ARCADIS Design & Consultancy for natural and built assets

SEMI-ANNUAL STATUS REPORT

First Half 2021
April 8, 2021

Facility No:	Former Standard Oil Bulk Plant No. 302095	Address:	149 and 167 Main Street, Morton, Washington

Arcadis Contact Person / Phone No.:	Stephen Ahlquist / (503) 785-9308
Arcadis Project No.:	30063832
Primary Agency/Regulatory ID No.:	Washington State Department of Ecology Southwest Regional Office, Toxics Cleanup Program Panjini Balaraju / Agreed Order No. DE 03TCPSR-5715

WORK CONDUCTED THIS PERIOD [First Half 2021]:

1. Conducted semi-annual groundwater monitoring and sampling on February 9, 2021.
2. Prepared the *Semi-Annual Status Report, First Half 2021*.

WORK PROPOSED NEXT PERIOD [Second Half 2021]:

1. Conduct semi-annual groundwater monitoring and sampling during the third quarter of 2021.
2. Prepare the *Semi-Annual Status Report, Second Half 2021*.

Current Phase of Project:	Monitoring	
Frequency of Monitoring / Sampling:	Semi-Annual (Q1/Q3)	
Is Light Non-Aqueous Phase Liquid (LNAPL) Present On-site:	None	
Cumulative LNAPL Recovered to Date:	None	(gallons)
Approximate Depth to Groundwater:	1.25 to 2.61	(feet below top of casing)
Approximate Groundwater Elevation:	947.13 to 948.50	(feet above NAVD 88)
Groundwater Flow Direction	South	
Groundwater Gradient	0.015	(feet per foot)

Current Remediation Techniques:	None
Permits for Discharge:	Not Applicable
Summary of Unusual Activity:	None
Agency Directive Requirements:	See Attachment C

DISCUSSION

Arcadis U.S., Inc. (Arcadis) conducted semi-annual groundwater monitoring activities on February 9, 2021. Groundwater monitoring activities were conducted in general accordance with Arcadis' Technical Guidance Instructions for Low-Flow Groundwater Purging and Sampling Procedures for Monitoring Wells included as **Attachment A**. The groundwater monitoring field data sheets are included as **Attachment B.** Groundwater monitoring activities were conducted in accordance with the regulatory directive dated April 24, 2017. The regulatory directive is included as **Attachment C**.

Groundwater samples were submitted to Pace Analytical in Mount Juliet, Tennessee under standard chain-of-custody protocols. Groundwater gauging and analytical results for the site are presented in **Table 1**. The site location and plan are presented on **Figures 1** and **2**, respectively.

The calculated groundwater flow direction is to the south with a hydraulic gradient of 0.015 feet/foot. Historically, groundwater flow direction at the site has been predominately to the southeast. Groundwater elevation contours and a rose diagram summarizing historical flow direction are presented on **Figure 3**.

No light non-aqueous phase liquid (LNAPL) was observed in any of the monitoring wells during the first semi-annual sampling event of 2021. Analytical results from groundwater wells during the first semi-annual groundwater sampling events are summarized below:

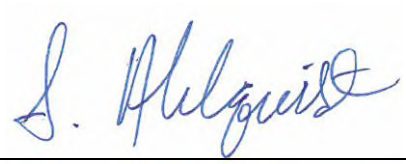
- Total petroleum hydrocarbons as gasoline range organics (TPH-GRO) was detected in all five of the wells sampled with concentrations ranging from 32.8 B J (MW-12) micrograms per liter (µg/L) where B represents that the same analyte is found in the associated blank and J is an estimated value between method detection limit and reported detection limit to 292 B µg/L (MW-16). All detected concentrations for TPH-GRO were less than the Model Toxics Control Act (MTCA) Method A Cleanup Level (CUL).
- Total petroleum hydrocarbons as diesel range organics (TPH-DRO) was detected in three of the five wells samples with concentrations ranging from 116 J µg/L (MW-11) to 934 µg/L (duplicate sample at MW-7). Two wells (MW-16 and MW-17) contained concentrations of TPH-DRO greater than the MTCA Method A CUL.

- Total petroleum hydrocarbons as heavy oil range organics (TPH-HRO) was detected in three of the five wells sampled with concentrations ranging from 301 B µg/L (duplicate sample at MW-7) to 593 µg/L (MW-16). One well (MW-16) contained concentrations of TPH-HRO greater than the MTCA Method A CUL.
- Benzene, toluene, ethylbenzene, and total xylenes were not detected at or above the laboratory reporting limit in the five wells sampled.

A groundwater analytical map summarizing the first semi-annual sampling event of 2021 is presented within **Figure 4**. A copy of the laboratory analytical report and chain-of-custody documentation are included as **Attachment D.**

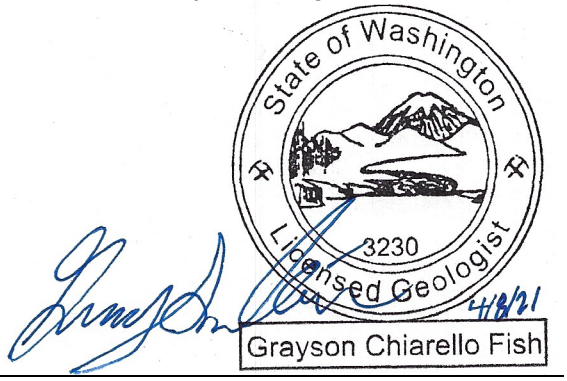
LIMITATIONS

This report was prepared in accordance with the scope of work outlined in Arcadis' contract and with generally accepted professional engineering and environmental consulting practices existing at the time this report was prepared and applicable to the location of the site. It was prepared for the exclusive use of Chevron Environmental Management Company for the express purpose stated above. Any re-use of this report for a different purpose or by others not identified above shall be at the user's sole risk without liability to Arcadis. To the extent that this report is based on information provided to Arcadis by third parties, Arcadis may have made efforts to verify this third-party information, but Arcadis cannot guarantee the completeness or accuracy of this information. The opinions expressed and data collected are based on the conditions of the site existing at the time of the field investigation. No other warranties expressed or implied are made by Arcadis.



Date: April 8, 2021

Stephen Ahlquist
Project Manager



Date: April 8, 2021

Grayson Fish, L.G.
Licensed Geologist

ATTACHMENTS:

Table 1	Groundwater Gauging and Analytical Results Fourth Quarter 2004 to Current
Figure 1	Site Location Map
Figure 2	Site Plan
Figure 3	Groundwater Elevation Contour Map, February 9, 2021
Figure 4	Groundwater Analytical Map, February 9, 2021
Attachment A	Technical Guidance Instructions for Low-Flow Groundwater Purging and Sampling Procedures for Monitoring Wells
Attachment B	Field Data Sheets
Attachment C	Regulatory Directive, April 24, 2017
Attachment D	Laboratory Report and Chain-of-Custody Documentation

TABLE

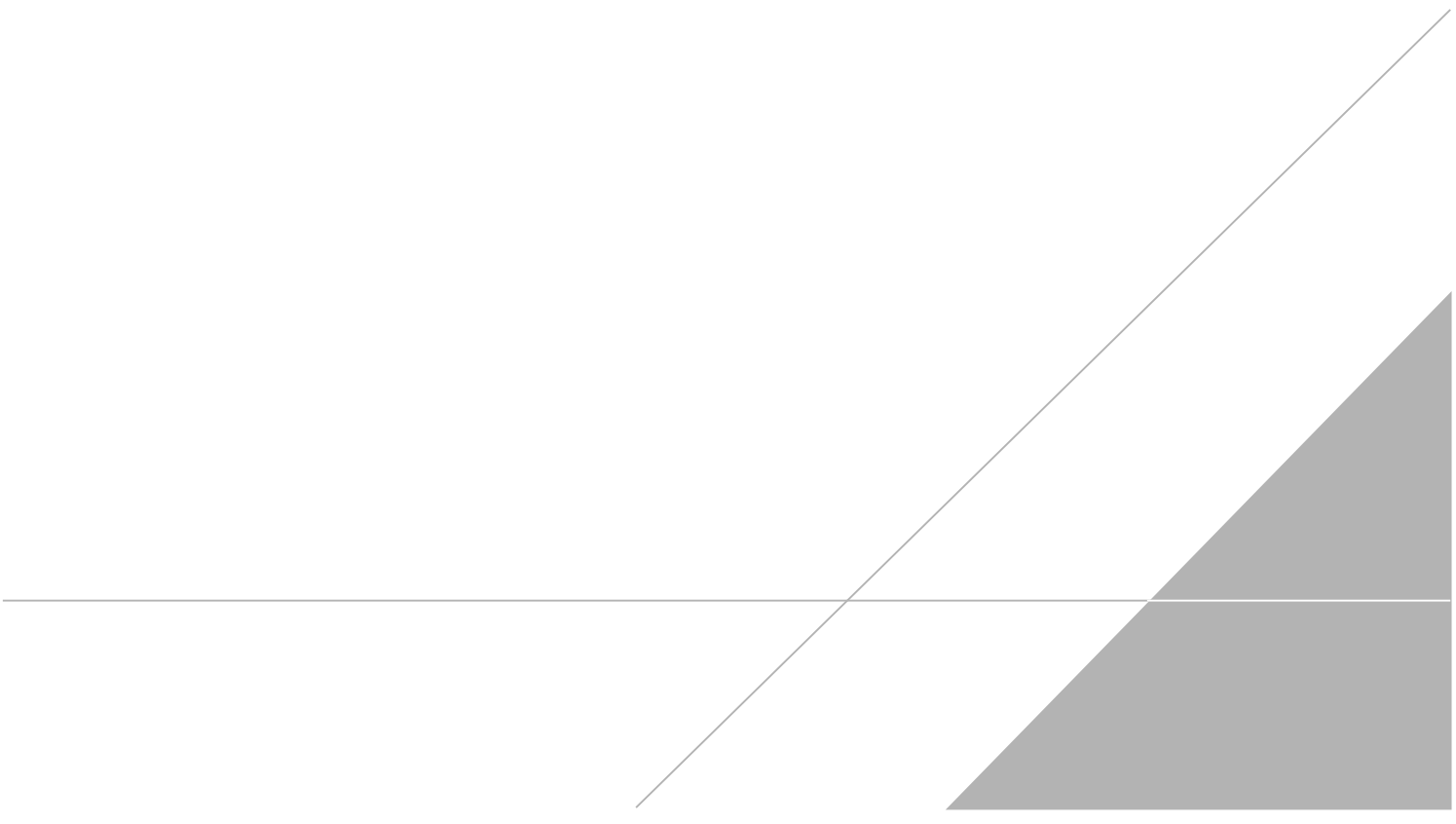


Table 1. Groundwater Gauging Data and Analytical Results
Former Standard Oil Bulk Plant No. 302095
149 and 167 Main Street
Morton, Washington

ARCADIS Design & Consultancy for natural and built assets

Well	Date	Screen Interval (ft. bTOC)	Top of Casing (ft. above NAVD 88)	Depth to Water (ft. bTOC)	Groundwater Elevation (ft. above NAVD 88)	TPH-GRO	TPH-DRO	TPH-HRO	Benzene	Toluene	Ethylbenzene	Total Xylenes	Methyl tert-butyl ether	Dissolved Lead	Total Lead	Naphthalene	Comments
MTCA Method A CULs						**800/1,000**	**500**	**500**	**5**	**1,000**	**700**	**1,000**	**20**	**15**	**15**	**160**	
MW-7	10/11/2004	5-20	99.89	3.79	96.10	200	**570**	<98	<0.5	<0.5	<0.5	<0.5	--	--	--	--	
MW-7	1/25/2005	5-20	99.89	3.27	96.62	190	**1,500**	220	<0.5	<0.5	<0.5	<0.5	--	--	--	--	
MW-7	4/13/2005	5-20	99.89	4.28	95.61	73	**880**	99	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-7	7/11/2005	5-20	99.89	4.02	95.87	140	**1,100**	120	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-7	8/13/2007	5-20	99.89	7.85	92.04	<50	**570**	210	<0.5	<0.5	<0.5	<1.5	--	<0.047	--	--	
MW-7	5/27/2008	5-20	99.89	3.42	96.47	<50	**750**	<97	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	
MW-7	12/2/2008	5-20	99.90	3.59	96.31	--	--	--	--	--	--	--	--	--	--	--	
MW-7	3/18/2009	5-20	99.90	3.29	96.61	71	360	<67	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	
MW-7	5/26-27/2009	5-20	99.90	4.13	95.77	73	**940**	69	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	
MW-7	8/3-4/2009	5-20	99.90	8.08	91.82	<50	**1,500**	**530**	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	
MW-7	12/29/2009	5-20	99.90	3.96	95.94	<50	**990**	77	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-7	2/4/2010	5-20	99.90	4.17	95.73	<50	**890**	110	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-7	6/1/2010	5-20	99.90	3.23	96.67	91	**780**	78	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-7	8/10/2010	5-20	99.90	7.22	92.68	<50	**830**	260	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-7	11/18/2010	5-20	99.90	2.43	97.47	58	480	400	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-7	3/15/2011	5-20	99.90	3.84	96.06	<50	**810**	250	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-7	6/2/2011	5-20	99.90	4.08	95.82	83	**10,000**	**870**	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-7	8/25/2011	5-20	99.90	7.92	91.98	<50	**650**	<67	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-7	11/10/2011	5-20	99.90	4.90	95.00	<50	380	<69	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-7	2/9/2012	5-20	99.90	4.25	95.65	<50	130	<68	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-7	5/31/2012	5-20	99.90	4.90	95.00	<50	430	<75	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-7	8/28/2012	5-20	99.90	7.83	92.07	<50	83	<68	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-7	11/21/2012	5-20	99.90	1.84	98.06	<50	160	<70	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-7	2/8/2013	5-20	99.90	3.29	96.61	89	310	<66	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-7	5/10/2013	5-20	99.90	4.46	95.44	60	97	<67	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-7	8/8/2013	5-20	99.90	7.23	92.67	<50	51	<66	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-7	10/23/2013	5-20	99.90	4.72	95.18	65	100	<66	<0.3	<0.5	<0.5	<1.5	--	--	--	--	
MW-7	2/25/2014	5-20	99.90	3.23	96.67	83	140	<67	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-7	5/28/2014	5-20	99.90	4.08	95.82	100	210	<66	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-7	8/26/2014	5-20	99.90	7.23	92.67	<50	110	<67	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-7	11/4/2014	5-20	99.90	1.89	98.01	<50	190	<68	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-7	3/23-24/2015	5-20	99.90	4.18	95.72	<50	85	<68	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-7	5/26-27/2015	5-20	99.90	5.68	94.22	<50	70	<68	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-7	8/13/2015	5-20	99.90	8.78	91.12	<50	**760**	<100	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-7	11/16-17/2015	5-20	99.90	3.21	96.69	110	**1,200**	190	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-7	2/21-22/2016	5-20	99.90	4.22	95.68	<50	**1,800**	380	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-7	5/15-16/2016	5-20	99.90	5.20	94.70	110	**1,500**	<100	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-7	8/15-16/2016	5-20	99.90	7.08	92.82	55	**730**	120	<0.2	<0.2	<0.2	<0.2	--	--	--	--	
MW-7	11/15/2016	5-20	99.90	2.77	97.13	<50	**930**	120	<0.2	<0.2	<0.2	<0.2	--	--	--	--	
MW-7	1/10/2019	5-20	99.90	2.82	97.08	<19	**710**	<100	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-7	7/21/2019	5-20	99.90	5.03	94.87	<19[1]	**940**	<100	<0.2	<0.2	<0.4	<1.0	--	--	--	--	
MW-7	2/12/2020	5-20	951.11	3.11	948.00	<100	**761**	277	<1.00	<1.00	<1.00	<3.00	--	--	--	--	WELL RESURVEYED
MW-7	8/2/2020	5-20	951.11	6.02	945.09	<100	**1,310**	341	<1.00	<1.00	<1.00	<3.00	--	--	--	--	
MW-7	2/9/2021	5-20	951.11	2.61	948.50	58.6 B J	**904**	318 B	<1.00	<1.00	<1.00	<3.00	--	--	--	--	
MW-7 DUP	2/9/2021	--	--	--	--	64.9 B J	**934**	301 B	<1.00	<1.00	<1.00	<3.00	--	--	--	--	
MW-11	10/11/2004	5-20	97.92	2.92	95.00	<50	<80	<100	<0.5	<0.5	<0.5	<0.5	--	--	--	--	
MW-11	1/25/2005	5-20	97.92	2.95	94.97	<48	<79	<99	<0.5	<0.5	<0.5	<0.5	--	--	--	--	
MW-11	4/13/2005	5-20	97.92	2.21	95.71	<48	<79	<98	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-11	7/11/2005	5-20	97.92	3.20	94.72	<48	<93	<120	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-11	8/13/2007	5-20	97.92	6.56	91.36	<50	<79	<99	<0.5	<0.5	<0.5	<1.5	--	0.07	--	--	
MW-11 DUP	8/13/2007	5-20	97.92	6.56	91.36	<50	<80	<100	<0.5	<0.5	<0.5	<1.5	--	0.091	--	--	
MW-11	5/27/2008	5-20	97.92	3.98	93.94	<50	<76	<95	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	
MW-11	12/2/2008	5-20	97.92	3.31	94.61	--	--	--	--	--	--	--	--	--	--	--	
MW-11	3/18/2009	5-20	97.92	2.70	95.22	<50	85	480	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	
MW-11	5/26-27/2009	5-20	97.92	3.69	94.23	<50	170	<69	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	
MW-11	8/3-4/2009	5-20	97.92	6.59	91.33	<50	<30	<69	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	
MW-11	12/29-30/2009	5-20	97.92							UNABLE TO LOCATE							
MW-11	2/4-5/2010	5-20	97.92							UNABLE TO LOCATE							
MW-11	6/1/2010	5-20	97.92							UNABLE TO LOCATE							
MW-11	8/10/2010	5-20	97.92							UNABLE TO LOCATE							
MW-11	11/18/2010	5-20	97.92							UNABLE TO LOCATE							
MW-11	3/15/2011	5-20	97.92							UNABLE TO LOCATE							
MW-11	6/2/2011	5-20	97.92							UNABLE TO LOCATE							
MW-11	8/25/2011	5-20	97.92							UNABLE TO LOCATE							
MW-11	11/10/2011	5-20	97.92							UNABLE TO LOCATE							
MW-11	2/10/2012	5-20	97.92	3.00	94.92	<50	<29	<67	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-11	5/30/2012	5-20	97.92	3.50	94.42	<50	<31	<72	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-11	8/27/2012	5-20	97.92	6.47	91.45	<50	<28	<66	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-11	11/20/2012	5-20	97.92	2.92	95.00	<50	<28	<66	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-11	2/7/2013	5-20	97.92	2.66	95.26	<50	<28	<66	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-11	5/10/2013	5-20	97.92	3.95	93.97	<50	<28	<66	<0.5	<0.5	<05	<1.5	--	--	--	--	
MW-11	8/8/2013	5-20	97.92	6.46	91.46	<50	<28	<66	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-11	10/22/2013	5-20	97.92	3.81	94.11	<50	<30	<70	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-11	2/24/2014	5-20	97.92	1.88	96.04	<50	<29	<68	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-11	5/28/2014	5-20	97.92	4.13	93.79	<50	200	**520**	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-11	8/25/2014	5-20	97.92	5.67	92.25	<50	29	<67	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-11	11/3/2014	5-20	97.92	2.93	94.99	<50	<29	<68	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-11	3/23-24/2015	5-20	97.92	2.96	94.96	<50	<29	<67	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-11	5/26-27/2015	5-20	97.92	6.96	90.96	<50	<28	<66	<0.5	<0.5	<0.5	<13	--	--	--	--	
MW-11	8/13/2015	5-20	97.92	6.42	91.50	<50	81	**540**	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-11	11/16-17/2015	5-20	97.92	2.34	95.58	<50	<46	170	<0.5	<0 5	<0.5	<1.5	--	--	--	--	

Table 1. Groundwater Gauging Data and Analytical Results
Former Standard Oil Bulk Plant No. 302095
149 and 167 Main Street
Morton, Washington

