SITE HAZARD ASSESSMENT
Worksheet 1
Summary Score Sheet

SITE INFORMATION:

Cleanup Site ID: 6537

Facility/Site ID: 70996824

Chevron 209335

1225 North 45th Street

Seattle, King County, WA 98103

Section:	18	Latitude:	47.66120
Township:	25	Longitude:	-122.34290
Range:	04E	Tax/Parcel ID:	7821200275 and 7821200255

Site scored/ranked for the Hazardous Sites List Publication: February 2018

SITE DESCRIPTION:

The Chevron 209335 site (Site) is a a former service station located in Seattle, King County, Washington. The 0.68-acre property is located approximately 3,800 feet from Green Lake, and zoned for neighborhood commercial (NC2P) use.

The property is south of North 45th Street, between Midvale Avenue North and Stone Way North. Across North 45th Street to the north is an apartment building. Across Stone Way North to the east is an office building. South of the property are a retail store and residences. Across Midvale Avenue North to the west is a residence.

The Site is currently operated as a mixed-use retail/residential building by Stone Way Apts c/o Bellwether Housing.

A gasoline service station operated on the property from 1935 to 1969. The original station included two 1,000-gallon and one 550-gallon underground storage tanks (USTs), contents unknown. In 1956, the station was remodeled to include one 3,000-gallon, one 2,000-gallon, and one 550-gallon UST, contents unknown. Between 1969 and 2006, the property sat vacant. The building currently occupying the property was constructed in 2006.

SITE BACKGROUND:

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

From	To	Operator/Tenant	Activity
1935	1954		Service station
1954	1978	Standard Oil Co. / Chevron USA	Service station until 1969 and then vacant
1978	2005	Seattle Housing Authority	Vacant
2005	2017	Housing Resources Group	Vacant until 2006 and then mixed-use retail/residential

SITE CONTAMINATION:

In 2015 the Chevron 209335 site was reported to Washington State Department of Ecology (Ecology) and placed on the Confirmed and Suspected Contaminated Sites List (CSCSL).

Spills and leaks during operation of the service station are the likely causes of petroleum contamination observed in soil and groundwater, though no specific releases are known. Total petroleum hydrocarbons (TPH) in the gasoline range (TPH-G) and in the diesel range (TPH-D), benzene, toluene, ethylbenzene, xylenes, and lead have been detected at concentrations above Method A in groundwater (Table 1).

Light non-aqueous phase liquid (LNAPL) has been observed in multiple wells on the property, most recently in

MW-7. LNAPL thickness in MW-7 has ranged up to 1.26 feet (November 2010). During an LNAPL recovery test conducted in September 2010, the initial product thickness in MW-7 was 0.56 foot; 1.5 gallons of LNAPL mixed with water was bailed from the well; and after three hours the product thickness was 0.38 foot. When LNAPL is present in a monitoring well, no groundwater sample was collected from that well. In the case of MW-7, LNAPL was present in 18 out of 23 sampling attempts between July 2009 and April 2016.

SAIC's 2005 cleanup action plan assumed that soils were contaminated from 15 to 45 feet below ground surface. However, none of the reports available in Ecology's file provides soil data.

REMEDIATION ACTIVITIES:

At this point, none of the historical USTs remain on the property. However, site records do not provide information about the decommissioning and removal of the tanks, with the exception of the removal of an undocumented 1,000-gallon UST in 2001.

On March 18, 2013, 100 gallons of a 4-5 percent surfactant solution were gravity fed into MW-7. The surfactant was non-ionic, water-based, low in toxicity, and biodegradable in both aerobic and anaerobic conditions. On March 19-21, 2013, an inertial pump was used to extract 327 gallons of the surfactant and emulsified LNAPL from MW-7. The extraction volume was much higher than the injection volume due to high well yield. The concentrations of petroleum analytes detected in MW-7 following the surfactant injection are summarized in Table 2 but are not necessarily considered representative of normal conditions in MW-7.

CURRENT SITE CONDITIONS:

The surface of the property is covered by a building and paved walkways, with small landscaped planting strips. Surrounding properties are similarly covered or are closely spaced residences with small yards.

Woodland Park is 1,350 feet north. The 200-acre park features a zoo, a rose garden, and picnic facilities. Meridian Playground is 2,250 feet northeast. The 7-acre playground features a soccer field, play structures, and picinc facilities. Wallingford Playfield is 1,200 feet southeast. The 4.5-acre playfield features a soccer field, tennis courts, and play structures.

