

TABLE 1
Summary of Gasoline and Volatile Organic Compound Results in Soil
Seattle Public Utilities Complex Spot Sewer Repairs Work Order 11837171
Seattle, Washington

Parameter	Units	Sample ID (sample depth)		MTCA Method A or B CUL		Class II Inert Waste Landfill Acceptance Criteria*	Inert Waste Landfill Acceptance Criteria†
		B-101:4.5 (4.5 feet bgs)	B-101:11.5 (11.5 feet bgs)	CUL	CUL Method		
Gasoline	mg/kg	< 7.3	< 6.7	30/100‡	A	100	30§
Dichlorodifluoromethane	mg/kg	< 0.0013	< 0.0013	16,000	B	n.e.	n.d.
Chloromethane	mg/kg	< 0.0064	< 0.0066	n.e.	n.e.	n.e.	n.d.
Vinyl Chloride	mg/kg	< 0.0013	< 0.0013	0.67	B	n.e.	n.d.
Bromomethane	mg/kg	< 0.0064	< 0.0066	110	B	n.e.	n.d.
Chloroethane	mg/kg	< 0.0064	< 0.0066	n.e.	n.e.	n.e.	n.d.
Trichlorofluoromethane	mg/kg	< 0.0013	< 0.0013	24,000	B	n.e.	n.d.
1,1-Dichloroethene	mg/kg	< 0.0013	< 0.0013	4,000	B	n.e.	n.d.
Acetone	mg/kg	0.087 J	0.053 J	72,000	B	n.e.	n.d.
Iodomethane	mg/kg	< 0.0082	< 0.008	n.e.	n.e.	n.e.	n.d.
Carbon Disulfide	mg/kg	< 0.0021	< 0.0021	8,000	B	n.e.	n.d.
Methylene Chloride	mg/kg	< 0.0064	< 0.0066	0.02	A	0.02	n.d.
(trans) 1,2-Dichloroethene	mg/kg	< 0.0013	< 0.0013	1600	B	n.e.	n.d.
Methyl t-Butyl Ether	mg/kg	< 0.0013	< 0.0013	0.1	A	0.1	n.d.
1,1-Dichloroethane	mg/kg	< 0.0013	< 0.0013	180	B	n.e.	n.d.
Vinyl Acetate	mg/kg	< 0.0064	< 0.0066	80,000	B	n.e.	n.d.
2,2-Dichloropropane	mg/kg	< 0.0013	< 0.0013	n.e.	n.e.	n.e.	n.d.
(cis) 1,2-Dichloroethene	mg/kg	< 0.0013	< 0.0013	160	B	n.e.	n.d.
2-Butanone	mg/kg	0.0098 J	0.013 J	48,000	B	n.e.	n.d.
Bromochloromethane	mg/kg	< 0.0013	< 0.0013	n.e.	n.e.	n.e.	n.d.
Chloroform	mg/kg	< 0.0013	< 0.0013	32	B	n.e.	n.d.
1,1,1-Trichloroethane	mg/kg	< 0.0013	< 0.0013	2	A	2	n.d.
Carbon Tetrachloride	mg/kg	< 0.0013	< 0.0013	14	B	n.e.	n.d.
1,1-Dichloropropene	mg/kg	< 0.0013	< 0.0013	n.e.	n.e.	n.e.	n.d.
Benzene	mg/kg	< 0.0013	< 0.0013	0.03	A	0.03	n.d.
1,2-Dichloroethane	mg/kg	< 0.0013	< 0.0013	11	B	n.e.	n.d.
Trichloroethene	mg/kg	< 0.0013	< 0.0013	0.03	A	0.03	n.d.
1,2-Dichloropropane	mg/kg	< 0.0013	< 0.0013	27	B	n.e.	n.d.
Dibromomethane	mg/kg	< 0.0013	< 0.0013	800	B	n.e.	n.d.
Bromodichloromethane	mg/kg	< 0.0013	< 0.0013	16	B	n.e.	n.d.
2-Chloroethyl Vinyl Ether	mg/kg	< 0.013	< 0.0130	n.e.	n.e.	n.e.	n.d.
(cis) 1,3-Dichloropropene	mg/kg	< 0.0013	< 0.0013	10	B	n.e.	n.d.
Methyl Isobutyl Ketone	mg/kg	< 0.0064	< 0.0066	6,400	B	n.e.	n.d.
Toluene	mg/kg	< 0.0013	< 0.0013	7	A	7	n.d.
(trans) 1,3-Dichloropropene	mg/kg	< 0.0013	< 0.0013	n.e.	n.e.	n.e.	n.d.
1,1,2-Trichloroethane	mg/kg	< 0.0013	< 0.0013	18	B	n.e.	n.d.
Tetrachloroethene	mg/kg	< 0.0013	< 0.0013	0.05	A	0.05	n.d.
1,3-Dichloropropane	mg/kg	< 0.0013	< 0.0013	1,600	B	n.e.	n.d.
2-Hexanone	mg/kg	< 0.0064	< 0.0066	400	B	n.e.	n.d.
Dibromochloromethane	mg/kg	< 0.0013	< 0.0013	12	B	n.e.	n.d.
1,2-Dibromoethane	mg/kg	< 0.0013	< 0.0013	0.005	A	0.005	n.d.
Chlorobenzene	mg/kg	< 0.0013	< 0.0013	1,600	B	n.e.	n.d.
1,1,1,2-Tetrachloroethane	mg/kg	< 0.0013	< 0.0013	38	B	n.e.	n.d.
Ethylbenzene	mg/kg	< 0.0013	< 0.0013	6	A	6	n.d.
Total Xylenes	mg/kg	< 0.0039	< 0.0039	9	A	9	n.d.
Styrene	mg/kg	< 0.0013	< 0.0013	16,000	B	n.e.	n.d.
Bromoform	mg/kg	< 0.0064	< 0.0066	130	B	n.e.	n.d.
Isopropylbenzene	mg/kg	< 0.0013	< 0.0013	8,000	B	n.e.	n.d.
Bromobenzene	mg/kg	< 0.0013	< 0.0013	640	B	n.e.	n.d.
1,1,2,2-Tetrachloroethane	mg/kg	< 0.0013	< 0.0013	5	B	n.e.	n.d.
1,2,3-Trichloropropane	mg/kg	< 0.0013	< 0.0013	0.0063	B	n.e.	n.d.
n-Propylbenzene	mg/kg	< 0.0013	< 0.0013	8,000	B	n.e.	n.d.
2-Chlorotoluene	mg/kg	< 0.0013	< 0.0013	1,600	B	n.e.	n.d.
4-Chlorotoluene	mg/kg	< 0.0013	< 0.0013	1,600	B	n.e.	n.d.
1,3,5-Trimethylbenzene	mg/kg	< 0.0013	< 0.0013	800	B	n.e.	n.d.
tert-Butylbenzene	mg/kg	< 0.0013	< 0.0013	8,000	B	n.e.	n.d.
1,2,4-Trimethylbenzene	mg/kg	< 0.0013	< 0.0013	800	B	n.e.	n.d.
sec-Butylbenzene	mg/kg	< 0.0013	< 0.0013	8,000	B	n.e.	n.d.
1,3-Dichlorobenzene	mg/kg	< 0.0013	< 0.0013	n.e.	n.e.	n.e.	n.d.
p-Isopropyltoluene	mg/kg	< 0.0013	< 0.0013	n.e.	n.e.	n.e.	n.d.
1,4-Dichlorobenzene	mg/kg	< 0.0013	< 0.0013	190	B	n.e.	n.d.
1,2-Dichlorobenzene	mg/kg	< 0.0013	< 0.0013	7,200	B	n.e.	n.d.
n-Butylbenzene	mg/kg	< 0.0013	< 0.0013	4,000	B	n.e.	n.d.
1,2-Dibromo-3-chloropropane	mg/kg	< 0.0064	< 0.0066	0.23	B	n.e.	n.d.
1,2,4-Trichlorobenzene	mg/kg	< 0.0013	< 0.0013	34	B	n.e.	n.d.
Hexachlorobutadiene	mg/kg	< 0.0064	< 0.0066	13	B	n.e.	n.d.
Naphthalene	mg/kg	< 0.0064	< 0.0066	5	A	5	n.d.
1,2,3-Trichlorobenzene	mg/kg	< 0.0013	< 0.0013	64	B	n.e.	n.d.

