

State of Oregon
Department of Environmental Quality

Memorandum

Date: February 26, 2024

To: FILE

Through: Kevin Parrett and Katie Daugherty

From: Kevin Dana
Northwest Region

Subject: Arcoa Building, ECSI #6199; Staff Memorandum in support of a Conditional No Further Action determination

This document presents the basis for the Oregon Department of Environmental Quality's (DEQ's) recommended Conditional No Further Action (CNFA) determination for the Arcoa Building site in Portland. As discussed in this report, contaminant concentrations in soils and soil gas exceed acceptable risk levels for applicable exposure pathways. Consequently, the No Further Action determination will be conditioned upon adherence to restrictions recorded in an Easement and Equitable Servitudes attached to the property deed.

The proposed CNFA determination meets the requirements of Oregon Administrative Rules Chapter 340, Division 122, Sections 010 to 0140; and ORS 465.200 through 465.455.

The proposal is based on information documented in the administrative record for this site. A copy of the administrative record index is presented at the end of this report.

1. BACKGROUND

Site location.

The site's location can be described as follows:

- Address: 1006 SE Grand Ave., Portland, Multnomah County, Oregon.
- Latitude 45.5155° North; Longitude 122.6603° West
- Tax Lot 1300, Township 1 South, Range 1 East, Section 2 BC, Willamette Baseline and Meridian.

Site setting.

The 0.44-acre site covers the northern half of the city block bounded by SE Yamhill Street to the north, SE Taylor Street to the south, SE 6th Avenue to the east, and SE Grand Avenue to the west. See Attachment 1 for a topographic map, Attachment 2 for an aerial photo, and Attachment 3 for a street-level view of the Arcoa Building. The south half of the block is occupied by a convenience store and an auto repair facility. The surrounding blocks are primarily commercial and industrial, with some mixed-use developments.

Hydrogeologic setting.

Soils at the site have generally been described as sandy or clayey silts to depths of about 15-20 feet below ground surface (bgs), underlain by sandy gravels to a maximum explored depth of 40 feet bgs. Groundwater was first encountered at depths ranging from 25-38 feet bgs, with an average depth of 30 feet bgs. Groundwater flows west-southwest towards the Willamette River.

Site history.

The Arcoa Building, a 3-story office building on the northwest quarter of the block at 1006 SE Grand Avenue, was constructed in 1907. The northeast quarter of the block, currently a parking lot for the Arcoa Building, appears to have remained relatively undeveloped.

The building on the southwest quarter of the block, at 1024 SE Grand Avenue, was constructed in 1920 and is currently a 7-Eleven convenience store. According to Sanborn maps, the building was used for auto repair in the 1920s and 1930s, and for auto sales and service in the 1950s and 1960s.

The building on the southeast quarter of the block, with addresses of 1025 SE 6th Avenue and 521 SE Taylor Street, was constructed in 1921. The building was in use as a service garage in 1935 and 1940, and was the home of Japanese Auto Repair from 2001 to 2012.

Allyn's Cleaning & Dyeing operated from a storefront between the Arcoa and 7-Eleven buildings from about 1909 to 1959. The storefront, outlined in red on Attachment 4, had the same address as the Arcoa Building, and was demolished around 1960.

2. BENEFICIAL LAND AND WATER USE DETERMINATIONS

Land use.

The three properties on the block are zoned Central Employment with a design overlay (EXd) by the City of Portland, as shown on Attachment 5. Properties east of SE 6th Avenue are zoned General Industrial 1 (IG1) by the City of Portland. The Central Employment zoning allows for high-density commercial, light industrial, and urban residential uses in and near downtown Portland. The General Industrial zoning provides a sanctuary where most industrial uses can locate, and where other uses are restricted. The design overlay promotes design excellence in the built environment through the application of additional design standards and guidelines.

Groundwater use.

A search of well logs on file with the Oregon Water Resources Department identified only two industrial wells within a 1,000 foot radius of the site. Both wells are over 800 feet from the site. The nearest water well, an irrigation well, is in Tom McCall Waterfront Park, across the Willamette River from the site.

The City of Portland is served by a municipal water supply system. The water is primarily obtained from surface water reservoirs in the Bull Run watershed on the western slopes of Mount Hood, and is supplemented by groundwater from the Columbia South Shore Wellfield.

Surface water use.

The nearest surface water body is the Willamette River, flowing from south to north 1,800 feet west of the site. The Willamette is used for navigation, fishing and recreation, and provides habitat for wildlife including steelhead and Chinook and Coho salmon. Stormwater at the site is directed to the City of Portland's storm sewer system.

3. INVESTIGATION AND CLEANUP WORK

In December 2012, eight soil borings were advanced on the Arcoa Building site as part of an environmental site assessment, as shown on Attachment 6. The borings generally extended 20 feet bgs, with boring SB-2 (in the Allyn's Cleaning location) extending 32 feet bgs. A total of 14 soil samples were collected from the borings and analyzed for diesel, heavy oils, metals, and volatile organic compounds (VOCs). As indicated on Attachment 6, contaminants were observed in soil samples from the borings along the north edge of the 7-Eleven building. The highest concentrations of contaminants were in boring SB-2 at a depth of eight feet bgs. Diesel-range organics were detected in the sample at a concentration of 7,100 parts per million (ppm), along with the VOCs benzene (93 ppm), chloroform (2.7 ppm), 1,2-dichloroethane (2.5 ppm), ethylbenzene (18 ppm), isopropylbenzene (27 ppm), naphthalene (12 ppm), tetrachloroethene (8.6 ppm), toluene (40 ppm), trichloroethene (1.1 ppm), 1,2,4-trimethylbenzene (310 ppm), 1,3,5-trimethylbenzene (150 ppm), and xylenes (170 ppm).

Concurrently, "Stoddard solvent range organics" were detected by sampling method NWTPH-Gx in a soil sample from boring SB-8 (near Grand Avenue) at 14 feet bgs at a concentration of 310 ppm. Metals were detected in all 14 soils samples, but at concentrations consistent with naturally-occurring background levels.

A groundwater sample was collected from boring SB-2 at a depth of about 28 feet bgs and analyzed for diesel and VOCs, along with "Stoddard solvent range organics". Stoddard solvent was detected in the groundwater at a concentration of 2,200 parts per billion (ppb), along with benzene (3.4 ppb), chloroform (35 ppb), isopropylbenzene (9.9 ppb), naphthalene (14 ppb), tetrachloroethene (53 ppb), trichloroethene (5.1 ppb), 1,2,4-trimethylbenzene (140 ppb), 1,3,5-trimethylbenzene (57 ppb), and xylenes (37 ppb). A soil sample from the same depth (28 feet bgs) showed 65 ppm Stoddard solvent.

In February 2013, two soil gas samples and one sub-slab vapor sample were collected from the Arcoa Property, at the locations indicated by solid red dots on Attachment 6. All three samples were analyzed for VOCs. The first soil gas sample canister, near the center of the block, didn't depressurize correctly in the field. The second soil gas sample, collected from 4 feet bgs along the north side of the 7-Eleven building, detected numerous VOCs including benzene at 66 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$), along with chloroform ($36 \mu\text{g}/\text{m}^3$), tetrachloroethene ($2,200 \mu\text{g}/\text{m}^3$), trichloroethene ($62 \mu\text{g}/\text{m}^3$), 1,2,4-trimethylbenzene ($2,800 \mu\text{g}/\text{m}^3$), 1,3,5-trimethylbenzene ($1,100 \mu\text{g}/\text{m}^3$), and xylenes ($300 \mu\text{g}/\text{m}^3$). High concentrations of carbon tetrachloride ($1,800 \mu\text{g}/\text{m}^3$) and chloroform ($19,000 \mu\text{g}/\text{m}^3$) were detected in the sub-slab vapor sample, collected one foot beneath the Arcoa Building foundation, along with cis-1,2-dichloroethene ($84 \mu\text{g}/\text{m}^3$), tetrachloroethene ($400 \mu\text{g}/\text{m}^3$) and trichloroethene ($66 \mu\text{g}/\text{m}^3$).

Two indoor air samples were collected from the basement of the Arcoa Building in March 2013 and analyzed for VOCs. The only contaminant of concern was tetrachloroethene, at $7.8 \mu\text{g}/\text{m}^3$.

South Half of the Block

Environmental investigations of the two properties on the south half of the block began in November 2016. In December 2016, borings were advanced in the locations of former hydraulic lifts on the west side of the Japanese Auto Repair building. In relevant part, a soil sample beneath the northernmost lift at $10\frac{1}{2}$ feet bgs encountered Stoddard solvent at a concentration of 12,800 ppm. No contamination was detected at 14 feet bgs.

In January 2017, two borings were advanced through the floor on the east end of the 7-Eleven building. Stoddard solvent was encountered beneath the northeast corner of the building at a concentration of 21,800 ppm at 11 feet bgs, decreasing to 79 ppm at $16\frac{1}{2}$ feet bgs. A few feet to the south, Stoddard solvent was detected at 6,540 ppm at 17 feet bgs. VOCs were also detected in the samples.

In March 2017, six additional borings were advanced through the floors of the 7-Eleven and Japanese Auto Repair buildings to determine the extent of the Stoddard solvent contamination. The boring locations are shown on Attachment 7. (Note that north is to the right on this figure). Stoddard solvent was detected at 15,000 ppm at 10 feet bgs in a boring in the north-central portion of the 7-Eleven building, decreasing to non-detected levels at 18 feet bgs. A boring in the extreme northwest corner of the Japanese Auto Repair building encountered 18,300 ppm Stoddard solvent at $4\frac{1}{2}$ feet bgs, decreasing to 114 ppm at $13\frac{1}{2}$ feet bgs. Other borings beneath Japanese Auto Repair encountered 15,000 ppm Stoddard and 13,800 ppm Stoddard, both at 12 feet bgs. The sample results suggested a near-surface source of Stoddard solvent in the center of the block (where Allyn's Cleaning & Dyeing was located), with the contaminant plume descending as it spread to the south.

A year later (in May 2018), three groundwater samples and three soil vapor samples were collected on and near the 7-Eleven property. The groundwater sample locations are shown on Attachment 8, and the soil vapor sample locations are shown on Attachment 9. A groundwater sample in the center of the block (where Allyn's Cleaning was located) encountered 1,460 ppb Stoddard solvent at 29 feet bgs. Stoddard was also detected in groundwater in the southwest corner of the block, at a concentration of 833 ppb. [Note that the recorded concentration on Attachment 8 is incorrect]. No significant concentrations of VOCs were detected in the soil vapor samples.

Groundwater Monitoring

Five groundwater monitoring wells were installed on the block in August 2019. The locations of the wells, labeled MW-1 through MW-5, are shown on Attachment 10. Eight soil samples were collected during installation of the wells. Samples were collected from the soil/groundwater interface in each well (at depths ranging from 26 to 39 feet bgs), and from three intervals that showed indicia of contamination. The eight soil samples were analyzed for extractable petroleum hydrocarbons (EPH) and volatile petroleum hydrocarbons (VPH) in addition to total petroleum hydrocarbons and VOCs to enable the calculation of contaminant-specific risk-based

concentrations for the Stoddard solvent. Stoddard solvent was detected in MW-3 (at the south end of the block) at 36 feet bgs at a concentration of 194 ppm, and in MW-4 (on the west edge of the block) at concentrations of 556 ppm at 15 feet bgs and 673 ppm at 34 feet bgs. In the center of the block (MW-5), Stoddard solvent was detected at a concentration of 23,100 ppm at 9 feet bgs, decreasing to 535 ppm at 31 feet bgs. VOCs included ethylbenzene (3.19 ppm), isopropylbenzene (13.2 ppm), naphthalene (12.8 ppm), 1,2,4-trimethylbenzene (479 ppm), 1,3,5-trimethylbenzene (147 ppm), and xylenes (49.0 ppm), with the highest concentrations at 9 feet bgs in MW-5.

Groundwater samples were collected from the wells in October 2019 and analyzed for petroleum products and VOCs. Stoddard solvent was only detected in MW-4, at a concentration of 941 ppb.

A soil gas sample was collected from the location of MW-5 in December 2019 and analyzed for gasoline-range organics (representing Stoddard solvent) and VOCs. Stoddard solvent was detected at a concentration of 1,500,000 $\mu\text{g}/\text{m}^3$, along with benzene (240 $\mu\text{g}/\text{m}^3$), ethylbenzene (610 $\mu\text{g}/\text{m}^3$), isopropylbenzene (1,100 $\mu\text{g}/\text{m}^3$), tetrachloroethene (1,500 $\mu\text{g}/\text{m}^3$), trichloroethene (220 $\mu\text{g}/\text{m}^3$), 1,2,4-trimethylbenzene (7,800 $\mu\text{g}/\text{m}^3$), 1,3,5-trimethylbenzene (8,400 $\mu\text{g}/\text{m}^3$), and xylenes (2,700 $\mu\text{g}/\text{m}^3$).

The groundwater monitoring wells were resampled for petroleum and VOCs in February and May 2020. Stoddard solvent (up to 1,100 ppb), diesel (up to 131 ppb), and heavy oils (185 ppb) were detected in MW-4, along with a number of VOCs. No Stoddard solvent or other petroleum products were detected in the other wells.

A sixth monitoring well (MW-6) was installed on the southwest corner of the block in July 2020, as shown on Attachment 11. The six monitoring wells were sampled for Stoddard solvent and VOCs in October 2020. Stoddard solvent was only detected in MW-4, at a concentration of 824 ppb. MW-6 showed cis-1,2-dichloroethene at 0.401 ppb and tetrachloroethene at 0.698 ppb.

From October 2019 through October 2020, the only contaminant detected in wells MW-1 through MW-3 was tetrachloroethene, at concentrations up to 0.952 ppb. VOCs in MW-4 included benzene (0.215 ppb), cis-1,2-dichloroethene (0.747 ppb), ethylbenzene (1.10 ppb), isopropylbenzene (7.07 ppb), 1,2,4-trimethylbenzene (16.0 ppb), 1,3,5-trimethylbenzene (2.24 ppb), and vinyl chloride (0.614 ppb). VOCs in MW-5 included chloroform (2.79 ppb), tetrachloroethene (1.27 ppb), and trichloroethene (0.76 ppb).