Ecology's Confirmed and Suspected Contaminated Sites List includes 11 sites within a half mile of the property. The closest are Chevron 92558 (CSID 6227), 200 feet east; Stone Way II Apartments (CSID 11753), 550 feet south; and Sound Transit NE 45th St (CSID 12019), 550 feet west.

There are no records of wells used for drinking water supply within two miles of the property. Three wells that appear to be for residences are listed for irrigation use. Based on the typical sizes of yards in the area, it was assumed that each of these wells irrigates 0.1 acres.

The approximate depth to groundwater is 34 to 38.5 feet below ground surface, with groundwater flowing to the south to southeast. Subsurface soils are sand, silty sand, and gravelly sand.

SPECIAL CONSIDERATIONS:

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

☐ **Surface Water**

No observed release

☑ **Air**

Volatile chemicals present in soil and groundwater

☑ **Groundwater**

Volatile chemicals present in groundwater

SITE HAZARD ASSESSMENT
Worksheet 1
Summary Score Sheet

ROUTE SCORES:

Surface Water/ Human Health:		Surface Water/ Environment:	
Air/ Human Health:	48.4	Air/ Environment:	1.9
Groundwater/ Human Health:	40.5		

Overall Rank: 1

REFERENCES:

1 Leidos. 2016. First Semi-annual 2016 Groundwater Monitoring and Sampling Report, Former Standard Oil Service Station, Chevron Site No. 209335. July 13.

2 SAIC. 2005. Cleanup Action Plan, Former Chevron Service Station #209335. April 6.

3 SAIC. 2005. Remedial Action Work Plan, Former Chevron Service Station 209335. May 26.

4 SAIC. 2013. Interim Remedial Action Report: Surfactant-Enhanced Recovery Status Update, Former Chevron Service Station No. 209335. June 21.

SITE HAZARD ASSESSMENT
Worksheet 2
Route Documentation

Cleanup Site ID: 6537 Chevron 209335

Facility/Site ID: 70996824

1. SURFACE WATER ROUTE

List those substances to be considered for scoring:

Not evaluated

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:

2. AIR ROUTE

List those substances to be considered for scoring:

TPH-G (benzene), toluene, ethylbenzene, and xylenes

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

Observed in groundwater

List those management units to be considered for scoring:

Groundwater

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

Exeedances of Method A

3. GROUNDWATER ROUTE

List those substances to be considered for scoring:

