SITE HAZARD ASSESSMENT
Worksheet 1
Summary Score Sheet

SITE INFORMATION:

Cleanup Site ID: 8836

Chevron Station 90619

Facility/Site ID: 35363194

1205 Washington Street

Bellingham, Whatcom County, WA 98225

Section:	25	Latitude:	48.76045
Township:	38N	Longitude:	-122.48807
Range:	02E	Tax/Parcel ID:	3802255175470000

Site scored/ranked for the Hazardous Sites List Publication: February 2018 Revised 2/22/18

SITE DESCRIPTION:

The Chevron Station 90619 site (Site) is a a former gasoline station located in Bellingham, Whatcom County, Washington. The 0.3-acre property is located approximately 900 feet from Bellingham Bay, and zoned for Urban Village use.

The triangle-shaped property is located on the northeast corner of the intersection of Broadway Street and Elm Street. Across Washington Street to the north are residential properties. Across Broadway Street to the southeast are residential properties and a fire station. Across Elm Street to the west are commercial buildings.

The Site is currently operated as a butcher shop called Carne by a tenant under ownship by James Wilson.

By the 1930s, the property was developed with a gasoline station and repair facility in the southern portion of the property. In 1975, the original structures were removed and the site was redeveloped with a second gasoline station and repair facility in the northern and central portions of the property. In 1991, the fueling and repair buildings were removed and in 1995 a commercial building was constructed in the central portion of the property.

SITE BACKGROUND:

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

From	To	Operator/Tenant	Activity
2017		Carne Butcher Shop	Butcher shop
1933	1942		Service station
1942	1947	Shell	Service station
1947	1950	Chevron	Service station
1950	1952	Diggs Service	Service station
1952	1995	Chevron (multiple operators)	Service station
1995	2009	Bean Blossom	Coffee shop
2009	2015	Supreme Bean	Coffee shop
2015	2017		Empty

SITE CONTAMINATION:

In 1991 the Chevron Station 90619 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 the time the property was used as a gasoline station are presumed to be the source of

gasoline range hydrocarbons (TPH-G), benzene, toluene, ethylbenzene, and xylenes observed in soil and groundwater.

Maximum concentrations of TPH-G and benzene observed in soil and groundwater in the 1990s exceeded their Method A cleanup levels (CULs) (Tables 1 and 2). The maximum groundwater concentrations for all analytes occurred in MW-12 on the southeast side of the property approximately 60 feet north of the southern-most corner of the site.

In November 2016, a limited soil and groundwater investigation was conducted focusing on the area around MW-12, which by this point had been abandoned. Six borings were advanced to intercept groundwater, which occurred at 12 feet bgs. One soil sample and one groundwater sample were collected from each of the borings, except for one boring where groundwater was not encountered and only a soil sample was collected. The maximum soil concentration of TPH-G (1,000 mg/kg at 8 feet bgs in B4 at the approximate location of MW-12) exceeded Method A (Table 3). No other soil analytes exceeded their Method A CULs. The only analyte detected in groundwater was toluene, which did not exceed its Method A CUL (Table 4). Although benzene was not detected in soil or ground water during the limited sampling event in November 2016, it was present in site soils and ground water previously and was conservatively assumed to be present for scoring purposes.

Non-aqueous phase liquid was not observed in ground water during any of the investigations.

REMEDIATION ACTIVITIES:

In January and February 1991, seven USTs, two hydraulic lifts, two pump islands, and delivery lines were removed from the property. The USTs included a 7,500-gallon, a 6,000-gallon, and a 3,000-gallon steel tank, each used for gasoline; two 1,000-gallon fiberglass tanks, one containing used oil and one containing heating oil; a 550-gallon steel tank used for heating oil; and a steel fuel tank (size not known) that had been abandoned in place. Two of the steel tanks had corrosion and holes. Soil was excavated to depths ranging from 4 feet to 12 feet bgs.

