SITE HAZARD ASSESSMENT
Worksheet 1: Summary Score Sheet

SITE NAME: Rainier Mall **Rank: 2**

Cleanup Site ID: 4187

Facility/Site ID: 88987973

Completed on 7/15/2019 for inclusion on the August 2019 Hazardous Sites List.

LOCATION OF SITE

4208 Rainier Avenue South

Seattle, King County, WA 98118

Tax Parcel ID: 7950301480

Township 24N, Range 04E, Section 15

Latitude, Longitude: 47.56481 , -122.28778

SITE DESCRIPTION

Within Currently Defined Site Boundaries

Based on currently available information, the Rainier Mall site (Site) includes one tax parcel listed above and likely the adjacent South Genesee Street right-of-way. The Site includes 2.3 acres of property zoned for neighborhood commercial use (NC2-40), and is currently occupied by a vacant commercial building and parking lot. Contamination on the property is linked to multiple dry cleaners who operated in buildings historically located in the southwest corner of the property. The Mount Baker Housing Authority is targeting the Site for a potential redevelopment into multi-family affordable housing.

The Site is located on the northeast corner of the intersection of South Genesee Street and Rainier Avenue South, at the boundary of the Mount Baker and Columbia City neighborhoods in Seattle (Figure 1). It is served by city water and sewer systems. A King County Metro bus stop is located on the western edge of the property on Rainier Avenue South.

The Site previously underwent a Site Hazard Assessment in 2003, and was ranked a 5. The Site is being re-ranked to incorporate additional data that has been collected since that time prior to the initiation of state action at the Site.

Historical Owners and Operators

From	To	Owner/Operator	Site Uses
1929	1968	various	retail stores on southern and western portions of property and residences on northeastern portion along 36th Avenue South
1968	1998	Safeway	grocery store built in 1968, remodeled in 1977, and enlarged in 1991
1955	1978		dry cleaners present in retail spaces in southwest part of property
1998	2019	Kane Properties LLC	mixed-retail mall, currently vacant; tenants included grocery store, furniture store, shoe store, cellular telephone store, photographic developing shop, bridal shop, restaurant, florist, hair salon, travel agency, and key shop

DEPARTMENT OF ECOLOGY
State of Washington

SITE HAZARD ASSESSMENT
Worksheet 1: Summary Score Sheet

Area Surrounding the Site

Retail and commercial buildings are present to the north, west, and south of the Site. Single family residences and retail are located to the east of the Site, across 36th Avenue South. La Escuelita Bilingual School is located to the southeast of the Site, across the intersection of South Genesee Street and 36th Avenue South. The closest park is the Rainier Playfield, approximately 700 feet south of the Site. The closest surface water is Lake Washington, located approximately one half mile northeast of the Site.

Fifteen other Ecology cleanup sites are located within one half mile of this Site. Nine have a status of Cleanup Started, 3 are Awaiting Cleanup, and 3 have received a determination of No Further Action. The closest cleanup sites to the Rainier Mall Site are the Darigold Seattle Rainier site, located one block north of the Rainier Mall (Cleanup Started) and the Genesee Shell and Genesee Fuel Heating sites, located one block east of the Rainier Mall on South Genesee Street (both No Further Action).

SITE CHARACTERIZATION AND/OR REMEDIATION

There are three distinct areas of confirmed or suspected contamination on the Site (Figure 2). From north to south, these are treated timber piles under the retail building currently on the Site; an area of petroleum contaminated soil on the northern half of the Site; and soil and groundwater contamination with chlorinated solvents in the area of the former dry cleaner buildings.

TREATED TIMBER PILES
The retail building on Site is supported by up to 170 subsurface timber piles. It is likely that these timber piles were treated with creosote, which includes polycyclic aromatic hydrocarbons (PAHs) that can contaminate soil surrounding the piles. Soil sampling from outside the building footprint has not indicated contaminated soil, so current information suggests that any soil contamination is limited to the area adjacent to the piles.

PETROLEUM CONTAMINATED SOIL
During sampling of the northern portion of the property conducted in 2017 by Sound Earth Strategies, discussed in more detail in the following section, oil range petroleum hydrocarbons (TPH-O) above MTCA Method A cleanup levels were discovered in soil collected 5 feet bgs in boring TB05. This boring was located near the southwest corner of the existing retail building (Figure 3). The lateral and vertical extent of petroleum contamination has not been fully delineated.

CHLORINATED SOLVENTS
Site characterization related to chlorinated solvents has been focused in the southwest part of the property, near the former buildings historically occupied by dry cleaners. Hahn and Associates completed sampling in this area in 2000 as part of a Phase II Environmental Site Assessment. A geophysical survey of the property was conducted, and did not indicate any evidence of underground storage tanks on the property. Soil samples were taken from 8 borings. Temporary wells were installed in 5 of the borings for the collection of groundwater samples. Groundwater was collected at depths of 27 to 32 feet below ground surface (bgs). Soil was determined to be contaminated with tetrachloroethylene (PCE), a chlorinated solvent often used in dry cleaning. The maximum observed concentration was 83 mg/kg PCE in a sample taken 19.5 feet bgs at boring location B-1, well above the MTCA Method A cleanup level of 0.05 mg/kg PCE. Groundwater concentrations of PCE and its breakdown products trichloroethylene (TCE) and vinyl chloride were also above the relevant Method A cleanup levels, with the highest concentrations observed in the sample from boring B-4.