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Well	Date	Screen Interval (ft. bTOC)	Top of Casing (ft. above NAVD 88)	Depth to Water (ft. bTOC)	Groundwater Elevation (ft. above NAVD 88)	TPH-GRO	TPH-DRO	TPH-HRO	Benzene	Toluene	Ethylbenzene	Total Xylenes	Methyl tert-butyl ether	Dissolved Lead	Total Lead	Naphthalene	Comments
MTCA Method A CULs						**800/1,000**	**500**	**500**	**5**	**1,000**	**700**	**1,000**	**20**	**15**	**15**	**160**	
MW-11	2/21-22/2016	5-20	97.92							UNABLE TO ACCESS							
MW-11	5/15-16/2016	5-20	97.92	4.19	93.73	<50	<47	<100	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-11	8/15-16/2016	5-20	97.92	5.43	92.49	<50	<46	<100	<0 2	<0 2	<0 2	<0.2	--	--	--	--	
MW-11	11/15/2016	5-20	97.92							UNABLE TO ACCESS							
MW-11	1/10/2019	5-20	97.92	1.69	92.49	<19	220	**890**	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-11	7/21/2019	5-20	97.92	3.71	94.21	<19	<46	<100	<0.2[1]	<0.2[1]	<0.4[1]	<1.0[1]	--	--	--	--	
MW-11	2/12/2020	5-20	949.22	1.61	947.61	<100	85.1 J	164 J	<1.00	<1.00	<1.00	<3.00	--	--	--	--	WELL RESURVEYED
MW-11	8/2/2020	5-20	949.22	4.55	944.67	<100	118 J	184 J	<1.00	<1.00	<1.00	<3.00	--	--	--	--	
MW-11	2/9/2021	5-20	949.22	1.94	947.28	42.4 B J	116 J	489	<1.00	<1.00	<1.00	<3.00	--	--	--	--	
MW-12	10/11/2004	5-20	98.25	2.64	95.61	<50	<79	<99	<0.5	<0.5	<0.5	<0.5	--	--	--	--	
MW-12	1/25/2005	5-20	98.25	2.70	95.55	<48	<79	<98	<0.5	<0.5	<0.5	<0.5	--	--	--	--	
MW-12	4/13/2005	5-20	98.25	2.34	95.91	<48	<84	<110	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-12	7/11/2005	5-20	98.25	3.25	95.00	<48	<81	110	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-12	8/13/2007	5-20	98.25	6.06	92.19	<50	<89	<110	<0.5	<0.5	<0.5	<1.5	--	0.047	--	--	
MW-12	5/27/2008	5-20	98.25	4.22	94.03	<50	<82	<100	<0.5	<0.5	<0.5	1	<0.5	--	--	--	
MW-12	12/2/2008	5-20	98.25	2.84	95.41	--	--	--	--	--	--	--	--	--	--	--	
MW-12	3/18/2009	5-20	98.25	2.15	96.10	<50	<29	<67	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	
MW-12	5/26-27/2009	5-20	98.25	3.50	94.75	<50	<30	<71	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	
MW-12	8/3-4/2009	5-20	98.25	6.40	91.85	<50	<30	<70	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	
MW-12	12/29-30/2009	5-20	98.25	3.00	95.25	<50	63	<67	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-12	2/4-5/2010	5-20	98.25	2.98	95.27	<50	<29	<68	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-12	6/1/2010	5-20	98.25	2.55	95.70	<50	<30	<69	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-12	8/10/2010	5-20	98.25	5.86	92.39	<50	<29	<190	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-12	11/18/2010	5-20	98.25	1.44	96.81	<50	<28	<66	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-12	3/15/2011	5-20	98.25	2.08	96.17	<50	<30	250	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-12	8/25/2011	5-20	98.25	6.36	91.89	<50	31	<68	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-12	11/10/2011	5-20	98.25	3.40	94.85	<50	<31	<72	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-12	2/10/2012	5-20	98.25	2.25	96.00	<50	39	<69	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-12	5/30/2012	5-20	98.25	3.10	95.15	<50	<30	<70	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-12	8/27/2012	5-20	98.25	6.51	91.74	<50	<29	<67	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-12	11/20/2012	5-20	98.25	2.63	95.62	<50	<29	<68	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-12	2/7/2013	5-20	98.25	2.01	96.24	<50	<28	<66	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-12	5/10/2013	5-20	98.25	3.80	94.45	<50	<29	<67	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-12	8/8/2013	5-20	98.25	6.32	91.93	<50	<30	<70	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-12	10/22/2013	5-20	98.25	3.79	94.46	<50	<29	<67	<0.5	<05	<0.5	<1.5	--	--	--	--	
MW-12	2/24/2014	5-20	98.25	3.40	94.85	<50	<29	71	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-12	5/28/2014	5-20	98.25	3.32	94.93	<50	<29	<68	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-12	8/25/2014	5-20	98.25	5.79	92.46	<50	<28	89	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-12	11/3/2014	5-20	98.25	2.62	95.63	<50	<29	<68	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-12	3/23-24/2015	5-20	98.25	2.71	95.54	<50	<31	<71	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-12	5/26-27/2015	5-20	98.25	4.88	93.37	<50	<29	<67	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-12	8/13/2015	5-20	98.25	6.03	92.22	<50	<46	<100	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-12	11/16-17/2015	5-20	98.25	2.87	95.38	<50	<45	<100	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-12	2/21-22/2016	5-20	98.25	2.43	95.82	<50	<47	<100	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-12	5/15-16/2016	5-20	98.25	4.39	93.86	<50	<46	<100	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-12	8/15-16/2016	5-20	98.25	5.44	92.81	<50	<46	<100	<0.2	<0.2	<0.2	<0.2	--	--	--	--	
MW-12	11/15/2016	5-20	99.25	2.48	96.77	<50	<45	<100	<0.2	<0.2	<0.2	<0.2	--	--	--	--	
MW-12	1/10/2019	5-20	98.25	2.72	95.53	<19	<46	<100	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-12	7/21/2019	5-20	98.25	4.11	94.14	<19	<45	<100	<0.2[1]	<0.2[1]	<0.4[1]	<1.0[1]	--	--	--	--	
MW-12	2/12/2020	5-20	949.53	2.35	947.18	<100	<200	<250	<1.00	<1.00	<1.00	<3.00	--	--	--	--	WELL RESURVEYED
MW-12	8/2/2020	5-20	949.53	5.00	944.53	64.4 B J	142 J	100 J	<1.00	<1.00	<1.00	<3.00	--	--	--	--	
MW-12	2/9/2021	5-20	949.53	2.40	947.13	32.8 B J	<200	<250	<1.00	<1.00	<1.00	<3.00	--	--	--	--	
MW-13	12/2/2008	3-18	99.02	3.22	95.80	--	--	--	--	--	--	--	--	--	--	--	
MW-13	3/18/2009	3-18	99.02	2.24	96.78	<50	180	330	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	
MW-13	5/26-27/2009	3-18	99.02	3.88	95.14	<50	360	**<700**	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	
MW-13	8/3-4/2009	3-18	99.02	6.73	92.29	<50	**660**	**700**	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	
MW-13	12/29-30/2009	3-18	99.02	4.57	94.45	<50	110	<68	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-13	2/4-5/2010	3-18	99.02	3.68	95.34	<50	59	<69	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-13	6/1/2010	3-18	99.02	2.83	96.19	<50	<30	<70	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-13	8/10/2010	3-18	99.02	6.20	92.82	<50	<300	**<700**	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-13	11/18/2010	3-18	99.02	--	--					UNABLE TO SAMPLE - AREA FLOODED							
MW-13	3/15/2011	3-18	99.02	--	--					UNABLE TO SAMPLE - AREA FLOODED							
MW-13	6/2/2011	3-18	99.02	--	--					UNABLE TO SAMPLE - AREA FLOODED							
MW-13	8/25/2011	3-18	99.02	--	--					UNABLE TO SAMPLE - AREA FLOODED							
MW-13	11/10/2011	3-18	99.02	--	--					UNABLE TO SAMPLE - AREA FLOODED							
MW-13	2/9/2012	3-18	99.02	3.50	95.52	86	<29	<67	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-13	5/31/2012	3-18	99.02	1.20	97.82	<50	<32	<75	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-13	8/28/2012	3-18	99.02	6.69	92.33	<50	<28	<66	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-13	11/21/2012	3-18	99.02	1.12	97.90	<50	<29	<69	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-13	2/8/2013	3-18	99.02	2.13	96.89	<50	<28	120	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-13	5/10/2013	3-18	99.02	4.36	94.66	<50	<28	<66	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-13	8/8/2013	3-18	99.02	6.72	92.30	<50	<29	<68	<0 5	<0.5	<0.5	<1.5	--	--	--	--	
MW-13	10/23/2013	3-18	99.02	4.17	94.85	<50	<28	<66	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-13	2/25/2014	3-18	99.02	3.02	96.00	<50	<29	<69	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-13	5/28/2014	3-18	99.02	4.92	94.10	<50	<29	<67	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-13	8/26/2014	3-18	99.02	6.83	92.19	<50	<29	<67	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-13	11/4/2014	3-18	99.02	1.22	97.80	<50	<29	<67	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-13	3/23-24/2015	3-18	99.02	2.93	96.09	<50	<30	<71	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-13	5/26-27/2015	3-18	99.02	4.72	94.30	<50	<28	<66	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-13	8/13/2015	3-18	99.02	7.80	91.22	<50	100	<100	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-13	11/16-17/2015	3-18	99.02	2.96	96.06	<50	50	<100	<0.5	<0.5	<0.5	<15	--	--	--	--	

Table 1. Groundwater Gauging Data and Analytical Results
Former Standard Oil Bulk Plant No. 302095
149 and 167 Main Street
Morton, Washington

Well	Date	Screen Interval (ft. bTOC)	Top of Casing (ft. above NAVD 88)	Depth to Water (ft. bTOC)	Groundwater Elevation (ft. above NAVD 88)	TPH-GRO	TPH-DRO	TPH-HRO	Benzene	Toluene	Ethylbenzene	Total Xylenes	Methyl tert-butyl ether	Dissolved Lead	Total Lead	Naphthalene	Comments
MTCA Method A CULs						**800/1,000**	**500**	**500**	**5**	**1,000**	**700**	**1,000**	**20**	**15**	**15**	**160**	
MW-13	2/21-22/2016	3-18	99.02	2.96	96.06	<50	<46	<100	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-13	5/15-16/2016	3-18	99.02	4.79	94.23	<50	77	<100	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-13	8/15-16/2016	3-18	99.02	5.76	93.26	<50	<46	<100	<0.2	<0.2	<0 2	<0.2	--	--	--	--	
MW-13	11/15/2016	3-18	99.02	2.72	96.30	<50	<45	<100	<0.2	<0.2	<0 2	<0.2	--	--	--	--	
MW-13	1/10/2019	3-18	99.02	2.41	96.61	NOT PART OF SAMPLING PROGRAM											
MW-13	7/21/2019	3-18	99.02	3.95	95.07	NOT PART OF SAMPLING PROGRAM											
MW-13	2/12/2020	3-18	950.32	--	--	WELL INADVERTENTLY NOT GAUGED. NOT PART OF SAMPLING PROGRAM.											WELL RESURVEYED
MW-13	8/2/2020	3-18	950.32	4.20	946.12	NOT PART OF SAMPLING PROGRAM											
MW-13	2/9/2021	3-18	950.32	2.11	948.21	NOT PART OF SAMPLING PROGRAM											
MW-14	12/2/2008	3-18	98.50	2.76	95.74	--	--	--	--	--	--	--	--	--	--	--	
MW-14	3/18/2009	3-18	98.50	1.71	96.79	<50	<29	<67	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	
MW-14	05/26-27/2009	3-18	98.50	3.49	95.01	<50	180	<69	0.6	<0.5	<0.5	<0.5	<0.5	--	--	--	
MW-14	8/3-4/2009	3-18	98.50	5.58	92.92	<50	**550**	<74	0.9	<0.5	0.7	<0.5	<0.5	--	--	--	
MW-14	12/29-30/2009	3-18	98.50	3.81	94.69	<50	42	<65	1.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-14	2/4-5/2010	3-18	98.50	3.88	94.62	<50	37	<69	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-14	6/1/2010	3-18	98.50	2.96	95.54	<50	<29	<68	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-14	8/10/2010	3-18	98.50	6.40	92.10	<50	120	<90	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-14	11/18/2010	3-18	98.50	2.71	95.79	<50	<29	76	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-14	3/15/2011	3-18	98.50	2.91	95.59	<50	<31	94	1.6	1.4	<0.5	<1.5	--	--	--	--	
MW-14	6/2/2011	3-18	98.50	3.83	94.67	<50	<29	190	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-14	8/25/2011	3-18	98.50	6.55	91.95	<50	48	<80	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-14	11/10/2011	3-18	98.50	3.60	94.90	<50	<30	<71	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-14	2/10/2012	3-18	98.50	3.50	95.00	<50	80	<67	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-14	5/31/2012	3-18	98.50	3.40	95.10	<50	<31	<73	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-14	8/27/2012	3-18	98.50	6.41	92.09	<50	<29	<68	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-14	11/21/2012	3-18	98.50	2.86	95.64	<50	<28	<66	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-14	2/8/2013	3-18	98.50	3.09	95.41	<50	<29	<67	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-14	5/10/2013	3-18	98.50	4.44	94.06	<50	<28	<66	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-14	8/8/2013	3-18	98.50	6.44	92.06	<50	73	<67	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-14	10/23/2013	3-18	98.50	3.46	95.04	<50	<30	<69	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-14	2/25/2014	3-18	98.50	2.64	95.86	<50	<28	<65	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-14	5/28/2014	3-18	98.50	3.92	94.58	<50	<28	<66	<0 5	<0.5	<0.5	<1.5	--	--	--	--	
MW-14	8/26/2014	3-18	98.50	5.89	92.61	<50	<29	100	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-14	11/4/2014	3-18	98.50	2.77	95.73	<50	<29	<68	<03	<0.5	<0.5	<1.5	--	--	--	--	
MW-14	3/23-24/2015	3-18	98.50	3.00	95.50	<50	<28	<65	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-14	5/26-27/2015	3-18	98.50	5.28	93.22	<50	<29	<67	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-14	8/13/2015	3-18	98.50	7.19	91.31	<50	100	<100	<03	<0.5	<0.5	<1.5	--	--	--	--	
MW-14	11/16-17/2015	3-18	98.50	3.02	95.48	<50	<46	<100	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-14	2/21-22/2016	3-18	98.50	2.94	95.56	<50	<46	<100	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-14	5/15-16/2016	3-18	98.50	4.87	93.63	<50	<47	<110	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-14	8/15-16/2016	3-18	98.50	5.70	92.80	<50	<46	<100	<0.2	<0.2	<0.2	<0 2	--	--	--	--	
MW-14	11/15/2016	3-18	98.50	2.76	95.74	<50	<46	<100	<0.2	<0.2	<0.2	<0 2	--	--	--	--	
MW-14	1/10/2019	3-18	98.50	--	--	NOT PART OF MONITORING PROGRAM											
WELL ABANDONED MARCH 2018																	
MW-15	12/2/2008	3-18	97.81	1.73	96.08	--	--	--	--	--	--	--	--	--	--	--	
MW-15	3/18/2009	3-18	97.81	1.45	96.36	**1,200**	300	180	<0.5	<0.5	1	<0.5	<0.5	--	--	--	
MW-15	5/26-27/2009	3-18	97.81	2.75	95.06	**1,500**	140	<69	<0.5	<0.5	1	<0.5	<0.5	--	--	--	
MW-15	8/3-4/2009	3-18	97.81	5.59	92.22	**1,200**	190	<69	0.9	<0.5	1	<0.5	<0.5	--	--	--	
MW-15	12/29-30/2009	3-18	97.81	2.48	95.33	**1,500**	230	<68	1.9	1.1	1.8	2.9	--	--	--	--	
MW-15	2/4-5/2010	3-18	97.81	2.54	95.27	**1,600**	190	<69	1.7	1.1	1.9	3.2	--	--	--	--	
MW-15	6/1/2010	3-18	97.81	1.67	96.14	760	82	<69	<0.5	0.7	0.9	<5.0	--	--	--	--	
MW-15	8/10/2010	3-18	97.81	5.15	92.66	**1,300**	160	<69	1.5	0.9	1.3	<10	--	--	--	--	
MW-15	11/18/2010	3-18	97.81	1.38	96.43	**830**	120	<66	1.2	0.8	0.9	<5.0	--	--	--	--	
MW-15	3/15/2011	3-18	97.81	1.60	96.21	**1,200**	180	77	2.6	2.1	1.6	6.9	--	--	--	--	
MW-15	6/2/2011	3-18	97.81	2.55	95.26	**1,300**	270	<71	1.6	<10	1.8	4.8	--	--	--	--	
MW-15	8/25/2011	3-18	97.81	5.60	92.21	**870**	210	<69	1.3	<0.5	1.5	7.1	--	--	--	--	
MW-15	11/10/2011	3-18	97.81	3.05	94.76	750	66	<69	<2.0	<5.0	1.3	6.7	--	--	--	--	
MW-15	2/10/2012	3-18	97.81	2.50	95.31	**820**	35	160	<2.0	<6.0	2.1	5.8	--	--	--	--	
MW-15	5/30/2012	3-18	97.81	2.50	95.31	**1,100**	110	<69	1.1	<8.0	2.4	7.8	--	--	--	--	
MW-15	8/28/2012	3-18	97.81	5.53	92.28	740	190	<69	1.4	<5.0	1.9	5.4	--	--	--	--	
MW-15	11/21/2012	3-18	97.81	1.93	95.88	760	57	<66	1.4	<5.0	2	5.6	--	--	--	--	
MW-15	2/7/2013	3-18	97.81	1.78	96.03	640	47	<66	1.1	<6.0	1.8	<6.0	--	--	--	--	
MW-15	5/10/2013	3-18	97.81	4.23	93.58	580	<29	<67	1	<4.0	0.9	<6.0	--	--	--	--	
MW-15	8/8/2013	3-18	97.81	5.89	91.92	630	150	<66	**13**	<5.0	1.9	6.3	--	--	--	--	
MW-15	10/22/2013	3-18	97.81	2.98	94.83	430	<30	<70	0.6	<3.0	0.8	2.3	--	--	--	--	
MW-15	2/25/2014	3-18	97.81	1.54	96.27	**900**	38	<70	1	<5.0	1.6	6.8	--	--	--	--	
MW-15	5/28/2014	3-18	97.81	2.32	95.49	760	36	<68	<2.0	<2.0	1.2	6	--	--	--	--	
MW-15	8/26/2014	3-18	97.81	4.89	92.92	870	50	<67	<2.0	<2.0	1.5	<8.0	--	--	--	--	
MW-15	11/3/2014	3-18	97.81	1.89	95.92	360	50	<69	0.9	<2.0	1	<6.0	--	--	--	--	
MW-15	3/23-24/2015	3-18	97.81	1.91	95.90	480	48	<65	<0.5	1.2	1.1	<5.0	--	--	--	--	
MW-15	5/26-27/2015	3-18	97.81	5.58	92.23	580	51	<68	<0.5	<2.0	1.6	<7.0	--	--	--	--	
MW-15	8/13/2015	3-18	97.81	6.06	91.75	**900**	150	<110	1	1.1	1.7	5.4	--	--	--	--	
MW-15	11/16-17/2015	3-18	97.81	1.75	96.06	460	78	<100	<0.5	<0.5	<0.5	2.6	--	--	--	--	
MW-15	2/21-22/2016	3-18	97.81	1.45	96.36	180	69	<100	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-15	5/15-16/2016	3-18	97.81	3.55	94.26	330	62	<100	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-15	8/15-16/2016	3-18	97.81	4.65	93.16	**1,000**	85	<100	<0.2	<0.2	1	4.1	--	--	--	--	
MW-15	11/15/2016	3-18	97.81	1.70	96.11	**1,200**	73	<100	<0.9	<0.2	1.3	4.8					
MW-15	1/10/2019	3-18	97.81	1.29	96.52	<19	<46	<100	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-15	7/21/2019	3-18	97.81	2.70	95.11	<19	<45	<100	<0.2	<0.2	<0.4	<1.0	--	--	--	--	
MW-15	2/12/2020	3-18	949.09	1.25	947.84	379	238	<250	<1.00	<1.00	<1.00	<3.00	--	--	--	--	WELL RESURVEYED
MW-15	8/2/2020	3-18	949.09	3.82	945.27	670	218	<250	<1.00	<1.00	<1.00	<3.00	--	--	--	--	

Table 1. Groundwater Gauging Data and Analytical Results
Former Standard Oil Bulk Plant No. 302095
149 and 167 Main Street
Morton, Washington

