissolved	111	ND	0.0300	0.100	ug/L		ND					U
Cobalt, Dissolved	59	0.390	0.0178	0.200	ug/L		0.360			8.00	20	
Copper, Dissolved	63	ND	0.173	0.500	ug/L		0.753					U
Nickel, Dissolved	60	1.25	0.0792	0.500	ug/L		1.30			3.84	20	
Selenium, Dissolved	78	ND	0.179	0.500	ug/L		ND					U
Zinc, Dissolved	66	ND	2.92	6.00	ug/L		ND					U
Duplicate (BJL0138-DUP2)						Source: 21K0382-07 Prepared: 06-Dec-2021 Analyzed: 07-Dec-2021 20:55						
Iron, Dissolved	54	9890	182	360	ug/L		10000			1.05	20	D
Manganese, Dissolved	55	1040	1.42	5.00	ug/L		1050			0.55	20	D
Vanadium, Dissolved	51a	3.19	0.556	2.00	ug/L		3.18			0.31	20	D
Matrix Spike (BJL0138-MS1)						Source: 21K0382-07 Prepared: 06-Dec-2021 Analyzed: 06-Dec-2021 21:11						
Barium, Dissolved	135	30.5	0.114	0.500	ug/L	25.0	5.66	99.3	75-125			



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
10-Dec-2021 17:23

Analysis by: Analytical Resources, LLC

Metals and Metallic Compounds (dissolved) - Quality Control

Batch BJL0138 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike (BJL0138-MS1)		Source: 21K0382-07			Prepared: 06-Dec-2021		Analyzed: 06-Dec-2021 21:11					
Chromium, Dissolved	52	21.9	0.260	0.500	ug/L	25.0	0.453	85.8	75-125			
Lead, Dissolved	208	25.0	0.0513	0.100	ug/L	25.0	ND	99.9	75-125			
Silver, Dissolved	107	23.5	0.0220	0.200	ug/L	25.0	ND	94.1	75-125			
Arsenic, Dissolved	75a	28.3	0.0373	0.200	ug/L	25.0	5.41	91.7	75-125			
Cadmium, Dissolved	111	22.8	0.0300	0.100	ug/L	25.0	ND	91.3	75-125			
Cobalt, Dissolved	59	23.7	0.0178	0.200	ug/L	25.0	0.360	93.3	75-125			
Copper, Dissolved	63	23.0	0.173	0.500	ug/L	25.0	0.753	89.2	75-125			
Nickel, Dissolved	60	24.0	0.0792	0.500	ug/L	25.0	1.30	90.8	75-125			
Selenium, Dissolved	78	70.2	0.179	0.500	ug/L	80.0	ND	87.7	75-125			
Zinc, Dissolved	66	71.0	2.92	6.00	ug/L	80.0	ND	88.8	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike (BJL0138-MS2)		Source: 21K0382-07			Prepared: 06-Dec-2021		Analyzed: 07-Dec-2021 21:00					
Iron, Dissolved	54	15500	182	360	ug/L	5000	10000	110	75-125			D
Manganese, Dissolved	55	1100	1.42	5.00	ug/L	25.0	1050	204	75-125			HC, D
Vanadium, Dissolved	51a	28.9	0.556	2.00	ug/L	25.0	3.18	103	75-125			D

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BJL0138-MSD1)		Source: 21K0382-07			Prepared: 06-Dec-2021		Analyzed: 06-Dec-2021 21:16					
Barium, Dissolved	135	30.2	0.114	0.500	ug/L	25.0	5.66	98.2	75-125	0.95	20	
Chromium, Dissolved	52	21.9	0.260	0.500	ug/L	25.0	0.453	85.6	75-125	0.27	20	
Lead, Dissolved	208	24.8	0.0513	0.100	ug/L	25.0	ND	99.3	75-125	0.57	20	
Silver, Dissolved	107	23.4	0.0220	0.200	ug/L	25.0	ND	93.8	75-125	0.32	20	
Arsenic, Dissolved	75a	29.7	0.0373	0.200	ug/L	25.0	5.41	97.1	75-125	4.66	20	
Cadmium, Dissolved	111	23.3	0.0300	0.100	ug/L	25.0	ND	93.4	75-125	2.27	20	
Cobalt, Dissolved	59	24.6	0.0178	0.200	ug/L	25.0	0.360	96.8	75-125	3.58	20	
Copper, Dissolved	63	23.7	0.173	0.500	ug/L	25.0	0.753	91.6	75-125	2.65	20	
Nickel, Dissolved	60	25.6	0.0792	0.500	ug/L	25.0	1.30	97.1	75-125	6.30	20	
Selenium, Dissolved	78	71.3	0.179	0.500	ug/L	80.0	ND	89.1	75-125	1.59	20	
Zinc, Dissolved	66	74.5	2.92	6.00	ug/L	80.0	ND	93.1	75-125	4.79	20	

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BJL0138-MSD2)		Source: 21K0382-07			Prepared: 06-Dec-2021		Analyzed: 07-Dec-2021 21:05					
Iron, Dissolved	54	15100	182	360	ug/L	5000	10000	103	75-125	2.21	20	D
Manganese, Dissolved	55	1080	1.42	5.00	ug/L	25.0	1050	120	75-125	1.94	20	HC, D



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
10-Dec-2021 17:23

Analysis by: Analytical Resources, LLC

Metals and Metallic Compounds (dissolved) - Quality Control

Batch B JL0138 - REN EPA 600/4-79-020 4.1.4 HNO₃ matrix

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (B JL0138-MSD2)		Source: 21K0382-07		Prepared: 06-Dec-2021 Analyzed: 07-Dec-2021 21:05								
Vanadium, Dissolved	51a	28.3	0.556	2.00	ug/L	25.0	3.18	100	75-125	2.07	20	D

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
10-Dec-2021 17:23

Analysis by: Analytical Resources, LLC

Wet Chemistry - Quality Control

Batch BJK0626 - No Prep Wet Chem

Instrument: N/A

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0626-BLK1)					Prepared: 23-Nov-2021 Analyzed: 23-Nov-2021 15:11						
Sulfite	ND	1.4	1.4	mg/L							U
LCS (BJK0626-BS1)					Prepared: 23-Nov-2021 Analyzed: 23-Nov-2021 15:11						
Sulfite	4.1	1.4	1.4	mg/L	5.01		81.2	75-100			
Duplicate (BJK0626-DUP1)					Source: 21K0382-02 Prepared: 23-Nov-2021 Analyzed: 23-Nov-2021 15:11						
Sulfite	ND	1.4	1.4	mg/L		ND					H, U



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

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Project Manager: Meg Strong

Reported:
10-Dec-2021 17:23

Analysis by: Analytical Resources, LLC

Wet Chemistry - Quality Control

Batch BJK0631 - No Prep Wet Chem

Instrument: UV1800-2 Analyst: BF

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0631-BLK1)						Prepared: 23-Nov-2021 Analyzed: 23-Nov-2021 16:42					
Ferrous Iron	ND	0.040	0.040	mg/L							U
LCS (BJK0631-BS1)						Prepared: 23-Nov-2021 Analyzed: 23-Nov-2021 16:42					
Ferrous Iron	0.520	0.040	0.040	mg/L	0.500		104	90-110			
Duplicate (BJK0631-DUP1)						Source: 21K0382-02 Prepared: 23-Nov-2021 Analyzed: 23-Nov-2021 16:44					
Ferrous Iron	9.18	0.800	0.800	mg/L		8.96			2.43	20	D
Matrix Spike (BJK0631-MS1)						Source: 21K0382-02 Prepared: 23-Nov-2021 Analyzed: 23-Nov-2021 16:45					
Ferrous Iron	28.9	0.800	0.800	mg/L	20.0	8.96	99.7	75-125			D

Recovery limits for target analytes in MS/MSD QC samples are advisory only.


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 10-Dec-2021 17:23

Analysis by: Analytical Resources, LLC
Wet Chemistry - Quality Control
Batch BJK0657 - No Prep Wet Chem

Instrument: IC930 Analyst: BF

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0657-BLK1)						Prepared: 24-Nov-2021 Analyzed: 24-Nov-2021 17:08					
Chloride	ND	0.100	0.100	mg/L							U
Nitrate-N	ND	0.100	0.100	mg/L							U
Nitrite-N	ND	0.100	0.100	mg/L							U
Sulfate	ND	0.100	0.100	mg/L							U
LCS (BJK0657-BS1)						Prepared: 24-Nov-2021 Analyzed: 24-Nov-2021 17:28					
Chloride	4.65	0.100	0.100	mg/L	5.00		93.0	90-110			
Nitrate-N	4.61	0.100	0.100	mg/L	5.00		92.2	90-110			
Nitrite-N	5.33	0.100	0.100	mg/L	5.00		107	90-110			
Sulfate	4.81	0.100	0.100	mg/L	5.00		96.2	90-110			
Duplicate (BJK0657-DUP1)						Source: 21K0382-02 Prepared: 24-Nov-2021 Analyzed: 24-Nov-2021 18:08					
Chloride	7.91	0.100	0.100	mg/L		7.89			0.19	20	
Nitrate-N	0.207	0.100	0.100	mg/L		0.206			0.48	20	
Nitrite-N	ND	0.100	0.100	mg/L		ND					U
Sulfate	6.31	0.100	0.100	mg/L		6.31			0.05	20	
Matrix Spike (BJK0657-MS1)						Source: 21K0382-02 Prepared: 24-Nov-2021 Analyzed: 24-Nov-2021 18:28					
Chloride	9.95	0.100	0.100	mg/L	2.00	7.89	103	75-125			
Nitrate-N	2.18	0.100	0.100	mg/L	2.00	0.206	98.9	75-125			
Nitrite-N	1.97	0.100	0.100	mg/L	2.01	ND	98.1	75-125			
Sulfate	8.53	0.100	0.100	mg/L	2.00	6.31	111	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Analytical Report

Shannon & Wilson, Inc
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Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
10-Dec-2021 17:23

Certified Analyses included in this Report

Analyte	Certifications
<i>EPA 300.0 in Water</i>	
Chloride	DoD-ELAP,WADOE,WA-DW,NELAP
Nitrate-N	DoD-ELAP,WADOE,WA-DW,NELAP
Nitrite-N	DoD-ELAP,WADOE,WA-DW,NELAP
Sulfate	DoD-ELAP,WADOE,WA-DW,NELAP
<i>EPA 6020B in Water</i>	
Silver-107	WADOE,WA-DW,DoD-ELAP,NELAP
Barium-135	NELAP,WADOE,DoD-ELAP,ADEC
Barium-137	NELAP,WADOE,DoD-ELAP,ADEC
Chromium-52	NELAP,WADOE,DoD-ELAP,ADEC
Chromium-53	NELAP,WADOE,DoD-ELAP,ADEC
Iron-54	NELAP,WADOE,DoD-ELAP
Iron-57	NELAP,WADOE,DoD-ELAP
Manganese-55	NELAP,WADOE,DoD-ELAP
Lead-208	NELAP,WADOE,DoD-ELAP,ADEC
Vanadium-51a	NELAP,DoD-ELAP,WADOE,ADEC
Vanadium-51b	NELAP,DoD-ELAP,WADOE,ADEC
Silver-107	WA-DW,DoD-ELAP,NELAP
Barium-135	NELAP,WADOE,DoD-ELAP,ADEC
Barium-137	NELAP,WADOE,DoD-ELAP,ADEC
Chromium-52	NELAP,WADOE,DoD-ELAP,ADEC
Chromium-53	NELAP,WADOE,DoD-ELAP,ADEC
Iron-54	NELAP,WADOE,DoD-ELAP
Iron-57	NELAP,WADOE,DoD-ELAP
Manganese-55	NELAP,WADOE,DoD-ELAP
Lead-208	NELAP,WADOE,DoD-ELAP,ADEC
Vanadium-51a	NELAP,DoD-ELAP,WADOE,ADEC
Vanadium-51b	NELAP,DoD-ELAP,WADOE,ADEC
<i>EPA 6020B UCT-KED in Water</i>	
Arsenic-75a	WADOE,WA-DW,DoD-ELAP,ADEC,NELAP
Cadmium-111	NELAP,WADOE,DoD-ELAP,ADEC
Cadmium-114	NELAP,WADOE,DoD-ELAP,ADEC
Cobalt-59	NELAP,DoD-ELAP,WADOE
Copper-63	NELAP,WADOE,DoD-ELAP
Copper-65	NELAP,WADOE,DoD-ELAP


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Nickel-60	NELAP,WADOE,DoD-ELAP,ADEC
Nickel-62	NELAP,WADOE,DoD-ELAP,ADEC
Selenium-78	NELAP,WADOE,DoD-ELAP
Zinc-66	WADOE,WA-DW,DoD-ELAP
Zinc-67	WADOE,WA-DW,DoD-ELAP
Arsenic-75a	NELAP,WADOE,DoD-ELAP,ADEC
Cadmium-111	NELAP,WADOE,DoD-ELAP,ADEC
Cadmium-114	NELAP,WADOE,DoD-ELAP,ADEC
Cobalt-59	DoD-ELAP,NELAP,WADOE
Copper-63	NELAP,WADOE,DoD-ELAP
Copper-65	NELAP,WADOE,DoD-ELAP
Nickel-60	NELAP,WADOE,DoD-ELAP,ADEC
Nickel-62	NELAP,WADOE,DoD-ELAP,ADEC
Selenium-78	NELAP,WADOE,DoD-ELAP
Zinc-66	NELAP,WADOE,DoD-ELAP
Zinc-67	NELAP,WADOE,DoD-ELAP

EPA 7470A in Water

Mercury	WADOE,NELAP,DoD-ELAP
Mercury	WADOE,NELAP,DoD-ELAP

EPA 8082A in Water

Aroclor 1016	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1016 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1221	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1221 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1232	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1232 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1242	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1242 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1248	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1248 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1254	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1254 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1260	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1260 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1262	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1262 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1268	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1268 [2C]	WADOE,DoD-ELAP,NELAP,ADEC



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
10-Dec-2021 17:23

EPA 8260D in Water

Chloromethane	DoD-ELAP,ADEC,NELAP,WADOE
Vinyl Chloride	DoD-ELAP,ADEC,NELAP,WADOE
Bromomethane	DoD-ELAP,ADEC,NELAP,WADOE
Chloroethane	DoD-ELAP,ADEC,NELAP,WADOE
Trichlorofluoromethane	DoD-ELAP,ADEC,NELAP,WADOE
Acrolein	DoD-ELAP,NELAP,WADOE
1,1,2-Trichloro-1,2,2-Trifluoroethane	DoD-ELAP,ADEC,NELAP,WADOE
Acetone	DoD-ELAP,ADEC,NELAP,WADOE
1,1-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Iodomethane	DoD-ELAP,NELAP,WADOE
Methylene Chloride	DoD-ELAP,ADEC,NELAP,WADOE
Acrylonitrile	DoD-ELAP,NELAP,WADOE
Carbon Disulfide	DoD-ELAP,NELAP,WADOE
trans-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Vinyl Acetate	DoD-ELAP,NELAP,WADOE
1,1-Dichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
2-Butanone	DoD-ELAP,NELAP,WADOE
2,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
cis-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Chloroform	DoD-ELAP,ADEC,NELAP,WADOE
Bromochloromethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1,1-Trichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
Carbon tetrachloride	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
Benzene	DoD-ELAP,ADEC,NELAP,WADOE
Trichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
Bromodichloromethane	DoD-ELAP,ADEC,NELAP,WADOE
Dibromomethane	DoD-ELAP,ADEC,NELAP,WADOE
2-Chloroethyl vinyl ether	DoD-ELAP,ADEC,NELAP,WADOE
4-Methyl-2-Pentanone	DoD-ELAP,NELAP,WADOE
cis-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
Toluene	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
2-Hexanone	DoD-ELAP,NELAP,WADOE
1,1,2-Trichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,3-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE


 Shannon & Wilson, Inc
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Project: Lower Duwamish Q4

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10-Dec-2021 17:23

Tetrachloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Dibromochloromethane	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dibromoethane	DoD-ELAP,NELAP,WADOE
Chlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Ethylbenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,1,1,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,WADOE
m,p-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
o-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
Styrene	DoD-ELAP,NELAP,WADOE
Bromoform	DoD-ELAP,NELAP,WADOE
1,1,2,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,2,3-Trichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,4-Dichloro 2-Butene	DoD-ELAP,ADEC,NELAP,WADOE
n-Propylbenzene	DoD-ELAP,NELAP,WADOE
Bromobenzene	DoD-ELAP,NELAP,WADOE
Isopropyl Benzene	DoD-ELAP,NELAP,WADOE
2-Chlorotoluene	DoD-ELAP,ADEC,NELAP,WADOE
4-Chlorotoluene	DoD-ELAP,ADEC,NELAP,WADOE
t-Butylbenzene	DoD-ELAP,NELAP,WADOE
1,3,5-Trimethylbenzene	DoD-ELAP,NELAP,WADOE
1,2,4-Trimethylbenzene	DoD-ELAP,NELAP,WADOE
s-Butylbenzene	DoD-ELAP,NELAP,WADOE
4-Isopropyl Toluene	DoD-ELAP,NELAP,WADOE
1,3-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,4-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
n-Butylbenzene	DoD-ELAP,NELAP,WADOE
1,2-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dibromo-3-chloropropane	DoD-ELAP,ADEC,NELAP,WADOE
1,2,4-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Hexachloro-1,3-Butadiene	DoD-ELAP,ADEC,NELAP,WADOE
Naphthalene	DoD-ELAP,ADEC,NELAP,WADOE
1,2,3-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Dichlorodifluoromethane	DoD-ELAP,ADEC,NELAP,WADOE
Methyl tert-butyl Ether	DoD-ELAP,ADEC,NELAP,WADOE
n-Hexane	WADOE
2-Pentanone	WADOE

