SITE HAZARD ASSESSMENT
WORKSHEET 1
Summary Score Sheet

SITE INFORMATION:

Name: Solid Wood Incorporated
Address: 700 West Bay Drive NW
City: Olympia   **County:** Thurston   **State:** WA   **Zip:** 98501
Section/Township/Range: S10/T18/R2W
Latitude: 47.05176   **Longitude:** 122.91331
TCP ID # 94656838
Date Scored: June 11, 2008
Site scored/ranked for the August 20, 2008 update

SITE DESCRIPTION:

The former Solid Wood, Incorporated (Solid Wood) site is located in downtown Olympia, on the shore of West Bay in Budd Inlet (See attached Thurston County Maps). The 16.4 acre site lies along West Bay Drive, between the Fourth Avenue Bridge and the Reliable Steel facility (See attached Figure 1). In recent years, the site was occupied by Solid Wood and utilized as a lumber mill. The mill ceased operations in 2002 and all associated structures were demolished. Asphalt pavement, concrete building foundations, wood piling remnants, and an inactive railroad line still remain.

Soils at the site consist of non-native dredge fill, which was likely deposited in the early 1900's. Groundwater at the site is tidally influenced and ranges in depth from 4 to 9 feet below ground surface (bgs).

The site was recently purchased by the City of Olympia for development as a waterfront park (West Bay Park). The purchase included two parcels; 1) the main upland area including the former Solid Wood facility, and 2) the Burlington Northern Santa Fe railroad right-of-way which runs through the middle of the site. The southern portion of the site also includes a lagoon/tide flat area that lies within a federal wildlife habitat easement. Presently, the future park is in the design and permit phase of development.

PREVIOUS SITE INVESTIGATIONS:

2007 Phase II Environmental Site Assessment:

In February 2007, a series of surface and subsurface samples were collected from various locations at the site (See attached Figures 2 and 3). The purpose of the assessment was to evaluate surface and subsurface soils, groundwater, and surface sediments. Sample locations were selected based upon past site operations and included the shoreline sediments, railroad line, former loading dock, and other potential areas of concern. A summary of soil and groundwater results showing elevated levels of contamination is listed below in Table 1 and Table 2.

Table 1: Soil Analytical Results

Sample ID# and depth	Pentachlorophenol ug/kg	Benzo[a] Pyrene ug/kg	TPH-Diesel mg/kg	HeavyOil mg/kg
SB-03-3 ft.	250	96	220	1100
SB-05-8 ft.	nd	**110**	**2400**	**4900**
MTCA[1]	No Value[2]	100	2,000	2,000

[1]*Model Toxics Control Act (MTCA) Method A cleanup level. Bold entries indicate MTCA exceedances*
[2]*No established MTCA Method A cleanup level*
nd - Analyte not detected

Table 2: Groundwater Analytical Results

Sample ID#	Arsenic	Lead	Benzo[a] pyrene	TPH-Diesel	HeavyOil
SB-03	**9.1**	**130**	nd	**1100**	**2700**
SB-04	nd	**36**	**0.17**	390	**2200**
SB-05	NA	NA	NA	**10000**	**28000**
MTCA[1]	5	15	0.1	500	500

[1]Model Toxics Control Act (MTCA) Method A cleanup level. Bold entries indicate MTCA exceedances
Results reported in parts per billion (ug/L)
nd - Analyte not detected
NA - Not analyzed

Dioxin levels in marine sediment samples were calculated utilizing the most recent mammalian toxicity data developed by the World Health Organization. The site-specific concentrations were compared to background concentrations and risk-based concentrations to determine the public health exposure threat. No samples exceeded the risk-based calculations for a hypothetical recreational scenario.

2008 Work Plan for Remedial Investigation/Feasibility Study (RI/FS)

In early 2008, additional sampling data was collected as part of a draft RI/FS work plan. Additional soil, groundwater, and sediment samples were collected from various locations at the site, which included the former loading dock, rail spur, former wood burner, and other areas. Samples were analyzed for diesel and heavy oil-range hydrocarbons, carcinogenic polycyclic aromatic hydrocarbons (cPAHs), dioxins/furans, and priority pollutant metals. A summary of soil and groundwater results showing elevated levels of contamination is listed below in Table 3 and Table 4.

