SITE HAZARD ASSESSMENT
Worksheet 1
Summary Score Sheet

SITE INFORMATION:

Cleanup Site ID: 3076

Puget Park

Facility/Site ID: 2479

16th Avenue SW and SW Edmunds St

Seattle, King County, WA 98106

Section:	19	Latitude:	47.55909
Township:	24N	Longitude:	-122.35494
Range:	4E	Tax/Parcel ID:	2424039020, 2840700135

Site scored/ranked for the Hazardous Sites List Publication: August 2015

SITE DESCRIPTION:

The Puget Park site (Site) is a former and current greenbelt area located in Seattle, King County, Washington. The 19.11-acre property is located approximately 750 feet from the Lower Duwamish Waterway (LDW), and zoned for residential (SF 7200) use.

Adjacent properties include Pigeon Point Park to the north of the Site, the Upper Hudson Street site (Cleanup Site ID [CSID] 2597) to the east of the Site, and single family residences to the south, west, and northeast of the Site. To the south of the site, beyond a single family residence, is Surplus Items (CSID 12489). The Site is bordered on the east by Puget Way Southwest, and on the west by 21st Avenue Southwest. The Southwest Edmunds Street right-of-way is located adjacent to the northeast corner of the Site. North of the intersection of the Southwest Edmunds Street right-of-way and Puget Way Southwest, Puget Way Southwest is also referred to as 16th Avenue Southwest.

The Site is currently operated as a park by City of Seattle Department of Parks and Recreation.

In the late 1960s, the Site was regraded with cement kiln dust (CKD) from the Ideal Basic Industries cement plant, located northeast of the Site along West Marginal Way Southwest. The plant was acquired by Holnam in 1986. The Surplus Items site (CSID 12489) also contains CKD fill.

A portion of Puget Park (tax parcel 2840700135) was previously owned by John McFarland, and was associated with the site name 'McFarland Property'. The 'McFarland Property' site has been merged with Puget Park. The Puget Park site and the McFarland Property have also been associated with the name 'Hudson Street site'; however, the 'Upper Hudson Street site' is currently associated with a state cleanup site (CSID 2597) located at the residential property owned by the McFarland family, to the east of the Site.

The Site is located within the Spokane Street to Kellogg Island Source Control Area for the Lower Duwamish Waterway. Puget Creek is located within the Site, and discharges to the LDW near Southwest Idaho Street.

SITE BACKGROUND:

A summary of prior operations/tenants at the subject property is presented below.

From	To	Operator/Tenant	Activity
	2002	John McFarland	Private property (tax parcel 2840700135)
2002	2014	City of Seattle Department of Parks and Recreation	Puget Park

SITE CONTAMINATION:

In 1993 the Puget Park site was reported to Washington State Department of Ecology (Ecology) and placed on the Confirmed and Suspected Contaminated Sites (CSCSL) list with ID number 3076.

In 1968 and 1969, CKD fill was placed in Puget Park. The fill was reportedly partially covered with soil and vegetation. The fill is up to 20 feet thick, and generally follows the natural slope of the park. The CKD fill was deposited in two areas, called the Puget Park lobe and the McFarland lobe, and both are currently located on City

of Seattle property. The Puget Park lobe is composed of approximately 40,000 cubic yards of CKD fill. Approximately 11,000 cubic yards of CKD was used to create the McFarland lobe, located to the east of the Puget Park Lobe. The McFarland Lobe is on property (tax parcel 2840700135) originally owned by Margaret and John McFarland, however the property was gifted to the City of Seattle in 2002. In 1996, the McFarland lobe was covered with grass, brush, and alders, and varied from a 20 degree to 45 degree slope. An estimated 20,000 square feet of the fill area is exposed with relatively little soil cover, and an estimated 10,000 square feet are covered with soil up to 6 inches in thickness.

The Site was listed in Ecology's database in 1993, when a representative from the Seattle Department of Parks and Recreation observed a calcium carbonate formation near a seep in Puget Park. Two surface water samples were collected and analyzed for pH and eight metals. The pH of water near the seep was 11.96, and 8.6 further downstream. Concentrations of arsenic in surface water were above the Model Toxics Control Act (MTCA) Method B (carcinogen and non-carcinogen) cleanup levels. Concentrations of lead and cadmium were above the fresh water acute toxicity for aquatic life (WAC 173-201A). The concentration of cadmium was below the MTCA Method B (non-carcinogen) cleanup level. A surface water MTCA Method B cleanup level has not been promulgated for lead.