Vapor Sampling

In October 2020, a soil gas sample was collected from the same location (adjacent to MW-5) as a December 2019 sample that had shown high concentrations of Stoddard solvent and VOCs. This time, no Stoddard solvent was detected. Three additional soil gas samples and one sub-slab vapor sample were collected in November 2020 to confirm earlier sampling results. As shown on Attachment 12, the three soil gas samples were collected from the center of the block and found little contamination. However, the sub-slab vapor sample (from the southwest corner of the Arcoa Building) showed high levels of carbon tetrachloride (3,700 $\mu\text{g}/\text{m}^3$) and chloroform (50,000 $\mu\text{g}/\text{m}^3$), along with tetrachloroethene (380 $\mu\text{g}/\text{m}^3$).

Two indoor air samples (AA1 and AA2) were collected from the basement of the Arcoa Building in December 2020, as indicated on Attachment 13. The samples were analyzed for gasoline-range organics (GRO) and VOCs. GRO (likely Stoddard solvent) was measured at concentrations up to $120 \mu\text{g}/\text{m}^3$, along with benzene ($0.91 \mu\text{g}/\text{m}^3$), carbon tetrachloride ($0.82 \mu\text{g}/\text{m}^3$), chloroform ($3.9 \mu\text{g}/\text{m}^3$), ethylbenzene ($0.61 \mu\text{g}/\text{m}^3$), and trichloroethene ($0.13 \mu\text{g}/\text{m}^3$). An outdoor, ambient air sample (AA3) showed no contamination.

The sampling was repeated in January 2021, with one outdoor air sample (AA4) and three indoor air samples (AA5 through AA7). Only chloroform was detected in the samples, with indoor air concentrations ranging from $0.81 \mu\text{g}/\text{m}^3$ to $2.9 \mu\text{g}/\text{m}^3$.

Sub-slab vapor and indoor air sampling in the Arcoa Building resumed a year later, in March 2022. Two indoor air samples (AA8 and AA9) showed benzene (up to $0.38 \mu\text{g}/\text{m}^3$), carbon tetrachloride ($2.7 \mu\text{g}/\text{m}^3$), and chloroform ($20 \mu\text{g}/\text{m}^3$), as indicated on Attachment 13. The three sub-slab vapor samples (SV8 through SV10) showed GRO (up to $3,600 \mu\text{g}/\text{m}^3$), benzene ($3.4 \mu\text{g}/\text{m}^3$), carbon tetrachloride ($42 \mu\text{g}/\text{m}^3$), chloroform ($280 \mu\text{g}/\text{m}^3$), and ethylbenzene ($8.9 \mu\text{g}/\text{m}^3$), as shown on Attachment 14.

The highest concentrations of sub-slab vapors were encountered beneath the southwest quarter of the Arcoa Building. In April 2022, six soil borings (SB9 through SB14) were advanced through the basement floor to determine the source of the contamination, as shown on Attachment 15. Soil samples were collected from each boring two feet beneath the basement floor and analyzed for Stoddard solvent, benzene, carbon tetrachloride, chloroform, ethylbenzene, and trichloroethene. Only chloroform was detected, at concentrations up to 0.51 ppm. A subsequent “sewer gas” sample from the building’s sanitary sewer line showed carbon tetrachloride ($1.8 \mu\text{g}/\text{m}^3$) and chloroform ($14 \mu\text{g}/\text{m}^3$).

Vapor Extraction & Monitoring

In December 2022, four sub-slab monitoring points (MP-1 through MP-4) and one vapor extraction point (EXT-1) were installed through the concrete floor slab in the southwest corner of the Arcoa Building, as shown on Attachment 16. In early 2023, the extraction point was connected to a vent riser extending five feet above the building’s roof, and a manifold was connected to the vent riser to allow for sub-slab vapors to be vented either passively or actively. Initial vapor samples were collected from the “hybrid active-passive sub-slab depressurization system” in April 2023. A sub-slab vapor sample (SV11, shown on Attachment 14) showed $61 \mu\text{g}/\text{m}^3$ carbon tetrachloride and $2,700 \mu\text{g}/\text{m}^3$ chloroform, while a sample from the vent riser showed $290 \mu\text{g}/\text{m}^3$ carbon tetrachloride and $3,300 \mu\text{g}/\text{m}^3$ chloroform.

A final round of groundwater samples were collected from the six monitoring wells in March 2023. Stoddard solvent was detected in MW-4 at concentrations up to 720 ppb, along with ethylbenzene (1.5 ppb), isopropylbenzene (5.6 ppb), 1,2,4-trimethylbenzene (12 ppb), 1,3,5-trimethylbenzene (1.5 ppb), and vinyl chloride (0.42 ppb). Only chloroform was detected in MW-3 (1.5 ppb) and MW-5 (1.8 ppb). No VOCs were detected in the other wells.

Based on the sampling results, the environmental consultant estimated at that 7,110 cubic yards of solvent-contaminated soils are present on the block, extending beneath the former Allyn's Cleaning & Dyeing facility (in the center of the block) from 4½ feet to 30 feet bgs, and migrating west-southwest (partially beneath the 7-Eleven building) between 7 feet and 18 feet bgs.

Nature and extent of contamination.

Stoddard solvent, likely from Allyn's Cleaning & Dyeing, is present in soil and groundwater at the site. Additional volatile contaminants, including chlorinated solvents, chloroform, and petroleum constituents, are present in the soil, groundwater, soil gas, and indoor air. The petroleum constituents may have originated from the auto repair shops that previously operated on the block. The chlorinated solvents may have been used by both Allyn's (for dry cleaning) and the auto repair shops (for degreasing).

4. RISK EVALUATION

Conceptual site model.

A conceptual site model identifies the sources of contamination at a site, the human or ecological receptors that could be exposed to the contamination, and the pathways by which the exposures could occur.

To evaluate human exposure to residual chemical contamination requires an assessment of the type and extent of that exposure. This is based on current and reasonably likely future site use. DEQ publishes risk-based concentrations (RBCs) for contaminants commonly encountered, for different types of exposure scenarios. These RBCs are conservative estimates of protective levels of contaminants in soil, groundwater and air. Table 1 shows potential exposure pathways and receptors for this site. Based on this, applicable RBCs are identified and used for risk screening.

Table 1. Identification of applicable RBCs, based on pertinent pathways and receptors

Pathway	Receptor	Applicable RBC?	Basis for exclusion
SOIL			
Ingestion, dermal contact, and inhalation	Residential	No	See Note 1 and Note 2.
	Urban residential	No	See Note 2.
	Occupational	No	See Note 2.
	Construction worker	Yes	
	Excavation worker	Yes	
Volatilization to outdoor air	Residential	No	See Note 1.
	Urban residential	Yes	
	Occupational	Yes	
Leaching to groundwater	Residential	No	See Note 1 and Note 3.
	Urban residential	No	See Note 3.
	Occupational	No	See Note 3.

Pathway	Receptor	Applicable RBC?	Basis for exclusion
GROUNDWATER			
Ingestion and inhalation from tap water	Residential	No	See Note 1 and Note 3.
	Urban residential	No	See Note 3.
	Occupational	No	See Note 3.
Volatilization to outdoor air	Residential	No	See Note 1.
	Urban residential	Yes	
	Occupational	Yes	
Volatilization to indoor air	Residential	No	See Note 1.
	Commercial	Yes	
Groundwater in excavation	Construction and excavation worker	No	See Note 4.
SOIL GAS			
Volatilization to indoor air	Residential	No	See Note 1.
	Commercial	Yes	
INDOOR AIR			
Inhalation	Residential	No	See Note 1.
	Commercial	Yes	

Notes:

1. Based on the current zoning, single-family residences are unlikely to be developed at the site.
2. No contamination was identified in the upper three feet of soils at the site.
3. A municipal water supply is available to the area, and no domestic water wells have been identified in the vicinity of the site. This exposure pathway is not likely to be complete.
4. Groundwater is present at about 30 feet bgs at the site. Construction and excavation work is generally assumed to extend only up to 15 feet bgs at sites.

Stoddard solvent, a petroleum-based solvent used by dry cleaners from the 1930s through the 1950s, was detected in soil and groundwater at the site by the NWTPH-Gx sampling method, which analyzes for gasoline-range organics. DEQ has not established RBCs for Stoddard solvent. Instead, site-specific RBCs for the Stoddard solvent were calculated using the EPH, VPH, and volatile constituent data collected in a soil sample from MW-5 in August 2019, where 23,100 ppm Stoddard solvent was detected. A memorandum describing the calculations and listing the site-specific RBCs for Stoddard solvent is included as Attachment 17.

Contaminant concentrations.

Contaminants of Potential Concern (COPCs) are contaminants that are present at a site at concentrations exceeding an RBC for a complete exposure pathway.

No visible or olfactory indications of contamination were observed in the upper three feet of soils at the site during the installation of soil borings and monitoring wells. Residents and occupants of a site are not likely to come into direct contact with soils more than three feet bgs. Consequently, the direct contact exposure pathway does not appear to be applicable for current or future residents and occupants of the site.

Construction and excavation workers may come into direct contact with soils at the site at depths up to 15 feet bgs. Table 2 shows the maximum concentrations of contaminants detected in soils at the site, and compares those concentrations with DEQ's direct contact RBCs to determine if there are any COPCs.

Table 2. Screening for Construction and Excavation worker COPCs for the Soil Ingestion, Dermal Contact, and Inhalation exposure pathway.

Contaminant of Interest	Maximum Soil Concentration	Construction Worker RBC	Excavation Worker RBC	COPC (Y/N)
Stoddard solvent	23,100 ppm	1,600 ppm	46,000 ppm	Y
Diesel	7,100 ppm	4,600 ppm	>MAX	Y
Benzene	93 ppm	380 ppm	11,000 ppm	N
Chloroform	2.7 ppm	410 ppm	11,000 ppm	N
EDC	2.5 ppm	200 ppm	5,600 ppm	N
Ethylbenzene	18 ppm	1,700 ppm	49,000 ppm	N
Isopropylbenzene	27 ppm	27,000 ppm	750,000 ppm	N
Naphthalene	12.8 ppm	580 ppm	16,000 ppm	N
Tetrachloroethene	8.6 ppm	1,800 ppm	50,000 ppm	N
Toluene	40 ppm	28,000 ppm	770,000 ppm	N
Trichloroethene	1.1 ppm	130 ppm	3,700 ppm	N
1,2,4-TMB	479 ppm	2,900 ppm	81,000 ppm	N
1,3,5-TMB	150 ppm	2,900 ppm	81,000 ppm	N
Xylenes	170 ppm	20,000 ppm	560,000 ppm	N

Notes:

1. The symbol ">MAX" signifies that the RBC for this pathway is greater than 1,000,000 ppm.
2. EDC = 1,2-dichloroethane.
3. TMB = trimethylbenzene.

Soil contaminants may volatilize to outdoor air and be inhaled by future residents and occupants of the block. Table 3 shows the maximum concentrations of contaminants detected in soils on the block, and compares those concentrations with DEQ's volatilization to outdoor air RBCs to determine if there are any COPCs.

Table 3. Screening for Urban Residential and Occupational COPCs for the Volatilization to Outdoor Air exposure pathway for soil contaminants.

Contaminant of Interest	Maximum Soil Concentration	Urban Residential RBC	Occupational RBC	COPC (Y/N)
Stoddard solvent	23,100 ppm	8,200 ppm	130,000 ppm	Y
Diesel	7,100 ppm	>MAX	>MAX	N
Benzene	93 ppm	27 ppm	50 ppm	Y
Chloroform	2.7 ppm	9.2 ppm	17 ppm	N

Contaminant of Interest	Maximum Soil Concentration	Urban Residential RBC	Occupational RBC	COPC (Y/N)
EDC	2.5 ppm	8.1 ppm	15 ppm	N
Ethylbenzene	18 ppm	85 ppm	160 ppm	N
Isopropylbenzene	27 ppm	>CSAT	>CSAT	N
Naphthalene	12.8 ppm	15 ppm	83 ppm	N
Tetrachloroethene	8.6 ppm	>CSAT	>CSAT	N
Toluene	40 ppm	>CSAT	>CSAT	N
Trichloroethene	1.1 ppm	33 ppm	96 ppm	N
1,2,4-TMB	479 ppm	>CSAT	>CSAT	N
1,3,5-TMB	150 ppm	>CSAT	>CSAT	N
Xylenes	170 ppm	>CSAT	>CSAT	N

Notes:

1. The symbol ">CSAT" signifies that the RBC for this pathway would not likely be exceeded unless soils were saturated with the contaminant.
2. The symbol ">MAX" signifies that the RBC for this pathway is greater than 1,000,000 ppm.
3. EDC = 1,2-dichloroethane.
4. TMB = trimethylbenzene.

Contaminants in the groundwater may also volatilize to outdoor air and be inhaled by future residents and occupants of the block. Table 4 shows the maximum concentrations of contaminants detected in the groundwater, and compares those concentrations with DEQ's volatilization to outdoor air RBCs to determine if there are any COPCs.

Table 4. Screening for Urban Residential and Occupational COPCs for the Volatilization to Outdoor Air exposure pathway for groundwater contaminants.

Contaminant of Interest	Maximum GW Concentration	Urban Residential RBC	Occupational RBC	COPC (Y/N)
Stoddard solvent	2,200 ppb	500,000 ppb	2,100,000 ppb	N
Diesel	131 ppb	>S	>S	N
Benzene	3.4 ppb	7,400 ppb	14,000 ppb	N
Chloroform	35 ppb	3,400 ppb	6,300 ppb	N
Isopropylbenzene	9.9 ppb	>S	>S	N
Naphthalene	14 ppb	8,500 ppb	16,000 ppb	N
Tetrachloroethene	53 ppb	150,000 ppb	>S	N
Trichloroethene	5.1 ppb	6,900 ppb	20,000 ppb	N
1,2,4-TMB	140 ppb	>S	>S	N
1,3,5-TMB	57 ppb	>S	>S	N
Xylenes	37 ppb	>S	>S	N

Notes:

1. The symbol ">S" signifies that the RBC for this contaminant under this exposure pathway exceeds the solubility limit of the contaminant. Groundwater concentrations in excess of the solubility limit would indicate the presence of free product.
2. TMB = trimethylbenzene.