Table 3: Soil Analytical Results

Sample ID# and depth	Dioxin/Furans ng/kg	Lead mg/kg	Arsenic mg/kg	Total cPAHs ug/kg	TPH-Diesel mg/kg	HeavyOil mg/kg
SB-13- 6 ft.	NA	NA	NA	**2.05**	nd	**140000**
TP-10-2 ft.	**18.44**	**840**	**24**	0.011	NA	NA
MTCA	11[2]	250[1]	20[1]	0.1[1]	2,000[1]	2,000[1]

[1]Model Toxics Control Act (MTCA) Method A cleanup level
[2]MTCA Method B cleanup level
Bold entries indicate MTCA exceedances.
NA – Not analyzed
nd – Not detected

Table 4: Groundwater Analytical Results

Sample ID#	Total cPAHs ug/kg	TPH-Diesel mg/kg	HeavyOil mg/kg
SB-13	**0.26**	**640**	**11000**
MTCA[1]	0.1	500	500

[1]Model Toxics Control Act (MTCA) Method A cleanup level
Bold entries indicate MTCA exceedances.

Dioxin concentrations exceeding the Washington Department of Ecology (Ecology) Model Toxics Control Act (MTCA) cleanup levels were confirmed in subsurface soil samples (1.5-2.0 feet bgs) from the former wood burner area (Sample #TP-10-2). However, additional marine sediment samples collected from the adjacent beach did not detect dioxins in excess of MTCA Method A cleanup levels or Washington State Sediment Management Standards.

CONCLUSION

Contamination resulting from historical industrial operations has been confirmed at the former Solid Wood property. Petroleum-range hydrocarbons, metals, polycyclic aromatic hydrocarbons, and dioxins have been confirmed in soil and/or groundwater in excess of applicable MTCA cleanup levels.

Dioxin levels along the shoreline are lower than concentrations detected in other parts of Budd Inlet. Levels detected in shoreline sediments were below risk-based levels for recreational users and terrestrial organisms. However, dioxins were confirmed in subsurface soil in excess of MTCA Method A cleanup levels near the former wood burner and there are no source controls to prevent contaminant migration.

SPECIAL CONSIDERATIONS

The first phase of site remediation and park construction is tentatively scheduled to commence in the summer of 2008. Remedial activities will be conducted under an Agreed Order between the City of Olympia and Ecology.

Groundwater at the site consists of tidally influenced water which is poor in quality and not utilized for drinking or irrigation. Furthermore, all drinking water and irrigation sources are documented to be located upgradient from the site.

ROUTE SCORES:

Surface Water/Human Health:	**18.7**	Surface Water/Environmental:	**37.4**
Air/Human Health:	**27.0**	Air/Environmental:	**NS**
Groundwater/Human Health:	**44.1**		

OVERALL RANK: 2

1. **SURFACE WATER ROUTE**

    a. List those substances to be <u>considered</u> for scoring: Source: 1

       Arsenic, Lead, TCDD Dioxin, Benzo[a]pyrene, TPH-Diesel

    b. Explain basis for choice of substance(s) to be <u>used</u> in scoring.

       Documented presence of Benzo[a]pyrene in excess of MTCA Method A cleanup levels in surface soils.

    c. List those management units to be <u>considered</u> for scoring: Source: 1

       Contaminated soil

    d. Explain basis for choice of unit to be <u>used</u> in scoring:

       Documented presence of Benzo[a]pyrene in excess of MTCA Method A cleanup levels in surface soils.

2. **AIR ROUTE**

    a. List those substances to be <u>considered</u> for scoring: Source: 1

       Benzo[a]pyrene, TPH-Diesel, Arsenic, Lead, TCDD Dioxin

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

       Documented presence of Benzo[a]pyrene and TPH-Diesel in excess of MTCA Method A cleanup levels in soil (at or near the ground surface).

    c. List those management units to be <u>considered</u> for scoring: Source: 1

       Contaminated soil

    d. Explain basis for choice of unit to be <u>used</u> in scoring:

       Documented presence of Benzo[a]pyrene and TPH-Diesel in excess of MTCA Method A cleanup levels in soil (at or near the ground surface).

3. **GROUNDWATER ROUTE**

    a. List those substances to be <u>considered</u> for scoring: Source: 1

       Arsenic, Lead, Benzo[a]pyrene, TPH-Diesel, TCDD Dioxin

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

       The above substances have been confirmed in groundwater and/or soil at concentrations exceeding MTCA Method A cleanup levels.

    c. List those management units to be <u>considered</u> for scoring: Source: 1

       Contaminated groundwater

    d. Explain basis for choice of unit to be <u>used</u> in scoring:

       The above substances have been confirmed in groundwater and/or soil at concentrations exceeding MTCA Method A cleanup levels.