In 1994, a limited environmental assessment was conducted to the east of the Site to assess the metals present in soils below two proposed road realignment alternatives for Puget Boulevard Southwest (also referred to as Puget Way Southwest). Twenty-eight soil samples were collected from depths of between 0.5 to 4 feet below ground surface (bgs) in the area of the McFarland lobe. Concentrations of arsenic, cadmium, and lead were present in soil at concentrations above MTCA Method A cleanup levels. Concentrations of chromium (total) in some soil samples were below the MTCA Method A cleanup level for chromium III but above the MTCA Method A cleanup level for chromium VI. The pH of soil samples ranged from 7.87 to 12.39. Samples were analyzed using the Toxicity Characteristic Leaching Procedure (TCLP), and none of the samples analyzed exceeded the 1994 TCLP criteria for dangerous waste.

In December 1994, the Static Acute Fish Toxicity Test was used to determine whether the fill constituted a dangerous or extremely hazardous waste. The fill was determined to be toxic to fish at a concentration of 1,000 milligrams per liter (mg/L) but not at 100 mg/L. Fish bioassays were reportedly within the 1994 acceptable range. Based on this information, Ecology determined that the CKD would not constitute a dangerous waste. Additionally, Holnam, the source of the CKD fill, reportedly received an exemption from the dangerous waste designation for CKD used as fill.

In 1996, Hart Crowser excavated 21 test pits around the north and south sides of the Puget Park lobe. The Puget Park lobe has a relatively flat top, and side slopes of approximately 30 to 40 degrees. The lobe is estimated to have a total surface area of approximately 100,000 square feet, of which 35,000 square feet is uncovered, and 65,000 square feet covered by soil. Travertine-like deposits of calcium carbonate were observed on the downgradient side of the CKD fill area.

Characterization of the CKD fill in the Puget Park lobe indicated that metal concentrations were above the MTCA Method A cleanup levels for soil; however, the CKD fill cannot be classified as dangerous waste. The mean value for characterization samples was 266 milligrams per kilogram (mg/kg) arsenic, 7.6 mg/kg cadmium, and 2,104 mg/kg lead.

The Site entered the Voluntary Cleanup Program (VCP) in 1997 with an ID number of NW0682, and was terminated from the VCP in 2007 due to inactivity.

PAST REMEDIATION ACTIVITIES:

In 1997, remedial activities began at the Site, and included implementation of an enhanced soil cover, management of the carbonate precipitate, and drainage improvements. Approximately 7.5 tons of solid waste were disposed of offsite, and generally consisted of debris that had been accumulated at the Site. Approximately 250 feet of hay bale sediment fence and 200 feet of silt fence were installed downhill of the excavation locations and roadways to provide erosion control.

Approximately 55,000 square feet of the Site received an enhanced soil cover. In these areas, vegetation was removed, chipped, and left onsite. This layer was covered by approximately 24 inches of soil cover, which was seeded with a standard soil erosion seed mixture consisting of seed, mulch, tackifier, and fertilizer. Areas of the

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CKD lobe that already contained a soil cover of at least 12 inches were not disturbed. Both lobes were then planted with a variety of plants to stabilize the soil, and temporary fencing was installed around the Site.

In two areas where carbonate precipitate formation was present at the surface, the carbonate was excavated and placed within the McFarland Lobe, beneath a 24-inch soil cover. The excavated area was generally 4 to 6 inches deep, and consisted of approximately 5,000 square feet. The excavations were lined with a nonwoven geotextile, and filled with gravel. These excavations were designed to promote precipitation of metals from seepage water. The two precipitate chambers were reportedly clogged by March 1998. Several holes were punctured in the geotextile fabric, which allowed the water to flow. In June 1998 and June 1999, surface water samples were reportedly collected flowing into and out of the precipitation area. In the gravel chamber south of the Puget Park lobe, surface water pH and dissolved lead concentrations were reportedly higher in the outflow than in the inflow water.

Prior to remedial activities, surface water from uphill of Puget Park discharged into a ravine that separated the Puget Park and McFarland CKD lobes. As part of the remedial action, a culvert was installed beneath Puget Way Southwest, which directed surface water along the east side of Puget Way Southwest, and away from the CKD lobes.