Contaminants in the groundwater may volatilize and intrude into indoor air. Table 5 shows the maximum concentrations of contaminants detected in the groundwater, and compares those concentrations with DEQ's groundwater volatilization to indoor air RBCs to determine if there are any COPCs.

Table 5. Screening for Commercial COPCs for the Groundwater Volatilization to Indoor Air exposure pathway.

Contaminant of Interest	Maximum GW Contamination	Commercial RBC	COPC (Y/N)
Stoddard solvent	2,200 ppb	1,500 ppb	Y
Diesel	131 ppb	1,700 ppb	N
Benzene	3.4 ppb	12 ppb	N
Chloroform	35 ppb	5.9 ppb	Y
Isopropylbenzene	9.9 ppb	9,100 ppb	N
Naphthalene	14 ppb	50 ppb	N
Tetrachloroethene	53 ppb	130 ppb	N
Trichloroethene	5.1 ppb	13 ppb	N
1,2,4-TMB	140 ppb	2,400 ppb	N
1,3,5-TMB	57 ppb	1,700 ppb	N
Xylenes	37 ppb	3,300 ppb	N

Volatile contaminants in soil gas and sub-slab vapors may intrude into indoor air. Table 6 shows the maximum concentrations of contaminants detected in soil gas and sub-slab vapors on the Arcoa Property, and compares those concentrations with DEQ's soil vapor intrusion into indoor air RBCs to determine if there are any COPCs.

Table 6. Screening for Commercial COPCs for the Soil Vapor Intrusion into Indoor Air exposure pathway.

Contaminant of Interest	Maximum Soil Gas Concentration	Commercial RBC	COPC (Y/N)
Stoddard solvent	1,500,000 µg/m ³	22,000 µg/m ³	Y
Benzene	240 µg/m ³	52 µg/m ³	Y
Carbon Tetrachloride	3,700 µg/m ³	68 µg/m ³	Y
Chloroform	50,000 µg/m ³	18 µg/m ³	Y
Ethylbenzene	610 µg/m ³	160 µg/m ³	Y

Contaminant of Interest	Maximum Soil Gas Concentration	Commercial RBC	COPC (Y/N)
Isopropylbenzene	1,100 µg/m ³	58,000 µg/m ³	N
Tetrachloroethene	2,200 µg/m ³	1,600 µg/m ³	Y
Trichloroethene	220 µg/m ³	100 µg/m ³	Y
1,2,4-TMB	7,800 µg/m ³	8,800 µg/m ³	N
1,3,5-TMB	8,400 µg/m ³	8,800 µg/m ³	N
Xylenes	2,700 µg/m ³	15,000 µg/m ³	N

Finally, occupants of the Arcoa Building may inhale contaminants in the indoor air. Table 7 shows the maximum concentrations of contaminants detected in air samples inside the Arcoa Building, and compares those concentrations with DEQ's inhalation RBCs to determine if there are any COPCs:

Table 7. Screening for Occupational COPCs for the Inhalation exposure pathway.

Contaminant of Interest	Maximum Indoor Air Concentration	Commercial RBC	COPC (Y/N)
Stoddard solvent	120 µg/m ³	660 µg/m ³	N
Benzene	0.91 µg/m ³	1.6 µg/m ³	N
Carbon Tetrachloride	2.7 µg/m ³	2.0 µg/m ³	Y
Chloroform	20 µg/m ³	0.53 µg/m ³	Y
Ethylbenzene	0.61 µg/m ³	4.9 µg/m ³	N
Tetrachloroethene	7.8 µg/m ³	47 µg/m ³	N
Trichloroethene	0.13 µg/m ³	3.0 µg/m ³	N

In summary, the Contaminants of Potential Concern at this site are Stoddard solvent, diesel, benzene, carbon tetrachloride, chloroform, ethylbenzene, tetrachloroethene, and trichloroethene. COPCs were identified in soils, groundwater, soil gas, and indoor air.

Human health risk.

Contaminants of Concern (COCs) are those chemicals at a site that present an unacceptable risk to human health or the environment.

Direct Contact with Contaminated Soils

No contamination was identified in the upper three feet of soils at the site. However, construction and excavation workers may come into direct contact with soils at depths up to 15 feet bgs at a site. Stoddard solvent and diesel were detected in on-site soils at concentrations exceeding direct contact RBCs for construction workers.

The highest diesel concentration (7,100 ppm) was detected in soil boring SB-2, in the center of the block, at a depth of eight feet bgs, as shown on Attachment 6. The concentration exceeds the construction worker direct contact RBC of 4,600 ppm. However, this was the only RBC exceedance among 21 soil samples collected at the Arcoa Building site and analyzed for diesel.

As diesel was only detected at a high concentration in one out of 21 soil samples, the extent of diesel contamination exceeding the construction worker direct contact RBC appears to be too limited to pose an actual direct contact risk. Consequently, DEQ has determined that diesel in the soil is not a COC for the direct contact exposure pathway.

Stoddard solvent was detected in the soils at concentrations up to 23,100 ppm, exceeding the construction worker direct contact RBC of 1,600 ppm. The highest concentration of Stoddard solvent was detected at nine feet bgs in MW-5, near the center of the block and adjacent to the former Allyn's Cleaning building. Stoddard solvent was also detected beneath the east end of the 7-Eleven building at concentrations up to 21,800 ppm, and beneath the northwest quarter of the Japanese Auto Repair building at concentrations up to 18,300 ppm. Given the high concentrations and extent of contamination, Stoddard solvent is a COC for the direct contact exposure pathway for construction workers.

Volatilization to Outdoor Air for Soil Contaminants

Benzene was detected in soil boring SB-2, in the center of the block, at a concentration of 93 ppm. The concentration exceeds the urban residential volatilization to outdoor air RBC of 27 ppm, and the occupational volatilization to outdoor air RBC of 50 ppm. However, this was the only RBC exceedance among 40 soil samples from across the block that were analyzed for benzene. (The second-highest benzene concentration was only 1.27 ppm). Given this, the extent of benzene at the site appears too limited to pose an actual risk to outdoor air. Consequently, DEQ has determined that benzene in the soil is not a COC for the volatilization to outdoor air exposure pathway.

Stoddard solvent was detected in the soils at concentrations up to 23,100 ppm, well below the occupational volatilization to outdoor air RBC of 130,000 ppm but above the urban residential RBC of 8,200 ppm. No urban residences are currently present on the block, so this is not a complete exposure pathway. However, as the current zoning allows for urban residential redevelopment of the block, Stoddard solvent is a COC for the volatilization to outdoor air exposure pathway for future urban residents.

Volatilization to Indoor Air for Groundwater Contaminants

Chloroform was detected in a groundwater grab sample from soil boring SB-2, in the center of the block, at a concentration of 35 ppb, exceeding the commercial volatilization to indoor air RBC of 5.9 ppb. However, subsequent groundwater monitoring (including from monitoring well MW-5 in the center of the block) has shown a maximum chloroform concentration of only 2.79 ppb. Given the recent low concentrations of chloroform in groundwater, and given that groundwater samples from monitoring wells are more representative than groundwater samples from soil borings, DEQ has determined that chloroform in the groundwater is not a COC for the volatilization to indoor air exposure pathway.

Stoddard solvent was detected in a groundwater grab sample from soil boring SB-2 at a concentration of 2,200 ppb, exceeding the commercial volatilization to indoor air RBC of 1,500 ppb. Subsequent groundwater monitoring has only shown Stoddard solvent in MW-4, on the west edge of the block, at concentrations up to 1,100 ppb. Stoddard solvent has not been

detected in the other monitoring wells, including MW-5. Given that groundwater samples from monitoring wells are a more accurate indicator of contaminant concentrations than groundwater grab samples from borings, DEQ has determined that Stoddard solvent in the groundwater is not a COC for the volatilization to indoor air exposure pathway.

Intrusion into Indoor Air from Soil Vapor Contaminants

Seven contaminants (Stoddard solvent, benzene, carbon tetrachloride, chloroform, ethylbenzene, tetrachloroethene, and trichloroethene) have been detected in soil gas and/or sub-slab vapors at concentrations exceeding commercial RBCs for the vapor intrusion into indoor air exposure pathway.

An initial soil gas sample was collected in the alleyway between the Arcoa Building and the 7-Eleven building in February 2013. Benzene ($66 \mu\text{g}/\text{m}^3$), chloroform ($36 \mu\text{g}/\text{m}^3$), and tetrachloroethene ($2,200 \mu\text{g}/\text{m}^3$) were detected at concentrations above commercial RBCs. In December 2019, Stoddard solvent ($1,500,000 \mu\text{g}/\text{m}^3$), benzene ($240 \mu\text{g}/\text{m}^3$), ethylbenzene ($610 \mu\text{g}/\text{m}^3$), and trichloroethene ($220 \mu\text{g}/\text{m}^3$) were detected in a soil gas sample from the center of the block at concentrations above commercial RBCs. And in November 2020, a sub-slab vapor sample was collected beneath the southwest corner of the Arcoa Building. Carbon tetrachloride ($3,700 \mu\text{g}/\text{m}^3$) and chloroform ($50,000 \mu\text{g}/\text{m}^3$) were detected at concentrations above commercial RBCs.

All seven contaminants were subsequently detected in indoor air samples in the basement of the Arcoa Building. Although only two of the contaminants were present at concentrations above commercial inhalation RBCs (as described below), to be conservative, all seven contaminants will be considered COCs for the soil vapor intrusion into commercial indoor air exposure pathway.

Inhalation of Indoor Air Contaminants

Five indoor air samples were collected from the basement of the Arcoa Building from December 2020 to January 2021, followed by two additional samples in March 2022. Carbon tetrachloride (at concentrations up to $2.7 \mu\text{g}/\text{m}^3$) and chloroform (at concentrations up to $20 \mu\text{g}/\text{m}^3$) were detected at concentrations exceeding commercial inhalation RBCs. Consequently, carbon tetrachloride and chloroform are COCs for the commercial indoor air inhalation exposure pathway.

In summary, the Contaminants of Concern at this site are Stoddard solvent, benzene, carbon tetrachloride, chloroform, ethylbenzene, tetrachloroethene, and trichloroethene.

Ecological risk.

An ecological risk assessment was not conducted for this site. As shown on Attachment 18, the site is located in an urban area, and no ecological habitat is present within a one-quarter mile (1,320 foot) radius of the site. Given the lack of ecological habitat, and given that contaminated soils at the site are over three feet bgs and capped by buildings and pavement, no adverse impacts to ecological receptors are likely at the site.

The nearest ecological habitat is the Willamette River, 1,800 feet to the west. The Willamette is listed as Essential Salmonid Habitat, and threatened and endangered fish species are present in the river. Contaminated groundwater at the site flows west towards the river, and potentially could discharge to the river.

Table 9 shows the maximum concentrations of contaminants detected in groundwater at the site, and compares those concentrations with the screening level values (SLVs) in DEQ's Internal Management Directive (IMD) for *Conducting Ecological Risk Assessments* to determine if there are any COPCs.

Table 9. Screening for Ecological Risks for the Freshwater exposure pathway.

Contaminant of Interest	Maximum GW Concentration	Eco Risk SLV	COPC (Y/N)
Stoddard solvent	2,200 ppb	640 ppb	Y
Diesel	131 ppb	640 ppb	N
Benzene	3.4 ppb	110,000 ppb	N
Chloroform	35 ppb	67,000 ppb	N
Isopropylbenzene	7.07 ppb	NE	N
Tetrachloroethene	53 ppb	8,900 ppb	N
Trichloroethene	5.1 ppb	440,000 ppb	N
1,2,4-TMB	140 ppb	NE	N
1,3,5-TMB	57 ppb	NE	N

Notes:

1. NE = Not Established. A Freshwater SLV has not been established for this contaminant. Given the generally high SLVs for VOCs in Freshwater, it is unlikely that this contaminant will pose an unacceptable risk via this exposure pathway.
2. TMB = trimethylbenzene.

Stoddard solvent was detected in a groundwater grab sample in the center of the block at a concentration of 2,200 ppb. Subsequent groundwater samples from six monitoring wells (including a well in the center of the block) has only shown Stoddard solvent in MW-4, on the west edge of the block, at concentrations up to 1,100 ppb. Although the downgradient extent of the contamination has not been delineated, given the relatively limited extent of Stoddard solvent in groundwater at the site and the distance from the site to the Willamette River, it is unlikely that Stoddard solvent could reach the river at concentrations above 640 ppb. Consequently, DEQ has determined that Stoddard solvent in the groundwater is not a COC for freshwater exposures.

5. RECOMMENDATION

Two contaminants, carbon tetrachloride and chloroform, have been detected in indoor air in the basement of the Arcoa Building at concentrations above occupational RBCs, and five additional contaminants (Stoddard solvent, benzene, ethylbenzene, tetrachloroethene, and trichloroethene) have been detected in soil gas and/or sub-slab vapors at concentrations exceeding vapor intrusion

RBCs. A hybrid active-passive sub-slab depressurization system has been installed in the basement to capture these contaminant vapors and vent them to the outside air.

Separately, Stoddard solvent is present in soils at the site at concentrations that exceed construction worker direct contact RBCs and urban residential volatilization to outdoor air RBCs. Without additional action, redevelopment of the site for urban residential use, as allowed by current zoning, would pose unacceptable risks to both the construction workers and the future urban residents.

To address these concerns, an Easement and Equitable Servitudes (EES) should be recorded with the Arcoa Building property deed requiring that any subsurface construction work be conducted in accordance with a DEQ-approved Contaminated Media Management Plan (CMMP). The EES should also prohibit urban residential redevelopment of the property without DEQ approval of further investigation or cleanup work or the installation of vapor mitigation measures in the new construction. Finally, the EES should require continued operation and maintenance of the existing hybrid active-passive sub-slab depressurization system until either a new vapor mitigation system is installed, or further investigation or cleanup demonstrates that a vapor mitigation system is no longer necessary to protect occupants of the site.