EPA 8260D-SIM in Water

Acrylonitrile	NELAP,WADOE
Vinyl chloride	NELAP,WADOE


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

Project: Lower Duwamish Q4

Project Number: 21-1-12596-012

Project Manager: Meg Strong

Reported:
 10-Dec-2021 17:23

1,1-Dichloroethene	NELAP,WADOE
cis-1,2-Dichloroethene	NELAP,WADOE
trans-1,2-Dichloroethene	NELAP,WADOE
Trichloroethene	NELAP,WADOE
Tetrachloroethene	NELAP,WADOE
1,1,2,2-Tetrachloroethane	NELAP,WADOE
1,2-Dichloroethane	NELAP,WADOE
Benzene	NELAP,WADOE

EPA 8270E-SIM in Water

Naphthalene	ADEC,DoD-ELAP,NELAP,WADOE
2-Methylnaphthalene	ADEC,DoD-ELAP,NELAP
1-Methylnaphthalene	ADEC,DoD-ELAP,NELAP,WADOE
Biphenyl	NELAP
Acenaphthylene	ADEC,DoD-ELAP,NELAP,WADOE
Acenaphthene	ADEC,DoD-ELAP,NELAP,WADOE
Dibenzofuran	ADEC,DoD-ELAP,NELAP
Fluorene	ADEC,DoD-ELAP,NELAP,WADOE
Phenanthrene	ADEC,DoD-ELAP,NELAP,WADOE
Anthracene	ADEC,DoD-ELAP,NELAP,WADOE
Carbazole	NELAP
Fluoranthene	ADEC,DoD-ELAP,NELAP,WADOE
Pyrene	ADEC,DoD-ELAP,NELAP,WADOE
Benzo(a)anthracene	ADEC,DoD-ELAP,NELAP,WADOE
Chrysene	ADEC,DoD-ELAP,NELAP,WADOE
Benzo(b)fluoranthene	ADEC,DoD-ELAP,NELAP,WADOE
Benzo(k)fluoranthene	ADEC,DoD-ELAP,NELAP,WADOE
Benzo(j)fluoranthene	ADEC,DoD-ELAP,NELAP,WADOE
Benzo(e)pyrene	NELAP
Benzo(a)pyrene	ADEC,DoD-ELAP,NELAP,WADOE
Perylene	ADEC,NELAP
Indeno(1,2,3-cd)pyrene	ADEC,DoD-ELAP,NELAP,WADOE
Dibenzo(a,h)anthracene	ADEC,DoD-ELAP,NELAP,WADOE
Benzo(g,h,i)perylene	ADEC,DoD-ELAP,NELAP,WADOE

EPA RSK-175 in Water

Methane	NELAP
Ethane	NELAP
Ethene	NELAP
Acetylene	NELAP


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 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
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NWTPH-Dx in Water

Diesel Range Organics (C12-C24)	DoD-ELAP,NELAP,WADOE
Diesel Range Organics (C10-C25)	DoD-ELAP,NELAP,WADOE
Diesel Range Organics (Tol-C18)	DoD-ELAP,NELAP,WADOE
Diesel Range Organics (C10-C24)	DoD-ELAP,NELAP,WADOE
Diesel Range Organics (C10-C28)	DoD-ELAP,NELAP,WADOE
Diesel Range Organics (C12-C22)	DoD-ELAP
Diesel Range Organics (C12-C25)	DoD-ELAP
Motor Oil Range Organics (C24-C38)	DoD-ELAP,NELAP,WADOE
Motor Oil Range Organics (C25-C36)	DoD-ELAP,NELAP,WADOE
Motor Oil Range Organics (C24-C40)	DoD-ELAP,NELAP,WADOE
Residual Range Organics (C23-C32)	DoD-ELAP
Mineral Spirits Range Organics (Tol-C12)	DoD-ELAP,NELAP,WADOE
Mineral Oil Range Organics (C16-C28)	DoD-ELAP,NELAP,WADOE
Kerosene Range Organics (Tol-C18)	DoD-ELAP,NELAP,WADOE
JP8 Range Organics (C8-C18)	DoD-ELAP,NELAP,WADOE
JP5 Range Organics (C10-C16)	DoD-ELAP,NELAP,WADOE
JP4 Range Organics (Tol-C14)	DoD-ELAP,NELAP,WADOE
Jet-A Range Organics (C10-C18)	DoD-ELAP,NELAP,WADOE
Creosote Range Organics (C12-C22)	DoD-ELAP,NELAP,WADOE
Bunker C Range Organics (C10-C38)	DoD-ELAP,NELAP,WADOE
Stoddard Range Organics (C8-C12)	DoD-ELAP,NELAP,WADOE
Transformer Oil Range Organics (C12-C28)	DoD-ELAP,NELAP,WADOE

NWTPHg in Water

Gasoline Range Organics (Tol-Nap)	WADOE,DoD-ELAP
Gasoline Range Organics (2MP-TMB)	WADOE,DoD-ELAP
Gasoline Range Organics (Tol-C12)	WADOE,DoD-ELAP
Gasoline Range Organics (C6-C10)	WADOE,ADEC,DoD-ELAP
Gasoline Range Organics (C5-C12)	WADOE,DoD-ELAP

SM 3500-Fe B-97 in Water

Ferrous Iron	WADOE,NELAP
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SM 4500-SO3 B-00 in Water

Sulfite	WADOE,NELAP
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Project: Lower Duwamish Q4
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Reported:
10-Dec-2021 17:23

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	17-015	03/28/2023
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	02/28/2022
NELAP	ORELAP - Oregon Laboratory Accreditation Program	WA100006-012	05/12/2022
WADOE	WA Dept of Ecology	C558	06/30/2022
WA-DW	Ecology - Drinking Water	C558	06/30/2022



Shannon & Wilson, Inc
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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
10-Dec-2021 17:23

Notes and Definitions

*	Flagged value is not within established control limits.
B	This analyte was detected in the method blank.
D	The reported value is from a dilution
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL)
H	Hold time violation - Hold time was exceeded.
HC	The natural concentration of the spiked analyte is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
J	Estimated concentration value detected below the reporting limit.
Q	Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20% RSD, <20% drift or minimum RRF)
U	This analyte is not detected above the reporting limit (RL) or if noted, not detected above the limit of detection (LOD).
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
[2C]	Indicates this result was quantified on the second column on a dual column analysis.



Analytical Resources, LLC
Analytical Chemists and Consultants

15 December 2021

Meg Strong
Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle, WA 98103-8636

RE: Lower Duwamish Q4

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)
21K0419

Associated SDG ID(s)
N/A

Shelly Fishel

Digitally signed by Shelly
Fishel
Date: 2021.12.15 19:13:02
-08'00'

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, LLC

Shelly Fishel, Project Manager

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



Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 2120419		Turn-around Requested: Standard		Page: 1 of 1	
ARI Client Company: Shannon + Wilson		Phone:		Date: 11/24/21	Ice Present? X
Client Contact: Sheshana Howard		No. of Coolers: 2		Cooler Temps: 5.4, 4.6	
Client Project Name: LDW		Analysis Requested			
Client Project #: 21-1-12596					
Sample ID	Date	Time	Matrix	No. Containers	Notes/Comments
MW-74 ms/msd - 20212411	11/24		GW		① As, Ba, Cr, Mn, Ni, Cd, Co, Cu, Fe, Pb, Hg, Se, Ag, V, Zn
MW-74-20212411	11/24	9:22	GW	26	① As, Mn, Ni, Cd, Cu, Pb, Hg, Se, Ag, Zn
TB-11 - 20212411	11/24	0924	W	5	ms/msd
MW-3-20212411	11/24	1103	GW	11	②
MW-4-20212411	11/24	1231	GW	9	③
MW-14-20212411	11/24	1240	GW	1	
Comments/Special Instructions • Metals are <u>not</u> field filtered • Reference project for detection limits Relinquished by: (Signature) <i>Rose Vogt</i> Printed Name: Rose Vogt Company: Shannon + Wilson Date & Time: 11/24/2021 1336 Received by: (Signature) <i>Arden Paist</i> Printed Name: Arden Paist Company: ARI Date & Time: 11/24/21 1336 Relinquished by: (Signature) Printed Name: Company: Date & Time: Received by: (Signature) Printed Name: Company: Date & Time:					



Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, notwithstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.



Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
15-Dec-2021 18:38

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-74-20212411	21K0419-01	Water	24-Nov-2021 09:22	24-Nov-2021 13:36
MW-74-20212411	21K0419-02	Water	24-Nov-2021 09:22	24-Nov-2021 13:36
TB-11-20212411	21K0419-03	Water	24-Nov-2021 09:24	24-Nov-2021 13:36
MW-3-20212411	21K0419-04	Water	24-Nov-2021 11:03	24-Nov-2021 13:36
MW-3-20212411	21K0419-05	Water	24-Nov-2021 11:03	24-Nov-2021 13:36
MW-4-20212411	21K0419-06	Water	24-Nov-2021 12:31	24-Nov-2021 13:36
MW-4-20212411	21K0419-07	Water	24-Nov-2021 12:31	24-Nov-2021 13:36
MW-14-20212411	21K0419-08	Water	24-Nov-2021 12:40	24-Nov-2021 13:36



Shannon & Wilson, Inc
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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
15-Dec-2021 18:38

Work Order Case Narrative

Client: Shannon & Wilson, Inc
Project: Lower Duwamish Q4
Work Order: 21K0419

Sample receipt

Samples as listed on the preceding page were received 24-Nov-2021 13:36 under ARI work order 21K0419. For details regarding sample receipt, please refer to the Cooler Receipt Form.

Gasoline by NWTPH-g (GC/MS)

The sample(s) were analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within control limits.

Sample specific QC was performed in association with sample 21K0419-01 in batch BJK0705. The matrix spike/matrix spike duplicate (MS/MSD) spike recoveries and relative percent difference (RPD) were within advisory control limits.

Volatiles - EPA Method SW8260D

The sample(s) were analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within control limits.


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
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Reported:
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Sample specific QC was performed in association with sample 21K0419-01 in batch BJK0705. The matrix spike/matrix spike duplicate (MS/MSD) spike recoveries and relative percent difference (RPD) were within advisory control limits.

Volatiles - EPA Method 8260D-SIM (Selected Ion Monitoring)

The sample(s) were analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within control limits.

Sample specific QC was performed in association with sample 21K0419-01 in batch BJK0740. The matrix spike/matrix spike duplicate (MS/MSD) percent recoveries and relative percent difference (RPD) were within advisory control limits.

Semivolatiles - EPA Method SW8270E

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements except Pentachlorophenol which was out of control low in the second source calibration verification SJL0062-SCV1.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits except Phenol-d5 which was out of control low in sample 21K0419-08 and has been flagged..

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within control limits.

Polynuclear Aromatic Hydrocarbons (PAH) - EPA Method SW8270E-SIM

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements except Benzo(g,h,i)perylene and surrogate Dibenzo(a,h)anthracene-d14 which were out of control low in the initial calibration verification SJL0008-ICV1. All samples


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 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
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which contain analyte have been flagged with a "Q" qualifier.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Sample specific QC was performed in association with sample 21K0419-01 in batch BJK0716. The matrix spike/matrix spike duplicate (MS/MSD) percent recoveries and relative percent difference (RPD) were within advisory control limits.

Total and Dissolved Metals - EPA Method 6020B

The sample(s) were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Sample specific QC was performed in association with sample 21K0419-01 in Total Metals batch BJL0102 and in association with sample 21K0419-02 in Dissolved Metals batch BJL0168. The duplicate (DUP) relative percent difference (RPD) were within advisory control limits. The matrix spike/matrix spike duplicate (MS/MSD) percent recoveries and relative percent difference (RPD) were within advisory control limits.

Total and Dissolved Mercury - EPA Method 7470/7471

The sample(s) were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Sample specific QC was performed in association with sample 21K0419-01 in Total Mercury batch BJL0270 and in association with sample 21K0419-07 in Dissolved Mercury batch BJL0169. The duplicate (DUP) relative percent difference (RPD) were within advisory control limits. The matrix spike/matrix spike duplicate (MS/MSD) percent recoveries and relative percent difference (RPD) were within advisory control limits.

Diesel/Heavy Oil Range Organics - WA-Ecology Method NW-TPHDx



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
15-Dec-2021 18:38

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Sample specific QC was performed in association with sample 21K0419-01 in batch BJK0711. The matrix spike/matrix spike duplicate (MS/MSD) percent recoveries and relative percent difference (RPD) were within advisory control limits.



WORK ORDER

21K0419

Samples will be discarded 90 days after submission of a final report unless other instructions are received.

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish Q4

Project Number: 21-1-12596-012

Preservation Confirmation

Container ID	Container Type	pH
21K0419-01 A	HDPE NM, 500 mL, 1:1 HNO ₃	LPASS
21K0419-01 B	HDPE NM, 500 mL, 1:1 HNO ₃	LPASS
21K0419-01 C	Glass NM, Amber, 500 mL	
21K0419-01 D	Glass NM, Amber, 500 mL	
21K0419-01 E	Glass NM, Amber, 500 mL	
21K0419-01 F	Glass NM, Amber, 500 mL	
21K0419-01 G	Glass NM, Amber, 500 mL	
21K0419-01 H	Glass NM, Amber, 500 mL	
21K0419-01 I	Glass NM, Amber, 500 mL	
21K0419-01 J	Glass NM, Amber, 500 mL	
21K0419-01 K	VOA Vial, Clear, 40 mL, HCL	
21K0419-01 L	VOA Vial, Clear, 40 mL, HCL	
21K0419-01 M	VOA Vial, Clear, 40 mL, HCL	
21K0419-01 N	VOA Vial, Clear, 40 mL, HCL	
21K0419-01 O	VOA Vial, Clear, 40 mL, HCL	
21K0419-01 P	VOA Vial, Clear, 40 mL, HCL	
21K0419-01 Q	VOA Vial, Clear, 40 mL, HCL	
21K0419-01 R	VOA Vial, Clear, 40 mL, HCL	
21K0419-01 S	VOA Vial, Clear, 40 mL, HCL	
21K0419-01 T	VOA Vial, Clear, 40 mL, HCL	
21K0419-01 U	VOA Vial, Clear, 40 mL, HCL	
21K0419-01 V	VOA Vial, Clear, 40 mL, HCL	
21K0419-01 W	VOA Vial, Clear, 40 mL, HCL	
21K0419-01 X	VOA Vial, Clear, 40 mL, HCL	
21K0419-02 A	HDPE NM, 500 mL	72 fail
21K0419-02 B	HDPE NM, 500 mL	72 fail
21K0419-03 A	VOA Vial, Clear, 40 mL, HCL	
21K0419-03 B	VOA Vial, Clear, 40 mL, HCL	
21K0419-03 C	VOA Vial, Clear, 40 mL, HCL	
21K0419-03 D	VOA Vial, Clear, 40 mL, HCL	Bubble
21K0419-03 E	VOA Vial, Clear, 40 mL, HCL	Bubble
21K0419-04 A	HDPE NM, 500 mL, 1:1 HNO ₃	LPASS
21K0419-04 B	Glass NM, Amber, 500 mL	
21K0419-04 C	Glass NM, Amber, 500 mL	



WORK ORDER

21K0419

Samples will be discarded 90 days after submission of a final report unless other instructions are received.

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish Q4

Project Number: 21-1-12596-012

21K0419-04 D	VOA Vial, Clear, 40 mL, HCL	
21K0419-04 E	VOA Vial, Clear, 40 mL, HCL	
21K0419-04 F	VOA Vial, Clear, 40 mL, HCL	
21K0419-04 G	VOA Vial, Clear, 40 mL, HCL	
21K0419-04 H	VOA Vial, Clear, 40 mL, HCL	
21K0419-04 I	VOA Vial, Clear, 40 mL, HCL	
21K0419-04 J	VOA Vial, Clear, 40 mL, HCL	
21K0419-05 A	HDPE NM, 500 mL	72 fail
21K0419-06 A	HDPE NM, 500 mL, 1:1 HNO3	72 pass
21K0419-06 B	Glass NM, Amber, 500 mL	
21K0419-06 C	Glass NM, Amber, 500 mL	
21K0419-06 D	VOA Vial, Clear, 40 mL, HCL	
21K0419-06 E	VOA Vial, Clear, 40 mL, HCL	
21K0419-06 F	VOA Vial, Clear, 40 mL, HCL	
21K0419-06 G	VOA Vial, Clear, 40 mL, HCL	
21K0419-06 H	VOA Vial, Clear, 40 mL, HCL	
21K0419-07 A	HDPE NM, 500 mL	72 fail
21K0419-08 A	Glass NM, Amber, 1000 mL	

Preservation Confirmed By

Date



Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Shannon + Wilson

Project Name: LDW

COC No(s): _____ (NA)

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Assigned ARI Job No: 21K0919

Tracking No: _____ (NA)

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of the cooler? _____

YES

(NO)

Were custody papers included with the cooler? _____

(YES)

NO

Were custody papers properly filled out (ink, signed, etc.) _____

(YES)

NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)

Time 1336

5.4 4.6

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: DOO 2565

Cooler Accepted by: AP

Date: 11/24/21 Time: 1336

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler? _____

(YES)

NO

What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: _____

Was sufficient ice used (if appropriate)? _____

NA

(YES)

NO

How were bottles sealed in plastic bags? _____

Individually

(Grouped)

Not

Did all bottles arrive in good condition (unbroken)? _____

(YES)

NO

Were all bottle labels complete and legible? _____

(YES)

NO

Did the number of containers listed on COC match with the number of containers received? _____

(YES)

NO

Did all bottle labels and tags agree with custody papers? _____

(YES)

NO

Were all bottles used correct for the requested analyses? _____

(YES)

NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs) ...

