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TECHNICAL MEMORANDUM

DATE: November 6, 2019
TO: Christopher Maurer
FROM: David Dinkuhn, P.E.
SUBJECT: Former Chevron Property Long Term Monitoring Events 10 and 11 (2018 and 2019)
CC: Bill Davis, P.E.
PROJECT NUMBER: 233-1896-107
PROJECT NAME: Former Chevron Property Remediation

FORMER CHEVRON PROPERTY LONG TERM GROUNDWATER MONITORING EVENTS 10 AND 11 (2018 AND 2019)

This technical memorandum presents a summary of the results of annual long-term groundwater monitoring events in 2018 and 2019 at the Former Chevron Property, located in Bremerton, Washington. Long-term monitoring is being performed under the site's Agreed Order Number DE-12TCPHQ-9509. Sampling during each event was conducted in accordance with the site's Long Term Monitoring Plan (LTGMP; Parametrix 2013). Data from these long-term monitoring events is intended to be used to evaluate groundwater quality trends at the site and confirm the continued occurrence of natural attenuation.

MONITORING RESULTS

Groundwater samples were collected on July 18th and 19th in 2018 and on July 22nd and 23rd in 2019 using a peristaltic pump and low flow sampling techniques. Samples were collected from ten designated long-term monitoring wells including: MW-4R, -10R, -11, -13R, -20R, -21R, -22R, -25, -26R, and -27. Monitoring well MW-9R was damaged in 2015 and is no longer used. Two other existing wells (MW-4R and MW-10R) are similarly located and provide sufficient information for evaluating concentrations near the plume's center. Figures 1 and 2 show monitoring well locations.

Prior to sampling, all wells were purged until measured water quality parameters stabilized according to criteria specified in the LTGMP. Upon stabilization, groundwater samples were collected in appropriate containers. The final set of water quality parameter measurements are provided in Table 1. During both 2018 and 2019, wells MW-4R, MW-13R, and MW-22R produced insufficient water for parameter stabilization and were pumped dry and allowed to recover prior to sampling. In 2018, the sample collected from MW-22R was analyzed for gasoline/BTEX, diesel, ferrous iron, and dissolved methane only. Samples from MW-4R and MW-13R and were analyzed for gasoline/BTEX and dissolved methane only. In 2019, MW-4R, MW-13R, and MW-22R were analyzed for gasoline/BTEX and dissolved methane only. Field sampling forms related to the sample collection for both 2018 and 2019 are attached.

Groundwater samples were submitted to Onsite Environmental of Redmond, Washington, for chemical analysis of gasoline, diesel, and lube oil along with benzene, toluene, ethyl benzene, and xylenes, and general chemistry parameters (including dissolved methane). Ferrous iron analysis was subcontracted to Analytical Resources Incorporated of Tukwila, Washington in 2018 and Fremont Analytical of Seattle, Washington in 2019. A summary

of analytical results is presented in Table 1. Analytical data review memorandums and laboratory reports are also attached for each monitoring event.

The depth to groundwater was measured in each well on July 18th in 2018 and July 22nd in 2019. Approximate areas of concentrations of contaminants of concern above MTCA A Cleanup Levels and inferred groundwater surface elevation contours are shown on Figures 1 and 2.

DISCUSSION

Concentration trends versus time for benzene and gasoline are presented graphically in Figures 3 and 4. Wells MW-4R and MW-21R still have concentrations of benzene that exceed the MTCA A cleanup level. Gasoline concentrations in wells MW-10R and MW-21R exceeded the MTCA A cleanup level. Overall concentration trends from historical sampling events through Event 11 appear to be relatively stable after an initial downward trend observed during events 1 through 3. Note that, for illustration purposes, linear regression trend lines for MW-21R are shown in Figures 3 and 4. Downward trends are shown for both gasoline and benzene concentrations in this well.

Evidence that anaerobic respiration is continuing to occur in the impacted aquifer is demonstrated by elevated ferrous iron, dissolved manganese, and dissolved methane concentrations with associated highly negative oxidation reduction potential values in a majority of wells. Upgradient well MW-11 has typically been used as a point of comparison for impacted wells, though it has recently had increases in some of the indicators discussed above (such as methane). This is similar to cross-gradient well MW-27 which has also not seen detections of contaminants of concern but has shown indicators of anaerobic respiration.

REFERENCES

Parametrix. 2013. Former Chevron Property Long-Term Groundwater Monitoring Plan. Prepared for Ecology on behalf of City of Bremerton. July 8.

ATTACHMENTS:

Figure 1 – Long Term Groundwater Monitoring Event 10 Sampling Results – July 2018

Figure 2 – Long Term Groundwater Monitoring Event 11 Sampling Results – July 2019

Figure 3 – Benzene Results

Figure 4 – Gasoline Results

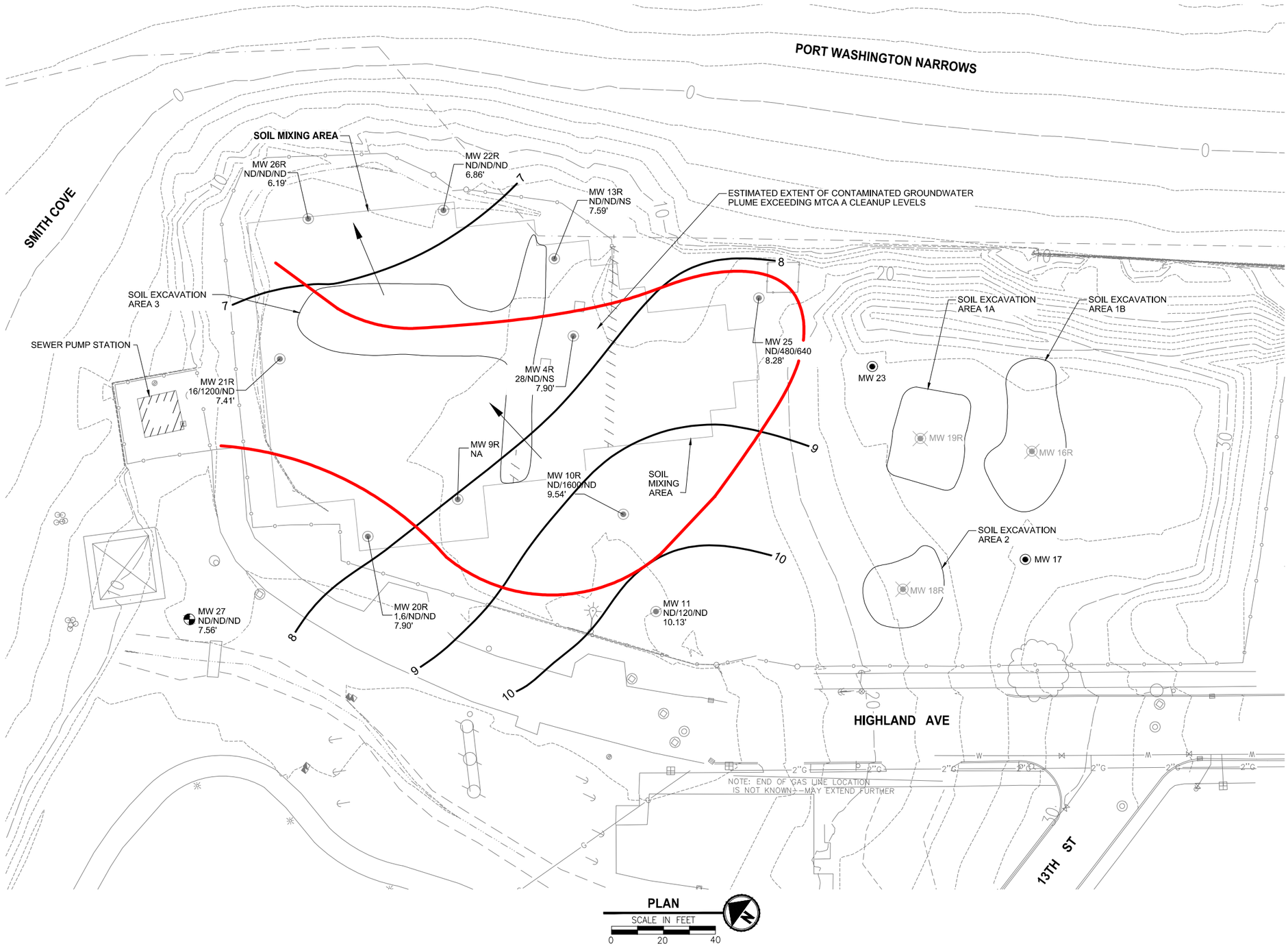
Table 1 – Groundwater Results Summary

Monitoring Well Logs

Field Sampling Forms

Data Validation Technical Memorandums

Laboratory Reports



LEGEND

- EXISTING CHAIN LINK FENCE
- EXISTING MONITORING WELL
- SOIL EXCAVATION AREA
- MW 14 — WELL REMOVED DURING INTERIM ACTION
- MW 19R — LONG TERM MONITORING WELL
- 5.08' — GROUNDWATER SURFACE ELEVATION
- R — INDICATES REPLACEMENT WELL
- ESTIMATED CONTAMINATED GROUNDWATER PLUME EXCEEDING MTCA A CLEANUP LEVELS
- GROUNDWATER FLOW DIRECTION
- 9 — GROUNDWATER SURFACE ELEVATION CONTOUR
- 19/1,500/ND — GW RESULTS FOR BENZENE / GASOLINE / DIESEL RESULTS IN ug/L
- ND — NOT DETECTED
- NS — NOT SAMPLED DUE TO LOW WELL PRODUCTION
- NA — NOT ACCESSIBLE

GENERAL NOTES:

1. CONTOUR DATUM NAVD 88
2. GROUNDWATER ELEVATION MEASUREMENTS COLLECTED 7/18/18

CLEANUP LEVELS	
MTCA A	**ug/L**
BENZENE	5
GASOLINE	800
DIESEL	500

PLAN
SCALE IN FEET
0 20 40

REVISIONS NO.	DESCRIPTION	DATE	BY

ENGINEER STAMP

0 1" 2"
TWO INCHES AT FULL SCALE
IF NOT SCALE ACCORDINGLY

SCALE
HORIZ. 1"=20' VERT. N/A

FIELD BOOK

DRAWING NO.

CITY OF BREMERTON
DEPARTMENT OF PUBLIC WORKS & UTILITIES
ENGINEERING DIVISION

DRAWN BY: JLP DATE 8/16
DESIGN BY: DLD WASH. P.E. # DATE 4/15
CHECKED BY: WASH. P.E. # DATE

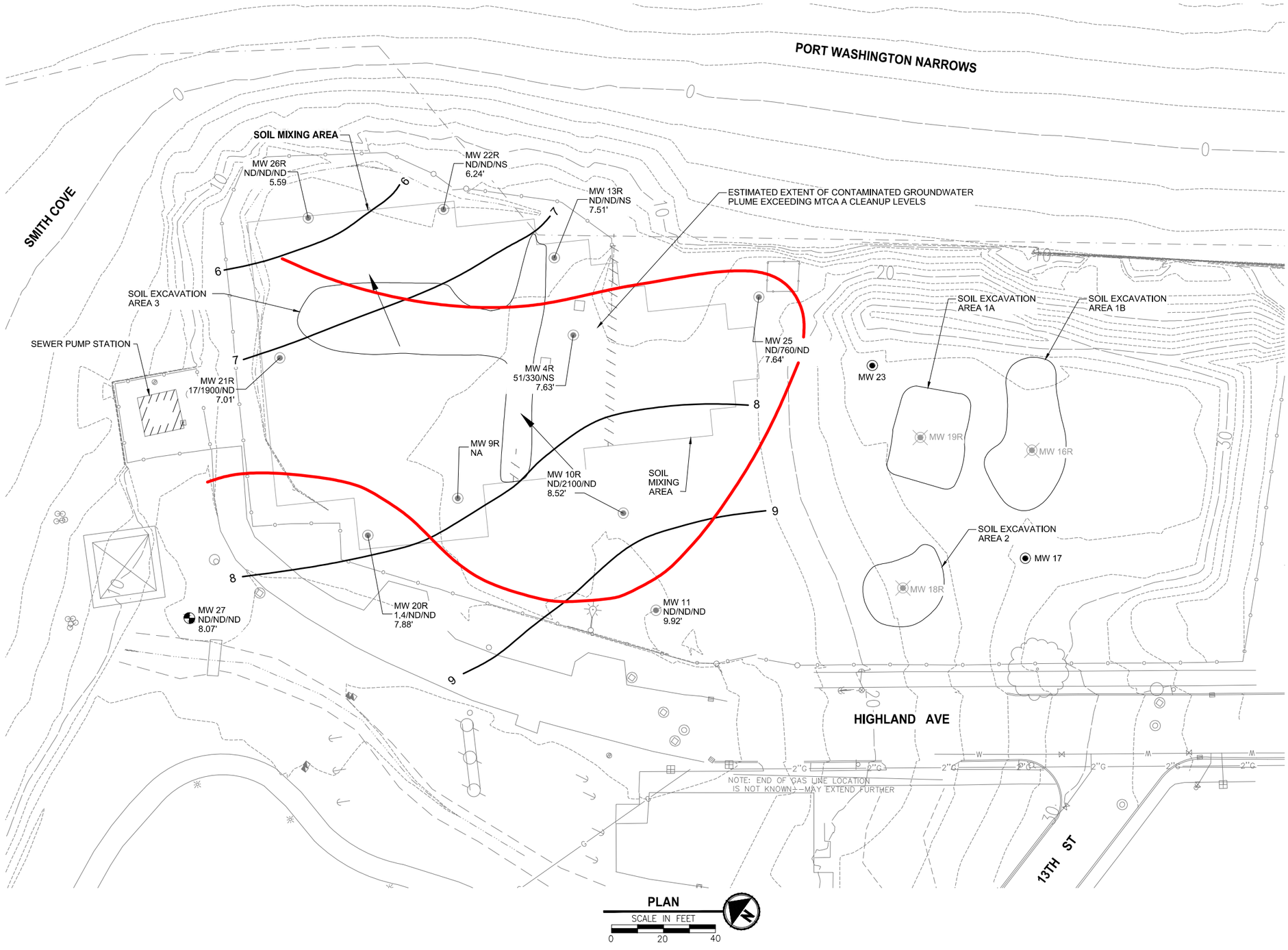
FORMER CHEVRON PROPERTY
LONG-TERM GROUNDWATER MONITORING
EVENT 10 SAMPLING RESULTS - JULY 2018