NOTES:

Gasoline concentrations determined by Northwest Total Petroleum Hydrocarbon - Gasoline method (NWTPH-Gx). All other constituent concentrations determined by EPA Method 8260D.

Concentrations listed in bold font identify constituents detected above the laboratory reporting limit.

"<" symbol indicates that the constituent was not detected in the sample above the listed concentration, which is the laboratory reporting limit.

"J" indicates that the reported concentration is considered an estimated concentration, due to the calibration verification for this analyte exceeding the 20% drift limit specified for the method.

bgs = below ground surface

CUL = cleanup level

mg/kg = milligrams per kilogram

n.d. = no detections of volatile organics are accepted under these disposal criteria

n.e. = criteria not established/provided for this constituent

* = Class II inert waste landfill acceptance criteria were obtained by SPU from the Iron Mountain Remediation reclamation facility and provided to Kane Environmental. The types of material that will be accepted from construction projects sources for reclamation at Iron Mountain Remediation are defined under Department of Natural Resources Reclamation Plan & Permit No. 70-011878 and Snohomish Health District Solid Waste Facility Permit No. SW-502. Soil and materials that exceed MTCA Method A Soil Cleanup Levels for Unrestricted Land Uses and/or Snohomish County Health District standards are prohibited. Class II inert waste landfill acceptance criteria listed in this table may not be comprehensive and may be subject to change.

† = Inert waste landfill acceptance criteria are for Cedar Mountain Reclamation, LLC. These criteria were obtained by SPU and provided to Kane Environmental. According to information provided by SPU, the Cedar Mountain Reclamation facility does not accept soils with any detections of volatiles or semivolatiles. Inert waste landfill acceptance criteria listed in this table may not be comprehensive and may be subject to change.

‡ = The Method A cleanup level for gasoline is 100 mg/kg if benzene is not detected, and 30 mg/kg if benzene is present.

§ = The value for gasoline-range organics without benzene is 30 mg/kg. The value for gasoline-range organics with benzene is 15 mg/kg.

TABLE 2
Summary of Diesel and Heavy Oil, PAHs, PCBs, and Metals Results in Soil
Seattle Public Utilities Complex Spot Sewer Repairs Work Order 11837171
Seattle, Washington