Sound Earth Strategies resumed site characterization activities in 2017 and 2018. The first round of sampling included 13 soil borings. Eight were advanced using direct push to a maximum depth of 24.5 feet bgs (SB01 through 08), 4 were advanced using hollow stem auger to a maximum depth of 41.5 feet bgs (B01 through 04) and 1 was advanced with sonic drilling to a maximum depth of 90 feet bgs to attempt to locate the regional aquifer (B05). A groundwater monitoring well was installed at location B01, and is identified as MW01. Results from the sampling indicated soil contamination with chlorinated solvents between depths of 12.5 and 32.5 feet bgs. PCE, TCE, and vinyl chloride were all present above cleanup levels in some samples. The highest observed concentration of PCE was 520 mg/kg in the sample collected 20 feet bgs from boring B01. Perched groundwater was encountered between 10 and 35 feet bgs. The deep boring did not encounter regional

groundwater at depths up to 90 feet bgs.

The second round of sampling conducted by Sound Earth Strategies split the property into northern and southern portions. Sampling in the northern portion was focused on identifying the northern edge of chlorinated solvent contamination and investigating the fill soil layer that is present from approximately 0 to 10 feet bgs across the Site. Seven soil borings were advanced (TB01 through 05, B10, B11). A subset of these samples were analyzed for chlorinated solvents, metals, petroleum hydrocarbons, and polycyclic aromatic hydrocarbons. The one sample with identified petroleum contamination is discussed above. No other contaminants were identified above cleanup levels. Three soil gas samples were also collected along the southern edge of the existing retail building (SG01 through 03). The only chlorinated solvent above laboratory reporting limits was PCE, with a maximum concentration of 48 ug/m3. This is below the MTCA Method B screening level of 610 ug/m3 for unrestricted land use.

In the southern portion of the Site, investigations included soil gas sampling to evaluate conditions in shallow soil. Soil gas was sampled using passive samplers at 3 feet bgs; results for PCE are below in Figure 4. Sampling does not indicate widespread vapor contamination in shallow soil. Sampling included 15 soil borings (B06 though 09, B12 through 14, and TB01 through 08). Four of these borings were completed as monitoring wells (MW02 through 05). B12 was an angled boring completed under the sidewalk on Rainier Avenue South on the western edge of the property. These soil borings, in conjunction with previous borings, were used to delineate an approximate area of soil contamination, as shown below on Figure 5. Groundwater sampling was conducted for MW01 through 05 in January 2018. Depth to groundwater was between 5.5 and 13.5 feet bgs, and groundwater flow was to the south-southeast. Groundwater samples from MW01, 02, and 05 contained PCE, TCE, and/or vinyl chloride above cleanup levels.

The final round of sampling conducted by Sound Earth Strategies in 2018 was done to assess conditions on the western and southern property boundaries. Four soil borings (B15 through 18) were installed near property boundaries and completed as monitoring wells (MW06 through 09). MW08 and 09 were vertical borings located on the western and southern edges of the property, respectively. MW06 and 07 were angled borings installed on the western property boundary to assess conditions under the adjacent Rainier Avenue South sidewalk. Groundwater from MW06 and 07 did not contain any chlorinated solvents above laboratory reporting limits, while groundwater from MW08 and 09 contained PCE, TCE, cis-1,2-dichloroethylene, and vinyl chloride above cleanup levels. Groundwater flow direction is shown in Figure 5.

The combined results from site characterization activities to date indicate an area of soil contaminated with chlorinated solvents that is contained within property boundaries (Figure 5), and an area of contaminated groundwater that has not been fully delineated. Based on sample results and groundwater flow, it is likely that the area of groundwater contamination extends off-property to the southeast, into the South Genesee Street right-of-way.

ADDITIONAL INFORMATION COLLECTED BY THE SITE HAZARD ASSESSOR

The Assessor visited the Site on April 25, 2019. Photos from the visit are in Figure 6. In general, the conditions observed were the same as those indicated in site reports. The existing retail building and parking lot were both empty. Fencing surrounded the property, preventing entry by vehicles or pedestrians. Barrels containing investigatively derived waste were observed in the parking lot in the southwest part of the property. Vehicles that appeared to be used as transient housing were observed east of the Site along 36th Avenue South, indicating a possible additional population that is not accounted for in scoring.

SPECIAL CONSIDERATIONS

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

☐ **Surface Water**

☑ **Air**

SITE HAZARD ASSESSMENT
Worksheet 1: Summary Score Sheet

Volatile contaminants are present in soil and groundwater. While the risk of vapor intrusion is low for current buildings, based on lateral distance to contamination, the risk remains for potential future buildings.

☑ **Groundwater**

Contamination above cleanup levels has been documented in groundwater on Site.