FIG. NO. **1**

PN: 233-1896-107

SHEET 1 OF 1

FILE: BR1896107-F08_081716
DATE: Sep 04, 2018 - 9:20am PLOTTED BY: chlodkyl
IMAGES:
XREF'S: XB-BREM_WTRFRNT-BA-SV-061201 | XBR1896063P041130IF-BA



PLAN

SCALE IN FEET

0 20 40

LEGEND

	EXISTING CHAIN LINK FENCE
	EXISTING MONITORING WELL
	SOIL EXCAVATION AREA
MW 14	WELL REMOVED DURING INTERIM ACTION
MW 19R	LONG TERM MONITORING WELL
5.08'	GROUNDWATER SURFACE ELEVATION
R	INDICATES REPLACEMENT WELL
	ESTIMATED CONTAMINATED GROUNDWATER PLUME EXCEEDING MTCA A CLEANUP LEVELS
	GROUNDWATER FLOW DIRECTION
9	GROUNDWATER SURFACE ELEVATION CONTOUR
19/1,500/ND	GW RESULTS FOR BENZENE / GASOLINE / DIESEL RESULTS IN ug/L
ND	NOT DETECTED
NS	NOT SAMPLED DUE TO LOW WELL PRODUCTION
NA	NOT ACCESSIBLE

GENERAL NOTES:

1. CONTOUR DATUM NAVD 88
2. GROUNDWATER ELEVATION MEASUREMENTS COLLECTED 7/22/19

CLEANUP LEVELS	
MTCA A	**ug/L**
BENZENE	5
GASOLINE	800
DIESEL	500

FILE: BR1896107-F08_08-19-19
DATE: Aug 19, 2019 - 2:44pm PLOTTED BY: chlodkyl
IMAGES:
XREF's: XB-BREM_WTRFRNT-BA-SV-061201 | XBR1896063P04113O1F-BA

REVISIONS NO.	DESCRIPTION	DATE	BY

ENGINEER STAMP

0 1" 2"
TWO INCHES AT FULL SCALE IF NOT SCALE ACCORDINGLY

SCALE
HORIZ. 1"=20' VERT. N/A

FIELD BOOK

DRAWING NO.

CITY OF BREMERTON
DEPARTMENT OF PUBLIC WORKS & UTILITIES
ENGINEERING DIVISION

DRAWN BY: JLP DATE 8/16
DESIGN BY: DLD WASH. P.E. # DATE 4/15
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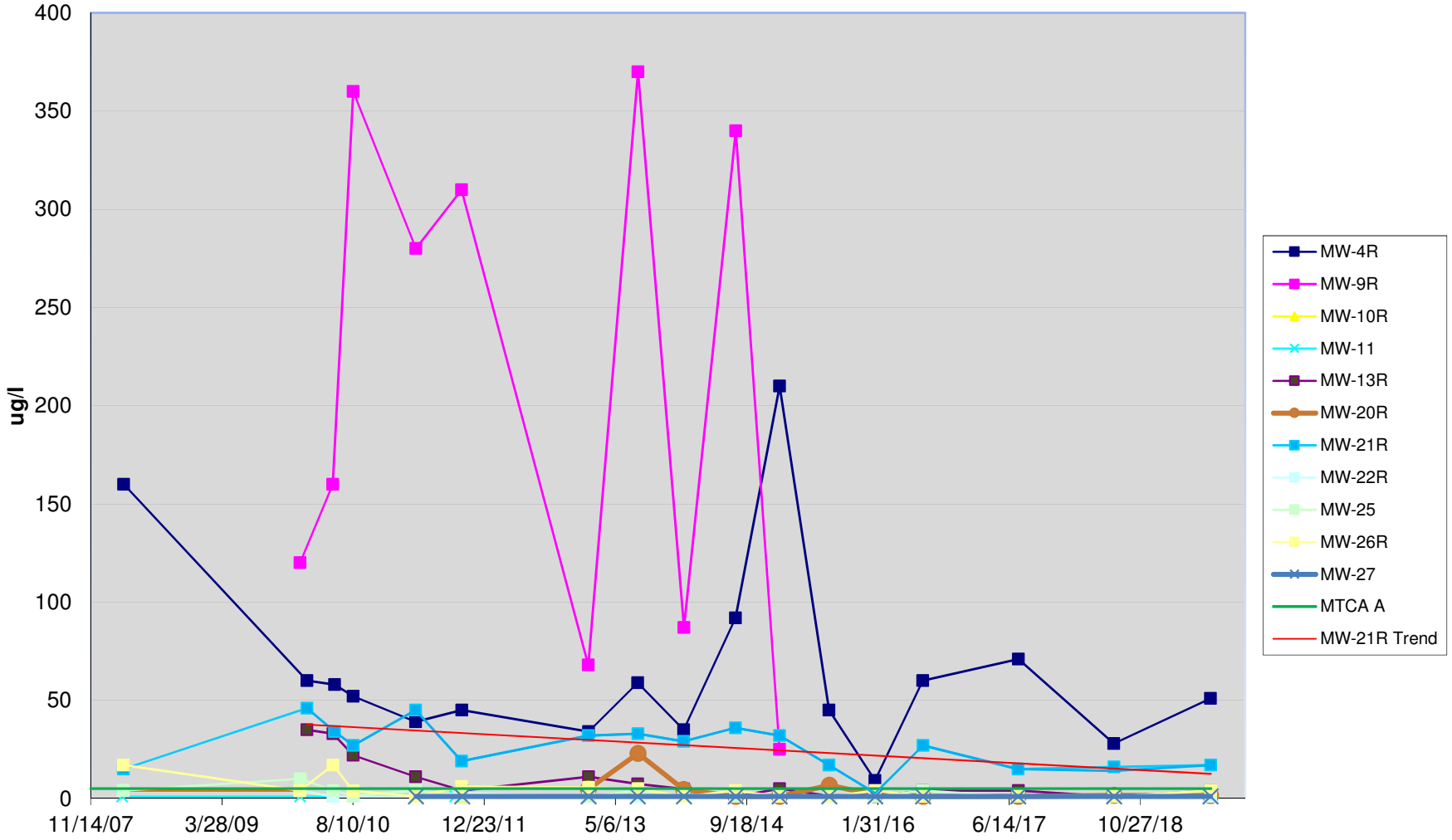
FORMER CHEVRON PROPERTY
LONG-TERM GROUNDWATER MONITORING
EVENT 11 SAMPLING RESULTS - JULY 2019

FIG. NO. **2**

PN: 233-1896-107

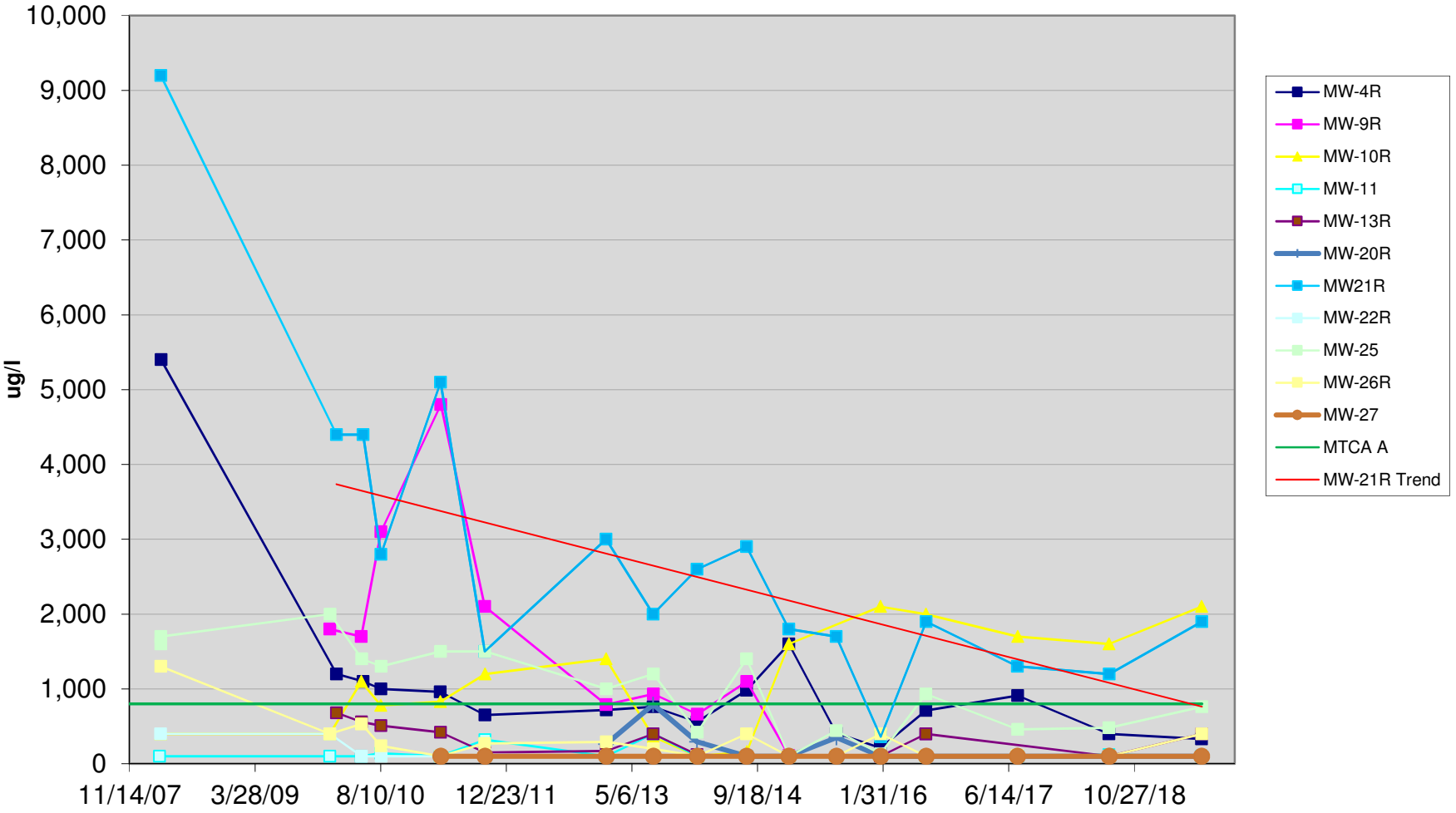
SHEET 1 OF 1

Figure 3. Event 11
Benzene Results - Former Chevron Property



August 2019

Figure 4. Event 11
Gasoline Results - Former Chevron Property



August 2019

Table 1 Groundwater Results Summary, Long Term Monitoring Events 10 and 11 (2018/2019)