ARCADIS Design & Consultancy for natural and built assets

Well	Date	Screen Interval (ft. bTOC)	Top of Casing (ft. above NAVD 88)	Depth to Water (ft. bTOC)	Groundwater Elevation (ft. above NAVD 88)	TPH-GRO	TPH-DRO	TPH-HRO	Benzene	Toluene	Ethylbenzene	Total Xylenes	Methyl tert-butyl ether	Dissolved Lead	Total Lead	Naphthalene	Comments
MTCA Method A CULs						**800/1,000**	**500**	**500**	**5**	**1,000**	**700**	**1,000**	**20**	**15**	**15**	**160**	
MW-15	2/9/2021	3-18	949.09	1.25	947.84	254 B	<200	<250	<1.00	<1.00	<1.00	<3.00	--	--	--	--	
MW-16	12/2/2008	3-18	97.73	2.32	95.41	--	--	--	--	--	--	--	--	--	--	--	
MW-16	3/18/2009	3-18	97.73	1.30	96.43	520	**1,200**	220	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	
MW-16	5/26-27/2009	3-18	97.73	2.97	94.76	680	390	<69	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	
MW-16	8/3-4/2009	3-18	97.73	5.36	92.37	410	**540**	<69	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	
MW-16	12/29-30/2009	3-18	97.73	2.80	94.93	500	**710**	100	0.6	0.6	<0.5	1.7	--	--	--	--	
MW-16	2/4-5/2010	3-18	97.73	2.89	94.84	**810**	**730**	70	0.8	0.9	0.7	1.7	--	--	--	--	
MW-16	6/1/2010	3-18	98.63	2.79	95.84	**1,400**	380	<69	<5.0	2.2	1.3	<1.5	--	--	--	--	
MW-16	8/10/2010	3-18	98.63	6.33	92.30	550	240	<90	0.6	0.6	0.6	1.7	--	--	--	--	
MW-16	11/18/2010	3-18	98.63	2.44	96.19	710	420	<68	0.8	1	0.9	1.8	--	--	--	--	
MW-16	3/15/2011	3-18	98.63	2.71	95.92	**890**	**1,500**	440	2.6	2.2	1.1	3.8	--	--	--	--	
MW-16	6/2/2011	3-18	98.63	3.60	95.03	490	**2,400**	320	0.5	<2.0	0.6	<5.0	--	--	--	--	
MW-16	8/25/2011	3-18	98.63	6.60	92.03	110	230	<68	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-16	11/10/2011	3-18	98.63	4.35	94.28	510	**850**	<69	0.5	0.6	0.8	2.9	--	--	--	--	
MW-16	2/10/2012	3-18	98.63	3.35	95.28	370	71	<67	0.6	0.6	0.7	1.6	--	--	--	--	
MW-16	5/31/2012	3-18	98.63	3.80	94.83	530	**1,800**	<70	0.7	0.6	1	2.7	--	--	--	--	
MW-16	8/28/2012	3-18	98.63	6.39	92.24	130	42	<67	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-16	11/20/2012	3-18	98.63	2.83	95.80	390	120	<66	0.6	0.5	0.6	<1.5	--	--	--	--	
MW-16	2/7/2013	3-18	98.63	2.91	95.72	480	120	<66	0.7	0.5	0.8	<1.5	--	--	--	--	
MW-16	5/9/2013	3-18	98.63	4.39	94.24	450	77	<68	0.6	<0.5	0.6	<5.0	--	--	--	--	
MW-16	8/8/2013	3-18	98.63	6.23	92.40	170	400	<67	<0.5	<0.5	0.6	<1.5	--	--	--	--	
MW-16	10/23/2013	3-18	98.63	4.16	94.47	580	99	<67	0.7	0.5	0.9	<5.0	--	--	--	--	
MW-16	2/25/2014	3-18	98.63	2.64	95.99	660	120	<70	0.7	0.6	1	2.7	--	--	--	--	
MW-16	5/27/2014	3-18	98.63	3.80	94.83	650	140	<67	0.6	0.5	0.9	2.5	--	--	--	--	
MW-16	8/25/2014	3-18	98.63	5.87	92.76	220	57	<66	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-16	11/4/2014	3-18	98.63	2.88	95.75	480	**1,800**	220	<2.0	0.7	1.1	<5.0	--	--	--	--	
MW-16	3/23-24/2015	3-18	98.63	2.82	95.81	220	230	<68	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-16	5/26-27/2015	3-18	98.63	4.72	93.91	180	93	<66	<0 5	<0.5	0.5	<2.0	--	--	--	--	
MW-16	8/13/2015	3-18	98.63	7.13	91.50	100	150	<100	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-16	11/16-17/2015	3-18	98.63	2.98	95.65	**1,700**	**1,700**	250	1.3	1.2	1.5	2.1	--	--	--	--	
MW-16	2/21-22/2016	3-18	98.63	2.68	95.95	**1,800**	**760**	<100	1.3	1	1.4	2.2	--	--	--	--	
MW-16	5/15-16/2016	3-18	98.63	4.89	93.74	400	280	<100	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-16	8/15-16/2016	3-18	98.63	5.69	92.94	700	290	<100	0.5	<0.2	0.8	1.6	--	--	--	--	
MW-16	11/15/2016	3-18	98.63	2.56	96.07	**940**	380	<100	0.7	0.6	1	1.7					
MW-16	1/10/2019	3-18	98.63	2.31	96.32	610	**590**	<100	0.9 J	0.6 J	1 J	<1.5	--	--	--	--	
MW-16	7/21/2019	3-18	98.63	3.77	94.86	**2,000**[1]	**550**	<100	<0.2	0.5 J	<0.4	<1.0	--	--	--	--	
MW-16	2/12/2020	3-18	949.89	2.18	947.71	167	**670**	184 J	<1.00	<1.00	<1.00	<3.00	--	--	--	--	
MW-16 DUP	2/12/2020	3-18	949.89	2.18	947.71	105	**665**	175 J	<1.00	<1.00	<1.00	<3.00	--	--	--	--	WELL RESURVEYED
MW-16	8/2/2020	3-18	949.89	4.70	945.19	345 B	**1,570**	134 J	<1.00	<1.00	<1.00	<3.00	--	--	--	--	
MW-16	2/9/2021	3-18	949.89	2.21	947.68	292 B	**642**	**593**	<1.00	<1.00	<1.00	<3.00	--	--	--	--	
MW-17	12/2/2008	3-18	97.76	2.21	95.55	--	--	--	--	--	--	--	--	--	--	--	
MW-17	3/18/2009	3-18	97.76	1.29	96.47	<50	310	200	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	
MW-17	5/26-27/2009	3-18	97.76	2.78	94.98	130	360	<69	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	
MW-17	8/3-4/2009	3-18	97.76	5.45	92.31	<50	100	<68	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	
MW-17	12/29-30/2009	3-18	97.76	3.44	94.32	<50	150	<68	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-17	2/4-5/2010	3-18	97.76	3.49	94.27	53	220	<69	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-17	6/1/2010	3-18	97.76	2.54	95.22	<50	82	<68	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-17	8/10/2010	3-18	97.76	6.22	91.54	<50	87	<90	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-17	11/18/2010	3-18	97.76	2.34	95.42	<50	70	<68	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-17	3/15/2011	3-18	97.76	2.55	95.21	94	140	84	2	2	<0.5	<1.5	--	--	--	--	
MW-17	6/2/2011	3-18	97.76	3.41	94.35	70	280	160	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-17	8/25/2011	3-18	97.76	6.70	91.06	<50	95	<73	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-17	11/10/2011	3-18	97.76	4.00	93.76	<50	100	<68	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-17	2/10/2012	3-18	97.76	3.20	94.56	<50	<29	<67	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-17	5/31/2012	3-18	97.76	3.60	94.16	<50	81	<71	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-17	8/28/2012	3-18	97.76	6.35	91.41	<50	<29	<68	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-17	11/20/2012	3-18	97.76	2.53	95.23	<50	<29	<67	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-17	2/7/2013	3-18	97.76	2.89	94.87	<50	<29	<67	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-17	5/9/2013	3-18	97.76	4.13	93.63	<50	<29	<67	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-17	8/8/2013	3-18	97.76	6.24	91.52	<50	<28	<66	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-17	10/23/2013	3-18	97.76	4.04	93.72	<50	<29	<69	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-17	2/25/2014	3-18	97.76	2.48	95.28	56	<28	<65	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-17	5/27/2014	3-18	97.76	3.64	94.12	<50	36	<67	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-17	8/25/2014	3-18	97.76	5.97	91.79	<50	<28	<66	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-17	11/4/2014	3-18	97.76	2.61	95.15	<50	99	<68	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-17	3/23-24/2015	3-18	97.76	2.88	94.88	<50	<29	<68	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-17	5/26-27/2015	3-18	97.76	4.71	93.05	<50	31	<67	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-17	8/13/2015	3-18	97.76	7.26	90.50	<50	58	<100	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-17	11/16-17/2015	3-18	97.76	2.70	95.06	79	65	<100	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-17	2/21-22/2016	3-18	97.76	2.62	95.14	100	110	<100	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-17	5/15-16/2016	3-18	97.76	4.76	93.00	<50	87	<100	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-17	8/15-16/2016	3-18	97.76	5.73	92.03	<50	60	<100	<0.2	<0.2	<0.2	<0.2	--	--	--	--	
MW-17	11/15/2016	3-18	97.76	2.41	95.35	<50	74	<100	<0.2	<0.2	<0.2	<0.2	--	--	--	--	
MW-17	1/10/2019	3-18	97.76	2.38	95.38	NOT PART OF SAMPLING PROGRAM											
MW-17	7/21/2019	3-18	97.76	3.54	94.22	NOT PART OF SAMPLING PROGRAM											
MW-17	2/12/2020	3-18	949.85	2.00	947.85	NOT PART OF SAMPLING PROGRAM											WELL RESURVEYED
MW-17	8/2/2020	3-18	949.85	4.58	945.27	NOT PART OF SAMPLING PROGRAM											
MW-17	2/9/2021	3-18	949.85	2.08	947.77	NOT PART OF SAMPLING PROGRAM											
MW-18	12/2/2008	3-18	98.44	3.41	95.03	--	--	--	--	--	--	--	--	--	--	--	
MW-18	3/18/2009	3-18	98.44	2.61	95.83	<50	73	<72	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	

Table 1. Groundwater Gauging Data and Analytical Results
Former Standard Oil Bulk Plant No. 302095
149 and 167 Main Street
Morton, Washington

Well	Date	Screen Interval (ft. bTOC)	Top of Casing (ft. above NAVD 88)	Depth to Water (ft. bTOC)	Groundwater Elevation (ft. above NAVD 88)	TPH-GRO	TPH-DRO	TPH-HRO	Benzene	Toluene	Ethylbenzene	Total Xylenes	Methyl tert-butyl ether	Dissolved Lead	Total Lead	Naphthalene	Comments
MTCA Method A CULs						**800/1,000**	**500**	**500**	**5**	**1,000**	**700**	**1,000**	**20**	**15**	**15**	**160**	
MW-18	5/26-27/2009	3-18	98.44	3.83	94.61	120	390	110	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	
MW-18	8/3-4/2009	3-18	98.44	6.51	91.93	<50	130	<70	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	
MW-18	12/29-30/2009	3-18	98.44	3.02	95.42	<50	360	120	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-18	2/4-5/2010	3-18	98.44	2.77	95.67	<50	130	310	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-18	6/1/2010	3-18	98.44	1.62	96.82	<50	<30	<69	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-18	8/10/2010	3-18	98.44	5.66	92.78	<50	310	400	<0.5	<0.5	<0.5	<1.6	--	--	--	--	
MW-18	11/18/2010	3-18	98.44	0.85	97.59	<50	42	160	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-18	3/15/2011	3-18	98.44	1.17	97.27	<50	60	200	3	2	<0.5	<1.5	--	--	--	--	
MW-18	6/2/2011	3-18	98.44	1.46	96.98	<50	<300	**<700**	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-18	8/25/2011	3-18	98.44	6.10	92.34	<50	710	230	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-18	11/10/2011	3-18	98.44	3.40	95.04	<50	<29	<69	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-18	2/10/2012	3-18	98.44	2.40	96.04	<50	<29	<68	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-18	5/31/2012	3-18	98.44	1.20	97.24	<50	<29	<67	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-18	8/27/2012	3-18	98.44	5.35	93.09	<50	31	190	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-18	11/20/2012	3-18	98.44	1.23	97.21	<50	<29	<67	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-18	2/7/2013	3-18	98.44	0.97	97.47	<50	<28	<66	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-18	5/9/2013	3-18	98.44	3.74	94.70	<50	<28	<66	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-18	8/8/2013	3-18	98.44	5.65	92.79	<50	<29	<67	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-18	10/23/2013	3-18	98.44	3.60	94.84	<50	<29	<68	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-18	2/25/2014	3-18	98.44	1.33	97.11	<50	<29	<68	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-18	5/27/2014	3-18	98.44	2.68	95.76	<50	<29	<67	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-18	8/25/2014	3-18	98.44	5.27	93.17	<50	<28	<66	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-18	11/4/2014	3-18	98.44	1.31	97.13	<50	<29	<68	<05	<0.5	<0.5	<1.5	--	--	--	--	
MW-18	3/23-24/2015	3-18	98.44	1.01	97.43	<50	<30	<71	<0.5	<0.5	<0 5	<1.5	--	--	--	--	
MW-18	5/26-27/2015	3-18	98.44	4.41	94.03	<50	<29	<67	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-18	8/13/2015	3-18	98.44	6.82	91.62	<50	77	<100	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-18	11/16-17/2015	3-18	98.44	1.08	97.36	<50	<46	<100	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-18	2/21-22/2016	3-18	98.44	1.19	97.25	<50	<47	<100	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-18	5/15-16/2016	3-18	98.44	3.22	95.22	<50	<46	<100	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-18	8/15-16/2016	3-18	98.44	5.21	93.23	<50	<46	<100	<0.2	<0.2	<0 2	<0.2	--	--	--	--	
MW-18	11/15/2016	3-18	98.44	0.44	98.00	<50	<45	<100	<0.2	<0.2	<0 2	<0.2	--	--	--	--	
MW-18	1/10/2019	3-18	98.44	--	--	NOT PART OF MONITORING PROGRAM											
MW-18	7/21/2019	3-18	98.44	--	--	NOT PART OF MONITORING PROGRAM											
MW-18	2/12/2020	3-18	949.19	0.84	948.35	NOT PART OF MONITORING PROGRAM. WELL INADVERTENTLY GAUGED.											WELL RESURVEYED
MW-19	12/2/2008	3-18	98.54	3.78	94.76	--	--	--	--	--	--	--	--	--	--	--	
MW-19	3/18/2009	3-18	98.54	2.90	95.64	<50	<29	<68	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	
MW-19	5/26-27/2009	3-18	98.54	4.56	93.98	<50	360	500	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	
MW-19	8/3-4/2009	3-18	98.54	6.88	91.66	<50	<29	<68	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	
MW-19	12/29-30/2009	3-18	98.54	3.02	95.52	<50	<29	<69	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-19	2/4-5/2010	3-18	98.54	3.75	94.79	<50	<30	<70	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-19	6/1/2010	3-18	98.54	3.14	95.40	<50	<30	<69	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-19	8/10/2010	3-18	98.54	6.41	92.13	<50	<29	<90	<0.5	<0.5	<0.5	<1.6	--	--	--	--	
MW-19	11/18/2010	3-18	98.54	1.89	96.65	<50	<29	<68	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-19	3/15/2011	3-18	98.54	2.78	95.76	<50	44	85	2	2	<0.5	<1.5	--	--	--	--	
MW-19	6/2/2011	3-18	98.54	3.94	94.60	<50	36	79	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-19	8/25/2011	3-18	98.54	6.95	91.59	<50	41	<70	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-19	11/10/2011	3-18	98.54	4.70	93.84	<50	<29	<69	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-19	2/10/2012	3-18	98.54	4.05	94.49	<50	<29	<67	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-19	5/31/2012	3-18	98.54	4.30	94.24	<50	<32	<75	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-19	8/27/2012	3-18	98.54	6.90	91.64	<50	<32	<75	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-19	11/20/2013	3-18	98.54	3.18	95.36	<50	<28	<66	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-19	2/7/2013	3-18	98.54	3.74	94.80	<50	<29	<67	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-19	5/9/2013	3-18	98.54	5.03	93.51	<50	<29	<68	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-19	8/8/2013	3-18	98.54	6.89	91.65	<50	<29	<67	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-19	10/23/2013	3-18	98.54	4.83	93.71	<50	<29	<67	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-19	2/24/2014	3-18	98.54	3.40	95.14	<50	<29	<67	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-19	5/27/2014	3-18	98.54	4.52	94.02	<50	<29	<67	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-19	8/25/2014	3-18	98.54	6.59	91.95	<50	<28	<66	<0.5	<0.5	<0 5	<15	--	--	--	--	
MW-19	11/4/2014	3-18	98.54	1.86	96.68	<50	<33	<77	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-19	3/23-24/2015	3-18	98.54	1.00	97.54	<50	<28	<66	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-19	5/26-27/2015	3-18	98.54	5.64	92.90	<50	<28	<66	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-19	8/13/2015	3-18	98.54	7.79	90.75	<50	<46	<100	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-19	11/16-17/2015	3-18	98.54	2.70	95.84	<50	<46	<100	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-19	2/21-22/2016	3-18	98.54	3.45	95.09	<50	<46	<100	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-19	5/15-16/2016	3-18	98.54	5.55	92.99	<50	<46	<100	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-19	8/15-16/2016	3-18	98.54	6.46	92.08	<50	<46	<100	<0.2	<0.2	<0.2	<0.2	--	--	--	--	
MW-19	11/15/2016	3-18	98.54	2.74	95.80	<50	<45	<100	<0.2	<0.2	<0.2	<0.2	--	--	--	--	
MW-19	1/10/2019	3-18	98.54	--	--	NOT PART OF MONITORING PROGRAM											
WELL ABANDONED MARCH 2018																	
MW-20	12/2/2008	3-18	98.92	1.93	96.99	--	--	--	--	--	--	--	--	--	--	--	
MW-20	3/18/2009	3-18	98.92	1.85	97.07	<50	<29	<67	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	
MW-20	5/26-27/2009	3-18	98.92	3.60	95.32	<50	63	<69	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	
MW-20	8/3-4/2009	3-18	98.92	7.28	91.64	<50	75	<70	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	
MW-20	12/29-30/2009	3-18	98.92	2.81	96.11	<50	<29	<68	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-20	2/4-5/2010	3-18	98.92	2.70	96.22	<50	<30	<70	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-20	6/1/2010	3-18	98.92	2.30	96.62	<50	<29	<69	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-20	8/10/2010	3-18	98.92	6.49	92.43	<50	350	300	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-20	11/18/2010	3-18	98.92	1.80	97.12	<50	<29	170	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-20	3/15/2011	3-18	98.92	2.26	96.66	<50	<29	170	2	2	<0.5	<1.5	--	--	--	--	
MW-20	6/3/2011	3-18	98.92	2.73	96.19	<50	<31	<71	<0.5	<0.5	<0.5	<1.5	--	--	--	--	

Table 1. Groundwater Gauging Data and Analytical Results
Former Standard Oil Bulk Plant No. 302095
149 and 167 Main Street
Morton, Washington

