Reviewed 8/3
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SITE HAZARD ASSESSMENT

WORKSHEET 1

Summary Score Sheet

SITE INFORMATION:

DRAFT

Bothell Riverside
NE 180th ST & Woodinville DR
Bothell, King County, WA 98011

Section/Township/Range: 08/ 26N/ 05E
Latitude: 47° 45' 32.44"
Longitude: 122° 12' 23.40"
Ecology Facility Site ID No: 53578168

Site scored/ranked for the August , 2009 update

June 22, 2009

Site Description

The Bothell Riverside site consists of two parcels of land that combined are approximately 2.0 acres in size. The site is triangular in shape and is bordered by Woodinville Drive to the north, Northeast 180th Street to the south and a commercial property and Horse Creek to the west. Except for a few planted areas the entire site is covered by compact gravel.

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The property is currently undeveloped and used as a parking lot by the City of Bothell for adjacent parks and green belts. The entire area is served by municipal water and sewer systems. There are four Group B drinking water wells within a two-mile radius of the site.

Background

From the mid 1940's until the early 1960's a gasoline service station was located on the property. During the mid 1960's the service station was demolished. The station contained at least two 1,000-gallon underground storage tanks (USTs). Historic records show that the tanks were removed sometime before 1990.

Investigations of the Bothell Riverside property began between 1990 and 1991 when the site was being excavated. During the excavation discarded oil filters, oil cans, transmission fluid containers and small barrels were encountered. Six groundwater monitoring wells were installed and 4,500 cubic yards of petroleum contaminated soil were excavated and treated on site. The treated soil was then returned to the excavation area. These activities continued through 1994 with four groundwater

monitoring events. In 1998, the City of Bothell (City) purchased the Bothell Landing property along with two other sites to develop a roadway widening and park project.

During 2008 HWA Geosciences Inc. (HWA) performed a Phase II Environmental Site Assessment of the Bothell Riverside site. The assessment included 14 soil borings and groundwater sampling from monitoring wells. Groundwater samples were analyzed for petroleum hydrocarbons, polyaromatic hydrocarbons, volatile organic compounds (VOCs) and metals. Soil samples were analyzed for petroleum hydrocarbons and VOCs.

Results of the testing showed that the Bothell Riverside property is contaminated with Total Petroleum Hydrocarbons oil (TPH-oil), benzene, trichloroethylene (TCE) and a few other contaminants at concentrations above their respective Model Toxics Control Act (MTCA) Method A Cleanup Levels. The following table shows some of the soil contamination encountered at the property during the 2008 analysis.

Analyte	R-11-3 (ppm)	R-9-18 (ppm)	R-4-15	Standard	(ppm)
TPH- Oil	**9,200**	-	-	MTCA A *	2000
Benzene	-	**6.7**	-	"	5.0
TCE	-	-	**140**	"	5.0

*MTCA A refers to the Model Toxics Control Act Table 740-1 Method A Cleanup Levels for Unrestricted Land Use Soil.
ppm = parts per million

Does - mean ND or Not Analyzed?

During the fall of 2008 the Washington Department of Ecology (Ecology) was contacted by The City of Bothell concerning the Bothell Riverside site. The City requested an Agreed Order for the property so the contamination could be removed during the roadway construction project. The site was then added to Ecology's Confirmed and Suspected Contaminated Sites list to await Site Hazard Assessment (SHA).

Site Hazard Assessment

A SHA was conducted by Carsten Thomsen, Public Health – Seattle & King County during April and May 2009. A phone interview with Arnie Sugar, the current consultant for the property, was used to gather information on the site. Mr. Sugar also provided reports and contamination monitoring results related to the Bothell Riverside property. A SHA site visit was conducted on April 20, 2009. No visible contamination was encountered during the SHA visit.

SPECIAL CONSIDERATIONS (include limitations in site file data or data which cannot be accommodated in the model, but which are important in evaluating the risk associated with the site, or any other factor(s) over-riding a decision of no further action for the site):

Due to the significant contamination documented on-site being primarily subsurface, the surface water route is not applicable for WARM scoring for this site. Thus, only the air and groundwater routes will be scored.

ROUTE SCORES:

Surface Water/Human Health:	**NS**	Surface Water/Environmental.:	**NS**
Air/Human Health:	**44.4**	Air/Environmental:	**17.8**
Groundwater/Human Health:	**39.4**		

OVERALL RANK: **2**

WORKSHEET 2
Route Documentation

1. **AIR ROUTE**

   a. List those substances to be considered for scoring: Source: 1,2,3

   Benzene, Trichloroethylene (TCE)

   b. Explain basis for choice of substance(s) to be used in scoring:

   Analytical results from soil and water sampling indicate the presence of these hazardous substances at levels which exceed our current Method A cleanup levels.

   c. List those management units to be considered for scoring: Source: 1,2,3

   Surface and subsurface soils

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

   Spills/discharges caused soil contamination

2. **GROUNDWATER ROUTE**

   a. List those substances to be considered for scoring: Source: 1,2,3

   Benzene, Trichloroethylene (TCE), TPH-Oil

   b. Explain basis for choice of substance(s) to be used in scoring:

   Analytical results from soil and water sampling indicate the presence of these hazardous substances at levels which exceed our current Method A cleanup levels.