Monitoring Well No.			MW-04R																	
PARAMETERS	**Units**		**3/19/08**	**1/21/10**	**6/1/10**	**6/1/10***	**8/11/10**	**8/11/10***	**4/5/11**	**4/5/11***	**9/29/11**	**1/24/13**	**7/30/13**	**1/21/14**	**8/6/14**	**1/21/15**	**7/29/15**	**1/20/16**	**7/20/16**	**7/20/17**	**7/18/18**	**7/22/19**
		MTCA A																				
VOLATILE ORGANICS (BTEX)																						
Benzene	ug/L	5	160	60 J	58	--	52	--	39	--	45	34	59	35	92	210	45	9.2	60 J	71	28	51
Toluene	ug/L	1,000	10 U	2.0 J	1.0 U	--	1.0 U	--	4.0 U	--	1.0 U	2.1 U	4.0 U	1.8 U	4.0 U	4.0 U	1.6	1.0 U	4.0 U	4.0	4.0 U	1.4
Ethylbenzene	ug/L	700	45	31 J	45	--	40	--	17	--	20	7.9	5.9	3.1	9.0	150	25	3.8	15 J	19	4.0 U	1.2
m,p-Xylene	ug/L	1,000	86	15 J	7.6	--	4.7	--	9.4	--	2.1	4.1	9.4	2.5	5.5	7.9	1.8	1.5	7.7 J	6.9	4.0 U	1.0 U
o-Xylene	ug/L	1,000	12	1.8 J	1.0 U	--	1.0 U	--	4.0	--	1.0 U	1.5	4.0 U	1.3 U	4.0 U	4.0 U	1.0 U	1.0 U	4.0 U	4.0	4.0 U	1.0 U
TOTAL PETROLEUM HYDROCARBONS																						
Gasoline	ug/L	800/1,000[2]	5,400	1,200 J	1,100	--	1,000	--	960	--	650	720	760	560	980	1,600	410	210	710 J	910	400 U	330
Diesel	mg/L	0.5	27	0.64 M	0.34 U	--	0.62 M	--	0.46	--	0.34 U	0.31 U	0.31 U	0.36 U	0.62	--	--	--	--	--	--	--
Lube Oil	mg/L	0.5	2.3	0.45 U	0.42 U	--	0.41 U	--	0.42 U	--	0.42 U	0.41 U	0.41 U	0.41 U	1.20	--	--	--	--	--	--	--
METALS																						
Total Lead	ug/L	15	--	8.2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dissolved Lead	ug/L	15	--	1.0 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dissolved Iron	ug/L		--	4,200	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Ferrous Iron	mg/L		--	--	7.36	--	9.75	--	5.4	--	--	7.35	9.70	9.64	11.5	--	--	--	--	--	--	--
Dissolved Manganese	ug/L		--	3,000	4,600	--	4,400	--	3,400	--	--	4,500	6,500	5,500	5,800	--	--	--	--	--	--	--
PAHs								--														
Naphthalene	ug/L		--	1.4	--	--	--	--	1.0 U	1.0 U	--	--	--	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	ug/L		--	0.20	--	--	--	--	1.0 U	1.0 U	--	--	--	--	--	--	--	--	--	--	--	--
1-Methylnappthalene	ug/L		--	3.2	--	--	--	--	4.7	4.9	--	--	--	--	--	--	--	--	--	--	--	--
Acenaphthylene	ug/L		--	0.23	--	--	--	--	1.0 U	1.0 U	--	--	--	--	--	--	--	--	--	--	--	--
Acenaphthene	ug/L		--	1.9	--	--	--	--	3.3	3.4	--	--	--	--	--	--	--	--	--	--	--	--
Flourene	ug/L		--	1.8	--	--	--	--	2.3	2.3	--	--	--	--	--	--	--	--	--	--	--	--
Phenanthrene	ug/L		--	0.15	--	--	--	--	1.0 U	1.0 U	--	--	--	--	--	--	--	--	--	--	--	--
Anthracene	ug/L		--	0.44	--	--	--	--	1.0 U	1.0 U	--	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	ug/L		--	0.39	--	--	--	--	1.0 U	1.0 U	--	--	--	--	--	--	--	--	--	--	--	--
Pyrene	ug/L		--	0.26	--	--	--	--	1.0 U	1.0 U	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	ug/L		--	0.047	0.032	0.03	0.050 U	0.042	0.10 U	0.10 U	--	--	--	--	--	--	--	--	--	--	--	--
Chrysene	ug/L		--	0.033	0.010 U	0.010 U	0.050 U	0.023	0.10 U	0.10 U	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	ug/L		--	0.013	0.010 U	0.010 U	0.010 U	0.010 U	0.10 U	0.10 U	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	ug/L		--	0.028	0.010 U	0.010 U	0.010 U	0.010 U	0.10 U	0.10 U	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	ug/L	0.1	--	0.020	0.010 U	0.010 U	0.010 U	0.010 U	0.10 U	0.10 U	--	--	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	ug/L		--	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.10 U	0.10 U	--	--	--	--	--	--	--	--	--	--	--	--
Dibenz(a,h)anthracene	ug/L		--	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.10 U	0.10 U	--	--	--	--	--	--	--	--	--	--	--	--
Benzo[g,h,i]perylene	ug/L		--	0.010 U	--	--	--	--	0.10 U	0.10 U	--	--	--	--	--	--	--	--	--	--	--	--
GENERAL CHEMISTRY																						
Alkalinity	mg/L		--	190	1,900	--	2,100	--	2,300	--	--	7,100	3,300	3,300	3,300	--	--	--	--	--	--	--
Nitrate (as Nitrogen)	mg/L		--	0.050 U	0.050 U	--	0.050 U	--	0.050 U	--	--	0.05 U	0.05 U	0.04 U	0.05 U	--	--	--	--	--	--	--
Sulfate	mg/L		--	250	150	--	120	--	110	--	--	5 U	5 U	10 U	5 U	--	--	--	--	--	--	--
Chloride	mg/L		--	290	250	--	250	--	230	--	--	240	520	260	270	--	--	--	--	--	--	--
Dissolved Methane	ug/L		--	710	590	--	670	--	740	--	--	690	540	600	776	--	1,200	240	660	1,200	150	740
BOD5	mg/L		--	8.97	8.1	--	8.6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FIELD PARAMETERS																						
Turbidity	Neth. Turbidity Units		--	333	5.3	5.3	106	106	9.0	9.0	116.0	NM	0.6	1.1	6.6	--	--	--	--	--	--	--
pH	--		--	6.63	6.90	6.90	7.01	7.01	7.09	7.09	7.11	7.07	7.24	6.96	6.56	--	--	--	--	--	--	--
Specific Conductance	Millisiemens/cm		--	3.50	3.42	3.42	32.6	32.6	35.1	35.1	5.48	5.41	5.43	5.73	5.68	--	--	--	--	--	--	--
Dissolved Oxygen	mg/L		--	4.91	4.55	4.55	0.0	0.0	4.02	4.02	0.06	0.00	1.01	0.43	3.56	--	--	--	--	--	--	--
Oxdat. Red. Potential	Millivolts		--	-136	-115	-115	-161	-161	-149	-149	-163	-247	-123	-140	-69.5	--	--	--	--	--	--	--

Notes:

1 Sample collected from replaced well.

2 MTCA A cleanup level for gasoline is 800 µg/L in the presence of detectable benzene

* Duplicate sample.

J : Reported concentration is an estimate.

mg Milligrams per liter.

NM Not measured due to equipment malfunction.

µg Micrograms per liter.

U Analyte not detected above practical quantitation limit given.

U The practical quantitation limit is elevated due to interferences present in the sample.

Exceeds MTCA A cleanup level.

Table 1 Groundwater Results Summary, Long Term Monitoring Events 10 and 11 (2018/2019)

Monitoring Well No.			MW-09R									
PARAMETERS	**Units**		**1/20/10**	**5/25/10**	**5/25/10***	**8/11/10**	**4/7/11**	**9/28/11**	**1/23/13**	**7/31/13**	**1/22/14**	**8/7/14**	**1/20/15**
		MTCA A											
VOLATILE ORGANICS (BTEX)													
Benzene	ug/L	5	120 J	160	170	360	280	310	68	370	87	340	25
Toluene	ug/L	1,000	4 U	3.2	3.6	11	11	13	4	7.4	3.4	6.5	1.0 U
Ethylbenzene	ug/L	700	89 J	89	97	230	220	150	20	25	13	19	2.8
m,p-Xylene	ug/L	1,000	170 J	120	140	400	300	190	12	6.9	6.4	8.2	1.7
o-Xylene	ug/L	1,000	4 U	3.5	3.9	8.1	11	10	4	2.5	2.4	4.0 U	1.0 U
TOTAL PETROLEUM HYDROCARBONS													
Gasoline	ug/L	800/1,000[2]	1,800 J	1,500	1,700	3,100	4,800	2,100	790	930	660	1,100	110
Diesel	mg/L	0.5	0.31 U	0.29 U	0.69	0.45 M	0.82	0.33 U	0.26 U	0.54 U	0.30 U	0.26 U	0.67
Lube Oil	mg/L	0.5	0.49 U	0.47 U	0.66	0.42 U	0.43 U	0.42 U	0.41 U	0.54	0.54 U	0.41 U	0.44
METALS													
Total Lead	ug/L	15	80	36 J	74 J	21 J	170	--	1.00 U	3.90	--	--	1.1 U
Dissolved Lead	ug/L	15	13	12	14	17	3.0	--	1.00 U	1.10 U	--	--	1 U
Dissolved Iron	ug/L		34,000	--	--	--	--	--	--	--	--	--	--
Total Ferrous Iron	mg/L		--	46.2	42.1	29.2	49.4	--	34.2	36.2	--	--	39.5 J
Dissolved Manganese	ug/L		5,000	3,600	3,900	4,200	4,500	--	4,000	4,500	--	--	4,400
PAHs													
Naphthalene	ug/L		6.4	--	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	ug/L		2.8	--	--	--	--	--	--	--	--	--	--
1-Methylnappthalene	ug/L		2.2	--	--	--	--	--	--	--	--	--	--
Acenaphthylene	ug/L		0.11 U	--	--	--	--	--	--	--	--	--	--
Acenaphthene	ug/L		0.18	--	--	--	--	--	--	--	--	--	--
Flourene	ug/L		0.14	--	--	--	--	--	--	--	--	--	--
Phenanthrene	ug/L		0.17	--	--	--	--	--	--	--	--	--	--
Anthracene	ug/L		0.11 U	--	--	--	--	--	--	--	--	--	--
Fluoranthene	ug/L		0.11 U	--	--	--	--	--	--	--	--	--	--
Pyrene	ug/L		0.11 U	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	ug/L		0.011 U	--	--	--	--	--	--	--	--	--	--
Chrysene	ug/L		0.011 U	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	ug/L		0.011 U	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	ug/L		0.011 U	--	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	ug/L	0.1	0.011 U	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	ug/L		0.011 U	--	--	--	--	--	--	--	--	--	--
Dibenz(a,h)anthracene	ug/L		0.011 U	--	--	--	--	--	--	--	--	--	--
Benzo[g,h,i]perylene	ug/L		0.011 U	--	--	--	--	--	--	--	--	--	--
GENERAL CHEMISTRY													
Alkalinity	mg/L		700	720	730	800	730	--	450	85	740	--	--
Nitrate (as Nitrogen)	mg/L		0.050 U	0.050 U	0.050 U	0.14	0.050 U	--	0.076	0.05 U	0.05 U	--	0.087
Sulfate	mg/L		30	7.5	7.4	5.0 U	5.0 U	--	25.00 U	5.00 U	5.00 U	--	10 U
Chloride	mg/L		77	120	120	78	91	--	32	35	31	--	32
Dissolved Methane	ug/L		2,100	8,600	7,800	6,600	9,900	--	11,000	7,100	11,000	--	7,200
BOD5	mg/L		5.46	3.0	4.3	12.3	--	--	--	--	--	--	--
FIELD PARAMETERS													
Turbidity	Neth. Turbidity Units		146	57.9	57.9	>1000	>1000	106.0	NM	60.0	5.1	--	6.20
pH	--		6.36	6.77	6.77	6.94	6.78	7.05	6.87	7.18	6.57	--	8.65
Specific Conductance	Millisiemens/cm		1.52	1.42	1.42	2.65	1.81	1.91	1.47	1.77	1.30	--	1.30
Dissolved Oxygen	mg/L		9.65	0.96	0.96	0.0	0.40	6.68	3.92	0.97	1.73	--	1.40
Oxdat. Red. Potential	Millivolts		-124	-136.8	-136.8	-169	-134	-152	-211	-139	-83	--	-132.00

Notes:

1 Sample collected from replaced well.

2 MTCA A cleanup level for gasoline is 800 µg/L in th

* Duplicate sample.

J : Reported concentration is an estimate.

mg Milligrams per liter.

NM Not measured due to equipment malfunction.

µg Micrograms per liter.

U Analyte not detected above practical quantitation limit given.

U The practical quantitation limit is elevated due to interferences present in the sample.

Exceeds MTCA A cleanup level.