NA

(YES)

NO

Were all VOC vials free of air bubbles? _____

NA

(YES)

(NO)

Was sufficient amount of sample sent in each bottle? _____

(YES)

NO

Date VOC Trip Blank was made at ARI: _____

NA

11/17/21

Were the sample(s) split by ARI? _____

(NA)

YES

Date/Time: _____

Equipment: _____

Split by: _____

Samples Logged by: LB Date: 11/26/21 Time: 13:12 Labels checked by: _____

**** Notify Project Manager of discrepancies or concerns ****

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC
	<u>TB-11-20212411</u>		

Additional Notes, Discrepancies, & Resolutions:

NO analysis listed on COC 4
TB-11-20212411

By: LB

Date: 11/26/21



Analytical Resources, LLC
Analytical Chemists and Consultants

Printed: 11/26/2021 3:29:57PM

WORK ORDER

21K0419

Samples will be discarded 90 days after submission of a final report unless other instructions are received.

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish Q4

Project Number: 21-1-12596-012

Preservation Confirmation

Container ID	Container Type	pH
21K0419-01 A	HDPE NM, 500 mL, 1:1 HNO3	pass
21K0419-01 B	HDPE NM, 500 mL, 1:1 HNO3	pass
21K0419-01 C	Glass NM, Amber, 500 mL	
21K0419-01 D	Glass NM, Amber, 500 mL	
21K0419-01 E	Glass NM, Amber, 500 mL	
21K0419-01 F	Glass NM, Amber, 500 mL	
21K0419-01 G	Glass NM, Amber, 500 mL	
21K0419-01 H	Glass NM, Amber, 500 mL	
21K0419-01 I	Glass NM, Amber, 500 mL	
21K0419-01 J	Glass NM, Amber, 500 mL	
21K0419-01 K	VOA Vial, Clear, 40 mL, HCL	
21K0419-01 L	VOA Vial, Clear, 40 mL, HCL	
21K0419-01 M	VOA Vial, Clear, 40 mL, HCL	
21K0419-01 N	VOA Vial, Clear, 40 mL, HCL	
21K0419-01 O	VOA Vial, Clear, 40 mL, HCL	
21K0419-01 P	VOA Vial, Clear, 40 mL, HCL	
21K0419-01 Q	VOA Vial, Clear, 40 mL, HCL	
21K0419-01 R	VOA Vial, Clear, 40 mL, HCL	
21K0419-01 S	VOA Vial, Clear, 40 mL, HCL	
21K0419-01 T	VOA Vial, Clear, 40 mL, HCL	
21K0419-01 U	VOA Vial, Clear, 40 mL, HCL	
21K0419-01 V	VOA Vial, Clear, 40 mL, HCL	
21K0419-01 W	VOA Vial, Clear, 40 mL, HCL	
21K0419-01 X	VOA Vial, Clear, 40 mL, HCL	
21K0419-02 A	HDPE NM, 500 mL	72 fail
21K0419-02 B	HDPE NM, 500 mL	72 fail
21K0419-03 A	VOA Vial, Clear, 40 mL, HCL	
21K0419-03 B	VOA Vial, Clear, 40 mL, HCL	
21K0419-03 C	VOA Vial, Clear, 40 mL, HCL	
21K0419-03 D	VOA Vial, Clear, 40 mL, HCL	Bubble
21K0419-03 E	VOA Vial, Clear, 40 mL, HCL	Bubble
21K0419-04 A	HDPE NM, 500 mL, 1:1 HNO3	pass
21K0419-04 B	Glass NM, Amber, 500 mL	
21K0419-04 C	Glass NM, Amber, 500 mL	



Analytical Resources, LLC
Analytical Chemists and Consultants

Printed: 11/26/2021 3:29:57PM

WORK ORDER

21K0419

Samples will be discarded 90 days after submission of a final report unless other instructions are received.

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish Q4

Project Number: 21-1-12596-012

21K0419-04 D	VOA Vial, Clear, 40 mL, HCL	
21K0419-04 E	VOA Vial, Clear, 40 mL, HCL	
21K0419-04 F	VOA Vial, Clear, 40 mL, HCL	
21K0419-04 G	VOA Vial, Clear, 40 mL, HCL	
21K0419-04 H	VOA Vial, Clear, 40 mL, HCL	
21K0419-04 I	VOA Vial, Clear, 40 mL, HCL	
21K0419-04 J	VOA Vial, Clear, 40 mL, HCL	
21K0419-05 A	HDPE NM, 500 mL	72 fail (1)
21K0419-06 A	HDPE NM, 500 mL, 1:1 HNO3	72 pass
21K0419-06 B	Glass NM, Amber, 500 mL	
21K0419-06 C	Glass NM, Amber, 500 mL	
21K0419-06 D	VOA Vial, Clear, 40 mL, HCL	
21K0419-06 E	VOA Vial, Clear, 40 mL, HCL	
21K0419-06 F	VOA Vial, Clear, 40 mL, HCL	
21K0419-06 G	VOA Vial, Clear, 40 mL, HCL	
21K0419-06 H	VOA Vial, Clear, 40 mL, HCL	
21K0419-07 A	HDPE NM, 500 mL	72 fail (1)
21K0419-08 A	Glass NM, Amber, 1000 mL	

Preservation Confirmed By LB

Date 11/26/21

(1) Filtered at 0.45 microns
PRESERVED TO pH 5.2
with 0.75 mL ~~conc. HNO3~~
conc. HNO3 (510414)
NM 12/1/21

Reviewed By _____

Date _____

Page 2 of 2


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 15-Dec-2021 18:38

MW-74-20212411
21K0419-01 (Water)
Volatile Organic Compounds

Method: EPA 8260D

Sampled: 11/24/2021 09:22

Instrument: NT3 Analyst: PKC

Analyzed: 11/29/2021 20:04

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0419-01 O

Preparation Batch: BJK0705

Sample Size: 10 mL

Prepared: 11/29/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.05	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.05	0.20	10.4	ug/L	
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.05	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.14	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.08	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.22	0.60	ND	ug/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				<i>80-129 %</i>	<i>109</i>	<i>%</i>	
<i>Surrogate: Toluene-d8</i>				<i>80-120 %</i>	<i>102</i>	<i>%</i>	
<i>Surrogate: 4-Bromofluorobenzene</i>				<i>80-120 %</i>	<i>97.7</i>	<i>%</i>	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				<i>80-120 %</i>	<i>105</i>	<i>%</i>	



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
15-Dec-2021 18:38

MW-74-20212411

21K0419-01 (Water)

Volatile Organic Compounds

Method: NWTPHg

Sampled: 11/24/2021 09:22

Instrument: NT3 Analyst: PKC

Analyzed: 11/29/2021 20:04

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0419-01 O

Preparation Batch: BJK0705

Sample Size: 10 mL

Prepared: 11/29/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Gasoline Range Organics (Tol-Nap)	GRO	1	100	ND	ug/L	U
<i>Surrogate: Toluene-d8</i>			80-120 %	102	%	
<i>Surrogate: 4-Bromofluorobenzene</i>			80-120 %	97.7	%	



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
15-Dec-2021 18:38

MW-74-20212411

21K0419-01 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260D-SIM

Sampled: 11/24/2021 09:22

Instrument: NT16 Analyst: KOTT

Analyzed: 11/30/2021 17:11

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0419-01 T

Preparation Batch: BJK0740

Sample Size: 10 mL

Prepared: 11/30/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	5.01	20.0	ND	ng/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				80-129 %	105	%	
<i>Surrogate: Toluene-d8</i>				80-120 %	99.5	%	
<i>Surrogate: 4-Bromofluorobenzene</i>				75-125 %	97.7	%	


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 15-Dec-2021 18:38

MW-74-20212411
21K0419-01 (Water)
Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM

Sampled: 11/24/2021 09:22

Instrument: NT11 Analyst: VTS

Analyzed: 12/01/2021 18:11

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJK0716 Prepared: 11/30/2021	Sample Size: 500 mL Final Volume: 0.5 mL	Extract ID: 21K0419-01 F 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJL0016 Cleaned: 01-Dec-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21K0419-01 F 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	1	0.001	0.010	0.004	ug/L	J
2-Methylnaphthalene	91-57-6	1	0.001	0.010	0.006	ug/L	J
1-Methylnaphthalene	90-12-0	1	0.0009	0.010	0.006	ug/L	J
Acenaphthylene	208-96-8	1	0.002	0.010	0.002	ug/L	J
Acenaphthene	83-32-9	1	0.003	0.010	0.369	ug/L	
Dibenzofuran	132-64-9	1	0.002	0.010	0.002	ug/L	J
Fluorene	86-73-7	1	0.002	0.010	0.003	ug/L	J
Phenanthrene	85-01-8	1	0.001	0.010	0.004	ug/L	J
Anthracene	120-12-7	1	0.001	0.010	0.002	ug/L	J
Carbazole	86-74-8	1	0.001	0.010	ND	ug/L	U
Fluoranthene	206-44-0	1	0.002	0.010	0.002	ug/L	J
Pyrene	129-00-0	1	0.001	0.010	0.002	ug/L	J
Benzo(a)anthracene	56-55-3	1	0.0008	0.010	ND	ug/L	U
Chrysene	218-01-9	1	0.0009	0.010	ND	ug/L	U
Benzo(b)fluoranthene	205-99-2	1	0.0005	0.010	ND	ug/L	U
Benzo(k)fluoranthene	207-08-9	1	0.003	0.010	ND	ug/L	U
Benzo(j)fluoranthene	205-82-3	1	0.002	0.010	ND	ug/L	U
Benzofluoranthenes, Total		1	0.004	0.010	ND	ug/L	U
Benzo(a)pyrene	50-32-8	1	0.002	0.010	ND	ug/L	U
Perylene	1985-5-0	1	0.006	0.010	ND	ug/L	U
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.001	0.010	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	1	0.001	0.010	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	1	0.001	0.010	ND	ug/L	U
<i>Surrogate: 2-Methylnaphthalene-d10</i>					42-120 %	85.6 %	
<i>Surrogate: Dibenzo[a,h]anthracene-d14</i>					29-120 %	66.2 %	Q
<i>Surrogate: Fluoranthene-d10</i>					57-120 %	97.9 %	



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
15-Dec-2021 18:38

MW-74-20212411

21K0419-01 (Water)

Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 11/24/2021 09:22

Instrument: FID4 Analyst: TWC

Analyzed: 11/30/2021 19:07

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21K0419-01 C 01

Preparation Batch: BJK0711

Sample Size: 420 mL

Prepared: 11/29/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	0.119	0.451	mg/L	
HC ID: DRO						
Motor Oil Range Organics (C24-C38)	RRO	1	0.238	0.374	mg/L	
HC ID: MOTOR OIL						
Surrogate: o-Terphenyl			50-150 %	108	%	


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 15-Dec-2021 18:38

MW-74-20212411
21K0419-01 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 11/24/2021 09:22

Instrument: ICPMS2 Analyst: MCB

Analyzed: 12/07/2021 22:12

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21K0419-01 B 01

Preparation Batch: BJL0102

Sample Size: 25 mL

Prepared: 12/03/2021

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Barium	7440-39-3	1	0.114	0.500	23.4	ug/L	
Chromium	7440-47-3	1	0.260	0.500	1.51	ug/L	
Iron	7439-89-6	1	18.2	36.0	18100	ug/L	
Lead	7439-92-1	1	0.0513	0.100	0.0590	ug/L	J
Manganese	7439-96-5	50	7.10	25.0	3500	ug/L	D
Silver	7440-22-4	1	0.0220	0.200	ND	ug/L	U
Vanadium	7440-62-2	1	0.0556	0.200	4.52	ug/L	



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
15-Dec-2021 18:38

MW-74-20212411

21K0419-01 (Water)

Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 11/24/2021 09:22

Instrument: ICPMS2 Analyst: MCB

Analyzed: 12/07/2021 22:12

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21K0419-01 B 01

Preparation Batch: BJL0102

Sample Size: 25 mL

Prepared: 12/03/2021

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	1	0.0373	0.200	5.92	ug/L	
Cadmium	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Cobalt	7440-48-4	1	0.0178	0.200	0.339	ug/L	
Copper	7440-50-8	1	0.173	0.500	0.355	ug/L	J
Nickel	7440-02-0	1	0.0792	0.500	0.694	ug/L	
Selenium	7782-49-2	1	0.179	0.500	0.294	ug/L	J
Zinc	7440-66-6	1	2.92	6.00	ND	ug/L	U



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
15-Dec-2021 18:38

MW-74-20212411
21K0419-01RE1 (Water)

Metals and Metallic Compounds

Method: EPA 7470A

Sampled: 11/24/2021 09:22

Instrument: HYDRA Analyst: ML

Analyzed: 12/14/2021 14:57

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: TWM EPA 7470A
Preparation Batch: BJL0270
Prepared: 12/13/2021

Sample Size: 20 mL
Final Volume: 20 mL

Extract ID: 21K0419-01RE1 A

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000013	0.000100	ND	mg/L	U



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
15-Dec-2021 18:38

MW-74-20212411

21K0419-02 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 11/24/2021 09:22

Instrument: ICPMS2 Analyst: MCB

Analyzed: 12/08/2021 02:53

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21K0419-02 A 02
	Preparation Batch: BJL0168	Filtration Batch: BJL0036
	Prepared: 12/07/2021	Filtration Date: 12/01/2021 15:23
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Barium, Dissolved	7440-39-3	1	0.114	0.500	5.03	ug/L	
Chromium, Dissolved	7440-47-3	1	0.260	0.500	0.524	ug/L	
Iron, Dissolved	7439-89-6	1	18.2	36.0	296	ug/L	
Lead, Dissolved	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Manganese, Dissolved	7439-96-5	50	7.10	25.0	3370	ug/L	D
Silver, Dissolved	7440-22-4	1	0.0220	0.200	ND	ug/L	U
Vanadium, Dissolved	7440-62-2	1	0.0556	0.200	0.441	ug/L	


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 15-Dec-2021 18:38

MW-74-20212411
21K0419-02 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 11/24/2021 09:22

Instrument: ICPMS2 Analyst: MCB

Analyzed: 12/09/2021 20:00

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21K0419-02 A 02
	Preparation Batch: BJL0168	Filtration Batch: BJL0036
	Prepared: 12/07/2021	Filtration Date: 12/01/2021 15:23
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic, Dissolved	7440-38-2	1	0.0373	0.200	1.72	ug/L	
Cadmium, Dissolved	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Cobalt, Dissolved	7440-48-4	1	0.0178	0.200	0.194	ug/L	J
Copper, Dissolved	7440-50-8	1	0.173	0.500	ND	ug/L	U
Nickel, Dissolved	7440-02-0	1	0.0792	0.500	0.405	ug/L	J
Selenium, Dissolved	7782-49-2	1	0.179	0.500	0.266	ug/L	J
Zinc, Dissolved	7440-66-6	1	2.92	6.00	ND	ug/L	U



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
15-Dec-2021 18:38

MW-74-20212411

21K0419-02 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 7470A

Sampled: 11/24/2021 09:22

Instrument: HYDRA Analyst: ML

Analyzed: 12/09/2021 13:15

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21K0419-02 A 01

Preparation Batch: BJL0169

Sample Size: 20 mL

Filtration Batch: BJL0036

Prepared: 12/07/2021

Final Volume: 20 mL

Filtration Date: 12/01/2021 15:23

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury, Dissolved	7439-97-6	1	0.000013	0.000100	0.000023	mg/L	J



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
15-Dec-2021 18:38

TB-11-20212411
21K0419-03 (Water)

Volatile Organic Compounds

Method: EPA 8260D

Sampled: 11/24/2021 09:24

Instrument: NT3 Analyst: PKC

Analyzed: 11/29/2021 14:58

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0419-03 E

Preparation Batch: BJK0705

Sample Size: 10 mL

Prepared: 11/29/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.05	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.05	0.20	0.06	ug/L	J
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.05	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.14	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.08	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.22	0.60	ND	ug/L	U
Methyl tert-butyl Ether	1634-04-4	1	0.14	0.50	ND	ug/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>					<i>80-129 %</i>	<i>108 %</i>	
<i>Surrogate: Toluene-d8</i>					<i>80-120 %</i>	<i>103 %</i>	
<i>Surrogate: 4-Bromofluorobenzene</i>					<i>80-120 %</i>	<i>98.9 %</i>	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>					<i>80-120 %</i>	<i>102 %</i>	



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
15-Dec-2021 18:38

TB-11-20212411
21K0419-03 (Water)

Volatile Organic Compounds

Method: NWTPHg

Sampled: 11/24/2021 09:24

Instrument: NT3 Analyst: PKC

Analyzed: 11/29/2021 14:58

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0419-03 E

Preparation Batch: BJK0705

Sample Size: 10 mL

Prepared: 11/29/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Gasoline Range Organics (Tol-Nap)	GRO	1	100	ND	ug/L	U
<i>Surrogate: Toluene-d8</i>			80-120 %	103	%	
<i>Surrogate: 4-Bromofluorobenzene</i>			80-120 %	98.9	%	



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
15-Dec-2021 18:38

TB-11-20212411
21K0419-03 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260D-SIM