Scoring of the groundwater pathway only included chlorinated solvents, and not other contaminants that are suspected (polycyclic aromatic hydrocarbons) or confirmed (TPH-O) to be on Site. Inclusion of these chemicals would not have changed groundwater scoring. The additional contaminants are not volatile, and would not be included in air pathway scoring.

ROUTE SCORES

Surface Water/ Human Health:		Surface Water/ Environment:	
Air/ Human Health:	54.4	Air/ Environment:	5.7
Groundwater/ Human Health:	37.6		

Overall Rank: 2

DEPARTMENT OF ECOLOGY
State of Washington

SITE HAZARD ASSESSMENT
Worksheet 1: Summary Score Sheet

REFERENCES

1 ESRI. Accessed 2019. World Annual Evapotranspiration Map. Acessed through https://www.esri.com/arcgis-blog/products/arcgis-online/mapping/world-average-annual-evapotranspiration-web-map-now-available/

2 Hahn and Associates, Inc. August 2000. Phase II Environmental Site Assessment, Rainier Mall, 4208 Rainier Avenue South, Seattle, Washington.

3 Hahn and Associates, Inc. May 2000. A Phase I Environmental Site Assessment, Rainier Mall (Former Safeway Store No. 441), 4208 Rainier Avenue S, Seattle, Washington.

4 King County. Accessed 2019. iMap. https://8 gismaps.kingcounty.gov/iMap/

5 Missouri Census Data Center. Accessed 2019. Circular Area Profiles – Version 10C. http://mcdc.missouri.edu/websas/caps10c.html

6 NOAA National Centers for Environmental Information. Accessed 2019. Global Summary of the Year 2009 - 2018 – Mercer Island Weather Forecast Office. Requested from https://www.ncdc.noaa.gov/cdo-web/

7 Sound Earth Strategies. March 2017. Subsurface Investigation Summary Letter, Rainier Mall Property, 4208 Rainier Avenue South, Seattle, Washington.

8 Sound Earth Strategies. March 2018. Subsurface Investigation Summary Report, Rainier Mall North Property, 4208 Rainier Avenue South, Seattle, Washington. [Draft - Issued for Client Reviews]

9 Sound Earth Strategies. March 2018. Subsurface Investigation Summary Report, Rainier Mall South Property, 4208 Rainier Avenue South, Seattle, Washington. [Draft - Issued for Client Reviews]

10 Sound Earth Strategies. October 2018. Supplemental Subsurface Investigation Summary Letter, Rainier Mall Property, 4208 Rainier Avenue South, Seattle, Washington.

11 WA Dept. of Ecology. Accessed 2019. What's in My Neighborhood. https://fortress.wa.gov/ecy/neighborhood/

12 WA Dept. of Health Office of Drinking Water. Accessed 2019. Find Water System. https://fortress.wa.gov/doh/eh/portal/odw/si/FindWaterSystem.aspx

DEPARTMENT OF ECOLOGY
State of Washington

SITE HAZARD ASSESSMENT
Worksheet 2: Route Documentation

SITE NAME: Rainier Mall

Cleanup Site ID: 4187

Facility/Site ID: 88987973

1. SURFACE WATER ROUTE

List those substances to be considered for scoring:

Not scored.

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:

PCE, TCE, vinyl chloride

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

Volatile chemicals detected in soil or groundwater.

List those management units to be considered for scoring:

Soil, groundwater, air

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

Some soil vapor sampling has been conducted. Other subsurface media (soil and groundwater) were considered because they can contribute to contamination in soil vapor.

3. GROUNDWATER ROUTE

List those substances to be considered for scoring:

PCE, TCE, vinyl chloride

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

Chemicals detected in groundwater above cleanup levels.

List those management units to be considered for scoring:

Soil, groundwater

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

Substance list was based on groundwater, and approximate area of contamination was based on area of contaminated soil.

