

State of Oregon
Department of Environmental Quality

Memorandum

Date: January 6, 2025

To: FILE

Through: Peter Donahower, Manager
Jeff Schatz, Project Manager and Hydrogeologist
Northwest Region Cleanup Program

From: Rebecca Digiustino, Project Manager
Northwest Region

Subject: Astro Western #503, LUST # 03-93-0024; Staff Memorandum in support of a 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 Astro Western #503 in Boring, Oregon. As discussed in this Staff Memorandum and conditional upon adherence to a contaminated media management plan (CMMP) and property use restrictions in an Easement and Equitable Servitudes (E&ES), residual contaminant in soil and groundwater do not pose unacceptable risk to human health and the environment.

The proposed NFA determination meets the requirements of Oregon Administrative Rules Chapter 340, Division 122, Sections 0205 to 360 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 (Figure 1) can be described as follows:

- Address: 13230 Southeast Orient Drive, Boring, Oregon 97009
- Latitude 45.4273° North, longitude -122.3213 West
- Clackamas County Tax Lot 24E04A 02000, Township 2 South, Range 4 East, Section 04A

Site setting.

The 1.11-acre site property is developed with two commercial buildings: a shop building to the northwest and a commercial building to the northeast (Figure 2). The commercial building is currently occupied by a tavern (Backroads Pub and Grub) and a barber shop (Boring Barber). Asphalt-paved parking areas are located along the south and west boundaries of the property. The site property is located to the northwest of the intersection of Southeast Bobby Bruce Lane and Southeast Orient Drive (also known as Old Loop Road) in Boring, Oregon, which is outside the urban growth boundary. According to Clackamas County, the surrounding properties are

zoned RRFF5 or exclusive farm use (EFU). Properties adjacent to the site are occupied as follows:

North: Residential use and undeveloped land (tax lot 24E04A 02100)

East: Residential use (tax lot 24E04A 01900)

South: Southeast Orient Drive, followed by agricultural land (tax lot 24E04 04000)

West: Undeveloped land and residential use (tax lot 24E04 04200)

Physical setting.

According to the United States Geological Survey (USGS) 7.5-minute topographic map for the Sandy, Oregon quadrangle, the site is located approximately 645 feet above mean sea level. Topography in the area generally slopes towards the west.

The United States Department of Agriculture soil survey lists the site within the Bornstedt Silt Loam unit. The typical soil profile for the unit is silt loam from the surface to 0.7 foot below ground surface (bgs), silty clay loam from 0.7 to 2.8 feet bgs, and silty clay from 2.8 to 5.9 feet bgs and greater.

Shallow groundwater is present beneath the site and fluctuates seasonally with depths ranging from approximately 6 to 18.5 feet bgs. Based on measured groundwater levels, the hydraulic gradient is to the northwest, towards Dolan Creek (Figure 1).

Site history.

By 1952, the property was developed as agricultural land. The site was developed with the commercial building by 1957 and the shop building by 1981. From at least 1971 until 2002, the site operated as a retail automobile fuel station with a convenience store. The fuel station initially included six underground storage tanks (USTs) (T1 through T6) that were decommissioned by removal in January 1993. The tanks were replaced with four USTs (T7 through T10) until they were decommissioned by removal in October 2007. The former tank locations are shown on Figure 2.

2. BENEFICIAL LAND AND WATER USE DETERMINATIONS

Land use.

Based on the information provided as part of the site investigations and groundwater monitoring, a Locality of Facility (LOF) was estimated for this site (Figure 3). The limits of the LOF include areas where site media have been impacted by petroleum hydrocarbons and associated constituents. The LOF encompasses the majority of the site and portions of the north, west, and south adjacent properties (tax lots 24E04A 02100, 24E04 04200, and 24E04 04000).

According to Clackamas County, the site property is listed as rural residential farm/forest 5 acres (RRFF5). Based on the current zoning designation, the property is reasonably likely to remain as commercial use in the future. But can be used as a single-family dwelling or residential home. The surrounding properties include agricultural, vacant, and residential uses.

Groundwater use.

A Beneficial Water Use Determination (BWUD) was conducted to identify any potential drinking or irrigation water wells of concern within a 0.25-radius of the site (Figure 4). The Oregon Water Resources Department's (WRD) Well Log Query database identified 14 water wells within the search radius. Five additional wells not listed in the database were identified based on a review of a door-to-door water well survey that was conducted in August 2018. In August 2018, nine water wells were identified within a 0.13-mile radius of the site and were sampled. Petroleum hydrocarbons and VOCs were not identified in any of the samples. Lead was detected in one sample but was below residential drinking water RBCs.

The nearest water wells are two wells present on the western portion of the site: one deep water well (well Identification CLAC75529) and one shallow water well (well identification CLAC5467). The deep water well is currently used to supply drinking water to the site and the adjacent property to the east. The well is 230 feet deep, perforated from 215 feet to 230 feet, and has a static water level of 140 feet. The well has a deep surface seal to 204 feet and the first water-bearing zone listed on the well report was at approximately 215 feet. The shallow water well is 58 feet deep and is not-in-use. The well was taken out of service in January 2020 by welding a steel cap over the top of the well casing.

The nearest downgradient, off-site water well is located approximately 500 feet northwest of the site (CLAC 76758). The well was installed in 2021 and was therefore not sampled during the 2018 off-site sampling of wells. The well is 173 feet deep with a static water level of 98 feet. However, based on the estimated extent of contamination, the depth and construction of the well, and analytical results from the on-site wells, the off-site well does not represent a concern with respect to petroleum contamination from the site.

A municipal water supply is not available to the site or surrounding properties. Drinking water is supplied by private domestic drinking water wells.

Surface water use.

No surface water body is located within the LOF. The closest surface water body is an agricultural irrigation ditch located about 700 feet southwest of the site. The ditch appears to connect to the North Fork Deep Creek, located approximately 1.7 miles west of the site. Additionally, Dolan Creek is located approximately 1,300 feet northeast of the site and the Welling Reservoir is located approximately 1,550 feet east of the site. Based on the distances and locations (cross-gradient), no surface water bodies of concern were identified for the site.

3. INVESTIGATION AND CLEANUP WORK

Soil and Groundwater Investigations.

During the decommissioning of six USTs (T1, T2, T3, T4, T5, and T6) in January 1993, a release of petroleum was discovered. Five exploratory test pits and three trenches were advanced at the site to delineate the lateral extent of the soil contamination around the tank basin. A groundwater sample collected from the tank basin confirmed impacts to the groundwater; however, the lateral extent of groundwater contamination was not investigated at this time.

Approximately 584 tons of soil was removed from the site and the former tanks were replaced with four new USTs (T7, T8, T9, and T10) (Figure 2), which remained in use through approximately 2002 when station operations ceased.

In October 2007, the four USTs (T7, T8, T9, and T10) were decommissioned and gasoline was detected in compliance samples collected from the western sidewall of the tank cavity. The tanks were reportedly in good condition with no indications of leaks; therefore, the detections were attributed to the 1993 release associated with the previous USTs.

Several site investigations were conducted between 1994 and 2003 to determine the extent of the soil and groundwater contamination. In April 1994, soil and groundwater samples were collected from the installation of three temporary wells (MW1, MW2, and MW3). In June and July 2002, soil and groundwater samples were collected from seven borings. In July 2003, groundwater samples were collected from two borings (WP1 and WP3). Groundwater analytical data from these investigations indicated that petroleum hydrocarbons were present downgradient of the release area and that additional investigation was needed to define the lateral extent.

In May 2004, four permanent monitoring wells (MW-1, MW-2, MW-3, and MW-4) were installed at the site. Free product was observed in MW-2 in December 2006 and January 2009 but was not observed in any wells during subsequent monitoring events. In general, concentrations of gasoline range organics (GRO) and related contaminants of interest have decreased over time in MW-1, MW-2, and MW-4 (downgradient) while remaining relatively stable in MW-3 (cross-gradient). Diesel was detected during some sampling events; however, the relatively low concentrations were attributed to overlap from a gasoline range product by the laboratory. Additionally, tetrachloroethene (PCE) was detected in the groundwater at relatively low concentrations. A no further action (NFA) determination was issued regarding the PCE contamination by DEQ on August 26, 2009.

In August 2007 and May 2011, a total of 21 push probe borings (P1 through P21) were advanced at the site to define the extent of petroleum hydrocarbons in soil and groundwater.

In November 2008, an air-sparge system comprised of 23 sparge points that were advanced to depths ranging from 39 to 40 feet below ground surface was installed at the site. The sparge point locations are illustrated on Figure 3. A total of 567.3 tons of petroleum-impacted soil was generated during installation and transported offsite for disposal. The air-sparge system began operation in June 2009 and aerobic bacteria were added to the sparge points in 2011 and 2012 to promote biodegradation of petroleum hydrocarbons. The air-sparging system ceased operations in 2014 due to excessive clogging and was not returned to service.

In April 2024, boring HA-1 was advanced 180 feet west-northwest of the site to define the western lateral extent of petroleum hydrocarbons in groundwater. Groundwater was encountered in the boring 6 feet bgs. A groundwater sample (HA1-GW) was collected and analyzed for GRO and VOCs. No analytes were detected at concentrations greater than their respective method detection limits.

Sample locations are shown on Figure 3. Analytical results for soil and groundwater samples are shown on Tables 1 through 8, 10, and 12 through 15.

Soil Gas Investigations.

In March 2021, two sub-slab vapor samples (*Tavern Building Floor Slab* and *Shop Building Floor Slab*) were collected at the site to evaluate the risk of vapor intrusion into buildings with respect to occupational receptors. The samples were analyzed for VOCs, which were not detected or were detected at concentrations below occupational soil vapor RBCs.

A soil vapor investigation was conducted on March 3 and April 28, 2023, to evaluate the vapor intrusion in buildings pathway with respect to residential receptors located east of the site. Soil vapor point SV-1 was installed along the eastern property boundary at the location to a depth of 3.2 feet bgs. GRO and VOCs were not detected above the method detection limits in soil vapor sample SV-1.

In April 2024, sub-slab vapor points were installed through the concrete floor of the shop building (SV-2) and the Tavern and Barber Shop building (SV-3) to further evaluate the vapor intrusion risk with respect to occupational worker receptors working in the on-site buildings. Relatively low concentrations of GRO, benzene, toluene, ethylbenzene and xylenes, isopropylbenzene (IPB), 1,2,4-trimethylbenzene (124-TMB), and 1,3,5-trimethylbenzene (135-TMB) were detected in one or both of the samples.

Sample locations are shown on Figure 3. Analytical results for soil vapor samples are shown on Tables 9 and 11.

Domestic Drinking Water Investigations.

Between July 2004 and December 2022, the onsite domestic deep water well was sampled 34 times, and the onsite domestic shallow water well was sampled 13 times. One or more volatile organic compounds (VOCs) were detected in the deep well samples collected in December 2006 and December 2007. However, these results were flagged as suspected invalid false positives due to laboratory cross-contamination. Petroleum hydrocarbons and/or related constituents were not detected in any of the other samples collected from the deep water well. VOCs were detected in the shallow water well in June 2005, December 2007, December 2013, and August 2018. In January 2020, the shallow water well was taken out of service by welding a steel cap over the top of well casing and there are no future plans to put the well back into service.

In July 2018, DEQ requested all drinking water wells located within a 0.13-mile radius of the site be sampled for petroleum hydrocarbons and associated contaminants of interest. Nine drinking water wells were identified within the search radius and samples were analyzed for petroleum hydrocarbons, VOCs, and lead in August 2018. Petroleum hydrocarbons and VOCs were not detected in any of the samples and lead was only detected in one sample at a relatively low concentration that was below the residential RBC for ingestion and inhalation from tap water.

4. RISK EVALUATION

Conceptual site model.

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 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. In-text Table A (below) shows potential exposure pathways and receptors for this site. Based on this, applicable RBCs are identified and used for risk screening.

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

Pathway	Receptor	Applicable RBC?	Basis for selection/exclusion
SOIL			
Ingestion, dermal contact, and inhalation	Residential	Yes	See Note 1.
	Urban residential	Yes	
	Occupational	Yes	
	Construction worker	Yes	
	Excavation worker	Yes	
Volatilization to outdoor air	Residential	Yes	See Notes 1.
	Urban residential	Yes	
	Occupational	Yes	
Leaching to groundwater	Residential	Yes	See Note 2.
	Urban residential	Yes	
	Occupational	Yes	
GROUNDWATER			
Ingestion and inhalation from tap water	Residential	Yes	See Note 2.
	Urban residential	Yes	
	Occupational	Yes	
Volatilization to outdoor air	Residential	Yes	See Note 1.
	Urban residential	Yes	
	Occupational	Yes	
Vapor intrusion into buildings	Residential	Yes	See Note 1.
	Urban residential	Yes	
	Occupational	Yes	
Groundwater in excavation	Construction and excavation worker	Yes	See Note 3.

Notes:

- Although the site is a non-residential facility, there are residential buildings adjacent to the site. Multi-use residential/commercial buildings are allowed to be built on the property based on county zoning, but residential exposure RBCs are used for comparison rather than urban residential exposure RBCs because single-family residences are more likely in a rural setting and
- Domestic groundwater wells are used for drinking water at the site and at surrounding properties.

3. Construction and excavation work are generally limited to a depth of approximately 15 feet. Groundwater has been encountered at the site as shallow as 6 feet bgs; therefore, the groundwater in excavation pathway is considered.

Contaminant concentrations.

Maximum Contaminant Concentrations – Soil

To evaluate human health risks posed by contaminants in soil under various exposure scenarios, the highest detected concentrations of GRO and VOCs from the on-site investigations were utilized for comparison to occupational RBCs and from the off-site investigations at tax lots 24E04A 02100, 24E04 04200, and 24E04 04000 were utilized for comparison to residential RBCs. It should be noted that although sixteen soil borings (P1 through P16) were advanced during the 2007 subsurface investigation, only soil samples collected from P5, and P13 through P16 were analyzed for petroleum constituents.

Soil Ingestion, Dermal Contact and Inhalation Pathway

Constituent of Interest	MDC in Soil mg/kg	Residential (RBC_{ss}) mg/kg	Occupational Worker (RBC_{ss}) mg/kg	Construction Worker (RBC_{ss}) mg/kg	COPC? (Yes/No)
GRO	7,700	1,200	20,000	9,700	Y
benzene	9.97	8.2	37	380	Y
toluene	86.5	5,800	88,000	28,000	N
ethylbenzene	43	34	150	1,700	Y
total xylenes	205	1,400	25,000	20,000	N

Yellow highlighted RBCs were exceeded in samples collected from one or more locations.

