

SITE HAZARD ASSESSMENT
Worksheet 1
Summary Score Sheet

SITE INFORMATION:

Basin Oil Co Dallas Ave
8661 Dallas Avenue S
Seattle, King County, WA 98108

Cleanup Site ID: 1844
Facility/Site ID: 83476734

Section:	33	Latitude:	47.52621
Township:	24N	Longitude:	-122.31152
Range:	4E	Tax/Parcel ID:	7884100110, 7884100145

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

SITE DESCRIPTION:

The Basin Oil Co Dallas Ave site (Site) is a former oil recycling facility located in Seattle, King County, Washington. The 0.38-acre property is located approximately 260 feet from the Duwamish River, and zoned for industrial (IG2 U/65) use.

Adjacent properties include a parcel also operated as Basin Oil Company to the north, and a warehouse, single family residences, and the Basin Oil storage site (Cleanup Site ID [CSID] 4789) to the west, across 17th Avenue South. To the south, across South Donovan Street, is a Boeing Company facility. North and east of the Site, across Dallas Avenue South, is the former Malarkey Asphalt/Port of Seattle Terminal 117 site (CSID 1385).

The Site is currently operated as a vacant lot by Basin Oil Co, Inc.

The Site is part of the triangular Basin Oil Company property, which is bordered by Dallas Avenue South to the east, by 17th Avenue South to the west, and by South Donovan Street to the south.

Nearby state cleanup sites include Basin Oil Drum Storage (CSID 4789) to the west across 17th Avenue South, Port of Seattle Terminal 117 (CSID 1385) to the northeast across Dallas Avenue South, and the South Park Marina (CSID 2858) to the north of Terminal 117. The streets in the South Park area, including 17th Avenue South, South Donovan Street, and Dallas Avenue South, were part of a City of Seattle interim action for polychlorinated biphenyls (PCBs) in soil. Final cleanup in this area is reportedly slated for 2015.

The Site previously had an industrial stormwater general permit (SO3-002273) but does not currently have a permit. City of Seattle Utilities maps indicate that the area one block west of the Site is drained by a combined sewer.

The Basin Oil Dallas Avenue Site is located within the Terminal 117 Early Action Area (EAA), though it is not part of the EAA. The Basin Oil Company was in operation at the Site from approximately 1987 to 2004. The Site originally belonged to Malarkey Asphalt, and was rented by Basin Oil until 2000, when Basin Oil purchased the property.

SITE BACKGROUND:

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

<u>From</u>	<u>To</u>	<u>Operator/Tenant</u>	<u>Activity</u>
1930			Single family residences
1990	2000	Duwamish Properties	Basin Oil Company
2000	2004	Basin Oil Co Inc.	Basin Oil Company
2004	2014	Basin Oil Co Inc.	Vacant

SITE CONTAMINATION:

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In 1991 the Basin Oil Co Dallas Ave site was reported to Washington State Department of Ecology (Ecology) and placed on the Confirmed and Suspected Contaminated Sites (CSCSL) list with ID number 1844.

Ecology was first notified of a release at the Site in 1991. The Site joined the Voluntary Cleanup Program (VCP) in 2006 with an ID number of NW1629. It was terminated from the program in 2008.

While in operation, Basin Oil collected and transported used oil to the Site, where it was stored in aboveground storage tanks (ASTs). Oil was reportedly treated using gravity sediment separation and de-emulsification by heating. The oil was blended, and then transferred into tank trucks for transport offsite. As part of the treatment process, two heat processing tanks were located on the Site, and vented directly to the atmosphere. No other information about these tanks was available for review. The operation reportedly comprised of approximately 22 ASTs, which had a total capacity of 150,000 gallons. The southern portion of the Site was formerly used for storage and crushing of drums and used oil filters.

Basin Tank and Environmental Service also operated at the Site until 2002. This company operated as an aboveground and underground storage tank (UST) removal service, including residential heating oil tanks. This operation was reportedly the source of 600 55-gallon drums stored at a private residence across the street to the west, also known as Basin Oil Drum Storage (CSID 4789). Northwest Antifreeze Service, Inc. also operated at the Site and was active in 2003.

Types of oil and waste products stored at the Site are reported have included metal working fluids, brake fluids, transmission fluids, diesel, oil water, crude oil, Bunker C oil, machine shop oils, oil/water separator sludge, and oil filters. Antifreeze was also formerly stored, but not processed, at the Site. Incidental spills reportedly occurred to soil.