1.0 SUBSTANCE CHARACTERISTICS

1.1 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	Benzo[a]pyrene	0.2	10	50 (rat)	10	ND	-	0.8	9.6	7
2										

Potency Factor, ND=No Data

Source: 1
Highest Value: 10
(Max = 10)
Plus 2 Bonus Points? No
Final Toxicity Value: 10
(Max = 12)

1.2 Environmental Toxicity ( ) Freshwater (X) Marine

	Substance	Acute Water Quality Criteria		Non-Human Mammalian Acute Toxicity	
		(µg/L)	Value	(mg/kg)	Value
1	Benzo[a]pyrene	300	4		
2					

Source: 1
Highest Value: 4
(Max = 10)

1.3 Substance Quantity (areal extent)

Explain Basis: 2,450 cubic yards: Estimated amount of contaminated soils proposed for removal.	Source: 1 **Value: 8** (Max = 10)

5

2.0 MIGRATION POTENTIAL

		Source	Value
2.1	**Containment:** Contaminated soil at the surface with no run-on/runoff control **Explain basis:** Documented presence of Benzo[a]pyrene in surface soils.	1	**10** (Max = 10)
2.2	**Surface Soil Permeability:** Poorly graded fill materials (sand, gravel, silt, debris, etc)	1	**1** (Max = 7)
2.3	**Total Annual Precipitation:** 50.81 inches	4	**4** (Max = 5)
2.4	**Max 2yr/24hr Precipitation:** 3.0 inches	3	**3** (Max = 5)
2.5	**Flood Plain:** between 100 and 500 year flood zone	6	**1** (Max = 2)
2.6	**Terrain Slope:** less than 2%	1, 6	**1** (Max = 5)

3.0 TARGETS

		Source	Value
3.1	**Distance to Surface Water:** 0 feet. Located on marine shoreline	1, 6	**10** (Max = 10)
3.2	**Population Served within 2 miles:** Total population = 0.	7, 8	**0** (Max = 75)
3.3	**Area Irrigated by surface water within 2 miles:** 0 acres.	8	**0** (Max = 30)
3.4	**Distance to Nearest Fishery Resource:** 0 feet. Located on marine shoreline	1, 6	**12** (Max = 12)
3.5	**Distance to, and Name(s) of, Nearest Sensitive Environment(s):** 0 feet, fisheries resource	1, 6	**12** (Max = 12)

4.0 RELEASE

Explain Basis: No documented release to shoreline sediments.	Source: 1 **Value: 0** (Max = 5)

WORKSHEET 5
Air Route

1.0 SUBSTANCE CHARACTERISTICS

1.1. Introduction

1.2 Human Toxicity

	Substance	Air Standard ($\mu g/m^3$)	Value	Acute Toxicity (mg/m^3)	Value	Chronic Toxicity (mg/kg/day)	Value	Carcinogenicity WOE	Carcinogenicity PF*	Value
1	Benzo[a]pyrene	.0006	10	ND	-	ND	-	B2	ND	-
2	TPH-Diesel	166.5	4	ND	-	ND	-		ND	-

Potency Factor, ND=No Data

Source: 2, 3
Highest Value: 10
(Max = 10)
Plus 2 Bonus Points? No
Final Toxicity Value: 10
(Max = 12)

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

	1.3.1 Gaseous Mobility Vapor Pressure(s) (mmHg)	1.3.2 Particulate Mobility Soil Type	Erodibility	Climatic Factor
1		Poorly sorted fill: sand, silt, clay, gravel, etc.	>30-80 tons/acre/yr	<1
2	8.2E-02, Value 3			

Source: 2, 3   Source: 2, 3
Value: 3   **Value: 1**
(Max = 4)   (Max = 4)

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

TPH-Diesel: Toxicity = 4, Mobility = 3, Final Value = 6
Benzo[a]pyrene: Toxicity = 10, Mobility = 1, Final Value = 5

Final Matrix Value: 6
(Max = 24)

1.5 Environmental Toxicity/Mobility

	Substance	Non-human Mammalian Inhalation Toxicity (mg/m^3)	Acute Value	Mobility (mmHg)	Value	Matrix Value
1	Benzo[a]pyrene	ND	-	particulate	1	-
2	TPH-Diesel	ND	-	8.2E-02	3	-