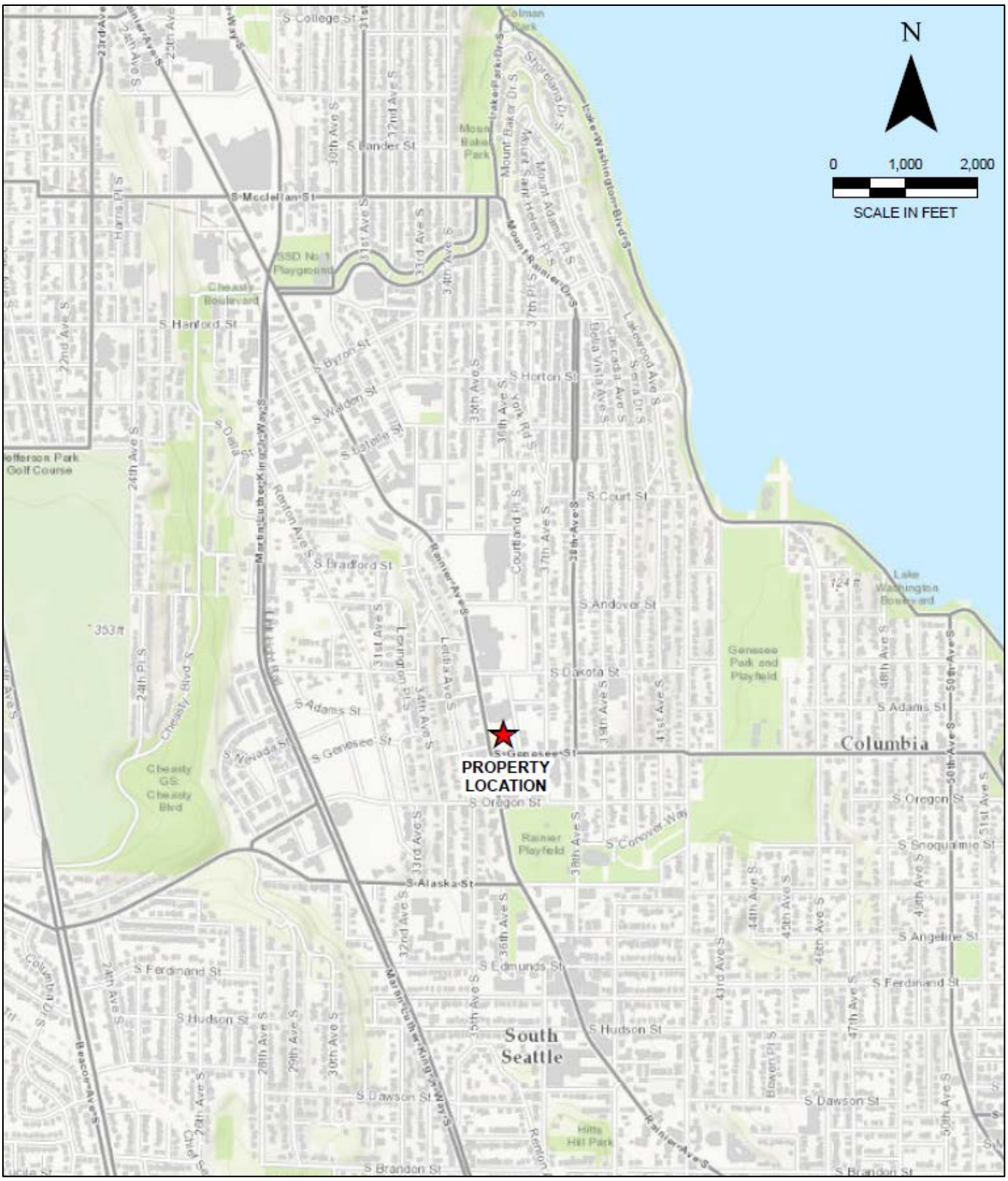

Figure 1. General location of the Site. From Sound Earth Strategies (October 2018).