Well	Date	Screen Interval (ft. bTOC)	Top of Casing (ft. above NAVD 88)	Depth to Water (ft. bTOC)	Groundwater Elevation (ft. above NAVD 88)	TPH-GRO	TPH-DRO	TPH-HRO	Benzene	Toluene	Ethylbenzene	Total Xylenes	Methyl tert-butyl ether	Dissolved Lead	Total Lead	Naphthalene	Comments
MTCA Method A CULs						**800/1,000**	**500**	**500**	**5**	**1,000**	**700**	**1,000**	**20**	**15**	**15**	**160**	
MW-20	8/25/2011	3-18	98.92	7.27	91.65	<50	120	<68	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-20	11/10/2011	3-18	98.92	3.55	95.37	<50	<30	<69	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-20	2/10/2012	3-18	98.92	2.45	96.47	<50	<28	<66	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-20	5/30/2012	3-18	98.92	2.80	96.12	<50	<30	<70	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-20	8/28/2012	3-18	98.92	6.82	92.10	<50	70	<69	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-20	11/21/2012	3-18	98.92	1.93	96.99	<50	<28	<66	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-20	2/7/2013	3-18	98.92	2.40	96.52	<50	<28	<66	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-20	5/10/2013	3-18	98.92	4.06	94.86	<50	<29	<68	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-20	8/8/2013	3-18	98.92	6.18	92.74	<50	<29	<67	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-20	10/22/2013	3-18	98.92	3.81	95.11	<50	<30	<70	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-20	2/25/2014	3-18	98.92	2.26	96.66	<50	<29	<67	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-20	5/28/2014	3-18	98.92	2.76	96.16	<50	<29	<67	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-20	8/26/2014	3-18	98.92	6.08	92.84	<50	30	<66	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-20	11/3/2014	3-18	98.92	1.90	97.02	<50	<28	<66	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-20	3/23-24/2015	3-18	98.92	1.98	96.94	<50	<29	<68	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-20	5/26-27/2015	3-18	98.92	4.88	94.04	<50	<29	<68	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-20	8/13/2015	3-18	98.92	7.81	91.11	<50	89	<100	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-20	11/16-17/2015	3-18	98.92	2.20	96.72	<50	<45	<100	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-20	2/21-22/2016	3-18	98.92	1.94	96.98	<50	<46	<100	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-20	5/15-16/2016	3-18	98.92	3.89	95.03	<50	<47	<100	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-20	8/15-16/2016	3-18	98.92	5.76	93.16	<50	300	<100	<0.2	<0.2	<0.2	<0.2	--	--	--	--	
MW-20	11/15/2016	3-18	98.92	1.84	97.08	<50	<45	<100	<0.2	<0.2	<0.2	<0.2	--	--	--	--	
MW-20	1/10/2019	3-18	98.92	--	--	NOT PART OF MONITORING PROGRAM											
WELL ABANDONED MARCH 2018																	
MW-1	7/9/2004	5-15	97.62	3.92	93.7	<50	**630**	210	<0.5	<0.5	<0.5	<0.5	<0.5	<0.99	--	<1	
MW-1	10/11/2004	5-15	97.62	1.79	95.83	<50	120	<100	<0.5	<0.5	<0.5	<0.5	--	--	--	--	
MW-1	1/25/2005	5-15	97.62	2.01	95.61	<48	<79	<99	<0.5	<0.5	<0.5	<0.5	--	--	--	--	
MW-1	4/13/2005	5-15	97.62	1.19	96.43	<48	450	<99	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-1	7/11/2005	5-15	97.62	2.38	95.24	48	380	<110	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-1	8/13/2007	5-15	97.62			UNABLE TO LOCATE											
MW-1	12/2/2008	5-15	97.55	2.17	95.38	NOT PART OF MONITORING PROGRAM											
NOT PART OF MONITORING PROGRAM																	
MW-2	7/9/2004	5-15	99.18	5.06	94.12	**2,500**	**1,800**	320	**1,100**	35	160	59	<0.5	<0.99	--	19	
MW-2	10/11/2004	5-15	99.18	2.68	96.50	**2,500**	**560**	<99	**1,100**	37	170	44	--	--	--	--	
MW-2	1/25/2005	5-15	99.18	2.82	96.36	**2,200**	**1,700**	180	**880**	33	150	35	--	--	--	--	
MW-2	4/13/2005	5-15	99.18	2.31	96.87	**2,800**	**960**	110	**1,100**	45	380	80	--	--	--	--	
MW-2 DUP	4/13/2005	5-15	99.18	2.31	96.87	**2,700**	**960**	120	**1,100**	48	380	84	--	--	--	--	
MW-2	7/11/2005	5-15	99.18	3.16	96.02	**2,300**	**1,400**	180	**760**	26	170	41	--	--	--	--	
MW-2 DUP	7/11/2005	5-15	99.18	3.16	96.02	**2,100**	**1,500**	170	**810**	25	150	36	--	--	--	--	
ABANDONED IN OCTOBER 2006																	
MW-3	7/9/2004	5-15	100.00	6.03	93.97	80	290	150	**22**	0.600	6	5	<0.5	<0.99	--	<1	
MW-3 DUP	7/9/2004	5-15	100.00	6.03	93.97	100	300	190	**23**	0.600	6	5	<0.5	<0.99	--	<1	
MW-3	10/11/2004	5-15	100.00	4.27	95.73	<50	<79	<98	2	<0.5	<0.5	<0.5	--	--	--	--	
MW-3	1/25/2005	5-15	100.00	4.13	95.87	<48	**670**	120	2	<0.5	<0.5	<0.5	--	--	--	--	
MW-3	4/13/2005	5-15	100.00	3.78	96.22	<48	89	<97	2	<0.5	<0.5	<1.5	--	--	--	--	
MW-3	7/11/2005	5-15	100.00	4.69	95.31	<48	<87	<110	2	<0.5	<0.5	<1.5	--	--	--	--	
ABANDONED IN OCTOBER 2006																	
MW-4	7/9/2004	5-15	97.88	5.30	92.58	**1,600**	**1,700**	240	**160**	13	67	6	<0.5	<0.99	--	4	
MW-4	10/11/2004	5-15	97.88	1.66	96.22	**1,800**	**520**	<97	**140**	16	76	10	--	--	--	--	
MW-4	1/25/2005	5-15	97.88	1.79	96.09	**2,000**	410	<98	**140**	16	79	9	--	--	--	--	
MW-4	4/13/2005	5-15	97.88	1.40	96.48	**2,100**	**1,300**	110	**120**	16	81	15	--	--	--	--	
MW-4	7/11/2005	5-15	97.88	2.18	95.70	**1,800**	**1,200**	170	**54**	8	43	7	--	--	--	--	
ABANDONED IN OCTOBER 2006																	
MW-5	10/11/2004	5-15	98.31	2.79	95.52	90	130	<99	<0.5	<0.5	<0.5	<0.5	--	--	--	--	
MW-5	1/25/2005	5-15	98.31	2.79	95.52	100	**860**	130	<0.5	<0.5	<0.5	<0.5	--	--	--	--	
MW-5	4/13/2005	5-15	98.31	2.23	96.08	110	**530**	<97	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-5	7/11/2005	5-15	98.31	3.38	94.93	64	**590**	140	<0.5	<0.5	<0.5	<1.5	--	--	--	--	
MW-5	8/13/2007	5-15	98.31	UNABLE TO LOCATE		--	--	--	--	--	--	--	--	--	--	--	
ABANDONED/DESTROYED																	
MW-6	10/11/2004	5-20	98.3	2.26	96.04	**1,000**	**600**	<97	1	0.700	<0.5	1	--	--	--	--	
MW-6	1/25/2005	5-20	98.3	2.46	95.84	**1,100**	**1,600**	260	1	0.700	<0.5	1	--	--	--	--	
MW-6 DUP	1/25/2005	5-20	98.3	2.46	95.84	**1,100**	**1,700**	270	1	0.700	0.600	1	--	--	--	--	
MW-6	4/13/2005	5-20	98.3	1.78	96.52	860	**900**	120	<2.0	1	0.900	<5.0	--	--	--	--	
MW-6	7/11/2005	5-20	98.3	3.16	95.14	**1,000**	**1,200**	150	2	1	1	2	--	--	--	--	
ABANDONED IN MARCH 2007																	
MW-8	10/11/2004	5-20	99.21	2.81	96.40	**1,200**	330	<98	**6**	<0.5	2	1	--	--	--	--	
MW-8	1/25/2005	5-20	99.21	2.63	96.58	**1,300**	**740**	170	5	<0.5	1	1	--	--	--	--	
MW-8	4/13/2005	5-20	99.21	2.44	96.77	**1,000**	470	<100	**6**	0.700	2	<5.0	--	--	--	--	
MW-8	7/11/2005	5-20	99.21	3.23	95.98	**1,400**	**670**	<110	**6**	0.900	3	4	--	--	--	--	
ABANDONED IN MARCH 2007																	
MW-9	10/11/2004	5-20	97.52	1.9	95.62	<0.5	<80	<50	<0.5	<0.5	<0.5	--	--	--	--	--	
MW-9	1/25/2005	5-20	97.52	1.68	95.84	<0.5	<78	<48	<0.5	<0.5	<0.5	--	--	--	--	--	
MW-9	4/13/2005	5-20	97.52	1.57	95.95	<0.5	<81	<48	<0.5	<0 5	<1.5	--	--	--	--	--	
MW-9	7/11/2005	5-20	97.52	2.25	95.27	<0.5	<83	<48	<0.5	<0.5	<1.5	--	--	--	--	--	
MW-9	8/13/2007	5-21	98.52	--	--	UNABLE TO LOCATE SINCE REMEDIAL EXCAVATON ACTIVITIES											

Table 1. Groundwater Gauging Data and Analytical Results
Former Standard Oil Bulk Plant No. 302095
149 and 167 Main Street
Morton, Washington

Well	Date	Screen Interval (ft. bTOC)	Top of Casing (ft. above NAVD 88)	Depth to Water (ft. bTOC)	Groundwater Elevation (ft. above NAVD 88)	TPH-GRO	TPH-DRO	TPH-HRO	Benzene	Toluene	Ethylbenzene	Total Xylenes	Methyl tert-butyl ether	Dissolved Lead	Total Lead	Naphthalene	Comments
MTCA Method A CULs						**800/1,000**	**500**	**500**	**5**	**1,000**	**700**	**1,000**	**20**	**15**	**15**	**160**	
MW-9	12/29-30/2009	5-20	97.52	3.15	94.37	NOT PART OF MONITORING PROGRAM											
MW-9	2/12/2020	5-20	949.98	--	--	NOT PART OF MONITORING PROGRAM											WELL RESURVEYED
NOT PART OF MONITORING PROGRAM																	
MW-10	10/11/2004	5-20	98.78	2.09	96.69	**1,800**	**560**	<95	**51**	7	25	7	--	--	--	--	
MW-10 DUP	10/11/2004	5-20	98.78	2.09	96.69	**1,900**	**500**	<98	**51**	7	25	6	--	--	--	--	
MW-10	1/25/2005	5-20	98.78	2.08	96.70	**1,700**	**540**	<110	**37**	6	23	5	--	--	--	--	
MW-10	4/13/2005	5-20	98.78	1.64	97.14	**1,700**	**760**	<100	**24**	4	19	7	--	--	--	--	
MW-10	7/11/2005	5-20	98.78	2.54	96.24	**1,500**	**910**	<110	**31**	4	17	5	--	--	--	--	
NOT PART OF MONITORING/SAMPLING PROGRAM																	

Table 1. Groundwater Gauging Data and Analytical Results
Former Standard Oil Bulk Plant No. 302095
149 and 167 Main Street
Morton, Washington

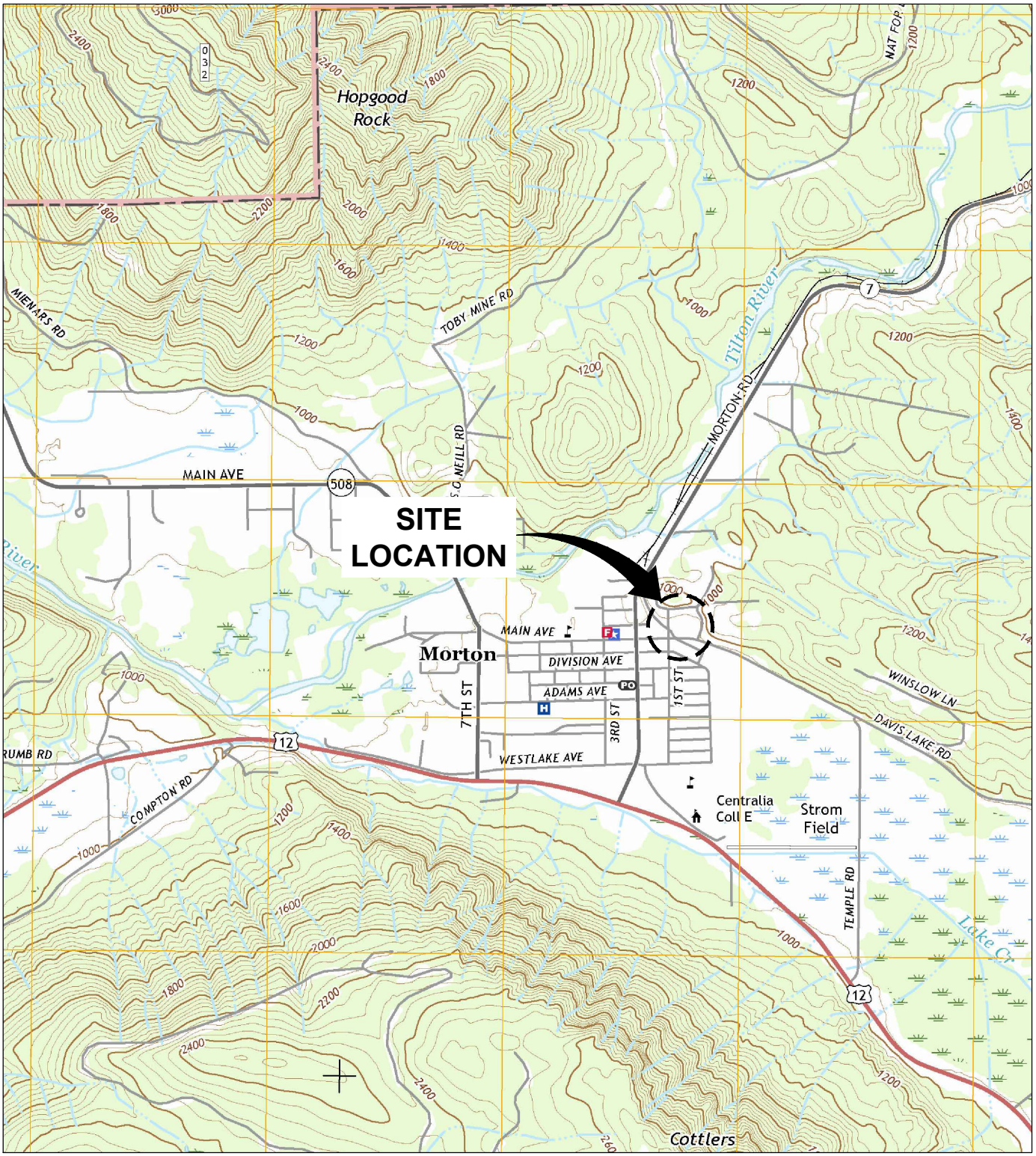
Notes:
Results reported in micrograms per liter (µg/L)
BOLD and highlighted values are greater than their respective MTCA Method A cleanup level
BOLD values are non-detect below the laboratory reporting limit (RL), but the RL is greater than the MTCA Method A cleanup level
Laboratory analytical methods for historical data may not be consistent with current analytical methods. Consult laboratory reports for historical analytical methods used.
Top of Casing data prior to first quarter of 2020 was measured relative to arbitrary 100-foot elevation.
Top of Casing data after the first quarter of 2020 (02/12/20) measured relatvie to North American Vertical Datum of 1988 (NAVD 88).
[4] = The requirement for no headspace at the time of analysis was not met. The container used for the testing had headspace at the time of analysis.
800/1,000 = GRO MTCA Method A CUL with benzene present is 800 µg/L and without is 1,000 µg/L

Abbreviations:
-- = Not applicable, not available, or not analyzed
BTEX = benzene, toluene, ethylbenzene, and xylenes
CUL = Cleanup Level
DUP = Blind duplicate sample results
ft. bTOC = feet below top of casing
ft. above NAVD 88 = feet above North American Vertical Datum of 1988
MTCA = Model Toxics Control Act
MW = groundwater monitoring well
TPH-DRO = Total Petroleum Hydrocarbon as Diesel Range Organics
TPH-GRO = Total petroleum hydrocarbons as Gasoline-Range Organics
TPH-HRO = Total Pretoleum Hydrocarbons as Heavy Oil Range Organics

Laboratory Qualifiers:
< = Not detected at or above the laboratory RL
J = Estimated value; result is greater than the laboratory Method Detection Limit (MDL) but less than the RL
B = The same analyte is found in the associated blank

Current Analytical Methods:
TPH-GRO analyzed by Method NWTPH-Gx
BTEX analyzed by the United States Environmental Protection Agency Method 8260D
TPH-DRO analyzed by NWTPH-Dx-NO SGT
TPH-HRO analyzed by NWTPH-Dx-NO SGT

FIGURES



SOURCE: BASE MAP USGS 7.5. MIN. TOPO. QUAD., MORTON, WA 2017.

N

AREA ■ LOCATION

WASHINGTON

0 2,000' 4,000'

APPROXIMATE SCALE : 1 in. = 2,000 ft.

FORMER STANDARD OIL BULK PLANT NO. 302095
149 & 167 MAIN STREET
MORTON, WASHINGTON

SITE LOCATION MAP

ARCADIS Design & Consultancy for natural and built assets

FIGURE 1

LEGEND:

- MW-16 GROUNDWATER MONITORING WELL
- MW-6 ABANDONED OR DESTROYED MONITORING WELL LOCATIONS
- FENCE LINE
- RAILROAD TRACKS

N

JAN'S LOST & FOUND
JAN'S WAREHOUSE
DEPOT
RESTROOM
EXISTING OFFICE
SIDEWALK
SIDEWALK
GEOTEXTILE LINED PLANTER
POWER POLE
DAVIS LAKE ROAD
FRONT AVENUE

MW-1
MW-2
MW-3
MW-4
MW-5
MW-6
MW-7
MW-8
MW-9
MW-10
MW-11
MW-12
MW-13
MW-14
MW-15
MW-16
MW-17
MW-18
MW-19
MW-20

0 30' 60'

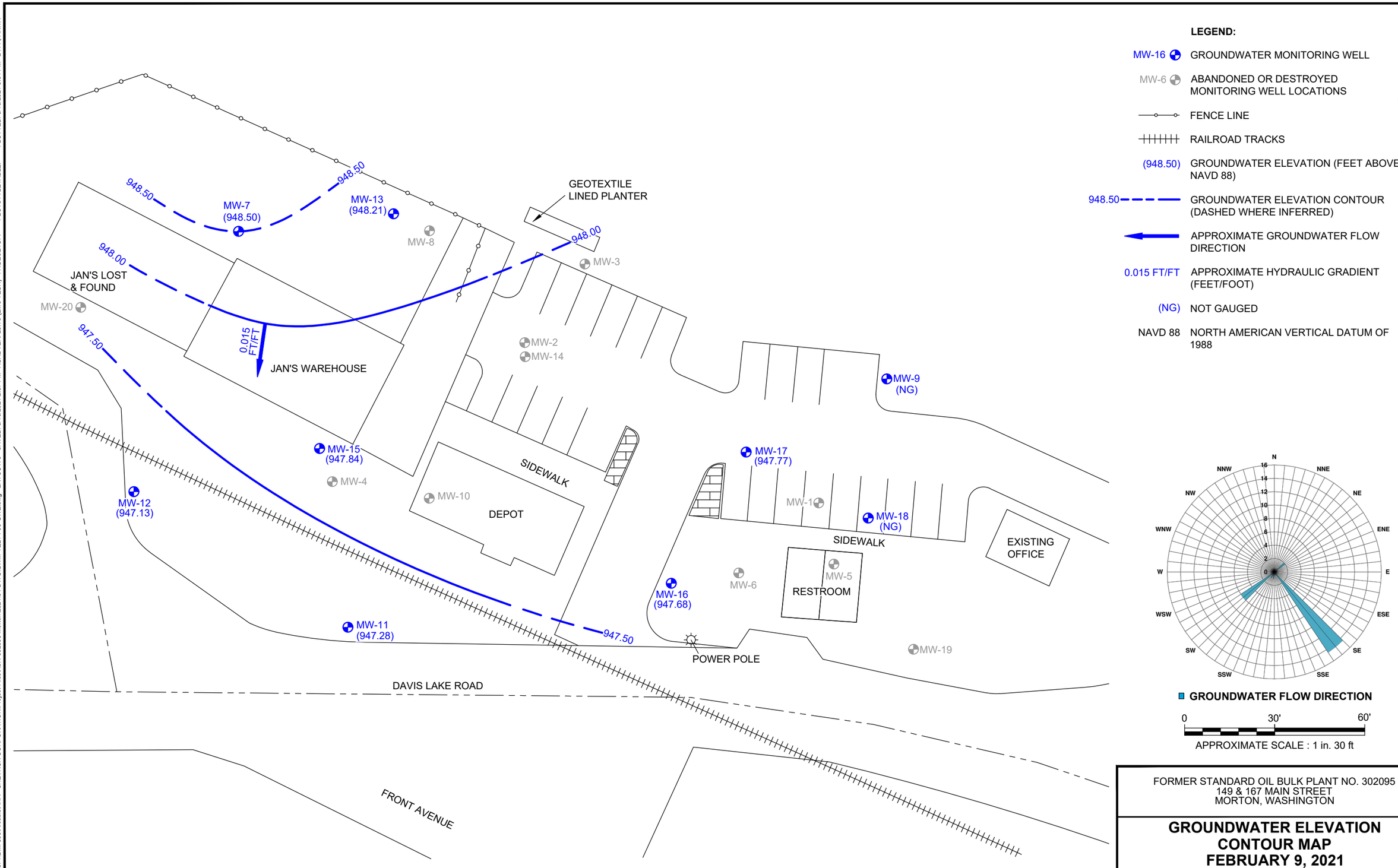
APPROXIMATE SCALE : 1 in. 30 ft

FORMER STANDARD OIL BULK PLANT NO. 302095
149 & 167 MAIN STREET
MORTON, WASHINGTON

SITE PLAN

ARCADIS Design & Consultancy for natural and built assets

FIGURE 2



LEGEND:

N

MW-16	GROUNDWATER MONITORING WELL
MW-6	ABANDONED OR DESTROYED MONITORING WELL LOCATIONS
	FENCE LINE
	RAILROAD TRACKS
(948.50)	GROUNDWATER ELEVATION (FEET ABOVE NAVD 88)
948.50	GROUNDWATER ELEVATION CONTOUR (DASHED WHERE INFERRED)
	APPROXIMATE GROUNDWATER FLOW DIRECTION
0.015 FT/FT	APPROXIMATE HYDRAULIC GRADIENT (FEET/FOOT)
(NG)	NOT GAUGED
NAVD 88	NORTH AMERICAN VERTICAL DATUM OF 1988

GROUNDWATER FLOW DIRECTION

0 30' 60'

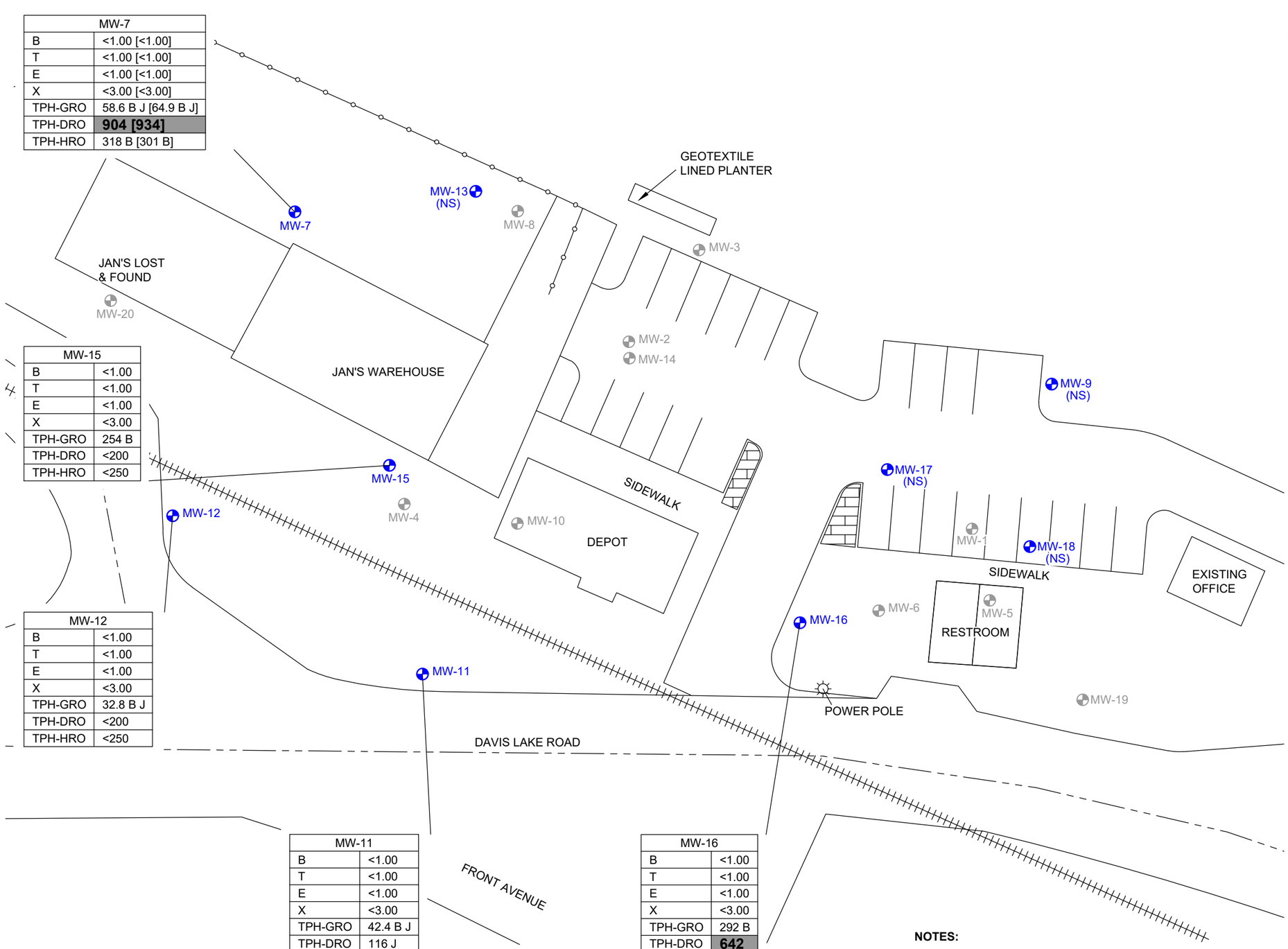
APPROXIMATE SCALE : 1 in. 30 ft

FORMER STANDARD OIL BULK PLANT NO. 302095
149 & 167 MAIN STREET
MORTON, WASHINGTON

GROUNDWATER ELEVATION CONTOUR MAP FEBRUARY 9, 2021

ARCADIS Design & Consultancy for natural and built assets

FIGURE 3



LEGEND:

MW-16	GROUNDWATER MONITORING WELL
MW-6	ABANDONED OR DESTROYED MONITORING WELL LOCATIONS
	FENCE LINE
	RAILROAD TRACKS
BOLD	BOLD AND HIGHLIGHTED VALUES ARE GREATER THAN THEIR RESPECTIVE MODEL TOXIC CONTROL ACT (MTCA) METHOD A CLEANUP LEVEL
<1.00	NOT DETECTED AT OR ABOVE THE LABORATORY RL
J	ESTIMATED VALUE; RESULT IS GREATER THAN THE LABORATORY METHOD DETECTION LIMIT BUT LESS THAN THE RL
B	THE SAME ANALYTE IS FOUND IN THE ASSOCIATED BLANK
[ ]	DUPLICATE RESULTS
(NS)	NOT SAMPLED

MTCA METHOD A CLEANUP LEVELS

ABBREVIATION	CONSTITUENT	MTCA METHOD A CLEANUP LEVEL
B	BENZENE	**5**
T	TOLUENE	**1,000**
E	ETHYLBENZENE	**700**
X	TOTAL XYLENES	**1,000**
TPH-GRO	TOTAL PETROLEUM HYDROCARBONS AS GASOLINE RANGE ORGANICS	**800/1,000**
TPH-DRO	TOTAL PETROLEUM HYDROCARBONS AS DIESEL RANGE ORGANICS	**500**
TPH-HRO	TOTAL PETROLEUM HYDROCARBONS AS HEAVY OIL RANGE ORGANICS	**500**

0 30' 60'

APPROXIMATE SCALE : 1 in. 30 ft

NOTES:

1. ALL CONCENTRATIONS REPORTED IN MICROGRAMS PER LITER (µg/L).
2. TPH-GRO MTCA METHOD A CLEANUP LEVEL IS 800 (µg/L) IF BENZENE PRESENT IN GROUNDWATER AND 1,000 (µg/L) IF NO DETECTABLE BENZENE IN GROUNDWATER.

FORMER STANDARD OIL BULK PLANT NO. 302095
149 & 167 MAIN STREET
MORTON, WASHINGTON

GROUNDWATER ANALYTICAL MAP FEBRUARY 9, 2021

ARCADIS Design & Consultancy for natural and built assets

FIGURE 4

ATTACHMENT A

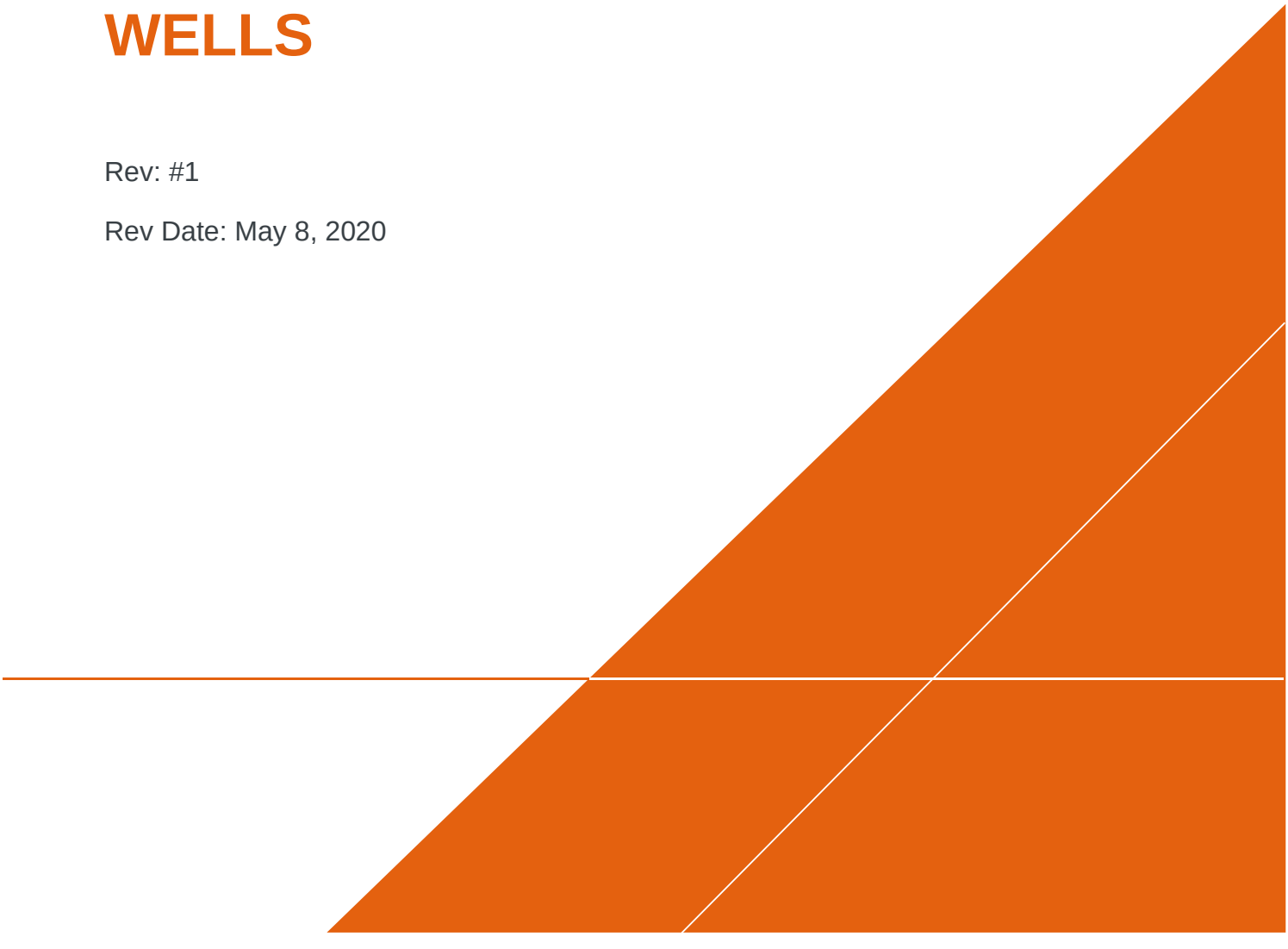
Technical Guidance Instructions for Low-Flow Groundwater Purging and Sampling Procedures for Monitoring Wells

ARCADIS Design & Consultancy for natural and built assets

TGI - LOW-FLOW GROUNDWATER PURGING AND SAMPLING PROCEDURES FOR MONITORING WELLS

Rev: #1

Rev Date: May 8, 2020



VERSION CONTROL

Revision No	Revision Date	Page No(s)	Description	Reviewed by
0	October 12, 2018	All	Updated and re-written as TGI with new branding and content	Marc Killingstad
1	May 8, 2020	Pages 5, 10-11	Added clarification/details for equipment requirements and procedure steps based on USEPA guidance	Marc Killingstad

APPROVAL SIGNATURES

Prepared by:		10/12/2018
	Ryan McKinney	Date:
Technical Expert Reviewed by:		May 8, 2020
	Marc Killingstad (Technical Expert)	Date:

1 INTRODUCTION

This document describes general and/or specific procedures, methods, actions, steps, and considerations to be used and observed by Arcadis staff when performing work, tasks, or actions under the scope and relevancy of this document. This document may describe expectations, requirements, guidance, recommendations, and/or instructions pertinent to the service, work task, or activity it covers.

It is the responsibility of the Arcadis Certified Project Manager (CPM) to provide this document to the persons conducting services that fall under the scope and purpose of this procedure, instruction, and/or guidance. The Arcadis CPM will also ensure that the persons conducting the work falling under this document are appropriately trained and familiar with its content. The persons conducting the work under this document are required to meet the minimum competency requirements outlined herein, and inquire to the CPM regarding any questions, misunderstanding, or discrepancy related to the work under this document.

This document is not considered to be all inclusive nor does it apply to all projects. It is the CPM's responsibility to determine the proper scope and personnel required for each project. There may be project- and/or client- and/or state-specific requirements that may be more or less stringent than what is described herein. The CPM is responsible for informing Arcadis and/or Subcontractor personnel of omissions and/or deviations from this document that may be required for the project. In turn, project staff are required to inform the CPM if or when there is a deviation or omission from work performed as compared to what is described herein.

In following this document to execute the scope of work for a project, it may be necessary for staff to make professional judgment decisions to meet the project's scope of work based upon site conditions, staffing expertise, regulation-specific requirements, health and safety concerns, etc. Staff are required to consult with the CPM when or if a deviation or omission from this document is required that has not already been previously approved by the CPM. Upon approval by the CPM, the staff can perform the deviation or omission as confirmed by the CPM.

2 SCOPE AND APPLICATION

Groundwater samples are collected from monitoring wells to evaluate groundwater quality. The protocol presented in this Technical Guidance Instruction (TGI) describes the procedures to purge monitoring wells and collect groundwater samples using the low flow purging/sampling methodology. This protocol has been developed in accordance with the United States Environmental Protection Agency (USEPA) Region I *Low Stress (Low Flow) Purging and Sampling Procedures for the Collection of Groundwater Samples from Monitoring Wells* (EQASOP-GW4; September 19, 2017).

Both filtered and unfiltered groundwater samples may be collected using this low-flow sampling method. Filtered samples will be obtained using a 0.45-micron disposable filter. Project teams will evaluate the last time the monitoring wells were developed and determine if additional development might be necessary. Water samples will not be taken immediately following well development. Sufficient time will be allowed for the groundwater flow regime in the vicinity of the monitoring well to stabilize and to approach chemical equilibrium with the well construction materials. This lag time will depend on site conditions and methods of installation but often exceeds one week.

3 PERSONNEL QUALIFICATIONS

Arcadis field sampling personnel will have completed or are in the process of completing site-specific training as well as having current health and safety training as required by Arcadis, client, or regulations, such as 40-hour HAZWOPER training and/or OSHA HAZWOPER site supervisor training. Arcadis personnel will also have current training as identified in the site-specific Health and Safety Plan (HASP) which may include first aid, cardiopulmonary resuscitation (CPR), Blood Borne Pathogens (BBP) as needed. The HASP will also identify any access control requirements.

Prior to mobilizing to the field, the groundwater sampling team will review and be thoroughly familiar with relevant site-specific documents including but not limited to the task-specific work plan or field implementation plan (FIP)/field sampling plan, Quality Assurance Project Plan (QAPP), HASP, historical information, and other relevant site documents.

Arcadis field sampling personnel will be knowledgeable in the relevant processes, procedures, and TGIs and possess the demonstrated required skills and experience necessary to successfully complete the desired field work. Additionally, the groundwater sampling team will review and be thoroughly familiar with documentation provided by equipment manufacturers and become familiar with the operation of (i.e., hands-on experience) all equipment that will be used in the field prior to mobilization.

4 EQUIPMENT LIST

Specific to this activity, the following materials (or equivalent) will be used:

- Site-specific HASP and health and safety documents identified in the HASP
- Field Implementation Plan (FIP) that includes site map, well construction records, sampling plan (sample analyses, sample volume required, and sample holding time), and prior groundwater sampling records (if available)
- Field notebook and/or smart device (phone or tablet)
- Low-flow sampling field forms (**Attachment A**)
- Appropriate personal protective equipment (PPE) (e.g., latex or nitrile gloves, safety glasses, etc.) as specified in the HASP
- Well keys and other tools to remove manhole covers (manual torque wrench with 9/16” socket and flat head screwdriver typical)
- Photoionization detector (PID) or Flame ionization detector (FID) (as appropriate, depending on site-specific constituents of concern)
- Electronic water-level indicator (e.g., Solinist Model 101) or oil/water interface probe with 0.01-foot accuracy (oil/water as appropriate, note that sampling will not be performed when sheen or light non-aqueous phase liquid [LNAPL] is present)
- Down-hole multi-parameter water-quality sonde (temperature/pH/specific conductivity/oxidation reduction [ORP]/turbidity/dissolved oxygen) meter coupled with flow-through-cell for measurements, for example:

  - YSI 6-Series Multi-Parameter Instrument
  - Horiba U-22 Multi-Parameter Instrument.
  - Hydrolab Series 3 or Series 4a Multiprobe and Display.

  NOTE: *Transparent, small volume flow-through-cells (e.g., 250 milliliters or less) are preferred as they allow for easy detection of air bubbles and sediment buildup in the cell, which can interfere with the monitoring instrument probes. A small volume cell also allows for quick turnover of water in the cell between measurements of the indicator field parameters. It is recommended to use a flow-through-cell and monitoring probes from the same manufacturer and model to avoid incompatibility between the probes and flow-through-cell.*

- Plastic sheeting (e.g., Weatherall Visqueen) to protect all down-hole sampling equipment from contact with potential sources of contamination.
- Decontamination equipment
  - Non-phosphate laboratory soap (Alconox or equivalent), brushes, clean buckets or clean wash tubs—new buckets or tubs will be purchased if it cannot be determined if the present items are clean
  - Distilled or de-ionized water for equipment decontamination
- Indelible ink pen
- 150-foot measuring tape (or sufficient length for the maximum site depth requirement)
- Sampling pump, which may consist of one or more of the following:
  - Submersible pump (e.g., Grundfos Redi-Flo 2)
  - Peristaltic pump (e.g., ISCO Model 150)
  - Bladder pump (e.g., Marschalk System 1, QED Micropurge, Geotech)
- Appropriate controller and power source for pump:
  - Submersible and peristaltic pumps require electric power from either a generator or a deep cell battery
  - Submersible pumps such as Grundfos require a pump controller to run the pump
  - Bladder pumps require a pump controller and a gas source (e.g., air compressor or compressed N2 or CO2 gas cylinders)
- Teflon® tubing or Teflon®-lined polyethylene tubing of an appropriate size for the pump being used
  - For peristaltic pumps, dedicated Tygon® tubing (or other type as specified by the manufacturer) will be used through the pump apparatus
  - Teflon® will not be used when sampling for per- and polyfluoroalkyl substances (PFAS)
- Graduated cylinder and stop watch or other device to measure time to determine pumping rate

- Appropriate water sample containers (supplied by the laboratory)
- Appropriate blanks (trip blank supplied by the laboratory)
- Sample labels and Chain-of-Custody forms (COC)
- 0.45-micron disposable filters (if field filtering is required)
- A supplemental turbidity meter (e.g., Horiba U-10, Hach 2100P, LaMotte 2020) may be required for specific projects and will be specified in the project FIP/ work plan and the kick-off notes.
    - If used, in-line 'T' and valve allows for collection of water for turbidity measurements before the pump discharge enters the flow-through cell

NOTE: *The maintenance requirements for the above equipment generally involve decontamination or periodic cleaning, battery charging, and proper storage, as specified by the manufacturer. For operational difficulties, the equipment will be serviced by a qualified technician.*

5 CAUTIONS

Different USEPA regions and/or state regulatory agencies may stipulate deviations from this document. It is the responsibility of the Project Team (Project Manager and Technical Lead) to be fully aware of the requirements from the applicable regulatory framework.

Weather

- If heavy precipitation occurs, and no cover over the sampling area and monitoring well can be erected, sampling may be discontinued until adequate cover is provided. Rain water could compromise groundwater samples.
- Avoid extreme weather situations. Be aware that thermal currents and vertical mixing of cold and warm water inside the well casing could create a convection cell within the well and compromise data collection (e.g., biological mechanisms).
    - Direct sunlight and hot ambient temperatures may cause the groundwater in the tubing or flow-through-cell to heat up and de-gas. This may result in the loss of volatile organic compounds (VOCs) and dissolved gases. Shade the equipment from direct sunlight, keep the tubing as short as possible, and avoid the hottest times of the day.
    - Sampling during freezing conditions may adversely impact the data quality objectives. USEPA recommends low-flow sampling be conducted at air temperatures above 32°F (0°C) or taking special precautions to prevent groundwater from freezing in the equipment.