   c. List those management units to be considered for scoring: Source: 1,2,3

   Surface and subsurface soils

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

   Spills/discharges caused soil contamination

WORKSHEET 3
Air Route

1.0 SUBSTANCE CHARACTERISTICS

1.1. Introduction

1.2 Human Toxicity

	Substance	Air Standard (µg/m³)	Value	Acute Toxicity (mg/ m³)	Value	Chronic Toxicity (mg/kg/day)	Value	Carcinogenicity		Value
								WOE	PF*	
1	Benzene	0.12	10	31947	3	ND	-	A	0.029	5
2	TCE	0.0091	10	15583	3	ND	-	B2	0.017	4

* *Potency Factor*

Source: 1,2,3

Highest Value: 10
(Max = 10)

Plus 2 Bonus Points? Yes

Final Toxicity Value: 12
(Max = 12)

1.3 Mobility (Use numbers to refer to above listed substances)

	1.3.1 Gaseous Mobility	1.3.2 Particulate Mobility			
	Vapor Pressure(s) (mmHg)	Soil Type	Erodibility	Climatic Factor	Particulate Value
1	95, Value = 4	Sand, Gravel	22	1 - 10	0
2	58, Value = 4				

Source: 2

Value: 4
(Max = 4)

Source: 2,3

Value: 0
(Max = 4)

1.4 Highest Human Health Toxicity/ Mobility Matrix Value (from Table A-7)

Final Matrix Value: 24
(Max = 24)

1.5 Environmental Toxicity/Mobility						
	Substance	**Non-human Mammalian Inhalation Toxicity (mg/m^3)**	**Acute Value**	**Mobility (mmHg)**	**Value**	**Matrix Value**
1	Benzene	31947 (rat)	3	95	4	6
2	TCE	ND	-	58	4	NS

Highest Environmental Toxicity/Mobility Matrix Value (from Table A-7) = **Final Matrix Value: 6**
(Max = 24)

1.6 Substance Quantity	
Explain Basis: Unknown. Sampling has not determined the extent of contamination. Use Default.	Source: 2,3 **Value: 1** (Max = 10)

2.0 MIGRATION POTENTIAL

		Source	Value
2.1	**Containment:** Soil cover >2 feet thick, no vapor collection system	2	**5** (Max = 10)

3.0 TARGETS

		Source	Value
3.1	**Nearest Population:** 120' to nearest park	8	**10** (Max = 10)
3.2	**Distance to [and name(s) of] nearest sensitive environment(s) [fisheries excluded]:** 120 feet, Bothell Landing Park	8	**7** (Max = 7)
3.3	**Population within 0.5 miles:** √ **pop.** = 5029; √5029 = 71	8	**71** (Max = 75)

4.0 RELEASE

Explain Basis for scoring a release to air: Not documented	Source: 2 **Value: 0** (Max = 5)

WORKSHEET 4
Groundwater Route

1.0 SUBSTANCE CHARACTERISTICS

1.2 Human Toxicity

	Substance	Drinking Water Standard (µg/L)	Value	Acute Toxicity (mg/ kg-bw)	Value	Chronic Toxicity (mg/kg/day)	Value	Carcinogenicity		Value
								WOE	PF*	
1	Benzene	5	8	3306	3	ND	-	A	0.029	5
3	TCE	5	8	2402	3	ND	-	B2	0.011	4
4	TPH-Oil	ND	-	ND	-	2	1	ND	-	-

* *Potency Factor*

Source: 1,2,3

Highest Value: 8
(Max = 10)

Plus 2 Bonus Points? Yes

Final Toxicity Value: 10
(Max = 12)

1.2 Mobility (use numbers to refer to above listed substances)

Cations/Anions	OR	Solubility (mg/L)
1=		1= 1.8×10^3 = Value 3
2=		2= 1.1×10^3 = Value 3
3=		3= ND

Source: 1,2

Value: 3
(Max = 3)

1.3 Substance Quantity:

Explain basis: Unknown. Sampling has not determined the extent of contamination. Use Default.	Source: 2,3 **Value: 1** (Max=10)

2.0 MIGRATION POTENTIAL

		Source	Value
2.1	**Containment (explain basis):** Leaking Underground Storage Tank	2	**10** (Max = 10)
2.2	**Net precipitation:** Bothell: 27.3" - 5.4" = 21.9"	5	**3** (Max = 5)
2.3	**Subsurface hydraulic conductivity:** Sandy silt	2	**3** (Max = 4)
2.4	**Vertical depth to groundwater:** 8 feet	2	**8** (Max = 8)

3.0 TARGETS

		Source	Value
3.1	**Groundwater usage:** Public supply/alt. sources avail.	2,9	**4** (Max = 10)
3.2	**Distance to nearest drinking water well:** 6165 feet	2,9	**1** (Max = 5)
3.3	**Population served within 2 miles:** $\sqrt{46}=7$	2,9	**7** (Max = 100)
3.4	**Area irrigated by (groundwater) wells within 2 miles:** $0.75\sqrt{0} = 0$	2	**0** (Max = 50)

4.0 RELEASE

	Source	Value
Explain basis for scoring a release to groundwater: Release confirmed by sampling results.	2,3	**5** (Max = 5)

SOURCES USED IN SCORING

1. Washington ranking Method Toxicological Data-Base
2. Phase II Environmental Site Assessment Riverside Property, HWA Geosciences Inc. Project No. 2007-098-220, July 28, 2008
3. Remedial Investigation and Feasibility Study Riverside Property, HWA Geosciences Inc. Project No. 2007-098-700, February 26, 2009
4. Site Hazard Assessment, PHSKC, 05/09
5. National Weather Service Data
6. Washington State Department of Health Public Water Supply Listing
7. Washington State Water Use Data
8. King County GIS Center Data, April 2007
9. 2000 Census Data, King County GIS Center
10. Washington Department of Ecology, Warm Scoring Manual