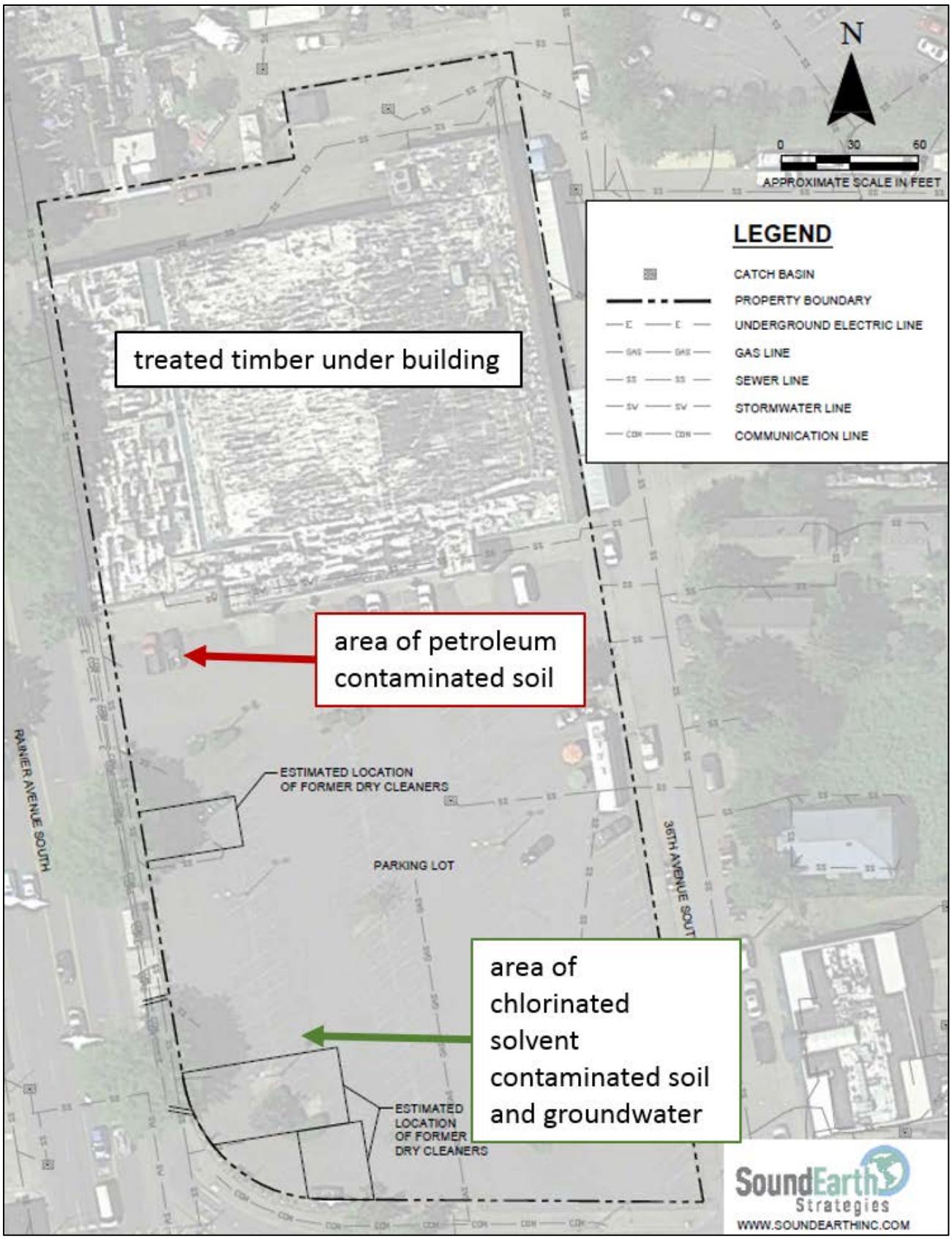

Figure 2. General location of areas of contamination on Site. Base figure from Sound Earth Strategies (October 2018).

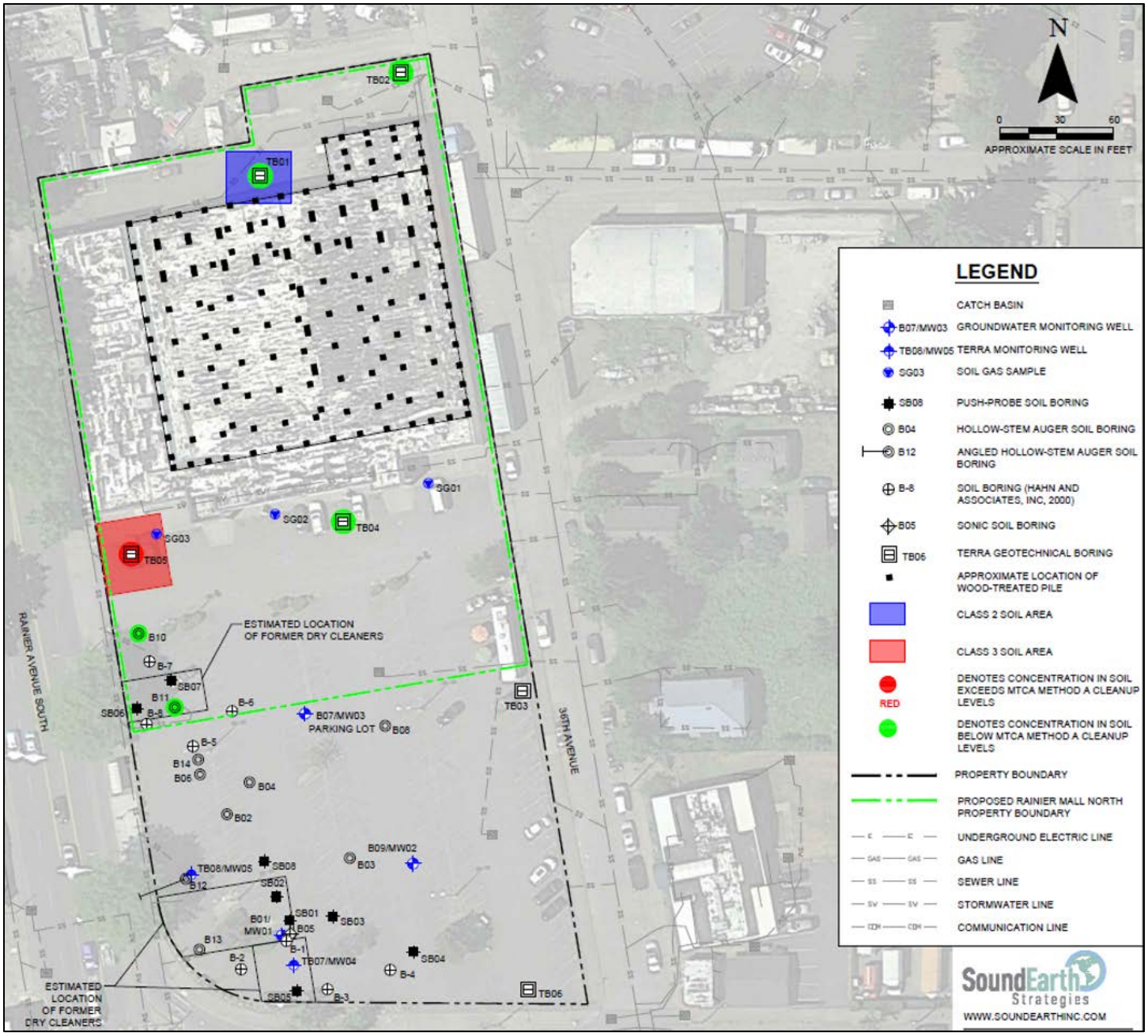

Figure 3. Sampling locations and areas of contamination during 2017 investigation of the northern part of the property. Soil indicated by the red area (Class 3 soil) is above cleanup levels. Figure from Sound Earth Strategies (March 2018 – north).