Basin Oil closed in April 2004, and was sold to Emerald Recycling. The ASTs were decommissioned in June 2004, but decommissioning work was stopped in October 2004 by the City of Seattle. Plans for decommissioning of the remaining tanks were submitted to the City of Seattle as of September 2006. No ASTs remain at the Site, but no information was available for review regarding their removal.

PAST REMEDIATION ACTIVITIES:

In 1991, Ecology reportedly conducted a Site Hazard Assessment on the Malarkey Property (Terminal 117, across Dallas Avenue South), which at that time included the Basin Oil Site. As part of this investigation, three groundwater monitoring wells were reportedly installed, including one well at the Basin Oil Site. PCBs were detected in soil samples collected from the soil borings at a concentration of 1.5 milligrams per kilogram (mg/kg) 18 inches below the surface, and at a concentration of 24 mg/kg at a depth of 3 feet below ground surface (bgs). These concentrations are above the Model Toxics Control Act (MTCA) Method A and B cleanup levels for PCBs in soil under unrestricted land use.

URS Consultants conducted a site inspection in 1994 for the Environmental Protection Agency (EPA). A groundwater sample collected from the onsite monitoring well reportedly contained 1,1,1-trichloroethane at a concentration of 7 micrograms per liter ($\mu\text{g/L}$). Trichloroethane was not detected in a groundwater sample collected in May 2003 from the same location.

A drainage investigation report from 1995 suggests that water from the Basin Oil oil/water separator was being pumped to a pond on the Malarkey property, which was then discharged to the Duwamish.

The Site had an industrial wastewater permit, likely starting in 1995. Reportedly, all catch basins located on the Site went to an oil/water separator, which discharged to Dallas Avenue South. It was noted in wastewater permit documentation that storm drains on the property have the potential to discharge oil from onsite spills. An unknown number of surface spills have been reported on the Site to King County Surface Water Management division. The two largest spills on record include one 500 to 600-gallon spill of used oil in 1993, and one spill of approximately 20 gallons of diesel fuel in 1996. The 500 to 600-gallon spill was reportedly from an AST, which spilled onto a concrete containment area. All of the oil was reportedly cleaned up. The 1996 spill of approximately 20 gallons diesel fuel was reportedly spilled onto the ground. Petroleum-impacted soils from this spill are reported to have been excavated and replaced with clean fill, but no documentation on this excavation was available for review.

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At least three reports of spilled oil were reported to Ecology during 1996 and 1997, though the amount of oil for each of these spills was not confirmed. Another surface spill of oil was reported in 2003.

A 1996 Phase I Environmental Site Assessment conducted at the Site reported no visual or olfactory evidence of soil contamination. Given the Site's close proximity to other known contaminated sites, 10 soil samples were collected and analyzed for total petroleum hydrocarbons (TPH), PCBs, and selected metals. Soil samples were collected at a depth of 1-foot below grade, and composited into 2 soil samples for laboratory analysis. No detections of analytes in soil were reported.

In 2004, sludge samples were collected from an oil/water separator and catch basin at the Site. Concentrations of polycyclic aromatic hydrocarbons (PAHs) (183 to 4,300 mg/kg), arsenic (98 and 248 mg/kg), zinc (711 and 830 mg/kg), bis(2-ethylhexyl)phthalate (41 and 84 mg/kg), and PCBs (0.14 and 0.35 mg/kg) were detected in the sludge samples. Concentrations of arsenic detected in the sludge samples were above the MTCA Method A and B cleanup levels for soil.

In August 2004, Seattle Public Utilities (SPU) discovered concentrations of PCBs above the MTCA Method A cleanup level in street dirt and catch basin samples in roadways adjacent to Terminal 117. The roads bordering the Basin Oil Site were identified as containing PCB-impacted dirt. Concentrations of PCBs identified in street median strips and grass strips along the sides of the roadway were as high as 9.2 mg/kg, and soil underlying roadways contained concentrations of PCBs up to 66 mg/kg. As part of an interim cleanup action led by the City of Seattle, some contaminated soil was removed, and a small amount was covered in order to reduce exposure. During this excavation, dioxins (15 parts per trillion [ppt]) were also reportedly detected in a soil sample from the south side of Dallas Avenue South, along the property boundary of Basin Oil. While these samples were not taken on the Basin Oil Site, and Basin Oil was not sampled as part of this project, it is suspected that soil containing PCBs and dioxins may be present at the Basin Oil Site.