Cross-Contamination

- To mitigate potential cross-contamination, groundwater samples are to be collected in a pre-determined order from least impacted to impacted based on previous analytical data. If no analytical data are available, collect samples in order of up-gradient, then furthest down-gradient to source area locations.

- Note that permanent markers could introduce volatile constituents into the samples; *therefore, indelible ink is recommended* to be used for labels on sample containers or sample coolers.
- When using a gasoline generator, this power source will be set-up at least 30 feet downwind from the well to avoid exhaust fumes to contaminate samples.

Pumps

- Preferred methods of extracting groundwater are adjustable rate, submersible pumps - such as centrifugal pumps or bladder pumps – constructed of stainless steel or polytetrafluoroethylene (PTFE, i.e. Teflon®). However, *PTFE will not be used when sampling for per- and polyfluoroalkyl substances (PFAS). PTFE could contain PFAS*.
- When using a bladder pump for collecting VOCs and dissolved gases, “best practice” is to set-up the pump to deliver sufficient water to fill a 40 mL VOC vial.
- The use of peristaltic pumps will be based on the type of data to be collected. *Because the use a peristaltic pump can result in de-gassing of VOC and / or dissolved gases from groundwater, a different type of pump will be considered if these compounds are of concern.*
- *Manual or motor driven inertial pumping devices are not recommended because they cause greater disturbance during purging and pumping than regular pumps and are less easily controlled. This could cause a higher degree of data variability.*

Tubing

- When sampling for VOCs, SVOCs, pesticides, PCBs and inorganics, use of PTFE (Teflon®) or PTFE-lined tubing is preferred. However, PTFE tubing will not be used when sampling for PFAS.
- PVC, polypropylene or polyethelene tubing may be used when sampling for metals or other inorganics.
- Tubing with inside diameters of 1/4 or 3/8 inch is recommended because this will help ensure tubing remains water filled when operating at very low pumping rates.

General Precautions

- Store and/or stage empty and full sample containers and coolers out of direct sunlight.
- It may be necessary to field filter the groundwater for some parameters (e.g., metals) during collection, depending on preservation, analytical method, and project quality objectives. The task-kick-off notes and the FIP/work plan will list the samples that require field filtering.
- Be careful not to overtighten lids with Teflon® liners or septa (e.g., 40 mL vials). Over-tightening can cause the glass to shatter or impair the integrity of the Teflon® seal.

6 HEALTH AND SAFETY CONSIDERATIONS

The HASP will be followed, as appropriate, to ensure the safety of field personnel.

Appropriate personal protective equipment (PPE) will be worn at all times in line with the task and the site-specific HASP.

Review all site-specific and procedural hazards as they are provided in the HASP, and review Job Safety Analysis (JSA) documents in the field each day prior to beginning work.

Access to wells may expose field personnel to hazardous materials such as contaminated groundwater or non-aqueous phase liquid (NAPL) (e.g., oil). Other potential hazards include pressurized wells, stinging insects that may inhabit well heads, other biologic hazards (e.g. ticks in long grass/weeds around well head), and potentially the use of sharp cutting tools (scissors, knife)—open well caps slowly and keep face and body away to allow to vent any built-up pressure; only use non-toxic peppermint oil spray for stinging insect nests; review client-specific health and safety requirements, which may preclude the use of fixed/folding-blade knives, and use appropriate hand protection.

Generators and cord and plug equipment will employ an overcurrent protection device such as an integrated ground fault circuit interrupter (GFCI) cord. Grundfos pump controllers will not run properly with a GFCI, so the power source will be equipped with other overcurrent protection means.

Overtightening of lids with Teflon® liners can cause the glass to shatter and create a risk for hand injuries.

7 PROCEDURE

Field personnel will set up and perform low-flow sampling in accordance with the following procedures.

1. Review FIP and groundwater sampling records from previous sampling events (if available) prior to mobilization to estimate the optimum pumping rate and anticipated drawdown for each well to perform sampling as efficiently as possible (i.e., reach a stabilized pumping condition).
2. Calibrate field instruments according to manufacturer procedures for calibration and record calibration procedure and results in field log.
3. All equipment will either be new or decontaminated in accordance with appropriate guidance document (*TGI – Groundwater and Soil Sampling Equipment Decontamination)* prior to use.
4. Visually inspect the well to ensure that it is undamaged, properly labeled and secured
    a) Damage or other conditions that may affect the integrity of the well will be recorded in the Field Activity Daily Log and brought to the attention of the designated Field Manager and/or Project Manager
    b) Record well construction and conditions on the Low-Flow Sampling Field Form (**Attachment A**)
5. Place clean plastic sheeting on the ground near the well to keep monitoring and sampling equipment off the surface unless the equipment is elevated above the ground (e.g. on a table).
6. Open the well cover while standing upwind of the well. Remove the well cap and place it on the plastic sheeting. If appropriate or required for site-specific conditions, insert the photoionization detector (PID) probe approximately 4 to 6 inches into the casing or the well headspace and cover it with a gloved hand. Record the PID reading in the field log. Perform air monitoring in the breathing zone according to the HASP and/or JSA.
7. Measure and record the initial depth to groundwater prior to placing the pumps.

8. Prepare and install the pump in the well.

   NOTE: *Groundwater will be purged from the wells using an appropriate pump. If the depth to water is below the sampling range of a peristaltic pump (approximately 25 feet below ground surface), a submersible or bladder pump will be used, provided that the well is constructed with a casing diameter of at least two (2) inches (the minimum well diameter capable of accommodating such pumps). For smaller diameter wells, where the depth to water is below the sampling range of a peristaltic pump, alternative sampling methods (i.e., bailing or small diameter bladder pumps) will be used to purge and sample the groundwater. Bladder pumps are preferred over peristaltic and submersible pumps to prevent volatilization if sampling of VOCs and/or dissolved gasses is required. Purge water will be collected and containerized according to the direction of the project team.*

   a) For submersible and non-dedicated bladder pumps, decontaminate the pump according to site decontamination procedures. Non-dedicated bladder pumps will require a new bladder and attachment of an air-line, sample discharge line, and safety cable prior to placement in the well. Attach the air-line tubing to the air-port on the top of the bladder pump. Attach the sample discharge tubing to the water port on the top of the bladder pump. Take care not to reverse the air and discharge tubing lines during bladder pump setup, as this could result in bladder failure or rupture. Attach and secure a safety cable to the eyebolt on the top of pump (if present, depending on pump model used). Slowly lower the pump, safety cable, tubing, and electrical lines into the well to a depth corresponding to the approximate center of the saturated screen section of the well. Avoid twisting and tangling of safety cable, tubing, and electrical lines while lowering the pump into the well; twisted and tangled lines could result in the pump becoming stuck in the well casing. Also, make sure to keep tubing and lines from touching the ground or other surfaces while introducing them into the well, as this could lead to unintended contamination.

   b) If using a bladder pump, connect the air-line to the pump controller output port. The pump controller will be connected to a supply line from an air compressor or compressed gas cylinder using an appropriate regulator and air hose. Tighten the regulator connector onto the gas cylinder (if used) to prevent leaks. Teflon® tape may be used on the threads of the cylinder to provide a tighter seal. Once the air compressor or gas cylinder is connected to the pump controller, turn on the compressor or open the valve on the cylinder to begin the gas flow. Turn on the pump controller power (if an on/off switch is present) and verify that all batteries are charged and fully functioning before starting the pump.

   c) If a peristaltic pump is being used, slowly lower the sampling tubing into the well to a depth corresponding to the approximate center of the saturated screen section of the well. The pump intake or sampling tube must be kept at least two (2) feet above the bottom of the well to prevent mobilization of any sediment present in the bottom of the well.

   d) If using an in-line ‘T’ and valve, install between pump discharge water line and the bottom inlet port of the flow-through cell. Attach a short piece of tubing to the outlet. This set-up will be used to collect samples for turbidity readings.

9. Connect the pump discharge water line to the bottom inlet port on the flow-through cell connected to the multi-parameter water-quality sonde and make sure to record equipment/instrument identification (manufacturer and model number).

10. Before starting the pump, ensure that the water level inside the well has stabilized (i.e., measure the water level multiple times after deploying the pump in the well).

11. Start pumping the well at 200 to 500 milliliters (mL) per minute (or at lower site-specific rate if specified) and adjust the pumping rate to cause little or no water level drawdown in the well (less than 0.3 feet below the initial static depth to water measurement): the water level should stabilize, however, this is not always possible.

12. If the well diameter is of sufficient size, measure the water level every 3 to 5 minutes (or as appropriate, lower flow rates may require longer time between readings) during pumping.

13. Maintain a steady flow rate to the extent practicable and do not break pump suction or cause entrainment of air in the sample.

14. Record pumping rate adjustments and depths to water.

    If necessary, reduce pumping rates to the minimum capabilities of the pump to avoid pumping the well dry and/or to stabilize indicator parameters; if the recharge rate of the well is very low, use alternative purging techniques, which will vary based on the well construction and screen position.

    For wells screened across the water table, the well may be pumped dry and sampling can commence as soon as the volume in the well has recovered sufficiently to permit collection of samples.

    For wells screened entirely below the water table, the well can be pumped until a stabilized level (which may be greater than the maximum displacement goal of 0.3 feet) is maintained and monitoring for stabilization of field indicator parameters can commence; if a lower stabilization level cannot be maintained, the well may be pumped until the drawdown is at a level slightly higher than top of the well screen.

15. After water levels have stabilized and a sufficient volume has been purged (*see note below*), continue pumping and begin monitoring field indicator parameters using a multi-parameter water-quality sonde coupled with a flow-through-cell.

    NOTE: *The final purge volume must be greater than the stabilized drawdown volume plus the pump's tubing volume. If the drawdown has exceeded 0.3 feet and stabilizes, calculate the volume of water between the initial water level and the stabilized water level. Add the volume of the water which occupies the pump's tubing to this calculation. This combined volume of water needs to be purged from the well after the water level has stabilized before samples are collected.*

16. Use the flow to measure all indicator field parameters, except for turbidity, every 3 to 5 minutes (or after each volume of the flow-through cell has been purged or other appropriate interval); turbidity samples will be collected before the flow-through-cell using the T-valve and a clean container such as a glass beaker.

17. Record field indicator parameters on the groundwater sampling log.

18. The well is considered stabilized and ready for sample collection when three consecutive readings are within the following limits:

    - **Turbidity** within ± 10% for values greater than 5 nephelometric turbidity units [NTUs] or if three turbidity values are less than 5 NTUs, consider the values stabilized
    - **Dissolved Oxygen (DO)** within ± 10% for values greater than 0.5 mg/L or if three DO values are less than 0.5 mg/L, consider the values stabilized
    - **Specific Conductance** within ± 3%
    - **Temperature** within ± 3%
    - **pH** within ± 0.1 unit
    - **Oxidation/Reduction Potential (ORP)** within ±10 millivolts (mV)

    NOTE: *Alternate stabilization goals may exist in different geographic regions, consult the site-specific FIP/work plan for stabilization criteria).*

    NOTE: *While achieving turbidity levels less than 5 NTU and a stable drawdown of less than 0.3 feet is desirable, sample collection may still take place provided the indicator field parameter criteria in this procedure are met.*

19. If the parameters have stabilized but turbidity remains relatively high (e.g., greater than 50 NTUs), the pump flow rate may be decreased to a minimum rate of 100 mL/min to reduce turbidity levels as low as possible. If groundwater turbidity has been minimized (i.e., consecutive readings within ± 10%) and the values for all other parameters have stabilized, the well may be sampled; however, consult specifications in the FIP/work plan and/or the project technical lead prior to sampling.

20. If after one (1) hour of purging indicator field parameters have not stabilized, consult specifications in the FIP/work plan and/or the project technical lead prior to sampling.

    In general, three potential options are available if stabilization criteria are not met:

    a) Continue purging until stabilization is achieved.

    b) Discontinue purging, do not collect any samples, and record in field logbook/on the sampling form that stabilization could not be achieved (documentation must describe attempts to achieve stabilization).

    c) Discontinue purging, collect samples and provide full explanation of attempts to achieve stabilization. *There is a risk that the analytical data obtained under these conditions, particularly metals and hydrophobic organic analytes, may reflect a sampling bias and, as a result, the data may not meet the data quality objectives of the sampling event.*

    NOTE: *DO is extremely susceptible to various external influences (including temperature or the presence of bubbles on the DO meter); therefore, great care will be taken to minimize the agitation or other disturbance of water within the flow-through cell while collecting these measurements. If air bubbles are present on the DO probe or in the discharge tubing, remove them before taking a measurement. If DO values are not within acceptable range for the temperature of groundwater, again check for and remove air bubbles on the probe before re-measuring. The table below may be*

used as a general guide for DO values under various temperatures; however, understand that the table corresponds to freshwater solubility and groundwater contaminants may affect oxygen solubility. If DO value is 0.00 or less, then the meter will be serviced and re-calibrated. If DO values are above possible results, then the meter will be serviced and re-calibrated.

NOTE: *During extreme weather conditions, stabilization of field indicator parameters may be difficult to attain. Modifications to the sampling procedures to alleviate these conditions (e.g., measuring the water temperature in the well adjacent to the pump intake) will be documented in the field logbook/on the sampling form.*

NOTE: *If other field conditions are suspected of preventing stabilization of certain parameters, detailed observations will be documented in the field logbook/on the sampling form.*

Oxygen Solubility in Fresh Water

Temperature (degrees C)	Dissolved Oxygen (mg/L)
0	14.6
1	14.19
2	13.81
3	13.44
4	13.09
5	12.75
6	12.43
7	12.12
8	11.83
9	11.55
10	11.27
11	11.01
12	10.76
13	10.52
14	10.29
15	10.07
16	9.85
17	9.65
18	9.45
19	9.26
20	9.07
21	8.9
22	8.72
23	8.56
24	8.4
25	8.24
26	8.09
27	7.95
28	7.81
29	7.67
30	7.54
31	7.41
32	7.28
33	7.16
34	7.05
35	6.93

Reference: Vesilind, P.A., *Introduction to Environmental Engineering*, PWS Publishing Company, Boston, 468 pages (1996).

21. Complete the sample label(s) and cover the label(s) with clear packing tape to secure the label onto the container.
22. After the indicator parameters have stabilized, collect groundwater samples by diverting flow out of the unfiltered discharge tubing into the appropriate labeled sample container.
    a) If a flow-through analytical cell is being used to measure field parameters, the flow-through cell will be disconnected after stabilization of the field indicator parameters and prior to groundwater sample collection.
    b) Under no circumstances will analytical samples be collected from the discharge of the flow-through cell.
    c) If an in-line 'T' and valve are used, the valve needs to be removed as well.
    d) Samples will be collected in the following order: VOCs, total organic carbon (TOC), semi-volatile organic compounds (SVOCs), metals and cyanide, and others (or other order as defined in the site-specific FIP/work plan).
    e) When the container is full, tightly screw on the cap.
23. If sampling for total and filtered metals and/or polychlorinated biphenyls (PCBs), a filtered and unfiltered sample will be collected.
    a) Install an in-line, disposable 0.45-micron particle filter on the discharge tubing after the appropriate unfiltered groundwater sample has been collected.
    b) Continue to run the pump until an initial volume of "flush" water has been run through the filter in accordance with the manufacturer's directions (generally 100 to 300 mL).
    c) Collect the filtered groundwater sample by diverting flow out of the filter into the appropriately labeled sample container.
    d) When the container is full, tightly screw on the cap.
24. Secure with packing material and store the samples on ice in an insulated transport container provided by the laboratory and include a temperature blank in each container to be shipped.
25. Record on the Low-Flow Sampling Field Form (and bound field logbook) the time at which sampling procedures were completed, any pertinent observations of the sample (e.g., physical appearance and the presence or lack of odors or sheens), and the values of the stabilized field indicator parameters as measured during the final reading during purging (see **Attachment A**).
26. Turn off the pump and air compressor or close the gas cylinder valve if using a bladder pump setup.
27. Slowly remove the pump, tubing, lines, and safety cable from the well.
    a) If using dedicated tubing, do not allow the tubing or lines to touch the ground or any other surfaces which could contaminate them.
    b) If using dedicated tubing, it will be folded - without pinching it - to a length that will allow the well to be capped and also facilitate retrieval of the tubing during later sampling events.
    c) Use a length of rope or string to tie the tubing to the well cap.

d) Alternatively, if tubing and safety line are to be saved and reused for sampling the well at a later date, coil the tubing neatly and placed in a clean plastic bag that is clearly labeled with the well ID ensuring the bag is tightly sealed before placing it in storage.

28. Secure the well and properly dispose of personal protective equipment (PPE) and disposable equipment.

29. Complete the procedures for packaging, shipping, and handling with the associated Chain-of-Custody.

30. Complete decontamination for flow-through analytical cell and submersible or bladder pump, as appropriate (*TGI – Groundwater and Soil Sampling Equipment Decontamination*).

31. At the end of each day of the sampling event, perform calibration check of field instruments and record procedure and results in field log.

8 WASTE MANAGEMENT

Materials generated during groundwater sampling activities, including disposable equipment and excess purge water, will be stored on site in appropriately labeled containers and disposed of properly. Waste will be managed in accordance with the *TGI – Investigation-Derived Waste Handling and Storage,* the procedures identified in the FIP or QAPP as well as state-, federal- or client-specific requirements. Be certain that waste containers are properly labeled and documented in the field logbook.

9 DATA RECORDING AND MANAGEMENT

Management of the original documents from the field will be completed in accordance with the site-specific QAPP.

In general, forms (e.g., Low-Flow Sampling Field Forms), logs/notes (including daily field and calibration logs), digital records, and Chain-of-Custody records will be maintained by the field team lead.

Field logs and Chain-of-Custody records will be transmitted to the Arcadis Project Manager and/or Task Manager, as appropriate, at the end of each day unless otherwise directed. Electronic data files will be sent to the project team and uploaded to the electronic project folder daily.

Records generated as a result of this TGI will be controlled and maintained in the project record files in accordance with project requirements.

10 QUALITY ASSURANCE

Quality assurance procedures shall be conducted in accordance with the Arcadis Quality Management System or the site-specific QAPP.

Unless described otherwise in the project-specific FIP/work plan, QAPP, or Sampling and Analysis Plan, quality assurance/quality control samples will be collected as follows:

- One duplicate for every 10 samples

- One laboratory matrix/matrix spike sample for every 20 samples

In addition to the quality control samples to be collected in accordance with this TGI, the following quality control procedures will be observed in the field:

- Collect samples from monitoring wells, in order of increasing concentration, to the extent known based on review of historical site information if available
- Equipment blanks will include the pump and tubing (if using disposable tubing) or the pump only (if using tubing dedicated to each well)
- Collect equipment blanks after wells with higher concentrations (if known) have been sampled
- Operate all monitoring instrumentation in accordance with manufacturer's instructions and calibration procedures—calibrate instruments at the beginning of each day, verify the calibration at the end of each day, and record all calibration activities in the field notebook
- Clean all groundwater sampling equipment prior to use in the first well and after each subsequent well following the procedure for equipment decontamination

11 REFERENCES

USEPA. 1986. *RCRA Groundwater Monitoring Technical Enforcement Guidance Document* (September 1986).

USEPA. 1991. *Handbook Groundwater, Volume II Methodology*, Office of Research and Development, Washington, DC. USEPN62S, /6-90/016b (July 1991).

USEPA Region I. 2017. *Low Stress (Low Flow) Purging and Sampling Procedures for the Collection of Groundwater Samples from Monitoring Wells* (EQASOP-GW4; September 19, 2017).

U.S. Geological Survey (USGS). 1977. *National Handbook of Recommended Methods for Water-Data Acquisition: USGS Office of Water Data Coordination*. Reston, Virginia.