Sampled: 11/24/2021 09:24

Instrument: NT16 Analyst: KOTT

Analyzed: 11/30/2021 18:14

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0419-03 B

Preparation Batch: BJK0740

Sample Size: 10 mL

Prepared: 11/30/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	5.01	20.0	ND	ng/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				80-129 %	102	%	
<i>Surrogate: Toluene-d8</i>				80-120 %	99.4	%	
<i>Surrogate: 4-Bromofluorobenzene</i>				75-125 %	97.1	%	


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 15-Dec-2021 18:38

MW-3-20212411
21K0419-04 (Water)
Volatile Organic Compounds

Method: EPA 8260D

Sampled: 11/24/2021 11:03

Instrument: NT3 Analyst: PKC

Analyzed: 11/29/2021 20:29

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0419-04 G

Preparation Batch: BJK0705

Sample Size: 10 mL

Prepared: 11/29/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.05	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.05	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.05	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.14	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.08	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.22	0.60	ND	ug/L	U
Methyl tert-butyl Ether	1634-04-4	1	0.14	0.50	ND	ug/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				80-129 %	121	%	
<i>Surrogate: Toluene-d8</i>				80-120 %	101	%	
<i>Surrogate: 4-Bromofluorobenzene</i>				80-120 %	102	%	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				80-120 %	101	%	



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
15-Dec-2021 18:38

MW-3-20212411
21K0419-04 (Water)

Volatile Organic Compounds

Method: NWTPHg

Sampled: 11/24/2021 11:03

Instrument: NT3 Analyst: PKC

Analyzed: 11/29/2021 20:29

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0419-04 G

Preparation Batch: BJK0705

Sample Size: 10 mL

Prepared: 11/29/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Gasoline Range Organics (Tol-Nap)	GRO	1	100	ND	ug/L	U
<i>Surrogate: Toluene-d8</i>			80-120 %	101	%	
<i>Surrogate: 4-Bromofluorobenzene</i>			80-120 %	102	%	



Analytical Resources, LLC
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Analytical Report

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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
15-Dec-2021 18:38

MW-3-20212411
21K0419-04 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260D-SIM

Sampled: 11/24/2021 11:03

Instrument: NT16 Analyst: KOTT

Analyzed: 11/30/2021 18:35

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0419-04 F

Preparation Batch: BJK0740

Sample Size: 10 mL

Prepared: 11/30/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	5.01	20.0	ND	ng/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				80-129 %	105	%	
<i>Surrogate: Toluene-d8</i>				80-120 %	99.3	%	
<i>Surrogate: 4-Bromofluorobenzene</i>				75-125 %	96.9	%	



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Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
15-Dec-2021 18:38

MW-3-20212411
21K0419-04 (Water)

Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 11/24/2021 11:03

Instrument: FID4 Analyst: TWC

Analyzed: 11/30/2021 20:05

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21K0419-04 B 01

Preparation Batch: BJK0711

Sample Size: 420 mL

Prepared: 11/29/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	0.119	ND	mg/L	U
Motor Oil Range Organics (C24-C38)	RRO	1	0.238	ND	mg/L	U
<i>Surrogate: o-Terphenyl</i>			<i>50-150 %</i>	<i>110</i>	<i>%</i>	



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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
15-Dec-2021 18:38

MW-3-20212411
21K0419-04 (Water)

Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 11/24/2021 11:03

Instrument: ICPMS2 Analyst: MCB

Analyzed: 12/08/2021 01:56

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO₃ matrix

Extract ID: 21K0419-04 A 01

Preparation Batch: BJL0102

Sample Size: 25 mL

Prepared: 12/03/2021

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Lead	7439-92-1	1	0.0513	0.100	0.0790	ug/L	J



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Analytical Report

Shannon & Wilson, Inc
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Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
15-Dec-2021 18:38

MW-3-20212411
21K0419-05 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 11/24/2021 11:03

Instrument: ICPMS2 Analyst: MCB

Analyzed: 12/08/2021 01:50

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21K0419-05 A 02

Preparation Batch: BJL0168

Sample Size: 25 mL

Filtration Batch: BJL0036

Prepared: 12/07/2021

Final Volume: 25 mL

Filtration Date: 12/01/2021 15:23

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Lead, Dissolved	7439-92-1	1	0.0513	0.100	ND	ug/L	U



Analytical Report

Shannon & Wilson, Inc
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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
15-Dec-2021 18:38

MW-4-20212411
21K0419-06 (Water)

Volatile Organic Compounds

Method: EPA 8260D

Sampled: 11/24/2021 12:31

Instrument: NT3 Analyst: PKC

Analyzed: 11/29/2021 20:54

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0419-06 G

Preparation Batch: BJK0705

Sample Size: 10 mL

Prepared: 11/29/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Benzene	71-43-2	1	0.05	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.05	0.20	0.05	ug/L	J
Ethylbenzene	100-41-4	1	0.05	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.14	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.08	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.22	0.60	ND	ug/L	U
Methyl tert-butyl Ether	1634-04-4	1	0.14	0.50	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4				80-129 %	108	%	
Surrogate: Toluene-d8				80-120 %	102	%	
Surrogate: 4-Bromofluorobenzene				80-120 %	96.7	%	
Surrogate: 1,2-Dichlorobenzene-d4				80-120 %	107	%	



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Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
15-Dec-2021 18:38

MW-4-20212411
21K0419-06 (Water)

Volatile Organic Compounds

Method: NWTPHg

Sampled: 11/24/2021 12:31

Instrument: NT3 Analyst: PKC

Analyzed: 11/29/2021 20:54

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21K0419-06 G

Preparation Batch: BJK0705

Sample Size: 10 mL

Prepared: 11/29/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Gasoline Range Organics (Tol-Nap)	GRO	1	100	139	ug/L	
HC ID: GAS						
Surrogate: Toluene-d8			80-120 %	102	%	
Surrogate: 4-Bromofluorobenzene			80-120 %	96.7	%	



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Analytical Report

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Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
15-Dec-2021 18:38

MW-4-20212411
21K0419-06 (Water)

Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 11/24/2021 12:31

Instrument: FID4 Analyst: TWC

Analyzed: 11/30/2021 20:25

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21K0419-06 B 01

Preparation Batch: BJK0711

Sample Size: 500 mL

Prepared: 11/29/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	0.100	ND	mg/L	U
Motor Oil Range Organics (C24-C38)	RRO	1	0.200	ND	mg/L	U
<i>Surrogate: o-Terphenyl</i>			<i>50-150 %</i>	<i>105</i>	<i>%</i>	



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Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
15-Dec-2021 18:38

MW-4-20212411
21K0419-06 (Water)

Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 11/24/2021 12:31

Instrument: ICPMS2 Analyst: MCB

Analyzed: 12/07/2021 22:07

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BJL0102 Sample Size: 25 mL
Prepared: 12/03/2021 Final Volume: 25 mL

Extract ID: 21K0419-06 A 01

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Lead	7439-92-1	1	0.0513	0.100	0.393	ug/L	
Manganese	7439-96-5	1	0.142	0.500	47.3	ug/L	
Silver	7440-22-4	1	0.0220	0.200	ND	ug/L	U


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 15-Dec-2021 18:38

MW-4-20212411
21K0419-06 (Water)
Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 11/24/2021 12:31

Instrument: ICPMS2 Analyst: MCB

Analyzed: 12/08/2021 18:07

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJL0102 Sample Size: 25 mL
 Prepared: 12/03/2021 Final Volume: 25 mL

Extract ID: 21K0419-06 A 01

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	2	0.0746	0.400	3.21	ug/L	D
Cadmium	7440-43-9	1	0.0300	0.100	0.104	ug/L	
Copper	7440-50-8	1	0.173	0.500	4.88	ug/L	
Nickel	7440-02-0	1	0.0792	0.500	2.00	ug/L	
Selenium	7782-49-2	1	0.179	0.500	0.322	ug/L	J
Zinc	7440-66-6	1	2.92	6.00	3.14	ug/L	J



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Analytical Report

Shannon & Wilson, Inc
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Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
15-Dec-2021 18:38

MW-4-20212411
21K0419-06RE1 (Water)

Metals and Metallic Compounds

Method: EPA 7470A

Sampled: 11/24/2021 12:31

Instrument: HYDRA Analyst: ML

Analyzed: 12/14/2021 15:06

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21K0419-06RE1 A

Preparation Batch: BJL0270

Sample Size: 20 mL

Prepared: 12/13/2021

Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000013	0.000100	ND	mg/L	U



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Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
15-Dec-2021 18:38

MW-4-20212411

21K0419-07 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 11/24/2021 12:31

Instrument: ICPMS2 Analyst: MCB

Analyzed: 12/08/2021 02:49

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21K0419-07 A 02

Preparation Batch: BJL0168

Sample Size: 25 mL

Filtration Batch: BJL0036

Prepared: 12/07/2021

Final Volume: 25 mL

Filtration Date: 12/01/2021 15:23

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Lead, Dissolved	7439-92-1	1	0.0513	0.100	0.0530	ug/L	J
Manganese, Dissolved	7439-96-5	1	0.142	0.500	4.43	ug/L	
Silver, Dissolved	7440-22-4	1	0.0220	0.200	ND	ug/L	U


 Shannon & Wilson, Inc
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 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 15-Dec-2021 18:38

MW-4-20212411
21K0419-07 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 11/24/2021 12:31

Instrument: ICPMS2 Analyst: MCB

Analyzed: 12/08/2021 18:02

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21K0419-07 A 02

Preparation Batch: BJL0168

Sample Size: 25 mL

Filtration Batch: BJL0036

Prepared: 12/07/2021

Final Volume: 25 mL

Filtration Date: 12/01/2021 15:23

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic, Dissolved	7440-38-2	1	0.0373	0.200	2.26	ug/L	
Cadmium, Dissolved	7440-43-9	1	0.0300	0.100	0.0400	ug/L	J
Copper, Dissolved	7440-50-8	1	0.173	0.500	3.36	ug/L	
Nickel, Dissolved	7440-02-0	1	0.0792	0.500	1.34	ug/L	
Selenium, Dissolved	7782-49-2	1	0.179	0.500	0.213	ug/L	J
Zinc, Dissolved	7440-66-6	1	2.92	6.00	ND	ug/L	U



Analytical Resources, LLC
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Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
15-Dec-2021 18:38

MW-4-20212411
21K0419-07 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 7470A

Sampled: 11/24/2021 12:31

Instrument: HYDRA Analyst: ML

Analyzed: 12/09/2021 13:06

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21K0419-07 A 01

Preparation Batch: BJL0169

Sample Size: 20 mL

Filtration Batch: BJL0036

Prepared: 12/07/2021

Final Volume: 20 mL

Filtration Date: 12/01/2021 15:23

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury, Dissolved	7439-97-6	1	0.000013	0.000100	0.000027	mg/L	J


 Shannon & Wilson, Inc
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 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 15-Dec-2021 18:38

MW-14-20212411
21K0419-08 (Water)
Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 11/24/2021 12:40

Instrument: NT10 Analyst: VTS

Analyzed: 12/06/2021 15:52

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21K0419-08 A 01

Preparation Batch: BJK0706

Sample Size: 1000 mL

Prepared: 11/29/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
1,4-Dichlorobenzene	106-46-7	1	0.03	0.2	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.03	0.2	ND	ug/L	U
2,4-Dimethylphenol	105-67-9	1	0.3	1.0	ND	ug/L	U
Benzoic acid	65-85-0	1	0.1	2.0	0.6	ug/L	J
N-Nitrosodiphenylamine	86-30-6	1	0.03	0.2	ND	ug/L	U
Pentachlorophenol	87-86-5	1	0.1	1.0	ND	ug/L	U
Di-n-Butylphthalate	84-74-2	1	0.05	0.2	ND	ug/L	U
Butylbenzylphthalate	85-68-7	1	0.07	0.2	ND	ug/L	U
bis(2-Ethylhexyl)phthalate	117-81-7	1	0.2	0.2	ND	ug/L	U

Surrogate: 2-Fluorophenol

30-160 %

46.4 %

Surrogate: Phenol-d5

30-160 %

25.2 %

*

Surrogate: 2-Chlorophenol-d4

30-160 %

77.1 %

Surrogate: 1,2-Dichlorobenzene-d4

30-160 %

68.2 %

Surrogate: Nitrobenzene-d5

30-160 %

86.9 %

Surrogate: 2-Fluorobiphenyl

30-160 %

88.4 %

Surrogate: 2,4,6-Tribromophenol

30-160 %

92.8 %

Surrogate: p-Terphenyl-d14

30-160 %

89.8 %



Analytical Report

Shannon & Wilson, Inc
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Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
15-Dec-2021 18:38

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - Quality Control

Batch BJK0705 - EPA 5030C (Purge and Trap)

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0705-BLK1)		Prepared: 29-Nov-2021 Analyzed: 29-Nov-2021 12:29								
Gasoline Range Organics (Tol-Nap)	ND	100	ug/L							U
Surrogate: Toluene-d8	5.06		ug/L	5.00		101	80-120			
Surrogate: 4-Bromofluorobenzene	5.04		ug/L	5.00		101	80-120			

Blank (BJK0705-BLK2)		Prepared: 29-Nov-2021 Analyzed: 29-Nov-2021 12:29								
Vinyl Chloride	ND	0.08	0.20	ug/L						U
1,1-Dichloroethene	ND	0.08	0.20	ug/L						U
trans-1,2-Dichloroethene	ND	0.07	0.20	ug/L						U
cis-1,2-Dichloroethene	ND	0.08	0.20	ug/L						U
Benzene	ND	0.05	0.20	ug/L						U
Trichloroethene	ND	0.07	0.20	ug/L						U
Toluene	ND	0.05	0.20	ug/L						U
Tetrachloroethene	ND	0.09	0.20	ug/L						U
Ethylbenzene	ND	0.05	0.20	ug/L						U
m,p-Xylene	ND	0.14	0.40	ug/L						U
o-Xylene	ND	0.08	0.20	ug/L						U
Xylenes, total	ND	0.22	0.60	ug/L						U
Methyl tert-butyl Ether	ND	0.14	0.50	ug/L						U
Surrogate: 1,2-Dichloroethane-d4	5.12		ug/L	5.00		102	80-129			
Surrogate: Toluene-d8	5.06		ug/L	5.00		101	80-120			
Surrogate: 4-Bromofluorobenzene	5.04		ug/L	5.00		101	80-120			
Surrogate: 1,2-Dichlorobenzene-d4	4.85		ug/L	5.00		97.1	80-120			

LCS (BJK0705-BS1)		Prepared: 29-Nov-2021 Analyzed: 29-Nov-2021 10:23								
Gasoline Range Organics (Tol-Nap)	961	100	ug/L	1000		96.1	72-128			
Surrogate: Toluene-d8	5.19		ug/L	5.00		104	80-120			
Surrogate: 4-Bromofluorobenzene	4.98		ug/L	5.00		99.6	80-120			

LCS (BJK0705-BS2)		Prepared: 29-Nov-2021 Analyzed: 29-Nov-2021 10:48								
Vinyl Chloride	8.40	0.08	0.20	ug/L	10.0	84.0	66-133			
1,1-Dichloroethene	9.78	0.08	0.20	ug/L	10.0	97.8	69-135			
trans-1,2-Dichloroethene	9.08	0.07	0.20	ug/L	10.0	90.8	78-128			
cis-1,2-Dichloroethene	9.53	0.08	0.20	ug/L	10.0	95.3	80-121			
Benzene	9.85	0.05	0.20	ug/L	10.0	98.5	80-120			



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
15-Dec-2021 18:38

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - Quality Control

Batch BJK0705 - EPA 5030C (Purge and Trap)

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJK0705-BS2)						Prepared: 29-Nov-2021	Analyzed: 29-Nov-2021 10:48				
Trichloroethene	9.71	0.07	0.20	ug/L	10.0		97.1	80-120			
Toluene	9.78	0.05	0.20	ug/L	10.0		97.8	80-120			
Tetrachloroethene	9.65	0.09	0.20	ug/L	10.0		96.5	80-120			
Ethylbenzene	9.45	0.05	0.20	ug/L	10.0		94.5	80-120			
m,p-Xylene	19.5	0.14	0.40	ug/L	20.0		97.5	80-121			
o-Xylene	9.53	0.08	0.20	ug/L	10.0		95.3	80-121			
Xylenes, total	29.0	0.22	0.60	ug/L	30.0		96.8	76-127			
Methyl tert-butyl Ether	9.77	0.14	0.50	ug/L	10.0		97.7	71-132			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	5.14			ug/L	5.00		103	80-129			
<i>Surrogate: Toluene-d8</i>	5.24			ug/L	5.00		105	80-120			
<i>Surrogate: 4-Bromofluorobenzene</i>	5.04			ug/L	5.00		101	80-120			
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	5.22			ug/L	5.00		104	80-120			
LCS Dup (BJK0705-BSD1)						Prepared: 29-Nov-2021	Analyzed: 29-Nov-2021 11:13				
Gasoline Range Organics (Tol-Nap)	998		100	ug/L	1000		99.8	72-128	3.73	30	
<i>Surrogate: Toluene-d8</i>	5.05			ug/L	5.00		101	80-120			
<i>Surrogate: 4-Bromofluorobenzene</i>	5.09			ug/L	5.00		102	80-120			
LCS Dup (BJK0705-BSD2)						Prepared: 29-Nov-2021	Analyzed: 29-Nov-2021 11:39				
Vinyl Chloride	9.37	0.08	0.20	ug/L	10.0		93.7	66-133	11.00	30	
1,1-Dichloroethene	9.94	0.08	0.20	ug/L	10.0		99.4	69-135	1.61	30	
trans-1,2-Dichloroethene	9.72	0.07	0.20	ug/L	10.0		97.2	78-128	6.84	30	
cis-1,2-Dichloroethene	10.2	0.08	0.20	ug/L	10.0		102	80-121	6.55	30	
Benzene	10.3	0.05	0.20	ug/L	10.0		103	80-120	4.13	30	
Trichloroethene	10.3	0.07	0.20	ug/L	10.0		103	80-120	5.43	30	
Toluene	10.2	0.05	0.20	ug/L	10.0		102	80-120	4.26	30	
Tetrachloroethene	10.6	0.09	0.20	ug/L	10.0		106	80-120	9.18	30	
Ethylbenzene	10.4	0.05	0.20	ug/L	10.0		104	80-120	9.73	30	
m,p-Xylene	21.4	0.14	0.40	ug/L	20.0		107	80-121	9.14	30	
o-Xylene	10.2	0.08	0.20	ug/L	10.0		102	80-121	6.90	30	
Xylenes, total	31.6	0.22	0.60	ug/L	30.0		105	76-127	8.41	30	
Methyl tert-butyl Ether	10.2	0.14	0.50	ug/L	10.0		102	71-132	4.69	30	
<i>Surrogate: 1,2-Dichloroethane-d4</i>	4.86			ug/L	5.00		97.1	80-129			
<i>Surrogate: Toluene-d8</i>	5.01			ug/L	5.00		100	80-120			