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

7

1.6 Substance Quantity (areal extent)	
Explain Basis: 2,450 cubic yards: Estimated amount of contaminated soils proposed for removal.	Source: 1 **Value: 8** (Max = 10)

2.0   MIGRATION POTENTIAL

		Source	Value
2.1	**Containment:** Spill likely occurred near the former loading dock area. Score as surface spill/discharge and no vapor collection or cover.	1	**10** (Max = 10)

3.0   TARGETS

		Source	Value
3.1	**Nearest Population:** less than 1000 feet	6	**10** (Max = 10)
3.2	**Distance to [and name(s) of] nearest sensitive environment(s) [fisheries excluded]:** 0 feet, State-designated areas for protection and maintenance of aquatic life.	3, 6	**7** (Max = 7)
3.3	**Population within 0.5 miles:** $\sqrt{3190}=56.5=57$	6	**57** (Max = 75)

4.0   RELEASE

Explain Basis for scoring a release to air: No confirmed release	Source: **Value: 0** (Max = 5)

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	Arsenic	10	8	763 (rat)	5	0.001 (RfD)	5	1.0	1.75	7
2	Lead	5	8	ND	-	<0.001 (NOAEL)	10	ND	ND	-
3	Benzo[a]pyrene	0.2	10	50 (rat)	10	ND	-	0.8	0.96	5
4	TPH-Diesel	160	4	490 (rat)	5	0.004	3	ND	ND	-
5	TCDD Dioxin	5E-05	10	ND	-	ND	-	0.8	12E +03	10

Potency Factor, ND=No Data

Source: 1
Highest Value:10
(Max = 10)
Plus 2 Bonus Points? Yes
Final Toxicity Value: 12
(Max = 12)

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

Cations/Anions [Coefficient of Aqueous Migration (K)] OR	Solubility (mg/L)
1= Arsenic, Value 3	1=
2= Lead, Value 2	2=
3=	3= Benzo[a]pyrene, 1.2E-03, Value 0
4=	4= TPH-Diesel, 3.0E+01, Value 1
5=	5= TCDD Dioxin, 2.0E-04, Value 0

Source: 1
Value: 3
(Max = 3)

1.3   Substance Quantity (volume):

Explain basis: 2,450 cubic yards: Estimated amount of contaminated soils proposed for removal.	Source: 1 **Value: 4** (Max=10)

MIGRATION POTENTIAL

		Source	Value
2.1	**Containment (explain basis):** Spills to soil, no cover or liner	1	**10** (Max = 10)
2.2	**Net precipitation:** Nov-Apr (inches): 38.54" total precipitation, 11.74" evapotranspiration rate, 38.54-11.74 = 26.80 net precip.	4, 5	**3** (Max = 5)
2.3	**Subsurface hydraulic conductivity:** Poorly sorted fill material	1, 6	**4** (Max = 4)
2.4	**Vertical depth to groundwater:** 4-9 feet bgs (Obs. Release = 0 feet)	1	**8** (Max = 8)

2.0 TARGETS

		Source	Value
3.1	**Groundwater usage:** Groundwater not useable, poor quality	7, 8	**1** (Max = 10)
3.2	**Distance to nearest drinking water well:** Not applicable, all wells upgradient	6	**0** (Max = 5)
3.3	**Population served within 2 miles:** Population = 0	7, 8	**0** (Max = 100)
3.4	**Area irrigated by (groundwater) wells within 2 miles:** All wells located upgradient	8	**0** (Max = 50)

3.0 RELEASE

	Source	Value
Explain basis for scoring a release to groundwater: Documented release	1	**5** (Max = 5)

SOURCES USED IN SCORING

1. Parametrix, *Draft Work Plan for Remedial Investigation/Feasibility Study and Interim Action, Solid Wood Incorporated Site (West Bay Park),* April 2008.
2. Washington State Department of Ecology, Toxicology Database for Use in Washington Ranking Method Scoring, January 1992.
3. Washington State Department of Ecology, WARM Scoring Manual, April 1992.
4. Western Regional Climate Center, Precipitation data from the Olympia, Washington Airport, June 1948 to September 2005.
5. Table 16-Estimated Evapotranspiration, E.M. 2462, p42, for Thurston County Airport.
6. Thurston County Geodata Center, Roads and Transportation Division, June 2008.
7. Washington State Department of Health, Drinking Water Division, Sentry Database, October 2007.
8. Washington State Department of Ecology, Water Resources Program, Water Right Tracking System (WRTS), October 2007.