The Site entered the Voluntary Cleanup Program (VCP) in 2006, and produced a draft workplan for an investigation which was to occur by the end of October 2006. The Site plan suggests that PCBs are not confirmed in soils at the Site, as is suggested in Ecology's Integrated Site Information System (ISIS) database. The Site was terminated from VCP in 2008 for inactivity. No information on the Site more recent than 1996 was provided to Ecology as part of the VCP application.

In November 2008, a penalty was issued to Basin Oil by Ecology for five hazardous waste violations, including failure to provide secondary containment, failure to properly identify oil tank bottom sludge, and failure to close a used oil facility without an Ecology-approved plan. Basin Oil appealed, and a payment plan was agreed to by both parties.

In May 2009, Science Applications International Corporation (SAIC) conducted field sampling at the Site. A total of ten soil borings were advanced (completed to approximately 14 to 16 feet bgs) and two offsite monitoring wells (28 to 30.5 feet bgs) were installed. Surface soil, subsurface soil, and groundwater samples were collected for laboratory analysis. Surface soil samples were analyzed for PCBs and dioxins/furans. PCBs were not detected in the samples at or above the laboratory reporting limit. Dioxins and furans were detected in soil; the highest detected concentrations were octachlorodibenzo-p-dioxin and 1,2,3,4,6,7,8-hexachloro dibenzo-p-dioxin, at concentrations of 223 picograms per gram (pg/g) and 36.4 pg/g respectively, both at a depth of 0 to 2 inches. The total toxicity equivalent concentration of dioxins were below the MTCA Method B (carcinogenic) cleanup level for 2,3,7,8-tetrachlorodibenzo-p-dioxin and the total toxicity equivalent concentration of furans were below the MTCA Method B (non-carcinogen) cleanup level for furans. Groundwater samples were collected from the two offsite wells in May 2009. The groundwater samples contained arsenic at concentrations above MTCA Method A and B cleanup levels, however the 2009 SAIC report does not report any concentrations of other metals. Groundwater samples reportedly did not contain detectable levels of TPH, PCBs, or semivolatile organic compounds (SVOCs). Chloromethane, acetone, and chloroform were detected in groundwater, but at concentrations below the MTCA Method B cleanup levels.

Soil samples collected in May 2009 from soil borings and monitoring wells were tested for selected metals, PCBs, petroleum hydrocarbons, SVOCs, and volatile organic compounds (VOCs). In all sampling locations, arsenic was detected in soil at concentrations above the MTCA Method B cleanup level, but not above the MTCA Method A cleanup level. Chromium was also detected in all soil boring samples and monitoring well soil samples at concentrations above the MTCA Method A cleanup level for chromium VI, but below the MTCA Method A cleanup level for chromium III. Other metals were detected, but at concentrations below their corresponding

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MTCA cleanup levels. One soil sample (BSB-3) contained PCBs at a concentration exceeding the MTCA Method A cleanup level, and two additional samples (BSB-6 and BSB-7) contained concentrations of PCBs above the MTCA Method B cleanup level, which is more conservative than the Method A level. PCBs were generally detected in the upper 6 inches of soil, though PCBs were also present above the MTCA Method B cleanup level in one sample from 12.5 feet bgs (BSB-3). Three soil samples contained gasoline at concentrations above the MTCA Method A cleanup level, and one sample contained heavy oil and benzene at concentrations above MTCA Method A cleanup levels (BSB-6, 0 to 6 inches depth, gasoline at 250 mg/kg; BSB-7, 0 to 6 inches depth, gasoline at 1,100 mg/kg; BSB-10, 0 to 6 inches depth, gasoline at 660 mg/kg, heavy oil at 5,200 mg/kg, benzene at 0.64 mg/kg). Petroleum products detected at concentrations above MTCA cleanup levels were present in the upper 6 inches of soil. Benzo(a)pyrene was present at concentrations above the MTCA Method A cleanup level in MW-12 and BSB-1, in the upper 0 to 12 inches. The total toxicity equivalent concentrations of cPAHs in those soil samples was above the MTCA Method A cleanup level for benzo(a)pyrene.