In April 1991, an additional 60 yd3 of contaminated soil were removed from around the used oil UST. In September to November 1992, approximately 1,150 yd3 of soil were excavated from the southern portion of the site, seqregated according to overburden vs. contaminated soil, and stockpiled on site. The contaminated soil was aerated during multiple events between July and September 1993. The uncontaminated soil and the aerated soil were backfilled into the excavation in multiple events ending in September 1993. Approximately 80 yd3 of soil containing oil-range hydrocarbons were transported to the RABANCO Roosevelt Regional Landfill in August 1993.

A vapor extraction system was installed in 1991. By April 1992 the system had removed at least 770 pounds of vapor emissions.

CURRENT SITE CONDITIONS:

The property is covered primarily by a building and a paved parking lot with landscaped strips around the perimeter. Surrounding properties to the west and southeast are similarly covered by commercial buildings, a fire station, and pavement. Surrounding properties to the north and northeast are residences with small yards. Elizabeth Park is located 320 feet southwest of the property; the 5-acre, wooded park features picnic tables, tennis courts, a playground, and walking trails.

No water supply wells are located within two miles of the property. An irrigation supply well serving a 45-acre park is located 3,800 feet northwest. Another irrigation supply well serving a 120-acre golf course is located 6,000 feet north.

A total of 28 listed MTCA sites are located within 0.5 miles of the property. The closest sites are Family Foot Care (CSID 11734), 500 feet northeast; Yorkstone Family LLC (CSID 5452), 275 feet south; and Bucks Texaco (CSID 6560), 450 feet southeast. Each of these sites is associated with petroleum contamination.

gasoline

SITE HAZARD ASSESSMENT
Worksheet 1
Summary Score Sheet

The approximate depth to groundwater is 7 to 13 feet below ground surface, with groundwater flowing to the southwest. Subsurface soils are silt, sand, and gravel.

SPECIAL CONSIDERATIONS:

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

☐ **Surface Water**

No observed release to surface water

☑ **Air**

Volatile chemicals may be present in soil and groundwater

☑ **Groundwater**

Although groundwater concentrations measured in November 2016 did not exceed MTCA cleanup levels, only a limited portion of the site was investigated

ROUTE SCORES:

Surface Water/ Human Health:		Surface Water/ Environment:	
Air/ Human Health:	37.7	Air/ Environment:	1.6
Groundwater/ Human Health:	36.7		

Overall Rank: 4

REFERENCES:

1 GeoEngineers. 1991. Report of Geoenvironmental Services, Subsurface Hydrocarbon Study, Service Station 0619.

2 GeoEngineers. 1991. Report of Geoenvironmental Services, Supplemental Subsurface Hydrocarbon Study, Decommissioned Service Station 60090619, 2200 Elm Street, Bellingham, Washington. May 21.

3 GeoEngineers. 1991. Report of Geoenvironmental Services, Tank Removal Monitoring, Chevron Service Station 60090619, Broadway and Elm, Bellingham, Washington. March 11.

4 GeoEngineers. 1991. Results of May and August Ground Water Sampling, Chevron Service Station, Broadway and Elm Streets, Bellingham, Washington. October 9.

5 GeoEngineers. 1992. Results of Remedial Action Monitoring, January 17 through May 19, 1992, Chevron Service Station 60090619, 2200 Elm Street, Bellingham, Washington. September 22.

6 GeoEngineers. 1993. Report of Geoenvironmental Services, Supplemental Subsurface Explorations and Remedial Excavation Monitoring , Decommissioned Service Station 60090619, 2200 Elm Street, Bellingham, Washington. February 10.

7 GeoEngineers. 1994. Geoenvironmental Services, Soil Stockpile Treatment Monitoring, Former Chevron Service Station 60090619, 2200 Elm Street, Bellingham, Washington. January 21.

8 Pacific Environmental Group. 1996. Quarterly Monitoring and Sampling Activities, Former Chevron Service Station 9-0619, 2200 Elm Street, Bellingham, Washington. January 22.