Table 1 Groundwater Results Summary, Long Term Monitoring Events 10 and 11 (2018/2019)

Monitoring Well No.			MW-10R														
PARAMETERS	Units		3/17/08[1]	1/20/10	5/25/10	8/10/10	4/5/11	9/30/11	1/23/13	7/30/13	1/22/14	8/7/14	1/21/15	1/20/16	7/20/16	7/20/17	7/18/18	7/22/19
		MTCA A																
VOLATILE ORGANICS (BTEX)																		
Benzene	ug/L	5	4.0 U	4.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	4.0 U	4.0 U	1.0 U	1.0 U
Toluene	ug/L	1,000	4.0 U	4.0 U	1.0 U	1.0 U	1.0 U	1.2	1.7	1.7	1.0 U	1.0 U	1.0 U	1.0 U	4.0 U	4.0 U	1.0 U	1.0 U
Ethylbenzene	ug/L	700	4.0 U	4.0 U	1.0 U	1.0 U	1.0 U	1.2	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	4.0 U	4.0 U	1.0 U	1.0 U
m,p-Xylene	ug/L	1,000	6.8	4.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	4.0 U	4.0 U	1.0 U	1.7
o-Xylene	ug/L	1,000	4.0 U	4.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	4.0 U	4.0 U	1.0 U	1.0 U
TOTAL PETROLEUM HYDROCARBONS																		
Gasoline	ug/L	800/1,000[2]	400 U	400 U	1,100	780	830	1,200	1,400	360	100 U	160	1,600	2,100	2,000	1,700	1,600	2,100
Diesel	mg/L	0.5	160	0.27 U	0.61 U	0.42 U	0.45 U	0.81 U	0.76 U	--	0.26 U	0.32	0.76 U	1.1 U	0.98 U	1.4	1.3 U	1.1 U
Lube Oil	mg/L	0.5	8.8 U	0.44 U	0.42 U	0.45 U	0.43 U	0.43 U	0.41 U	--	0.41 U	0.58	0.41 U	0.42 U	0.41 U	0.42 U	0.44 U	0.41 U
METALS																		
Total Lead	ug/L	15	--	3.8	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dissolved Lead	ug/L	15	--	2.2	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dissolved Iron	ug/L		--	6,400	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Ferrous Iron	mg/L		--	--	25.2	34.4	12.4	--	40.8	--	2.14	30.4	21.6 J	14.6	17.4	14.4	14.9 J	12.2 J
Dissolved Manganese	ug/L		--	1,100	1,400	2,000	1,500	--	3,700	--	2,000	3,400	1,800	1,500	1,800	1,600	1,400	1,300
PAHs																		
Naphthalene	ug/L		--	0.14	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	ug/L		--	0.12 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1-Methylnappthalene	ug/L		--	21	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Acenaphthylene	ug/L		--	0.12 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Acenaphthene	ug/L		--	0.23	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Flourene	ug/L		--	0.32	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phenanthrene	ug/L		--	0.12 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Anthracene	ug/L		--	0.12 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	ug/L		--	0.12 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pyrene	ug/L		--	0.12 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	ug/L		--	0.014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chrysene	ug/L		--	0.012 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	ug/L		--	0.012 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	ug/L		--	0.012 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	ug/L	0.1	--	0.012 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	ug/L		--	0.012 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dibenz(a,h)anthracene	ug/L		--	0.012 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo[g,h,i]perylene	ug/L		--	0.012 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
GENERAL CHEMISTRY																		
Alkalinity	mg/L		220	190	200	210	230	--	250	--	280	290	--	210	250	210	220	190
Nitrate (as Nitrogen)	mg/L		0.050 U	0.77	0.094	0.050 U	0.050 U	--	0.05 U	--	0.58	0.50 U	0.24	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Sulfate	mg/L		5.0 U	10	10 U	5.0 U	5.0 U	--	25.00 U	--	43	5.00 U	10 U	10 U	10 U	5.0 U	10.0 U	5.0 U
Chloride	mg/L		2.5	10	10	14	6.8	--	14.00	--	16	7.8	8.8	7.2	6.1	5.4	4.3	6.8
Dissolved Methane	ug/L		--	170	510	260	590	--	2,900	--	37	279	420	340	1,100	1,100	1,200	1,200
BOD5	mg/L		--	3.06	2.0	12 U	--	--	--	--	--	--	--	--	--	--	--	--
FIELD PARAMETERS																		
Turbidity	Neth. Turbidity Units		208	54.7	3.0	235	2.7	6.5	NM	NM	0.1	3.8	5.9	3.0	9.2	1.4	0.46	1.11
pH	--		6.38	6.00	6.32	6.05	6.50	6.52	6.58	NM	6.38	6.29	NM	6.75	6.75	6.65	6.50	6.44
Specific Conductance	Millisiemens/cm		53.4	35.9	51.2	90	90	81.2	0.8	NM	0.68	0.605	0.44	0.41	0.44	0.41	0.38	0.38
Dissolved Oxygen	mg/L		0.0	5.38	6.31	2.38	2.20	6.16	0.20	NM	0.72	1.9	0.34	0.25	0.46	0.40	0.98	1.26
Oxdat. Red. Potential	Millivolts		-35	-64	-19.0	-79	-110	-96	-194	NM	-58.2	-32.6	-168.7	-38.6	-28.0	-100.8	-88.2	-79.4

Notes:

1 Sample collected from replaced well.

2 MTCA A cleanup level for gasoline is 800 µg/L in th

* Duplicate sample.

J : Reported concentration is an estimate.

mg Milligrams per liter.

NM Not measured due to equipment malfunction.

µg Micrograms per liter.

U Analyte not detected above practical quantitation limit given.

U The practical quantitation limit is elevated due to interferences present in the sample.

Exceeds MTCA A cleanup level.

Table 1 Groundwater Results Summary, Long Term Monitoring Events 10 and 11 (2018/2019)

Monitoring Well No.			MW-11																		
PARAMETERS	Units		3/13/08	1/20/10	5/25/10	8/10/10	8/10/10*	4/5/11	4/5/11*	9/30/11	1/23/13	1/23/2013*	7/30/13	1/22/14	8/7/14	1/21/15	7/30/15	1/20/16	7/20/16	7/20/17	7/18/18	7/22/19
		MTCA A																			
VOLATILE ORGANICS (BTEX)																					
Benzene	ug/L	5	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	4.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Toluene	ug/L	1,000	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	4.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Ethylbenzene	ug/L	700	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	4.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
m,p-Xylene	ug/L	1,000	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	4.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
o-Xylene	ug/L	1,000	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	4.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
TOTAL PETROLEUM HYDROCARBONS																					
Gasoline	ug/L	800/1,000[2]	100 U	100 U	100 U	140	130	100 U	100 U	320	100 U	100 U	400 U	100 U	100 U	100 U	100 U	100 U	100	100 U	120	100 U
Diesel	mg/L	0.5	0.27	0.17 U	0.26 U	0.25 U	0.25 U	0.26 U	0.26 U	0.37	0.26 U	0.26 U	0.27 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.25 U	0.30	0.28 U	0.29 U
Lube Oil	mg/L	0.5	0.40 U	0.27 U	0.42 U	0.41 U	0.41 U	0.42 U	0.42 U	0.42 U	0.41 U	0.41 U	0.44 U	0.41 U	0.41 U	0.41 U	0.42 U	0.42 U	0.40 U	0.46 U	0.44 U	0.47 U
METALS																					
Total Lead	ug/L	15	--	4.7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dissolved Lead	ug/L	15	--	1.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dissolved Iron	ug/L		--	270	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Ferrous Iron	mg/L		--	--	19.0	30.4	30.0	2.66	2.74	--	0.67	0.88	35.90	6.88	36.80	0.35	1.16	0.832	36.0 J	8.4	16.9 J	8.4 J
Dissolved Manganese	ug/L		--	300	1,400	2,600	2,600	400	400	--	370	350	3,800	1,100	3,700	230	320	570	1,600	670	1,000	630
PAHs																					
Naphthalene	ug/L		--	0.13 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	ug/L		--	0.13 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1-Methylnappthalene	ug/L		--	0.13 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Acenaphthylene	ug/L		--	0.13 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Acenaphthene	ug/L		--	0.13 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Flourene	ug/L		--	0.13 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phenanthrene	ug/L		--	0.13 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Anthracene	ug/L		--	0.13 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	ug/L		--	0.13 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pyrene	ug/L		--	0.13 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	ug/L		--	0.013 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chrysene	ug/L		--	0.013 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	ug/L		--	0.013 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	ug/L		--	0.013 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	ug/L	0.1	--	0.013 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	ug/L		--	0.013 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dibenz(a,h)anthracene	ug/L		--	0.013 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo[g,h,i]perylene	ug/L		--	0.013 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
GENERAL CHEMISTRY																					
Alkalinity	mg/L		170	52	210	120	110	70	66	--	130	180	160	190	280	--	170	230	350	250	230	210
Nitrate (as Nitrogen)	mg/L		0.050 U	0.050 U	0.070	0.086	0.1	0.050 U	0.050 U	--	2.40	1.60	0.05 U	30.00	0.05	2.5	4.5	0.05 U	0.057	0.050 U	0.050 U	0.050 U
Sulfate	mg/L		5.0 U	8.8	10 U	25 U	25 U	5.0 U	5.0 U	--	56	47	5 U	45	5 U	24	24	12	10 U	5.3	5.0 U	5.0 U
Chloride	mg/L		5.2	3.1	7.9	8.8	9.4	6.0	5.5	--	2.7	3.6	9.7	25.0	10.0	4.2	6.7	8.1	7.9	8.1	5.6	9.1
Dissolved Methane	ug/L		--	15	1,200	870	730	310	340	220	53	68	390	190	805	220	220	150	760	240	1,700	3,100
BOD5	mg/L		--	3.36	3.1	12 U	12 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FIELD PARAMETERS																						
Turbidity	Neth. Turbidity Units		12.6	165	1.5	32.9	32.9	3.4	3.4	21.1	NM	--	5.80	13.20	14.40	11.00	1.13	4.31	2.31	3.80	6.89	7.22
pH	--		6.20	5.27	6.20	6.27	6.27	6.17	6.17	6.41	6.19	--	6.72	6.15	6.07	8.30	7.17	6.46	7.00	6.56	6.36	6.28
Specific Conductance	Millisiemens/cm		63.5	10.3	32.0	90	90	64.3	64.3	89.0	0.4	--	0.61	0.78	0.65	0.35	0.38	0.44	0.62	0.54	0.44	0.42
Dissolved Oxygen	mg/L		0.0	5.87	0.90	0.0	0.0	2.67	2.67	0.00	0.91	--	0.59	0.71	0.27	0.46	0.55	0.31	0.47	0.28	1.21	2.39
Oxdat. Red. Potential	Millivolts		62	169	-49.3	-110	-110	-31	-31	-106	-221	--	-98.0	36.4	-27.1	61.0	45.8	51.6	-29.2	-83.6	-106.7	-26.5

Notes:

1 Sample collected from replaced well.

2 MTCA A cleanup level for gasoline is 800 µg/L in th

* Duplicate sample.

J : Reported concentration is an estimate.

mg Milligrams per liter.

NM Not measured due to equipment malfunction.

µg Micrograms per liter.

U Analyte not detected above practical quantitation limit given.

U The practical quantitation limit is elevated due to interferences present in the sample.

Exceeds MTCA A cleanup level.