A hydrogeologic study was proposed in 2000, however no report on the hydrogeology of the area was available for review in Ecology's files.

A study by the Geo Group in 2003 suggested that further remedial action should be directed towards the reduction of impacted surface water flow into Puget Creek. The suggested remedies included drainage changes above and around the CKD lobes.

In 2003, samples of surface water, bottom solids from Puget Creek, and CKD from the fill area were collected and analyzed for dioxins and furans. The toxicity equivalent concentrations of dioxins and furans were below the MTCA Method B (carcinogen) cleanup level for 2,3,7,8-TCDD and furans.

A leachate collection trench was designed for the Puget Park CKD lobe in 2005, however no plans or documentation on the implementation of this trench were available for review in Ecology's files.

CURRENT SITE CONDITIONS:

CKD fill is present at the Site beneath a soil cap of 12 to 24 inches. The CKD fill at the Site contains concentrations of arsenic, cadmium, and lead above the MTCA Method A cleanup level for soils. Surface water samples from Puget Creek, located within the Site, contained arsenic above the MTCA Method B cleanup level cleanup level, and lead and cadmium above the fresh water acute toxicity criteria for aquatic life.

Further cleanup actions, including construction of a leachate trench and other drainage improvements, have been proposed for the Site, however no record of the implementation of these plans was available for review in Ecology's files.

The approximate depth to groundwater is 5 to 13 feet below ground surface, with groundwater flowing to the southeast (estimated based on surface topography). Subsurface soils are CKD overlying sandy silt and silty clay.

SPECIAL CONSIDERATIONS:

Checked boxes indicate routes applicable for Washington Ranking Method (WARM) scoring

☑ **Surface Water**

Surface water at the Site contains arsenic at concentrations above the MTCA Method B cleanup level, and lead and cadmium at concentrations above the fresh water acute toxicity criteria.

☐ **Air**

CKD fill has been capped with 12 to 24 inches of soil cover.

☑ **Groundwater**

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Metals in CKD fill at the Site have the potential to impact shallow perched groundwater. Groundwater has not been characterized at the Site.

The relationship between this Site and several nearby state cleanup sites (former McFarland Property site (merged with Puget Park); Upper Hudson Street (CSID 2597)) is sometimes unclear in the file history. This Site Hazard Assessment (SHA) is associated with CKD fill on tax parcels currently owned by the City of Seattle and operated as Puget Park.

ROUTE SCORES:

Surface Water/ Human Health:	20.9	Surface Water/ Environment:	40.5
Air/ Human Health:		Air/ Environment:	
Groundwater/ Human Health:	40.0		

Overall Rank: 4

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9 Hart Crowser, 1997a, Remedial Evaluation Report Hudson Street Site West Seattle, Washington. Prepared for Joint Defense Team. September 5, 1997.

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17 North Creek Analytical, 1994, Bioassay Report 96-Hour DOE Hazardous Waste Characterization, Rainbow Trout. Prepared for Agra E & E. December 1994.

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19 Seattle Department of Parks and Recreation, 1993, Memorandum Re: Puget Park Leachate. July 13, 1993.

20 Seattle Parks and Recreation, 2005, Letter Re: Leachate Collection Trench. January 6, 2005.

21 Sherwood History Files: Puget park. Http://www.seattle.gov/parks/history/PugetPk.pdf. Accessed 18 March 2015.

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23 WARM Toxicological Database

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25 Washington State Department of Ecology, 1997, Memo Re: Consolidation of Puget Park and McFarland sites Puget Park: N-17-5252-000, McFarland Property, N-17-5378-000. November 21, 1997.

SITE HAZARD ASSESSMENT
Worksheet 2
Route Documentation

Cleanup Site ID: 3076 Puget Park

Facility/Site ID: 2479

1. SURFACE WATER ROUTE

List those substances to be considered for scoring:

Arsenic, cadmium, lead

Explain the basis for choice of substances to be used in scoring:

Prior detection in surface water at the Site

List those management units to be considered for scoring:

Surface water

Explain basis for choice of unit to be used in scoring:

Presence in Site surface water (seeps and Puget Creek)

2. AIR ROUTE

List those substances to be considered for scoring:

Not applicable

Explain the basis for choice of substances to be used in scoring:

List those management units to be considered for scoring:

Explain basis for choice of unit to be used in scoring:

3. GROUNDWATER ROUTE

List those substances to be considered for scoring:

Arsenic, cadmium, lead

Explain the basis for choice of substances to be used in scoring:

Prior detection in Site fill at concentrations above the MTCA Method A cleanup levels

List those management units to be considered for scoring:

Groundwater

Explain basis for choice of unit to be used in scoring:

Potential for transport to shallow perched groundwater; seeps at the Site are documented to emerge from downgradient of the CKD fill areas. Groundwater discharges to surface water at the Site.