COPC = constituent of potential concern

Soil collected in the vicinity of the former tank basin and dispenser island contained concentrations of GRO, benzene, and ethylbenzene that exceeded the soil ingestion, dermal contact and inhalation exposure pathway for the possible future residential scenario. However, the exceedances are limited to on-site, which is used for commercial purposes, and the majority of samples with COIs exceeding residential RBCs for this pathway were collected at depths greater than three feet bgs. The soil samples did not exceed RBCs for occupational or construction worker scenarios.

Based on the detected concentrations, sample collection depths, and known property uses of the site and adjacent properties, the contamination does not pose unacceptable risks under residential, occupational, or construction worker exposure scenarios, as appropriate for each property use.

Maximum Contaminant Concentrations – Groundwater

To evaluate human health risks from contamination in groundwater under various exposure scenarios, the highest detected concentrations of GRO, VOCs, and lead from the on-site investigations were utilized for comparison to occupational RBCs and from the off-site investigations at tax lots 24E04A 02100, 24E04 04200, and 24E04 04000 were utilized for comparison to residential RBCs. The analytical data from the following sampling investigations were used to determine the highest detected concentrations in groundwater:

- 2011 groundwater data collected from borings P17 through P21;
- 2018 survey well water test results;
- 2022 and 2023 groundwater data collected from monitoring wells MW-1 through MW-4;
- Groundwater data collected from the on-site shallow and deep wells; and
- 2024 groundwater data collected from boring HA1.

Groundwater Ingestion and Inhalation from Tap Water

Constituent of Interest	MDC in Groundwater µg/l	Residential (RBC _{tw}) µg/l	Occupational Worker (RBC _{tw}) µg/l	COPC? (Yes/No)
GRO	51,200	110	450	Y
benzene	388	0.46	2.1	Y
toluene	3,560	1,100	6,300	Y
ethylbenzene	1,300	1.5	6.4	Y
total xylenes	7,040	190	830	Y
Naphthalene	235	0.17	0.72	Y
Methyl t-butyl ether	2.37	14	68	N
1,2,4-Trimethylbenzene	1,250	54	250	Y
1,3,5-Trimethylbenzene	274	59	280	Y
Isopropylbenzene	66.6	440	2,000	N

Yellow highlighted RBCs were exceeded in samples collected from one or more locations.

The constituents of interest that exceeded the residential and occupational RBCs for groundwater ingestion and inhalation from tap water were generally detected in groundwater from monitoring wells MW-1 through MW-4, with the highest concentrations being detected in monitoring wells MW-2 and MW-3. However, concentrations of benzene and GRO appear to be decreasing over time suggesting natural attenuation is occurring at the site (Graphs 1 through 8).

Benzene and ethylbenzene were detected at concentrations greater than the residential RBC for groundwater ingestion and inhalation from tap water collected from the on-site shallow well in December 2013; however, these analytes were not detected above the method detection limits in subsequent samples taken in 2014 and 2018 and the well was taken out of service in January 2020. Constituents of interest have not been detected in the on-site deep well, with the exception of naphthalene (6 micrograms per liter [µg/L]) in December 2006 and toluene, total xylenes, and naphthalene in December 2007.

Based on the 2023 groundwater monitoring data, groundwater containing concentrations greater than the residential and/or occupational RBCs for groundwater ingestion and inhalation from tap water does not extend offsite. However, due to elevated concentrations detected in the shallow groundwater, potential risks to on-site occupants could not be ruled out.

Groundwater in Excavation

Constituent of Interest	MDC in Groundwater µg/l	Construction/Excavation Worker (RBC _{we}) µg/l	COPC? (Yes/No)

GRO	51,200	14,000	Y
benzene	388	1,800	N
toluene	3,560	220,000	N
ethylbenzene	1,300	4,500	N
total xylenes	7,040	23,000	N
Naphthalene	235	500	N
Methyl t-butyl ether	2.37	63,000	N
1,2,4-Trimethylbenzene	1,250	6,300	N
1,3,5-Trimethylbenzene	274	7,500	N
Isopropylbenzene	66.6	51,000	N

Yellow highlighted RBCs were exceeded in samples collected from one or more locations.

GRO concentrations exceed the construction and excavation worker RBC for groundwater in excavations in recent groundwater samples collected from monitoring wells MW2 and MW3. Based on the elevated concentrations of GRO detected in the shallow groundwater, potential risks to construction or excavation workers of on-site buildings could not be ruled out. Although future development is not anticipated at this time, any potentially impacted groundwater encountered during future redevelopment on-site would need to be managed through implementation of a DEQ-approved CMMP.

Additional Evaluation of Soil Gas.

Three soil gas investigations were conducted to evaluate possible vapor intrusion risks to the onsite buildings and the residential dwelling located west of the site on tax lot 24E04A 01900 on Clackamas County Map No. 2 4 E 04A.

Soil Gas Vapor Intrusion into Buildings

Constituent of Interest	MDC in Groundwater $\mu\text{g}/\text{m}^3$	Residential (RBC _{sv}) $\mu\text{g}/\text{m}^3$	Occupational Worker (RBC _{sv}) $\mu\text{g}/\text{m}^3$	COPC? (Yes/No)
GRO	1,200	10,000	40,000	N
benzene	4.2	12	52	N
toluene	2.6	170,000	730,000	N
ethylbenzene	3.1	37	160	N
m,p-xylenes	2.6	3,500	15,000	N
o-xylenes	1.5	3,500	15,000	N
naphthalene	5.6	2.8	12	Y
1,2,4-Trimethylbenzene	2.8	2,100	8,800	N
1,3,5-Trimethylbenzene	1.0	2,100	8,800	N
Isopropylbenzene	0.97	14,000	58,000	N

Yellow highlighted RBCs were exceeded in samples collected from one or more locations.

In March 2021, two sub-slab vapor samples were collected from the on-site buildings to evaluate the risk of vapor intrusion into buildings with respect to occupational receptors. The samples were analyzed for VOCs, which were not detected or were detected at concentrations below occupational soil vapor RBCs. Naphthalene was detected in the sample collected from the shop building at a concentration of 5.6 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$), which is above the vapor

intrusion into buildings with respect to residential receptors; however, the building is not used for residential purposes and naphthalene was not detected above the method detection limit in a subsequent sample (SV-2) collected from the building in April 2024.

On March 3 and April 28, 2023, a soil vapor sample (SV-1) was collected along the eastern property boundary to evaluate the vapor intrusion in buildings pathway with respect to tax lot 24E04A 01900. GRO and VOCs were not detected above the method detection limits in soil vapor sample SV-1.

In April 2024, sub-slab vapor points (SV-2 and SV-3) were installed through the concrete floor of the on-site buildings. Relatively low concentrations of GRO, benzene, toluene, ethylbenzene and xylenes, isopropylbenzene (IPB), 1,2,4-trimethylbenzene (124-TMB), and 1,3,5-trimethylbenzene (135-TMB) were detected in one or both of the samples, but all detected concentrations were below their respective vapor intrusion into building soil gas RBCs for residential and occupational scenarios.

Based on the detected concentrations during the three soil vapor investigations, the contamination does not pose unacceptable vapor intrusion risks to occupants of the current buildings constructed at the site and on tax lots 24E04A 01900 and 24E04A 02100. It should be noted that soil gas data were not collected from tax lots 24E04 04200 or 24E04 04000; however, based on the 2023 groundwater monitoring data, groundwater containing concentrations greater than the residential and/or occupational RBCs for groundwater volatilization to indoor air does not extend offsite and contamination does not pose unacceptable vapor intrusion risks to tax lots 24E04 04200 and 24E04 04000.

Despite the favorable soil gas sampling data, due to elevated concentrations detected in the shallow groundwater on-site and zoning allowing possible future residential property use, potential vapor intrusion risks to occupants of future on-site buildings could not be ruled out.

Human health risk.

Petroleum hydrocarbon contamination, such as GRO and benzene, were detected in soil and groundwater at concentrations exceeding generic RBCs for one or more exposure pathways and exposure scenarios and therefore screened in as COPCs. However, based on the following, risks to human receptors are limited (i.e., or nonexistent) for selected exposure pathways and these COPCs were not carried forward as COCs:

- Soil contamination at the site exceeding RBCs for the soil ingestion, dermal contact, and inhalation exposure pathway for residential scenarios is located at depths unlikely to be encountered by possible future residential receptors. The contamination likewise does not pose unacceptable risks under occupational worker exposure scenarios.
- Soil and/or groundwater contamination exceeding generic RBCs for the vapor intrusion into building exposure pathways under residential and/or occupational worker scenarios is present at the site. Soil gas data collected from the site indicate that *as currently developed*, soil and groundwater contamination does not appear to pose unacceptable vapor intrusion risks to building occupants at the site.

Exposure pathways and scenarios carried forward as COCs due to unacceptable human health risks include:

- Excavation workers contacting contaminated groundwater in sufficiently deep excavations at the site.
- Groundwater contamination exceeding generic RBCs for the groundwater ingestion and inhalation from tap water for residential and/or occupational worker scenarios is present in the shallow groundwater at the site. As a result, a remedy is necessary to mitigate drinking water risks to the current or future occupants of the site.
- Groundwater contamination exceeding generic RBCs for the vapor intrusion into building exposure pathways under residential and/or occupational worker scenarios is present at the site. The vapor intrusion data collected at the current buildings located at the site does not rule out risks to occupants of future buildings constructed at the property. As a result, a remedy is necessary to mitigate vapor intrusion risks to occupants of future buildings constructed at the site.

The general extent of the area exceeding RBCs protective of excavation workers in deep excavations and the general extent of the area exceeding RBCs for the vapor intrusion into building exposure pathways is shown on Figure 3.

Ecological risk.

The site is devoid of habitat and surrounding properties are landscaped residential yards or agricultural fields. The closest surface water body is Dolan Creek located about 1,300 feet northeast of the Site. The creek connects to North Fork Deep Creek, located approximately 1.5 miles northwest of the Site, which eventually connects to Deep Creek and then to the Clackamas River. Analytical data from the on-site monitoring wells and grab samples from borings advanced on tax lots 24E04A 02100, 24E04 04200, and 24E04 04000 indicate that the plume is largely restricted to the site. Based on the known extent of the groundwater contamination, groundwater flow and distance, ecological receptors are unlikely to be impacted.

5. RECOMMENDATION

Unacceptable risks to construction and excavation workers from contact with groundwater in excavations should be mitigated through implementation of the DEQ-approved CMMP. The CMMP establishes procedures for evacuation, characterization, and management of groundwater in excavations exhibiting characteristics of impact by petroleum hydrocarbons which is exposed during future construction and/or utility work. The CMMP should be maintained at the site for future implementation as needed.

Barring further cleanup, an E&ES that prohibits the installation of any new drinking water wells and construction of any new buildings for human occupation without DEQ's prior written approval would be needed to mitigate unacceptable risks to future site occupants. Prior to such construction, development plans would have to be submitted to DEQ for approval. If further cleanup and/or soil gas sampling is not performed, the development plans would have to include engineering controls incorporated into the design of future buildings constructed for human occupation to mitigate unacceptable vapor intrusion risks to occupants.

Proposed land use restrictions described above would be memorialized in E&ES documents executed for the site and recorded on the corresponding property deeds on file with Clackamas County. Provided that the site agrees to the terms outlined in the proposed E&ES, a conditional No Further Action determination is possible for this site. The No Further Action determination should be recorded in DEQ's Your DEQ Online database (DEQ Cleanup File No. 03-93-0024).

6. SELECT ADMINISTRATIVE RECORD

Subsurface Investigation: 13230 SE Orient Drive, Boring, Oregon 97009. Robert D. Miller Consulting, Inc. December 6, 2007.

Subsurface Investigation: 13230 SE Orient Drive, Boring, Oregon 97009. Robert D. Miller Consulting, Inc. July 22, 2011.

Subsurface Investigation and Risk Based Analysis at Holt's Shopping Center. Robert D. Miller Consulting, Inc. September 4, 2022.

Groundwater Monitoring Report for December 14, 2022 Field Event. Robert D. Miller Consulting, Inc. December 29, 2022.

Site Investigation and Risk-Based Closure Report: Former Holts Shopping Center. Martin S. Burck Associates, Inc. February 8, 2024.

2024 Groundwater and Subslab Vapor Sampling – Recommendation for Closure: Former Holts Shopping Center. Martin S. Burck Associates, Inc. June 20, 2024.

7. ATTACHMENTS

Figure 1. Site Location Map

Figure 2. Site and Surrounding Features Map

Figure 3. Soil Vapor and Groundwater Data (2023)