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
15-Dec-2021 18:38

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - Quality Control

Batch BJK0705 - EPA 5030C (Purge and Trap)

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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LCS Dup (BJK0705-BSD2)

Prepared: 29-Nov-2021 Analyzed: 29-Nov-2021 11:39

Surrogate: 4-Bromofluorobenzene	5.18			ug/L	5.00		104	80-120			
Surrogate: 1,2-Dichlorobenzene-d4	4.99			ug/L	5.00		99.7	80-120			

Matrix Spike (BJK0705-MS1)

Source: 21K0419-01

Prepared: 29-Nov-2021 Analyzed: 29-Nov-2021 21:20

Gasoline Range Organics (Tol-Nap)	964		100	ug/L	1000	ND	88.6	72-128			
Surrogate: Toluene-d8	5.19			ug/L	5.00	5.12	104	80-120			
Surrogate: 4-Bromofluorobenzene	4.71			ug/L	5.00	4.89	94.2	80-120			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike (BJK0705-MS2)

Source: 21K0419-01

Prepared: 29-Nov-2021 Analyzed: 29-Nov-2021 22:10

Vinyl Chloride	8.37	0.08	0.20	ug/L	10.0	ND	83.7	66-133			
1,1-Dichloroethene	10.7	0.08	0.20	ug/L	10.0	ND	107	69-135			
trans-1,2-Dichloroethene	9.46	0.07	0.20	ug/L	10.0	ND	94.6	78-128			
cis-1,2-Dichloroethene	9.85	0.08	0.20	ug/L	10.0	ND	98.5	80-121			
Benzene	10.2	0.05	0.20	ug/L	10.0	ND	102	80-120			
Trichloroethene	9.63	0.07	0.20	ug/L	10.0	ND	96.3	80-120			
Toluene	20.5	0.05	0.20	ug/L	10.0	10.4	101	80-120			
Tetrachloroethene	9.36	0.09	0.20	ug/L	10.0	ND	93.6	80-120			
Ethylbenzene	9.76	0.05	0.20	ug/L	10.0	ND	97.6	80-120			
m,p-Xylene	19.6	0.14	0.40	ug/L	20.0	ND	98.1	80-121			
o-Xylene	9.50	0.08	0.20	ug/L	10.0	ND	95.0	80-121			
Xylenes, total	29.1	0.22	0.60	ug/L	30.0	ND	97.1	76-127			
Methyl tert-butyl Ether	10.1	0.14	0.50	ug/L	10.0	ND	101	71-132			
Surrogate: 1,2-Dichloroethane-d4	5.26			ug/L	5.00	5.44	105	80-129			
Surrogate: Toluene-d8	5.15			ug/L	5.00	5.12	103	80-120			
Surrogate: 4-Bromofluorobenzene	5.06			ug/L	5.00	4.89	101	80-120			
Surrogate: 1,2-Dichlorobenzene-d4	5.09			ug/L	5.00	5.25	102	80-120			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BJK0705-MSD1)

Source: 21K0419-01

Prepared: 29-Nov-2021 Analyzed: 29-Nov-2021 21:45

Gasoline Range Organics (Tol-Nap)	982		100	ug/L	1000	ND	90.5	72-128	1.89	30	
Surrogate: Toluene-d8	5.15			ug/L	5.00	5.12	103	80-120			
Surrogate: 4-Bromofluorobenzene	4.85			ug/L	5.00	4.89	97.1	80-120			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 15-Dec-2021 18:38

Analysis by: Analytical Resources, LLC
Volatile Organic Compounds - Quality Control
Batch BJK0705 - EPA 5030C (Purge and Trap)

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (BJK0705-MSD2)		Source: 21K0419-01		Prepared: 29-Nov-2021		Analyzed: 29-Nov-2021 22:35				
Vinyl Chloride	8.57	0.08	0.20	ug/L	10.0	ND	85.7	66-133	2.37	30
1,1-Dichloroethene	11.0	0.08	0.20	ug/L	10.0	ND	110	69-135	2.02	30
trans-1,2-Dichloroethene	9.63	0.07	0.20	ug/L	10.0	ND	96.3	78-128	1.79	30
cis-1,2-Dichloroethene	10.0	0.08	0.20	ug/L	10.0	ND	100	80-121	1.51	30
Benzene	10.4	0.05	0.20	ug/L	10.0	ND	104	80-120	2.47	30
Trichloroethene	10.0	0.07	0.20	ug/L	10.0	ND	100	80-120	4.11	30
Toluene	21.0	0.05	0.20	ug/L	10.0	10.4	106	80-120	2.18	30
Tetrachloroethene	9.75	0.09	0.20	ug/L	10.0	ND	97.5	80-120	4.06	30
Ethylbenzene	9.92	0.05	0.20	ug/L	10.0	ND	99.2	80-120	1.68	30
m,p-Xylene	20.3	0.14	0.40	ug/L	20.0	ND	102	80-121	3.46	30
o-Xylene	9.84	0.08	0.20	ug/L	10.0	ND	98.4	80-121	3.48	30
Xylenes, total	30.2	0.22	0.60	ug/L	30.0	ND	101	76-127	3.47	30
Methyl tert-butyl Ether	9.98	0.14	0.50	ug/L	10.0	ND	99.8	71-132	1.65	30
<i>Surrogate: 1,2-Dichloroethane-d4</i>	5.22			ug/L	5.00	5.44	104	80-129		
<i>Surrogate: Toluene-d8</i>	5.20			ug/L	5.00	5.12	104	80-120		
<i>Surrogate: 4-Bromofluorobenzene</i>	4.90			ug/L	5.00	4.89	98.0	80-120		
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	4.99			ug/L	5.00	5.25	99.8	80-120		

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
15-Dec-2021 18:38

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - SIM - Quality Control

Batch BJK0740 - EPA 5030C (Purge and Trap)

Instrument: NT16 Analyst: KOTT

QC Sample/Alyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0740-BLK1)					Prepared: 30-Nov-2021 Analyzed: 30-Nov-2021 14:31						
Vinyl chloride	ND	5.01	20.0	ng/L							U
Surrogate: 1,2-Dichloroethane-d4	5060			ng/L	5000		101	80-129			
Surrogate: Toluene-d8	5110			ng/L	5000		102	80-120			
Surrogate: 4-Bromofluorobenzene	4980			ng/L	5000		99.7	75-125			
LCS (BJK0740-BS1)					Prepared: 30-Nov-2021 Analyzed: 30-Nov-2021 12:32						
Vinyl chloride	2100	5.01	20.0	ng/L	2000		105	62-141			
Surrogate: 1,2-Dichloroethane-d4	5250			ng/L	5000		105	80-129			
Surrogate: Toluene-d8	5250			ng/L	5000		105	80-120			
Surrogate: 4-Bromofluorobenzene	5190			ng/L	5000		104	75-125			
LCS Dup (BJK0740-BSD1)					Prepared: 30-Nov-2021 Analyzed: 30-Nov-2021 13:35						
Vinyl chloride	2090	5.01	20.0	ng/L	2000		104	62-141	0.60	30	
Surrogate: 1,2-Dichloroethane-d4	5170			ng/L	5000		103	80-129			
Surrogate: Toluene-d8	5250			ng/L	5000		105	80-120			
Surrogate: 4-Bromofluorobenzene	5190			ng/L	5000		104	75-125			
Matrix Spike (BJK0740-MS1)					Source: 21K0419-01 Prepared: 30-Nov-2021 Analyzed: 30-Nov-2021 17:32						
Vinyl chloride	1900	5.01	20.0	ng/L	2000	ND	95.1	62-141			
Surrogate: 1,2-Dichloroethane-d4	5190			ng/L	5000	5270	104	80-129			
Surrogate: Toluene-d8	5090			ng/L	5000	4970	102	80-120			
Surrogate: 4-Bromofluorobenzene	5170			ng/L	5000	4880	103	75-125			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Matrix Spike Dup (BJK0740-MSD1)					Source: 21K0419-01 Prepared: 30-Nov-2021 Analyzed: 30-Nov-2021 17:53						
Vinyl chloride	2060	5.01	20.0	ng/L	2000	ND	103	62-141	8.04	30	
Surrogate: 1,2-Dichloroethane-d4	4940			ng/L	5000	5270	98.7	80-129			
Surrogate: Toluene-d8	5080			ng/L	5000	4970	102	80-120			
Surrogate: 4-Bromofluorobenzene	5150			ng/L	5000	4880	103	75-125			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
15-Dec-2021 18:38

Analysis by: Analytical Resources, LLC

Semivolatile Organic Compounds - Quality Control

Batch BJK0706 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0706-BLK1)											
						Prepared: 29-Nov-2021 Analyzed: 06-Dec-2021 13:58					
1,4-Dichlorobenzene	ND	0.03	0.2	ug/L							U
1,2-Dichlorobenzene	ND	0.03	0.2	ug/L							U
2,4-Dimethylphenol	ND	0.3	1.0	ug/L							U
Benzoic acid	ND	0.1	2.0	ug/L							U
N-Nitrosodiphenylamine	ND	0.03	0.2	ug/L							U
Pentachlorophenol	ND	0.1	1.0	ug/L							U
Di-n-Butylphthalate	ND	0.05	0.2	ug/L							U
Butylbenzylphthalate	ND	0.07	0.2	ug/L							U
bis(2-Ethylhexyl)phthalate	ND	0.2	0.2	ug/L							U
<i>Surrogate: 2-Fluorophenol</i>	4.08			ug/L	7.50		54.4	30-160			
<i>Surrogate: Phenol-d5</i>	2.41			ug/L	7.50		32.1	30-160			
<i>Surrogate: 2-Chlorophenol-d4</i>	6.54			ug/L	7.50		87.2	30-160			
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	3.77			ug/L	5.00		75.4	30-160			
<i>Surrogate: Nitrobenzene-d5</i>	4.39			ug/L	5.00		87.8	30-160			
<i>Surrogate: 2-Fluorobiphenyl</i>	4.44			ug/L	5.00		88.9	30-160			
<i>Surrogate: 2,4,6-Tribromophenol</i>	5.63			ug/L	7.50		75.1	30-160			
<i>Surrogate: p-Terphenyl-d14</i>	4.55			ug/L	5.00		91.0	30-160			
LCS (BJK0706-BS1)											
						Prepared: 29-Nov-2021 Analyzed: 06-Dec-2021 14:36					
1,4-Dichlorobenzene	3.8	0.03	0.2	ug/L	5.00		76.1	30-160			
1,2-Dichlorobenzene	3.4	0.03	0.2	ug/L	5.00		67.1	30-160			
2,4-Dimethylphenol	11.4	0.3	1.0	ug/L	13.0		88.1	30-160			
Benzoic acid	7.9	0.1	2.0	ug/L	23.0		34.2	30-160			
N-Nitrosodiphenylamine	4.1	0.03	0.2	ug/L	5.00		81.7	30-160			
Pentachlorophenol	11.4	0.1	1.0	ug/L	13.0		87.8	30-160			
Di-n-Butylphthalate	4.7	0.05	0.2	ug/L	5.00		93.5	30-160			
Butylbenzylphthalate	4.1	0.07	0.2	ug/L	5.00		81.9	30-160			
bis(2-Ethylhexyl)phthalate	4.1	0.2	0.2	ug/L	5.00		81.2	30-160			
<i>Surrogate: 2-Fluorophenol</i>	4.49			ug/L	7.50		59.9	30-160			
<i>Surrogate: Phenol-d5</i>	2.73			ug/L	7.50		36.4	30-160			
<i>Surrogate: 2-Chlorophenol-d4</i>	6.61			ug/L	7.50		88.1	30-160			
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	3.64			ug/L	5.00		72.9	30-160			
<i>Surrogate: Nitrobenzene-d5</i>	4.53			ug/L	5.00		90.5	30-160			
<i>Surrogate: 2-Fluorobiphenyl</i>	4.28			ug/L	5.00		85.5	30-160			


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 15-Dec-2021 18:38

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - Quality Control
Batch BJK0706 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJK0706-BS1)						Prepared: 29-Nov-2021 Analyzed: 06-Dec-2021 14:36					
Surrogate: 2,4,6-Tribromophenol	6.83			ug/L	7.50		91.1	30-160			
Surrogate: p-Terphenyl-d14	4.69			ug/L	5.00		93.8	30-160			
LCS Dup (BJK0706-BSD1)						Prepared: 29-Nov-2021 Analyzed: 06-Dec-2021 15:14					
1,4-Dichlorobenzene	3.9	0.03	0.2	ug/L	5.00		78.7	30-160	3.31	30	
1,2-Dichlorobenzene	3.6	0.03	0.2	ug/L	5.00		71.8	30-160	6.69	30	
2,4-Dimethylphenol	12.6	0.3	1.0	ug/L	13.0		97.2	30-160	9.83	30	
Benzoic acid	9.9	0.1	2.0	ug/L	23.0		43.0	30-160	22.80	30	
N-Nitrosodiphenylamine	4.4	0.03	0.2	ug/L	5.00		87.7	30-160	7.03	30	
Pentachlorophenol	12.9	0.1	1.0	ug/L	13.0		99.3	30-160	12.30	30	
Di-n-Butylphthalate	5.2	0.05	0.2	ug/L	5.00		103	30-160	9.80	30	
Butylbenzylphthalate	4.6	0.07	0.2	ug/L	5.00		92.8	30-160	12.50	30	
bis(2-Ethylhexyl)phthalate	4.4	0.2	0.2	ug/L	5.00		88.8	30-160	8.88	30	
Surrogate: 2-Fluorophenol	4.63			ug/L	7.50		61.7	30-160			
Surrogate: Phenol-d5	2.89			ug/L	7.50		38.5	30-160			
Surrogate: 2-Chlorophenol-d4	6.83			ug/L	7.50		91.1	30-160			
Surrogate: 1,2-Dichlorobenzene-d4	3.88			ug/L	5.00		77.6	30-160			
Surrogate: Nitrobenzene-d5	4.78			ug/L	5.00		95.6	30-160			
Surrogate: 2-Fluorobiphenyl	4.52			ug/L	5.00		90.4	30-160			
Surrogate: 2,4,6-Tribromophenol	7.00			ug/L	7.50		93.4	30-160			
Surrogate: p-Terphenyl-d14	4.82			ug/L	5.00		96.4	30-160			



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
15-Dec-2021 18:38

Analysis by: Analytical Resources, LLC

Semivolatile Organic Compounds - SIM - Quality Control

Batch BJK0716 - EPA 3510C SepF

Instrument: NT11 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0716-BLK1)						Prepared: 30-Nov-2021 Analyzed: 01-Dec-2021 17:11					
Naphthalene	0.002	0.001	0.010	ug/L							J
2-Methylnaphthalene	0.001	0.001	0.010	ug/L							J
1-Methylnaphthalene	ND	0.0009	0.010	ug/L							U
Acenaphthylene	ND	0.002	0.010	ug/L							U
Acenaphthene	ND	0.003	0.010	ug/L							U
Dibenzofuran	ND	0.002	0.010	ug/L							U
Fluorene	ND	0.002	0.010	ug/L							U
Phenanthrene	ND	0.001	0.010	ug/L							U
Anthracene	ND	0.001	0.010	ug/L							U
Carbazole	ND	0.001	0.010	ug/L							U
Fluoranthene	ND	0.002	0.010	ug/L							U
Pyrene	ND	0.001	0.010	ug/L							U
Benzo(a)anthracene	ND	0.0008	0.010	ug/L							U
Chrysene	ND	0.0009	0.010	ug/L							U
Benzo(b)fluoranthene	ND	0.0005	0.010	ug/L							U
Benzo(k)fluoranthene	ND	0.003	0.010	ug/L							U
Benzo(j)fluoranthene	ND	0.002	0.010	ug/L							U
Benzo(a)fluoranthene, Total	ND	0.004	0.010	ug/L							U
Benzo(a)pyrene	ND	0.002	0.010	ug/L							U
Perylene	ND	0.006	0.010	ug/L							U
Indeno(1,2,3-cd)pyrene	ND	0.001	0.010	ug/L							U
Dibenzo(a,h)anthracene	ND	0.001	0.010	ug/L							U
Benzo(g,h,i)perylene	ND	0.001	0.010	ug/L							U
<i>Surrogate: 2-Methylnaphthalene-d10</i>	0.246			ug/L	0.300		82.1	42-120			
<i>Surrogate: Dibenzo[a,h]anthracene-d14</i>	0.175			ug/L	0.300		58.3	29-120			Q
<i>Surrogate: Fluoranthene-d10</i>	0.272			ug/L	0.300		90.6	57-120			