Worksheet 4

Surface Water Route

CSID: 3076 **Site Name:** Puget Park

1.0 Substance Characteristics

1.1 Human Toxicity

Substance	Drinking Water Standard Value	Acute Toxicity Value	Chronic Toxicity Value	Carcinogenicity Value
Arsenic	8	5	5	7
Lead	6	X	10	X
Cadmium	8	5	5	X

Highest Value 10

Bonus Points? 2

Human Health Toxicity Value 12

1.2 Environmental Toxicity

	Acute Water Quality Criteria		Non-human Mammalian Acute Toxicity	
Substance	ug/L	Value	mg/kg	Value
Arsenic	360	4	763	5
Lead	82	6	X	X
Cadmium	3.9	8	225	5

Environmental Toxicity Value 8

1.3 Substance Quantity

Amount: Approximately 51,000 cubic yards

Basis: Estimated volume of CKD fill

Substance Quantity Value 9

2.0 Migration Potential

2.1 Containment Containment Value 5

Explain Basis: CKD material has been capped/covered with some drainage controls.
Maintenance of cover and drainage controls is uncertain.

2.2 Surface Soil Permeability Soil Permeability Value 3

Sands and silts

2.3 Total Annual Precipitation Total Precipitation Value 3

37 inches

2.4 Max 2-yr/24-hour Precipitation 2YR/24HR Precipitation Value 3

2.4 inches

2.5 Floodplain Floodplain Value 0

Not in the floodplain

2.6 Terrain Slope Slope Value 5

>8% slope

Worksheet 4

Surface Water Route

CSID: 3076 **Site Name:** Puget Park

3.0 Targets

3.1 Distance to Surface Water — Surface Water Distance Value: 10

Small stream within Site (Puget Creek)

3.2 Population Served within 2 miles — Population Value: 0

0 people

3.3 Area Irrigated within 2 miles — Irrigation Value: 0

0 acres

3.4 Distance to Nearest Fishery Resource — Fishery Value: 12

Small stream within Site (Puget Creek)

3.5 Distance to and Name of Nearest Sensitive Environment — Sensitive Environment Value: 12

Site is a public park

4.0 Release — Release to Surface Water Value: 5

Explain basis for scoring a release to surface water

Confirmed release to surface water

Pathway Scoring - Surface Water Route, Human Health Pathway

$SW_H = (SUB_{SH}*40/175)*[(MIG_S*25/24) + REL_S + (TAR_{SH}*30/115)]/24$

Where:

SUB_{SH} = (Human Toxicity Value + 3)*(Containment + 1) + Substance Quantity	SUB_{SH}	99
MIG_S = Soil Permeability + Annual Precip + Rainfall Frequency + Floodplain + Slope	MIG_S	14
REL_S = Release to Surface Water	REL_S	5
TAR_{SH} = Distance to Surface Water + Population Served by Surface Water + Area Irrigated	TAR_{SH}	10.0
	SW_H	20.9

Pathway Scoring -Surface Water Route, Environmental Pathway

$SW_E = (SUB_{SE}*40/153)*[(MIG_S*25/24) + REL_S + (TAR_{SE}*30/34)]/24$

Where:

SUB_{SE} = (Env Tox Value + 3) * (Containment + 1) + Substance Qty	SUB_{SE}	75
MIG_S = Soil Permeability + Annual Precip + Rainfall Frequency + Floodplain + Slope	MIG_S	14
REL_S = Release to Surface Water	REL_S	5
TAR_{SE} = Distance to Surface Water + Distance to Fishery + Distance to Sensitive Environment	TAR_{SE}	34.0
	SW_E	40.5

Worksheet 6

Groundwater Route

CSID: 3076 **Site Name:** Puget Park

1.0 Substance Characteristics

1.1 Human Toxicity

Substance	Drinking Water Standard Value	Acute Toxicity Value	Chronic Toxicity Value	Carcinogenicity Value
Arsenic	8	5	5	7
Lead	6	X	10	X
Cadmium	8	5	5	X