With the installation of a sub-slab depressurization system in the basement of the Arcoa Building, a No Further Action determination is recommended, conditioned upon adherence to the restrictions in the Easement & Equitable Servitudes recorded with the property deed. The Conditional No Further Action determination will be recorded in Your DEQ Online (YDO) in Environmental Cleanup Site Information (ECSI) file #6199.

6. ADMINISTRATIVE RECORD

1. Chugwater "Subsurface Environmental Site Assessment" (March 12, 2013).
2. Point Source Solutions "Risk Based Corrective Action Determination" (May 22, 2017).
3. Point Source Solutions "Additional Investigation Data" (September 11, 2018).
4. Point Source Solutions "May 2020 Project Update and Work Plan" (May 13, 2020).
5. Point Source Solutions "Site-Specific Risk-Based Corrective Action Determination" (February 18, 2021).
6. Point Source Solutions "Voluntary Cleanup Program Final Report" (April 28, 2023).
7. Point Source Solutions "Contaminated Media Management Plan" (May 24, 2023).

7. ATTACHMENTS

1. Topographic Map
2. Aerial Photo
3. Arcoa Building Photo
4. Sanborn Map of Allyn's Cleaning
5. Zoning Map
6. Boring Locations Map (2012)
7. Boring Locations Map (2013)

8. Groundwater Sample Locations Map (2018)
9. Soil Vapor Sample Locations Map (2018)
10. Groundwater Sample Locations Map (2018)
11. Groundwater Sample Locations Map (2019)
12. Soil Vapor Sample Locations Map (2020)
13. Indoor Air Sample Locations Map (2020)
14. Subslab Vapor Sample Locations Map (2022)
15. Subslab Soil Sample Locations Map (2022)
16. Vapor Sampling & Extraction Locations Map
17. Stoddard Solvent RBCs Memo
18. Surface Water Map

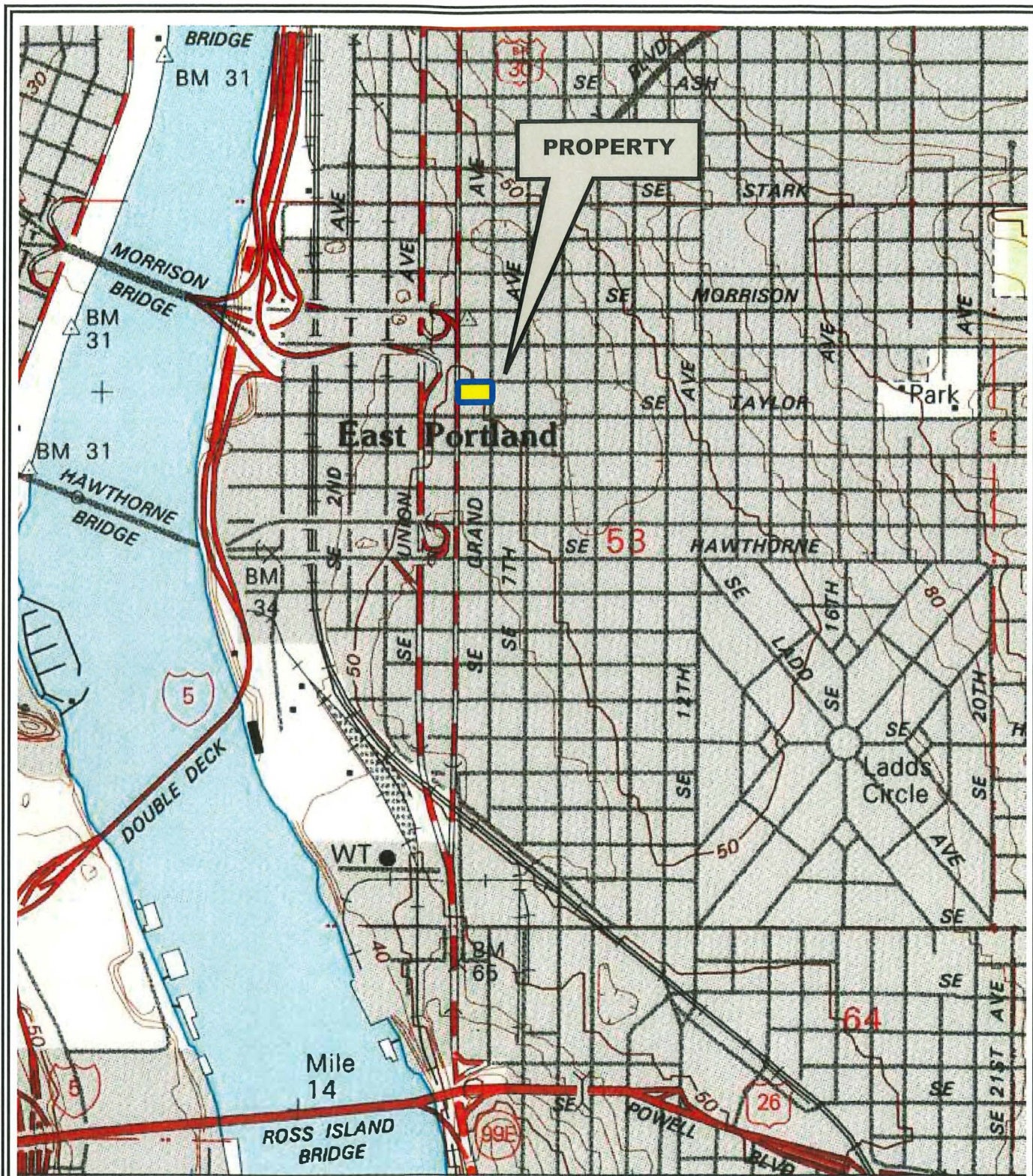


FIGURE 1 - TOPOGRAPHIC MAP

Source: USGS 7.5 Minute Topographic Map
Portland, OR Quadrangle 1984

N↑



Site Name: Arcoa Building
1006 SE Grand Avenue
Portland, OR

Project Number: OR190517-3



Attachment 2



Attachment 3

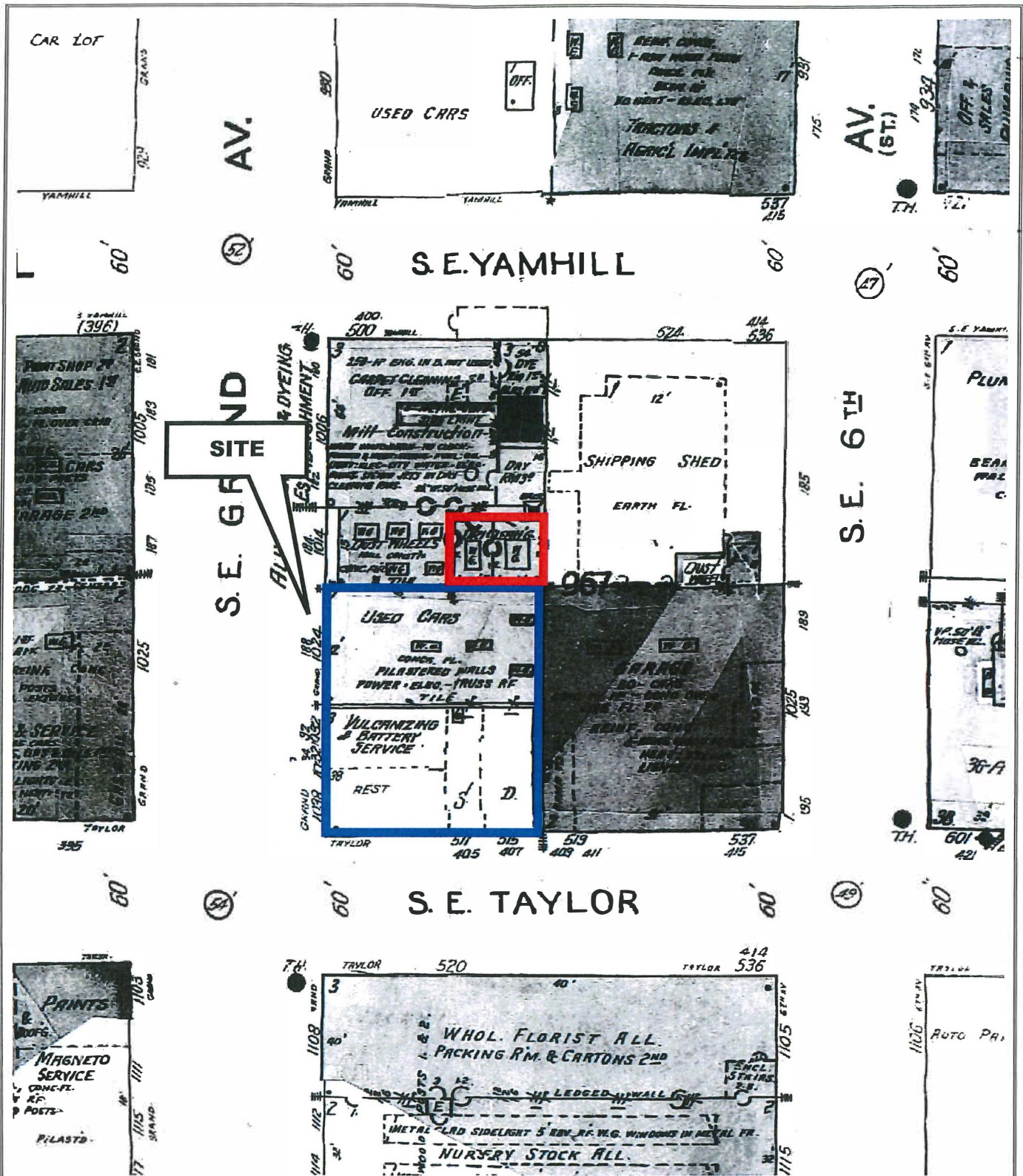


FIGURE 4 - SANBORN MAP

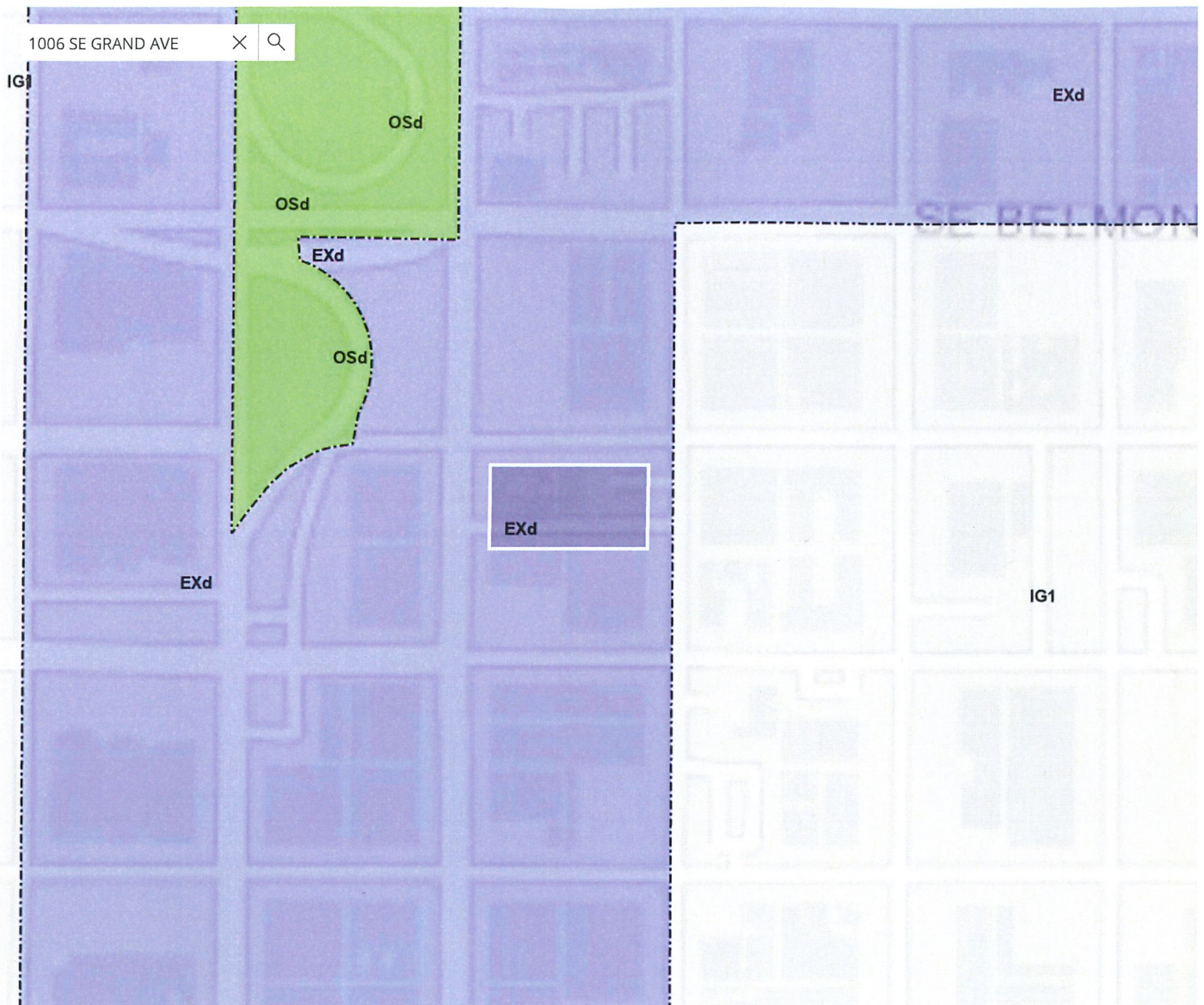
Date: 1950

N↑



Site Name: 7-Eleven Property
1024 SE Grand Avenue
Portland, Oregon 97214

Project Number: OR160930-4B



Attachment 5



Oregon Metro, Bureau of Land Management, State of Oregon, State of Oregon DOT, State of Oregon GEO, Esri, HERE, Garmin, GeoTechnologies, Inc., USGS, EPA | City ... Powered by Esri

1006 SE GRAND AVE

Comprehensive information for this property is available on PortlandMaps.com: [R233839](#)

The official zoning quarter section map(s) for this property is [3131](#)

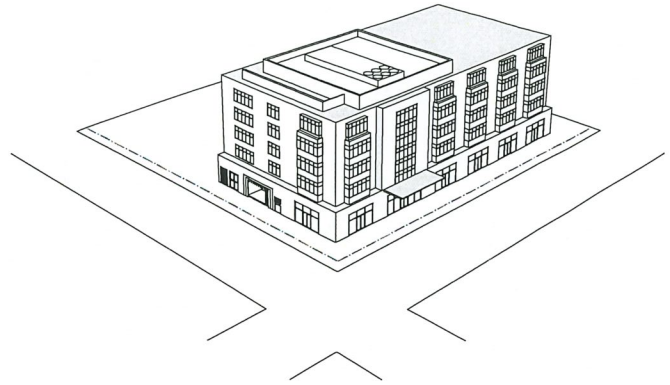
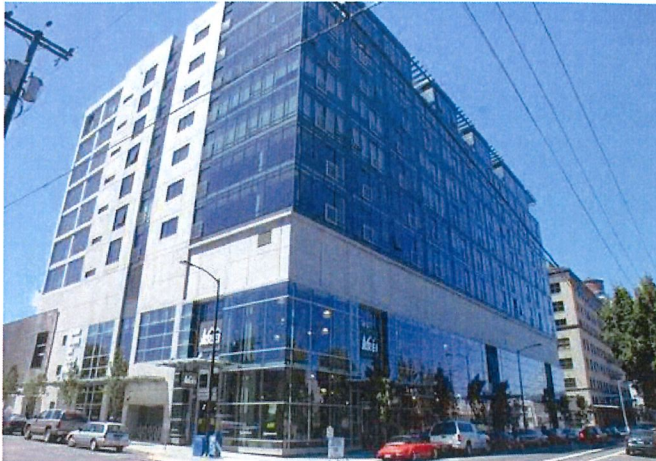
This property contains the following Comprehensive Plan Map Designation(s):

Central Employment

Detailed zone summaries are available below.