The 2009 SAIC report suggested that PAH concentrations were generally highest on the west side of the Site, at BSB-1 and MW-12, and metals and petroleum hydrocarbons were highest in the northern end of the Site, in BSB-10, BSB-7, and BSB-6.

CURRENT SITE CONDITIONS:

No further excavation is known to have occurred since the Site Characterization in 2009. The property is currently unused.

Concentrations of chromium, PCBs, heavy oil, gasoline, benzene, and benzo(a)pyrene were detected in soil above their respective MTCA Method A cleanup levels. With the exception of arsenic and chromium, impacted soil is located primarily at depths of 0 to 6 inches bgs. Dioxins and furans have also been detected in soil at the Site.

Arsenic is present in groundwater at concentrations exceeding the MTCA Method A and B cleanup levels.

The approximate depth to groundwater is 4 to 17 feet below ground surface, with groundwater flowing to the northeast (estimated based on surface topography relative to the Lower Duwamish Waterway). Subsurface soils are sand and silty sand overlying sand and gravel (based on soil borings).

SPECIAL CONSIDERATIONS:

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

Surface Water

Petroleum-impacted soils are primarily located within the top 0 to 6 inches of Site soils, and arsenic and chromium were detected in Site soils at several depths. The Site is located within 300 feet of the Duwamish River.

Air

Volatile compounds are present in shallow soils.

Groundwater

Arsenic was detected in groundwater at concentrations above MTCA Method A cleanup levels.

PCBs are primarily present at the Site in shallow soils. One boring and soil sample detected PCBs at depth, but PCBs are unlikely to be transported via groundwater due the low mobility of PCBs in groundwater.

ROUTE SCORES:

Surface Water/ Human Health:	23.0	Surface Water/ Environment:	57.8
Air/ Human Health:	49.0	Air/ Environment:	2.7
Groundwater/ Human Health:	33.3		

Overall Rank: 1

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REFERENCES:

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 - 2 Creative Environmental Technologies, Inc., 1996, Level 1 Environmental Site Assessment Report. December 30, 1996.
 - 3 Ecology Water Resources Explorer, accessed February 2014.
<https://fortress.wa.gov/ecy/waterresources/map/WaterResourcesExplorer.aspx>
 - 4 ENSR Corporation, 2006, DRAFT Workplan for Initial Investigation of the Former Basin Oil Facility, Seattle, Washington. September 2006.
 - 5 King County GIS Center iMAP application, Property Information, Groundwater Program, and Sensitive Areas mapsets. Accessed March 2014.
<http://www.kingcounty.gov/operations/GIS/Maps/iMAP.aspx>
 - 6 King County Surface Water Management Division, 1993, Drainage Investigation Report, Basin Oil. December 20, 1993.
 - 7 King County Surface Water Management Division, 1995, Drainage Investigation Report, Basin Oil/Malarkey. June 12, 1995.
 - 8 Missouri Census Data Center, Circular Area Profiles - 2010 census data around a point location. <http://mcdc.missouri.edu/websas/caps10c.html>. Accessed March 2014.
 - 9 National Climatic Data Center 2011 Local Climatological Data for Seattle, Seattle Tacoma Airport. <http://www1.ncdc.noaa.gov/pub/orders/IPS-90B1F39F-6CFA-4A6B-AA82-5ED1FF897CCC.pdf>
 - 10 Science Applications International Corporation, 2005, Lower Duwamish Waterway Source Control Action Plan for the Terminal 117 Early Action Area. July 2005.
 - 11 Science Applications International Corporation, 2009, Draft Summary of Site Characterization Activities. August 28, 2009.
 - 12 State of Washington, 2008, Pollution Control Hearings Board, State of Washington, Terry Drexler and Basin Oil v. State of Washington Department of Ecology.
 - 13 United States Environmental Protection Agency Region 10, 2003, TSCA PCB Inspection, Basin Oil, Seattle, Washington. August 21, 2003.
 - 14 WARM Scoring Manual
 - 15 WARM Toxicological Database
 - 16 Washington Department of Transportation 24-hour Isopluvial Maps, January 2006 update.
<http://www.wsdot.wa.gov/publications/fulltext/Hydraulics/Wa24hrIsopluvials.pdf>
 - 17 Washington State Department of Ecology, 2009, Fiscal Year 2009 End-of-Year Report, RCRA Performance Partnership. September 2009.
Agreement (PPA)
 - 18 Washington State Department of Health, 2001, Basin Oil Company, Seattle, King County, Washington. September 5, 2001.
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SITE HAZARD ASSESSMENT
Worksheet 2
Route Documentation