9 Stratum Group. 2016. Environmental Site Assessment: Phase II Limited Soil and Groundwater Sampling Investigation, 1205 Washington Street, Bellingham, Washington. December 8.

SITE HAZARD ASSESSMENT
Worksheet 2
Route Documentation

Cleanup Site ID: 8836 Chevron Station 90619

Facility/Site ID: 35363194

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:

Gasoline (benzene)

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

Detected in soil in November 2016. Detected in groundwater in 1995

List those management units to be considered for scoring:

Soil

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

More recent detections.

3. GROUNDWATER ROUTE

List those substances to be considered for scoring:

Gasoline (benzene)

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

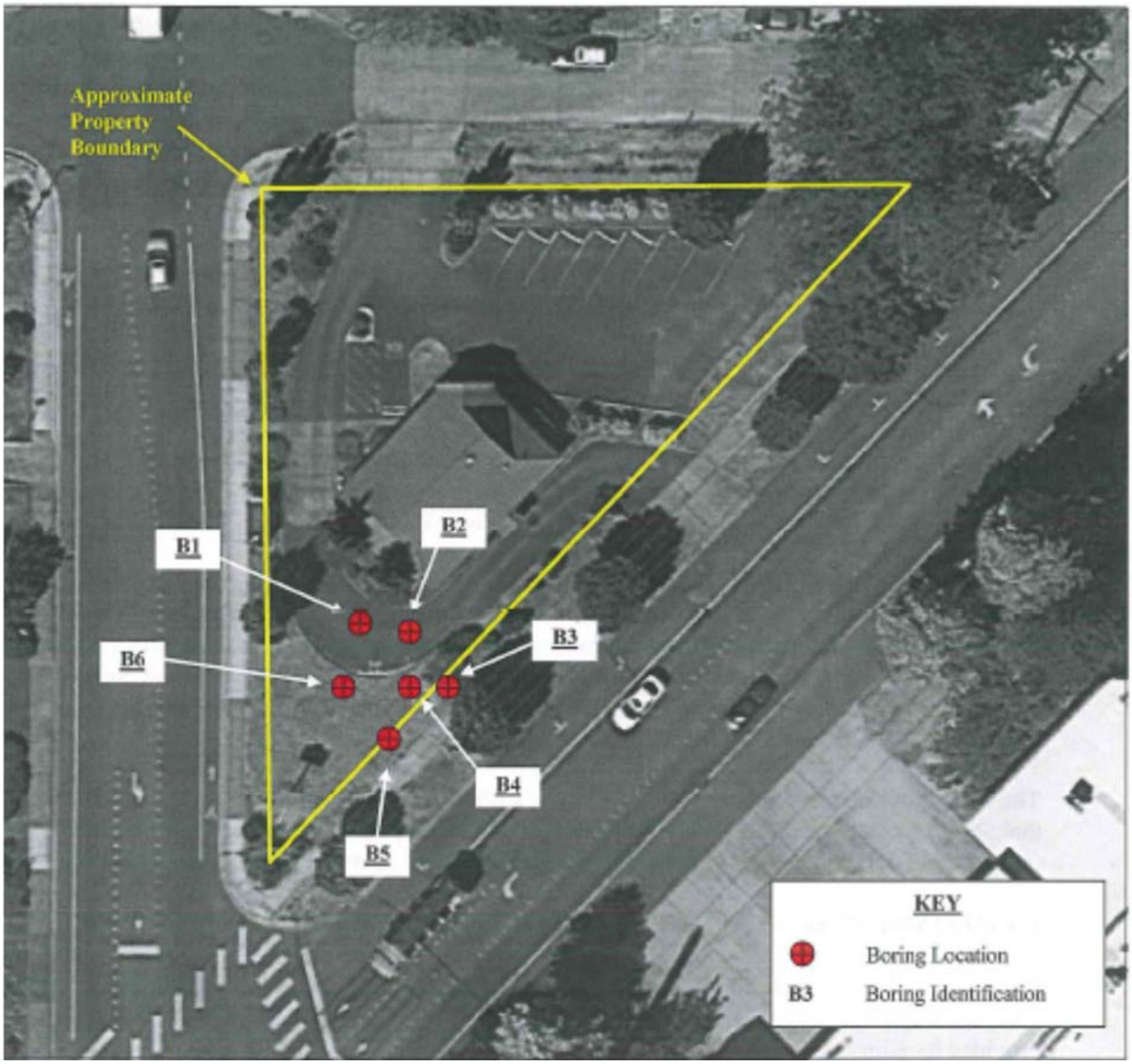
Detected in soil in November 2016; detected in groundwater in 1995