TPH-D (naphthalene), TPH-G (benzene), toluene, ethylbenzene, xylenes, and lead

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

Observed in groundwater

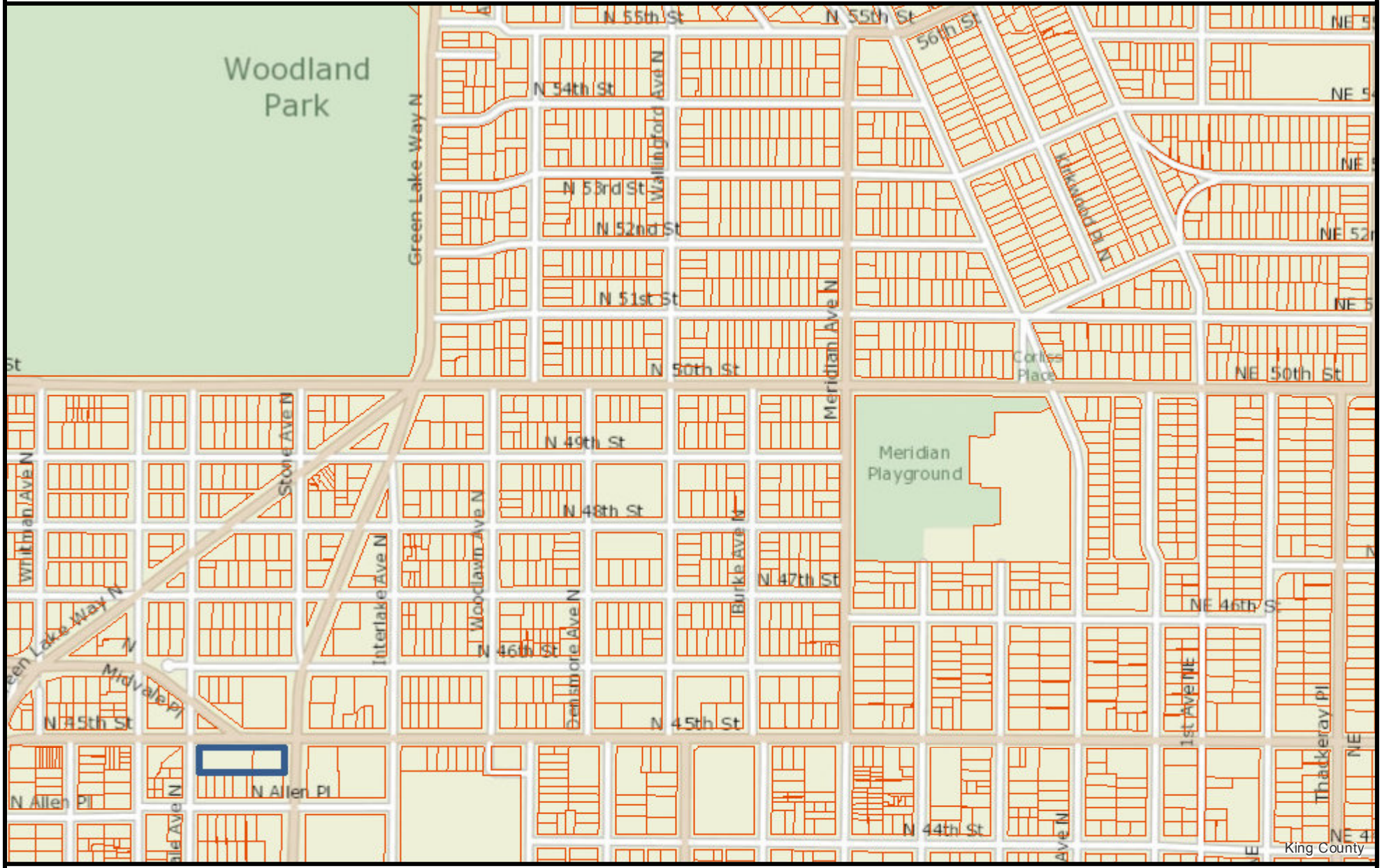
List those management units to be considered for scoring:

Groundwater

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

Exceedances of Method A

Figure 1. Chevron 209335 Location Map



Date: 10/6/2017 Notes:

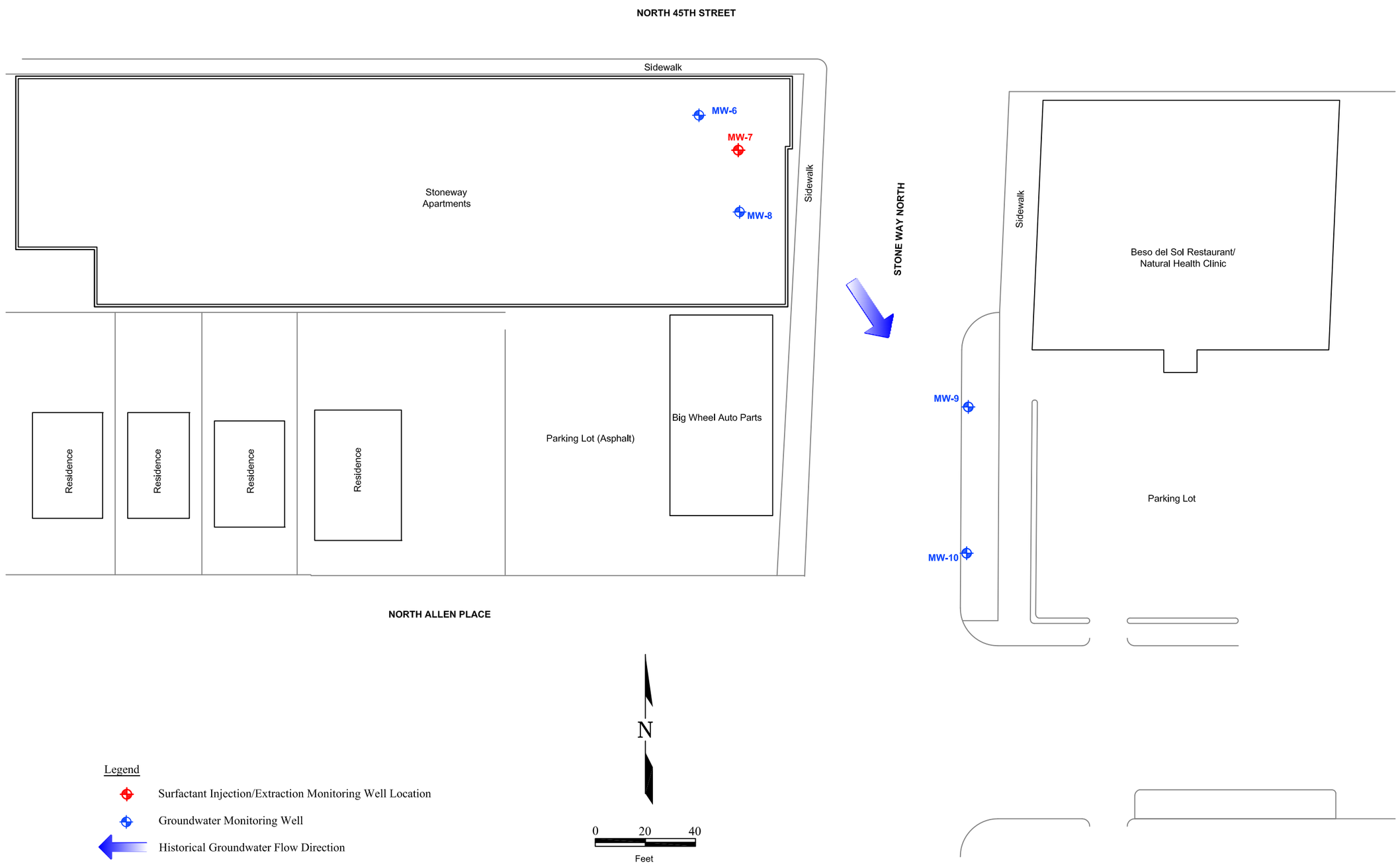
N

King County GIS Center

Figure 2. Chevron 209335 Vicinity Map

Date: 10/6/2017 Notes:

King County
GIS Center



SAIC

Former Chevron Service Station No. 209335
1225 North 45th Street
Seattle, Washington

FIGURE 2
Surfactant Injection/Extraction
Monitoring Well Location

DATE: 6/21/2013 | DRAWING: 209335 Site Map.dwg

Table 1. Maximum Groundwater Concentrations in MW-7,
Chevron Station 209335

Analyte	Maximum Concentration (µg/L)	Date	Method A (µg/L)
TPH-D	200,000	March 2015	500
TPH-G	150,000	June 2011	800
Benzene	45	June 2011	5
Toluene	4,800	June 2011	1,000
Ethylbenzene	2,600	June 2011	700
Total xylenes	18,000	June 2011	1,000
Total lead	310	June 2011	15

Table 2. Groundwater Concentrations in MW-7 Following Surfactant Injection in March 2013,
Chevron Station 209335

Analyte	Concentration (µg/L)	Method A (µg/L)
TPH-D	5,200	500
TPH-G	99,000	800
Benzene	12	5
Toluene	1,600	1,000
Ethylbenzene	1,700	700
Total xylenes	17,000	1,000

Worksheet 4
Surface Water Route

CSID: 6537

Site: Chevron 209335

Not evaluated.

Worksheet 5
Air Route

CSID: 6537

Site: Chevron 209335

1.0 SUBSTANCE CHARACTERISTICS

1.1 Introduction

No scoring in Section 1.1.

1.2 Human Toxicity

Substance	Amb. Air Stnd. Value (ug/m^3)	Score	Acute Toxicity Value (mg/m^3)	Score	Chronic Toxicity Value (ug/m^3)	Score	Carcinogenicity Adj. CPFi (risk/mg/kg-day)	Score
Benzene (gasoline)	0.0345	10	31947	3	8.57E-03	8	2.73E-02	5
Toluene	5000	1	--	X	1.43E+00	3	--	X
Ethylbenzene	0.4	10	--	X	2.86E-01	3	--	X
Xylenes	--	X	21714	3	2.86E-02	5	--	X