Figure 4. Water Well Location Map

Graph 1. MW-1 Benzene Vs Time

Graph 2. MW-2 Benzene Vs Time

Graph 3. MW-3 Benzene Vs Time

Graph 4. MW-4 Benzene Vs Time

Graph 5. MW-1 Gasoline Vs Time

Graph 6. MW-2 Gasoline Vs Time

Graph 7. MW-3 Gasoline Vs Time

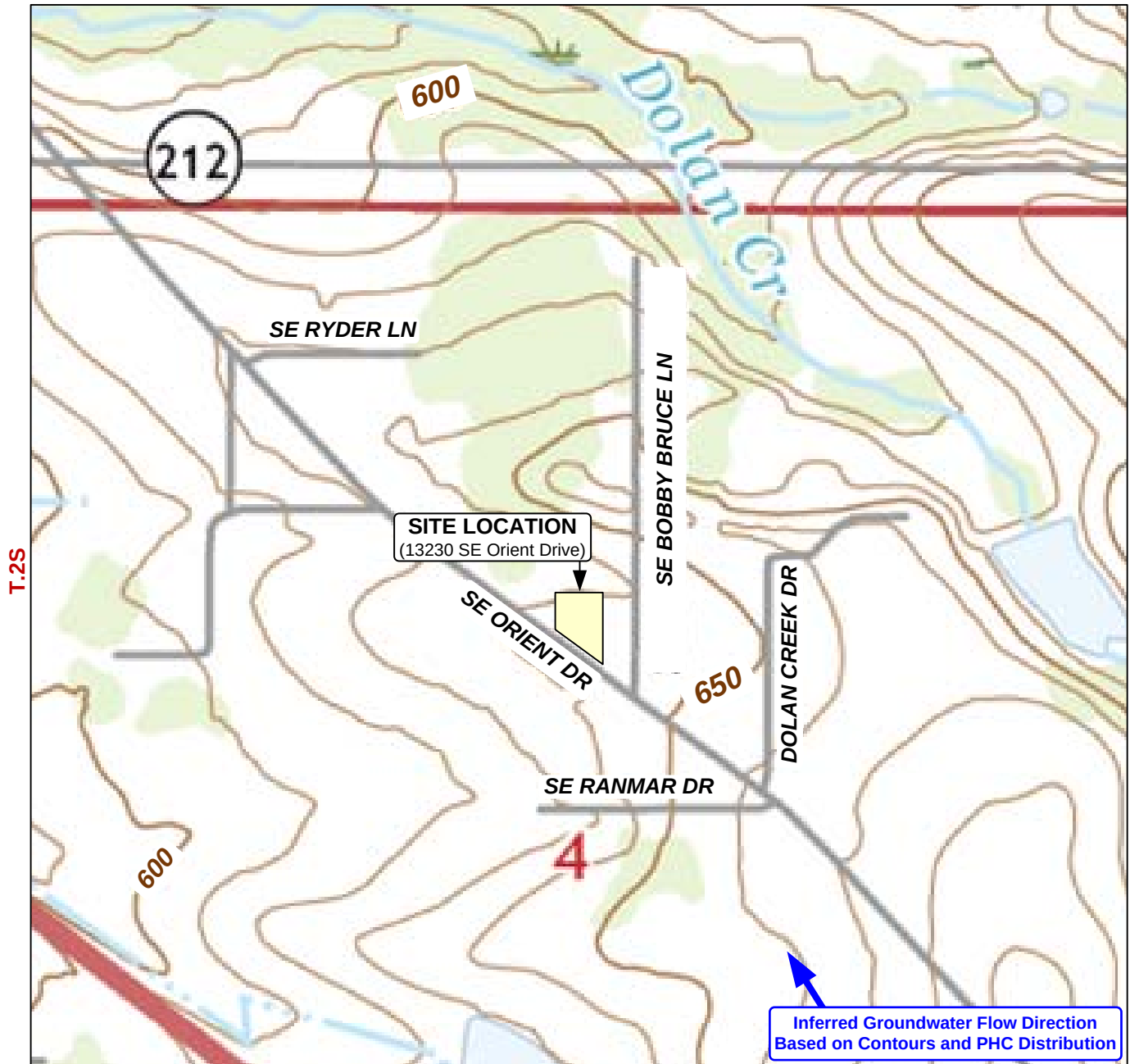
Graph 8. MW-4 Gasoline Vs Time

1993 and 1994 Site Investigation Tables

Table 1. Soil Samples for Astro #503

Table 2. Water Samples for Astro #503
1994 and 2002 Site Investigation Tables
Table 3. Soil Analysis
Table 4. Groundwater Analysis
August 2007 Site Investigation Tables
Table 5. Soil Analytical Results
Table 6. Water Analytical Results for Gasoline Hydrocarbons
October 2007 Site Investigation Table
Table 7. Site Assessment Analytical Results
2008 Site Investigation Table
Table 8. Analytical Results in Soil
2021 Site Investigation Table
Table 9. Test Results for Soil Gas Vapor Intrusion into Buildings
2023 and 2024 Site Investigation Tables
Table 10. Groundwater Sample Analytical Data
Table 11. Sub-slab/Soil Vapor Sample Analytical Data
2004 to 2022 Groundwater Monitoring Tables
Table 12. Static Water Levels (SWL) in Feet
Table 13. Test Results for Groundwater Samples
Table 14. Test Results for Survey Water Samples

R.4E



Adapted from: Sandy Quadrangle, Oregon
USGS Topographic Map, 2020
7.5 Minute Series, Contour Interval 10 feet
North American Vertical Datum of 1988



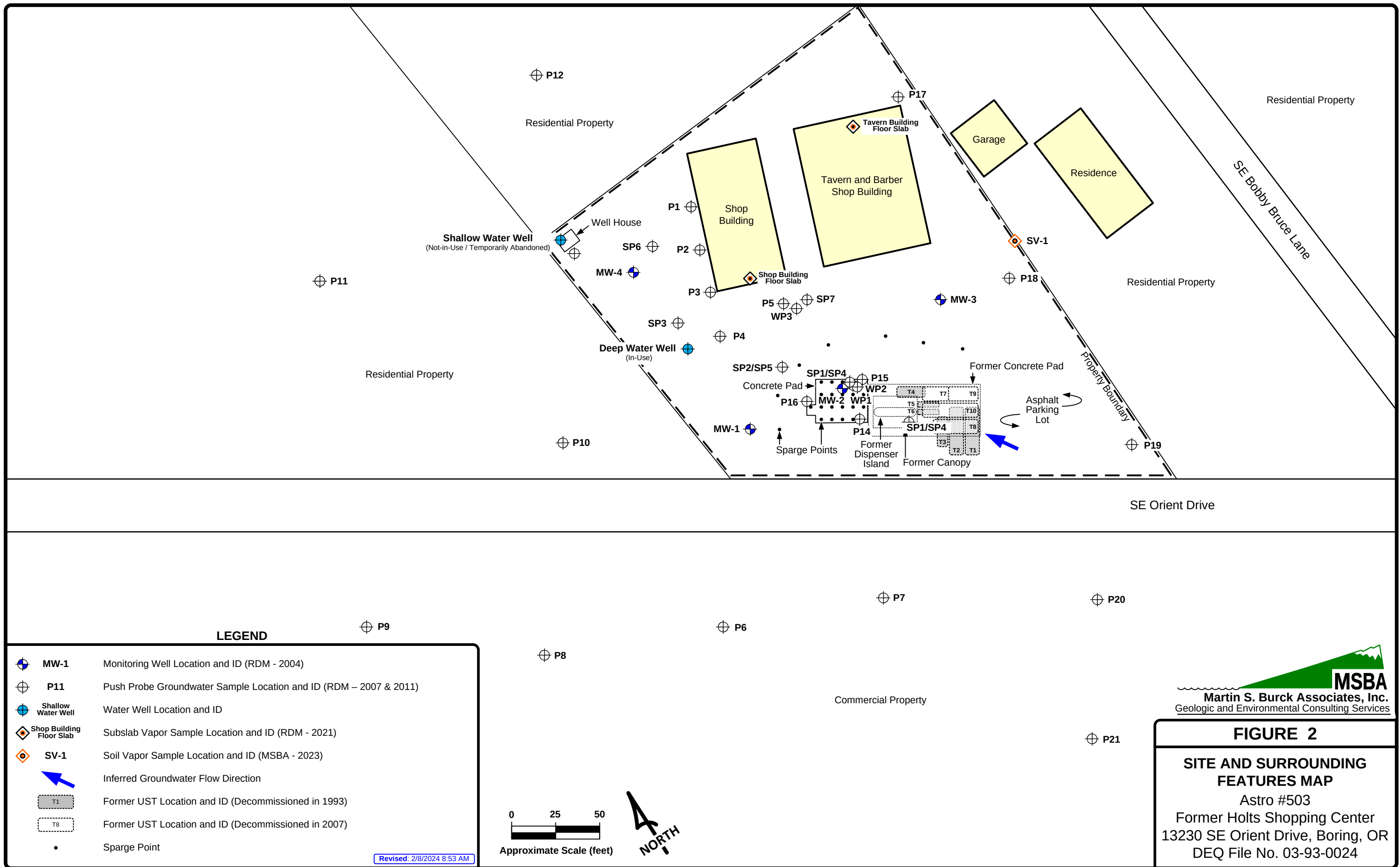
FIGURE 1

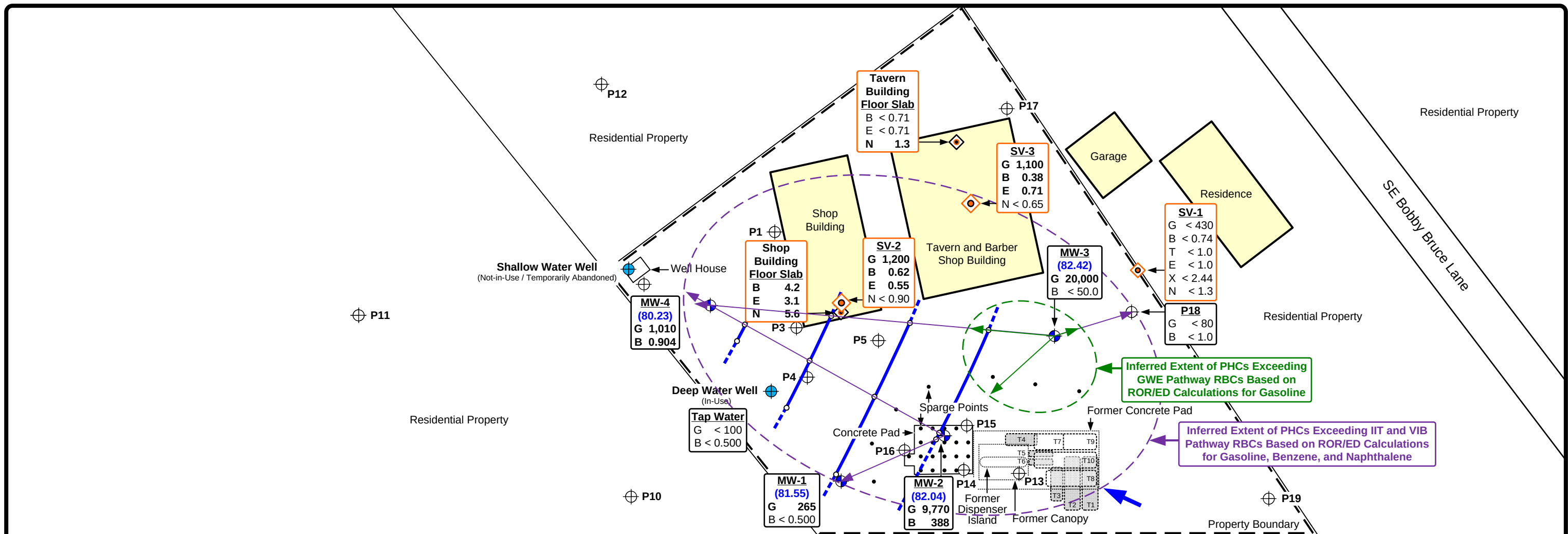
SITE LOCATION MAP

Astro #503
Former Holts Shopping Center
13230 SE Orient Drive, Boring, OR
DEQ File No. 03-93-0024

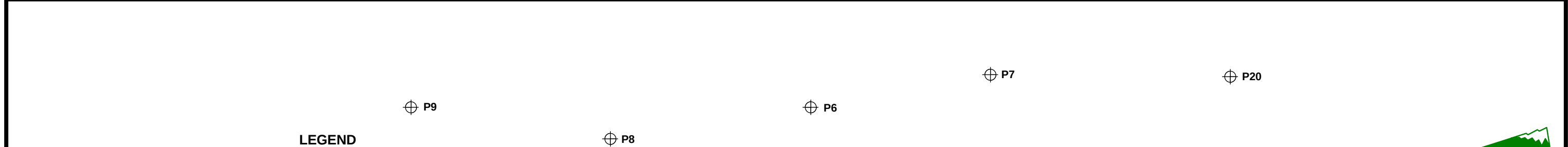


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SE Orient Drive



LEGEND

SV-1
G < 430
B < 0.74
T < 1.0
E < 1.0
X < 2.44
N < 1.3

(TO-15) (µg/m³)

MW-1
(81.55)
G 265
B 0.377

Gasoline (NWTPH-Dx) (ppm)
Benzene (8260D) (ppm)

Inferred Groundwater Flow Direction Based on Contours and PHC Distribution

Bold Value

< Not Detected Above the Laboratory Reporting Limit, as Listed

81.50 Groundwater Elevation Contour (Feet); Dashed Where Inferred

○ Calculated Gradient Control Point

P4 Push Probe Groundwater Sample Location and ID (RDM – 2007 & 2011)

P4 Water Well Location and ID

P4 Subslab Vapor Sample Location and ID (RDM - 2021)

T1 Former UST Location and ID (Decommissioned in 1993)

T8 Former UST Location and ID (Decommissioned in 2007)

Revised: 10/29/2024 11:00 AM

MSBA
Martin S. Burck Associates, Inc.
Geologic and Environmental Consulting Services

FIGURE 3

SOIL VAPOR AND GROUNDWATER DATA (2023)

Astro #503

Former Holts Shopping Center

13230 SE Orient Drive, Boring, OR

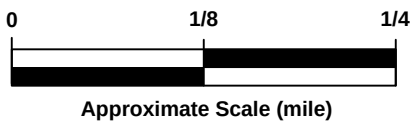
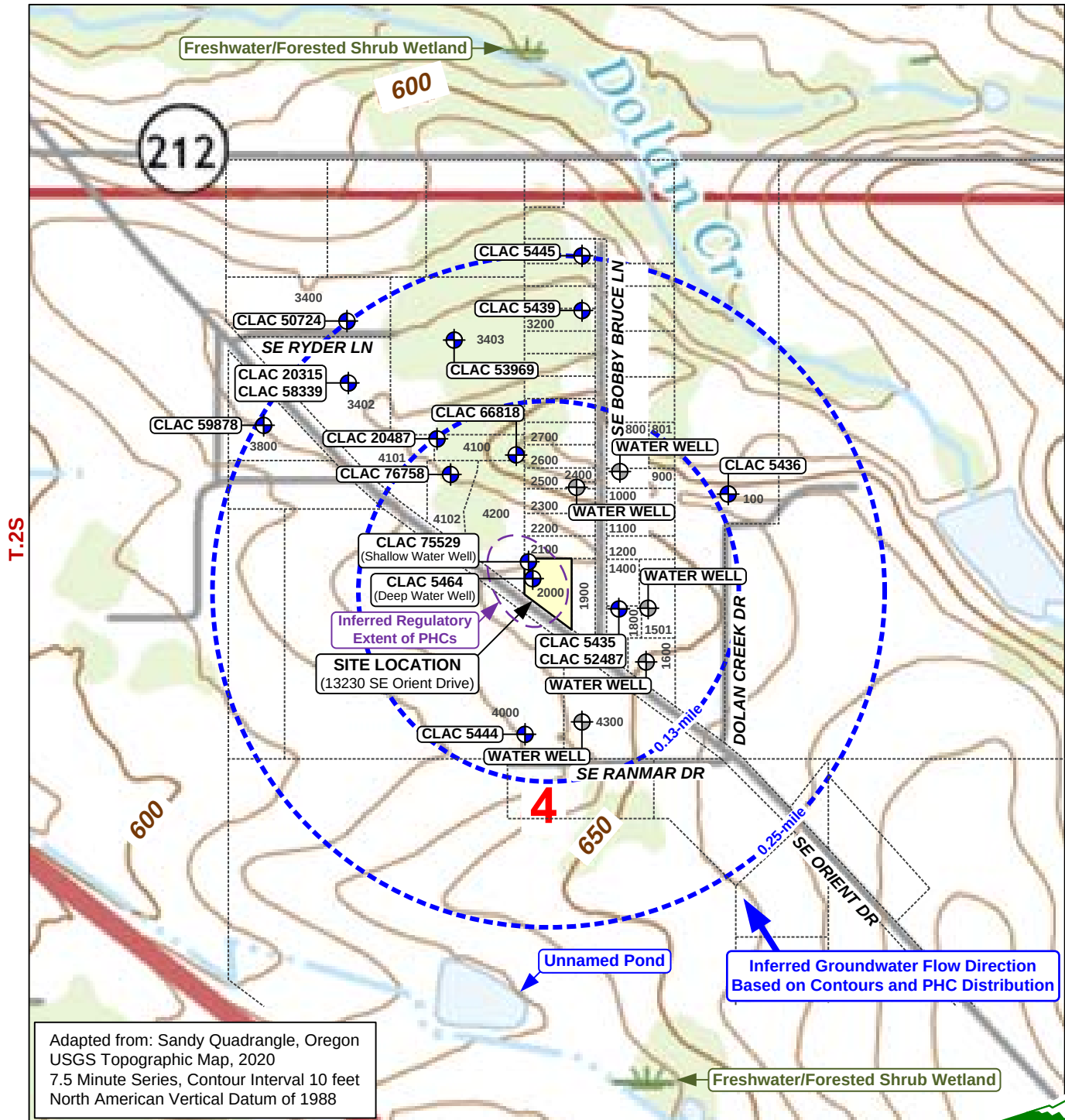
DEQ File No. 03-93-0024

Approximate Scale (feet)

0 25 50

NORTH

R.4E



LEGEND

- CLAC 5436 General Location of Water Well Identified by WRD Database Search Associated WRD Well Log Number
- WATER WELL General Location of Water Well Identified by RDM Door-to-Door Survey (WRD Well Log Number Not Available)
- Tax Lot Boundary and Number

Revised: 2/8/2024 8:44 AM

MSBA

Martin S. Burck Associates, Inc.
Geologic and Environmental Consulting Services

FIGURE 4

WATER WELL LOCATION MAP

Astro #503

Former Holts Shopping Center
13230 SE Orient Drive, Boring, OR
DEQ File No. 03-93-0024

Table 1.