LCS (BJK0716-BS1)						Prepared: 30-Nov-2021 Analyzed: 01-Dec-2021 17:41					
Naphthalene	0.220	0.001	0.010	ug/L	0.300		73.3	37-120			
2-Methylnaphthalene	0.237	0.001	0.010	ug/L	0.300		78.9	37-120			
1-Methylnaphthalene	0.236	0.0009	0.010	ug/L	0.300		78.8	29-120			
Acenaphthylene	0.246	0.002	0.010	ug/L	0.300		82.0	41-120			
Acenaphthene	0.251	0.003	0.010	ug/L	0.300		83.7	41-120			
Dibenzofuran	0.237	0.002	0.010	ug/L	0.300		79.1	38-120			
Fluorene	0.244	0.002	0.010	ug/L	0.300		81.2	43-120			



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
15-Dec-2021 18:38

Analysis by: Analytical Resources, LLC

Semivolatile Organic Compounds - SIM - Quality Control

Batch BJK0716 - EPA 3510C SepF

Instrument: NT11 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJK0716-BS1)											
						Prepared: 30-Nov-2021 Analyzed: 01-Dec-2021 17:41					
Phenanthrene	0.246	0.001	0.010	ug/L	0.300		82.0	41-120			
Anthracene	0.243	0.001	0.010	ug/L	0.300		81.0	40-120			
Carbazole	0.248	0.001	0.010	ug/L	0.300		82.6	30-160			
Fluoranthene	0.253	0.002	0.010	ug/L	0.300		84.5	45-120			
Pyrene	0.246	0.001	0.010	ug/L	0.300		82.1	41-120			
Benzo(a)anthracene	0.247	0.0008	0.010	ug/L	0.300		82.3	42-120			
Chrysene	0.241	0.0009	0.010	ug/L	0.300		80.4	44-120			
Benzo(b)fluoranthene	0.229	0.0005	0.010	ug/L	0.300		76.2	44-120			
Benzo(k)fluoranthene	0.245	0.003	0.010	ug/L	0.300		81.5	50-120			
Benzo(j)fluoranthene	0.262	0.002	0.010	ug/L	0.300		87.3	39-160			
Benzofluoranthenes, Total	0.735	0.004	0.010	ug/L	0.900		81.7	46-120			
Benzo(a)pyrene	0.233	0.002	0.010	ug/L	0.300		77.7	35-120			
Perylene	0.227	0.006	0.010	ug/L	0.300		75.6	30-160			
Indeno(1,2,3-cd)pyrene	0.204	0.001	0.010	ug/L	0.300		67.9	37-120			
Dibenzo(a,h)anthracene	0.203	0.001	0.010	ug/L	0.300		67.8	34-120			
Benzo(g,h,i)perylene	0.171	0.001	0.010	ug/L	0.300		56.8	38-120			Q
Surrogate: 2-Methylnaphthalene-d10	0.259			ug/L	0.300		86.2	42-120			
Surrogate: Dibenzo[a,h]anthracene-d14	0.203			ug/L	0.300		67.6	29-120			Q
Surrogate: Fluoranthene-d10	0.276			ug/L	0.300		92.0	57-120			
Matrix Spike (BJK0716-MS1)											
				Source: 21K0419-01		Prepared: 30-Nov-2021 Analyzed: 01-Dec-2021 18:42					
Naphthalene	0.220	0.001	0.010	ug/L	0.300	0.004	71.9	37-120			
2-Methylnaphthalene	0.241	0.001	0.010	ug/L	0.300	0.006	78.3	37-120			
1-Methylnaphthalene	0.239	0.0009	0.010	ug/L	0.300	0.006	77.6	29-120			
Acenaphthylene	0.251	0.002	0.010	ug/L	0.300	0.002	83.1	41-120			
Acenaphthene	0.594	0.003	0.010	ug/L	0.300	0.369	74.8	41-120			
Dibenzofuran	0.230	0.002	0.010	ug/L	0.300	0.002	76.1	38-120			
Fluorene	0.253	0.002	0.010	ug/L	0.300	0.003	83.4	43-120			
Phenanthrene	0.255	0.001	0.010	ug/L	0.300	0.004	83.7	41-120			
Anthracene	0.267	0.001	0.010	ug/L	0.300	0.002	88.2	40-120			
Carbazole	0.273	0.001	0.010	ug/L	0.300	ND	90.9	30-160			
Fluoranthene	0.255	0.002	0.010	ug/L	0.300	0.002	84.3	45-120			
Pyrene	0.260	0.001	0.010	ug/L	0.300	0.002	86.1	41-120			
Benzo(a)anthracene	0.264	0.0008	0.010	ug/L	0.300	ND	87.9	42-120			
Chrysene	0.235	0.0009	0.010	ug/L	0.300	ND	78.4	44-120			


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 15-Dec-2021 18:38

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - SIM - Quality Control
Batch BJK0716 - EPA 3510C SepF

Instrument: NT11 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike (BJK0716-MS1)		Source: 21K0419-01		Prepared: 30-Nov-2021		Analyzed: 01-Dec-2021 18:42					
Benzo(b)fluoranthene	0.236	0.0005	0.010	ug/L	0.300	ND	78.7	44-120			
Benzo(k)fluoranthene	0.234	0.003	0.010	ug/L	0.300	ND	78.1	50-120			
Benzo(j)fluoranthene	0.238	0.002	0.010	ug/L	0.300	ND	79.5	39-160			
Benzofluoranthenes, Total	0.709	0.004	0.010	ug/L	0.900	ND	78.8	46-120			
Benzo(a)pyrene	0.245	0.002	0.010	ug/L	0.300	ND	81.5	35-120			
Perylene	0.230	0.006	0.010	ug/L	0.300	ND	76.7	30-160			
Indeno(1,2,3-cd)pyrene	0.195	0.001	0.010	ug/L	0.300	ND	65.0	37-120			
Dibenzo(a,h)anthracene	0.196	0.001	0.010	ug/L	0.300	ND	65.3	34-120			
Benzo(g,h,i)perylene	0.164	0.001	0.010	ug/L	0.300	ND	54.5	38-120			Q
<i>Surrogate: 2-Methylnaphthalene-d10</i>	0.251			ug/L	0.300	0.257	83.8	42-120			
<i>Surrogate: Dibenzo[a,h]anthracene-d14</i>	0.191			ug/L	0.300	0.199	63.7	29-120			Q
<i>Surrogate: Fluoranthene-d10</i>	0.282			ug/L	0.300	0.294	93.9	57-120			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BJK0716-MSD1)		Source: 21K0419-01		Prepared: 30-Nov-2021		Analyzed: 01-Dec-2021 19:12					
Naphthalene	0.252	0.001	0.010	ug/L	0.300	0.004	82.8	37-120	13.90	30	
2-Methylnaphthalene	0.272	0.001	0.010	ug/L	0.300	0.006	88.8	37-120	12.30	30	
1-Methylnaphthalene	0.273	0.0009	0.010	ug/L	0.300	0.006	89.1	29-120	13.40	30	
Acenaphthylene	0.286	0.002	0.010	ug/L	0.300	0.002	94.6	41-120	12.80	30	
Acenaphthene	0.613	0.003	0.010	ug/L	0.300	0.369	81.2	41-120	3.19	30	
Dibenzofuran	0.262	0.002	0.010	ug/L	0.300	0.002	86.4	38-120	12.60	30	
Fluorene	0.285	0.002	0.010	ug/L	0.300	0.003	93.9	43-120	11.70	30	
Phenanthrene	0.284	0.001	0.010	ug/L	0.300	0.004	93.2	41-120	10.60	30	
Anthracene	0.298	0.001	0.010	ug/L	0.300	0.002	98.7	40-120	11.20	30	
Carbazole	0.303	0.001	0.010	ug/L	0.300	ND	101	30-160	10.40	30	
Fluoranthene	0.285	0.002	0.010	ug/L	0.300	0.002	94.3	45-120	11.10	30	
Pyrene	0.291	0.001	0.010	ug/L	0.300	0.002	96.3	41-120	11.10	30	
Benzo(a)anthracene	0.297	0.0008	0.010	ug/L	0.300	ND	98.9	42-120	11.70	30	
Chrysene	0.266	0.0009	0.010	ug/L	0.300	ND	88.7	44-120	12.30	30	
Benzo(b)fluoranthene	0.273	0.0005	0.010	ug/L	0.300	ND	91.0	44-120	14.50	30	
Benzo(k)fluoranthene	0.268	0.003	0.010	ug/L	0.300	ND	89.2	50-120	13.20	30	
Benzo(j)fluoranthene	0.267	0.002	0.010	ug/L	0.300	ND	89.1	39-160	11.40	30	
Benzofluoranthenes, Total	0.808	0.004	0.010	ug/L	0.900	ND	89.8	46-120	13.00	30	
Benzo(a)pyrene	0.278	0.002	0.010	ug/L	0.300	ND	92.5	35-120	12.70	30	



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
15-Dec-2021 18:38

Analysis by: Analytical Resources, LLC

Semivolatile Organic Compounds - SIM - Quality Control

Batch BJK0716 - EPA 3510C SepF

Instrument: NT11 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (BJK0716-MSD1)		Source: 21K0419-01		Prepared: 30-Nov-2021 Analyzed: 01-Dec-2021 19:12							
Perylene	0.262	0.006	0.010	ug/L	0.300	ND	87.4	30-160	13.10	30	
Indeno(1,2,3-cd)pyrene	0.229	0.001	0.010	ug/L	0.300	ND	76.5	37-120	16.20	30	
Dibenzo(a,h)anthracene	0.229	0.001	0.010	ug/L	0.300	ND	76.4	34-120	15.60	30	
Benzo(g,h,i)perylene	0.190	0.001	0.010	ug/L	0.300	ND	63.2	38-120	14.80	30	Q
<i>Surrogate: 2-Methylnaphthalene-d10</i>	0.277			ug/L	0.300	0.257	92.4	42-120			
<i>Surrogate: Dibenzo[a,h]anthracene-d14</i>	0.216			ug/L	0.300	0.199	71.9	29-120			Q
<i>Surrogate: Fluoranthene-d10</i>	0.309			ug/L	0.300	0.294	103	57-120			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 15-Dec-2021 18:38

Analysis by: Analytical Resources, LLC
Petroleum Hydrocarbons - Quality Control
Batch BJK0711 - EPA 3510C SepF

Instrument: FID4 Analyst: TWC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJK0711-BLK1)		Prepared: 29-Nov-2021 Analyzed: 30-Nov-2021 18:08								
Diesel Range Organics (C12-C24)	ND	0.100	mg/L							U
Motor Oil Range Organics (C24-C38)	ND	0.200	mg/L							U
<i>Surrogate: o-Terphenyl</i>	0.222		mg/L	0.225		98.8	50-150			
LCS (BJK0711-BS1)		Prepared: 29-Nov-2021 Analyzed: 30-Nov-2021 18:28								
Diesel Range Organics (C12-C24)	3.00	0.100	mg/L	3.00		99.8	56-120			
<i>Surrogate: o-Terphenyl</i>	0.266		mg/L	0.225		118	50-150			
Matrix Spike (BJK0711-MS1)		Source: 21K0419-01	Prepared: 29-Nov-2021 Analyzed: 30-Nov-2021 19:26							
Diesel Range Organics (C12-C24)	3.29	0.119	mg/L	3.57	0.451	79.4	56-120			
<i>Surrogate: o-Terphenyl</i>	0.252		mg/L	0.268	0.289	94.1	50-150			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.										
Matrix Spike Dup (BJK0711-MSD1)		Source: 21K0419-01	Prepared: 29-Nov-2021 Analyzed: 30-Nov-2021 19:46							
Diesel Range Organics (C12-C24)	3.12	0.100	mg/L	3.00	0.451	89.1	56-120	5.12	30	
<i>Surrogate: o-Terphenyl</i>	0.238		mg/L	0.225	0.289	106	50-150			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.										



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
15-Dec-2021 18:38

Analysis by: Analytical Resources, LLC

Metals and Metallic Compounds - Quality Control

Batch BJL0102 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: SKD

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJL0102-BLK1)						Prepared: 03-Dec-2021 Analyzed: 03-Dec-2021 16:55						
Lead	208	ND	0.0513	0.100	ug/L							U
Silver	107	ND	0.0220	0.200	ug/L							U
Arsenic	75a	ND	0.0373	0.200	ug/L							U
Blank (BJL0102-BLK2)						Prepared: 03-Dec-2021 Analyzed: 06-Dec-2021 19:25						
Chromium	52	ND	0.260	0.500	ug/L							U
Chromium	53	ND	0.239	0.500	ug/L							U
LCS (BJL0102-BS1)						Prepared: 03-Dec-2021 Analyzed: 03-Dec-2021 16:59						
Lead	208	26.3	0.0513	0.100	ug/L	25.0		105	80-120			
Silver	107	26.2	0.0220	0.200	ug/L	25.0		105	80-120			
Arsenic	75a	24.7	0.0373	0.200	ug/L	25.0		98.9	80-120			
LCS (BJL0102-BS2)						Prepared: 03-Dec-2021 Analyzed: 06-Dec-2021 19:31						
Chromium	52	24.7	0.260	0.500	ug/L	25.0		98.6	80-120			
Chromium	53	24.2	0.239	0.500	ug/L	25.0		96.7	80-120			
Duplicate (BJL0102-DUP1)						Source: 21K0419-01 Prepared: 03-Dec-2021 Analyzed: 07-Dec-2021 22:18						
Barium	135	23.1	0.114	0.500	ug/L		23.4			1.36	20	
Chromium	52	1.45	0.260	0.500	ug/L		1.51			4.06	20	
Iron	54	17900	18.2	36.0	ug/L		18100			1.49	20	
Lead	208	0.0550	0.0513	0.100	ug/L		0.0590			7.02	20	J
Silver	107	ND	0.0220	0.200	ug/L		ND					U
Vanadium	51a	4.43	0.0556	0.200	ug/L		4.52			2.12	20	
Arsenic	75a	5.88	0.0373	0.200	ug/L		5.92			0.78	20	
Cadmium	111	ND	0.0300	0.100	ug/L		ND					U
Cobalt	59	0.332	0.0178	0.200	ug/L		0.339			2.09	20	
Copper	63	0.290	0.173	0.500	ug/L		0.355			20.20	20	L, J
Nickel	60	0.614	0.0792	0.500	ug/L		0.694			12.20	20	
Selenium	78	0.564	0.179	0.500	ug/L		0.294			62.90	20	L
Zinc	66	ND	2.92	6.00	ug/L		ND					U
Duplicate (BJL0102-DUP2)						Source: 21K0419-01 Prepared: 03-Dec-2021 Analyzed: 08-Dec-2021 19:19						
Manganese	55	3390	7.10	25.0	ug/L		3500			3.19	20	D
Matrix Spike (BJL0102-MS1)						Source: 21K0419-01 Prepared: 03-Dec-2021 Analyzed: 07-Dec-2021 22:23						



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
15-Dec-2021 18:38

Analysis by: Analytical Resources, LLC

Metals and Metallic Compounds - Quality Control

Batch BJL0102 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike (BJL0102-MS1)		Source: 21K0419-01			Prepared: 03-Dec-2021 Analyzed: 07-Dec-2021 22:23							
Barium	135	48.5	0.114	0.500	ug/L	25.0	23.4	100	75-125			
Chromium	52	22.4	0.260	0.500	ug/L	25.0	1.51	83.4	75-125			
Iron	54	22500	18.2	36.0	ug/L	5000	18100	86.5	75-125			
Lead	208	24.2	0.0513	0.100	ug/L	25.0	0.0590	96.8	75-125			
Silver	107	23.1	0.0220	0.200	ug/L	25.0	ND	92.2	75-125			
Vanadium	51a	25.7	0.0556	0.200	ug/L	25.0	4.52	84.6	75-125			
Arsenic	75a	30.4	0.0373	0.200	ug/L	25.0	5.92	97.9	75-125			
Cadmium	111	23.4	0.0300	0.100	ug/L	25.0	ND	93.5	75-125			
Cobalt	59	26.0	0.0178	0.200	ug/L	25.0	0.339	103	75-125			
Copper	63	25.1	0.173	0.500	ug/L	25.0	0.355	99.0	75-125			
Nickel	60	25.6	0.0792	0.500	ug/L	25.0	0.694	99.6	75-125			
Selenium	78	73.4	0.179	0.500	ug/L	80.0	0.294	91.3	75-125			
Zinc	66	75.4	2.92	6.00	ug/L	80.0	ND	94.2	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike (BJL0102-MS2)		Source: 21K0419-01			Prepared: 03-Dec-2021 Analyzed: 08-Dec-2021 19:24							
Manganese	55	3450	7.10	25.0	ug/L	25.0	3500	-208	75-125			HC, D

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BJL0102-MSD1)		Source: 21K0419-01			Prepared: 03-Dec-2021 Analyzed: 07-Dec-2021 22:30							
Barium	135	48.9	0.114	0.500	ug/L	25.0	23.4	102	75-125	0.75	20	
Chromium	52	21.4	0.260	0.500	ug/L	25.0	1.51	79.6	75-125	4.41	20	
Iron	54	22000	18.2	36.0	ug/L	5000	18100	76.1	75-125	2.33	20	
Lead	208	24.3	0.0513	0.100	ug/L	25.0	0.0590	97.0	75-125	0.29	20	
Silver	107	23.4	0.0220	0.200	ug/L	25.0	ND	93.7	75-125	1.66	20	
Vanadium	51a	25.1	0.0556	0.200	ug/L	25.0	4.52	82.4	75-125	2.17	20	
Arsenic	75a	30.1	0.0373	0.200	ug/L	25.0	5.92	96.5	75-125	1.15	20	
Cadmium	111	23.9	0.0300	0.100	ug/L	25.0	ND	95.6	75-125	2.22	20	
Cobalt	59	25.5	0.0178	0.200	ug/L	25.0	0.339	101	75-125	2.08	20	
Copper	63	24.8	0.173	0.500	ug/L	25.0	0.355	97.7	75-125	1.34	20	
Nickel	60	24.6	0.0792	0.500	ug/L	25.0	0.694	95.6	75-125	3.98	20	
Selenium	78	72.5	0.179	0.500	ug/L	80.0	0.294	90.2	75-125	1.20	20	
Zinc	66	72.4	2.92	6.00	ug/L	80.0	ND	90.6	75-125	3.96	20	

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
15-Dec-2021 18:38

Analysis by: Analytical Resources, LLC

Metals and Metallic Compounds - Quality Control

Batch BJL0102 - REN EPA 600/4-79-020 4.1.4 HNO₃ matrix

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (BJL0102-MSD2)		Source: 21K0419-01		Prepared: 03-Dec-2021 Analyzed: 08-Dec-2021 19:30								
Manganese	55	3450	7.10	25.0	ug/L	25.0	3500	-224	75-125	0.12	20	HC, D

Recovery limits for target analytes in MS/MSD QC samples are advisory only.