12 ATTACHMENTS

A. Low-Flow Sampling Field Form

GROUNDWATER SAMPLING FORM

ARCADIS

Project No. _____ Well ID _____ Date _____

Project Name/Location _____ Weather _____

Measuring Pt. Description _____ Screen Setting (ft-bmp) _____ Casing Diameter (in.) _____ Well Material ____ PVC ____ SS

Static Water Level (ft-bmp) _____ Total Depth (ft-bmp) _____ Water Column (ft) _____ Gallons in Well _____

MP Elevation _____ Pump Intake (ft-bmp) _____ Purge Method: _____ Sample Method _____

Pump On/Off _____ Centrifugal / Submersible / Other _____

Sample Time: _____ Volumes Purged _____

Purge Start _____ Gallons Purged _____ Sample ID _____ Sampled by _____

Purge End _____ Replicate/Code No. _____

Time	Minutes Elapsed	Rate (gpm)/(mL/min) 200mL/min +	Depth to Water (ft) -0.3	Gallons Purged	pH ± 0.1	Cond. (µMhos)/(mS/cm) ± 3%	Turbidity (NTU) ± 10%	DO (mg/L) ± 10%	Temp. (°C)/(°F) ± 3%	Redox (mV) ± 10mV	Appearance	
											Color	Odor
Stabilization Calculations (±)												
Stabilization Criteria					**± 0.1 s.u.**	**±3%**	**± 10% or within 1 NTU (1)**	**± 10%**	**±3%**	**±10 mV**		

(1) **Turbidity** < 50 NTU and ±10% or within 1 NTU of a previous reading when <10 NTU

Constituents Sampled	Container	Number	Preservative

Comments _____

Well Casing Volumes

Gallons/Foot					
	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	

Well Information

Well Location: _____ Well Locked at Arrival: Yes / No

Condition of Well: _____ Well Locked at Departure: Yes / No

Well Completion: Flush Mount / Stick Up Key Number To Well: _____

ATTACHMENT B

Field Data Sheets

ARCADIS Design & Consultancy for natural and built assets

Groundwater Gauging Log

Client:	Chevron
Site ID:	302095
Site Location:	Morton, Washington
Measuring Point:	Top of Casing
Date(s):	02/08/2021, 02/09/2021
Sampler(s):	Grace Boyd, Tyler Green
Gauging Equipment:	Water Level Meter

Well ID	Date	Gauging Time	Static Water Level (ft bmp)	Depth to Product (ft bmp)	Total Depth (ft bmp)	PID Reading (ppm)	Comments
MW-7	02/09/2021	15:47	2.61	ND	8.68	0	--
MW-11	02/08/2021	14:01	1.94	ND	19.51	--	--
MW-12	02/09/2021	13:35	2.4	ND	19.44	0	--
MW-13	02/09/2021	17:25	2.11	ND	16.55	--	--
MW-15	02/09/2021	11:01	1.25	ND	17.50	0	--
MW-16	02/09/2021	15:44	2.21	ND	18.48	0	--
MW-17	02/09/2021	17:02	2.08	ND	17.79	0	--

ft-bmp = feet below measuring point ND = Not Detected PID = Photoionization Detector Reading

ppmv = parts per million volume -- = Not Recorded

Chevron Groundwater Sampling Form

ARCADIS Design & Consultancy for natural and built assets

Project Number	30063832	**Well ID**	MW-11	**Date**	2/8/2021		
Site Location	Morton, Washington	**Site ID**	302095	**Weather (°F)**	Clear	**Sampled by**	Tyler Green
Measuring Point Description	Top of Casing	**Screen Depth Interval (ft-bmp)**	5 to 19	**Casing Diameter (in.)**	2	**Well Casing Material**	PVC
Static Water Level (ft-bmp)	1.94	**Total Depth (ft-bmp)**	19.51	**Water Column (ft)**	17.57	**Gallons in Well**	2.85
Water Quality Meter Make/Model	Horiba U-52	**Purge Method**	Low-Flow	**Sample Method**			Grab
Sample Time	14:28	**Well Volumes Purged**	1.05	**Sample ID**	MW-11	**Evacuation Equipment**	Peristaltic
Purge Start	14:05	**Gallons Purged**	3.00	**Duplicate ID**	--		
Purge End	14:37	**Total Purge Time (h:m)**	0:32				

Time	Rate (ml/min)	Depth to Water (ft)	pH (standard units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature (°C)	Redox (mV)	Appearance	
									Color	Odor
14:09	300	2.00	6.29	0.205	--	4.01	11.97	69	Clear	None
14:13	300	2.31	6.47	0.199	--	8.62	11.78	83	Clear	None
14:16	300	2.27	6.50	0.199	--	8.01	11.67	119	Clear	None
14:20	300	2.27	6.51	0.192	--	8.98	11.43	123	Clear	None
14:23	300	2.27	6.50	0.191	--	8.92	11.36	124	Clear	None
14:26	300	2.31	6.50	0.191	--	9.13	11.34	125	Clear	None

Comments: Turbidity sensor failed. NTU not collected.

Well Casing Volume Conversion

Well diameter (in.) = gallons per foot
1 = 0.04 1.5 = 0.09 2.5 = 0.26 3.5 = 0.50 6 = 1.47
1.25 = 0.06 2 = 0.16 3 = 0.37 4 = 0.65

Sample Information

Sample ID: MW-11 Sample Time: 14:28 Sample Depth (ft-bmp): 11

Analytes and Methods: See Chain-of-Custody.

ft-bmp = feet below measuring point
in. = inches
ft = feet
mL/min = milliliters per minute

mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter
PVC = Polyvinyl Chloride

mV = millivolts
°F = degrees Fahrenheit
°C = degrees Celsius
-- = Not Recorded

Chevron Groundwater Sampling Form

ARCADIS Design & Consultancy for natural and built assets

Project Number	30063832	**Well ID**	MW-12	**Date**	2/9/2021		
Site Location	Morton, Washington	**Site ID**	302095	**Weather (°F)**	Clear	**Sampled by**	Grace Boyd
Measuring Point Description	Top of Casing	**Screen Depth Interval (ft-bmp)**	5 to 19	**Casing Diameter (in.)**	2	**Well Casing Material**	PVC
Static Water Level (ft-bmp)	2.4	**Total Depth (ft-bmp)**	19.44	**Water Column (ft)**	17.04	**Gallons in Well**	2.77
Water Quality Meter Make/Model	Horiba U-52	**Purge Method**	Low-Flow	**Sample Method**			Grab
Sample Time	14:04	**Well Volumes Purged**	0.72	**Sample ID**	MW-12	**Evacuation Equipment**	Peristaltic
Purge Start	13:47	**Gallons Purged**	2.00	**Duplicate ID**	--		
Purge End	14:02	**Total Purge Time (h:m)**	0:15				

Time	Rate (ml/min)	Depth to Water (ft)	pH (standard units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature (°C)	Redox (mV)	Appearance	
									Color	Odor
13:49	300	2.64	4.90	0.075	---	2.81	10.06	143	Clear	None
13:53	300	2.71	5.68	0.075	--	2.73	10.04	146	Clear	None
13:56	300	2.68	5.64	0.075	--	2.56	9.91	148	Clear	None
13:59	300	2.68	5.62	0.075	--	2.40	9.94	153	Clear	None
14:02	300	2.68	5.56	0.075	--	2.35	9.92	155	Clear	None

Comments: Turbidity sensor failed. NTU not collected.

Well Casing Volume Conversion

Well diameter (in.) = gallons per foot
1 = 0.04 1.5 = 0.09 2.5 = 0.26 3.5 = 0.50 6 = 1.47
1.25 = 0.06 2 = 0.16 3 = 0.37 4 = 0.65

Sample Information

Sample ID: MW-12 Sample Time: 14:04 Sample Depth (ft-bmp): 10

Analytes and Methods: See Chain-of-Custody.

ft-bmp = feet below measuring point
in. = inches
ft = feet
mL/min = milliliters per minute

mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter
PVC = Polyvinyl Chloride

mV = millivolts
°F = degrees Fahrenheit
°C = degrees Celsius
-- = Not Recorded

Chevron Groundwater Sampling Form

ARCADIS Design & Consultancy for natural and built assets

Project Number	30063832	**Well ID**	MW-15	**Date**	2/9/2021		
Site Location	Morton, Washington	**Site ID**	302095	**Weather (°F)**	Clear	**Sampled by**	Grace Boyd
Measuring Point Description	Top of Casing	**Screen Depth Interval (ft-bmp)**	3 to 18	**Casing Diameter (in.)**	2	**Well Casing Material**	PVC
Static Water Level (ft-bmp)	1.25	**Total Depth (ft-bmp)**	17.5	**Water Column (ft)**	16.25	**Gallons in Well**	2.64
Water Quality Meter Make/Model	Horiba U-52	**Purge Method**	Low-Flow	**Sample Method**			Grab
Sample Time	12:10	**Well Volumes Purged**	ERROR, please enter volume purged in only one unit.	**Sample ID**	MW-15	**Evacuation Equipment**	Peristaltic
Purge Start	11:18			**Duplicate ID**	--		
Purge End	12:09						
		Gallons Purged	0.79				
		Total Purge Time (h:m)	0:51				

Time	Rate (ml/min)	Depth to Water (ft)	pH (standard units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature (°C)	Redox (mV)	Appearance	
									Color	Odor
11:20	300	9.00	5.94	--	--	10.03	9.03	66	Clear	None
11:24	30	1.40	5.85	0.091	--	8.30	8.87	65	Clear	None
11:30	1.4	1.30	5.77	0.086	--	7.83	8.77	63	Clear	None
11:34	300	1.25	5.81	0.090	--	7.20	8.78	62	Clear	None
11:37	300	9.10	5.78	0.090	--	6.75	8.70	62	Clear	None
11:40	300	1.25	5.74	0.090	--	6.20	8.72	65	Clear	None
11:43	300	9.10	5.66	0.089	--	5.74	8.66	63	Clear	None
11:47	300	9.10	5.72	0.088	--	5.25	8.73	60	Clear	None
11:51	300	1.25	5.68	0.088	--	4.75	8.64	62	Clear	None
11:54	300	1.25	5.69	0.090	--	4.53	8.67	61	Clear	None
11:57	300	1.25	5.61	0.089	--	4.26	8.63	65	Clear	None
12:00	300	1.30	5.59	0.089	--	4.03	8.61	66	Clear	None
12:03	300	1.25	5.62	0.089	--	1.40	8.63	65	Clear	None
12:06	300	1.25	5.65	0.089	--	1.34	8.62	65	Clear	None
12:09	300	1.25	5.66	0.089	--	1.35	8.68	64	Clear	None

ft-bmp = feet below measuring point
in. = inches
ft = feet
mL/min = milliliters per minute

mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter
PVC = Polyvinyl Chloride

mV = millivolts
°F = degrees Fahrenheit
°C = degrees Celsius
-- = Not Recorded

Chevron Groundwater Sampling Form

Comments: Turbidity sensor failed. NTU not collected.

Well Casing Volume Conversion

Well diameter (in.) = 1 = 0.04 1.5 = 0.09 2.5 = 0.26 3.5 = 0.50 6 = 1.47
gallons per foot 1.25 = 0.06 2 = 0.16 3 = 0.37 4 = 0.65

Sample Information

Sample ID:	MW-15	Sample Time:	12:10	Sample Depth (ft-bmp):	9
Analytes and Methods:	See Chain-of-Custody.				

ft-bmp = feet below measuring point
in. = inches
ft = feet
mL/min = milliliters per minute

mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter
PVC = Polyvinyl Chloride

mV = millivolts
°F = degrees Fahrenheit
°C = degrees Celsius
-- = Not Recorded

Chevron Groundwater Sampling Form

ARCADIS Design & Consultancy for natural and built assets

Project Number	30063832	**Well ID**	MW-16	**Date**	2/9/2021		
Site Location	Morton, Washington	**Site ID**	302095	**Weather (°F)**	Clear	**Sampled by**	Tyler Green
Measuring Point Description	Top of Casing	**Screen Depth Interval (ft-bmp)**	3 to 18	**Casing Diameter (in.)**	2	**Well Casing Material**	PVC
Static Water Level (ft-bmp)	2.21	**Total Depth (ft-bmp)**	18.48	**Water Column (ft)**	16.27	**Gallons in Well**	2.64
Water Quality Meter Make/Model	Horiba U-52	**Purge Method**	Low-Flow	**Sample Method**			Grab
Sample Time	16:32	**Well Volumes Purged**	1.14	**Sample ID**	MW-16	**Evacuation Equipment**	Peristaltic
Purge Start	16:09	**Gallons Purged**	3.00	**Duplicate ID**	--		
Purge End	17:43	**Total Purge Time (h:m)**	1:34				

Time	Rate (ml/min)	Depth to Water (ft)	pH (standard units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature (°C)	Redox (mV)	Appearance	
									Color	Odor
16:15	300	2.41	7.08	0.311	--	17.98	10.80	101	Clear	None
16:18	300	2.47	7.14	0.306	--	15.54	11.00	56	Clear	None
16:21	300	2.49	7.15	0.306	--	17.13	10.94	74	Clear	None
16:24	300	2.52	7.16	0.305	--	17.33	11.00	89	Clear	None
16:27	300	2.53	7.16	0.307	--	17.75	10.94	93	Clear	None
16:30	300	2.54	7.16	0.308	--	17.58	10.88	99	Clear	None

Comments: Turbidity sensor failed. NTU not collected.

Well Casing Volume Conversion

Well diameter (in.) = gallons per foot
1 = 0.04 1.5 = 0.09 2.5 = 0.26 3.5 = 0.50 6 = 1.47
1.25 = 0.06 2 = 0.16 3 = 0.37 4 = 0.65

Sample Information

Sample ID: MW-16 Sample Time: 16:32 Sample Depth (ft-bmp): 11

Analytes and Methods: See Chain-of-Custody.

ft-bmp = feet below measuring point
in. = inches
ft = feet
mL/min = milliliters per minute

mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter
PVC = Polyvinyl Chloride

mV = millivolts
°F = degrees Fahrenheit
°C = degrees Celsius
-- = Not Recorded

Chevron Groundwater Sampling Form

ARCADIS Design & Consultancy for natural and built assets

Project Number	30063832	**Well ID**	MW-7	**Date**	2/9/2021		
Site Location	Morton, Washington	**Site ID**	302095	**Weather (°F)**	Clear	**Sampled by**	Grace Boyd
Measuring Point Description	Top of Casing	**Screen Depth Interval (ft-bmp)**	5 to 19	**Casing Diameter (in.)**	2	**Well Casing Material**	PVC
Static Water Level (ft-bmp)	2.61	**Total Depth (ft-bmp)**	8.68	**Water Column (ft)**	6.07	**Gallons in Well**	0.99
Water Quality Meter Make/Model	Horiba U-52	**Purge Method**	Low-Flow	**Sample Method**			Grab
Sample Time	16:32	**Well Volumes Purged**	3.03	**Sample ID**	MW-7	**Evacuation Equipment**	Peristaltic
Purge Start	16:08	**Gallons Purged**	3.00	**Duplicate ID**	BD-1		
Purge End	16:28	**Total Purge Time (h:m)**	0:20				

Time	Rate (ml/min)	Depth to Water (ft)	pH (standard units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature (°C)	Redox (mV)	Appearance	
									Color	Odor
16:10	300	4.87	6.34	0.167	--	0.00	8.31	87	Brown	None
16:14	300	4.91	6.25	0.179	--	0.00	8.58	78	Brown	None
16:17	300	4.91	6.12	0.185	--	0.00	8.73	78	Brown	None
16:20	300	4.93	6.09	0.193	--	0.00	8.89	63	Brown	None
16:23	300	4.91	6.07	0.195	--	0.00	8.97	59	Brown	None
16:26	300	4.91	6.04	0.194	--	0.00	8.91	57	Brown	None

Comments: Turbidity sensor failed. NTU not collected.

Well Casing Volume Conversion

Well diameter (in.) = gallons per foot
1 = 0.04 1.5 = 0.09 2.5 = 0.26 3.5 = 0.50 6 = 1.47
1.25 = 0.06 2 = 0.16 3 = 0.37 4 = 0.65

Sample Information

Sample ID: MW-7 Sample Time: 16:32 Sample Depth (ft-bmp): 6

Analytes and Methods: See Chain-of-Custody.

ft-bmp = feet below measuring point
in. = inches
ft = feet
mL/min = milliliters per minute

mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter
PVC = Polyvinyl Chloride

mV = millivolts
°F = degrees Fahrenheit
°C = degrees Celsius
-- = Not Recorded

ATTACHMENT C

Regulatory Directive, April 24, 2017

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
PO Box 47775 • Olympia, Washington 98504-7775 • (360) 407-6300
711 for Washington Relay Service • Persons with a speech disability can call 877-833-6341

April 24, 2017

Electronic Copy

Mr. Don Wyll
Principal Project Manager
Leidos
18912 North Creek Parkway, Suite 101
Bothell, WA 98011

Re: Former Chevron Bulk Plant (Wolfe and Parks Property), Morton, Washington.
Compliance Groundwater Monitoring Modifications Approval Letter.

Dear Mr. Wyll:

I reviewed your proposed modifications to the Compliance Groundwater Monitoring Plan (copy enclosed) for the Former Chevron Bulk Plant (Wolfe and Parks Property) Site located at 149 and 167 Main Street, Morton, Washington. I also reviewed the results of the groundwater monitoring conducted at this Site from 2004 through 2016.

Based on my review of the above information, Ecology is here by approving your request except the abandonment of monitoring wells MW-13 and MW-17. Ecology's approval include the following:

- Reduction in the sampling frequency from quarterly to semi-annual.
- Reduction in the number of monitoring wells from twelve to five (MW-7, MW-11, MW-12, MW-15 and MW-16) for chemical analysis.
- Abandonment of four monitoring wells (MW-14, MW-18, MW-19 and MW-2). Based on the results of groundwater monitoring, Ecology understands that the contaminant concentrations in these wells were either below the laboratory detection limits or below the Model Toxics Control Act (MTCA) Method A cleanup levels since December 2008 (30 rounds of monitoring). Since continued monitoring of these wells will not provide any valuable information, it is Ecology's opinion that it is appropriate to discontinue the monitoring and abandon these wells.

- Ecology would like to retain the monitoring wells MW-13 and MW-17 just for water level measurements. Ecology believes that measurement of water level elevations in seven wells (MW-7, MW-11, MW-12, MW-13, MW-15, MW-16 and MW-17) will aid to develop a more accurate groundwater flow direction at the site.

- The two rounds of semi-annual groundwater monitoring must reflect the lowest and highest water level elevations (seasons). Please review the existing water level elevation data and select two rounds (seasons) for reflecting the lowest and highest water level conditions at the Site. These two rounds may coincide with the summer and winter seasons.

If you have any questions, regarding this approval, please call me at (360) 407-6335.

Sincerely,

Panjini Balaraju, P.E.

By Certified Mail: [91 7199 9991 7037 0279 7772]

Enclosure: (1)

cc: Central File

ATTACHMENT D

Laboratory Report and Chain-of-Custody Documentation

Pace Analytical®
National Center for Testing & Innovation

ANALYTICAL REPORT

February 22, 2021

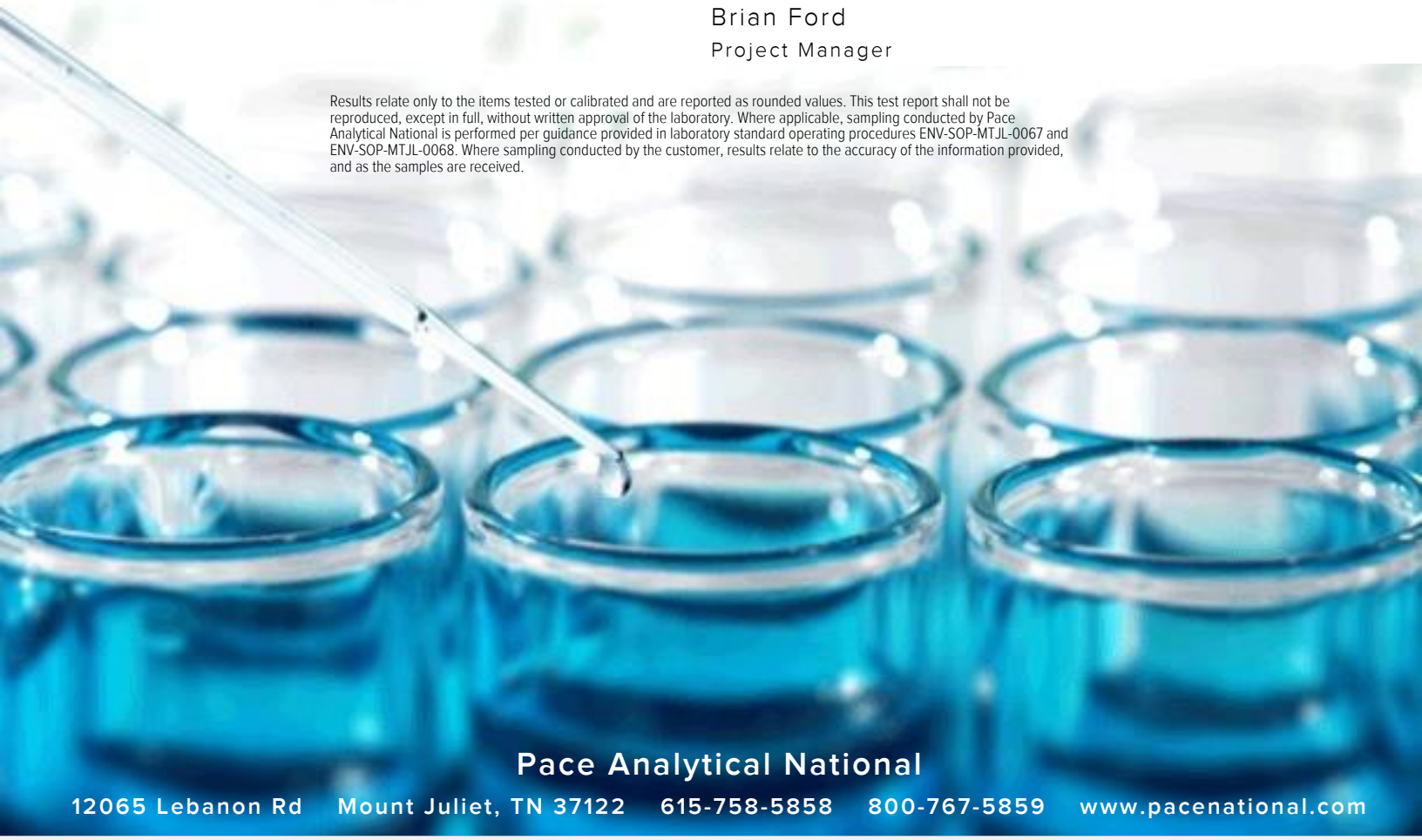
Arcadis - Chevron - WA

Sample Delivery Group:	L1316486
Samples Received:	02/12/2021
Project Number:	30063832
Description:	302095
Site:	MAIN AVE, MORTON, WA 98356
Report To:	Stephen Ahlquist 1100 Olive Way Suite 800 Seattle, WA 98101

Entire Report Reviewed By:

Brian Ford
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.