Highest Value 10

Bonus Points? 2

Toxicity Value 12

1.2 Mobility

Cations/Anions Max Value: 3

Solubility Max Value:

Mobility Value 3

1.3 Substance Quantity

Amount: Approximately 51,000 cubic yards

Basis: Estimated volume of CKD fill

Substance Quantity Value 6

2.0 Migration Potential

2.1 Containment

Containment Value 10

Explain Basis: Contaminated soil

2.2 Net Precipitation >10 to 20 inches

Net Precipitation Value 2

2.3 Subsurface Hydraulic Conductivity

Conductivity Value 3

Sand and silt

2.4 Vertical Depth to Groundwater 8 feet

Confirmed release: No

Depth to Aquifer Value 8

3.0 Targets

3.1 Groundwater Usage

Aquifer Use Value 2

Groundwater not used, but usable

3.2 Distance to Nearest Drinking Water Well >10,000 feet

Well Distance Value 0

3.3 Population Served within 2 Miles

Population Served Value 0

0 people

Worksheet 6

Groundwater Route

CSID: 3076 **Site Name:** Puget Park

3.4 Area Irrigated by GW Wells within 2 miles Area Irrigated Value 0

0 acres

4.0 Release Release to Groundwater Value 5

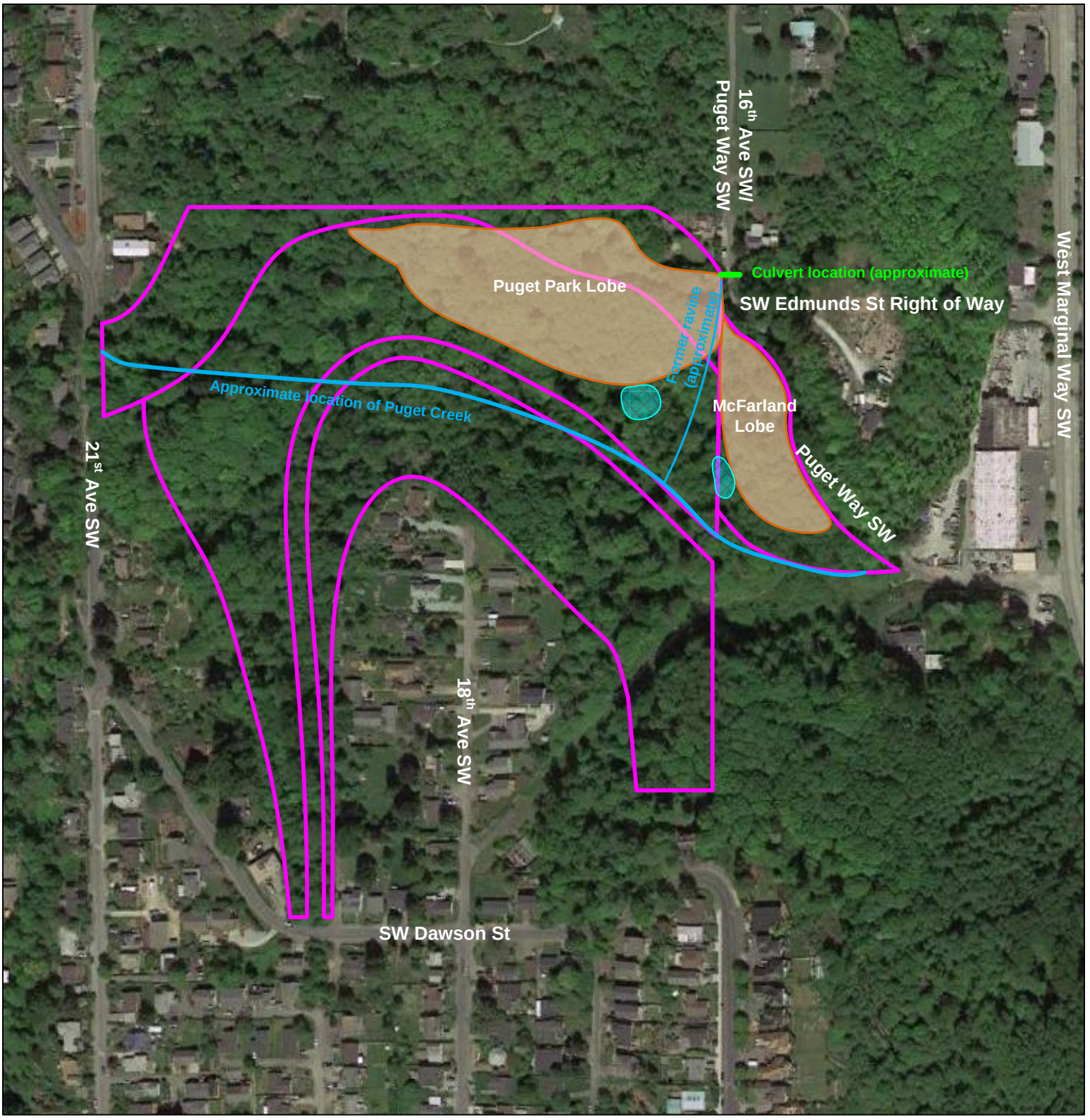
Explain basis for scoring a release to groundwater:
Groundwater has not been characterized, however release to seeps discharging to surface water has been confirmed