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 15-Dec-2021 18:38

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds - Quality Control
Batch BJL0270 - TWM EPA 7470A

Instrument: HYDRA Analyst: ML

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJL0270-BLK1)						Prepared: 13-Dec-2021 Analyzed: 14-Dec-2021 14:48					
Mercury	ND	0.000013	0.000100	mg/L							U
LCS (BJL0270-BS1)						Prepared: 13-Dec-2021 Analyzed: 14-Dec-2021 14:55					
Mercury	0.00180	0.000013	0.000100	mg/L	0.00200		90.0	80-120			
Duplicate (BJL0270-DUP1)						Source: 21K0419-01RE1 Prepared: 13-Dec-2021 Analyzed: 14-Dec-2021 14:59					
Mercury	ND	0.000013	0.000100	mg/L		ND					U
Matrix Spike (BJL0270-MS1)						Source: 21K0419-01RE1 Prepared: 13-Dec-2021 Analyzed: 14-Dec-2021 15:02					
Mercury	0.000960	0.000013	0.000100	mg/L	0.00100	ND	95.9	75-125			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Matrix Spike Dup (BJL0270-MSD1)						Source: 21K0419-01RE1 Prepared: 13-Dec-2021 Analyzed: 14-Dec-2021 15:04					
Mercury	0.000883	0.000013	0.000100	mg/L	0.00100	ND	88.3	75-125	8.30	20	
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
15-Dec-2021 18:38

Analysis by: Analytical Resources, LLC

Metals and Metallic Compounds (dissolved) - Quality Control

Batch BJJ0168 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJL0168-BLK1)						Prepared: 07-Dec-2021 Analyzed: 08-Dec-2021 01:13						
Barium, Dissolved	135	ND	0.114	0.500	ug/L							U
Barium, Dissolved	137	ND	0.0765	0.500	ug/L							U
Chromium, Dissolved	52	ND	0.260	0.500	ug/L							U
Chromium, Dissolved	53	ND	0.239	0.500	ug/L							U
Iron, Dissolved	54	ND	18.2	36.0	ug/L							U
Iron, Dissolved	57	ND	18.2	36.0	ug/L							U
Lead, Dissolved	208	ND	0.0513	0.100	ug/L							U
Manganese, Dissolved	55	ND	0.142	0.500	ug/L							U
Silver, Dissolved	107	ND	0.0220	0.200	ug/L							U
Vanadium, Dissolved	51a	ND	0.0556	0.200	ug/L							U
Vanadium, Dissolved	51b	ND	0.0521	0.200	ug/L							U
Cadmium, Dissolved	111	ND	0.0300	0.100	ug/L							U
Cadmium, Dissolved	114	ND	0.0400	0.100	ug/L							U

Blank (BJL0168-BLK2)						Prepared: 07-Dec-2021 Analyzed: 08-Dec-2021 17:33						
Arsenic, Dissolved	75a	ND	0.0373	0.200	ug/L							U
Cobalt, Dissolved	59	ND	0.0178	0.200	ug/L							U
Copper, Dissolved	63	ND	0.173	0.500	ug/L							U
Copper, Dissolved	65	ND	0.350	0.500	ug/L							U
Nickel, Dissolved	60	ND	0.0792	0.500	ug/L							U
Nickel, Dissolved	62	ND	0.220	0.500	ug/L							U
Selenium, Dissolved	78	ND	0.179	0.500	ug/L							U
Zinc, Dissolved	66	ND	2.92	6.00	ug/L							U
Zinc, Dissolved	67	ND	0.940	6.00	ug/L							U

LCS (BJL0168-BS1)						Prepared: 07-Dec-2021 Analyzed: 08-Dec-2021 01:18						
Barium, Dissolved	135	25.3	0.114	0.500	ug/L	25.0		101	80-120			
Barium, Dissolved	137	25.5	0.0765	0.500	ug/L	25.0		102	80-120			
Chromium, Dissolved	52	24.7	0.260	0.500	ug/L	25.0		98.7	80-120			
Chromium, Dissolved	53	24.5	0.239	0.500	ug/L	25.0		97.9	80-120			
Iron, Dissolved	54	5090	18.2	36.0	ug/L	5000		102	80-120			
Iron, Dissolved	57	5110	18.2	36.0	ug/L	5000		102	80-120			
Lead, Dissolved	208	24.2	0.0513	0.100	ug/L	25.0		96.8	80-120			
Manganese, Dissolved	55	24.9	0.142	0.500	ug/L	25.0		99.5	80-120			
Silver, Dissolved	107	25.9	0.0220	0.200	ug/L	25.0		103	80-120			



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
15-Dec-2021 18:38

Analysis by: Analytical Resources, LLC

Metals and Metallic Compounds (dissolved) - Quality Control

Batch BJJ0168 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit	Notes
LCS (BJL0168-BS1)						Prepared: 07-Dec-2021 Analyzed: 08-Dec-2021 01:18					
Vanadium, Dissolved	51a	24.9	0.0556	0.200	ug/L	25.0		99.6	80-120		
Vanadium, Dissolved	51b	24.8	0.0521	0.200	ug/L	25.0		99.4	80-120		
Cadmium, Dissolved	111	24.4	0.0300	0.100	ug/L	25.0		97.7	80-120		
Cadmium, Dissolved	114	24.1	0.0400	0.100	ug/L	25.0		96.6	80-120		
LCS (BJL0168-BS2)						Prepared: 07-Dec-2021 Analyzed: 08-Dec-2021 17:38					
Arsenic, Dissolved	75a	23.7	0.0373	0.200	ug/L	25.0		94.9	80-120		
Cobalt, Dissolved	59	24.6	0.0178	0.200	ug/L	25.0		98.4	80-120		
Copper, Dissolved	63	24.6	0.173	0.500	ug/L	25.0		98.2	80-120		
Copper, Dissolved	65	24.8	0.350	0.500	ug/L	25.0		99.1	80-120		
Nickel, Dissolved	60	24.3	0.0792	0.500	ug/L	25.0		97.4	80-120		
Nickel, Dissolved	62	24.3	0.220	0.500	ug/L	25.0		97.1	80-120		
Selenium, Dissolved	78	75.4	0.179	0.500	ug/L	80.0		94.3	80-120		
Zinc, Dissolved	66	74.9	2.92	6.00	ug/L	80.0		93.6	80-120		
Zinc, Dissolved	67	72.4	0.940	6.00	ug/L	80.0		90.5	80-120		
Duplicate (BJL0168-DUP1)						Source: 21K0419-02 Prepared: 07-Dec-2021 Analyzed: 08-Dec-2021 02:57					
Barium, Dissolved	135	5.25	0.114	0.500	ug/L		5.03		4.34	20	
Chromium, Dissolved	52	0.497	0.260	0.500	ug/L		0.524		5.29	20	J
Iron, Dissolved	54	301	18.2	36.0	ug/L		296		1.68	20	
Lead, Dissolved	208	ND	0.0513	0.100	ug/L		ND				U
Silver, Dissolved	107	ND	0.0220	0.200	ug/L		ND				U
Vanadium, Dissolved	51a	0.440	0.0556	0.200	ug/L		0.441		0.23	20	
Cadmium, Dissolved	111	ND	0.0300	0.100	ug/L		ND				U
Duplicate (BJL0168-DUP2)						Source: 21K0419-02 Prepared: 07-Dec-2021 Analyzed: 09-Dec-2021 20:05					
Arsenic, Dissolved	75a	1.68	0.0373	0.200	ug/L		1.72		2.48	20	
Cobalt, Dissolved	59	0.203	0.0178	0.200	ug/L		0.194		4.53	20	
Copper, Dissolved	63	ND	0.173	0.500	ug/L		ND				U
Nickel, Dissolved	60	0.441	0.0792	0.500	ug/L		0.405		8.51	20	J
Selenium, Dissolved	78	0.352	0.179	0.500	ug/L		0.266		27.80	20	L, J
Zinc, Dissolved	66	ND	2.92	6.00	ug/L		ND				U
Duplicate (BJL0168-DUP3)						Source: 21K0419-02 Prepared: 07-Dec-2021 Analyzed: 10-Dec-2021 19:30					
Manganese, Dissolved	55	3270	7.10	25.0	ug/L		3370		3.07	20	D



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
15-Dec-2021 18:38

Analysis by: Analytical Resources, LLC

Metals and Metallic Compounds (dissolved) - Quality Control

Batch BJL0168 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: MCB

QC Sample/Alyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike (BJL0168-MS1)		Source: 21K0419-02		Prepared: 07-Dec-2021		Analyzed: 08-Dec-2021 03:01						
Barium, Dissolved	135	31.3	0.114	0.500	ug/L	25.0	5.03	105	75-125			
Chromium, Dissolved	52	20.8	0.260	0.500	ug/L	25.0	0.524	81.1	75-125			
Iron, Dissolved	54	4450	18.2	36.0	ug/L	5000	296	83.1	75-125			
Lead, Dissolved	208	22.6	0.0513	0.100	ug/L	25.0	ND	90.4	75-125			
Silver, Dissolved	107	24.7	0.0220	0.200	ug/L	25.0	ND	98.7	75-125			
Vanadium, Dissolved	51a	21.5	0.0556	0.200	ug/L	25.0	0.441	84.1	75-125			
Cadmium, Dissolved	111	23.0	0.0300	0.100	ug/L	25.0	ND	92.0	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike (BJL0168-MS2)		Source: 21K0419-02		Prepared: 07-Dec-2021		Analyzed: 09-Dec-2021 20:11						
Arsenic, Dissolved	75a	25.2	0.0373	0.200	ug/L	25.0	1.72	93.9	75-125			
Cobalt, Dissolved	59	25.5	0.0178	0.200	ug/L	25.0	0.194	101	75-125			
Copper, Dissolved	63	24.7	0.173	0.500	ug/L	25.0	ND	98.9	75-125			
Nickel, Dissolved	60	25.2	0.0792	0.500	ug/L	25.0	0.405	99.2	75-125			
Selenium, Dissolved	78	73.3	0.179	0.500	ug/L	80.0	0.266	91.3	75-125			
Zinc, Dissolved	66	73.8	2.92	6.00	ug/L	80.0	ND	92.2	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike (BJL0168-MS3)		Source: 21K0419-02		Prepared: 07-Dec-2021		Analyzed: 10-Dec-2021 19:34						
Manganese, Dissolved	55	3230	7.10	25.0	ug/L	25.0	3370	-591	75-125			HC, D

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BJL0168-MSD1)		Source: 21K0419-02		Prepared: 07-Dec-2021		Analyzed: 08-Dec-2021 03:07						
Barium, Dissolved	135	31.7	0.114	0.500	ug/L	25.0	5.03	107	75-125	1.12	20	
Chromium, Dissolved	52	21.1	0.260	0.500	ug/L	25.0	0.524	82.5	75-125	1.60	20	
Iron, Dissolved	54	4560	18.2	36.0	ug/L	5000	296	85.3	75-125	2.44	20	
Lead, Dissolved	208	22.6	0.0513	0.100	ug/L	25.0	ND	90.6	75-125	0.18	20	
Silver, Dissolved	107	24.6	0.0220	0.200	ug/L	25.0	ND	98.4	75-125	0.24	20	
Vanadium, Dissolved	51a	22.1	0.0556	0.200	ug/L	25.0	0.441	86.5	75-125	2.75	20	
Cadmium, Dissolved	111	23.8	0.0300	0.100	ug/L	25.0	ND	95.3	75-125	3.50	20	

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BJL0168-MSD2)		Source: 21K0419-02		Prepared: 07-Dec-2021		Analyzed: 09-Dec-2021 20:18						
Arsenic, Dissolved	75a	25.6	0.0373	0.200	ug/L	25.0	1.72	95.4	75-125	1.47	20	
Cobalt, Dissolved	59	25.5	0.0178	0.200	ug/L	25.0	0.194	101	75-125	0.13	20	


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 15-Dec-2021 18:38

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds (dissolved) - Quality Control
Batch BJL0168 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (BJL0168-MSD2)		Source: 21K0419-02		Prepared: 07-Dec-2021 Analyzed: 09-Dec-2021 20:18								
Copper, Dissolved	63	24.9	0.173	0.500	ug/L	25.0	ND	99.4	75-125	0.53	20	
Nickel, Dissolved	60	25.4	0.0792	0.500	ug/L	25.0	0.405	100	75-125	0.78	20	
Selenium, Dissolved	78	73.2	0.179	0.500	ug/L	80.0	0.266	91.1	75-125	0.14	20	
Zinc, Dissolved	66	73.0	2.92	6.00	ug/L	80.0	ND	91.3	75-125	0.98	20	

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BJL0168-MSD3)		Source: 21K0419-02		Prepared: 07-Dec-2021 Analyzed: 10-Dec-2021 19:39								
Manganese, Dissolved	55	3280	7.10	25.0	ug/L	25.0	3370	-371	75-125	1.69	20	HC, D

Recovery limits for target analytes in MS/MSD QC samples are advisory only.


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish Q4
 Project Number: 21-1-12596-012
 Project Manager: Meg Strong

Reported:
 15-Dec-2021 18:38

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds (dissolved) - Quality Control
Batch BJL0169 - TWM EPA 7470A

Instrument: HYDRA Analyst: ML

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJL0169-BLK1)						Prepared: 07-Dec-2021 Analyzed: 09-Dec-2021 13:01					
Mercury, Dissolved	0.000024	0.000013	0.000100	mg/L							J
LCS (BJL0169-BS1)						Prepared: 07-Dec-2021 Analyzed: 09-Dec-2021 13:04					
Mercury, Dissolved	0.00200	0.000013	0.000100	mg/L	0.00200		100	80-120			
Duplicate (BJL0169-DUP1)						Source: 21K0419-07 Prepared: 07-Dec-2021 Analyzed: 09-Dec-2021 13:08					
Mercury, Dissolved	0.000024	0.000013	0.000100	mg/L		0.000027			12.50	20	J
Matrix Spike (BJL0169-MS1)						Source: 21K0419-07 Prepared: 07-Dec-2021 Analyzed: 09-Dec-2021 13:11					
Mercury, Dissolved	0.00104	0.000013	0.000100	mg/L	0.00100	0.000027	101	75-125			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Matrix Spike Dup (BJL0169-MSD1)						Source: 21K0419-07 Prepared: 07-Dec-2021 Analyzed: 09-Dec-2021 13:13					
Mercury, Dissolved	0.00106	0.000013	0.000100	mg/L	0.00100	0.000027	103	75-125	1.93	20	
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish Q4
Project Number: 21-1-12596-012
Project Manager: Meg Strong