Base zones

Central Employment (EX)



The **EX** zone allows a full range of high density commercial, light industrial, institutional and residential uses. This zone is intended for sites in or near the Central City and in Gateway.

For specific zoning code details, visit the [zoning code website](#). The regulations for this zone are found in [Chapter 33.140](#).

Generally, the uses and character of this zone are oriented towards:



RETAIL



OFFICE



RESIDENTIAL



INDUSTRY



INSTITUTIONAL



OPEN SPACE

Specific allowable uses include: manufacturing, warehouse, wholesale sales, industrial services, residential, parks and open spaces, educational institutions, hospitals and quick vehicle servicing.

Quick facts

Location

EX Zones are located predominantly in or near the Central City and in Gateway.

65'+

maximum height, which is generally 6 stories.

FAR Range

FAR in the EX zone ranges from **3:1 - 9:1**

Height and FAR varies per plan district maps. Generally, buildings in EX zones are at least 65' and can reach up to 225' in some places.

Parking

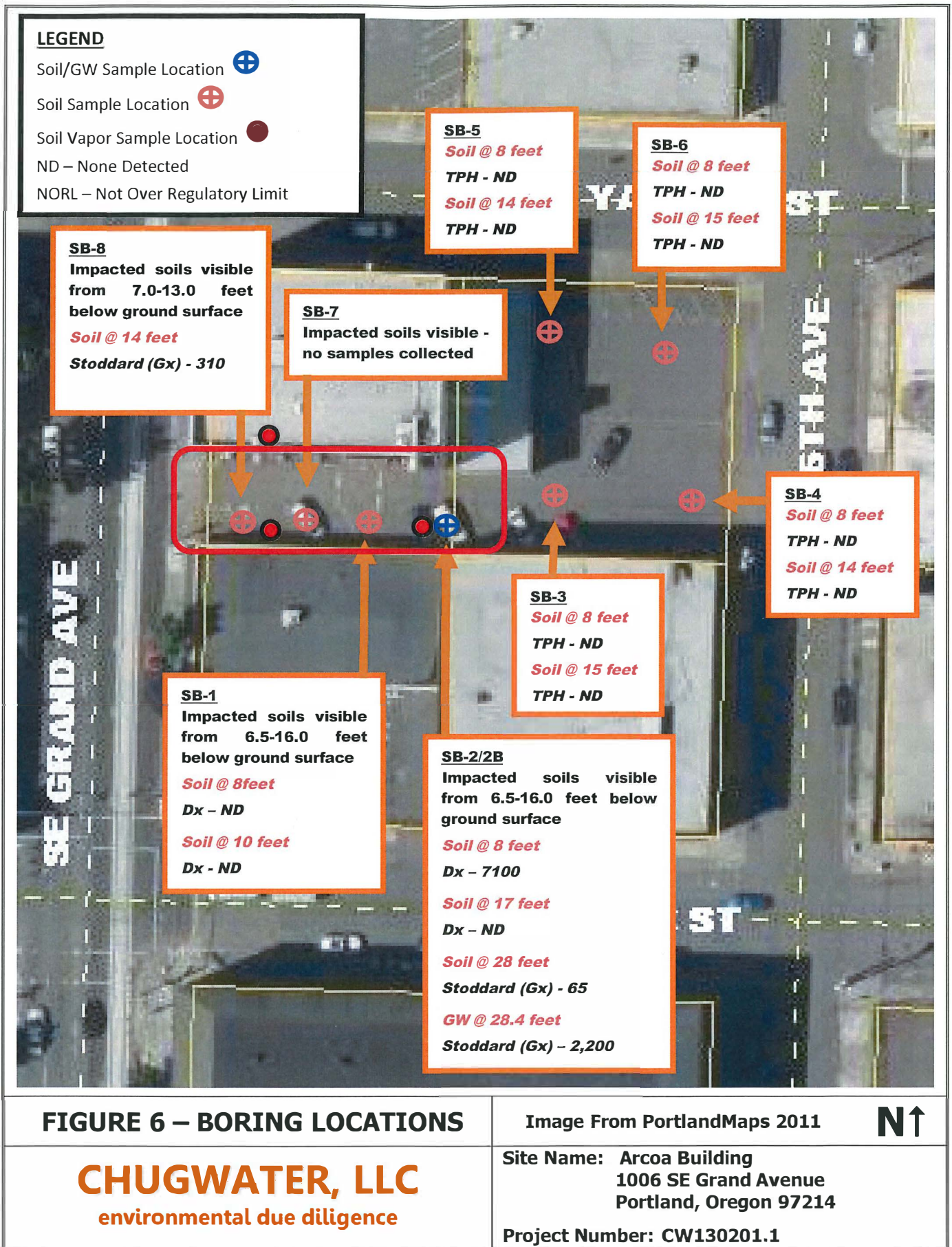
is generally not required for non-residential uses when development is located near transit or contains fewer than 30 residential units.

Overlay zones

Design (d)

The Design (**d**) overlay zone ensures that Portland is both a city designed for people and a city in harmony with nature. The Design overlay zone supports the city's evolution within current and emerging centers of civic life. The overlay promotes design excellence in the built environment through the application of additional design standards and design guidelines that:

- Build on context by enhancing the distinctive physical, natural, historic and cultural qualities of the location while accommodating growth and change;
- Contribute to a public realm that encourages social interaction and fosters inclusivity in people's daily experience; and
- Promotes quality and long-term resilience in the face of changing demographics, climate and economy.



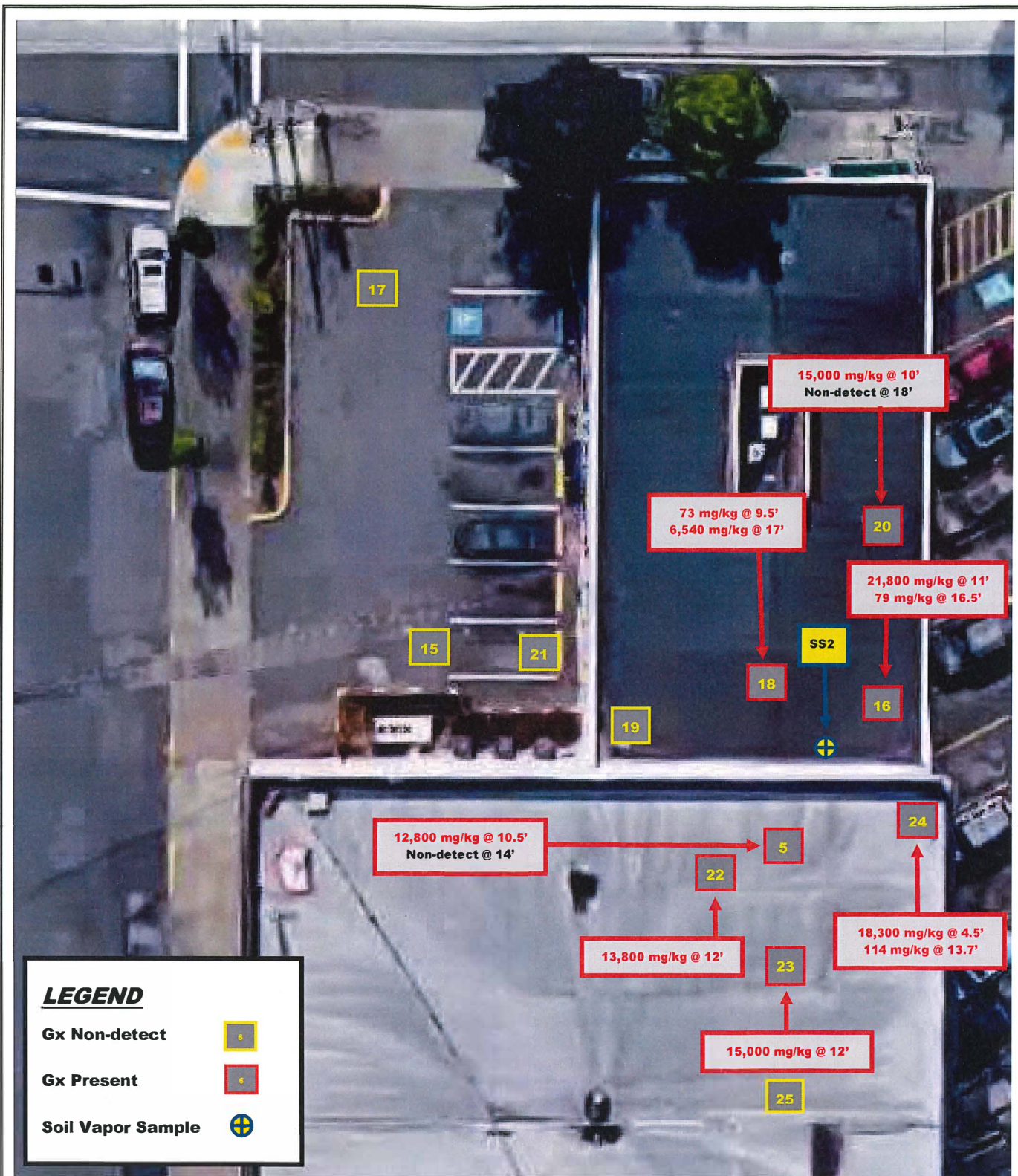


FIGURE 7 – BORING LOCATIONS

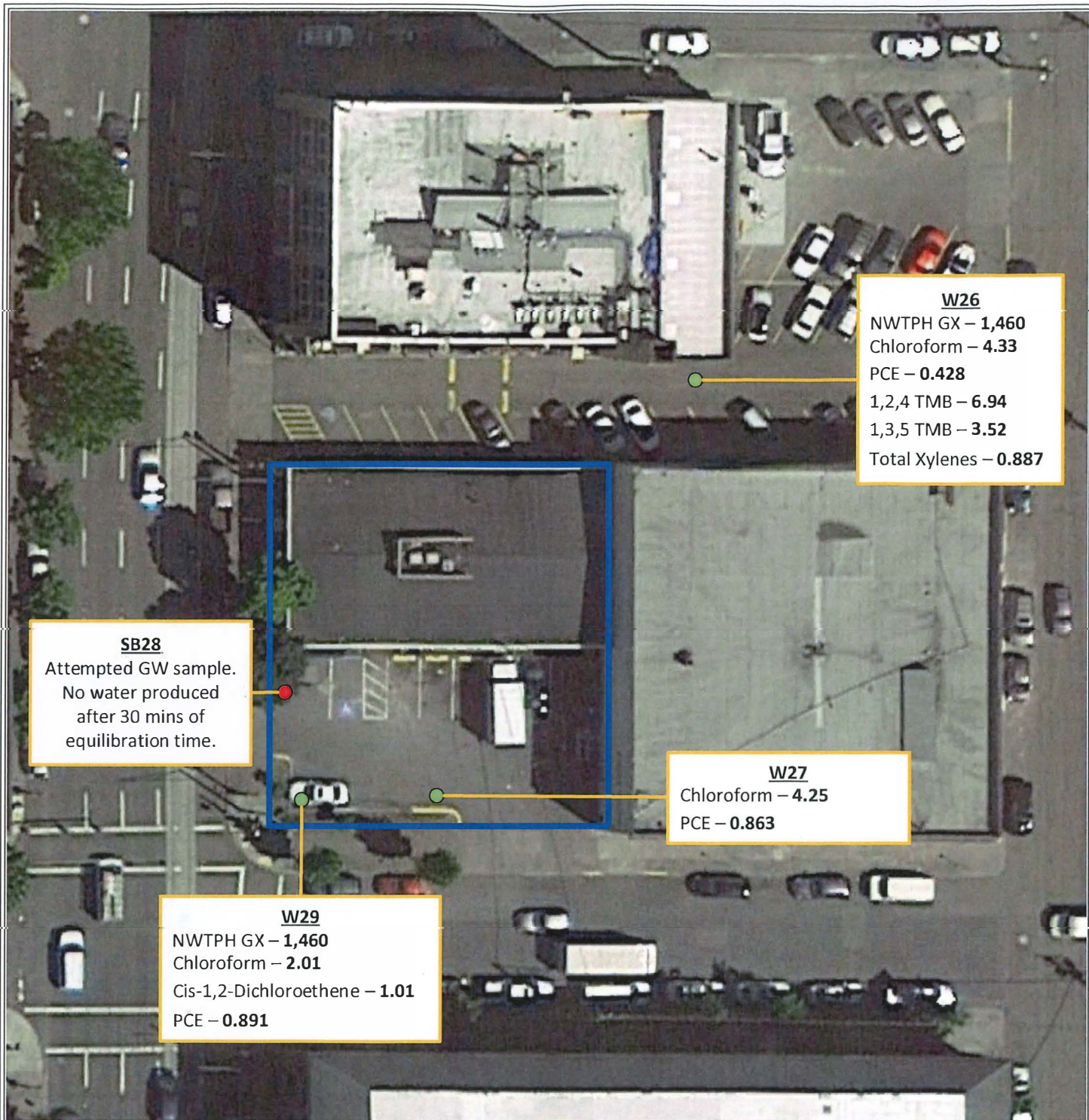
From 2017 Google Maps

N →



Site Name: 7-Eleven Property
1024 SE Grand Ave
Portland, OR 97214

Project Number: OR160930-4B



GROUNDWATER SAMPLE LOCATION DIAGRAM

Image From Google
Earth (2018)