Soil samples for Astro #503.

SAMPLE NUMBER	LOCATION DEPTH (Feet)	DATE COLLECTED	B	T	E	X	TPH-G	418.1m
			Concentration (mg/kg)					
1	Top of T2 @ 3'	1-28-93					206	
2	Top of T4 @ 3'	"						17100
3	Below T6 @ 5'	"	ND	0	1	5	166	
4	Below T6 @ 5.5'	"	ND	ND	ND	0	ND	
5	Below T5 @ 6.5'	"	ND	95	43	159	2663	
6	Below T5 @ 6.5'	"	1	5	4	27	305	
7	Below T6 @ 6.5'	"	0	2	3	14	322	
8	Below T6 @ 6.5'	"	2	48	27	97	1482	
9	Below T4 @ 11' E	"	0	9	10	73	914	
10	Below T4 @ 11' W	"	0	5	4	33	471	
11	Below T1 @ 12' N	"	1	10	4	21	293	
12	Below T1 @ 12' S	"	0	ND	ND	ND	ND	
13	Below T2 @ 12' N	"	ND	0	1	3	49	
14	Below T3 @ 10.5' Mid	"	ND	1	6	37	592	
15	S of T2 @ 12.5'	"	ND	ND	ND	ND	ND	
16	S Wall @ 8.5'	2-2-93	0	0	0	2	41	26
17	E Wall @ 8.5'	"	0	ND	0	1	10	8
18	N Wall @ 9.5'	"	ND	ND	ND	ND	ND	ND
19	SE Wall @ 8.5'	"	0	0	ND	0	103	10
20	N Wall T4 @ 8.5'	"	0	0	0	1	44	11
21	W Wall T4 @ 8.5'	"	0	1	4	11	322	41
24	NE Wall @ 15'	2-16-93	ND	ND	ND	ND	ND	
25	Near T1 @ 13'	"	0	0	0	0	45	
26	Center T2 @ 13'	"	ND	0	ND	0	159	
27	S Wall @ 8.5'	"	ND	0	ND	0	22	
28	Btwn T4 & T5 @ 12'	"	0	1	1	9	257	
29	Below T6 @ 12'	"	ND	0	ND	0	30	
30	N Wall @ 12'	"	ND	1	2	14	226	
31	Below T5 @ 14'	"	0	0	ND	0	ND	
32	Below #10 @ 14'	"	2	2	0	2	11	
33	W of T4 @ 14'	"	0	2	1	13	91	
34	Center, T1 floor	"	0	0	0	1	40	
35	NW Corner T1	2-17-93	1	4	3	24	171	
36	N of T2	"	0	1	0	4	22	
37	N of T3, floor	"	2	2	0	2	25	
38	SW Corner of T2	"	0	0	0	1	19	
39	E of N end of T1	"	ND	0	0	1	27	
40	S end of T2, floor	"	0	0	0	1	109	

Table 1. - Continued

Soil samples for Astro #503.

SAMPLE NUMBER		DATE COLLECTED	B	T	E	X	TPH-G	418.1m
			-----Concentration (mg/kg)-----					
41	Base of W Wall	"	3	16	11	74	571	26
42	W end T4 @ 15'	2-18-93	1	3	0	2	36	
43	W end T4 @ 15'	"	1	3	0	1	26	
44	N of T2 @ 13'	"	1	17	8	32	563	46
45	Trench A @ 9.5'	2-22-93	ND	1	0	1	19	
46	Trench A @ 13'	"	0	1	0	3	66	
47	Trench B @ 12'	"	ND	1	0	2	41	
48	Trench C @ 8.5'	"	1	3	1	4	43	
49	TP2 @ 9'	"	ND	ND	ND	ND	ND	
50	TP2 @ 11.5'	"	0	ND	ND	0	ND	
51	TP2 @ 12.5'	"	ND	ND	0	1	44	
52	TP3 @ 11.5'	"	1	9	4	15	281	25
53	TP3 @ 13'	"	0	1	0	1	12	
54	TP3 @ 14'	"	ND	0	ND	0	20	
55	TP4 @ 8.5'	"	ND	ND	ND	ND	ND	
56	TP4 2 11'	"	ND	ND	ND	ND	ND	
57	TP4 @ 12.5'	"	ND	ND	ND	ND	ND	
58	TP5 @ 8'	"	ND	ND	ND	ND	ND	
59	TP5 @ 12'	"	ND	0	0	2	ND	
60	S of T3 @ 12'	2-24-93	0	ND	0	0	19	
61	S of T2 @ 13'	"	ND	ND	ND	ND	ND	
62	Center of T2 @ 13'	"	0	4	2	2	159	
63	NE Corner @ 11.5'	"	ND	ND	ND	0	12	
MW1	Monitor Well 1	4-15-94	n.a.	n.a.	n.a.	n.a.	102	
MW2	Monitor Well 2	"	n.a.	n.a.	n.a.	n.a.	40	
MW3	Monitor Well 3	"	n.a.	n.a.	n.a.	n.a.	ND	

"ND" Means Not Detected or below the reporting limit

Table 2.

Water samples for Astro #503.

SAMPLE NUMBER	LOCATION DEPTH (Feet)	DATE COLLECTED	B T E X					TPH-G	418.1m
			-----Concentration (ug/kg)-----						
22	Pit Water	2-02-93	424	1147	203	3526	7115	1500	
23	Holt's Well Water	2-16-93	ND	ND	ND	ND	ND		
OW1	Observation Well 1	1-22-94	ND	ND	ND	ND			
OW2	Observation Well 2	"	ND	ND	ND	ND			
MW1	Monitor Well 1	4-15-94	6580	7600	2000	7650			
MW2	Monitor Well 2	"	3380	7100	2100	10020			
MW3	Monitor Well 3	"	5	ND	ND	8			

"ND" Means Not Detected or below the reporting limit

TABLE 3: SOIL ANALYSIS

Location *	Date	CONTAMINANTS ANALYZED					
		Benzene	Toluene	Ethylbenzene	Xylenes	TPH-Gx	TPH-Dx
MW1, 11.5'	04/29/94	—	—	—	—	102	—
MW2, 12.5'	04/29/94	—	—	—	—	40	—
MW3, 14.0'	04/29/94	—	—	—	—	ND	—
SP1, 6.0'	06/06/02	—	—	—	—	ND	—
SP1, 8.0'	06/06/02	ND	ND	0.19	0.5	—	—
SP1, 10.5'	06/06/02	—	—	—	—	ND	—
SP1, 11.5'	06/06/02	ND	ND	0.3	1.2	ND	—
SP1, 16.5'	06/06/02	—	—	—	—	ND	—
SP1, 19.5'	06/06/02	2.67	2.98	15.9	29.9	823	—
SP2, 6.0'	06/06/02	—	—	—	—	ND	—
SP2, 8.0'	06/06/02	—	—	—	—	ND	—
SP2, 11.5'	06/06/02	ND	ND	ND	ND	ND	—
SP3, 6.5'	06/06/02	—	—	—	—	ND	—
SP3, 13.5'	06/06/02	ND	ND	ND	ND	ND	—
SP4, 28.0'	07/08/02	1.36	2.33	0.44	2.33	34	—
SP4, 36.0'	07/08/02	2.93	3.61	0.72	3.46	60	—
SP4, 40.0'	07/08/02	1.08	1.53	0.27	1.51	21	—
SP5, 17.0'	07/08/02	ND	ND	ND	ND	ND	—
SP5, 24.0'	07/08/02	0.14	0.24	0.13	0.47	ND	—
SP5, 30.0'	07/08/02	0.44	1.16	0.16	1.1	ND	—
SP6, 2.0'	07/08/02	—	—	—	—	ND	ND
SP6, 4.0'	07/08/02	—	—	—	—	ND	ND
SP6, 10.0'	07/08/02	—	—	—	—	ND	ND
SP7, 11.5'	07/08/02	ND	ND	ND	0.04	ND	—
SP7, 20.0'	07/08/02	0.06	ND	0.09	0.3	ND	—
SP7, 30.0'	07/08/02	0.04	ND	ND	0.05	ND	—
SP7, 40.0'	07/08/02	ND	ND	ND	0.04	ND	—
RBCA Limits	—	0.044	190	330	360	—	—

* MW1, SP1 and SP4 are in close proximity to each other
 MW2, SP2 and SP5 are in close proximity to each other
 MW3 and SP3 are in close proximity to each other

TABLE 4: GROUNDWATER ANALYSIS

Location *	Date	CONTAMINANTS ANALYZED							
		Benzene	Toluene	Ethylbenzene	Xylenes	TPH-Gx	EDB	EDC	Dissolved Lead
MW1	04/29/94	6580	7600	2000	7650		12.6	6.2	9
MW2	04/29/94	3380	7100	2100	10020		ND	1.7	ND
MW3	04/29/94	5	ND	ND	8				
SP1	06/06/02	5335	21255	4002	21631	230000	ND	ND	—
SP3	06/06/02	4	3	ND	98	4650	ND	ND	—
SP4	07/08/02	8280	4900	3420	19500	147000	—	—	—
SP5	07/08/02	125	277	86	413	3420	—	—	—
SP7	07/08/02	484	32	452	1730	7540	—	—	—
RBCA Limits	—	0.44	740	1300	1400	—	0.0006	0.32	—

* MW1, SP1 and SP4 are in close proximity
 MW2 and SP5 are in close proximity

Table 5 - Soil Analytical Results
Astro #503 - Boring, Oregon

Field ID	Location	Date	Depth	Gx	B	T	E	X
----- milligrams per kilogram (mg/Kg) -----								
	P5*	08/08/07	15'	--	ND	ND	ND	ND
1	P13	8/10/2007	7'	49	ND	ND	ND	0.72
2	P13	"	11'	ND	0.15	0.55	0.26	1.52
3	P13	"	14'	570	0.99	9.02	6.56	29.8
4	P13	"	16'	ND	0.45	2.09	0.35	1.97
5	P13	"	18'	ND	0.61	1.6	0.4	2.06
6	P14	"	6.5'	--	ND	ND	ND	ND
7	P14	"	10'	ND	0.11	ND	0.28	0.58
8	P14	"	12'	74	0.41	0.69	1.62	9.15
9	P14	"	14.5'	2260	3.91	26.9	17.34	102
10	P14	"	18'	26	0.67	2.66	0.55	3.48
11	P14	"	22'	26	1.41	4.61	0.62	3.59
12	P14	"	24'-25'	65	1.81	6.65	1.58	8.78
13	P14	"	26.5'	ND	0.32	1.32	0.37	2.35
14	P14	"	30'-34'	39	2.51	5.05	0.47	2.7
15	P14	"	37'	ND	0.63	1.56	ND	0.88
16	P15	"	2-3'	ND	ND	ND	ND	0.69
17	P15	"	7'	--	ND	ND	ND	ND
18	P15	"	10'	55	0.26	0.11	1.61	2.62
19	P15	"	11.5'-12.5'	30	0.36	0.13	1.69	2.52
20	P15	"	15'	ND	0.35	0.26	0.92	4.62
21	P15	"	13.5'-14.5'	ND	0.75	0.37	5.07	19.4
22	P15	"	18'	7700	8.84	75.3	41.8	205
23	P15	"	20'	73	0.85	4.26	0.76	4.84
24	P16	"	11'	--	ND	ND	ND	ND
25	P16	"	8'	--	ND	ND	ND	ND
26	P16	"	14'	--	ND	ND	ND	ND
27	P16	"	16'	ND	0.06	ND	ND	0.63
28	P16	"	17.5'	ND	0.09	ND	ND	0.92
29	P16	"	18'-20'	ND	0.09	ND	ND	0.88
DEQ's Most Stringent Risk-Based Cleanup Concentrations for Residential Receptors				26	0.0084	44	160	25

Notes:

B = Benzene

T = Toluene

E = Ethyl-benzene

X = Xylenes

N = Naphthalene

Red indicates result is above DEQ's lowest potentially applicable cleanup limit

P5* EPA 8260 results for this sample were "not detected" for:

Naphthalene, MTBE, EDB, EDC, iso-PB, n-PB, 1,2,4-TMB, 1,3,5-TMB and PCE

PCE = Tetrachloroethylene

Gx = Total Petroleum Hydrocarbons in Gasoline Range

"ND" means not detected above test method reporting limit

"-" means not tested

Table 6 - Water Analytical Results for Gasoline Hydrocarbons
Holts/Astro #503 - Boring, Oregon