List those management units to be considered for scoring:

Groundwater

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

Observed historical releases to groundwater



Current Site Layout with 2016 Sampling Locations
Chevron 90619

Table 1. Maximum Soil Concentrations Prior to 2016, Chevron 90619

Analyte	Maximum Concentration (mg/kg)	Location	Depth (feet bgs)	Method A (mg/kg)
TPH-G	**650**	G11	10	30
Benzene	**0.042**	G26	2	0.03
Ethylbenzene	1.4	G11	10	6
Toluene	0.56	G2	11.5	7
Total xylenes	3.3	G11 G26	10 2	9

Table 2. Maximum Groundwater Concentrations Prior to 2016, Chevron 90619

Analyte	Maximum Concentration (µg/L)	Location	Date	Method A (µg/L)
TPH-G	**3,000**	MW-12	March 1991	800
Benzene	**73**	MW-12	December 1994	5
Ethylbenzene	94	MW-12	March 1991	700
Toluene	7.0	MW-12	March 1995	1,000
Total xylenes	96	MW-12	March 1991	1,000

Table 3. Maximum Soil Concentrations in November 2016, Chevron 90619

Analyte	Maximum Concentration (mg/kg)	Location	Depth (feet bgs)	Method A (mg/kg)
TPH-G	**1,000**	B4	8	100
Benzene	< 0.03	All	--	0.03
Ethylbenzene	4.0	B4	8	6
Toluene	< 1.2	All	--	7
Total xylenes	0.89	B2	7.5	9
MTBE	< 2.5	All	--	1

Table 4. Maximum Ground Water Concentrations in November 2016, Chevron 90619

Analyte	Maximum Concentration (µg/L)	Location	Method A (µg/L)
TPH-G	< 50	All	1,000
Benzene	< 3	All	5
Ethylbenzene	< 1	All	700
Toluene	1.6	B1	1,000
Total xylenes	< 3	All	1,000
MTBE	< 3	All	20

Worksheet 4
Surface Water Route

CSID: **8836**
Site: **Chevron Station 90619**

Not scored.

Worksheet 5
Air Route

CSID: 8836

Site: Chevron Station 90619

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 WOE	Score
Gasoline (benzene)	0.0345	10	31947	3	8.57E-03	8	2.73E-02	5

Maximum score:	10		
Bonus points:	0	Human Toxicity Score:	10
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
Gasoline (benzene)	95	4	0.00556	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:	20
		Range: 1-24	

1.5 Environmental Toxicity/Mobility

Substance	Acute Value (ug/m^3)	Score
Gasoline (benzene)	3.19E+04	3

Maximum score	3	Environmental Toxicity Score:	3
Source:	WARM Toxicity Database	Range: 1-10	
		Environmental Tox/Mobil Score:	6
		Range: 1-24	

1.6 Substance Quantity

Quantity:	350 yd3		
Basis:	Area within borings B1-B3, B5, and B6; assumed to be 2 feet thick		
Source:	Stratum (2016) Figure 3	Substance Quantity Score:	6
		Range: 1-10	

2.1 Containment

Description:	Cover > 2 feet thick; no vapor collection system		
Basis:	Stratum (2016)	Containment Score:	5
		Range: 0-10	