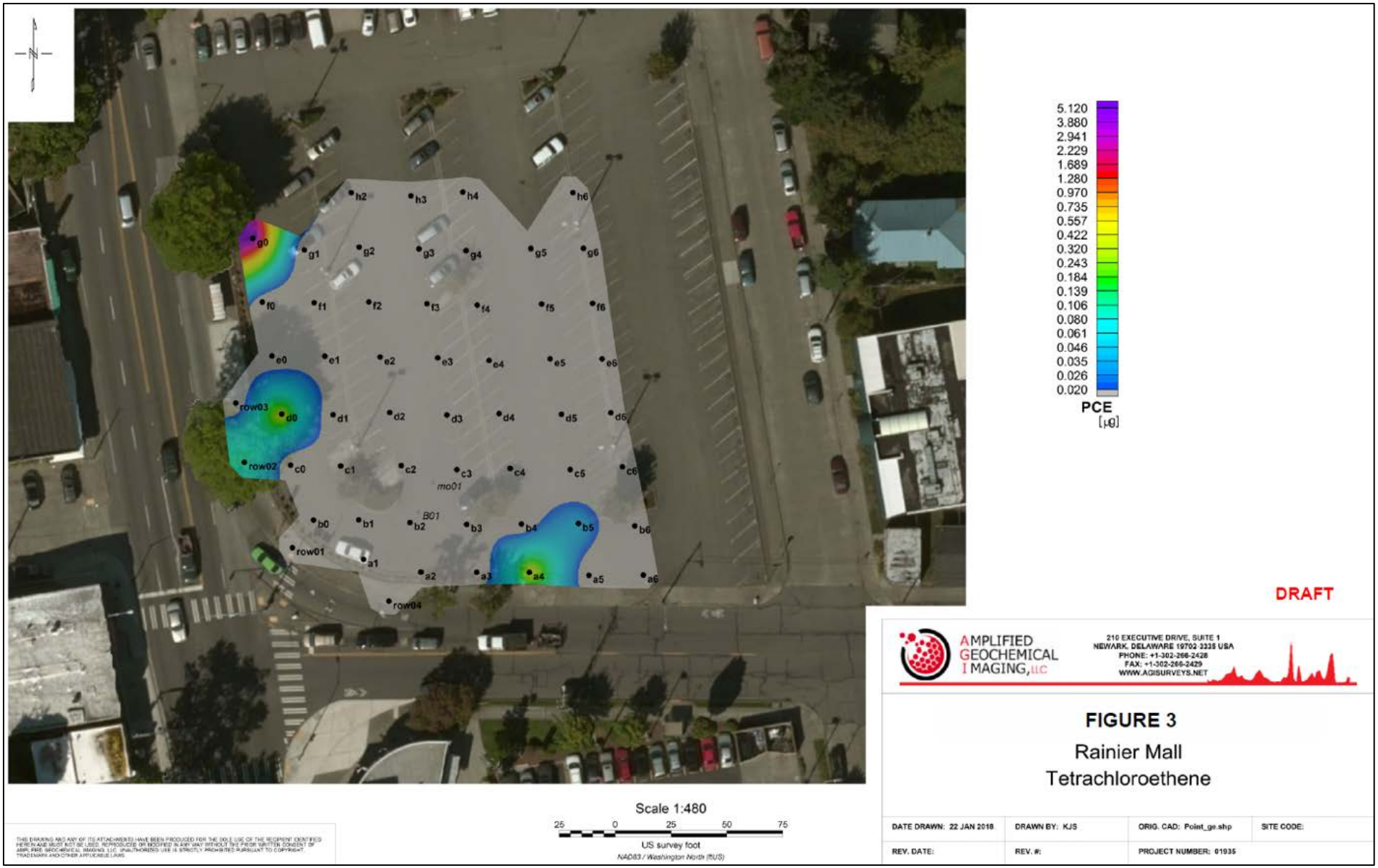

Figure 4. Sampling locations and PCE results of soil gas sampling conducted on the southern portion of the property. Figure from Sound Earth Strategies (March 2018 – south).