Location	Date	Depth	Gx	B	T	E	X	N	MTBE	EDB	EDC	iso-PB	n-PB	1,3,5-TMB	1,2,4-TMB
-----micrograms per liter (ug/L)-----															
P1	08/08/07		257	8.9	ND	ND	5	ND	ND	ND	ND	ND	ND	ND	2
P2	"		805	70.2	ND	ND	15	21	6	ND	ND	13	4	ND	ND
P3	"		6,290	13.3	12	93	542	40	10	ND	ND	21	62	72	455
P4	"		3,700	23.4	17	64	466	30	16	ND	ND	23	68	42	424
P5	"		3,440	31.3	ND	64	103	38	42	ND	ND	23	45	9	190
P6	8/9/2007		929	157	ND	ND	24	4	ND	ND	11	ND	ND	ND	ND
P7	"		472	165	ND	ND	17	5	5	ND	12	2	ND	ND	ND
P8	"		--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P9	"		--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P10	"		15,700	560	611	260	1,871	91	ND	8	25	40	82	478	386
P11	"		ND	0.97	2	ND	6	ND	ND	ND	ND	ND	ND	ND	2
P12	"		ND	0.33	ND	ND	2	ND	ND	ND	ND	ND	ND	ND	ND
DEQ's Most Stringent Risk-Based Cleanup Concentrations for Residential Receptors			100	0.35	720	1300	210	6.2	6.4	0.00064	0.13	660	240	12	12

Notes:

Gx = Total Petroleum Hydrocarbons in Gasoline Range via NWTPH-Gx test method
B = Benzene
T = Toluene
E = Ethyl-benzene
X = Xylenes
N = Naphthalene
MTBE = Methyl tert-butyl ethelene
Red indicates result is above DEQ's lowest potentially applicable cleanup limit
"ND" means not detected above test method reporting limits

iso-PB = iso-propylbenzene
n-PB = n-propylbenzene
1,3,5-TMB = 1,3,5-trimethylbenzene
1,2,4-TMB = 1,2,4-trimethylbenzene
Potential presence of Lead was not tested
EDB = 1,2-dibromoethane
EDC = 1,2-dichloroethane
"--" means not tested

Table 7 - Site Assessment Analytical Results
Former Buss Stop, Boring, Oregon

Sample Number	Date Collected	Depth in Feet	Location	NWTPH-HCID	NWTPH-Gx	NWTPH-Dx		Volatile Organic Compounds (VOCs)				
						Diesel	Oil	B	T	E	X	N
					----- milligrams per kilogram (mg/Kg) -----							
1	10/31/07	water	pit water	ND	--	--	--	ND	ND	ND	ND	--
2	"	9.5	S Wall	ND	--	--	--	--	--	--	--	--
3	"	8.5	W Wall	G	5100	ND	ND	--	--	--	--	--
4	"	7.5	N Wall	O	--	ND	107	--	--	--	--	--
5	"	8.5	N Wall	ND	--	--	--	--	--	--	--	--
6	"	8.5	E Wall	ND	--	--	--	--	--	--	--	--
7	"	8.5	W Wall	G	1030	ND	ND	--	--	--	--	--
8	"	3	E Fuel Island	ND	--	--	--	--	--	--	--	--
9	"	3	W Fuel Island	ND	--	--	--	--	--	--	--	--
DEQ's most stringent risk based concentration												

Notes:

"NWTPH-HCID" means Hydrocarbon Identification via method NWTPH-HCID

"B" means benzene

"T" means toluene

"E" means ethylbenzene

"X" means xylenes

"N" means naphthalene

"Lead" means total lead

"ND" means not detected or below reporting limit

"--" means not tested for

"G, D, O" indicates gasoline, diesel and/or oil range total petroleum hydrocarbons detected

Gray indicates sample and surrounding soil were removed.

Table 8. Analytical Results in Soil.
Holt's Shopping Center

Sample Number	Location	Depth (feet)	Date Collected	NWTPH-Gx	Volatile Organic Compounds			
					B	T	E	X
					Results in milligrams per kilogram (mg/kg)			
1	A7	10	11/13/08	—	—	—	—	—
2	"	24	"	22.5	1.14	3.49	0.431	2.61
3	"	30	"	26.3	2.31	5.47	0.558	3.35
4	"	38	"	14.2	1.47	3.13	0.272	1.65
5	A8	15	"	68.9	ND	0.187	0.683	4.22
6	A11	12	"	ND	ND	ND	ND	ND
7	"	20	"	ND	0.0672	ND	0.932	0.566
8	"	30	"	14.0	0.882	2.36	0.397	2.33
9	"	38	"	14.8	1.25	3.42	0.333	1.98
10	A15	15	11/14/08	18.0	ND	ND	0.138	0.647
11	"	22	"	46.8	0.341	1.87	1.09	5.89
12	"	32	"	21.6	1.64	4.61	0.462	2.82
13	"	38	"	25.6	2.26	5.63	0.536	3.23
14	A17	10	"	ND	ND	ND	ND	ND
15	"	22	"	ND	0.127	0.248	0.269	1.56
16	"	30	"	18.7	1.28	3.87	0.495	2.92
17	"	38	"	17.3	1.73	4.09	0.354	2.10
18	A18	10	11/17/08	—	—	—	—	—
19	"	22	"	398	3.20	22.9	9.04	48.5
20	"	30	"	91.6	2.38	9.85	2.08	11.3
21	"	35	"	—	—	—	—	—
22	A19	10	"	—	—	—	—	—
23	"	22	"	653	3.80	33.8	13.2	69.5
24	A21	18	"	—	—	—	—	—
25	A22	10	"	—	—	—	—	—
26	"	22	"	423	2.80	20.4	9.77	52.9
27	"	29	"	41.5	1.66	5.66	0.928	5.24
28	"	39	"	—	—	—	—	—
29	A23	22	"	—	—	—	—	—
30	"	30	"	ND	0.0562	ND	ND	0.128
31	"	37	"	—	—	—	—	—
32	A24	15	"	—	—	—	—	—
33	"	25	"	—	—	—	—	—
34	"	30	"	6.83	0.267	0.446	0.380	2.07
35	"	36	"	—	—	—	—	—
36	A25	12	"	—	—	—	—	—
37	"	21	"	13.5	0.739	1.40	0.609	3.34
38	"	31	"	16.7	1.13	4.25	0.470	2.73
39	A26	19	"	876	5.61	43.4	18.3	96.2
40	A27	11	11/18/08	—	—	—	—	—
41	"	17	"	—	—	—	—	—
42	"	23	"	627	3.22	30.3	13.3	68.8
43	"	30	"	—	—	—	—	—
DEQ's Most Stringent Risk-Based Concentrations				26	0.0084	44	160	25

Table 8. Analytical Results in Soil.
Holt's Shopping Center

Sample Number	Location	Depth (feet)	Date Collected	NWTPH-Gx	Volatile Organic Compounds			
					B	T	E	X
					Results in milligrams per kilogram (mg/kg)			
44	"	38	"	—	—	—	—	—
45	A28	10	"	—	—	—	—	—
46	"	13	"	—	—	—	—	—
47	"	18	"	—	—	—	—	—
48	"	20	"	666	4.18	33.0	13	67.6
49	"	31	"	—	—	—	—	—
50	"	40	"	—	—	—	—	—
51	A20	21	"	1590	9.97	86.5	34.2	185
52	A29	13	"	—	—	—	—	—
53	"	20	"	548	1.47	18.0	11.3	60.3
54	"	28	"	—	—	—	—	—
55	"	40	"	—	—	—	—	—
DEQ's Most Stringent Risk-Based Concentrations				26	0.0084	44	160	25

"NWTPH-Gx" means gasoline range hydrocarbons via method NWTPH-Gx

"B" means benzene.

"T" means toluene.

"E" means ethylbenzene.

"X" means xylenes.

"ND" means not detected above laboratory reporting limit

"—" means not tested.

Table 9 - Test Results for Soil Gas Vapor Intrusion into Buildings
Astro #503 - Boring, Oregon

Astro 503 Subslab Test Results

Sample Collection Date	Sample ID & Field Observed Slab Condition	TPH-Gx	B	T	E	X	N	MTBE	EDB	EDC	Isopropyl Benzene	1,2,4-TMB	1,3,5-TMB	Isopropyl Alcohol**	% vol IPA to 1L test vol
Soil Gas Concentrations in micrograms/ cubic meter (ug/m ³)															% ppbV
03/30/21	Sample #1 - Tavern Sound concrete slab in employee work area	--	<0.71	0.93	<0.71	4.5	1.3	<0.71	<0.71	<0.71	<0.71	6.1	1.1	40	0.000004%
03/29/21	Sample #2 - Shop Building Sound concrete slab inside high traffic work area	--	4.2	9.9	3.1	19.7	5.6	<0.91	<0.91	<0.91	<0.91	18	3.4	130	0.000013%
DEQ - Soil Gas Occupational RBCs		1.7x10 ⁶	1,600	21.9x10 ⁶	4,900	440,000	360	47,000	20	470	1.8x10 ⁶	260,000	260,000	NA	
DEQ - Soil Gas Residential RBCs		79,000	72	1.0x10 ⁶	220	21,000	360	2,200	0.94	22	83,000	13,000	13,000	NA	

Notes:

"B" means benzene
 "T" means toluene
 "E" means ethyl-benzene
 "X" means xylenes
 "N" means naphthalene
 "MTBE" means methyl tert-butyl ether

EDB is ethylene dibromide; aka 1,2-Dibromoethane
 EDC is ethylene dichloroethane; aka 1,2-Dichloroethane
 1,2,4-TMB means 1,2,4-Trimethylbenzene
 1,3,5-TMB means 1,3,5-Trimethylbenzene
 Red indicates results above highlighted (most stringent) Risk-Based Cleanup levels for this site.
 **Isopropyl Alcohol (IPB) was used solely for leak detection of ambient air.
 NA means IPB is not applicable, since it was introduced during the test for leak detection only.

TABLE 10 **GROUNDWATER SAMPLE ANALYTICAL DATA**

Astro #503 - Former Holts Shopping Center

13230 SE Orient Drive, Boring, OR

DEQ File No. 03-93-0024

Sample ID	Sample Date	PHCs ^a and VOCs ^b (ppb) ^c											
		Gasoline	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	Methyl Tert-Butyl Ether	1,2-Dibromoethane	1,2-Dichloroethane	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Isopropylbenzene
Monitoring Well Samples													
MW-1	8/16/23	265 ^{d, e}	< 0.500 ^f	< 0.500	< 0.500	< 1.50	< 2.50	0.691	< 0.500	< 0.500	< 0.500	< 0.500	0.562
MW-2	8/16/23	9,770	388	1,990	452	2,580	< 250	< 50.0	< 50.0	< 50.0	463	116	< 50.0
MW-3	8/16/23	20,000	< 50.0	2,300	927	4,840	< 250	< 50.0	< 50.0	< 50.0	818	178	55.8
MW-4	8/16/23	1,010	0.904	< 0.500	0.600	2.24	3.15	2.37	< 0.500	< 0.500	1.79	1.17	4.37
Deep Water Well Sample													
Tap Water	8/16/23	< 100	< 0.500	< 0.500	< 0.500	< 1.50	< 2.50	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500
Temporary Well Sample													
HA1-GW	4/15/24	< 54	< 0.093	< 0.31	< 0.20	< 0.44	< 0.63	< 0.16	< 0.20	< 0.31	< 0.31	< 0.32	< 0.24
DEQ Groundwater Risk-Based Concentrations (RBCs) - Revised May 2018 and June 2023													
IIT ^g	Residential	110	0.46	1,100	1.5	190	0.17	14	0.0075	0.17	54	59	440
	Occupational	450	2.1	6,300	6.4	830	0.72	68	0.034	0.78	250	280	2,000
VIB ^h	Residential	120	2.8	36,000	7.1	780	11	740	0.34	4	560	400	2,200
	Occupational	520	12	150,000	31	3,300	50	3,200	1.5	18	2,400	1,700	9,100
VOA ⁱ	Residential	> S ^j	3,100	> S	9,900	> S	3,600	350,000	180	2,100	> S	> S	> S
	Occupational	> S	14,000	> S	43,000	> S	16,000	1.5E+06	790	9,000	> S	> S	> S
GWE ^k	Construction	14,000	1,800	220,000	4,500	23,000	500	63,000	27	630	63,000	7,500	51,000
	Excavation												

a Petroleum hydrocarbons (PHCs) were analyzed using Department of Environmental Quality (DEQ) NWTPH method Gx (gasoline)

b Volatile organic compounds (VOCs) were analyzed using EPA method 8260C

c Analytical results reported in parts per billion (ppb)

d Bold value indicates analyte concentration exceeded laboratory reporting limit

e Yellow shading indicates analyte concentration (or one-half the laboratory reporting limit, which was unusually high due to dilution required for analysis) exceeds an RBC. The exceeded level is also shaded

f (<) Analyte concentration not detected above the laboratory reporting limit, as listed

g Ingestion and Inhalation from Tapwater (IIT) RBCs for the residential and occupational receptors

h Vapor Intrusion into Buildings (VIB) RBCs for the residential and occupational receptors

i Volatilization to Outdoor Air (VOA) RBCs for the residential and occupational receptors

j (> S) "This groundwater RBC exceeds the solubility limit" (Appendix A, RBDM, 2018)

k Groundwater in Excavation (GWE) RBCs for the construction and excavation worker receptor

TABLE 11 SUBSLAB/SOIL VAPOR SAMPLE ANALYTICAL DATA

Astro #503
Former Holts Shopping Center
13230 SE Orient Drive, Boring, OR
DEQ File No. 03-93-0024

Sample ID	Sample Date	Gasoline and RBDM VOCs ^a (µg/m ³) ^b													Leak Test Results ^c (µg/m ³)
		Gasoline	Benzene	Toluene	Ethylbenzene	m,p-Xylenes	o-Xylene	Naphthalene	Methyl tert-butyl ether	1,2-Dibromoethane	1,2-Dichloroethane	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Isopropylbenzene	2-Propanol
MSBA Soil Vapor Sample															
SV-1	4/28/23	< 430 ^d	< 0.74	< 1.0	< 1.0	< 2.44	< 0.84	< 1.3	< 0.92	< 1.8	< 0.97	< 1.8	< 1.8	< 1.8	SV-1: 7.1 SV1-Shroud ^e : 71,000
MSBA Subslab Vapor Samples															
SV-2	4/15/24	1,200	0.62	2.0	0.55	1.8	0.86	< 0.90	< 0.31	< 0.54	< 0.28	2.6	0.82	< 0.52	SV-2: 210 SV2-Shroud ^e : 170,000
SV-3	4/15/24	1,100	0.38	2.6	0.71	2.6	1.5	< 0.65	< 0.22	< 0.39	< 0.20	2.8	1.0	0.97	SV-3: 21 SV3-Shroud ^e : 320,000
DEQ Risk-Based Concentrations (RBCs) - Revised March 2024															
Soil Vapor	Residential	10,000	12	170,000	37	3,500	2.8	360	0.16	3.6	2,100	2,100	14,000	_ _ ^f	
	Occupational	40,000	52	730,000	160	15,000	12	1,600	0.68	16	8,800	8,800	58,000	_ _	

a Gasoline and Risk-Based Decision Making (RBDM) volatile organic compounds (VOCs) analyzed using method TO-15.