Parameter	Method	Units	Sample ID (sample depth range)		MTCA Method A or B CUL		Class II Inert Waste Landfill Acceptance Criteria*	Inert Waste Landfill Acceptance Criteria†	Toxicity Characteristic Dangerous Waste Screening Levels‡	
			B-101-COMP:2-5.5 (2-5.5 feet bgs)	B-101-COMP:11.25-12 (11.25-12 feet bgs)	CUL	CUL Method				
<i>Diesel and Heavy Oil Range Organics (DRO and ORO)</i>										
DRO	NWTPH-Dx	mg/kg		31	<	26			2,000	n.e.
ORO	NWTPH-Dx	mg/kg		300	<	65	2,000	A	2,000	200
<i>cPAHs</i>										
Benzo[a]anthracene	EPA 8270E SIM	mg/kg		0.48	<	0.0086	n.e.	n.e.	n.e.	n.d.
Chrysene	EPA 8270E SIM	mg/kg		0.50	<	0.0086	n.e.	n.e.	n.e.	n.d.
Benzo[b]fluoranthene	EPA 8270E SIM	mg/kg		0.59	<	0.0086	n.e.	n.e.	n.e.	n.d.
Benzo(j,k)fluoranthene	EPA 8270E SIM	mg/kg		0.23	<	0.0086	n.e.	n.e.	n.e.	n.d.
Benzo[a]pyrene	EPA 8270E SIM	mg/kg		0.65	<	0.0086	0.1	A	0.1	n.d.
Indeno(1,2,3-c,d)pyrene	EPA 8270E SIM	mg/kg		0.46	<	0.0086	n.e.	n.e.	n.e.	n.d.
Dibenz[a,h]anthracene	EPA 8270E SIM	mg/kg		0.058	<	0.0086	n.e.	n.e.	n.e.	n.d.
Adjusted total cPAHs§		mg/kg		0.837		n.a.	0.1	A	0.1	n.d.
<i>Other PAHs</i>										
Naphthalene	EPA 8270E SIM	mg/kg		0.054	<	0.0086	5	A	5	n.d.
2-Methylnaphthalene	EPA 8270E SIM	mg/kg		0.077		0.0096	320	B	n.e.	n.d.
1-Methylnaphthalene	EPA 8270E SIM	mg/kg		0.079		0.011	20	B	n.e.	n.d.
Acenaphthylene	EPA 8270E SIM	mg/kg	<	0.020	<	0.0086	n.e.	n.e.	n.e.	n.d.
Acenaphthene	EPA 8270E SIM	mg/kg		0.10	<	0.0086	4,800	B	n.e.	n.d.
Fluorene	EPA 8270E SIM	mg/kg		0.050	<	0.0086	3,200	B	n.e.	n.d.
Phenanthrene	EPA 8270E SIM	mg/kg		0.700		0.033	n.e.	n.e.	n.e.	n.d.
Anthracene	EPA 8270E SIM	mg/kg		0.16		0.010	24,000	B	n.e.	n.d.
Fluoranthene	EPA 8270E SIM	mg/kg		0.95		0.014	3,200	B	n.e.	n.d.
Pyrene	EPA 8270E SIM	mg/kg		1.1		0.016	2,400	B	n.e.	n.d.
Benzo(g,h,i)perylene	EPA 8270E SIM	mg/kg		0.41	<	0.0086	n.e.	n.e.	n.e.	n.d.
<i>PCBs</i>										
Aroclor 1016	EPA 8082A	mg/kg	<	0.060	<	0.065	5.6	B	n.e.	n.e.
Aroclor 1221	EPA 8082A	mg/kg	<	0.060	<	0.065	n.e.	n.e.	n.e.	n.e.
Aroclor 1232	EPA 8082A	mg/kg	<	0.060	<	0.065	n.e.	n.e.	n.e.	n.e.
Aroclor 1242	EPA 8082A	mg/kg	<	0.060	<	0.065	n.e.	n.e.	n.e.	n.e.
Aroclor 1248	EPA 8082A	mg/kg	<	0.060	<	0.065	n.e.	n.e.	n.e.	n.e.
Aroclor 1254	EPA 8082A	mg/kg	<	0.060	<	0.065	0.5	B	n.e.	n.e.
Aroclor 1260	EPA 8082A	mg/kg	<	0.060	<	0.065	0.5	B	n.e.	n.e.
Aroclor 1262	EPA 8082A	mg/kg	<	0.060	<	0.065	n.e.	n.e.	n.e.	n.e.
Aroclor 1268	EPA 8082A	mg/kg	<	0.060	<	0.065	n.e.	n.e.	n.e.	n.e.
Total PCBs	EPA 8082A	mg/kg	<	0.060	<	0.065	1	A	1	n.e.
<i>RCRA 8 Metals</i>										
Arsenic	EPA 6010D	mg/kg	<	6.0	<	6.5	20	A	20	9
Barium	EPA 6010D	mg/kg		120		14	16,000	B	n.e.	2,000
Cadmium	EPA 6010D	mg/kg	<	0.60	<	0.65	2	A	2	1
Chromium (total)	EPA 6010D	mg/kg		16		10	2,000**	A	48	63
Copper	EPA 6010D	mg/kg		35		9.7	3,200	B	n.e.	n.e.
Lead	EPA 6010D	mg/kg		34	<	6.5	250	A	250	36
Mercury	EPA 7471B	mg/kg	<	0.30	<	0.32	2	A	2	0.2
Nickel	EPA 6010D	mg/kg		22		7.2	1,600	B	n.e.	n.e.
Selenium	EPA 6010D	mg/kg	<	0.60	<	0.65	400	B	n.e.	1
Silver	EPA 6010D	mg/kg	<	1.2	<	1.3	400	B	n.e.	1.5
Zinc	EPA 6010D	mg/kg		71		20	24,000	B	n.e.	n.e.

NOTES:

Concentrations listed in bold font identify constituents detected above the laboratory reporting limit.

Concentrations listed in bold font and shaded cells identify constituents detected above the MTCA Method A or B CUL.

"<" symbol indicates that the constituent was not detected in the sample above the listed concentration, which is the laboratory reporting limit.

bgs = below ground surface

cPAHs = carcinogenic PAHs, including benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene

CUL = cleanup level

DRO = diesel range organics

Dx = diesel and lube oil range organics

EPA = United States Environmental Protection Agency

mg/kg = milligrams per kilogram

MTCA = Model Toxics Control Act

n.a. = not calculated for this sample

n.d. = no detections of PAHs are accepted under these disposal criteria

n.e. = criteria not established/provided for this constituent

NWTPH = Northwest Total Petroleum Hydrocarbons

ORO = oil range organics

PAHs = polycyclic aromatic hydrocarbons

PCBs = polychlorinated biphenyls

RCRA = Resource Conservation and Recovery Act

TEQ = toxic equivalent concentration

WAC = Washington Administrative Code

* = Class II inert waste landfill acceptance criteria were obtained by SPU from the Iron Mountain Remediation reclamation facility and provided to Kane Environmental. The types of material that will be accepted from construction projects sources for reclamation at Iron Mountain Remediation are defined under Department of Natural Resources Reclamation Plan & Permit No. 70-011878 and Snohomish Health District Solid Waste Facility Permit No. SW-502. Soil and materials that exceed MTCA Method A Soil Cleanup Levels for Unrestricted Land Uses and/or Snohomish County Health District standards are prohibited. Class II inert waste landfill acceptance criteria listed in this table may not be comprehensive and may be subject to change.