Table 1 Groundwater Results Summary, Long Term Monitoring Events 10 and 11 (2018/2019)

Monitoring Well No.			MW-13R															
PARAMETERS	Units		2/15/10	5/26/10	8/11/10	4/6/11	9/29/11	1/24/13	7/30/13	7/30/13	1/21/14	8/6/14	1/21/15	7/29/15	1/20/16	7/20/16	7/20/17	7/18/18	7/23/19
		MTCA A																	
VOLATILE ORGANICS (BTEX)																			
Benzene	ug/L	5	35 J	33	22	11	4	11	11	7.4	4.8	1 U	5.0	1.3	1 U	4.0 U	4.0 U	1 U	4.0 U
Toluene	ug/L	1,000	4.0 U	1.3	1.0 U	1.0 U	1.0 U	1 U	1 U	4 U	1 U	1 U	1 U	1 U	6.8	4.0 U	4.0 U	1 U	4.0 U
Ethylbenzene	ug/L	700	13 J	15	10	2.6	1.0 U	2	2	8.8	1	1	1 U	1 U	1 U	4.0 U	4.0 U	1 U	4.0 U
m,p-Xylene	ug/L	1,000	4.0 U	1.4	1.7	1.0 U	1.0 U	1 U	1 U	4 U	1 U	1 U	1 U	1 U	1 U	6.7	4.0 U	1 U	4.0 U
o-Xylene	ug/L	1,000	4.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1 U	1 U	4 U	1 U	1 U	1 U	1 U	1 U	4.0 U	4.0 U	1 U	4.0 U
TOTAL PETROLEUM HYDROCARBONS																			
Gasoline	ug/L	800/1,000[2]	680 J	560	510	420	150	170	170	400 U	120 U	100 U	100 U	100 U	100 U	400 U	400 U	100 U	400 U
Diesel	mg/L	0.5	0.49 J1	0.43	0.39 U	0.41	0.26 U	0.26 U	0.26 U	0.35	0.27 U	0.27 U	--	--	--	--	--	--	--
Lube Oil	mg/L	0.5	0.70 J	0.45 U	0.43 U	0.42 U	0.42 U	0.42 U	0.42 U	0.64	0.43 U	0.43 U	--	--	--	--	--	--	--
METALS																			
Total Lead	ug/L	15	5.2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dissolved Lead	ug/L	15	1.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dissolved Iron	ug/L		3,600	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Ferrous Iron	mg/L		--	15.2	9.31	7.94	--	4.51	4.51	--	0.286	--	--	--	--	--	--	--	--
Dissolved Manganese	ug/L		1,500	1,300	2,000	1,800	--	1,700	1,700	--	--	--	--	--	--	--	--	--	--
PAHs																			
Naphthalene	ug/L		15	--	--	0.35	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	ug/L		1.1	--	--	0.10 U	--	--	--	--	--	--	--	--	--	--	--	--	--
1-Methylnappthalene	ug/L		4.7	--	--	0.38	--	--	--	--	--	--	--	--	--	--	--	--	--
Acenaphthylene	ug/L		1.1	--	--	0.40	--	--	--	--	--	--	--	--	--	--	--	--	--
Acenaphthene	ug/L		48	--	--	22	--	--	--	--	--	--	--	--	--	--	--	--	--
Flourene	ug/L		21	--	--	7.6	--	--	--	--	--	--	--	--	--	--	--	--	--
Phenanthrene	ug/L		3.2	--	--	0.70	--	--	--	--	--	--	--	--	--	--	--	--	--
Anthracene	ug/L		1.9	--	--	1.2	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	ug/L		1.5	--	--	1.2	--	--	--	--	--	--	--	--	--	--	--	--	--
Pyrene	ug/L		0.91	--	--	0.58	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	ug/L		0.15	0.057	0.061	0.058	--	--	--	--	--	--	--	--	--	--	--	--	--
Chrysene	ug/L		0.15	0.040	0.050 U	0.044	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	ug/L		0.093	0.010 U	0.010 U	0.018	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	ug/L		0.083	0.010 U	0.010 U	0.014	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	ug/L	0.1	0.092	0.010 U	0.010 U	0.017	--	--	--	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	ug/L		0.041	0.010 U	0.010 U	0.010 U	--	--	--	--	--	--	--	--	--	--	--	--	--
Dibenz(a,h)anthracene	ug/L		0.013	0.010 U	0.010 U	0.010 U	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo[g,h,i]perylene	ug/L		0.053	--	--	0.010 U	--	--	--	--	--	--	--	--	--	--	--	--	--
GENERAL CHEMISTRY																			
Alkalinity	mg/L		1,300	1,400	1,600	1,500	--	1,900	1,900	--	--	--	--	--	--	--	--	--	--
Nitrate (as Nitrogen)	mg/L		0.050 U	0.050 U	0.050 U	0.050 U	--	0.05 U	0.05 U	--	--	--	--	--	--	--	--	--	--
Sulfate	mg/L		460	460	560	280	--	160.00	160.00	--	--	--	--	--	--	--	--	--	--
Chloride	mg/L		710	670	750	420	--	400.00	400.00	--	--	--	--	--	--	--	--	--	--
Dissolved Methane	ug/L		280	580	680	290	--	10	10	--	220	--	82	44	250	230	130	53	330
BOD5	mg/L		4.47	2.2	5.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FIELD PARAMETERS																			
Turbidity	Neth. Turbidity Units		366	275.3	106	>1000	170.0	NM	NM	11.2	10.4	--	35.20	--	--	--	--	--	--
pH	--		6.96	6.81	6.89	6.99	7.42	7.20	7.20	7.31	7.01	--	NM	--	--	--	--	--	--
Specific Conductance	Millisiemens/cm		57.3	4.53	55.2	438	5.99	4.85	4.85	5.82	5.24	--	3.19	--	--	--	--	--	--
Dissolved Oxygen	mg/L		7.56	3.07	0.0	4.82	7.70	7.68	7.68	5.34	3.29	--	2.56	--	--	--	--	--	--
Oxdat. Red. Potential	Millivolts		-13	-96.3	-146	-103	-133	151	151	151	80	--	-40.70	--	--	--	--	--	--

Notes:

1 Sample collected from replaced well.

2 MTCA A cleanup level for gasoline is 800 µg/L in th

* Duplicate sample.

J : Reported concentration is an estimate.

mg Milligrams per liter.

NM Not measured due to equipment malfunction.

µg Micrograms per liter.

U Analyte not detected above practical quantitation limit given.

U The practical quantitation limit is elevated due to interferences present in the sample.

Exceeds MTCA A cleanup level.

Table 1 Groundwater Results Summary, Long Term Monitoring Events 10 and 11 (2018/2019)

Monitoring Well No.			MW-20R										
PARAMETERS	**Units**		**1/23/13**	**7/31/13**	**1/21/14***	**1/21/14**	**8/7/14**	**1/20/15**	**7/30/15**	**1/20/16**	**7/21/16**	**7/19/17**	**7/19/18**	**7/22/19**
		MTCA A												
VOLATILE ORGANICS (BTEX)														
Benzene	ug/L	5	4.8	23	4.3	4.5	1.0 U	1.0 U	6.7	1.8	1 U	1.0	1.6	1.4
Toluene	ug/L	1,000	1.0 U	4.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Ethylbenzene	ug/L	700	2.7	40	4.9	5.0	1.0 U	1.0 U	16	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
m,p-Xylene	ug/L	1,000	1.0 U	4.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
o-Xylene	ug/L	1,000	1.0 U	4.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
TOTAL PETROLEUM HYDROCARBONS														
Gasoline	ug/L	800/1,000[2]	260	790	280	290	100 U	100 U	350	100 U	100 U	100 U	100 U	100 U
Diesel	mg/L	0.5	0.26 U	0.27 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.28 U	0.26 U	0.25 U
Lube Oil	mg/L	0.5	0.42 U	0.43 U	0.41 U	0.41 U	0.42 U	0.42 U	0.41 U	0.42 U	0.42 U	0.45 U	0.41 U	0.41 U
METALS														
Total Lead	ug/L	15	--	--	--	--	--	--	--	--	--	--	--	--
Dissolved Lead	ug/L	15	--	--	--	--	--	--	--	--	--	--	--	--
Dissolved Iron	ug/L		--	--	--	--	--	--	--	--	--	--	--	--
Total Ferrous Iron	mg/L		26.2	29.2	0.088	0.078	33.2	2.4	31.2	35.4	25.2	17.4 J	18.9	18.3 J
Dissolved Manganese	ug/L		1,900	2,600	390	390	2,500	740	1,900	1,900	1,400	1,300	1,600	1,600
PAHs														
Naphthalene	ug/L		--	--	--	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	ug/L		--	--	--	--	--	--	--	--	--	--	--	--
1-Methylnappthalene	ug/L		--	--	--	--	--	--	--	--	--	--	--	--
Acenaphthylene	ug/L		--	--	--	--	--	--	--	--	--	--	--	--
Acenaphthene	ug/L		--	--	--	--	--	--	--	--	--	--	--	--
Flourene	ug/L		--	--	--	--	--	--	--	--	--	--	--	--
Phenanthrene	ug/L		--	--	--	--	--	--	--	--	--	--	--	--
Anthracene	ug/L		--	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	ug/L		--	--	--	--	--	--	--	--	--	--	--	--
Pyrene	ug/L		--	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	ug/L		--	--	--	--	--	--	--	--	--	--	--	--
Chrysene	ug/L		--	--	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	ug/L		--	--	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	ug/L		--	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	ug/L	0.1	--	--	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	ug/L		--	--	--	--	--	--	--	--	--	--	--	--
Dibenz(a,h)anthracene	ug/L		--	--	--	--	--	--	--	--	--	--	--	--
Benzo[g,h,i]perylene	ug/L		--	--	--	--	--	--	--	--	--	--	--	--
GENERAL CHEMISTRY														
Alkalinity	mg/L		220	270	250	270	300	--	350	330	270	240	220	230
Nitrate (as Nitrogen)	mg/L		0.05 U	0.05 U	6.40	6.30	0.05 U	3.2	0.06	0.05 U	0.05 U	0.051	0.050 U	0.050 U
Sulfate	mg/L		25 U	10 U	43	38	19	14	25 U	10 U	10 U	10 U	10 U	5.0 U
Chloride	mg/L		24	28	43	42	25	9.1	15	15	14	7.3	8.2	9.8
Dissolved Methane	ug/L		540	2,000	930	840	1,650	250	2,200	1,800	1,400	1,800	1,600	3,300
BOD5	mg/L		--	--	--	--	--	--	--	--	--	--	--	--
FIELD PARAMETERS														
Turbidity	Neth. Turbidity Units		NM	0.0	--	0.1	6.1	8.5	10.2	2.1	6.2	9.6	8.0	8.0
pH	--		6.67	6.62	--	5.98	6.11	8.16	7.83	6.74	7.00	6.69	6.95	6.95
Specific Conductance	Millisiemens/cm		0.64	0.70	--	0.724	0.72	0.46	0.64	0.68	0.50	0.50	0.42	0.42
Dissolved Oxygen	mg/L		0.00	3.79	--	0.56	0.25	1.48	0.44	0.32	0.32	0.36	3.79	3.79
Oxdat. Red. Potential	Millivolts		-243	-79	--	166	-30.1	72.1	-57.4	-33.1	-24.0	-60.6	-105.4	-105.4

Notes:

1 Sample collected from replaced well.

2 MTCA A cleanup level for gasoline is 800 µg/L in th

* Duplicate sample.

J : Reported concentration is an estimate.

mg Milligrams per liter.

NM Not measured due to equipment malfunction.

µg Micrograms per liter.

U Analyte not detected above practical quantitation limit given.

U The practical quantitation limit is elevated due to interferences present in the sample.

Exceeds MTCA A cleanup level.

Table 1 Groundwater Results Summary, Long Term Monitoring Events 10 and 11 (2018/2019)