Reported:
15-Dec-2021 18:38

Certified Analyses included in this Report

Analyte	Certifications
EPA 6020B in Water	
Silver-107	WADOE,WA-DW,DoD-ELAP,NELAP
Barium-135	NELAP,WADOE,DoD-ELAP,ADEC
Barium-137	NELAP,WADOE,DoD-ELAP,ADEC
Chromium-52	NELAP,WADOE,DoD-ELAP,ADEC
Chromium-53	NELAP,WADOE,DoD-ELAP,ADEC
Iron-54	NELAP,WADOE,DoD-ELAP
Iron-57	NELAP,WADOE,DoD-ELAP
Manganese-55	NELAP,WADOE,DoD-ELAP
Lead-208	NELAP,WADOE,DoD-ELAP,ADEC
Vanadium-51a	NELAP,DoD-ELAP,WADOE,ADEC
Vanadium-51b	NELAP,DoD-ELAP,WADOE,ADEC
Silver-107	WA-DW,DoD-ELAP,NELAP
Barium-135	NELAP,WADOE,DoD-ELAP,ADEC
Barium-137	NELAP,WADOE,DoD-ELAP,ADEC
Chromium-52	NELAP,WADOE,DoD-ELAP,ADEC
Chromium-53	NELAP,WADOE,DoD-ELAP,ADEC
Iron-54	NELAP,WADOE,DoD-ELAP
Iron-57	NELAP,WADOE,DoD-ELAP
Manganese-55	NELAP,WADOE,DoD-ELAP
Lead-208	NELAP,WADOE,DoD-ELAP,ADEC
Vanadium-51a	NELAP,DoD-ELAP,WADOE,ADEC
Vanadium-51b	NELAP,DoD-ELAP,WADOE,ADEC
EPA 6020B UCT-KED in Water	
Arsenic-75a	WADOE,WA-DW,DoD-ELAP,ADEC,NELAP
Cadmium-111	NELAP,WADOE,DoD-ELAP,ADEC
Cadmium-114	NELAP,WADOE,DoD-ELAP,ADEC
Cobalt-59	NELAP,DoD-ELAP,WADOE
Copper-63	NELAP,WADOE,DoD-ELAP
Copper-65	NELAP,WADOE,DoD-ELAP
Nickel-60	NELAP,WADOE,DoD-ELAP,ADEC
Nickel-62	NELAP,WADOE,DoD-ELAP,ADEC
Selenium-78	NELAP,WADOE,DoD-ELAP
Zinc-66	WADOE,WA-DW,DoD-ELAP
Zinc-67	WADOE,WA-DW,DoD-ELAP
Arsenic-75a	NELAP,WADOE,DoD-ELAP,ADEC


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Cadmium-111	NELAP,WADOE,DoD-ELAP,ADEC
Cadmium-114	NELAP,WADOE,DoD-ELAP,ADEC
Cobalt-59	DoD-ELAP,NELAP,WADOE
Copper-63	NELAP,WADOE,DoD-ELAP
Copper-65	NELAP,WADOE,DoD-ELAP
Nickel-60	NELAP,WADOE,DoD-ELAP,ADEC
Nickel-62	NELAP,WADOE,DoD-ELAP,ADEC
Selenium-78	NELAP,WADOE,DoD-ELAP
Zinc-66	NELAP,WADOE,DoD-ELAP
Zinc-67	NELAP,WADOE,DoD-ELAP

EPA 7470A in Water

Mercury	WADOE,NELAP,DoD-ELAP
Mercury	WADOE,NELAP,DoD-ELAP

EPA 8260D in Water

Chloromethane	DoD-ELAP,ADEC,NELAP,WADOE
Vinyl Chloride	DoD-ELAP,ADEC,NELAP,WADOE
Bromomethane	DoD-ELAP,ADEC,NELAP,WADOE
Chloroethane	DoD-ELAP,ADEC,NELAP,WADOE
Trichlorofluoromethane	DoD-ELAP,ADEC,NELAP,WADOE
Acrolein	DoD-ELAP,NELAP,WADOE
1,1,2-Trichloro-1,2,2-Trifluoroethane	DoD-ELAP,ADEC,NELAP,WADOE
Acetone	DoD-ELAP,ADEC,NELAP,WADOE
1,1-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Iodomethane	DoD-ELAP,NELAP,WADOE
Methylene Chloride	DoD-ELAP,ADEC,NELAP,WADOE
Acrylonitrile	DoD-ELAP,NELAP,WADOE
Carbon Disulfide	DoD-ELAP,NELAP,WADOE
trans-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Vinyl Acetate	DoD-ELAP,NELAP,WADOE
1,1-Dichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
2-Butanone	DoD-ELAP,NELAP,WADOE
2,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
cis-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Chloroform	DoD-ELAP,ADEC,NELAP,WADOE
Bromochloromethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1,1-Trichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
Carbon tetrachloride	DoD-ELAP,ADEC,NELAP,WADOE



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

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1,2-Dichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
Benzene	DoD-ELAP,ADEC,NELAP,WADOE
Trichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
Bromodichloromethane	DoD-ELAP,ADEC,NELAP,WADOE
Dibromomethane	DoD-ELAP,ADEC,NELAP,WADOE
2-Chloroethyl vinyl ether	DoD-ELAP,ADEC,NELAP,WADOE
4-Methyl-2-Pentanone	DoD-ELAP,NELAP,WADOE
cis-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
Toluene	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
2-Hexanone	DoD-ELAP,NELAP,WADOE
1,1,2-Trichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,3-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
Tetrachloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Dibromochloromethane	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dibromoethane	DoD-ELAP,NELAP,WADOE
Chlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Ethylbenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,1,1,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,WADOE
m,p-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
o-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
Styrene	DoD-ELAP,NELAP,WADOE
Bromoform	DoD-ELAP,NELAP,WADOE
1,1,2,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,2,3-Trichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,4-Dichloro 2-Butene	DoD-ELAP,ADEC,NELAP,WADOE
n-Propylbenzene	DoD-ELAP,NELAP,WADOE
Bromobenzene	DoD-ELAP,NELAP,WADOE
Isopropyl Benzene	DoD-ELAP,NELAP,WADOE
2-Chlorotoluene	DoD-ELAP,ADEC,NELAP,WADOE
4-Chlorotoluene	DoD-ELAP,ADEC,NELAP,WADOE
t-Butylbenzene	DoD-ELAP,NELAP,WADOE
1,3,5-Trimethylbenzene	DoD-ELAP,NELAP,WADOE
1,2,4-Trimethylbenzene	DoD-ELAP,NELAP,WADOE
s-Butylbenzene	DoD-ELAP,NELAP,WADOE
4-Isopropyl Toluene	DoD-ELAP,NELAP,WADOE
1,3-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,4-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE


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n-Butylbenzene	DoD-ELAP,NELAP,WADOE
1,2-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dibromo-3-chloropropane	DoD-ELAP,ADEC,NELAP,WADOE
1,2,4-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Hexachloro-1,3-Butadiene	DoD-ELAP,ADEC,NELAP,WADOE
Naphthalene	DoD-ELAP,ADEC,NELAP,WADOE
1,2,3-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Dichlorodifluoromethane	DoD-ELAP,ADEC,NELAP,WADOE
Methyl tert-butyl Ether	DoD-ELAP,ADEC,NELAP,WADOE
n-Hexane	WADOE
2-Pentanone	WADOE

EPA 8260D-SIM in Water

Acrylonitrile	NELAP,WADOE
Vinyl chloride	NELAP,WADOE
1,1-Dichloroethene	NELAP,WADOE
cis-1,2-Dichloroethene	NELAP,WADOE
trans-1,2-Dichloroethene	NELAP,WADOE
Trichloroethene	NELAP,WADOE
Tetrachloroethene	NELAP,WADOE
1,1,2,2-Tetrachloroethane	NELAP,WADOE
1,2-Dichloroethane	NELAP,WADOE
Benzene	NELAP,WADOE

EPA 8270E in Water

Phenol	NELAP,DoD-ELAP
bis(2-chloroethyl) ether	NELAP,DoD-ELAP
2-Chlorophenol	NELAP,DoD-ELAP
1,3-Dichlorobenzene	NELAP,DoD-ELAP
1,4-Dichlorobenzene	NELAP,DoD-ELAP
1,2-Dichlorobenzene	NELAP,DoD-ELAP
Benzyl Alcohol	NELAP,DoD-ELAP
2,2'-Oxybis(1-chloropropane)	NELAP,DoD-ELAP
2-Methylphenol	NELAP,DoD-ELAP
Hexachloroethane	NELAP,DoD-ELAP
N-Nitroso-di-n-Propylamine	NELAP,DoD-ELAP
4-Methylphenol	NELAP,DoD-ELAP
Nitrobenzene	NELAP,DoD-ELAP
Isophorone	NELAP,DoD-ELAP
2-Nitrophenol	NELAP,DoD-ELAP


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2,4-Dimethylphenol	NELAP,DoD-ELAP
Bis(2-Chloroethoxy)methane	NELAP,DoD-ELAP
2,4-Dichlorophenol	NELAP,DoD-ELAP
1,2,4-Trichlorobenzene	NELAP,DoD-ELAP
Naphthalene	NELAP,DoD-ELAP
Benzoic acid	NELAP,DoD-ELAP
4-Chloroaniline	NELAP,DoD-ELAP
Hexachlorobutadiene	NELAP,DoD-ELAP
4-Chloro-3-Methylphenol	NELAP,DoD-ELAP
2-Methylnaphthalene	NELAP,DoD-ELAP
Hexachlorocyclopentadiene	NELAP,DoD-ELAP
2,4,6-Trichlorophenol	NELAP,DoD-ELAP
2,4,5-Trichlorophenol	NELAP,DoD-ELAP
2-Chloronaphthalene	NELAP,DoD-ELAP
2-Nitroaniline	NELAP,DoD-ELAP
Acenaphthylene	NELAP,DoD-ELAP
Dimethylphthalate	NELAP,DoD-ELAP
2,6-Dinitrotoluene	NELAP,DoD-ELAP
Acenaphthene	NELAP,DoD-ELAP
3-Nitroaniline	NELAP,DoD-ELAP
2,4-Dinitrophenol	NELAP,DoD-ELAP
Dibenzofuran	NELAP,DoD-ELAP
4-Nitrophenol	NELAP,DoD-ELAP
2,4-Dinitrotoluene	NELAP,DoD-ELAP
Fluorene	NELAP,DoD-ELAP
4-Chlorophenylphenyl ether	NELAP,DoD-ELAP
Diethyl phthalate	NELAP,DoD-ELAP
4-Nitroaniline	NELAP,DoD-ELAP
4,6-Dinitro-2-methylphenol	NELAP,DoD-ELAP
N-Nitrosodiphenylamine	NELAP,DoD-ELAP
4-Bromophenyl phenyl ether	NELAP,DoD-ELAP
Hexachlorobenzene	NELAP,DoD-ELAP
Pentachlorophenol	NELAP,DoD-ELAP
Phenanthrene	NELAP,DoD-ELAP
Anthracene	NELAP,DoD-ELAP
Carbazole	NELAP,DoD-ELAP
Di-n-Butylphthalate	NELAP,DoD-ELAP
Fluoranthene	NELAP,DoD-ELAP
Pyrene	NELAP,DoD-ELAP


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Butylbenzylphthalate	NELAP,DoD-ELAP
Benzo(a)anthracene	NELAP,DoD-ELAP
3,3'-Dichlorobenzidine	NELAP,DoD-ELAP
Chrysene	NELAP,DoD-ELAP
bis(2-Ethylhexyl)phthalate	NELAP,DoD-ELAP
Di-n-Octylphthalate	NELAP,DoD-ELAP
Benzo(b)fluoranthene	NELAP,DoD-ELAP
Benzo(k)fluoranthene	NELAP,DoD-ELAP
Benzo(a)fluoranthene, Total	NELAP
Benzo(a)pyrene	NELAP,DoD-ELAP
Indeno(1,2,3-cd)pyrene	NELAP,DoD-ELAP
Dibenzo(a,h)anthracene	NELAP,DoD-ELAP
Benzo(g,h,i)perylene	NELAP,DoD-ELAP
N-Nitrosodimethylamine	NELAP,DoD-ELAP
1-Methylnaphthalene	NELAP,DoD-ELAP

EPA 8270E-SIM in Water

Naphthalene	ADEC,DoD-ELAP,NELAP,WADOE
2-Methylnaphthalene	ADEC,DoD-ELAP,NELAP
1-Methylnaphthalene	ADEC,DoD-ELAP,NELAP,WADOE
Biphenyl	NELAP
Acenaphthylene	ADEC,DoD-ELAP,NELAP,WADOE
Acenaphthene	ADEC,DoD-ELAP,NELAP,WADOE
Dibenzofuran	ADEC,DoD-ELAP,NELAP
Fluorene	ADEC,DoD-ELAP,NELAP,WADOE
Phenanthrene	ADEC,DoD-ELAP,NELAP,WADOE
Anthracene	ADEC,DoD-ELAP,NELAP,WADOE
Carbazole	NELAP
Fluoranthene	ADEC,DoD-ELAP,NELAP,WADOE
Pyrene	ADEC,DoD-ELAP,NELAP,WADOE
Benzo(a)anthracene	ADEC,DoD-ELAP,NELAP,WADOE
Chrysene	ADEC,DoD-ELAP,NELAP,WADOE
Benzo(b)fluoranthene	ADEC,DoD-ELAP,NELAP,WADOE
Benzo(k)fluoranthene	ADEC,DoD-ELAP,NELAP,WADOE
Benzo(j)fluoranthene	ADEC,DoD-ELAP,NELAP,WADOE
Benzo(e)pyrene	NELAP
Benzo(a)pyrene	ADEC,DoD-ELAP,NELAP,WADOE
Perylene	ADEC,NELAP
Indeno(1,2,3-cd)pyrene	ADEC,DoD-ELAP,NELAP,WADOE
Dibenzo(a,h)anthracene	ADEC,DoD-ELAP,NELAP,WADOE


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Benzo(g,h,i)perylene

ADEC, DoD-ELAP, NELAP, WADOE

NWTPH-Dx in Water

Diesel Range Organics (C12-C24)	DoD-ELAP, NELAP, WADOE
Diesel Range Organics (C10-C25)	DoD-ELAP, NELAP, WADOE
Diesel Range Organics (Tol-C18)	DoD-ELAP, NELAP, WADOE
Diesel Range Organics (C10-C24)	DoD-ELAP, NELAP, WADOE
Diesel Range Organics (C10-C28)	DoD-ELAP, NELAP, WADOE
Diesel Range Organics (C12-C22)	DoD-ELAP
Diesel Range Organics (C12-C25)	DoD-ELAP
Motor Oil Range Organics (C24-C38)	DoD-ELAP, NELAP, WADOE
Motor Oil Range Organics (C25-C36)	DoD-ELAP, NELAP, WADOE
Motor Oil Range Organics (C24-C40)	DoD-ELAP, NELAP, WADOE
Residual Range Organics (C23-C32)	DoD-ELAP
Mineral Spirits Range Organics (Tol-C12)	DoD-ELAP, NELAP, WADOE
Mineral Oil Range Organics (C16-C28)	DoD-ELAP, NELAP, WADOE
Kerosene Range Organics (Tol-C18)	DoD-ELAP, NELAP, WADOE
JP8 Range Organics (C8-C18)	DoD-ELAP, NELAP, WADOE
JP5 Range Organics (C10-C16)	DoD-ELAP, NELAP, WADOE
JP4 Range Organics (Tol-C14)	DoD-ELAP, NELAP, WADOE
Jet-A Range Organics (C10-C18)	DoD-ELAP, NELAP, WADOE
Creosote Range Organics (C12-C22)	DoD-ELAP, NELAP, WADOE
Bunker C Range Organics (C10-C38)	DoD-ELAP, NELAP, WADOE
Stoddard Range Organics (C8-C12)	DoD-ELAP, NELAP, WADOE
Transformer Oil Range Organics (C12-C28)	DoD-ELAP, NELAP, WADOE

NWTPHg in Water

Gasoline Range Organics (Tol-Nap)	WADOE, DoD-ELAP
Gasoline Range Organics (2MP-TMB)	WADOE, DoD-ELAP
Gasoline Range Organics (Tol-C12)	WADOE, DoD-ELAP
Gasoline Range Organics (C6-C10)	WADOE, ADEC, DoD-ELAP
Gasoline Range Organics (C5-C12)	WADOE, DoD-ELAP

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	17-015	03/28/2023
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	02/28/2022
NELAP	ORELAP - Oregon Laboratory Accreditation Program	WA100006-012	05/12/2022
WADOE	WA Dept of Ecology	C558	06/30/2022
WA-DW	Ecology - Drinking Water	C558	06/30/2022



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Notes and Definitions

*	Flagged value is not within established control limits.
B	This analyte was detected in the method blank.
D	The reported value is from a dilution
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL)
HC	The natural concentration of the spiked analyte is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
J	Estimated concentration value detected below the reporting limit.
L	Analyte concentration is ≤ 5 times the reporting limit and the replicate control limit defaults to $\pm$ RL instead of 20% RPD
Q	Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria ($<20\%$ RSD, $<20\%$ drift or minimum RRF)
U	This analyte is not detected above the reporting limit (RL) or if noted, not detected above the limit of detection (LOD).
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
[2C]	Indicates this result was quantified on the second column on a dual column analysis.

IMPORTANT INFORMATION

Important Information

About Your Geotechnical/Environmental Report

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

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

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

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

SUBSURFACE CONDITIONS CAN CHANGE.

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

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

MOST RECOMMENDATIONS ARE PROFESSIONAL JUDGMENTS.

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

your consultant to observe subsurface construction operations can be particularly beneficial in this respect.

A REPORT'S CONCLUSIONS ARE PRELIMINARY.

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

THE CONSULTANT'S REPORT IS SUBJECT TO MISINTERPRETATION.

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

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

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

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

READ RESPONSIBILITY CLAUSES CLOSELY.

Because geotechnical/environmental engineering is based extensively on judgment and opinion, it is far less exact than other design disciplines. This situation has resulted in wholly unwarranted claims

IMPORTANT INFORMATION

being lodged against consultants. To help prevent this problem, consultants have developed a number of clauses for use in their contracts, reports, and other documents. These responsibility clauses are not exculpatory clauses designed to transfer the consultant's liabilities to other parties; rather, they are definitive clauses that identify where the consultant's responsibilities begin and end. Their use helps all parties involved recognize their individual responsibilities and take appropriate action. Some of these definitive clauses are likely to appear in your report, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to your questions.

**The preceding paragraphs are based on information
provided by the GBA, Silver Spring, Maryland**