† = Inert waste landfill acceptance criteria are for Cedar Mountain Reclamation, LLC. These criteria were obtained by SPU and provided to Kane Environmental. According to information provided by SPU, the Cedar Mountain Reclamation facility does not accept soils with any detections of volatiles or semivolatiles. Inert waste landfill acceptance criteria listed in this table may not be comprehensive and may be subject to change.

‡ = Dangerous waste screening levels are 20 times the threshold concentrations for dangerous waste under the toxicity characteristic listed in WAC 173-303-090. These screening levels are not regulatory thresholds, but guidelines for determining if additional evaluation is necessary. If total concentrations of contaminants in soil exceed these screening levels, the soil should be evaluated as a potential toxicity characteristic dangerous waste by the Toxicity Characteristic Leaching Procedure (EPA Method 1311). Criteria available at <https://app.leg.wa.gov/WAC/default.aspx?cite=173-303-090>.

§ = For samples in which cPAHs are detected, adjusted total cPAHs concentrations are calculated following the procedures described in the Ecology publication *Evaluating the Human Health Toxicity of Carcinogenic PAHs (cPAH) Using Toxicity Equivalency Factors (TEFs)* (Ecology 2015).

** = The listed MTCA cleanup level for chromium (total) is the Method A cleanup level for chromium(III).

†† = Wastes containing greater than 2 parts per million (equivalent to 2 mg/kg) of PCBs are considered dangerous waste under WAC 173-303-9904.

TABLE 3
Summary of Gasoline and Volatile Organic Compound Results in Groundwater
Seattle Public Utilities Complex Spot Sewer Repairs Work Order 11837171
Seattle, Washington