b Analytical results reported in micrograms per cubic meter (µg/m³)

c 2-propanol analyzed using method TO-15.

d (<) Analyte concentration not detected above the method detection limit, as listed

e Represents the sample collected inside the shroud spiked with 2-propanol for leak testing

f (- -) Not applicable

S:\Project Files\W\SCO - Astro 503 - Boring OR\Tables\T2 Vapor Analytical Data.xlsx\T5 with 2023 RBCs

Table 12 - Static Water Levels (SWL) in Feet

Astro #503 - Boring, Oregon

Monitor Well MW1

Well Identification and Physical Data		Date Measured	Depth TOC to SWL	Average SWL Elevation	Rise+/-Fall - SWL (ft)	Condition of Water
Top Of Casing Elevation Well Bottom Elevation Depth of Well	99.19 58.19 41.00	07/20/04	14.43	84.76	--	Turbid
		11/08/04	9.69	89.50	4.74	Turbid
		03/16/05	13.26	85.93	-3.57	Turbid
		06/09/05	10.19	89.00	3.07	Turbid
		01/04/06	7.57	91.62	2.62	Turbid
		08/25/06	16.49	82.70	-8.92	Turbid
		12/15/06	7.86	91.33	8.63	Turbid
		06/18/07	13.34	85.85	-5.48	Silty, slt odor
Resurvey on 01/09/08 includes recalculated data for 12/07 Top Of Casing Elevation Well Bottom Elevation Depth of Well	98.94 56.21 42.73	12/06/07	8.81	90.13	4.53	Clear, suds
		12/18/07	8.98	89.96	-0.17	Clear
		08/01/08	14.77	84.17	-5.79	Suds, slt odor
		01/19/09	8.28	90.66	6.49	Clear
		07/15/09	14.61	84.33	-6.33	Turbid
		10/15/09	17.77	81.17	-3.16	Clear
		01/23/10	8.28	90.66	9.49	Clear
		04/22/10	10.25	88.69	-1.97	Clear
		07/16/10	12.89	86.05	-2.64	Lt Brn Turbid
		11/18/10	7.81	91.13	5.08	Gas odor
		06/03/11	10.72	88.22	-2.91	Brown Turbid
		12/13/11	11.29	87.65	-0.57	Clear
		08/21/12	15.78	83.16	-4.49	Lt Brn Turbid
		12/27/12	7.44	91.50	8.34	Clear
		07/26/13	15.12	83.82	-7.68	Slight Turbid
		12/17/13	10.12	88.82	5.00	Slight Turbid
		07/18/14	14.38	84.56	-4.26	Pale Gray Turbid
		09/18/15	18.59	80.35	-4.21	Pale Gray Turbid
		08/17/16	15.93	83.01	2.66	Clear
		08/09/18	15.90	83.04	0.03	Clear - Trace odor
		11/22/19	15.15	83.79	0.75	Clear - No odor
		05/26/20	9.65	89.29	5.50	Clear - No odor
		12/17/20	8.69	90.25	0.96	Clear - No odor
		04/13/21	12.03	86.91	-3.34	Clear - No odor
		07/28/21	16.35	82.59	-4.32	Clear - No odor
		11/02/21	13.99	84.95	2.36	Very Slight Turbid
		06/09/22	10.24	88.70	3.75	Clear - No odor
12/14/22	8.45	90.49	1.79	Clear - No odor		

Table 12 - Static Water Levels (SWL) in Feet

Astro #503 - Boring, Oregon

Monitor Well MW2

Well Identification and Physical Data		Date Measured	Depth TOC to SWL	Average SWL Elevation	Rise+/-Fall - SWL (ft)	Condition of Water
Top Of Casing Elevation 99.80 Well Bottom Elevation 59.80 Depth of Well 40.00		07/20/04	15.39	84.41	--	Turbid
		11/08/04	10.36	89.44	5.03	Turbid
		03/16/05	13.60	86.20	-3.24	Sheen
		06/09/05	9.60	90.20	4.00	Turbid
		01/04/06	7.47	92.33	2.13	Clear
		08/25/06	17.08	82.72	-9.61	Clear
		12/15/06	10.24	89.56	6.84	Free Product
		06/18/07	13.70	86.10	-3.46	Odor, sheen
Resurvey on 01/09/08 includes recalculated data for 12/07		12/06/07	9.19	90.74	4.51	Odor, suds, sheen
Top Of Casing Elevation 99.93 Well Bottom Elevation 58.89 Depth of Well 41.04		12/18/07	9.35	90.58	-0.16	Gas odor
		08/01/08	15.26	84.67	-5.91	Oily globules, odor
		01/19/09	8.27	91.66	6.99	1/4' Free Product
		07/15/09	15.08	84.85	-6.81	Sheen
		10/15/09	18.43	81.50	-3.35	Gas Odor
		01/23/10	8.13	91.80	10.30	Sheen
		04/22/10	10.34	89.59	-2.21	Clear
		07/16/10	13.09	86.84	-2.75	Lt Brn Turbid
		11/18/10	7.25	92.68	5.84	Gas Odor
		06/03/11	10.32	89.61	-3.07	Gas Odor
		12/13/11	11.35	88.58	-1.03	Gas Odor
		08/21/12	16.13	83.80	-4.78	Odor, Ash Turbid
		12/27/12	7.62	92.31	8.51	Odor, Ash Turbid
		07/26/13	15.40	84.53	-7.78	Slight Gas Odor
		12/17/13	10.09	89.84	5.31	Slight Gas Odor
		07/18/14	14.70	85.23	-4.61	Slight Gas Odor
		09/18/15	19.03	80.90	-4.33	Slight Gas Odor
		08/17/16	16.58	83.35	2.45	Gas Odor
		08/09/18	16.42	83.51	0.16	Sm spots sheen
		11/22/19	15.67	84.26	0.75	Clear, Slight Odor
		05/26/20	10.11	89.82	5.56	Clear, Slight Odor
		12/17/20	9.03	90.90	1.08	Clear, Gas Odor
		04/13/21	11.90	88.03	-2.87	Slt Brn & Gas Odor
		07/28/21	16.67	83.26	-4.77	Slt Brn & Gas Odor
		11/02/21	14.55	85.38	2.12	Slt Brn & Gas Odor
		06/09/22	10.31	89.62	4.24	Clear, Slt Gas Odor
		12/14/22	9.07	90.86	1.24	Clear, Slt Gas Odor

Table 12 - Static Water Levels (SWL) in Feet

Astro #503 - Boring, Oregon

Monitor Well MW3

Well Identification and Physical Data		Date Measured	Depth TOC to SWL	Average SWL Elevation	Rise+/Fall - SWL (ft)	Condition of Water
Top Of Casing Elevation 99.84 Well Bottom Elevation 54.54 Depth of Well 45.30		07/20/04	15.93	83.91	--	Turbid
		11/08/04	9.29	90.55	6.64	Turbid
		03/16/05	12.81	87.03	-3.52	Turbid
		06/09/05	9.65	90.19	3.16	Clear
		01/04/06	6.57	93.27	3.08	Clear
		08/25/06	16.80	83.04	-10.23	Clear
		12/15/06	7.38	92.46	9.42	Clear
		06/18/07	12.90	86.94	-5.52	Clear
Resurvey on 01/09/08 includes recalculated data for 12/07		12/06/07	8.33	91.63	4.57	Faint odor, suds
Top Of Casing Elevation 99.96 Well Bottom Elevation 54.42 Depth of Well 45.54		12/18/07	8.47	91.49	-0.14	Gas Odor
		08/01/08	14.78	85.18	-6.31	Suds
		01/19/09	7.80	92.16	6.98	Odor, Sheen
		07/15/09	14.61	85.35	-6.81	Sheen, Suds
		10/15/09	18.14	81.82	-3.53	Clear
		01/23/10	7.94	92.02	10.20	Clear
		04/22/10	10.00	89.96	-2.06	Clear
		07/16/10	12.79	87.17	-2.79	Lt Brn Turbid
		11/18/10	8.03	91.93	4.76	Gas Odor
		06/03/11	9.94	90.02	-1.91	Clear
		12/13/11	11.08	88.88	-1.14	Clear
		08/21/12	15.90	84.06	-4.82	Clear
		12/27/12	7.37	92.59	8.53	Clear
		07/26/13	15.00	84.96	-7.63	Slight Turbid
		12/17/13	9.73	90.23	5.27	Slight Turbid
		07/18/14	14.42	85.54	-4.69	Slight Turbid
		09/18/15	18.57	81.39	-4.15	Pale Gray Turbid
		08/17/16	15.81	84.15	2.76	Gas Odor
		08/09/18	16.09	83.87	-0.28	Slight Gas Odor
		11/22/19	14.92	85.04	1.17	Clear, Slight Odor
		05/26/20	10.01	89.95	4.91	Clear, Slight Odor
		12/17/20	8.50	91.46	1.51	Turbid, Gas Odor
		04/13/21	11.44	88.52	-2.94	V Clear, No Odors
		07/28/21	16.44	83.52	-5.00	V Clear, No Odors
		11/02/21	14.31	85.65	2.13	Clear, Gas Odor
		06/09/22	9.65	90.31	4.66	Clear, Gas Odor
		12/14/22	8.66	91.30	0.99	Clear, Gas Odor

Table 12 - Static Water Levels (SWL) in Feet
Astro #503 - Boring, Oregon

Monitor Well MW4

Well Identification and Physical Data		Date Measured	Depth TOC to SWL	Average SWL Elevation	Rise+/-Fall - SWL (ft)	Condition of Water
Top Of Casing Elevation 97.82 Well Bottom Elevation 60.82 Depth of Well 37.00		07/20/04	13.90	83.92	--	Turbid
		11/08/04	8.14	89.68	5.76	Turbid
		03/16/05	11.91	85.91	-3.77	Turbid
		06/09/05	8.79	89.03	3.12	Turbid
		01/04/06	5.90	91.92	2.89	Clear
		08/25/06	15.88	81.94	-9.98	Clear
		12/15/06	5.71	92.11	10.17	Clear
		06/18/07	11.95	85.87	-6.24	Brown Turbid
Resurvey on 01/09/08 includes recalculated data for 12/07		12/06/07	6.92	90.44	5.03	Brown Turbid
Top Of Casing Elevation 97.36 Well Bottom Elevation 58.66 Depth of Well 38.70		12/18/07	6.96	90.40	-0.04	Lt Brn Turbid
		08/01/08	13.91	83.45	-6.95	Brown Turbid
		01/19/09	7.05	90.31	6.86	Clear
		07/15/09	13.72	83.64	-6.67	Turbid
		10/15/09	17.10	80.26	-3.38	Light brown
		01/23/10	7.09	90.27	10.01	Clear
		04/22/10	9.15	88.21	-2.06	Light brown
		07/16/10	12.10	85.26	-2.95	Lt Brn Turbid
		11/18/10	6.29	91.07	5.81	Gas Odor
		06/03/11	9.10	88.26	-2.81	Lt Brn Turbid
		12/13/11	9.98	87.38	-0.88	Lt Brn Turbid
		08/21/12	15.06	82.30	-5.08	Clear
		12/27/12	5.82	91.54	9.24	Clear
		07/26/13	14.33	83.03	-8.51	Clear
		12/17/13	8.97	88.39	5.36	Pale Gray Turbid
		07/18/14	13.38	83.98	-4.41	Pale Gray Turbid
		09/18/15	17.68	79.68	-4.30	Pale Gray Turbid
		08/17/16	15.15	82.21	2.53	Pale Gray Turbid
		08/09/18	15.36	82.00	-0.21	Clear - no odors
		11/22/19	14.34	83.02	1.02	Milky, gas odor
		05/26/20	8.40	88.96	5.94	Lt brown, gas odor
		12/17/20	6.79	90.57	1.61	Clear - no odors
		04/13/21	11.12	86.24	-4.33	Trace brn & odors
		07/28/21	16.03	81.33	-4.91	Trace brn & odors
		11/02/21	13.64	83.72	2.39	Clear - no odors
		06/09/22	9.33	88.03	4.31	Clear - no odors
		12/14/22	7.44	89.92	1.89	Clear - no odors

Table 12 - Static Water Levels (SWL) in Feet

Astro #503 - Boring, Oregon

Averages of Monitor Wells*

	Date Measured	Depth TOC to SWL	Average SWL Elevation	Rise+/Fall - SWL (ft)	
Average TOC Elevation 99.16	07/20/04	14.91	84.25	--	
	11//08/04	9.37	89.79	5.54	
	03/16/05	12.90	86.27	-3.53	
	06/09/05	9.56	89.61	3.34	
	Highest level recorded	01/04/06	6.88	92.29	2.68
		08/25/06	16.56	82.60	-9.69
	Did not include MW2	12/15/06	6.98	91.97	9.58
	06/18/07	12.97	86.19	-5.99	
Resurvey on 01/09/08 includes recalculated data for 12/07	12/06/07	8.31	90.74	4.66	
	12/18/07	8.44	90.61	-0.13	
	08/01/08	14.68	84.37	-6.24	
	01/19/09	7.85	91.20	6.83	
	07/15/09	14.51	84.54	-6.66	
	10/15/09	17.86	81.19	-3.36	
	01/23/10	7.86	91.19	10.00	
	04/22/10	9.94	89.11	-2.08	
	07/16/10	12.72	86.33	-2.78	
	11/18/10	7.35	91.70	5.37	
	06/03/11	10.02	89.03	-2.68	
	12/13/11	10.93	88.12	-0.91	
	08/21/12	15.72	83.33	-4.79	
	12/27/12	7.06	91.99	8.66	
	07/26/13	14.96	84.09	-7.90	
	12/17/13	9.73	89.32	5.24	
	07/18/14	14.22	84.83	-4.49	
	Lowest level recorded	09/18/15	18.47	80.58	-4.25
		08/17/16	15.87	83.18	2.60
		08/09/18	15.94	83.11	-0.08
		11/22/19	15.02	84.03	0.92
		05/26/20	9.54	89.51	5.48
		12/17/20	8.25	90.80	1.29
		04/13/21	11.62	87.43	-3.37
		07/28/21	16.37	82.68	-4.75
		11/02/21	14.12	84.93	2.25
		06/09/22	9.88	89.17	4.24
		12/14/22	8.41	90.64	1.48

*Averages include only monitor wells MW1 through MW4, unless otherwise noted

Table 12 - Static Water Levels (SWL) in Feet

Astro #503 - Boring, Oregon

Observation Well OW3

Well Identification and Physical Data		Date Measured	Depth TOC to SWL	Calc. SWL Elevations	Rise+/-Fall - SWL (ft)	Condition of Water
Top Of Casing Elevation Well Bottom Elevation Depth of Well	99.33 79.04 9.70	07/20/04	8.65	92.38	--	Turbid
		11/08/04	4.87	94.46	3.78	Clear
		03/16/05	7.36	91.97	-2.49	Turbid
		06/09/05	5.45	93.88	1.91	Clear
		01/04/06	3.46	95.87	1.99	Clear
		08/25/06	Dry	--	--	--
		12/15/06	3.09	96.24	--	Clear
		06/18/07	8.25	91.08	-5.16	Very turbid
OW3 was removed 10/31/07, when all remaining USTs were removed and tank pit backfilled.						