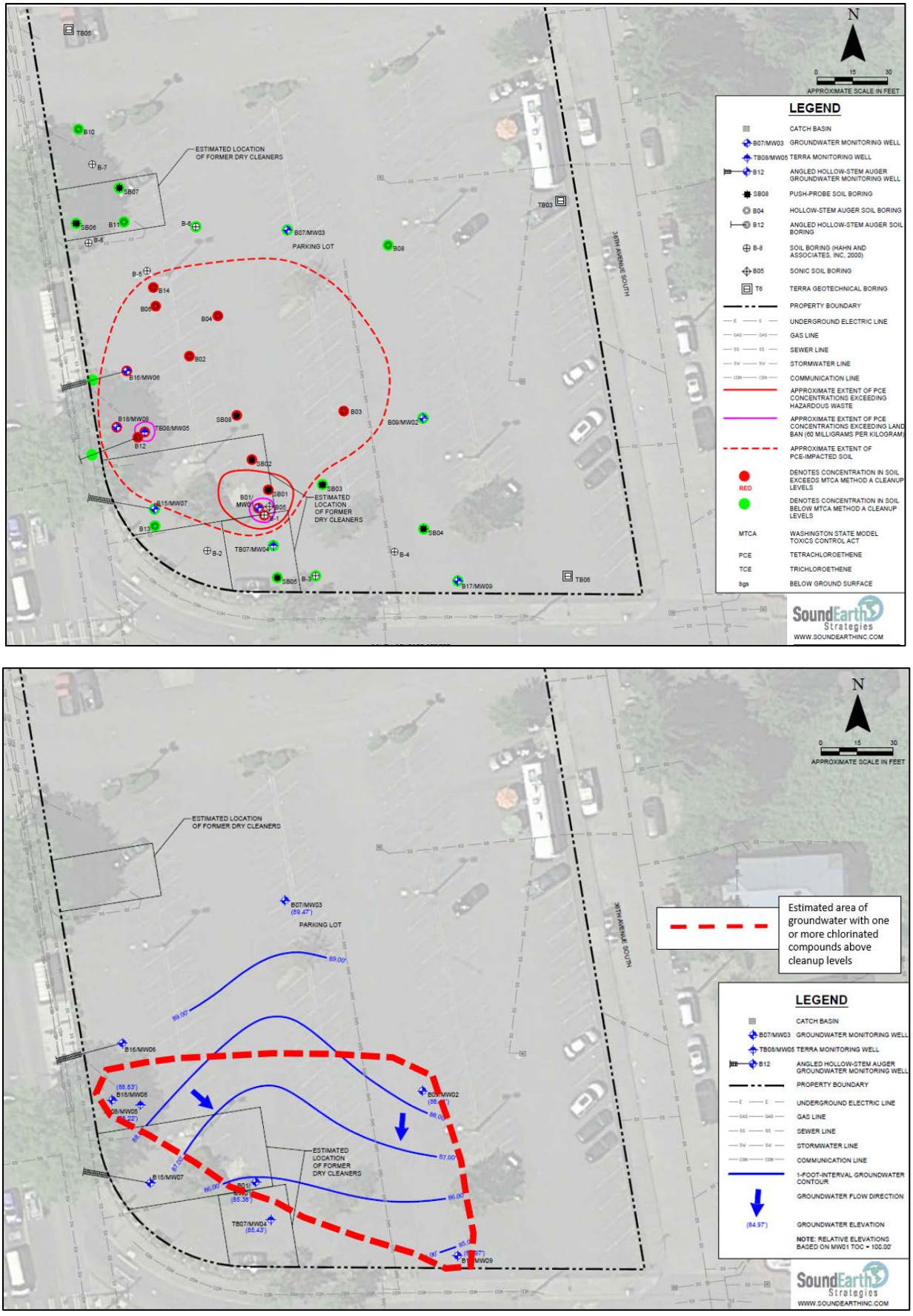

Figure 5. Area of soil (top) and groundwater (bottom) contaminated with chlorinated solvents. Base figures from Sound Earth Strategies (October 2018).

Figure 6. Photos from April 25, 2019 site visit. View of Site from the southeast corner, across South Genesee Street (left) and view of southwest corner of the property from sidewalk along Rainier Avenue South facing south (right).

Worksheet 4
Surface Water Route

CSID: 4187

Site: Rainier Mall

Not scored.

Worksheet 5
Air Route

CSID: 4187

Site: Rainier Mall

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 (mg/kg/day)	Score	Carcinogenicity Adj. CPFi (risk/mg/kg-day)	Score
Tetrachloroethene (PCE)	1.69E-01	10	4.00E+03	5	1.14E-02	5	7.28E-04	3
Trichlorothene (TCE)	5.00E-01	10	1.56E+04	3	5.71E-04	10	1.44E-02	5
Vinyl chloride	1.28E-02	10	4.60E+05	1	2.86E-02	5	3.10E-02	5

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
Tetrachloroethene (PCE)	1.80E+01	4	1.82E-02	4
Trichlorothene (TCE)	5.80E+01	4	1.03E-02	4
Vinyl chloride	2.70E+03	4	2.71E-02	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 (mg/m^3)	Score
Tetrachloroethene (PCE)	4.00E+03	5
Trichlorothene (TCE)	1.56E+04	3
Vinyl chloride	1.69E+03	5
Maximum score	5	

Source: WARM Toxicity Database

Environmental Toxicity Score: 5

Range: 1-10

Environmental Tox/Mobil Score: 10

Range: 1-24

1.6 Substance Quantity

Quantity: 12,800 ft^2

Basis: area of soil contamination with PCE or TCE

Source: site reports

Substance Quantity Score: 5

Range: 1-10

2.1 Containment

Description: contamination > 2' deep with 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 179.0