N↑

Notes:

- Results in ug/L

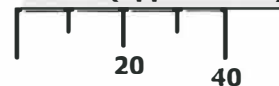


Water Sample
Location



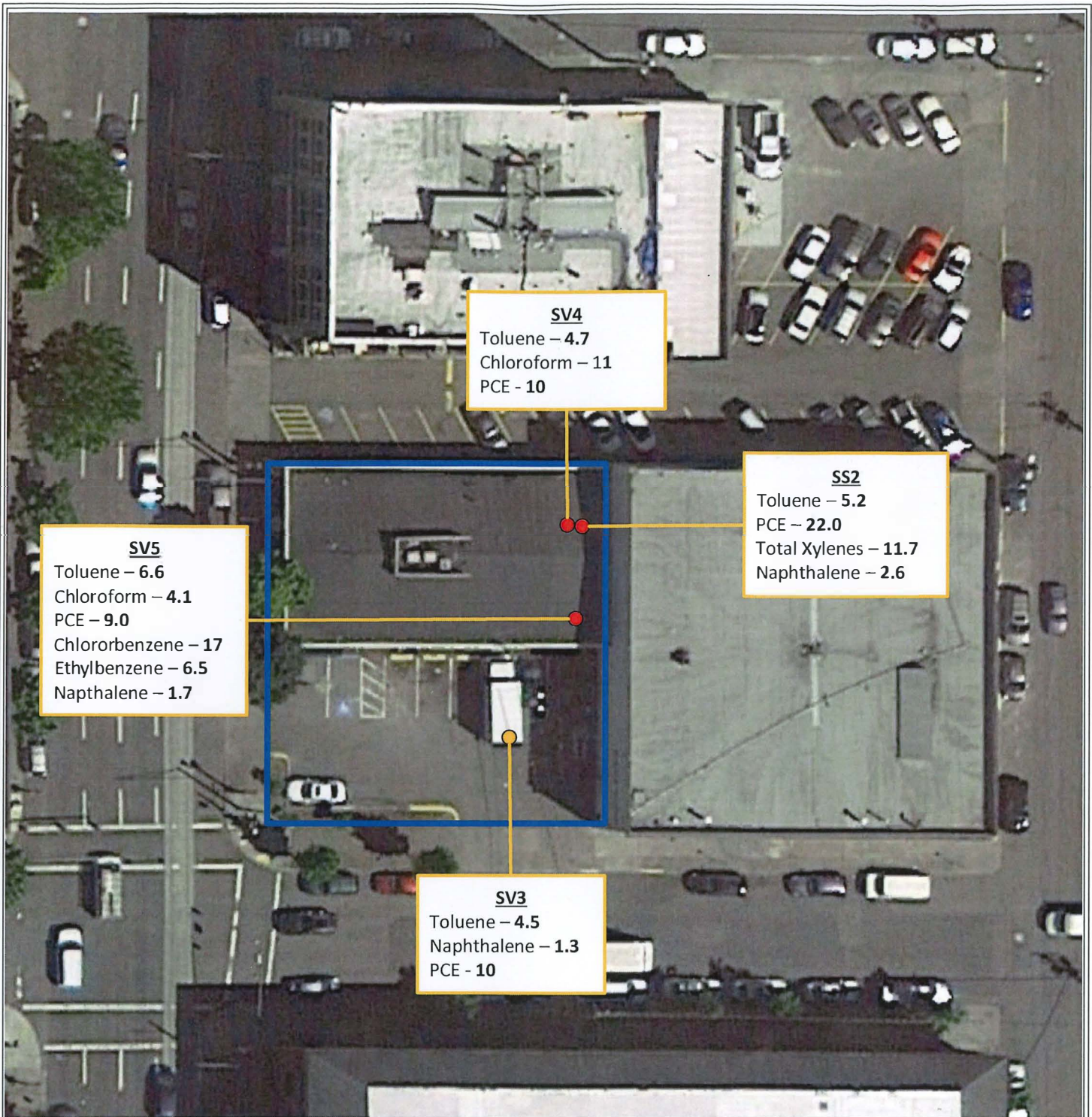
Site Boundary

Scale in Feet (Approximate)



Site Name: **7 - Eleven**
1024 SE Grand Avenue
Portland, Oregon 97214

Attachment 8



SOIL-VAPOR SAMPLE LOCATION DIAGRAM

Image From Google
Earth (2018)

N↑

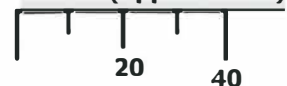
Notes:

- Soil Vapor results in ug/m³
- Includes sample location/results from 2017 Sub-surface investigation (SS2)

- Vapor Sample Location (Sub-slab)
- Vapor Sample Location (Soil-gas)

Site Boundary

Scale in Feet (Approximate)



Site Name: 7 - Eleven
1024 SE Grand Avenue
Portland, Oregon 97214

Attachment 9



FIGURE 10 - WATER SAMPLE LOCATION DIAGRAM

Image From Google
Earth (2018)

N↑

Notes:

- Water Sample results in ug/L
- Results depicted for TPH-Dx/Gx (stoddard solvent) only
- W26 – W29 collected by PSS (2018)
- SB2B-W1 collected by Chugwater (2013)
- MW1 – MW5 installed by PSS (2019)

- Water Sample Location
- Monitoring Well Location

Site Boundary

Scale in Feet (Approximate)



Site Name: Arcoa Building
1006 SE Grand Avenue
Portland, Oregon 97214

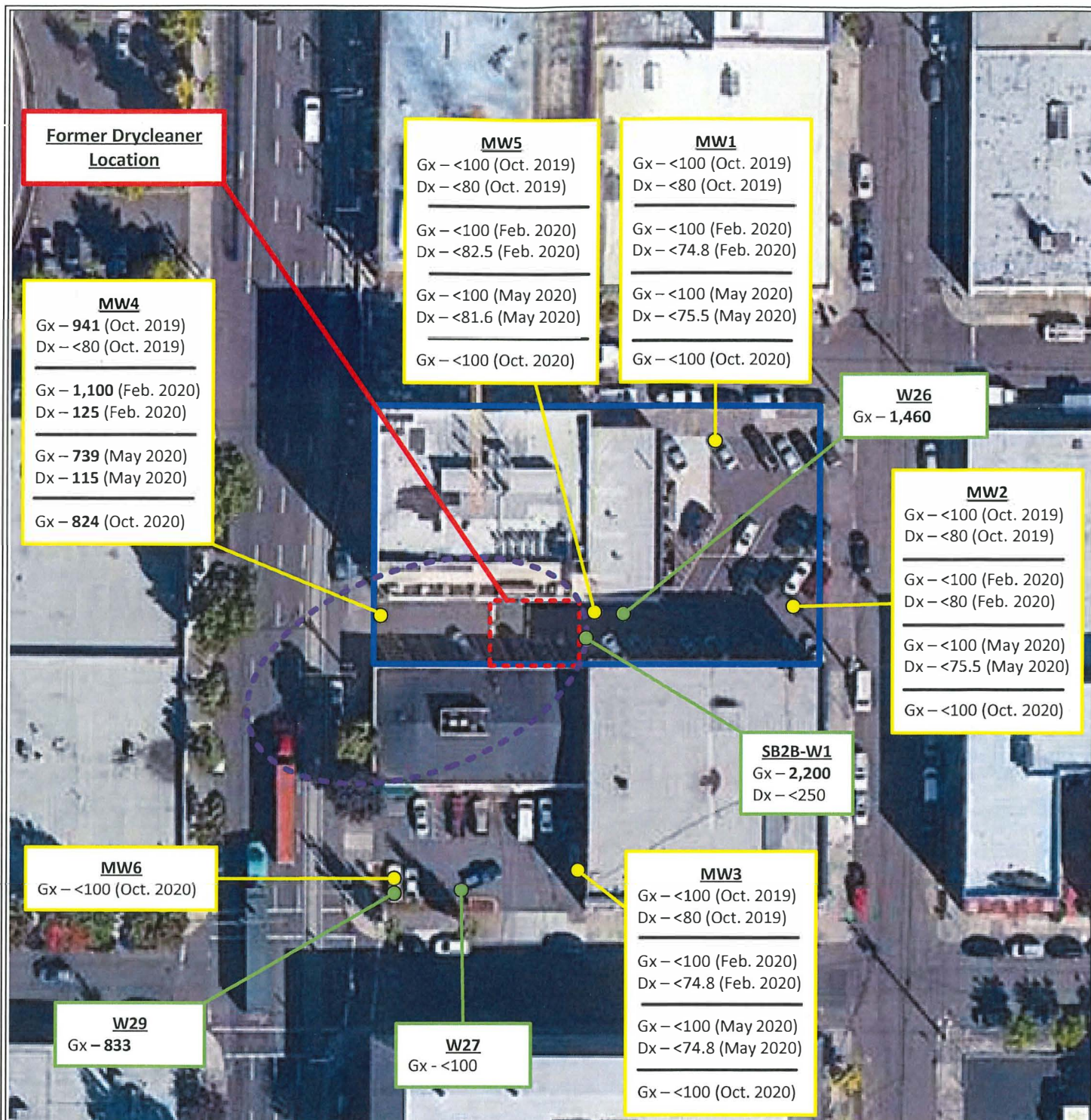


FIGURE 11 - WATER TPH-DX/GX SAMPLE LOCATION DIAGRAM

Image From Google Earth (2018)



Notes:

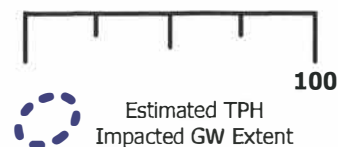
- Water Sample results in ug/L
- Results depicted for TPH-Dx/Gx (stoddard solvent) only
- Estimate GW TPH plume based upon Oct 2020 GWM event
- SB2B-W1 collected by Chugwater (2013)
- W26 - W29 collected by PSS (2018)
- MW1 - MW6 installed by PSS (2019-2020)

- Water Sample Location
- Monitoring Well Location



- Site Boundary
- Former Drycleaner Location

Scale in Feet (Approximate)



Site Name: Arcoa Building
1006 SE Grand Avenue
Portland, Oregon 97214

Project Number: OR190517-3

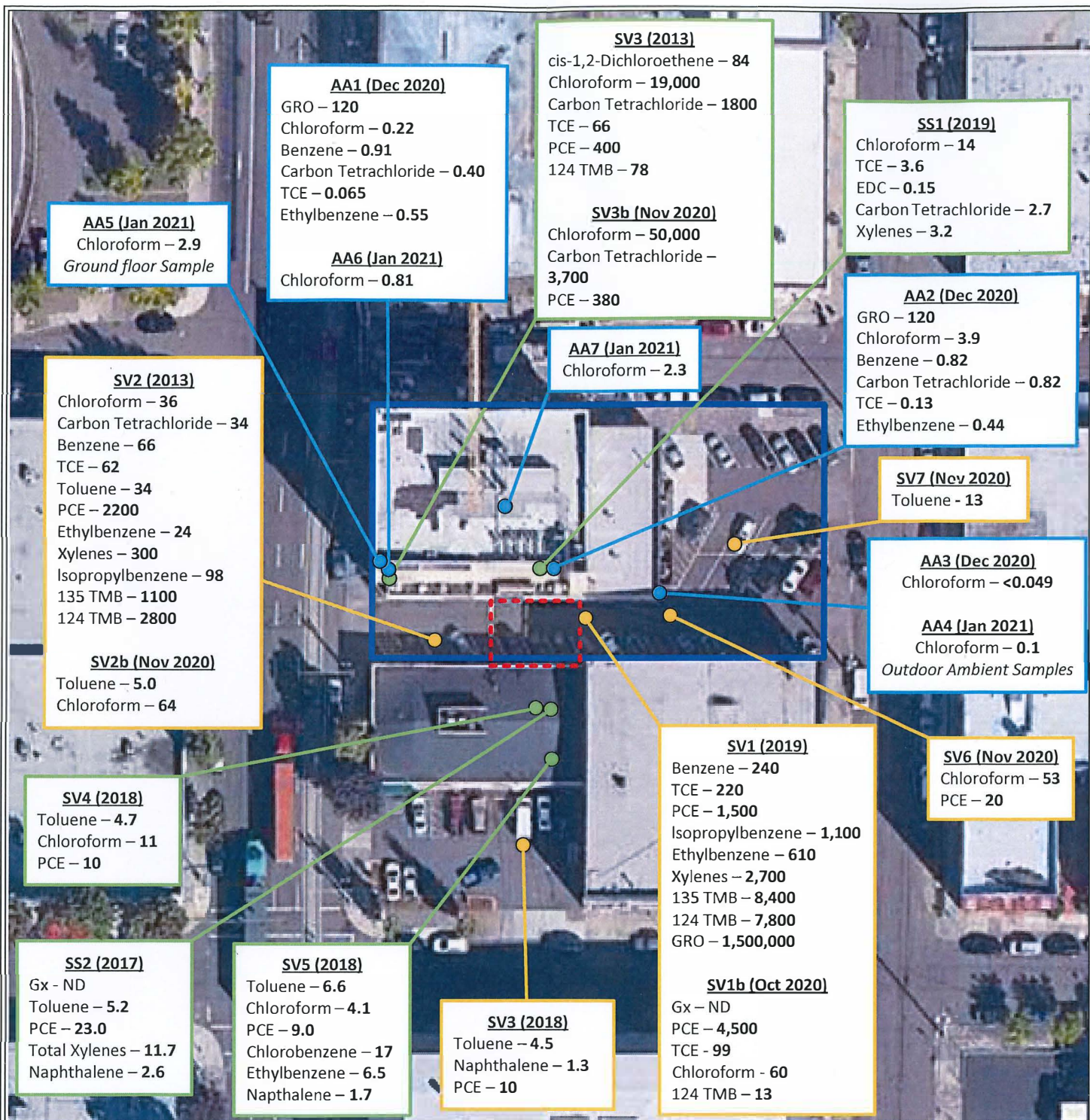


FIGURE 12 – VAPOR/AIR SAMPLE LOCATION DIAGRAM

Image From Google Earth (2018)