Cleanup Site ID: 1844

Basin Oil Co Dallas Ave

Facility/Site ID: 83476734

1. SURFACE WATER ROUTE

List those substances to be considered for scoring:

Gasoline, heavy oil, arsenic, chromium, PCBs, benzo(a)pyrene, zinc, bis(2-ethylhexyl)phthalate

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

Prior detection in shallow soils at the Site; bare ground and/or cracked pavement is suspected to be present 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:

The Site does not currently have a stormwater permit, but previously discharged directly to a stormwater system that is connected to surface water. There is evidence of surface impacts, or surface conditions at the property may allow stormwater to impact soils and/or groundwater

2. AIR ROUTE

List those substances to be considered for scoring:

Gasoline (benzene), arsenic, chromium, and benzo(a)pyrene were evaluated using Worksheet 3, which indicated that gasoline was the substance that should be scored using the air route

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

Prior detection in soils at concentrations above MTCA Method A or B cleanup levels

List those management units to be considered for scoring:

Soil vapor

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

Potential for vapor transport

3. GROUNDWATER ROUTE

List those substances to be considered for scoring:

Arsenic

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

Prior detection in groundwater at concentrations above MTCA Method A and B cleanup levels

List those management units to be considered for scoring:

Groundwater

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

Presence of arsenic in groundwater at concentrations above MTCA Method A and B cleanup levels

Worksheet 3

Substance Characteristics Worksheet For Multiple Unit/Substance Sites

CSID 1844

Site Name Basin Oil Dallas Ave

	Combination 1	Combination 2	Combination 3
Management Unit:	Arsenic & Chromium impacted soils	Petroleum impacted soils	Benzo(a)pyrene impacted soils

1. Surface Water Route

Substance(s):			
Human Toxicity Value:			
Env. Toxicity Value:			
Containment Value:			
Rationale:			

Surface Water Human Subscore			
Surface Water Environment Subscore			

2. Air Route

Substance(s):	Arsenic, chromium	Gasoline	Benzo(a)pyrene
Human Toxicity/Mobility Value:	6	20	5
Env Toxicity/Mobility Value:	X	6	X
Containment Value:	10	10	10
Rationale:			

Air Human Subscore	99	253	88
Air Environment Subscore	X	99	X

3. Ground Water Route

Substance(s):			
Human Toxicity Value:			
Containment Value:			
Rationale:			

Groundwater Subscore			
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Based on the highest scoring toxicity/containment combinations, the following management units will be used for route scoring:

Surface Water:
 Air: Petroleum impacted soil
 Ground Water:

Worksheet 4
Surface Water Route

CSID: 1844

Site Name: Basin Oil Dallas Ave

1.0 Substance Characteristics

1.1 Human Toxicity

Substance	Drinking Water Standard Value	Acute Toxicity Value	Chronic Toxicity Value	Carcinogenicity Value
Gasoline	8	3	X	5
Diesel	4	5	3	X
Arsenic	8	5	5	7
Chromium	6	X	1	X
Benzo(a)pyrene	10	10	X	7
Bis(2-ethylhexyl)phthalate	X	1	1	4
Zinc	2	X	1	X
PCBs	10	3	X	6

Highest Value 10

Bonus Points? 2

Human Health Toxicity Value

1.2 Environmental Toxicity

Substance	Acute Water Quality Criteria		Non-human Mammalian Acute Toxicity	
	ug/L	Value	mg/kg	Value
Gasoline	5100	2	3306	3
Diesel	2350	2	490	5
Arsenic	69	6	763	5
Chromium	10300	2	X	X
Benzo(a)pyrene	300	4	50	10
Bis(2-ethylhexyl)phthalate	2944	2	30600	1
Zinc	95	6	X	X
PCBs	10	8	1315	3