Parameter	Units	Sample ID (Well ID)		MTCA Method A or B CUL		Toxicity Characteristic Dangerous Waste Threshold*	KCIW Discharge Screening Level†	Washington State Surface Water Quality Standard for Protection of Aquatic Life‡
		B-101-102424 (B-101)	CUL	CUL Method				
Gasoline	µg/L	<	100	800/1,000§	A	n.e.	n.e.	1,700**
Dichlorodifluoromethane	µg/L	<	0.20	1,600	B	n.e.	41	n.e.
Chloromethane	µg/L	<	1.0	n.e.	n.e.	n.e.	570	n.e.
Vinyl Chloride	µg/L	<	0.20	0.2	A	200	12	n.e.
Bromomethane	µg/L	<	1.0	11	B	n.e.	78	n.e.
Chloroethane	µg/L	<	1.0	n.e.	n.e.	n.e.	570	n.e.
Trichlorofluoromethane	µg/L	<	0.20	n.e.	n.e.	n.e.	n.e.	n.e.
1,1-Dichloroethene	µg/L	<	0.20	400	B	700	1,700	n.e.
Acetone	µg/L	<	5.0	7,200	B	n.e.	n.e.	n.e.
Iodomethane	µg/L	<	1.0	n.e.	n.e.	n.e.	n.e.	n.e.
Carbon Disulfide	µg/L	<	0.20	800	B	n.e.	73	n.e.
Methylene Chloride	µg/L	<	1.0	5	A	n.e.	4,100	n.e.
(trans) 1,2-Dichloroethene	µg/L	<	0.20	160	B	n.e.	1,000	n.e.
Methyl t-Butyl Ether	µg/L	<	0.20	20	A	n.e.	n.e.	n.e.
1,1-Dichloroethane	µg/L	<	0.20	7.7	B	n.e.	1,700	n.e.
Vinyl Acetate	µg/L	<	1.0	8,000	B	n.e.	n.e.	n.e.
2,2-Dichloropropane	µg/L	<	0.20	n.e.	n.e.	n.e.	n.e.	n.e.
(cis) 1,2-Dichloroethene	µg/L	<	0.20	16	B	n.e.	1,000	n.e.
2-Butanone	µg/L	<	5.0	4,800	B	200,000	n.e.	n.e.
Bromochloromethane	µg/L	<	0.20	n.e.	n.e.	n.e.	n.e.	n.e.
Chloroform	µg/L	<	0.20	1.4	B	6,000	60	n.e.
1,1,1-Trichloroethane	µg/L	<	0.20	200	A	n.e.	2,700	n.e.
Carbon Tetrachloride	µg/L	<	0.20	0.63	B	500	11	n.e.
1,1-Dichloropropene	µg/L	<	0.20	n.e.	n.e.	n.e.	n.e.	n.e.
Benzene	µg/L	<	0.20	5	A	500	70	23**
1,2-Dichloroethane	µg/L	<	0.20	5	A	500	170	n.e.
Trichloroethene	µg/L	<	0.20	5	A	500	500	n.e.
1,2-Dichloropropane	µg/L	<	0.20	1.2	B	n.e.	3,000	n.e.
Dibromomethane	µg/L	<	0.20	80	B	n.e.	n.e.	n.e.
Bromodichloromethane	µg/L	<	0.20	0.71	B	n.e.	n.e.	n.e.
(cis) 1,3-Dichloropropene	µg/L	<	0.20	0.44	B	n.e.	90	n.e.
Methyl Isobutyl Ketone	µg/L	<	2.0	640	B	n.e.	15,000	n.e.
Toluene	µg/L	<	1.0	1,000	A	n.e.	1,400	102**
(trans) 1,3-Dichloropropene	µg/L	<	0.20	0.44	B	n.e.	90	n.e.
1,1,2-Trichloroethane	µg/L	<	0.20	0.77	B	n.e.	1,300	n.e.
Tetrachloroethene	µg/L	<	0.20	5	A	700	240	n.e.
1,3-Dichloropropane	µg/L	<	0.20	160	B	n.e.	n.e.	n.e.
2-Hexanone	µg/L	<	2.0	40	B	n.e.	n.e.	n.e.
Dibromochloromethane	µg/L	<	0.20	0.52	B	n.e.	n.e.	n.e.
1,2-Dibromoethane	µg/L	<	0.20	0.01	A	n.e.	n.e.	n.e.
Chlorobenzene	µg/L	<	0.20	160	B	100,000	2,300	n.e.
1,1,1,2-Tetrachloroethane	µg/L	<	0.20	1.7	B	n.e.	n.e.	n.e.
Ethylbenzene	µg/L	<	0.20	700	A	n.e.	1,700	21**
Total Xylenes	µg/L	<	0.60	1,000	A	n.e.	2,200	106**
Styrene	µg/L	<	0.20	1,600	B	n.e.	n.e.	n.e.
Bromoform	µg/L	<	1.0	5.5	B	n.e.	220	n.e.
Isopropylbenzene	µg/L	<	0.20	800	B	n.e.	n.e.	n.e.
Bromobenzene	µg/L	<	0.20	64	B	n.e.	n.e.	n.e.
1,1,2,2-Tetrachloroethane	µg/L	<	0.20	0.22	B	n.e.	380	n.e.
1,2,3-Trichloropropane	µg/L	<	0.20	0.00038	B	n.e.	n.e.	n.e.
n-Propylbenzene	µg/L	<	0.20	800	B	n.e.	n.e.	n.e.
2-Chlorotoluene	µg/L	<	0.20	160	B	n.e.	n.e.	n.e.
4-Chlorotoluene	µg/L	<	0.20	160	B	n.e.	n.e.	n.e.
1,3,5-Trimethylbenzene	µg/L	<	0.20	80	B	n.e.	n.e.	n.e.
tert-Butylbenzene	µg/L	<	0.20	800	B	n.e.	n.e.	n.e.
1,2,4-Trimethylbenzene	µg/L	<	0.20	80	B	n.e.	n.e.	n.e.
sec-Butylbenzene	µg/L	<	0.20	800	B	n.e.	n.e.	n.e.
1,3-Dichlorobenzene	µg/L	<	0.20	n.e.	n.e.	n.e.	n.e.	n.e.
p-Isopropyltoluene	µg/L	<	0.20	n.e.	n.e.	n.e.	n.e.	n.e.
1,4-Dichlorobenzene	µg/L	<	0.20	8.1	B	7,500	n.e.	n.e.
1,2-Dichlorobenzene	µg/L	<	0.20	720	B	n.e.	n.e.	n.e.
n-Butylbenzene	µg/L	<	0.20	400	B	n.e.	n.e.	n.e.
1,2-Dibromo-3-chloropropane	µg/L	<	1.0	0.014	B	n.e.	n.e.	n.e.
1,2,4-Trichlorobenzene	µg/L	<	0.20	1.5	B	n.e.	n.e.	n.e.
Hexachlorobutadiene	µg/L	<	1.0	0.56	B	500	n.e.	n.e.
Naphthalene	µg/L	<	1.4	160	A	n.e.	3,820	n.e.
1,2,3-Trichlorobenzene	µg/L	<	1.3	6.4	B	n.e.	n.e.	n.e.

NOTES:

Gasoline concentrations determined by Northwest Total Petroleum Hydrocarbon - Gasoline method (NWTPH-Gx). All other constituent concentrations determined by EPA Method 8260D.

"<" symbol indicates that the constituent was not detected in the sample above the listed concentration, which is the laboratory reporting limit.

µg/L = micrograms per liter

CUL = cleanup level

EPA = United States Environmental Protection Agency

KCIW = King County Industrial Waste

n.d. = no detections of volatile or semivolatile organics are accepted under these disposal criteria

n.e. = criteria not established for this constituent

RCRA = Resource Conservation and Recovery Act

SPU = Seattle Public Utilities

* = Water containing contaminants at concentrations exceeding dangerous waste threshold concentrations is a toxicity characteristic dangerous waste.

Criteria available at <https://app.leg.wa.gov/WAC/default.aspx?cite=173-303-090>.

† = Concentrations listed in this column are KCIW Discharge Screening Levels for Volatile Organic Compounds. Concentrations available at <https://kingcounty.gov/en/dept/dnrp/waste-services/wastewater-treatment/sewer-system-services/industrial-waste/wastewater-discharge-limits-regulations>.

‡ = Surface water quality standards are those established for protection of marine aquatic life under acute exposures (WAC 173-201A-240), as specified by SPU. Standards from Washington State Department of Ecology July 2024 Cleanup Levels and Risk Calculation (CLARC) tables available at <https://ecology.wa.gov/regulations-permits/guidance-technical-assistance/contamination-clean-up-tools/clarc> (Ecology 2024d).

§ = The Method A cleanup level for gasoline is 1,000 µg/L if benzene is not detected in the sample, and 800 µg/L if benzene is present in the sample.

** = Surface water quality standards are those established for protection of aquatic receptors in surface waters. Standards from Washington State Department of Ecology Implementation Memo No. 23, *Concentrations of Gasoline and Diesel Range Organics Predicted to be Protective of Aquatic Receptors in Surface Waters* available at <https://apps.ecology.wa.gov/publications/documents/1909043.pdf> (Ecology 2021).