Shallow 6" dia. Domestic Well

Well Identification and Physical Data		Date Measured	Depth TOC to SWL	Calc. SWL Elevations	Rise+/Fall - SWL (ft)	Condition of Water
Top Of Casing Elevation	Unknown	07/26/13	14.32	--	--	Clear
Well Bottom Elevation	Unknown	12/17/13	8.38	--	5.94	Dark Green Color
Depth of Well	58.00	"				; then cleared
Not accessible		07/18/14	--	--	--	--
Owner denied access		09/18/15	--	--	--	--
Owner denied access		08/17/16	--	--	--	--
SWL not recorded to hundreths		08/09/18	about 15.0	--	--	Pumped well dry
At 63 gal (one well volume), pumped		2.86 well volumes prior to water sampling				15 min at 12 gpm
Well not opened or measured		11/22/19	--	--	--	--
Well was temporarily abandoned in January, 2020 per DEQ directive, and is no longer measured						

**Table 13 - Test Results for Groundwater
Samples Astro #503 - Boring, Oregon**

Monitor Well MW1

Well Data	Date Sampled	Gx	D ²	B ¹	T	E	X	N	MTBE	EDB	EDC	iso-PB	n-PB	1,2,4-TMB	1,3,5-TMB	Oxy. ³	Lead
----- micrograms per liter (ug/L) -----																	
2" PVC casing	07/20/04	--	--	2,900	5,800	753	5,500	102	ND	37	ND	70	65	642	122	--	ND
42.73' Deep	11/08/04	--	--	3,580	6,740	958	5,560	169	ND	32	121	73	149	848	141	--	--
	03/16/05	--	--	3,070	6,520	919	5,870	226	ND	32	124	67	108	915	159	--	--
	06/09/05	91,300	--	4,830	9,190	1,180	8,840	330	ND	43	102	100	215	1,390	247	--	--
	01/04/06	--	--	5,120	9,230	1,070	8,830	225	ND	46	107	86	194	1,000	235	--	--
	08/25/06	--	--	2,590	5,540	781	4,110	--	--	--	--	--	--	--	--	--	--
	12/15/06	--	--	3,770	4,940	1,220	6,470	--	--	--	--	--	--	--	--	--	--
Columbia Inspection	06/18/07	--	--	3,010	3,920	872	4,610	--	339***	--	--	--	--	--	--	--	--
Columbia Inspection	12/06/07	--	--	2,900	4,600	1,200	5,900	230	ND	31	72	55	120	680	69	--	--
Columbia Inspection	12/18/07	--	--	4,900	6,600	1,500	8,600	490	6.0	42	69	70	120	980	130	--	--
Wy'East Environmental	12/18/07	--	--	1,760	900	171	821	117	ND	41	65	106	ND	181	242	--	--
Test America	08/01/08	--	--	5,070	7,720	1,600	15,790	--	--	--	--	--	--	--	--	--	--
Test America	01/19/09	--	--	5,170	9,680	1,840	9,380	--	ND	--	--	--	--	--	--	--	--
Test America	07/15/09	29,200	1,260	3,050	4,620	1,010	4,860	ND	ND	ND	ND	ND	ND	820	ND	--	--
Test America	10/15/09	--	--	1,250	55	320	1,050	--	--	--	--	--	--	--	--	--	--
Test America	01/23/10	--	--	3,670	1,700	1,050	4,320	--	--	--	--	--	--	--	--	--	--
Test America	04/22/10	19,700	1,950	3,120	438	924	3,840	225	ND	ND	ND	ND	151	762	165	--	3.54
Test America	07/16/10	4,720	--	560	26.5	164	452	--	--	--	--	--	--	--	--	--	--
Test America	11/18/10	5,150	--	783	40.2	208	355	--	--	--	--	--	--	--	--	--	--
Test America	06/03/11	2,420	--	173	2.16	36	27.2	--	--	--	--	--	--	--	--	--	--
Test America	12/13/11	2,060	--	30.7	<1	6.46	10.2	--	--	--	--	--	--	--	--	--	--
Wy'East Environmental	08/21/12	3,710	--	60.3	27.0	20.1	58.4	--	--	--	--	--	--	--	--	--	--
Wy'East Environmental	12/27/12	3,520	--	46.6	<1.00	10.0	16.0	--	--	--	--	--	--	--	--	--	--
Apex Laboratories	07/26/13	1,470	--	18.9	<1.00	13.3	7.75	17.5	31.8	<0.50	1.57	10.5	19.7	22.3	16.7	--	--
Apex Laboratories	12/17/13	2,210	--	22.3	<1.00	8.36	15.3	--	--	--	--	--	--	--	--	--	--
Apex Laboratories	07/18/14	1,630	--	20.6	<1.00	10.4	7.43	19.4	29.4	<0.50	0.79	11.5	25.0	22.2	32.2	--	--
Apex Laboratories	09/18/15	1,890	--	5.34	<1.00	9.83	22.1	--	--	--	--	--	--	--	--	--	--
Apex Laboratories	08/17/16	1,290	--	3.58	<1.00	1.20	2.42	3.05	13.9	<0.50	0.91	2.55	6.36	8.60	8.59	--	--
Apex Laboratories	8/9/2018 ⁴	338	91.7	0.91	<1.00	<0.50	<1.50	<2.00	9.67	<0.50	0.75	<1.00	--	<1.00	1.20	<100	<1.00
Apex Laboratories	11/22/19	509	93.4	1.44	<1.00	<0.50	<1.50	<2.00	4.03	<0.50	<0.50	1.41	--	<1.00	<1.00	<125	<0.20
Apex Laboratories	05/26/20	286	<75.5	1.01	<1.00	<0.50	<1.50	<2.00	4.62	<0.50	0.57	<1.00	--	<1.00	<1.00	<125	<0.20
Apex Laboratories	12/17/20	476	<80.8	1.21	<1.00	<0.50	<1.50	<2.00	4.88	<0.50	<0.50	1.4	--	<1.00	<1.00	<125	<0.20
Apex Laboratories	04/13/21	--	--	--	--	--	--	--	4.77	--	--	--	--	--	--	<125	<0.20
Apex Laboratories	07/28/21	264	<75.1	0.60	<1.00	<0.50	<1.50	<4.00	3.49	<0.50	<0.50	<1.00	--	<1.00	<1.00	<125	<0.20
Apex Laboratories	11/02/21	299	<76.2	0.75	<1.00	<0.50	<1.50	<4.00	1.68	<0.50	<0.50	<1.00	--	<1.00	<1.00	<125	<0.20
Apex Laboratories	06/09/22	320	<74.8	0.42	<1.00	<0.50	<1.50	<2.00	3.29	<0.50	<0.50	<1.00	--	<1.00	<1.00	--	--
Apex Laboratories	12/14/22	376	<75.5	0.60	<1.00	<0.50	<1.50	<2.00	<1.00	<0.50	<0.50	<1.00	--	<1.00	<1.00	--	--
DEQ's RBDM Cleanup Limits rev 5/2018 - GW Inhalation/Injection		110	100	0.46	1100	1.5	190	0.17	14	0.0075	0.17	440	NL	54	59	Varies	15

Table 13 - Test Results for Groundwater
Samples Astro #503 - Boring, Oregon

Monitor Well MW2

Well Data	Date Sampled	Gx	D ²	B ¹	T	E	X	N	MTBE	EDB	EDC	iso-PB	n-PB	1,2,4-TMB	1,3,5-TMB	Oxy. ³	Lead
----- micrograms per liter (ug/L) -----																	
2" PVC casing	07/20/04	--	--	8,510	26,700	3,090	17,700	307	291	51	ND	127	293	2,170	516	--	ND
41.04' Deep	11/08/04	--	--	9,090	27,900	2,390	12,800	544	288	53	200	87	261	1,780	521	--	--
	3/16/05*	--	--	8,240	28,200	2,570	15,100	651	204	54	189	106	272	2,080	542	--	--
	06/09/05	3,760	--	8,540	26,300	2,840	16,300	709	193	61	98	126	303	2,380	551	--	--
	01/04/06	--	--	9,200	26,600	2,550	14,300	491	251	65	106	115	239	1,360	527	--	--
	08/25/06	--	--	8,660	27,300	2,740	13,900	--	--	--	--	--	--	--	--	--	--
	12/15/06	--	--	9,240	49,200	15,500	123,000	--	--	--	--	--	--	--	--	--	--
Columbia Inspection	06/18/07	--	--	9,160	26,200	2,940	17,000	--	2331**	--	--	--	--	--	--	--	--
Columbia Inspection	12/06/07	--	--	7,200	31,000	2,700	19,000	1,900	ND	85	ND	96	200	1,500	270	--	--
Columbia Inspection	12/18/07	--	--	19,000	89,000	7,000	54,000	14,000	90	74	150	92	180	3,900	530	--	--
Wy'East Environmental	12/18/07	--	--	9,540	23,270	2,960	17,500	786	ND	59	38	136	342	2,360	498	--	--
Test America	08/01/08	--	--	8,180	27,600	2,730	34,010	--	--	--	--	--	--	--	--	--	--
Test America	01/19/09	--	--	7,080	24,000	3,050	19,300	--	ND	--	--	--	--	--	--	--	--
Test America	07/15/09	105,000	15,700	6,400	21,200	2,750	17,180	ND	ND	ND	ND	ND	ND	3,410	790	--	--
Test America	10/15/09	--	--	5,950	18,900	2,480	15,600	--	--	--	--	--	--	--	--	--	--
Test America	01/23/10	--	--	1,270	2,960	399	2,410	--	--	--	--	--	--	--	--	--	--
Test America	04/22/10	19,000	1,090	2,540	5,510	695	4,160	ND	ND	ND	ND	ND	ND	645	ND	--	21.6
Test America	07/16/10	50,000	4,940 ¹	2,790	7,250	1,040	6,220	--	--	--	--	--	--	--	--	--	--
Test America	11/18/10	44,600	1,280 ¹	3,050	8,520	846	5,320	148	--	--	--	--	--	--	--	--	--
Test America	06/03/11	12,500	--	1,410	2,410	357	1,900	--	--	--	--	--	--	--	--	--	--
Test America	12/13/11	49,900	--	2,540	8,460	1,430	7,640	--	--	--	--	--	--	--	--	--	--
Wy'East Environmental	08/21/12	65,500	--	2,360	6,352	888	5,131	--	--	--	--	--	--	--	--	--	--
Wy'East Environmental	12/27/12	77,200	--	2,180	8,610	1,150	6,720	--	--	--	--	--	--	--	--	--	--
Apex Laboratories	07/26/13	37,200	--	950	4,620	802	4,780	246	<50	<25	<25	53	152	1,190	58	--	--
Apex Laboratories	12/17/13	38,100	--	742	4,150	786	4,820	--	--	--	--	--	--	--	--	--	--
Apex Laboratories	07/18/14	23,500	--	511	2,720	556	3,250	171	<50	<25	<25	<50	98.5	731	180	--	--
Apex Laboratories	09/18/15	42,500	--	608	4,410	648	3,980	146	<20	<10	<10	34.0	81.6	655	162	--	--
Apex Laboratories	08/17/16	27,200	--	272	2,020	475	2,900	122	<25	<12.5	<12.5	31.6	83.6	649	164	--	--
Apex Laboratories	08/09/18	10,900	345	144	786	225	1,350	45.5	<10	<5.0	<5.0	14.4	--	278	69.6	<1000	1.24
Apex Laboratories	11/22/19	11,600	238	171	1,130	232	1,520	<50	<25	<12.5	<12.5	<25	--	246	63.8	<3120	1.10
Apex Laboratories	05/26/20	11,000	147	162	1,160	263	1,620	35.2	<10	<5.0	<5.0	13.5	--	306	70.6	<1250	1.19
Apex Laboratories	12/17/20	7,270	165	107	573	182	1,010	35.4	<10	<5.0	<5.0	13.7	--	235	64.5	<1250	1.57
Apex Laboratories	04/13/21	--	--	--	--	--	--	--	<20	--	--	--	--	--	--	<2500	0.974
Apex Laboratories	07/28/21	8,280	181	111	568	169	1,070	<80	<20	<10.0	<10.0	<20	--	247	63.2	<2500	0.909
Apex Laboratories	11/02/21	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<625	0.971
Apex Laboratories	06/09/22	14,900	148	166	1,060	300	1,830	49.4	<10	<5.0	<5.0	18.4	--	381	96.0	--	--
Apex Laboratories	12/14/22	21,100	178	172	1,660	430	2,800	67.1	<10	<5.0	<5.0	19.9	--	510	124	--	--
DEQ's RBDM Cleanup Limits rev 5/2018 - GW Inhalation/Ingestion		110	100	0.46	1100	1.5	190	0.17	14	0.0075	0.17	440	NL	54	59	Varies	15