Notes:

- Soil Vapor and Air results in ug/m³
- Location of former drycleaner based upon historical documentation.
- All Indoor air samples were placed in the basement with the exception of AA5
- 2013 Chugwater Indoor samples not depicted

- Vapor Sample Location (Sub-slab)
- Vapor Sample Location (Soil-gas)

- Indoor/Outdoor Ambient Air Sample Location
- | Site Boundary

Scale in Feet (Approximate)



Site Name: Arcoa Building
1006 SE Grand Avenue
Portland, Oregon 97214

Project Number: OR190517-3

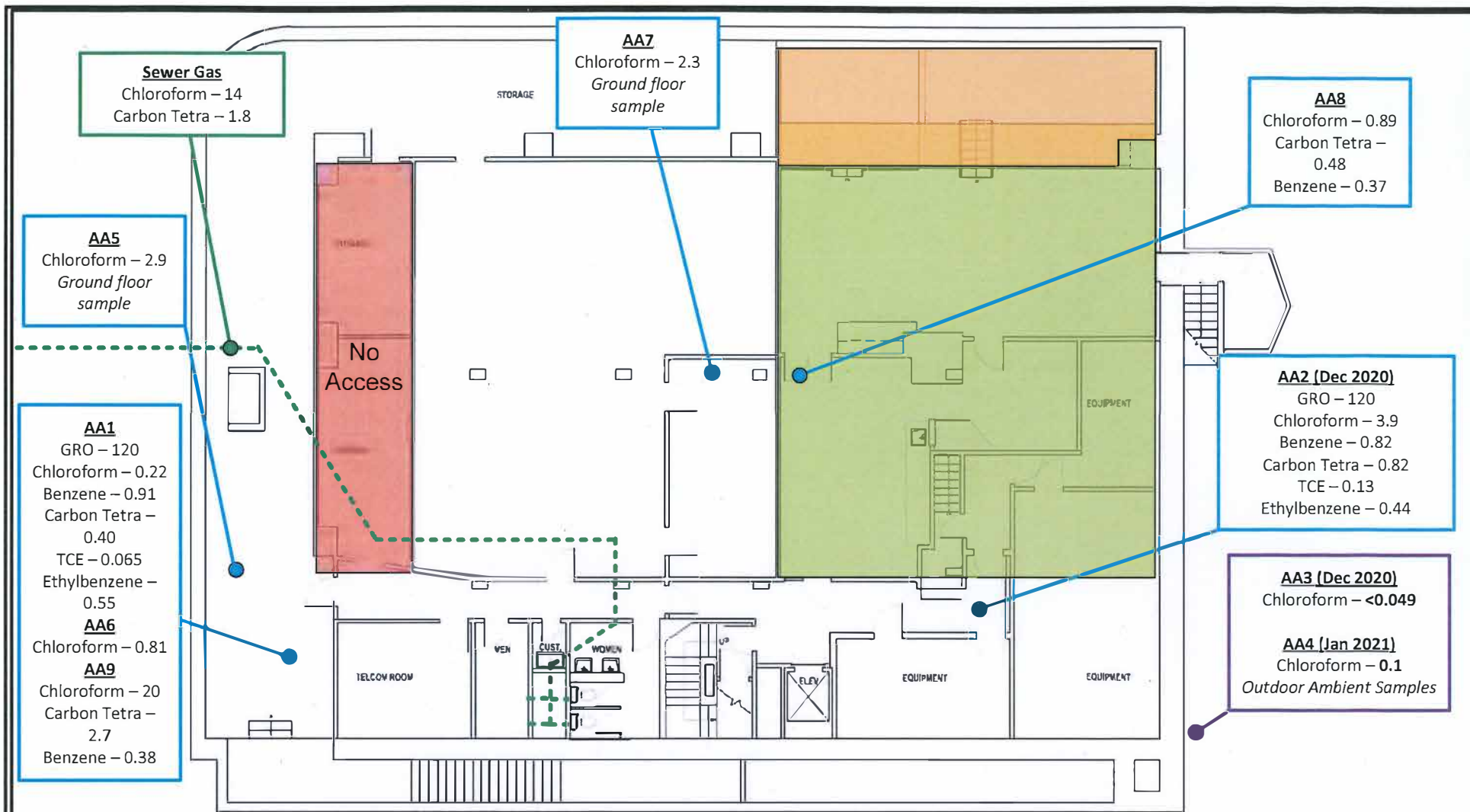


FIGURE 13 – INDOOR AIR SAMPLE LOCATION DIAGRAM

N↑

Notes:

- Results in ug/m3

● Sewer Gas Sample from Cleanout

--- Sanitary Sewer Line

● Indoor Air Sample

● Outdoor Ambient Air Sample

■ Outline of

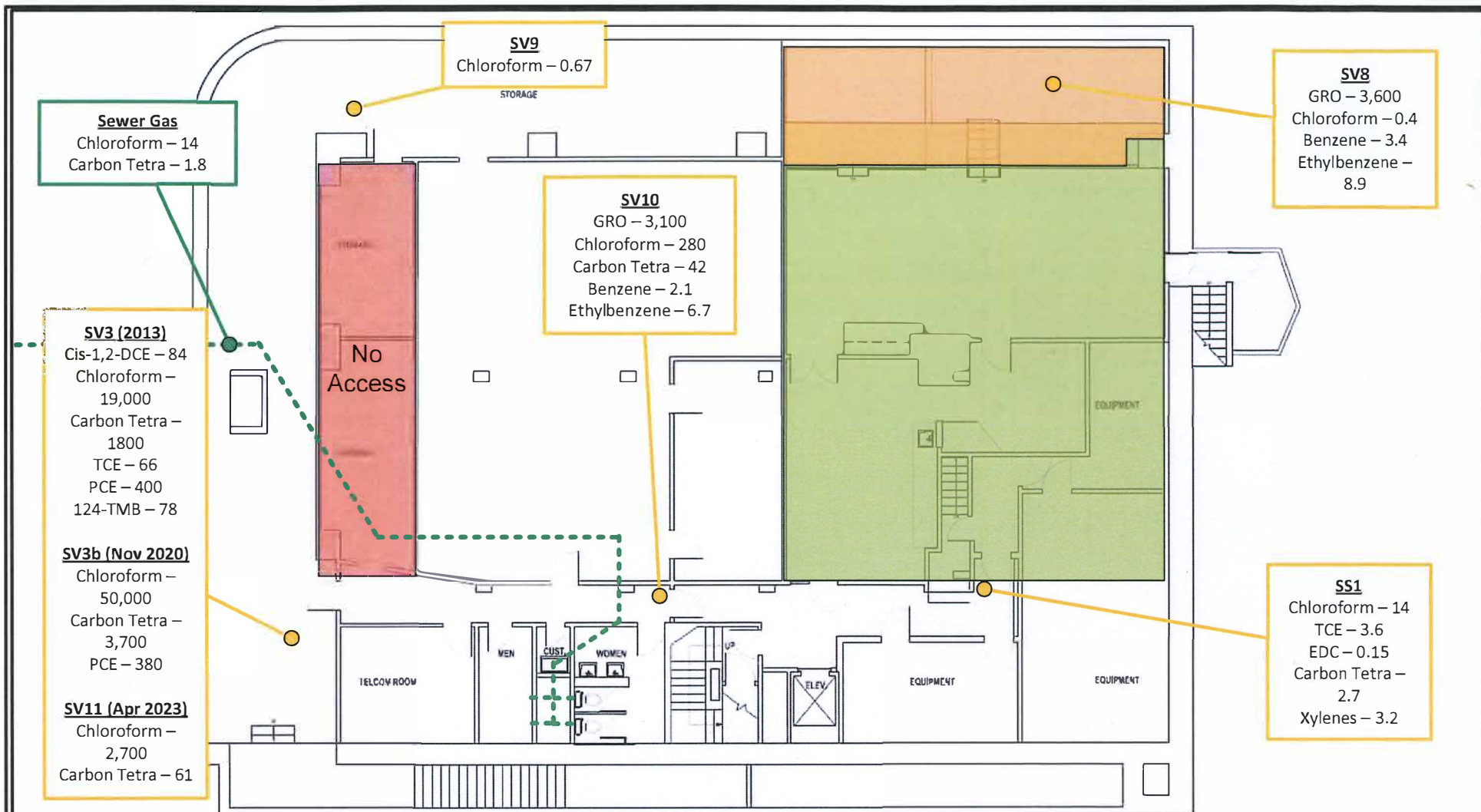
■ Lower Grade

Scale in Feet (Approximate)



Site Name: Arcoa Building
1006 SE Grand Avenue
Portland, OR 97214

Project Number: ECSI #6199



Notes:

- Results in ug/m3

● Sewer Gas Sample from Cleanout

--- Sanitary Sewer Line



● Subslab Vapor Sample



Outline of Subgrade Basement



Lower Grade

Scale in Feet (Approximate)



20



Site Name: Arcoa Building
 1006 SE Grand Avenue
 Portland, OR 97214

Project Number: ECSI #6199

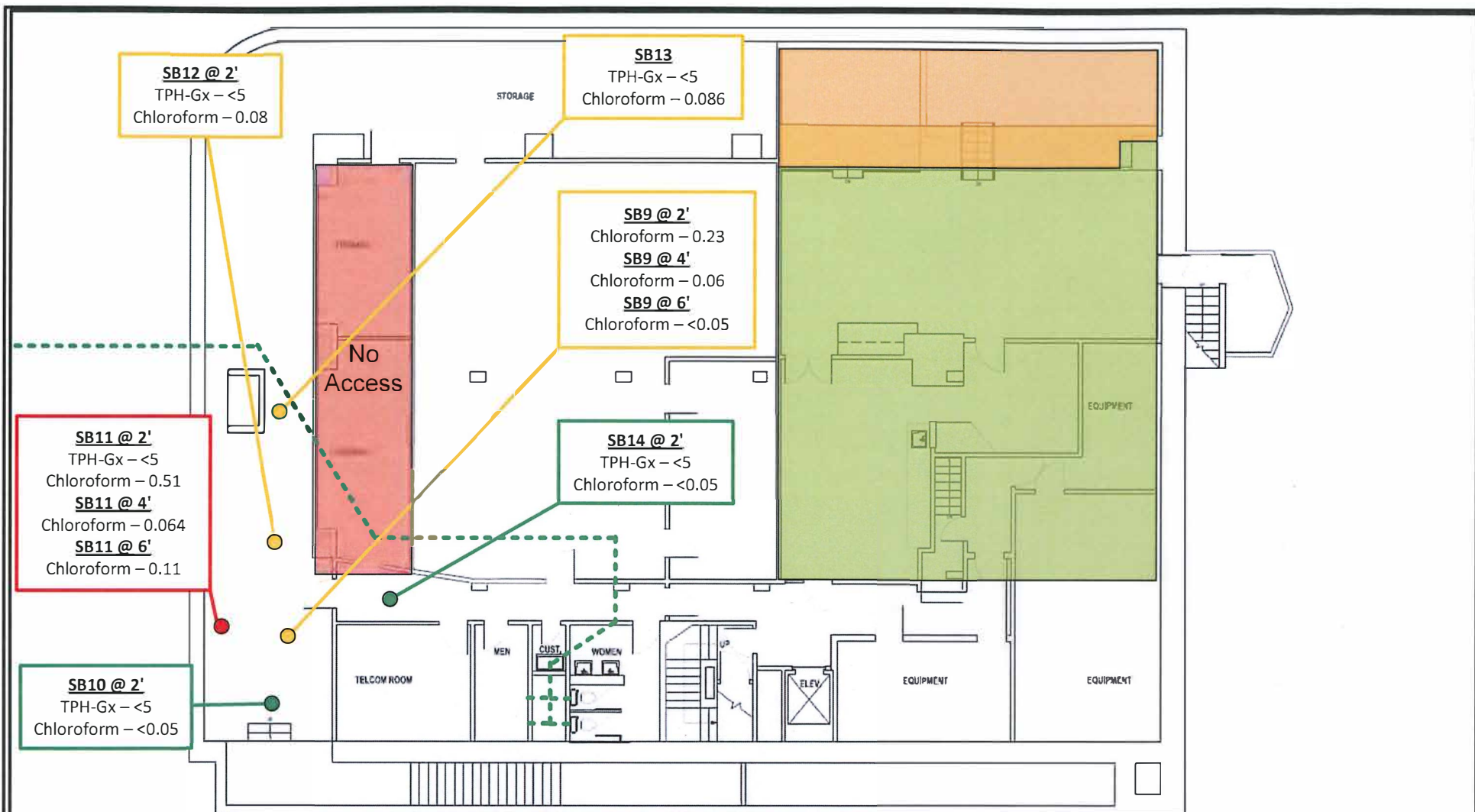


FIGURE 15 – BASEMENT SOIL SAMPLE LOCATION DIAGRAM

N↑

Notes:

- Soil sample results in mg/kg

- Soil Sample (<Urban Residential)
- Soil Sample (>Urban Residential)
- Soil Sample (>Occupational)

--- Sanitary Sewer Line

Outline of Subgrade Basement

Lower Grade

Scale in Feet (Approximate)