SUBSTANCE PARAMETER CALCULATIONS

Human Health Pathway

SUBh (Human Tox/Mobil + 5) x (Containment +1) + Substance Quantity **156.0**

Environmental Pathway

SUBe (Environ. Tox/Mobil + 5) x (Containment +1) + Substance Quantity **72.0**

3.0 TARGETS

3.1 Nearest Population

Description:	Commercial building to west		
Distance (ft):	130	Nearest Population Score:	10
Source:	iMap	Range: 0-10	

3.2 Nearest Sensitive Environment

Description:	Elizabeth Park		
Distance (ft):	320	Nearest Sensitive Environment Score:	7
Source:	iMap	Range: 0-7	

3.3 Population within One-Half Mile

Number:	4,531	Population within Half Mile Score:	67.3
Source:	MO CDC	Range:	0-75

TARGET PARAMETER CALCULATIONS

Human Health Pathway

TARh = Nearest Population + Population within Half Mile | 77.3

Environmental Pathway

TARe Nearest Sensitive Environment | 7.0

4.0 RELEASE

Evid. of release?	No visual evidence		
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 | 37.7

Environmental Pathway

AIRe = (SUBe x 60/329) x {REL + (TARe x 35/85} / 24 | 1.6

Range: 0-100

Worksheet 6
Groundwater Route

CSID: 8836

Site: Chevron Station 90619

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
Gasoline (benzene)	5	8	3,306	3	4.00E-03	3	5.50E-02	5

Maximum score: 8
Bonus points:
Source: WARM Toxicity Database

Human Toxicity Score: 8
Range: 1-12

1.2 Mobility

Substance	Solubility Value (ug/L)	Score
Gasoline (benzene)	1.75E+03	3

Maximum value: 3
Source: WARM Toxicity Database

Mobility Score: 3
Range: 1-3

1.3 Substance quantity

Quantity: 350 cu yd
Basis: Area within borings B1-B3, B5, and B6; assumed to be 2 feet thick
Source: Stratum (2016) Figure 3

Substance Quantity Score: 3
Range: 1-10

2.1 Containment

Description: None
Source: Site reports

Containment Score: 10
Range: 0-10

SUBSTANCE PARAMETER CALCULATION

SUB = (Human Toxicity + Mobility + 3) x (Containment + 1) + Substance Quantity **157.0**

2.0 MIGRATION POTENTIAL

2.2 Net precipitation

Amount (in.):	35	Net Precipitation Score:	4
Source:	Wikipedia (rounded)	Range: 0-5	

2.3 Subsurface Hydraulic Conductivity

Description:	Silt, sand, and gravel		
Source:	Site reports	Hydraulic Conductivity Score:	3
		Range: 1-4	

2.4 Vertical Depth to Aquifer

Depth (ft):	7-13	Depth to Aquifer Score:	8
Source:	Site reports	Range: 1-8	

MIGRATION PARAMETER CALCULATION

MIG = Depth to Aquifer + Net Precipitation + Hydraulic Conductivity **15.0**

3.0 TARGETS

3.1 Aquifer Usage

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

3.2 Distance to Nearest Drinking Water Well

Distance (ft):	none	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		

3.4 Area Irrigated by Wells within Two Miles — Area Irrigated Score: 9.6

Area (acres):	165	Range: 0-50	
Source:	Water Resources Explorer		

TARGET PARAMETER CALCULATION

11.6

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

4.0 RELEASE

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

GROUND WATER ROUTE CALCULATION

36.7

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

Site Name: **Chevron Station 90619**
Site Address: **5040 148th Avenue NE, Redmond, WA 98052**
CSID: **8836**
FSID: **36542815**

Human Health Route Scores

Pathway	Score	Quintile
Surface water	0.0	
Air	37.7	4
Groundwater	36.7	3

Quintile	Value
High (H)	4
Middle (M)	3
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: 2.8

Environmental Route Scores

Pathway	Score	Quintile
Surface water	0.0	
Air	1.6	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: 4