Monitoring Well No.			MW-21R																				
PARAMETERS	Units		3/18/08	2/15/10	6/1/10	8/11/10	4/6/11	9/28/11	1/23/13	7/31/13	7/31/13*	1/21/14	8/6/14	8/6/14 *	1/21/15	7/29/15	7/29/15 *	1/21/16	7/21/16	7/21/16 *	7/19/17	7/19/17 *	7/19/18	7/19/18 *
		MTCA A																					
VOLATILE ORGANICS (BTEX)																							
Benzene	ug/L	5	15	46 J	34	27	45	19	32	39	33	29	33	36	32	16	17	2.7	27	26	15	16	16	14
Toluene	ug/L	1,000	91	5.0 J	2.9	1.7	6.7	1.0 U	4.5	7.3	6.7	9.1	11.0	11.0	10.0	7.1	7.2	1.4	9.6	11	6.9	7.0	6.1	5.4
Ethylbenzene	ug/L	700	620	230 J	240	120	340	34	160	98	82	95	58	58	49	26	26	17	42	42	29	27	10	8
m,p-Xylene	ug/L	1,000	910	190 J	210	100	290	21	85	59	48	80	51	50	41	24	24	18	31	32	20	19	8.6	7.4
o-Xylene	ug/L	1,000	110	8.9 J	2.3	1.9	4.0 U	1.0 U	2.3	4.0 U	4.0 U	4.1	5.2	5.2	4.0 U	2.0	1.9	1.0 U	4.0 U	4.0 U	4.0 U	4.0 U	1.0	1.0 U
TOTAL PETROLEUM HYDROCARBONS																								
Gasoline	ug/L	800/1,000[2]	9,200	4,400 J	4,400	2,800	5,100	1,500	3,000	2,300	2,000	2,600	2,700	2,900	1,800	1,600	1,700	360	1,900	1,900	1,300	1,300	1,200	1,000
Diesel	mg/L	0.5	1.7	0.89 1	0.79 U	0.87	0.68 U	0.42 U	0.47 U	0.59 U	0.65 U	0.77 U	0.67 U	0.76 U	0.61 U	0.45 U	0.45 U	0.25 U	0.48 U	0.48 U	0.36 U	0.38 U	0.54 U	0.61 U
Lube Oil	mg/L	0.5	0.40 U	0.46 U	0.42 U	0.41 J	0.42 U	0.42 U	0.41 U	0.43 U	0.42 U	0.41 U	0.43 U	0.42 U	0.42 U	0.41 U	0.41 U	0.41 U	0.42 U	0.42 U	0.42 U	0.43 U	0.42 U	0.42 U
METALS																								
Total Lead	ug/L	15	10	15	2.8 J	10 J	1.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dissolved Lead	ug/L	15	8.9	2.3	1.4	1.4	1.0 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dissolved Iron	ug/L		--	18,000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Ferrous Iron	mg/L		--	--	16.2	17.9	10.1	--	6.45	7.10	--	7.42	8.18	7.62	8.42	9.66	10.3	0.408	6.92	7.37	7.64 J	7.70 J	7.52	7.19
Dissolved Manganese	ug/L		--	4,100	4,500	3,500	4,200	--	2,800	3,400	--	3,300	3,700	3,700	2,600	2,300	2,400	66	2,000	1,900	1,600	1,800	1,800	1,800
PAHs																								
Naphthalene	ug/L		18	18	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	ug/L		32	7.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1-Methylnappthalene	ug/L		20	18	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Acenaphthylene	ug/L		0.099	1.1 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Acenaphthene	ug/L		1.1	1.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Flourene	ug/L		0.96	0.61	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phenanthrene	ug/L		0.65	0.44	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Anthracene	ug/L		0.095 U	0.26	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	ug/L		0.11	0.12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pyrene	ug/L		0.095 U	0.11 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	ug/L		0.012	0.011 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chrysene	ug/L		0.011	0.011 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	ug/L		0.010	0.011 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	ug/L		0.011	0.011 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	ug/L	0.1	0.012	0.011 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	ug/L		0.0099	0.011 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dibenz(a,h)anthracene	ug/L		0.0095 U	0.011 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo[g,h,i]perylene	ug/L		0.013	0.011 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
GENERAL CHEMISTRY																								
Alkalinity	mg/L		150	140	1,400	1,500	2,000	--	1,700	1,800	--	2,000	1,800	1,900	--	1,600	1,600	350	1,600	1,600	1,700	1,300	1,100	1,100
Nitrate (as Nitrogen)	mg/L		0.050 U	0.050 U	0.050 U	0.057	0.27	--	0.05 U	0.05 U	--	0.062	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.051	0.051	0.05 U	0.05 U	0 U	0 U
Sulfate	mg/L		5.0 U	230	170	120	110	--	5.0 U	5.0 U	--	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5 U	5 U
Chloride	mg/L		28	140	120	110	100	--	74	120	--	100	150	140	130	110	97	20	57	57	33	32	24	24
Dissolved Methane	ug/L		--	5,700	4,200	4,800	3,200	--	1,300	2,200	--	4,200	5,130	6,190	4,100	4,400	2,700	970	4,200	3,300	4,900	5,200	5,700	4,600
BOD5	mg/L		--	17	8.4	16.2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FIELD PARAMETERS																								
Turbidity	Neth. Turbidity Units		168	303	8.9	384	52.2	646.0	NM	NM	5.6	5.7	6.3	--	0.60	6.26	6.26	2.02	2.02	2.02	4.02	4.02	4.11	4.11
pH	--		6.39	6.56	6.83	7.00	7.06	7.06	7.08	7.08	7.20	6.84	6.83	--	8.87	7.99	7.99	7.52	7.40	7.40	7.12	7.12	7.15	7.15
Specific Conductance	Millisiemens/cm		44.4	33.3	2.50	4.47	430	3.33	3.22	3.22	3.09	3.60	3.27	--	2.86	2.85	2.85	0.62	2.33	2.33	2.16	2.16	1.70	1.70
Dissolved Oxygen	mg/L		0.0	0.00	4.92	0.0	1.80	0.00	0.70	0.70	0.71	0.36	4.72	--	0.35	5.02	5.02	0.14	0.32	0.32	0.27	0.27	0.95	0.95
Oxdat. Red. Potential	Millivolts		15	-107	-140.0	-162	-160	-195	-244	-244	-117	-32	-16	--	-182.7	-142.0	-142.0	85.4	-39.9	-39.9	-112.4	-112.4	-149.0	-149.0

Notes:

1 Sample collected from replaced well.

2 MTCA A cleanup level for gasoline is 800 µg/L in th

* Duplicate sample.

J : Reported concentration is an estimate.

mg Milligrams per liter.

NM Not measured due to equipment malfunction.

µg Micrograms per liter.

U Analyte not detected above practical quantitation limit given.

U The practical quantitation limit is elevated due to interferences present in the sample.

Exceeds MTCA A cleanup level.

Table 1 Groundwater Results Summary, Long Term Monitoring Events 10 and 11 (2018/2019)

Monitoring Well No. / PARAMETERS	Units		7/23/19	7/23/19 *
		MTCA A		
VOLATILE ORGANICS (BTEX)				
Benzene	ug/L	5	17	17
Toluene	ug/L	1,000	9.3	9.6
Ethylbenzene	ug/L	700	12	12
m,p-Xylene	ug/L	1,000	13	13
o-Xylene	ug/L	1,000	4.0 U	4.0 U
TOTAL PETROLEUM HYDROCARBONS				
Gasoline	ug/L	800/1,000[2]	1,900	1,900
Diesel	mg/L	0.5	0.52 U	0.56 U
Lube Oil	mg/L	0.5	0.41 U	0.41 U
METALS				
Total Lead	ug/L	15	--	--
Dissolved Lead	ug/L	15	--	--
Dissolved Iron	ug/L		--	--
Total Ferrous Iron	mg/L		3.80	4.10 J
Dissolved Manganese	ug/L		1,600	1,600
PAHs				
Naphthalene	ug/L		--	--
2-Methylnaphthalene	ug/L		--	--
1-Methylnappthalene	ug/L		--	--
Acenaphthylene	ug/L		--	--
Acenaphthene	ug/L		--	--
Flourene	ug/L		--	--
Phenanthrene	ug/L		--	--
Anthracene	ug/L		--	--
Fluoranthene	ug/L		--	--
Pyrene	ug/L		--	--
Benzo(a)anthracene	ug/L		--	--
Chrysene	ug/L		--	--
Benzo(b)fluoranthene	ug/L		--	--
Benzo(k)fluoranthene	ug/L		--	--
Benzo(a)pyrene	ug/L	0.1	--	--
Indeno(1,2,3-cd)pyrene	ug/L		--	--
Dibenz(a,h)anthracene	ug/L		--	--
Benzo[g,h,i]perylene	ug/L		--	--
GENERAL CHEMISTRY				
Alkalinity	mg/L		1,100	1,100
Nitrate (as Nitrogen)	mg/L		0.050 U	0.050 U
Sulfate	mg/L		5.0 U	5.0 U
Chloride	mg/L		21	21
Dissolved Methane	ug/L		5,600	6,300
BOD5	mg/L		--	--
FIELD PARAMETERS				
Turbidity	Neth. Turbidity Units		4.01	4.01
pH	--		6.96	6.96
Specific Conductance	Millisiemens/cm		1.74	1.74
Dissolved Oxygen	mg/L		1.68	1.68
Oxdat. Red. Potential	Millivolts		-121.1	-121.1

Notes:

1 Sample collected from replaced well.

2 MTCA A cleanup level for gasoline is 800 µg/L in th

* Duplicate sample.

J : Reported concentration is an estimate.

mg Milligrams per liter.

NM Not measured due to equipment malfunction.

µg Micrograms per liter.

U Analyte not detected above practical quantitation limit given.

U The practical quantitation limit is elevated due to interferences present in the sample.

Exceeds MTCA A cleanup level.

Table 1 Groundwater Results Summary, Long Term Monitoring Events 10 and 11 (2018/2019)

Monitoring Well No.			MW-22R														
PARAMETERS	Units		3/17/08[1]	1/20/10	5/26/10	8/12/10	4/6/11	9/29/11	1/24/13	7/31/13	1/21/14	8/6/14	1/21/15	7/29/15	7/20/16	7/20/16	7/19/18	7/23/19
		MTCA A																
VOLATILE ORGANICS (BTEX)																		
Benzene	ug/L	5	4.0 U	4.0 U	1.0 U	1.0 U	1.0 U	2.7	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Toluene	ug/L	1,000	4.0 U	4.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.7	1.0 U	1.0 U	1.0 U
Ethylbenzene	ug/L	700	4.0 U	4.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
m,p-Xylene	ug/L	1,000	4.0 U	4.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
o-Xylene	ug/L	1,000	4.0 U	4.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
TOTAL PETROLEUM HYDROCARBONS																		
Gasoline	ug/L	800/1,000[2]	400 U	400 U	100 U	100 U	100 U	120	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
Diesel	mg/L	0.5	0.26 U	0.26 U	0.27 U	0.25 U	0.27 U	0.26 U	0.26 U	0.27 U	0.26 U	0.26 U	0.26 U	0.26 U	--	0.26 U	0.31 U	--
Lube Oil	mg/L	0.5	0.41 U	0.41 U	0.43 U	0.41 U	0.43 U	0.41 U	0.41 U	0.44 U	0.41 U	0.42 U	0.41 U	0.41 U	--	0.41 U	0.49 U	--
METALS																		
Total Lead	ug/L	15	1.1 U	1.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dissolved Lead	ug/L	15	1.0 U	1.0 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dissolved Iron	ug/L		--	220	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Ferrous Iron	mg/L		--	--	0.295	1.29	0.043	--	0.06	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	--	0.11 J	3.15	--
Dissolved Manganese	ug/L		--	1,400	890	3,200	840	--	700	770	400	510	160	360	--	--	--	--
PAHs																		
Naphthalene	ug/L		0.098 U	0.10 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	ug/L		0.098 U	0.10 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1-Methylnappthalene	ug/L		0.098 U	0.10 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Acenaphthylene	ug/L		0.098 U	0.10 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Acenaphthene	ug/L		0.52	0.10 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Flourene	ug/L		0.098 U	0.10 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phenanthrene	ug/L		0.098 U	0.10 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Anthracene	ug/L		0.098 U	0.10 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	ug/L		0.098 U	0.10 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pyrene	ug/L		0.098 U	0.10 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	ug/L		0.0098 U	0.010 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chrysene	ug/L		0.0098 U	0.010 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	ug/L		0.0098 U	0.010 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	ug/L		0.0098 U	0.010 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	ug/L	0.1	0.0098 U	0.010 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	ug/L		0.0098 U	0.010 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dibenz(a,h)anthracene	ug/L		0.0098 U	0.010 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo[g,h,i]perylene	ug/L		0.0098 U	0.010 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
GENERAL CHEMISTRY																		
Alkalinity	mg/L		340	160	320	240	310	--	250	200	280	280	--	300	--	--	--	--
Nitrate (as Nitrogen)	mg/L		0.050 U	0.50	0.050 U	0.17	0.41	--	0.31 U	0.22	0.50	0.50	0.72	0.56	--	--	--	--
Sulfate	mg/L		22	1,200	75	200	39	--	34	510	240	120	690	75	--	--	--	--
Chloride	mg/L		370	9,100	390	1,600	97	--	90	4,100	1,300	560	5,000	310	--	--	--	--
Dissolved Methane	ug/L		--	6.3	21	10	6.8	--	1.90	3.30	5.40	0.70 U	0.97	3.0	4.8	55	30	91
BOD5	mg/L		--	2.0 U	1.0 U	1.2 U	--	--	--	--	--	--	--	--	--	--	--	--
FIELD PARAMETERS																		
Turbidity	Neth. Turbidity Units		212	56.3	4.1	132	0.8	112.0	NM	0.0	0.2	0.5	1.4	--	--	--	--	--
pH	--		6.62	6.32	6.82	6.69	7.03	7.65	7.08	6.97	6.98	6.33	8.63	--	--	--	--	--
Specific Conductance	Millisiemens/cm		19.6	17.9	1.37	NM	128	6.04	0.85	11.00	5.13	2.34	18.49	--	--	--	--	--
Dissolved Oxygen	mg/L		0.0	7.55	4.90	0.01	1.75	8.48	8.69	7.10	0.97	4.76	4.46	--	--	--	--	--
Oxdat. Red. Potential	Millivolts		148	54	62.0	-36	32	-139	-161	35	41.3	83	70	--	--	--	--	--

Notes:

1 Sample collected from replaced well.

2 MTCA A cleanup level for gasoline is 800 µg/L in th

* Duplicate sample.

J : Reported concentration is an estimate.

mg Milligrams per liter.

NM Not measured due to equipment malfunction.

µg Micrograms per liter.

U Analyte not detected above practical quantitation limit given.

U The practical quantitation limit is elevated due to interferences present in the sample.

Exceeds MTCA A cleanup level.