Maximum score: 10

Bonus points: 2 Human Toxicity Score: 12

Source: WARM Toxicity Database Range: 1-12

1.3 Mobility

Gaseous Mobility

Substance	Vapor Pressure Value (mm Hg)	Score	Henry's Law Value (atm-m3/ mol)	Score
Benzene (gasoline)	9.50E+01	4	5.56E-03	4
Toluene	2.80E+01	4	6.63E-03	4
Ethylbenzene	7.00E+00	3	7.88E-03	4
Xylenes	1.00E+01	3	6.80E-03	4

Maximum score: 4

Source: WARM Toxicity Database

Particulate Mobility

Soil type:

Erodibility factor:

Climatic factor:

Mobility value: Mobility Score: 4

Source: Range: 0-4

1.4 Human Toxicity/Mobility

Source: WARM Scoring Manual Human Tox/Mobil Score: 24

Range: 1-24

1.5 Environmental Toxicity/Mobility

Substance	Acute Value (ug/m^3)	Score
Benzene (gasoline)	3.19E+04	3
Toluene	--	X
Ethylbenzene	--	X
Xylenes	2.17E+04	3
Maximum score	3	

Source: WARM Toxicity Database

Environmental Toxicity Score: 3
Range: 1-10

Environmental Tox/Mobil Score: 6
Range: 1-24

1.6 Substance Quantity

Quantity: 2,778 cu yd
Basis: Estimated plume volume originating around MW-7: 50 x 100 x 5 ft
Source: Leidos (2016) Table 1 and Figure 2

Substance Quantity Score: 8
Range: 1-10

2.1 Containment

Description: Uncontaminated soil > 2 feet thick, no vapor collection system
Basis: Site reports

Containment Score: 5
Range: 0-10

SUBSTANCE PARAMETER CALCULATIONS

Human Health Pathway
SUBh (Human Tox/Mobil + 5) x (Containment +1) + Substance Quantity: 182.0

Environmental Pathway
SUBe (Environ. Tox/Mobil + 5) x (Containment +1) + Substance Quantity: 74.0

3.0 TARGETS

3.1 Nearest Population

Description: Stoneway Apartments on property
Distance (ft): 0
Source: iMap

Nearest Population Score: 10
Range: 0-10

3.2 Nearest Sensitive Environment

Description: Woodland Park

Distance (ft): 1,350
Source: iMap

Nearest Sensitive Environment Score: 8
Range: 0-7

3.3 Population within One-Half Mile

Number: 9,200
Source: MO CDC

Population within Half Mile Score: 75.0
Range: 0-75

TARGET PARAMETER CALCULATIONS

Human Health Pathway

TARh: Nearest Population + Population within Half Mile | 85.0

Environmental Pathway

TARe Nearest Sensitive Environment | 8.0

4.0 RELEASE

Evid. of release? No
Source: Site reports

Release Score (REL): 0.0
Range: 0 or 5

AIR ROUTE CALCULATIONS

Human Health Pathway

AIRh = (SUBh x 60/329) x {REL + (TARh x 35/85} / 24 | 48.4

Environmental Pathway

AIRe = (SUBe x 60/329) x {REL + (TARe x 35/85} / 24 | 1.9

Range: 0-100

Worksheet 6
Groundwater Route

CSID: 6537

Site: Chevron 209335

1.0 SUBSTANCE CHARACTERISTICS

1.1 Human toxicity

Substance	Drink. Wat. Stnd Value (ug/L)	Score	Acute Toxicity Value (ug/L)	Score	Chronic Toxicity Value (ug/L)	Score	Carcinogenicity Adj. CPFo (risk/mg/kg-day)	Score
Benzene (gasoline)	5	8	3,306	3	4.00E-03	3	5.50E-02	5
Toluene	1000	4	5,000	3	8.00E-02	1	--	X
Ethylbenzene	700	4	3,500	3	1.00E-01	1	--	X
Xylenes	10000	2	50	10	2.00E-01	1	--	X
Naphthalene (diesel)	--	X	490	5	2.00E-02	1	--	X
Lead	15	6	<0.001	10	--	X	--	X

Maximum score: 10
Bonus points: 2
Human Toxicity Score: 12
Source: WARM Toxicity Database
Range: 1-12