Environmental Pathway

SUBe (Environ. Tox/Mobil + 5) x (Containment +1) + Substance Quantity 95.0

3.0 TARGETS

3.1 Nearest Population

Description: retail buildings south across S Genesee St

Distance (ft): 110

Source: iMap

Nearest Population Score: 10

Range: 0-10

3.2 Nearest Sensitive Environment

Description:	Rainier Playfield		
Distance (ft):	725	Nearest Sensitive Environment Score:	7
Source:	iMap	Range:	0-7

3.3 Population within One-Half Mile

Number:	6,016	Population within Half Mile Score:	75.0
Source:	MO CDC	Range:	0-75

TARGET PARAMETER CALCULATIONS

Human Health Pathway

TARh: Nearest Population + Population within Half Mile — 85.0

Environmental Pathway

TARe Nearest Sensitive Environment — 7.0

4.0 RELEASE

Evid. of release?	PCE in soil gas collected by passive samplers		
Source:	site reports	Release Score (REL):	5.0
		Range:	0 or 5

AIR ROUTE CALCULATIONS

Human Health Pathway

AIRh = (SUBh x 60/329) x {REL + (TARh x 35/85} / 24 — 54.4

Environmental Pathway

AIRe = (SUBe x 60/329) x {REL + (TARe x 35/85} / 24 — 5.7

Range: 0-100

Worksheet 6
Groundwater Route

CSID: 4187

Site: Rainier Mall

1.0 SUBSTANCE CHARACTERISTICS

1.1 Human toxicity

Substance	Drink. Wat. Stnd Value (ug/L)	Score	Acute Toxicity Value (mg/kg)	Score	Chronic Toxicity Value (mg/kg/day)	Score	Carcinogenicity Adj. CPFo (risk/mg/kg-day)	Score
Tetrachloroethene (PCE)	5.00E+00	8	8.00E+02	5	6.00E-03	3	1.68E-03	3
Trichlorothene (TCE)	5.00E+00	8	2.40E+03	3	5.00E-04	5	4.64E-02	5
Vinyl chloride	2.00E+00	8	5.00E+02	5	3.00E-03	3	1.50E+00	7

Maximum score: 8
Bonus points: 2
Human Toxicity Score: 10
Source: WARM Toxicity Database
Range: 1-12

1.2 Mobility

Substance	Solubility Value (mg/L)	Score
Tetrachloroethene (PCE)	2.00E+02	2
Trichlorothene (TCE)	1.10E+03	3
Vinyl chloride	2.76E+03	3

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

1.3 Substance quantity

Quantity: 7100 yd^3
Basis: 12,800 ft^2 surface area x 15 ft maximum vertical extent of contamination
Source: site reports
Substance Quantity Score: 5
Range: 1-10

2.1 Containment

Description: contamination has reached groundwater
Source: siter reports
Containment Score: 10
Range: 0-10

SUBSTANCE PARAMETER CALCULATION

SUB = (Human Toxicity + Mobility + 3) x (Containment + 1) + Substance Quantity **181.0**

2.0 MIGRATION POTENTIAL

2.2 Net precipitation

Amount (in.):	25.6	Net Precipitation Score:	3
Source:	NOAA NCEI, ESRI	Range:	0-5

2.3 Subsurface Hydraulic Conductivity

Description:	silty sand and sandy silt		
Source:	site reports	Hydraulic Conductivity Score:	3
		Range:	1-4

2.4 Vertical Depth to Aquifer

Depth (ft):	contamination has reached groundwater	Depth to Aquifer Score:	8
Source:	site reports	Range:	1-8

MIGRATION PARAMETER CALCULATION

MIG = Depth to Aquifer + Net Precipitation + Hydraulic Conductivity 14.0

3.0 TARGETS

3.1 Aquifer Usage

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

3.2 Distance to Nearest Drinking Water Well

Distance (ft):	>2mi	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: 0.0

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

TARGET PARAMETER CALCULATION

2.0

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

4.0 RELEASE

Evid. of release?	groundwater is contaminated	Release Score (REL):	5.0
Source:	site reports	Range:	0 or 5

GROUND WATER ROUTE CALCULATION

37.6

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: **4187**

Site: **Rainier Mall**

Human Health Route Scores

Pathway	Score	Quintile
Surface water	0.0	
Air	54.4	5
Groundwater	37.6	3

Quintile	Value
High (H)	5
Middle (M)	3
Low (L)	

Human Health Pathway Quintiles - based off February 2019 HSL

Quintile	Surface Water		Air		Groundwater	
1	<=	7.9	<=	8.6	<=	24.1
2	8.0	15.2	8.7	16.3	24.2	33.1
3	15.3	21.2	16.4	25.3	33.2	40.4
4	21.3	29.7	25.4	40.1	40.5	49.4
5	>=	29.8	>=	40.2	>=	49.5

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

Human Health Priority Bin Score: 3.9

Environmental Route Scores

Pathway	Score	Quintile
Surface water	0.0	
Air	5.7	3

Quintile	Value
High (H)	3
Low (L)	

Environmental Pathway Quintiles - based off February 2019 HSL

Quintile	Surface Water		Air	
1	<=	11.3	<=	1.2
2	11.4	24.1	1.3	1.5
3	24.2	32.0	1.6	13.8
4	32.1	49.9	13.9	26.5
5	>=	50.0	>=	26.6

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

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: 2