Table 1 Groundwater Results Summary, Long Term Monitoring Events 10 and 11 (2018/2019)

Monitoring Well No.			MW-25																
PARAMETERS	Units		3/18/08	3/18/08	1/21/10	5/27/10	8/12/10	4/6/11	9/29/11	1/24/13	7/30/13	1/22/14	8/7/14	1/21/15	7/29/15	1/20/16	7/20/16	7/20/17	7/18/18	7/23/19
		MTCA A																	
VOLATILE ORGANICS (BTEX)																			
Benzene	ug/L	5	4.0 U	4.0	10 J	4.0 U	1.3	4.0 U	1.4	1.0	4.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	4.0 U	1.0 U	1.0 U	4.0 U
Toluene	ug/L	1,000	4.0 U	4.0	7.2 J	4.0 U	2.1	4.0 U	2.5	1.2	4.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	4.0 U	1.0 U	1.0 U	4.0 U
Ethylbenzene	ug/L	700	56	56	74 J	4.0 U	6.1	5.3	11	2.3	5.0	1.0 U	1.0 U	1.0 U	1.3	1.0 U	4.0 U	1.4	1.0 U	4.0 U
m,p-Xylene	ug/L	1,000	4.2	4.1	140 J	4.0 U	5.0 U	8.4	1.2	3.4	9.0	1.0 U	1.0 U	1.0 U	5.0 U	5.0 U	5.6	1.0 U	1.0 U	4.0 U
o-Xylene	ug/L	1,000	4.0 U	4.0	200 J1	4.0 U	1.0 U	4.0 U	1.0 U	1.0 U	4.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	4.0 U	1.0 U	1.0 U	4.0 U
TOTAL PETROLEUM HYDROCARBONS																			
Gasoline	ug/L	800/1,000[2]	1,600	1,700	2,000 U	1,400	1,300	1,500	1,500	1,000	1,200	420	1,400	100	440	130	930	460	480	760
Diesel	mg/L	0.5	1.2	1.0	0.49	0.92	2	7.0	1.3	0.7 U	2.0	0.7	4.9	0.26 U	0.36 U	0.26 U	0.49	0.91	0.64	0.41 U
Lube Oil	mg/L	0.5	0.48 U	0.46 U	0.42 U	0.42 U	0.41 U	0.42 U	0.41 U	0.44 U	0.48	0.41	0.41 U	0.42 U	0.42 U	0.41 U	0.42 U	0.43 U	0.41 U	0.41 U
METALS																			
Total Lead	ug/L	15	1.2	1.3	1.1 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dissolved Lead	ug/L	15	1.0 U	1.0 U	1.0 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dissolved Iron	ug/L		--	--	2,000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Ferrous Iron	mg/L		--	--	--	0.352	3.78	1.39	--	5.71	108	0.088	13.1	0.509	16.0	1.92	28.4 J	22.3 J	2.86 J	3.87 J
Dissolved Manganese	ug/L		--	--	120	220	130	170	--	670	2,700	250	96	20	520	110	2,100	2,300	230	290
PAHs																			
Naphthalene	ug/L		1.2	1.4	0.27	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	ug/L		0.11 U	0.11 U	0.10 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1-Methylnappthalene	ug/L		22	25	0.67	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Acenaphthylene	ug/L		0.17	0.17	0.10 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Acenaphthene	ug/L		0.98	0.96	0.15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Flourene	ug/L		1.6	1.7	0.18	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phenanthrene	ug/L		0.11 U	0.11 U	0.10 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Anthracene	ug/L		0.11 U	0.11 U	0.10 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	ug/L		0.11 U	0.11 U	0.10 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pyrene	ug/L		0.11 U	0.11 U	0.10 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	ug/L		0.011 U	0.011 U	0.010 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chrysene	ug/L		0.011 U	0.011 U	0.010 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	ug/L		0.011 U	0.011 U	0.010 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	ug/L		0.011 U	0.011 U	0.010 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	ug/L	0.1	0.011 U	0.011 U	0.010 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	ug/L		0.011 U	0.011 U	0.010 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dibenz(a,h)anthracene	ug/L		0.011 U	0.011 U	0.010 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo[g,h,i]perylene	ug/L		0.011 U	0.11 U	0.010 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
GENERAL CHEMISTRY																			
Alkalinity	mg/L		420	410	140	190	260	200	--	400	130	150	340	--	200	130	230	260	200	200
Nitrate (as Nitrogen)	mg/L		0.052	0.050 U	3.4	0.73	0.050 U	1.4	--	0.05 U	0.05 U	7.60	0.07	1.2	0.07	0.61	0.052	0.079	0.095	0.095
Sulfate	mg/L		36	36	13	8.0	26	5.0 U	--	18	1,100	140	40	11	48	10 U	18	5.8	5.0 U	5.0 U
Chloride	mg/L		980	910	38	31	610	24	--	120	8,000	1300	530	3.3	780	11	330	410	30	89
Dissolved Methane	ug/L		--	--	220	190	330	190	--	110	57	3.2	63	16	500	20	910	1200	190	700
BOD5	mg/L		--	--	2.0 U	1.9	4.3	--	--	--	--	--	--	--	--	--	--	--	--	--
FIELD PARAMETERS																			
Turbidity	Neth. Turbidity Units		120	120	164	4.8	32.6	65.5	60.0	NM	49.0	8.1	6.7	14.9	9.7	7.4	1.92	3.26	8.01	8.62
pH	--		6.31	6.31	5.81	6.28	6.96	6.20	6.21	6.54	6.30	5.80	6.35	8.45	8.15	6.37	6.33	6.35	6.29	6.32
Specific Conductance	Millisiemens/cm		19.8	19.8	31.8	28.90	5.13	90.00	51.60	1.07	23.40	4.77	2.41	0.26	2.59	0.30	0.61	2.00	0.40	0.62
Dissolved Oxygen	mg/L		0.0	0.0	4.96	1.10	0.0	0.57	0.00	0.07	0.50	0.80	0.32	2.06	0.61	1.42	0.50	0.10	1.07	1.93
Oxdat. Red. Potential	Millivolts		-56	-56	-14	85.6	-120	-30	-99	-287	-32	179	-76.6	76.1	-181.2	106.1	81.9	-119.6	-104.2	-75.0

Notes:

1 Sample collected from replaced well.

2 MTCA A cleanup level for gasoline is 800 µg/L in th

* Duplicate sample.

J : Reported concentration is an estimate.

mg Milligrams per liter.

NM Not measured due to equipment malfunction.

µg Micrograms per liter.

U Analyte not detected above practical quantitation limit given.

U The practical quantitation limit is elevated due to interferences present in the sample.

Exceeds MTCA A cleanup level.

Table 1 Groundwater Results Summary, Long Term Monitoring Events 10 and 11 (2018/2019)

Monitoring Well No.			MW-26R														
PARAMETERS	Units		3/18/08[1]	1/20/10	5/26/10	8/11/10	4/6/11	9/28/11	1/24/13	7/31/13	1/21/14	8/6/14	1/21/15	7/29/15	1/21/16	7/20/16	7/19/17	7/19/18	7/23/19
		MTCA A																	
VOLATILE ORGANICS (BTEX)																			
Benzene	ug/L	5	17	4.0 U	17	3.9	1.0 U	6.0	5.7	5.0	1.0 U	4.2 U	1.0 U	1.0 U	4.0 U	1.0 U	1.7	1.0 U	4.0 U
Toluene	ug/L	1,000	4.0 U	4.0 U	4.0 U	1.0 U	1.0 U	1.0 U	1.0 U	4.0 U	1.0 U	4.0 U	1.0 U	1.0 U	4.0 U	1.0 U	1.0 U	1.0 U	4.0 U
Ethylbenzene	ug/L	700	4.0 U	4.0 U	4.0 U	1.0 U	1.0 U	1.0 U	1.0 U	4.0 U	1.0 U	4.0 U	1.0 U	1.0 U	4.0 U	1.0 U	1.0 U	1.0 U	4.0 U
m,p-Xylene	ug/L	1,000	4.0 U	4.0 U	4.0 U	1.0 U	1.0 U	1.0 U	1.1	4.0	1.0 U	4.0 U	1.0 U	1.0 U	4.0 U	1.0 U	1.0 U	1.0 U	4.0 U
o-Xylene	ug/L	1,000	4.0 U	4.0 U	4.0 U	1.0 U	1.0 U	1.0 U	1.0 U	4.0 U	1.0 U	4.0 U	1.0 U	1.0 U	4.0 U	1.0 U	1.0 U	1.0 U	4.0 U
TOTAL PETROLEUM HYDROCARBONS																			
Gasoline	ug/L	800/1,000[2]	1,300	400 U	530	240	100 U	270	290	400 U	100 U	400 U	100 U	100 U	400 U	100 U	110	100 U	400 U
Diesel	mg/L	0.5	1.3	0.27 U	0.26 U	0.31 U	0.27 U	0.26 U	0.26 U	0.26 U	0.25 U	0.26 U	0.25 U	0.26 U	0.26 U	--	0.25 U	0.27 U	0.25 U
Lube Oil	mg/L	0.5	0.40 U	0.43 U	0.41 U	0.40 U	0.43 U	0.41 U	0.41 U	0.41 U	0.40 U	0.41 U	0.41 U	0.41 U	0.41 U	--	0.40 U	0.43 U	0.41 U
METALS																			
Total Lead	ug/L	15	3.3	1.1 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dissolved Lead	ug/L	15	1.0 U	1.0 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dissolved Iron	ug/L		--	56 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Ferrous Iron	mg/L		--	--	0.758	0.8	0.059	--	0.395	0.706	0.196	0.385	0.04 U	0.542	0.040 U	--	0.165 J	0.208	0.108 J
Dissolved Manganese	ug/L		--	11 U	66	560	10 U	--	4,000	260	77	150	10 U	89	10 U	--	250	79	150
PAHs																			
Naphthalene	ug/L		0.80	0.10 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	ug/L		0.10 U	0.10 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1-Methylnappthalene	ug/L		69	0.10 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Acenaphthylene	ug/L		0.45	0.15 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Acenaphthene	ug/L		23	0.17 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Flourene	ug/L		4.8	0.10 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phenanthrene	ug/L		10	0.10 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Anthracene	ug/L		2.4	0.17 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	ug/L		0.88	0.10 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pyrene	ug/L		1.2	0.10 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	ug/L		0.10	0.016 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chrysene	ug/L		0.098	0.010 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	ug/L		0.022	0.010 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	ug/L		0.027	0.010 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	ug/L	0.1	0.051	0.010 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	ug/L		0.017	0.010 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dibenz(a,h)anthracene	ug/L		0.010 U	0.010 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo[g,h,i]perylene	ug/L		0.020	0.010 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
GENERAL CHEMISTRY																			
Alkalinity	mg/L		190	180	270	210	300	--	330	200	160	320	--	300	210	--	270	200	270
Nitrate (as Nitrogen)	mg/L		0.050 U	1.0	0.16	0.050 U	0.050 U	--	0.05 U	0.05 U	0.41	0.05 U	0.32	0.05 U	0.25	--	0.052	0.050 U	0.050 U
Sulfate	mg/L		1,400	1,200	1,400	2,200	1,300	--	1,100	1,100	2,400	1,600	1,500	1,300	1,200	--	1,500	1,800	1,100
Chloride	mg/L		9,400	9,100	10,000	20,000	8,400	--	7,200	14,000	11,000	9,400	24,000	7,800	9,000	--	9,200	13,000	8,900
Dissolved Methane	ug/L		--	3.0	68	5.0	29	--	270	16	1.0	12.1	0.5 U	18	3	45	130	150	490
BOD5	mg/L		--	2.00 U	1.7	1.5	--	--	--	--	--	--	--	--	--	--	--	--	--
FIELD PARAMETERS																			
Turbidity	Neth. Turbidity Units		85.7	70.2	3.8	38.0	0.1	82.3	NM	0.0	4.9	16.0	0.4	8.3	7.1	--	1.8	5.2	4.3
pH	--		6.24	6.19	6.31	6.53	6.88	6.52	6.72	6.68	6.51	6.52	8.03	8.31	6.88	--	6.69	6.77	6.57
Specific Conductance	Millisiemens/cm		3.25	16.6	22.42	--	--	--	5.70	38.0	38.3	25.8	30.2	23.5	27.7	--	34.7	35.0	23.6
Dissolved Oxygen	mg/L		0.0	6.75	5.52	0.01	0.36	0.00	0.21	2.11	2.60	4.95	5.97	1.87	4.20	--	0.73	6.77	1.55
Oxdat. Red. Potential	Millivolts		48	58	-64.5	-98	-84	-275	-321	-88	-156.5	-192	89.2	-240.6	311	--	-155.9	-78.0	-53.8

Notes:

1 Sample collected from replaced well.

2 MTCA A cleanup level for gasoline is 800 µg/L in th

* Duplicate sample.