TABLE 4
Summary of Diesel and Heavy Oil, PAHs, PCBs, and Metals Results in Groundwater
Seattle Public Utilities Complex Spot Sewer Repairs Work Order 11837171
Seattle, Washington

Parameter	Method	Units	Sample ID (Well ID)		MTCA Method A or B CUL		Toxicity Characteristic Dangerous Waste Threshold*	KCIW Discharge Limit or Screening Level†	Washington State Surface Water Quality Standard for Protection of Aquatic Life‡
			B-101-102424 (B-101)		CUL	CUL Method			
Diesel and Heavy (Lube) Oil Range Organics (DRO and ORO)									
DRO	NWTPH-Dx	µg/L	<	200	500	A	n.e.	n.e.	50/2,100§
ORO	NWTPH-Dx	µg/L	<	200			n.e.	n.e.	
cPAHs									
Benzo[a]anthracene	EPA 8270E SIM	µg/L	<	0.010	n.e.	n.e.	n.e.	n.e.	n.e.
Chrysene	EPA 8270E SIM	µg/L	<	0.010	n.e.	n.e.	n.e.	n.e.	n.e.
Benzo[b]fluoranthene	EPA 8270E SIM	µg/L	<	0.010	n.e.	n.e.	n.e.	n.e.	n.e.
Benzo[j,k]fluoranthene	EPA 8270E SIM	µg/L	<	0.010	n.e.	n.e.	n.e.	n.e.	n.e.
Benzo[a]pyrene	EPA 8270E SIM	µg/L	<	0.010	0.1	A	n.e.	n.e.	n.e.
Indeno(1,2,3-c,d)pyrene	EPA 8270E SIM	µg/L	<	0.010	n.e.	n.e.	n.e.	n.e.	n.e.
Dibenz[a,h]anthracene	EPA 8270E SIM	µg/L	<	0.010	n.e.	n.e.	n.e.	n.e.	n.e.
Adjusted total cPAHs**		µg/L		n.a.	0.1	A	n.e.	n.e.	n.e.
Other PAHs									
Naphthalene	EPA 8270E SIM	µg/L	<	0.10	160	A	n.e.	3,820	n.e.
2-Methylnaphthalene	EPA 8270E SIM	µg/L	<	0.10	32	B	n.e.	n.e.	n.e.
1-Methylnaphthalene	EPA 8270E SIM	µg/L	<	0.10	0.86	B	n.e.	n.e.	n.e.
Acenaphthylene	EPA 8270E SIM	µg/L	<	0.10	n.e.	n.e.	n.e.	n.e.	n.e.
Acenaphthene	EPA 8270E SIM	µg/L	<	0.10	480	B	n.e.	n.e.	n.e.
Fluorene	EPA 8270E SIM	µg/L	<	0.10	320	B	n.e.	n.e.	n.e.
Phenanthrene	EPA 8270E SIM	µg/L	<	0.10	n.e.	n.e.	n.e.	n.e.	n.e.
Anthracene	EPA 8270E SIM	µg/L	<	0.10	2,400	B	n.e.	n.e.	n.e.
Fluoranthene	EPA 8270E SIM	µg/L	<	0.10	640	B	n.e.	n.e.	n.e.
Pyrene	EPA 8270E SIM	µg/L	<	0.10	240	B	n.e.	n.e.	n.e.
Benzo[g,h,i]perylene	EPA 8270E SIM	µg/L	<	0.010	n.e.	n.e.	n.e.	n.e.	n.e.
PCBs									
Aroclor 1016	EPA 8082A	µg/L	<	0.050	0.56	B	n.e.	n.e.	n.e.
Aroclor 1221	EPA 8082A	µg/L	<	0.050	n.e.	n.e.	n.e.	n.e.	n.e.
Aroclor 1232	EPA 8082A	µg/L	<	0.050	n.e.	n.e.	n.e.	n.e.	n.e.
Aroclor 1242	EPA 8082A	µg/L	<	0.050	n.e.	n.e.	n.e.	n.e.	n.e.
Aroclor 1248	EPA 8082A	µg/L	<	0.050	n.e.	n.e.	n.e.	n.e.	n.e.
Aroclor 1254	EPA 8082A	µg/L	<	0.050	0.022	B	n.e.	n.e.	n.e.
Aroclor 1260	EPA 8082A	µg/L	<	0.050	0.022	B	n.e.	n.e.	n.e.
Aroclor 1262	EPA 8082A	µg/L	<	0.050	n.e.	n.e.	n.e.	n.e.	n.e.
Aroclor 1268	EPA 8082A	µg/L	<	0.050	n.e.	n.e.	n.e.	n.e.	n.e.
Total PCBs	EPA 8082A	µg/L	<	0.050	0.1	A	2,000††	n.e.	10
Total RCRA 8 Metals									
Arsenic	EPA 6020B	µg/L		4.5	5	A	5,000	1,000	69
Barium	EPA 6020B	µg/L		31	3,200	B	100,000	n.e.	n.e.
Cadmium	EPA 6020B	µg/L	<	4.4	5	A	1,000	500	42
Chromium (total)	EPA 6020B	µg/L	<	11	50	A	5,000	2,750	1,100§§
Copper	EPA 6020B	µg/L	<	4.4	640	B	n.e.	3,000	4.8
Lead	EPA 6020B	µg/L	<	1.1	15	A	5,000	2,000	210
Mercury	EPA 7470A	µg/L	<	0.50	80	B	1,000	100	1.8
Nickel	EPA 6020B	µg/L	<	22	320	B	n.e.	2500	74
Selenium	EPA 6020B	µg/L	<	5.6	80	B	5,000	n.e.	290
Silver	EPA 6020B	µg/L	<	1.1	2	A	200	1000	1.9
Zinc	EPA 6020B	µg/L		110	4,800	B	n.e.	5,000	90
Dissolved RCRA 8 Metals									
Arsenic	EPA 6020B	µg/L		3.8	5	A	5,000	1,000	69
Barium	EPA 6020B	µg/L		27	3,200	B	100,000	n.e.	n.e.
Cadmium	EPA 6020B	µg/L	<	4.0	5	A	1,000	500	42
Chromium (total)	EPA 6020B	µg/L	<	10	50	A	5,000	2,750	1,100§§
Copper	EPA 6020B	µg/L	<	4.0	640	B	n.e.	3,000	4.8
Lead	EPA 6020B	µg/L	<	1.0	15	A	5,000	2,000	210
Mercury	EPA 7470A	µg/L	<	0.50	80	B	1,000	100	1.8
Nickel	EPA 6020B	µg/L	<	20	320	B	n.e.	2500	74
Selenium	EPA 6020B	µg/L	<	5.0	80	B	5,000	n.e.	290
Silver	EPA 6020B	µg/L	<	1.0	2	A	200	1000	1.9
Zinc	EPA 6020B	µg/L	<	25	4800	B	n.e.	5,000	90