**Table 13 - Test Results for Groundwater
Samples Astro #503 - Boring, Oregon**

Monitor Well MW3

Well Data	Date Sampled	Gx	D ²	B ¹	T	E	X	N	MTBE	EDB	EDC	iso-PB	n-PB	1,2,4-TMB	1,3,5-TMB	Oxy. ³	Lead
micrograms per liter (ug/L)																	
2" PVC casing	07/20/04	--	--	118	4,040	100	6,560	138	ND	ND	ND	97	202	1,250	279	--	ND
45.54' Deep	11/08/04	--	--	121	4,140	1,010	4,600	230	ND	ND	ND	63	192	1,130	229	--	--
	03/16/05	--	--	73	3,750	850	4,690	262	ND	ND	ND	60	57	936	174	--	--
	06/09/05	29,100	--	61	1,480	666	2,580	240	ND	ND	ND	66	157	814	148	--	--
	01/04/06	--	--	110	2,930	487	3,030	--	--	--	--	--	--	--	--	--	--
	08/25/06	--	--	1060	7,890	1,250	7,430	--	--	--	--	--	--	--	--	--	--
	12/15/06	--	--	93	1,700	647	2,330	--	--	--	--	--	--	--	--	--	--
Columbia Inspection	06/18/07	--	--	83	2,550	690	3,660	--	632***	--	--	--	--	--	--	--	--
Columbia Inspection	12/06/07	--	--	69	4,900	1,000	6,100	1,000	ND	ND	ND	46	94	680	70	--	--
Columbia Inspection	12/18/07	--	--	290	4,700	1,000	6,300	620	ND	ND	ND	50	96	780	78	--	--
Wy'East Environmental	12/18/07	--	--	233	4,140	1,180	5,810	236	ND	ND	ND	ND	228	1,150	213	--	--
Test America	08/01/08	--	--	59.0	3,500	861	9,650	--	--	--	--	--	--	--	--	--	--
Test America	01/19/09	--	--	200	9,030	1,650	9,360	--	ND	--	--	--	--	--	--	--	--
Test America	07/15/09	33,700	1,040	162	6,630	1,260	7,140	243	ND	ND	ND	ND	168	1,170	246	--	--
Test America	10/15/09	--	--	186	6,770	1,270	7,330	--	--	--	--	--	--	--	--	--	--
Test America	01/23/10	--	--	197	6,200	1,180	6,410	--	--	--	--	--	--	--	--	--	--
Test America	04/22/10	30,900	2,850	200	6,840	1,160	6,600	ND	ND	ND	ND	ND	ND	924	ND	--	11.2
Test America	07/16/10	36,300	--	128	5,580	1,140	6,430	--	--	--	--	--	--	--	--	--	--
Test America	11/18/10	33,800	--	120	5,290	1,100	5,810	--	--	--	--	--	--	--	--	--	--
Test America	06/03/11	22,900	--	112	4,110	914	4,980	--	--	--	--	--	--	--	--	--	--
Test America	12/13/11	30,600	--	86	4,710	1,090	5,640	--	--	--	--	--	--	--	--	--	--
Wy'East Environmental	08/21/12	44,900	--	41	3,178	704	3,703	--	--	--	--	--	--	--	--	--	--
Wy'East Environmental	12/27/12	53,500	--	67	3,450	749	4,210	--	--	--	--	--	--	--	--	--	--
Apex Laboratories	07/26/13	24,200	--	21.3	2,720	730	4,210	186	<5	<2.5	<2.5	51	123	758	55	--	--
Apex Laboratories	12/17/13	29,500	--	25.8	2,560	751	4,180	--	--	--	--	--	--	--	--	--	--
Apex Laboratories	07/18/14	20,300	--	20.5	1,690	686	3,720	148	<50	<25	<25	<50	102	626	147	--	--
Apex Laboratories	09/18/15	33,600	--	19.2	1,740	689	4,050	--	--	--	--	--	--	--	--	--	--
Apex Laboratories	08/17/16	35,900	--	22.9	2,000	754	4,330	210	<20	<10	<10	53.8	107	762	181	--	--
Apex Laboratories	8/9/2018 ⁴	31,400	553	21.1	1,840	817	4,590	196	<1.00	<0.5	<0.5	66.1	--	821	206	<100	1.80
Apex Laboratories	11/22/19	33,600	519	22.2	2,200	878	4,970	183	<20	<10	<10	13.2	--	837	195	<2500	1.86
Apex Laboratories	05/26/20	23,900	581	15.8	1,770	719	3,830	134	<20	<10	<10	45.6	--	709	155	<2500	1.41
Apex Laboratories	12/17/20	28,400	661	32.2	2,450	849	4,320	213	<20	<10	<10	67.2	--	798	197	<2500	0.57
Apex Laboratories	04/13/21	--	--	--	--	--	--	--	<20	--	--	--	--	--	--	<2500	1.27
Apex Laboratories	07/28/21	31,800	611	20.0	2,210	844	4,640	<200	<50	<25	<25	52.0	--	824	185	<6250	1.47
Apex Laboratories	11/02/21	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<6250	1.58
Apex Laboratories	06/09/22	38,800	714	24.8	2,340	994	5,210	219	<20	<10	<10	70.4	--	925	204	--	--
Apex Laboratories	12/14/22	51,200	890	34.0	3,560	1,300	7,040	235	<20	<10	<10	66.6	--	1,250	274	--	--
DEQ's RBDM Cleanup Limits rev 5/2018 - GW Inhalation/Ingestion		110	100	0.46	1100	1.5	190	0.17	14	0.0075	0.17	440	NL	54	59	Varies	15

B10

B10

B10

**Table 13 - Test Results for Groundwater
Samples Astro #503 - Boring, Oregon**

On-site Deep Well (Tap Water)																	
Well Data	Date Sampled	Gx	D ²	B ¹	T	E	X	N	MTBE	EDB	EDC	iso-PB	n-PB	1,2,4-TMB	1,3,5-TMB	Oxy. ³	Lead
-----micrograms per liter (ug/L)-----																	
6" Steel casing	07/20/04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
230' Deep - Potable Use	11/08/04	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--
-----Tap Water-----	03/16/05	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--
	06/09/05	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--
	01/04/06	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--
	08/25/06	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--
	12/15/06	--	--	ND	ND	ND	ND	6**	ND	ND	ND	ND	ND	ND	ND	--	--
Columbia Inspection	06/18/07	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--
Columbia Inspection	12/06/07	--	--	ND	1.7**	ND	0.67**	2.7**	ND	ND	ND	ND	ND	ND	ND	--	--
Columbia Inspection	12/18/07	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--
Wy'East Environmental	12/18/07	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--
Test America	08/01/08	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--
Test America	01/19/09	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--
Test America	07/15/09	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--
Test America	10/15/09	--	--	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--
Test America	01/23/10	--	--	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--
Test America	04/22/10	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--
Test America	07/16/10	--	--	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--
Test America	10/18/10	--	--	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--
Test America	06/03/11	--	--	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--
Test America	12/13/11	--	--	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--
Wy'East Environmental	08/21/12	ND	--	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--
Wy'East Environmental	12/27/12	ND	--	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--
Apex Laboratories	07/26/13	ND	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--
Apex Laboratories	12/17/13	--	--	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--
Apex Laboratories	07/18/14	ND	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--
Apex Laboratories	09/18/15	ND	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--
Apex Laboratories	08/17/16	--	--	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--
Apex Laboratories	08/09/18	<100	<74.1	<0.20	<1.00	<0.50	<1.5	<2.0	<1.00	<0.50	<0.50	<1.00	--	<1.00	<1.00	<100	<1.00
Apex Laboratories	11/22/19	<100	<75.5	<0.20	<1.00	<0.50	<1.5	<2.0	<1.00	<0.50	<0.50	<1.00	--	<1.00	<1.00	<125	0.832
Apex Laboratories	05/26/20	<100	<77.7	<0.20	<1.00	<0.50	<1.5	<2.0	<1.00	<0.50	<0.50	<1.00	--	<1.00	<1.00	<125	<0.20
Apex Laboratories	12/17/20	<100	<74.8	<0.20	<1.00	<0.50	<1.5	<2.0	<1.00	<0.50	<0.50	<1.00	--	<1.00	<1.00	<125	<0.20
Apex Laboratories	04/13/21	--	--	--	--	--	--	--	<1.00	--	--	--	--	--	--	<125	<0.20
Apex Laboratories	07/28/21	<100	<75.5	<0.20	<1.00	<0.50	<1.5	<4.0	<1.00	<0.50	<0.50	<1.00	--	<1.00	<1.00	<125	0.232
Apex Laboratories	11/02/21	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<125	0.394
Apex Laboratories	06/09/22	<100	<74.8	<0.20	<1.00	<0.50	<1.5	<4.0	<1.00	<0.50	<0.50	<1.00	--	<1.00	<1.00	--	--
Apex Laboratories	12/14/22	<100	<77.7	<0.20	<1.00	<0.50	<1.5	<2.0	<1.00	<0.50	<0.50	<1.00	--	<1.00	<1.00	--	--
DEQ's RBDM Cleanup Limits rev 5/2018 - GW Inhalation/Injection		110	100	0.46	1100	1.5	190	0.17	14	0.0075	0.17	440	NL	54	59	Varies	15

**Table 13 - Test Results for Groundwater
Samples Astro #503 - Boring, Oregon**

On-site Shallow Well

Well Data	Date Sampled	Gx	D ²	B ¹	T	E	X	N	MTBE	EDB	EDC	iso-PB	n-PB	1,2,4-TMB	1,3,5-TMB	Oxy. ³	Lead
micrograms per liter (ug/L)																	
6" Steel casing	07/20/04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
58' Deep - Not in Use	11/08/04	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--
	03/16/05	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--
	06/05/05	--	--	ND	2**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--
pump test start	08/05/05	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--
pump test finish	08/06/05	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--
	01/04/06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	08/25/06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	12/15/06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Columbia Inspection	06/18/07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Columbia Inspection	12/06/07	--	--	ND	0.68**	ND	ND	ND	ND	--	--	--	--	--	--	--	--
Columbia Inspection	12/18/07	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--
Wy'East Environmental	12/18/07	--	--	ND	ND	ND	2**	ND	ND	ND	ND	ND	ND	ND	ND	--	--
Wy'East Environmental	08/01/08	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--
Wy'East Environmental	2009-12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Apex Laboratories	07/26/13	<1.00	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--
Apex Laboratories	12/17/13	--	--	1.24	22.5	7.9	46.6	--	--	--	--	--	--	--	--	--	--
Apex Laboratories	07/18/14	<1.00	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--
Owner refused access	09/18/15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Owner refused access	08/17/16	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Apex Laboratories	08/09/18	<100	<7.41	<0.20	<1.00	<0.50	<1.50	<2.00	<1.00	<0.50	<0.50	<1.00	--	<1.00	<1.00	<100	<1.0
DEQ no longer requires sampling of this well. Well was temporarily abandoned on Jan 24, 2020																	
DEQ's RBDM Cleanup Limits rev 5/2018 - GW Inhalation/Ingestion		110	100	0.46	1100	1.5	190	0.17	14	0.0075	0.17	440	NL	54	59	Varies	15

Notes:

B¹ = benzene
T = toluene
E = ethyl-benzene
X = xylenes
N = naphthalene
"--" means not tested

MTBE is oxygenate Methyl Tert-Butyl Ethylene
EDB is Ethylene bromide or 1,2-Dibromoethane
EDC is Ethylene chloride or 1,2-Dichloroethane
iso-PB is Isopropylbenzene
TMB is Trimethylbenzene
PCE = Tetrachloroethylene (unrelated to motor fuels)
"<" means not detected above test method reporting limit
"ND" means not detected above test method reporting limits
Red indicates results above regulatory cleanup limit

Gx = Gasoline extended Range Hydrocarbons via NWTPH-Gx test method
D² = Diesel Range Hydrocarbons without Oil via NWTPH-Dx test method
Oxy.³ Oxygenates tested were: Ethanol, TBA, DIPE, ETBE and TAME
Lead means dissolved phase lead using in-field 45 micron filter
**Test result is suspected an invalid false positive
*** Unreliable estimates via EPA 8021B test method
D² shows test results for diesel only without oil via TPH-Dx test method.
Lab repeatedly flags Dx test results as overlap from detected gasoline
Test results achieved 4 consecutive quarters of compliance

8/9/2018⁴

Water sample labels MW1 and MW3 were accidentally reversed in field. Lab samples were corrected and data displayed in table above.

Table 14 - Test Results for Survey Water Samples
Astro #503 - Boring, Oregon

Survey Well Water Test Results

Well Water ID on Tax Lot	Date Sampled	B	T	E	X	N	MTBE	EDB	EDC	iso-PB	1,3,5-TMB	1,2,4-TMB	Gx	Dx	Oxy. ³	Lead
micrograms per liter (ug/L)																
7 - TL4000	08/09/18	<0.20	<1.0	<0.50	<1.5	<2.0	<1.00	<0.50	<0.50	<1.00	<1.0	<1.0	<100	<7.6	<100	<1.0
8 - TL2400	08/09/18	<0.20	<1.0	<0.50	<1.5	<2.0	<1.00	<0.50	<0.50	<1.00	<1.0	<1.0	<100	<7.4	<100	<1.0
9 - TL1501	08/09/18	<0.20	<1.0	<0.50	<1.5	<2.0	<1.00	<0.50	<0.50	<1.00	<1.0	<1.0	<100	<7.3	<100	<1.0
10 - TL1400	08/09/18	<0.20	<1.0	<0.50	<1.5	<2.0	<1.00	<0.50	<0.50	<1.00	<1.0	<1.0	<100	<7.5	<100	<1.0
11 - TL4200 ¹	08/09/18	<0.20	<1.0	<0.50	<1.5	<2.0	<1.00	<0.50	<0.50	<1.00	<1.0	<1.0	<100	<7.5	<100	<1.0
12 - TL1600	08/09/18	<0.20	<1.0	<0.50	<1.5	<2.0	<1.00	<0.50	<0.50	<1.00	<1.0	<1.0	<100	<7.5	<100	<1.0
13 - TL0900	08/09/18	<0.20	<1.0	<0.50	<1.5	<2.0	<1.00	<0.50	<0.50	<1.00	<1.0	<1.0	<100	<7.5	<100	<1.0
14 - TL4300	08/10/18	<0.20	<1.0	<0.50	<1.5	<2.0	<1.00	<0.50	<0.50	<1.00	<1.0	<1.0	<100	<7.5	<100	0.20
15 - TL4100 ²	08/10/18	<0.20	<1.0	<0.50	<1.5	<2.0	<1.00	<0.50	<0.50	<1.00	<1.0	<1.0	<100	<7.5	<100	<2.0
DEQ's RBDM Cleanup Limits rev 5/2018 - GW Inhalation/Injection		0.46	1100	1.5	190	0.17	14	0.0075	0.17	440	59	54	110	100	Varies	15

Notes:

B = benzene

T = toluene

E = ethyl-benzene

X = xylenes

N = naphthalene

MTBE is oxygenate Methyl Tert-Butyl Ethylene

EDB is Ethylene bromide or 1,2-Dibromoethane

EDC is Ethylene chloride or 1,2-Dichlorethane

iso-PB is Isopropylbenzene

TMB is Trimethylbenzene

DEQ Risk-Based Decision Making Cleanup Limits are current rules.

Gx = Gasoline extended Range Hydrocarbons via NWTPH-Gx test method

Dx = Diesel extended Range Hydrocarbons via NWTPH-Dx test method

Oxy³ Oxygenates tested were: Ethanol, TBA, DIPE, ETBE and TAME

Lead means dissolved phase lead

"<" means not detected above test method reporting limit

Red indicates test result above regulatory cleanup limit

Footnotes:

1. Water sample collected from hose bib on TL4200, although shared water well is located on TL4100

2. Water sample 15 was obtained from hose bib on TL4100, which is connected to a second unshared water well located on TL4100

3. Refer to Table 4 for locations of samples collected and locations of water wells withing the DEQ required survey area.