Environmental Toxicity Value

1.3 Substance Quantity

Amount: 0.38 acres

Basis: Estimated extent of impacted surface soil

Substance Quantity Value

2.0 Migration Potential

2.1 Containment

Containment Value

Explain Basis: Contaminated soil at the surface with unknown runoff controls

2.2 Surface Soil Permeability

Soil Permeability Value

Sand and silty sand

2.3 Total Annual Precipitation

Total Precipitation Value

37 inches

2.4 Max 2-yr/24-hour Precipitation

2YR/24HR Precipitation Value

2.4 inches

2.5 Floodplain

Floodplain Value

Not in a floodplain

2.6 Terrain Slope

Slope Value

2% to 5% slope

Worksheet 4
Surface Water Route

CSID: 1844

Site Name: Basin Oil Dallas Ave

3.0 Targets

3.1 Distance to Surface Water

Less than 100 feet to the storm drain; 260 feet to the Duwamish River

Surface Water Distance Value

3.2 Population Served within 2 miles

people

Population Value

3.3 Area Irrigated within 2 miles

acres

Irrigation Value

3.4 Distance to Nearest Fishery Resource

260 feet to the Duwamish River

Fishery Value

3.5 Distance to and Name of Nearest Sensitive Environment

260 feet to the Duwamish River

Sensitive Environment Value

4.0 Release

Explain basis for scoring a release to surface water

No confirmed release to surface water

Release to Surface Water Value

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

MIG_S = Soil Permeability + Annual Precip + Rainfall Frequency + Floodplain + Slope

REL_S = Release to Surface Water

TAR_{SH} = Distance to Surface Water + Population Served by Surface Water + Area Irrigated

SUB_{SH}	172
MIG_S	11
REL_S	0
TAR_{SH}	10
SW_H	23.0

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

MIG_S = Soil Permeability + Annual Precip + Rainfall Frequency + Floodplain + Slope

REL_S = Release to Surface Water

TAR_{SE} = Distance to Surface Water + Distance to Fishery + Distance to Sensitive Environment

SUB_{SE}	128
MIG_S	11
REL_S	0
TAR_{SE}	34
SW_E	57.8

Worksheet 5

Air Route

CSID: 1844

Site Name: Basin Oil Co. Dallas Ave

1.0 Substance Characteristics

1.1 Introduction (WARM Scoring Manual) - Please Review before scoring

1.2 Human Toxicity

Substance	Ambient Air Standard Value	Acute Toxicity Value	Chronic Toxicity Value	Carcinogenicity Value
Gasoline (benzene)	10	3	X	5

Highest Value 10

Bonus Points? 0

Toxicity Value

1.3 Mobility

Gaseous Mobility	Max Value:	4
Particulate Mobility	Soil Type:	
	Erodibility:	
	Climatic Factor:	

Mobility Value

1.4 Final Human Health Toxicity/Mobility Matrix Value

HH Final Matrix Value

1.5 Environmental Toxicity/Mobility

Substance	Non-human Mammalian Inhalation Toxicity (mg/m3)	Acute Value	Mobility Value	Table A-7 Matrix Value
Gasoline (benzene)	31947	3	4	6

Env. Final Matrix Value

1.6 Substance Quantity

Amount: 1,200 square feet

Basis: Estimated extent of petroleum impacted soils

Substance Quantity Value

Worksheet 5

Air Route

CSID: 1844

Site Name: Basin Oil Co. Dallas Ave

2.0 Migration Potential

2.1 Containment

Containment Value

Explain Basis: Less than 2 feet of soil cover, and no vapor collection system present

3.0 Targets

3.1 Nearest Population

Population Distance Value

<200 feet to the nearest dwelling

3.2 Distance to and name of nearest sensitive environments

Sensitive Environment Value

<300 feet to the Duwamish River

3.3 Population within 0.5 miles

Population Value

2,131 population

4.0 Release

Release to Air Value

Explain basis for scoring a release to air:
No confirmed release to air

Pathway Scoring - Air Route, Human Health Pathway

$$AIR_H = (SUB_{AH} * 60/329) * [REL_A + (TAR_{AH} * 35/85)] / 24$$

Where:

$$SUB_{AH} = (\text{Human toxicity} + 5) * (\text{Containment} + 1) + \text{Substance Qty}$$

$$REL_A = \text{Release to Air}$$

$$TAR_{AH} = \text{Nearest Population} + \text{Population within 1/2 mile}$$

SUB _{AH}	279
REL _A	0
TAR _{AH}	56
AIR_H	49.0

Pathway Scoring - Air Route, Environmental Pathway

$$AIR_E = (SUB_{AE} * 60/329) * [REL_A + (TAR_{AE} * 35/85)] / 24$$

Where:

$$SUB_{AE} = (\text{Environmental Toxicity Value} + 5) * (\text{Containment} + 1) + \text{Substance Qty}$$

$$REL_A = \text{Release to Air}$$

$$TAR_{AE} = \text{Nearest Sensitive Environment}$$

SUB _{AE}	125
REL _A	0
TAR _{AE}	7
AIR_E	2.7

Worksheet 6
Groundwater Route

CSID: 1844

Site Name: Basin Oil Co. Dallas Ave

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

Highest Value 8
 Bonus Points?
 Toxicity Value

1.2 Mobility

Cations/Anions Max Value: 3
 Solubility Max Value: Mobility Value

1.3 Substance Quantity

Amount: 613 cubic yards
 Basis: Estimated volume of contaminated soil based on soil borings
 Substance Quantity Value

2.0 Migration Potential

2.1 Containment Containment Value
 Explain Basis: Contaminated soil

2.2 Net Precipitation 10 to 20 inches Net Precipitation Value

2.3 Subsurface Hydraulic Conductivity Conductivity Value
 Sand and silty sand over sand and gravel

2.4 Vertical Depth to Groundwater 0 to 25 feet Depth to Aquifer Value
 Confirmed release: Yes

3.0 Targets

3.1 Groundwater Usage Aquifer Use Value
 Private supply, but alternate sources available with minimum hookup requirements

3.2 Distance to Nearest Drinking Water Well 6,480 feet Well Distance Value

3.3 Population Served within 2 Miles Population Served Value
 0 people

Worksheet 6
Groundwater Route

CSID: 1844

Site Name: Basin Oil Co. Dallas Ave

3.4 Area Irrigated by GW Wells within 2 miles

Area Irrigated Value

0 acres

4.0 Release

Release to Groundwater Value

Explain basis for scoring a release to groundwater:

Confirmed release to groundwater

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:

$SUB_{GH} = (\text{Human toxicity} + \text{mobility} + 3) * (\text{Containment} + 1) + \text{Substance Qty}$

$MIG_G = \text{Depth to Aquifer} + \text{Net Precip} + \text{Hydraulic Conductivity}$

$REL_G = \text{Release to Groundwater}$

$TAR_{GH} = \text{Aquifer Use} + \text{Well Distance} + \text{Population Served} + \text{Area Irrigated}$

SUB _{GH}	157
MIG _G	14
REL _G	5
TAR _{GH}	5
GW _H	33.3

Washington Ranking Method

Route Scores Summary and Ranking Calculation Sheet

Site Name: Basin Oil Co. Dallas Ave

CSID: 1844

Site Address: 8661 Dallas Avenue South

FSID: 83476734

HUMAN HEALTH ROUTE SCORES

Enter Human Health Route Scores for all Applicable Routes:

Pathway	Route Score	Quintile Group
Surface Water	23.0	4
Air	49.0	5
Groundwater	33.3	3

H= 5
M= 4
L= 3

$$\begin{array}{c}
 H^2 + 2M + L \\
 \hline
 25 + 8 + 3 \\
 \hline
 8
 \end{array}$$

**Human Health
Priority Bin Score:**
5
 rounded up to next whole number

ENVIRONMENT ROUTE SCORES

Enter Environment Route Scores for all Applicable Routes:

Pathway	Route Score	Quintile Group
Surface Water	57.8	5
Air	2.7	2

H= 5
L= 2

$$\begin{array}{c}
 H^2 + 2L \\
 \hline
 25 + 4 \\
 \hline
 7
 \end{array}$$

**Environment
Priority Bin Score:**
5
 rounded up to next whole number

Comments/Notes:

**FINAL MATRIX
RANKING**

1

FOR REFERENCE:

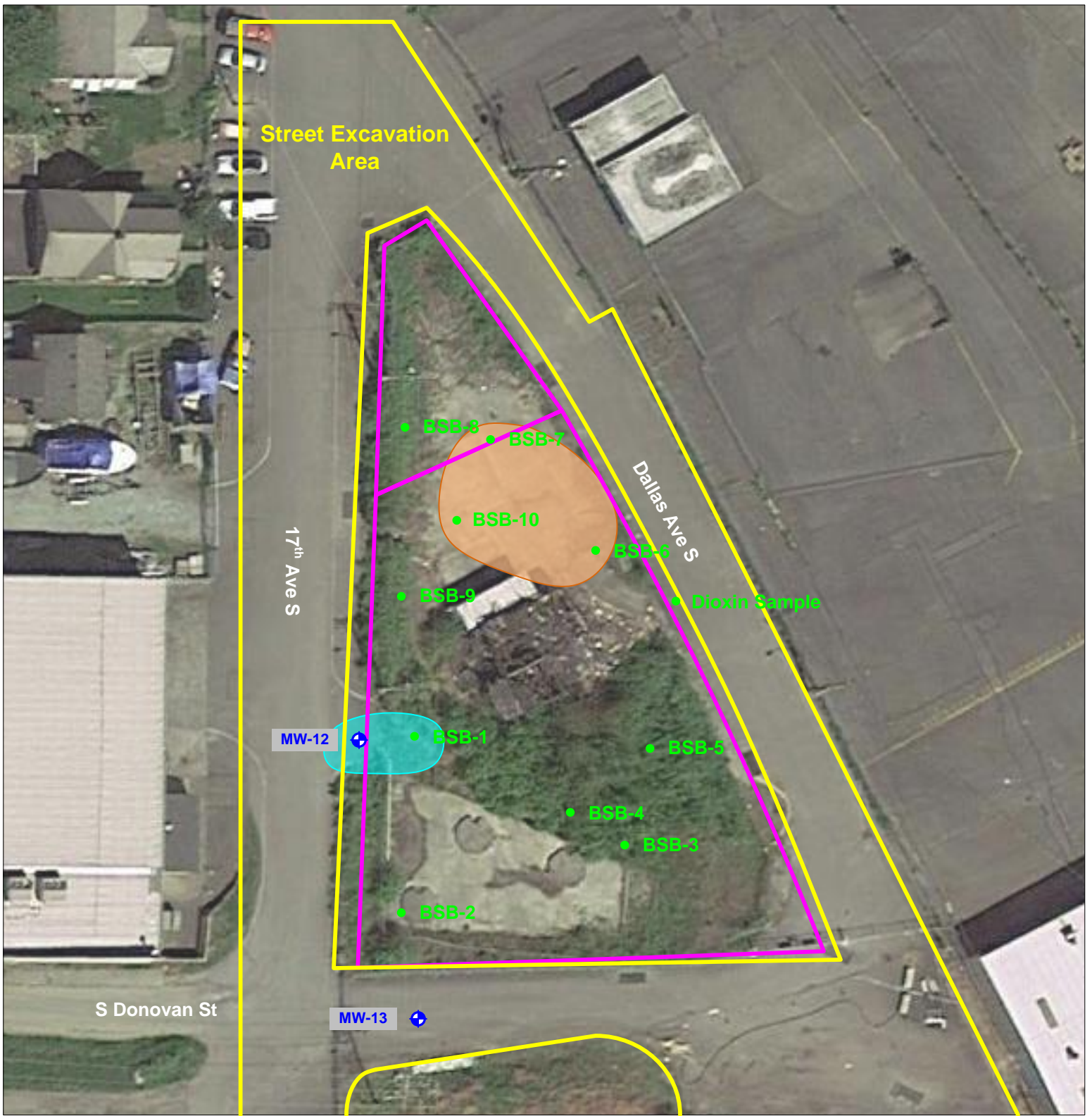
Final WARM Bin Ranking Matrix

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 - August 2014 Values

Quintile	Human Health			Environment	
	Surface Water	Air	Ground Water	Surface Water	Air
5	>= 30.7	>= 37.3	>= 51.9	>= 49.8	>= 30.3
4	>= 22.5	>= 23.0	>= 41.0	>= 30.9	>= 23.0
3	>= 13.0	>= 14.5	>= 33.1	>= 23.2	>= 14.1
2	>= 6.8	>= 8.1	>= 23.5	>= 10.7	>= 1.6
1	<= 6.7	< 8.1	<= 23.4	<= 10.6	<= 1.5

Quintile value associated with each route score entered above



Legend:

- Property location (approximate)
- Excavation area (approximate)
- Remaining gasoline soil contamination (approximate)
- Remaining benzo(a)pyrene soil contamination (approximate)
- + Monitoring well (approximate)
- Soil sample (approximate)

Notes:

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



**Basin Oil Co. Dallas Ave
8661 Dallas Avenue South
Seattle, WA 98108**

Site Overview Map

CSID 1844
CSID1844.vsd