NOTES:

Concentrations listed in bold font identify constituents detected above the laboratory reporting limit.

"<" symbol indicates that the constituent was not detected in the sample above the listed concentration, which is the laboratory reporting limit.

µg/L = micrograms per liter

cPAHs = carcinogenic PAHs, including benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene

CUL = cleanup level

DRO = diesel range organics

Dx = diesel and lube oil range organics

EPA = United States Environmental Protection Agency

MTCA = Model Toxics Control Act

n.a. = not analyzed or not calculated for this sample

n.d. = no detections of volatile or semivolatile organics are accepted under these disposal criteria

n.e. = criteria not established for this constituent

NWTPH = Northwest Total Petroleum Hydrocarbons

ORO = heavy oil range organics

PAHs = polycyclic aromatic hydrocarbons

PCBs = polychlorinated biphenyls

RCRA = Resource Conservation and Recovery Act

SPU = Seattle Public Utilities

TEQ = toxic equivalent concentration

* = Water containing contaminants at concentrations exceeding dangerous waste threshold concentrations is a toxicity characteristic dangerous waste. Criteria available at

<https://app.leg.wa.gov/WAC/default.aspx?cite=173-303-090>.

† = Concentrations listed in this column are KCIW Discharge Screening Levels for Volatile Organic Compounds and Daily Average Maximum Values for Heavy Metals. Concentrations available at

<https://kingcounty.gov/en/dept/dnpr/waste-services/wastewater-treatment/sewer-system-services/industrial-waste/wastewater-discharge-limits-regulations>.

‡ = Surface water quality standards are those established for protection of marine aquatic life under acute exposures (WAC 173-201A-240). Standards from Washington State Department of Ecology

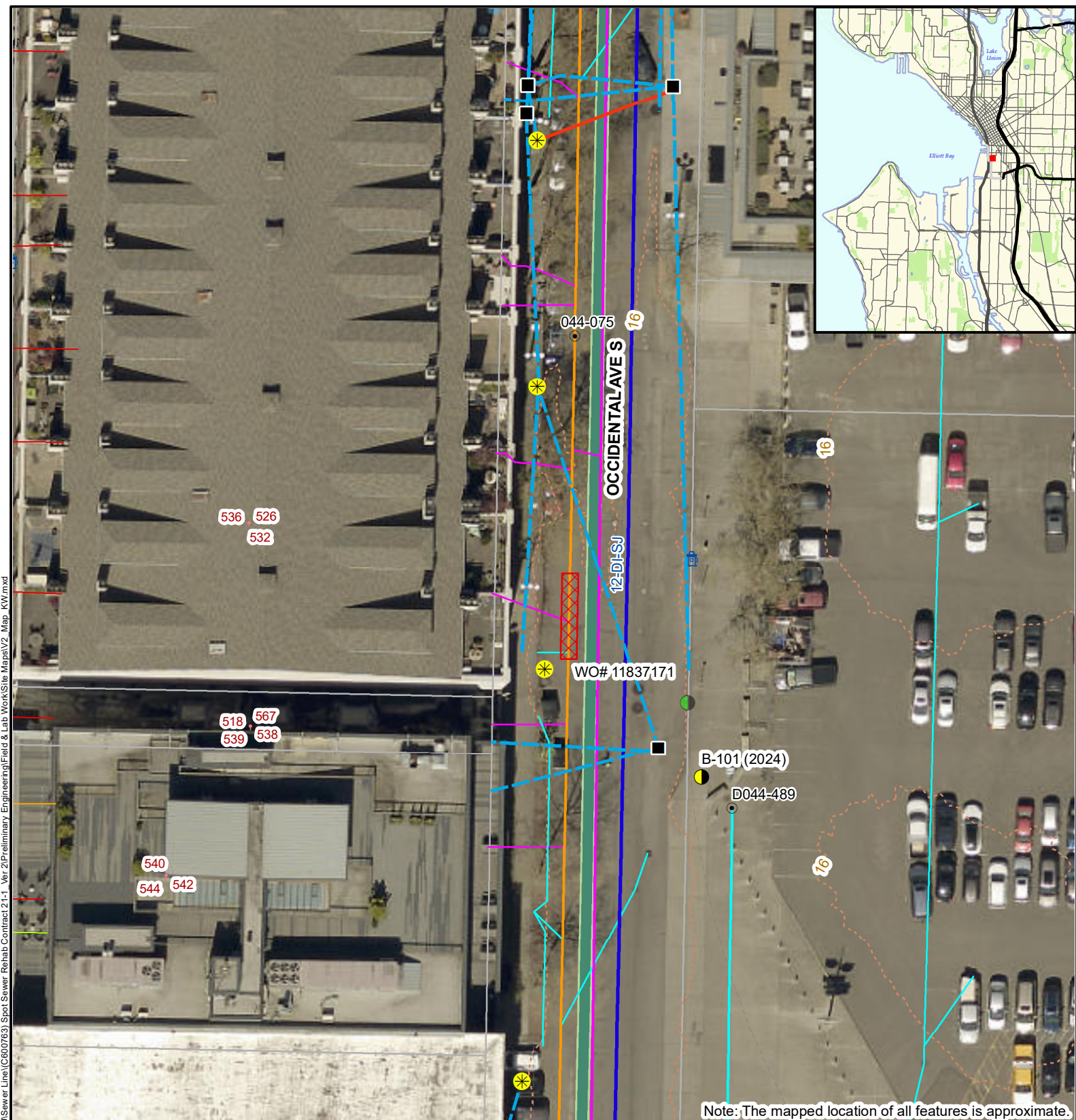
July 2024 Cleanup Levels and Risk Calculation tables available at <https://ecology.wa.gov/regulations-permits/guidance-technical-assistance/contamination-clean-up-tools/clarc> (Ecology 2024c).