Pathway Scoring - Groundwater Route, Human Health Pathway

$GW_H = (SUB_{GH}*40/208)*[(MIG_G*25/17)+REL_G+(TAR_{GH}*30/165)]/24$

Where:

SUB_{GH} =(Human toxicity + mobility + 3) * (Containment + 1) + Substance Qty	SUB_{GH}	204
MIG_G=Depth to Aquifer+Net Precip + Hydraulic Conductivity	MIG_G	13
REL_G = Release to Groundwater	REL_G	5
TAR_{GH} = Aquifer Use + Well Distance + Population Served + Area Irrigated	TAR_{GH}	2.0
	GW_H	40.0



Legend:

- Property location (approximate)
- CKD fill area with soil cap (approximate)
- Gravel precipitate area (approximate)

Note: The section of road north of the intersection of SW Edmunds Street and Puget Way SW is referred to in reference documents as both 16th Avenue SW and Puget Way SW.

Notes:

1. All locations are approximate, and not to scale.

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Puget Park
16th Avenue Southwest and Southwest Edmunds Street
Seattle, WA 98106

DEPARTMENT OF ECOLOGY
State of Washington

Site Overview Map

CSID 3076
CSID3076.vsd

Washington Ranking Method

Route Scores Summary and Ranking Calculation Sheet

Site Name: Puget Park **CSID:** 3076

Site Address: 16th Avenue Southwest and Southwest Edmunds Street **FSID:** 2479

HUMAN HEALTH ROUTE SCORES

Enter Human Health Route Scores for all Applicable Routes:

Pathway	Route Score	Quintile Group
Surface Water	20.9	3
Air	ns	0
Groundwater	40.0	3

H=	3
M=	3
L=	0

$$\frac{H^2 + 2M + L}{8} = \frac{9 + 6 + 0}{8}$$

Human Health Priority Bin Score: **2**

rounded up to next whole number

ENVIRONMENT ROUTE SCORES

Enter Environment Route Scores for all Applicable Routes:

Pathway	Route Score	Quintile Group
Surface Water	40.5	4
Air	ns	0

H=	4
L=	0

$$\frac{H^2 + 2L}{7} = \frac{16 + 0}{7}$$

Environment Priority Bin Score: **3**

rounded up to next whole number

Comments/Notes:

FINAL MATRIX RANKING **4**

FOR REFERENCE:

Final WARM Bin Ranking Matrix

Human Health Priority	Environment Priority 5	4	3	2	1	N/A
5	1	1	1	1	1	1
4	1	2	2	2	3	2
3	1	2	3	4	4	3
2	2	3	4	4	5	3
1	2	3	4	5	5	5
N/A	3	4	5	5	5	NFA

Quintile Values for Route Scores - February 2015 Values

Quintile	Human Health Surface Water	Air	Ground Water	Environment Surface Water	Air
5	>= 30.7	>= 37.6	>= 51.6	>= 50.9	>= 29.9
4	>= 23.1	>= 23.8	>= 40.9	>= 31.2	>= 22.5
3	>= 14.1	>= 15.5	>= 33.2	>= 23.6	>= 14.0
2	>= 7.0	>= 8.5	>= 23.5	>= 11.0	>= 1.6
1	<= 6.9	<= 8.4	<= 23.4	<= 10.9	<= 1.5

Quintile value associated with each route score entered above