Pace Analytical National
12065 Lebanon Rd Mount Juliet, TN 37122 615-758-5858 800-767-5859 www.pacenational.com

TABLE OF CONTENTS

MW-16_210209 L1316486-01 GW

Collected by: Tyler Green | Collected date/time: 02/09/21 16:32 | Received date/time: 02/12/21 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (GC) by Method NWTPHGX	WG1620691	1	02/12/21 19:26	02/12/21 19:26	ADM	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260D	WG1620827	1	02/13/21 03:11	02/13/21 03:11	ADM	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method NWTPHDX-NO SGT	WG1621576	1	02/19/21 01:15	02/19/21 21:21	AEG	Mt. Juliet, TN

MW-11_210209 L1316486-02 GW

Collected by: Tyler Green | Collected date/time: 02/09/21 14:28 | Received date/time: 02/12/21 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (GC) by Method NWTPHGX	WG1620691	1	02/12/21 19:53	02/12/21 19:53	ADM	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260D	WG1620827	1	02/13/21 03:30	02/13/21 03:30	ADM	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method NWTPHDX-NO SGT	WG1621576	1	02/19/21 01:15	02/19/21 21:47	AEG	Mt. Juliet, TN

MW-15_210209 L1316486-03 GW

Collected by: Tyler Green | Collected date/time: 02/09/21 12:10 | Received date/time: 02/12/21 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (GC) by Method NWTPHGX	WG1620691	1	02/12/21 20:19	02/12/21 20:19	ADM	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260D	WG1620827	1	02/13/21 03:49	02/13/21 03:49	ADM	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method NWTPHDX-NO SGT	WG1622309	1	02/19/21 20:35	02/20/21 00:17	DMG	Mt. Juliet, TN

MW-7_210209 L1316486-04 GW

Collected by: Tyler Green | Collected date/time: 02/09/21 16:32 | Received date/time: 02/12/21 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (GC) by Method NWTPHGX	WG1620691	1	02/12/21 20:46	02/12/21 20:46	ADM	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260D	WG1620827	1	02/13/21 04:08	02/13/21 04:08	ADM	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method NWTPHDX-NO SGT	WG1622309	1	02/19/21 20:35	02/20/21 00:37	DMG	Mt. Juliet, TN

MW-12_210209 L1316486-05 GW

Collected by: Tyler Green | Collected date/time: 02/09/21 14:04 | Received date/time: 02/12/21 08:00

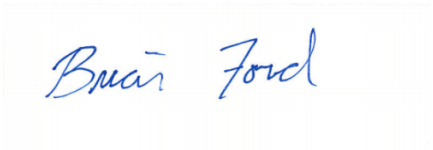
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (GC) by Method NWTPHGX	WG1620691	1	02/12/21 21:12	02/12/21 21:12	ADM	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260D	WG1620827	1	02/13/21 04:27	02/13/21 04:27	ADM	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method NWTPHDX-NO SGT	WG1622309	1	02/19/21 20:35	02/20/21 00:57	DMG	Mt. Juliet, TN

BD-1_210209 L1316486-06 GW

Collected by: Tyler Green | Collected date/time: 02/09/21 00:00 | Received date/time: 02/12/21 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (GC) by Method NWTPHGX	WG1620691	1	02/12/21 21:39	02/12/21 21:39	ADM	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260D	WG1620827	1	02/13/21 04:47	02/13/21 04:47	ADM	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method NWTPHDX-NO SGT	WG1622309	1	02/19/21 20:35	02/20/21 01:17	DMG	Mt. Juliet, TN

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.



Brian Ford
Project Manager

Volatile Organic Compounds (GC) by Method NWTPHGX

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Gasoline Range Organics-NWTPH	292	B	31.6	100	1	02/12/2021 19:26	WG1620691
(S) a,a,a-Trifluorotoluene(FID)	*103*			*78.0-120*		*02/12/2021 19:26*	WG1620691

Volatile Organic Compounds (GC/MS) by Method 8260D

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Benzene	U		0.0941	1.00	1	02/13/2021 03:11	WG1620827
Toluene	U		0.278	1.00	1	02/13/2021 03:11	WG1620827
Ethylbenzene	U		0.137	1.00	1	02/13/2021 03:11	WG1620827
Total Xylenes	U		0.174	3.00	1	02/13/2021 03:11	WG1620827
(S) Toluene-d8	*95.9*			*80.0-120*		*02/13/2021 03:11*	WG1620827
(S) 4-Bromofluorobenzene	*100*			*77.0-126*		*02/13/2021 03:11*	WG1620827
(S) 1,2-Dichloroethane-d4	*109*			*70.0-130*		*02/13/2021 03:11*	WG1620827

Semi-Volatile Organic Compounds (GC) by Method NWTPHDX-NO SGT

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Diesel Range Organics (DRO)	642		66.7	200	1	02/19/2021 21:21	WG1621576
Residual Range Organics (RRO)	593		83.3	250	1	02/19/2021 21:21	WG1621576
(S) o-Terphenyl	*123*			*52.0-156*		*02/19/2021 21:21*	WG1621576

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

Volatile Organic Compounds (GC) by Method NWTPHGX

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Gasoline Range Organics-NWTPH	42.4	B J	31.6	100	1	02/12/2021 19:53	WG1620691
(S) a,a,a-Trifluorotoluene(FID)	*112*			*78.0-120*		*02/12/2021 19:53*	WG1620691

Volatile Organic Compounds (GC/MS) by Method 8260D

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Benzene	U		0.0941	1.00	1	02/13/2021 03:30	WG1620827
Toluene	U		0.278	1.00	1	02/13/2021 03:30	WG1620827
Ethylbenzene	U		0.137	1.00	1	02/13/2021 03:30	WG1620827
Total Xylenes	U		0.174	3.00	1	02/13/2021 03:30	WG1620827
(S) Toluene-d8	*106*			*80.0-120*		*02/13/2021 03:30*	WG1620827
(S) 4-Bromofluorobenzene	*103*			*77.0-126*		*02/13/2021 03:30*	WG1620827
(S) 1,2-Dichloroethane-d4	*102*			*70.0-130*		*02/13/2021 03:30*	WG1620827

Semi-Volatile Organic Compounds (GC) by Method NWTPHDX-NO SGT

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Diesel Range Organics (DRO)	116	J	66.7	200	1	02/19/2021 21:47	WG1621576
Residual Range Organics (RRO)	489		83.3	250	1	02/19/2021 21:47	WG1621576
(S) o-Terphenyl	*115*			*52.0-156*		*02/19/2021 21:47*	WG1621576

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

Volatile Organic Compounds (GC) by Method NWTPHGX

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Gasoline Range Organics-NWTPH	254	B	31.6	100	1	02/12/2021 20:19	WG1620691
(S) a,a,a-Trifluorotoluene(FID)	*101*			*78.0-120*		*02/12/2021 20:19*	WG1620691

Volatile Organic Compounds (GC/MS) by Method 8260D

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Benzene	U		0.0941	1.00	1	02/13/2021 03:49	WG1620827
Toluene	U		0.278	1.00	1	02/13/2021 03:49	WG1620827
Ethylbenzene	U		0.137	1.00	1	02/13/2021 03:49	WG1620827
Total Xylenes	U		0.174	3.00	1	02/13/2021 03:49	WG1620827
(S) Toluene-d8	*100*			*80.0-120*		*02/13/2021 03:49*	WG1620827
(S) 4-Bromofluorobenzene	*99.4*			*77.0-126*		*02/13/2021 03:49*	WG1620827
(S) 1,2-Dichloroethane-d4	*99.1*			*70.0-130*		*02/13/2021 03:49*	WG1620827

Semi-Volatile Organic Compounds (GC) by Method NWTPHDX-NO SGT

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Diesel Range Organics (DRO)	U		66.7	200	1	02/20/2021 00:17	WG1622309
Residual Range Organics (RRO)	U		83.3	250	1	02/20/2021 00:17	WG1622309
(S) o-Terphenyl	*87.4*			*52.0-156*		*02/20/2021 00:17*	WG1622309

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

Volatile Organic Compounds (GC) by Method NWTPHGX

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Gasoline Range Organics-NWTPH	58.6	B J	31.6	100	1	02/12/2021 20:46	WG1620691
(S) a,a,a-Trifluorotoluene(FID)	*113*			*78.0-120*		*02/12/2021 20:46*	WG1620691

Volatile Organic Compounds (GC/MS) by Method 8260D

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Benzene	U		0.0941	1.00	1	02/13/2021 04:08	WG1620827
Toluene	U		0.278	1.00	1	02/13/2021 04:08	WG1620827
Ethylbenzene	U		0.137	1.00	1	02/13/2021 04:08	WG1620827
Total Xylenes	U		0.174	3.00	1	02/13/2021 04:08	WG1620827
(S) Toluene-d8	*105*			*80.0-120*		*02/13/2021 04:08*	WG1620827
(S) 4-Bromofluorobenzene	*101*			*77.0-126*		*02/13/2021 04:08*	WG1620827
(S) 1,2-Dichloroethane-d4	*98.9*			*70.0-130*		*02/13/2021 04:08*	WG1620827

Semi-Volatile Organic Compounds (GC) by Method NWTPHDX-NO SGT

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Diesel Range Organics (DRO)	904		66.7	200	1	02/20/2021 00:37	WG1622309
Residual Range Organics (RRO)	318	B	83.3	250	1	02/20/2021 00:37	WG1622309
(S) o-Terphenyl	*91.1*			*52.0-156*		*02/20/2021 00:37*	WG1622309

Volatile Organic Compounds (GC) by Method NWTPHGX

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Gasoline Range Organics-NWTPH	32.8	B J	31.6	100	1	02/12/2021 21:12	WG1620691
(S) a,a,a-Trifluorotoluene(FID)	*112*			*78.0-120*		*02/12/2021 21:12*	WG1620691

Volatile Organic Compounds (GC/MS) by Method 8260D

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Benzene	U		0.0941	1.00	1	02/13/2021 04:27	WG1620827
Toluene	U		0.278	1.00	1	02/13/2021 04:27	WG1620827
Ethylbenzene	U		0.137	1.00	1	02/13/2021 04:27	WG1620827
Total Xylenes	U		0.174	3.00	1	02/13/2021 04:27	WG1620827
(S) Toluene-d8	*92.3*			*80.0-120*		*02/13/2021 04:27*	WG1620827
(S) 4-Bromofluorobenzene	*97.6*			*77.0-126*		*02/13/2021 04:27*	WG1620827
(S) 1,2-Dichloroethane-d4	*99.9*			*70.0-130*		*02/13/2021 04:27*	WG1620827

Semi-Volatile Organic Compounds (GC) by Method NWTPHDX-NO SGT

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Diesel Range Organics (DRO)	U		66.7	200	1	02/20/2021 00:57	WG1622309
Residual Range Organics (RRO)	U		83.3	250	1	02/20/2021 00:57	WG1622309
(S) o-Terphenyl	*82.6*			*52.0-156*		*02/20/2021 00:57*	WG1622309

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

Volatile Organic Compounds (GC) by Method NWTPHGX

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Gasoline Range Organics-NWTPH	64.9	B J	31.6	100	1	02/12/2021 21:39	WG1620691
(S) a,a,a-Trifluorotoluene(FID)	*112*			*78.0-120*		*02/12/2021 21:39*	WG1620691

Volatile Organic Compounds (GC/MS) by Method 8260D

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Benzene	U		0.0941	1.00	1	02/13/2021 04:47	WG1620827
Toluene	U		0.278	1.00	1	02/13/2021 04:47	WG1620827
Ethylbenzene	U		0.137	1.00	1	02/13/2021 04:47	WG1620827
Total Xylenes	U		0.174	3.00	1	02/13/2021 04:47	WG1620827
(S) Toluene-d8	*101*			*80.0-120*		*02/13/2021 04:47*	WG1620827
(S) 4-Bromofluorobenzene	*110*			*77.0-126*		*02/13/2021 04:47*	WG1620827
(S) 1,2-Dichloroethane-d4	*105*			*70.0-130*		*02/13/2021 04:47*	WG1620827

Semi-Volatile Organic Compounds (GC) by Method NWTPHDX-NO SGT

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Diesel Range Organics (DRO)	934		66.7	200	1	02/20/2021 01:17	WG1622309
Residual Range Organics (RRO)	301	B	83.3	250	1	02/20/2021 01:17	WG1622309
(S) o-Terphenyl	*92.6*			*52.0-156*		*02/20/2021 01:17*	WG1622309

Method Blank (MB)

(MB) R3622282-2 02/12/21 14:41

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Gasoline Range Organics-NWTPH	43.0	J	31.6	100
(S) a,a,a-Trifluorotoluene(FID)	*114*			*78.0-120*

Laboratory Control Sample (LCS)

(LCS) R3622282-1 02/12/21 13:04

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Gasoline Range Organics-NWTPH	5500	4990	90.7	70.0-124	
(S) a,a,a-Trifluorotoluene(FID)			*100*	*78.0-120*	

Method Blank (MB)

(MB) R3622232-3 02/12/21 19:32

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	ug/l		ug/l	ug/l
Benzene	U		0.0941	1.00
Ethylbenzene	U		0.137	1.00
Toluene	U		0.278	1.00
Xylenes, Total	U		0.174	3.00
(S) Toluene-d8	*99.1*			*80.0-120*
(S) 4-Bromofluorobenzene	*96.9*			*77.0-126*
(S) 1,2-Dichloroethane-d4	*106*			*70.0-130*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3622232-1 02/12/21 18:34 • (LCSD) R3622232-2 02/12/21 18:53

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	ug/l	ug/l	ug/l	%	%	%			%	%
Benzene	5.00	5.85	5.51	117	110	70.0-123			5.99	20
Ethylbenzene	5.00	5.63	5.06	113	101	79.0-123			10.7	20
Toluene	5.00	5.69	5.23	114	105	79.0-120			8.42	20
Xylenes, Total	15.0	17.3	15.6	115	104	79.0-123			10.3	20
(S) Toluene-d8				*101*	*99.6*	*80.0-120*				
(S) 4-Bromofluorobenzene				*103*	*100*	*77.0-126*				
(S) 1,2-Dichloroethane-d4				*99.6*	*103*	*70.0-130*				

Method Blank (MB)

(MB) R3623253-1 02/19/21 11:06

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Diesel Range Organics (DRO)	U		66.7	200
Residual Range Organics (RRO)	U		83.3	250
(S) o-Terphenyl	*118*			*52.0-156*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3623253-2 02/19/21 11:32 • (LCSD) R3623253-3 02/19/21 11:58

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Diesel Range Organics (DRO)	1500	1700	1700	113	113	50.0-150			0.000	20
(S) o-Terphenyl				*156*	*151*	*52.0-156*				

Method Blank (MB)

(MB) R3623415-1 02/19/21 23:17

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Diesel Range Organics (DRO)	U		66.7	200
Residual Range Organics (RRO)	88.3	J	83.3	250
(S) o-Terphenyl	*73.0*			*52.0-156*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3623415-2 02/19/21 23:37 • (LCSD) R3623415-3 02/19/21 23:57

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Diesel Range Organics (DRO)	1500	1530	1570	102	105	50.0-150			2.58	20
(S) o-Terphenyl				*89.5*	*91.5*	*52.0-156*				

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDL	Method Detection Limit.
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state “ND” (Not Detected) or “BDL” (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
B	The same analyte is found in the associated blank.
J	The identification of the analyte is acceptable; the reported value is an estimate.

Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.
* Not all certifications held by the laboratory are applicable to the results reported in the attached report.
* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

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Colorado	TN00003	New York	11742
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Florida	E87487	North Carolina [1]	DW21704
Georgia	NELAP	North Carolina [3]	41
Georgia [1]	923	North Dakota	R-140
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Kansas	E-10277	Rhode Island	LA000356
Kentucky [1 6]	KY90010	South Carolina	84004002
Kentucky [2]	16	South Dakota	n/a
Louisiana	AI30792	Tennessee [1 4]	2006
Louisiana	LA018	Texas	T104704245-20-18
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Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	998093910
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[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

Company Name/Address:
Arcadis - Chevron - WA
1100 Olive Way
Suite 800
Seattle. WA 98101

Billing Information:
Attn: Accounts Payable
630 Plaza Dr., Ste. 600
Highlands Ranch, CO 80129

Pres Chk

Report to:
Stephen Ahlquist

Email To:
stephen.Ahlquist@arcadis.com;environmentDM

Project Description:
302095

City/State Collected: Morton, WA

Please Circle: (PT) MT CT ET

Phone: **206-325-5254**

Client Project #
30063832

Lab Project #
CHEVARCWA-302095

Collected by (print):
Tyler Green

Site/Facility ID #
MAIN AVE, MORTON, WA

P.O. #

Collected by (signature):
Immediately
Packed on Ice N ___ Y ✓

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day X 10 Day (Rad Only)
___ Three Day

Date Results Needed

Quote #

Analysis / Container / Preservative

Chain of Custody Page ___ of ___

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SDG # 1316986
J219

Acctnum: **CHEVARCWA**
Template: **T181153**
Prelogin: **P824743**
PM: **110 - Brian Ford**
PB:
Shipped Via:

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	BTEX 8260D 40mlAmb-HCl	NWTPHDX LVINOSGT 40mlAmb-HCl-BT	NWTPHGX 40mlAmb HCl	Remarks	Sample # (lab only)
MW-16	Grab	GW	11'	2/9/21	1632	8	X	X	X		-01
MW-11	Grab	GW	11'	2/9/21	1428	8	X	X	X		-02
MW-15	GRAB	GW	9"	2/9/21	12:10	8	X	X	X		-03
MW-7	Grab	GW	6"	2/9/21	16:32	8	X	X	X		-04
MW-12	Grab	GW	10"	2/9/21	14:04	8	X	X	X		-05
BD-1	Grab	GW	—	2/9/21	—	8	X	X	X		-06

* Matrix:
SS - Soil **AIR** - Air **F** - Filter
GW - Groundwater **B** - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks: Send report to stephen.ahlquist@arcadis.com
-Hold for dissolved lead

pH _____ Temp _____
Flow _____ Other _____

Samples returned via:
__ UPS __ FedEx __ Courier _____

Tracking #

Sample Receipt Checklist
COC Seal Present/Intact: NP Y N
COC Signed/Accurate: ✓Y N
Bottles arrive intact: ✓Y N
Correct bottles used: ✓Y N
Sufficient volume sent: ✓Y N
If Applicable
VOA Zero Headspace: ✓Y N
Preservation Correct/Checked: ✓Y N
RAD Screen <0.5 mR/hr: ✓Y N

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / No HCL / MeoH TBR	If preservation required by Login: Date/Time
	2/11/21	0912		2	
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Temp: °C Bottles Received:	
PM Pony	2/11/20	1000		TURB 1.4 1.1 = 1.5	48
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: Time:	Hold: / Condition: NCF / OK
			Patricia Medina	2-12-21 0800	

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