1.2 Mobility

Substance	Solubility Value (ug/L)	Score
Benzene (gasoline)	1.75E+03	3
Toluene	5.26E+02	2
Ethylbenzene	1.69E+02	2
Xylenes	1.71E+02	2
Naphthalene (diesel)	3.10E+01	1
Lead	0.1 < K < 1	2

Maximum value: 3
Mobility Score: 3
Source: WARM Toxicity Database
Range: 1-3

1.3 Substance quantity

Quantity: 2,778 cu yd
Basis: Estimated plume volume originating around MW-7: 50 x 100 x 5 ft
Source: Leidos (2016) Table 1 and Figure 2
Substance Quantity Score: 8
Range: 1-10

2.1 Containment

Description: Contamination observed in ground water
Source: Site reports
Containment Score: 10

Range: 0-10

SUBSTANCE PARAMETER CALCULATION

SUB = (Human Toxicity + Mobility + 3) x (Containment + 1) + Substance Quantity | 206.0

2.0 MIGRATION POTENTIAL

2.2 Net precipitation

Amount (in.):	37.5	Net Precipitation Score:	4
Source:	NOAA data for Seatac Airport	Range:	0-5

2.3 Subsurface Hydraulic Conductivity

Description:	Sand with silt and gravel		
Source:	Site reports	Hydraulic Conductivity Score:	3
		Range:	1-4

2.4 Vertical Depth to Aquifer

Depth (ft):	34-38.5	Depth to Aquifer Score:	6
Source:	Site reports	Range:	1-8

MIGRATION PARAMETER CALCULATION

MIG = Depth to Aquifer + Net Precipitation + Hydraulic Conductivity | 13.0

3.0 TARGETS

3.1 Aquifer Usage

Description:	Not used by useable		
Source:	iMap, WDOH Water System Database	Aquifer Use Score:	2
		Range:	1-10

3.2 Distance to Nearest Drinking Water Well

Distance (ft):	> 10,000	Well Distance Score:	0
Source:	iMap, WDOH Water System Database	Range:	0-5

3.3 Population Served by Drinking Water Wells within Two Miles

		Population Served Score:	0.0
No. of people:	0	Range:	0-100
Source:	WDOH Water System Database, Well Log Viewer		

3.4 Area Irrigated by Wells within Two Miles

		Area Irrigated Score:	0.4
Area (acres):	0.3	Range:	0-50
Source:	Water Resources Explorer		

TARGET PARAMETER CALCULATION

2.4

TAR = Aquifer Use + Well Distance + Population Served + Area Irrigated

4.0 RELEASE

Evid. of release?	Contaminated ground water	Release Score (REL):	5.0
Source:	Site reports	Range:	0 or 5

GROUND WATER ROUTE CALCULATION

40.5

GW = (SUB x 40/208) x {(MIG x 25/17) + REL + (TAR x 30/165)} / 24

Range: 0-100

Washington Ranking Method
Route Scoring Summary and Ranking Calculation

CSID: **6537**

Site: **Chevron 209335**

Human Health Route Scores

Pathway	Score	Quintile
Surface water	0.0	
Air	48.4	5
Groundwater	40.5	4

Quintile	Value
High (H)	5
Middle (M)	4
Low (L)	

Human Health Pathway Quintiles - February 2015

Quintile	Surface Water		Air		Groundwater	
1	<=	7.9	<=	8.3	<=	23.9
2	8.0	15.4	8.4	15.7	24.0	33.0
3	15.5	21.3	15.8	24.9	33.1	40.2
4	21.4	29.7	25.0	39.0	40.3	50.2
5	>=	29.8	>=	39.1	>=	50.3

$(H^2 + 2M + L) / 8$

Human Health Priority Bin Score: 4.1

Environmental Route Scores

Pathway	Score	Quintile
Surface water	0.0	
Air	1.9	3

Quintile	Value
High (H)	3
Low (L)	

Environmental Pathway Quintiles - February 2015

Quintile	Surface Water		Air	
1	<=	11.5	<=	1.2
2	11.6	24.1	1.3	1.5
3	24.2	32.0	1.6	15.2
4	32.1	49.6	15.3	27.7
5	>=	49.7	>=	27.8

$(H^2 + 2L) / 7$

Environmental Priority Bin Score: 1.3

FINAL MATRIX RANKING

Human Health Priority	Environmental 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

n/a - not applicable

NFA - no further action

Site Rank: 1