§ = Surface water quality standards are those established for protection of aquatic receptors in surface waters. The standard for unweathered diesel and lube oil is 50 µg/L. The standard for weathered diesel and lube oil is 2,100 µg/L. Standards from Washington State Department of Ecology Implementation Memo No. 23, *Concentrations of Gasoline and Diesel Range Organics Predicted to be Protective of Aquatic Receptors in Surface Waters* available at <https://apps.ecology.wa.gov/publications/documents/1909043.pdf> (Ecology 2021).

** = For samples in which cPAHs are detected, adjusted total cPAHs concentrations are calculated following the procedures described in the Ecology publication *Evaluating the Human Health Toxicity of Carcinogenic PAHs (cPAH) Using Toxicity Equivalency Factors (TEFs)* (Ecology 2015).

†† = Wastes containing greater than 2 parts per million (equivalent to 2,000 µg/L) of PCBs are considered dangerous waste under WAC 173-303-9904

§§ = The hexavalent chromium marine surface water quality standard protective of aquatic receptors is used for evaluation of total chromium. A marine water quality standard protective of aquatic receptors has not been established for total chromium.



Note: The mapped location of all features is approximate.

LEGEND	
	Initially Proposed Exploration
	Boring with Well Completed for Current Study
	Sewer Repair Site
	SCL Pole with Streetlight
	SCL Underground Structures
	Overhead
	Underground
	Distribution Main
	Inactive Water Service
	Retired Water Service
	Active Water Service
	Connected Water Hydrant
	Maintenance Hole
	Sanitary Main
	Combined Main
	Drainage Main
	Side Sewer
	Drainage Lateral
	King County Sewer System Mainline
	Residential Streets
	Pavement Edge
	2 Foot Topographic Contour
	Parcels

Complex Spot Sewer Repairs
WO 11837171
Seattle, Washington

Site & Exploration Map

Seattle Public Utilities
Geotechnical Engineering

Figure 1
December 2024
Project No. C600763

Feet

Document Path: P:\Geotech\GEO\Technical Projects\SPU\Sewer Line\C600763\Spot Sewer Rehab Contract 2-1-1_Ver 2\Preliminary Engineering\Field & Lab Work\Site Maps\SV2_Map_KW.mxd

Kirkman, Donna K. (ECY)

From: Encelle, Ophélie <Ophelie.Encelle@seattle.gov>
Sent: Monday, December 23, 2024 2:36 PM
To: Kirkman, Donna K. (ECY)
Cc: Treat, Tanya; Ramirez, Juan_Carlos
Subject: Environmental results in Seattle right-of-way
Attachments: 11837171.pdf; 11615697.pdf; 11870299.pdf

External Email

Dear Ms. Kirkman:

On behalf of City of Seattle, Seattle Public Utilities (SPU), we are submitting for your records the environmental results attached that we obtained in the right-of-way (ROW) of Seattle during explorations associated with spot sewer improvements referred as WO 11837171, WO 11870299 and WO 11615697. The results showed the presence of analytes in the Seattle ROW at concentrations exceeding Model Toxics Control Act (MTCA) Method A residential cleanup levels, including:

- In the soil collected from B-101 near WO 11837171, for mixtures of carcinogenic polycyclic aromatic hydrocarbons (cPAHs) and benzo(a)pyrene. B-101 is located on the east side of Occidental Avenue S sidewalk, 9 feet west and 10 feet north of SPU maintenance hole D044-489. The location of B-101 (WO 11837171) determined using a handheld GPS unit is 47.59712066° N, 122.33312871° W.
- In the soil collected from B-101 near WO 11870299, for mixtures of cPAHs and benzo(a)pyrene. B-101 is located within the Airport Way S east grass strip, 6 feet east and 9 feet south of the utility pole located at the southeast corner of the intersection with S Stevens St. The approximate location of B-101 (WO 11870299) is 47.576748° N, 122.321241° W.
- In the groundwater collected from B-101 near WO 11615697, for chloroform above MTCA Method B CUL. B-101 is located in the grass strip on the north side of W Cremona Street, approximately 17 feet north of the W Cremona street centerline and 10 feet east of the first trolley line pole east of 3rd Avenue W. The approximate location of B-101 (WO 11615697) is 47.649599° N, 122.360321° W.

Please note, WO 11870299 is adjacent to the Rainier Commons PCB Removal Project managed by the U.S. Environmental Protection Agency (U.S. EPA). SPU communicated the environmental results for this site to U.S. EPA's Region 10 Toxic Substances Control Act PCBs Coordinator on 12/12.

Thank you,

Ophélie Encelle

Senior Environmental Scientist | Engineering & Technical Services Division
Project Delivery and Engineering Branch, Seattle Public Utilities
707 South Plummer St. | Seattle, WA 98134
Tel (206) 795-0193
[Geotechnical Engineering \(sharepoint.com\)](#)