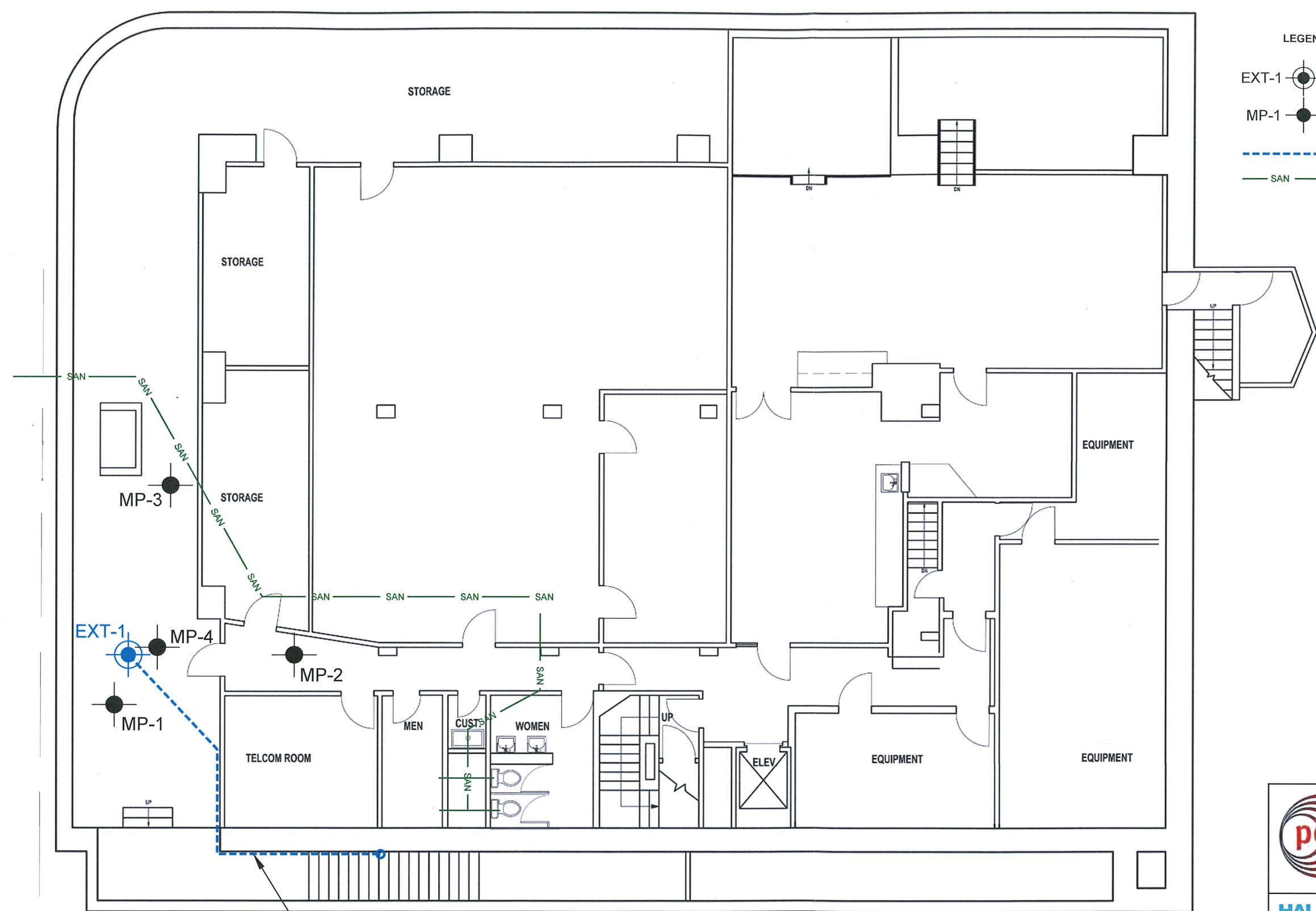
20



Site Name: Arcoa Building
1006 SE Grand Avenue
Portland, OR 97214

Project Number: ECSI #6199

Save by: KPOSTOLOWSKI Printed: 1/19/2023 2:45 PM Sheet: FIG 1
\\HALEYALDRICH\COM\SHARE\PD\DATA\NOTEBOOKS\0205783-000 ARCOA BUILDING SSDS DESIGN\CAD\0205783_000_0002 SITE PLAN.DWG



LEGEND

EXT-1 DESIGNATION, LOCATION AND PROPOSED LOCATION OF EXTRACTION WELL

MP-1 DESIGNATION, LOCATION AND PROPOSED LOCATION OF VAPOR MONITORING POINT

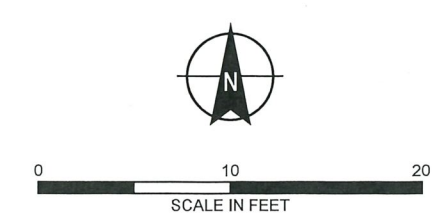
PROPOSED SSDS PIPING

EXISTING SANITARY SEWER LINE (APPRX.)

NOTES

1. BACKGROUND FROM ELECTRONIC CAD IMAGE ENTITLED "BASEMENT PLAN" DATED 2 APRIL 2019 FROM WRIGHT ARCHITECTURE.

Attachment 16



 **point source solutions, llc**
ENVIRONMENTAL CONSULTING AND CONTRACTING

HALEY ALDRICH ARCOA BUILDING
1006 SE GRAND AVENUE
PORTLAND, OREGON 97214

PROPOSED SSDS LAYOUT

SCALE: AS SHOWN
JANUARY 2023

FIGURE 1

PREFERRED ROUTING FROM EXT-1 TO
MANIFOLD/ROOF PENETRATION

Memorandum

To: Kevin Dana
From: Mike Poulsen
Date: February 14, 2024
Subject: Vapor Intrusion RBCs for TPH-Stoddard Solvent
Alcoa Building, Portland, Oregon



DEQ's TPH RBC spreadsheet can be used to calculate site-specific risk-based concentrations for various exposure scenarios. However, the current spreadsheet available on DEQ's website is outdated in three ways: 1) some of the toxicity and chemical values have been updated, 2) DEQ is using a new method to calculate vapor intrusion RBCs, and 3) default screening levels for urban residential scenarios are no longer considered sufficiently protective. DEQ's revised vapor intrusion RBCs were provided on DEQ's website in June 2023 updates (<https://www.oregon.gov/deq/hazards-and-cleanup/env-cleanup/pages/risk-based-decision-making.aspx>).

While a full draft guidance document is still being prepared, the available RBC vapor intrusion spreadsheet documents how total petroleum hydrocarbon RBCs were calculated. Using this information, the TPH RBC spreadsheet can be used to calculate site-specific RBCs. I modified the TPH RBC spreadsheet as described in the June 2023 vapor intrusion spreadsheet, and used hydrocarbon fraction data provided by Point Source Solutions to calculate Stoddard Solvent RBCs. The fraction data are shown in Table A-1.

The spreadsheet Stoddard-TPH-RBC.xlsm shows changes to the toxicity and chemical properties, and presents site-specific RBCs. However, the vapor intrusion RBCs are incorrect because they were calculated using an outdated method. The associated spreadsheet Stoddard-VI-RBC.xlsx provides calculations to support vapor intrusion RBCs. The TPH sheet from the June 2023 vapor intrusion RBC spreadsheet was modified, and data from the output of the TPH RBC spreadsheet was added to create a new Table 6 to calculate vapor intrusion RBCs. In combination with the TPH RBC spreadsheet, this provides all relevant site-specific RBCs for Stoddard Solvent for the Arcoa Building site. Site-specific RBCs are presented in Table A-2.

One unusual finding was that the RBCwi values for Stoddard Solvent are almost exactly the same as those for mineral oil. As far as we can tell, this is a coincidence and not a result of incorrect calculations.

Memorandum

Table A-1. Site-Specific Stoddard Solvent TPH Fraction Composition

TPH Fraction	Concentration (mg/kg)
Aliphatic	
EC5 – EC6	
>EC6 – EC8	47
>EC8 – EC10	2830
>EC10 – EC12	2450
>EC12 – EC16	
>EC16 – EC21	
>EC21 – EC34	
Aromatic	
>EC8 – EC10	2780
>EC10 – EC12	2370
>EC12 – EC16	240
>EC16 – EC21	
>EC21 – EC34	
Benzene	
Toluene	
Ethylbenzene	
Total Xylenes	49
1,2,4-Trimethylbenzene	479
1,3,5-Trimethylbenzene	135
Naphthalene	12.8

Note:

TPH = total petroleum hydrocarbon

EC = equivalent carbon



State of Oregon
Department of
Environmental
Quality

Memorandum

Table A-2. Site-Specific Risk-Based Concentrations for Stoddard Solvent

Medium and Scenario	RBC	Units
Soil Contact		
Residential RBCss	340	mg/kg
Occupational RBCss	4,600	mg/kg
Construction RBCss	1,600	mg/kg
Excavation RBCss	46,000	mg/kg
Soil to Outdoor Air		
Residential RBCso	8,200	mg/kg
Occupation RBCso	130,000	mg/kg
Soil Leaching to Groundwater		
Residential RBCsw	130	mg/kg
Occupational RBCsw	130,000	mg/kg
Groundwater, Tapwater		
Residential RBCtw	200	µg/L
Occupational RBCtw	840	µg/L
Groundwater to Outdoor Air		
Residential RBCwo	500,000	µg/L
Occupational RBCwo	2,100,000	µg/L
Groundwater to Indoor Air		
Residential RBCwi	360	µg/L
Occupational RBCwi	1,500	µg/L
Groundwater in Excavation		
Excavation RBCwe	12,000	µg/L
Soil Vapor to Indoor Air		
Residential RBCsv	5,200	µg/m ³
Occupational RBCsv	22,000	µg/m ³
Air		
Residential RBCair	160	µg/m ³
Occupational RBCair	660	µg/m ³

Note:
RBC = risk-based concentration





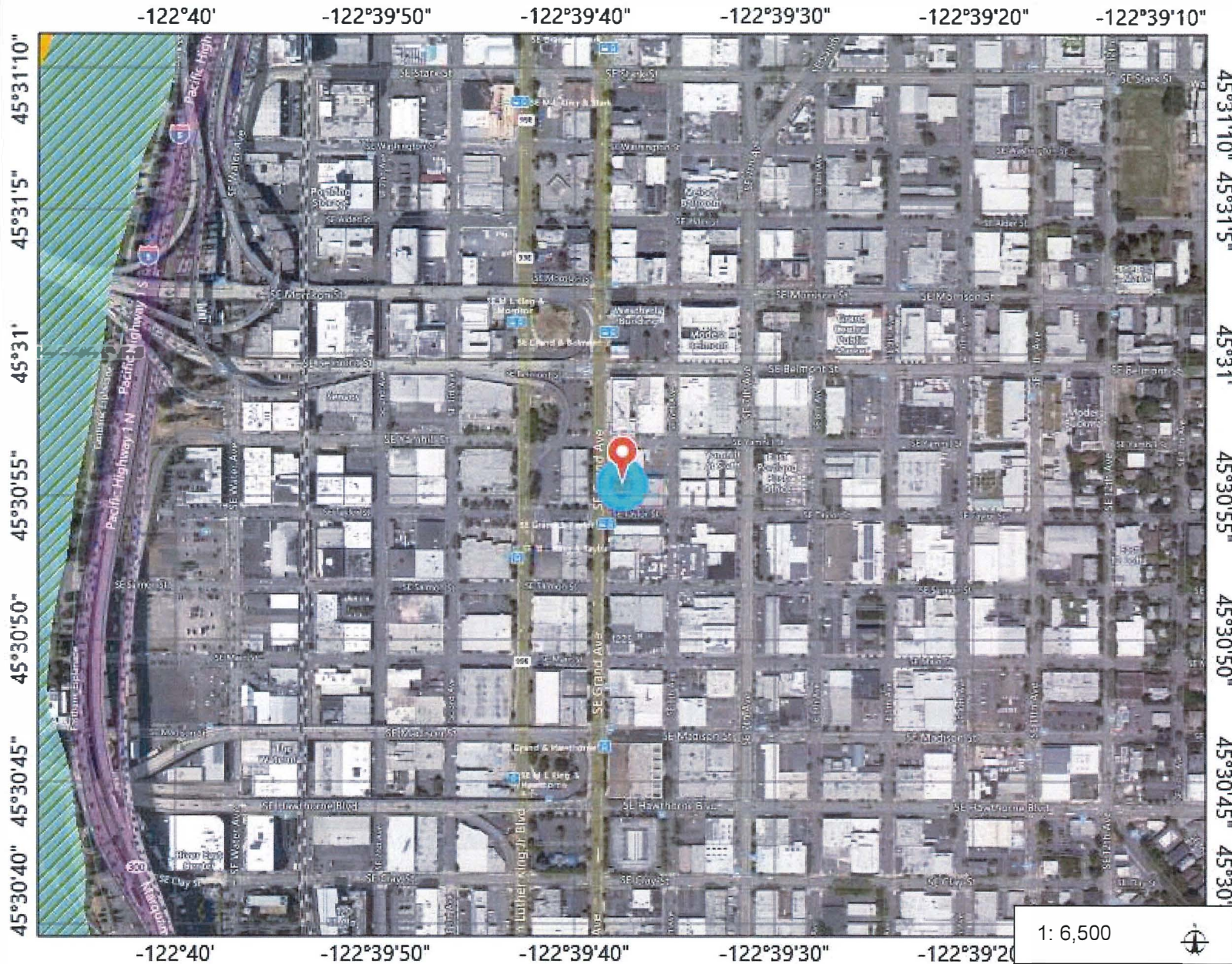
OREGON
EXPLORER

Allyn's Cleaning & Dyeing



Legend

- County Boundaries (2015)
- Essential Salmonid Habitat
- National Wetland Inventory (2019)
- Dark Gray Canvas Reference
- Dark Gray Canvas Base



Notes

Attachment 18

0.2 0 0.10 0.2 Miles

WGS_1984_Web_Mercator_Auxiliary_Sphere
© Oregon Explorer (<https://oregonexplorer.info>)

This map is a user generated static output for reference only from:
[Oregon Explorer Map Viewer](https://oregonexplorer.info)

Data layers that appear on this map may or may not be accurate, current, or reliable.
THIS MAP IS NOT TO BE USED FOR NAVIGATION.