J : Reported concentration is an estimate.

mg Milligrams per liter.

NM Not measured due to equipment malfunction.

µg Micrograms per liter.

U Analyte not detected above practical quantitation limit given.

U The practical quantitation limit is elevated due to interferences present in the sample.

Exceeds MTCA A cleanup level.

Table 1 Groundwater Results Summary, Long Term Monitoring Events 10 and 11 (2018/2019)

Monitoring Well No.			MW-27													
PARAMETERS	**Units**		**4/7/11**	**9/30/11**	**1/24/13**	**7/30/13**	**1/22/14**	**8/7/14**	**1/20/15**	**1/20/15 ***	**7/30/15**	**1/21/16**	**1/21/16 ***	**7/21/16**	**7/19/17**	**7/19/18**	**7/22/19**
		MTCA A															
VOLATILE ORGANICS (BTEX)																	
Benzene	ug/L	5	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Toluene	ug/L	1,000	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Ethylbenzene	ug/L	700	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
m,p-Xylene	ug/L	1,000	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
o-Xylene	ug/L	1,000	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
TOTAL PETROLEUM HYDROCARBONS																	
Gasoline	ug/L	800/1,000[2]	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
Diesel	mg/L	0.5	0.26 U	0.26 U	0.26 U	0.27 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U
Lube Oil	mg/L	0.5	0.41 U	0.42 U	0.42 U	0.43 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U
METALS																	
Total Lead	ug/L	15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dissolved Lead	ug/L	15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dissolved Iron	ug/L		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Ferrous Iron	mg/L		27.6	--	34.9	42.6	32.4	49.4	33.1	32.9	49.0	30.6	30.4	--	22.9 J	23.7	22.8 J
Dissolved Manganese	ug/L		3,900	--	4,300	6,500	5,400	6,800	4,100	4,000	5,200	3,200	3,200	3,000	2,800	2,800	3,100
PAHs																	
Naphthalene	ug/L		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	ug/L		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1-Methylnappthalene	ug/L		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Acenaphthylene	ug/L		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Acenaphthene	ug/L		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Flourene	ug/L		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phenanthrene	ug/L		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Anthracene	ug/L		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	ug/L		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pyrene	ug/L		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	ug/L		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chrysene	ug/L		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	ug/L		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	ug/L		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	ug/L	0.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	ug/L		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dibenz(a,h)anthracene	ug/L		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo[g,h,i]perylene	ug/L		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
GENERAL CHEMISTRY																	
Alkalinity	mg/L		310	--	270	310	360	370	--	--	490	350	370	270	270	230	240
Nitrate (as Nitrogen)	mg/L		0.050 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.12 U	0.12 U	0.07	0.05 U	0.05 U	0.05 U	0.14	0.05 U	0.05 U
Sulfate	mg/L		25 U	--	25 U	10 U	25 U	5 U	25 U	25 U	25 U	25 U	25 U	25 U	10 U	10 U	5.0 U
Chloride	mg/L		9.8	--	10	20	34	12	14	13	19	16	17	10	7.4	7.2	11
Dissolved Methane	ug/L		8,600	--	6,900	5,200	5,900	10,900	14,000	9,900	5,000	5,800 J	8,700 J	4,200	6,200	4,600	6,100
BOD5	mg/L		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FIELD PARAMETERS																	
Turbidity	Neth. Turbidity Units		49.2	>1000	NM	NM	9.2	35.80	15.30	15.30	1.11	2.04	2.04	4.92	4.29	6.01	4.81
pH	--		6.58	6.53	6.61	6.60	6.50	5.97	7.76	7.76	7.88	6.76	6.76	6.61	6.77	6.83	6.59
Specific Conductance	Millisiemens/cm		92	1.18	5.76	0.82	0.77	0.80	0.57	0.57	0.57	0.68	0.68	0.52	0.51	0.45	0.50
Dissolved Oxygen	mg/L		0.27	0.00	0.10	5.20	0.53	0.22	0.23	0.23	0.51	0.13	0.13	0.42	0.21	0.45	2.31
Oxdat. Red. Potential	Millivolts		-88	-111	-210	-99	-60.3	-38.8	-80.3	-80.3	-41.7	-46.2	-46.2	10.2	-90.5	-100.4	-102.2

Notes:

1 Sample collected from replaced well.

2 MTCA A cleanup level for gasoline is 800 µg/L in th

* Duplicate sample.

J : Reported concentration is an estimate.

mg Milligrams per liter.

NM Not measured due to equipment malfunction.

µg Micrograms per liter.

U Analyte not detected above practical quantitation limit given.

U The practical quantitation limit is elevated due to interferences present in the sample.

Exceeds MTCA A cleanup level.

Parametrix

Boring Log

Boring ID: MW-4R

Project Name: Chevron Interim Action

Project #: 255-1896-063 / 04-1304

Location: Bremerton, WA

Drilling Company:

Drilling Method: Direct Push

Logged by: Lily Vagelatos

Checked by: Ingmar Saul, L.G.

Sheet 1 of 1

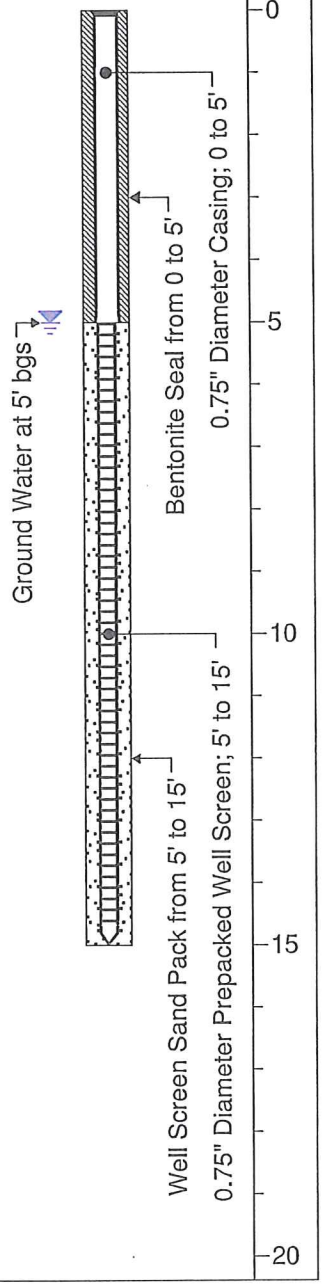
Starting Date: 12/14/09

Ending Date: 12/14/09

Boring Depth: 15 ft

Depth to Water: 5 ft

Depth (ft)	Lithologic Symbol	Description/Classification of Materials	Sample ID	Recovery	Boring Diagram	Depth (ft)
0		Ground Surface				0
		MIXED TREATMENT ZONE Sandy silt with gravel, tan brown, very moist.		50"		
5				55"		5
10		Silty sand and gravel, tan brown, saturated, starting at approximately 10 ft bgs.		40"		10
15		Bottom of boring at 15 feet bgs.				15
20						20



Parametrix

Boring Log

Boring ID: MW-9R

Project Name: Chevron Interim Action

Project #: 255-1896-063 / 04-1304

Location: Bremerton, WA

Drilling Company:

Drilling Method: Direct Push

Logged by: Lily Vagelatos

Checked by: Ingmar Saul, L.G.

Sheet 1 of 1

Starting Date: 12/15/09

Ending Date: 12/15/09

Boring Depth: 15 ft

Depth to Water: 9 ft

Depth (ft)	Lithologic Symbol	Description/Classification of Materials	Sample ID	Recovery	Boring Diagram	Depth (ft)
0		Ground Surface				0
		TOP SOIL with VEGETATION Silty sand		30"		
		MIXED TREATMENT ZONE Sandy silt with gravel, tan brown, very moist.				
5				45"		5
			CHEV-SO-MW9R-0090			
10		Silty sand and gravel, tan brown, saturated, starting at approximately 10 ft bgs.		24"		10
15		Bottom of boring at 15 feet bgs.				15
20						20

Ground Water at 9' bgs

Bentonite Seal from 0 to 5'

0.75" Diameter Casing; 0 to 5'

Well Screen Sand Pack from 5' to 15'

0.75" Diameter Prepacked Well Screen; 5' to 15'

Parametrix

Boring Log

Boring ID: MW-10R

Project Name: Chevron Interim Action

Project #: 255-1896-063 / 04-1304

Location: Bremerton, WA

Drilling Company:

Drilling Method: Direct Push

Logged by: Lily Vagelatos

Checked by: Ingmar Saul, L.G.

Sheet 1 of 1

Starting Date: 12/29/09

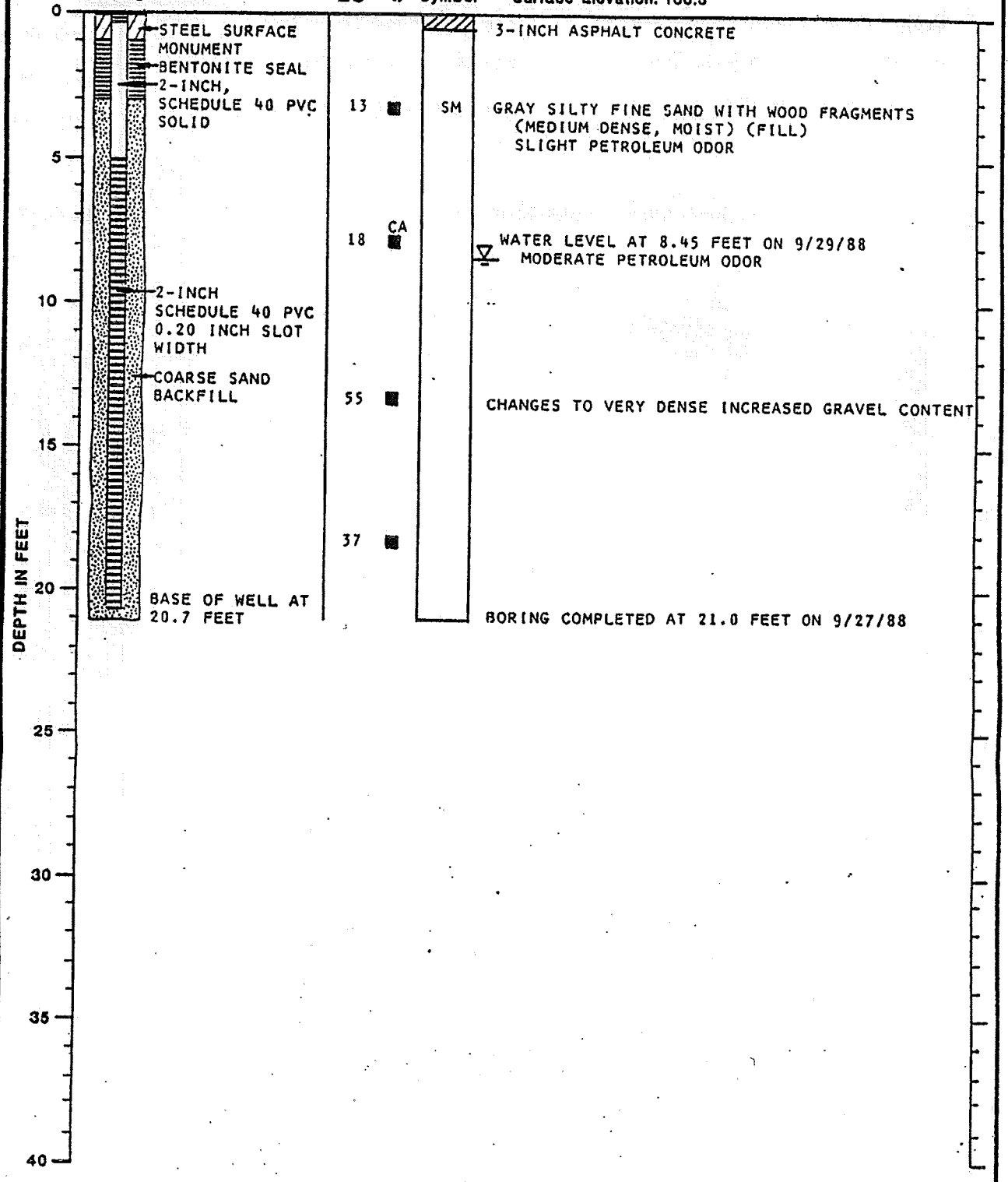
Ending Date: 12/29/09

Boring Depth: 15 ft

Depth to Water: 7 ft

Depth (ft)	Lithologic Symbol	Description/Classification of Materials	Sample ID	Recovery	Boring Diagram	Depth (ft)
0		Ground Surface				0
		TILL and FILL MATERIAL Silty sand and gravel, brown tan.		12"		
5		Damp, starting at approximately 5 ft bgs.				5
		Saturated starting at approximately 7 ft bgs.	CHEV-SO-MW10R-0070	20"	Ground Water at 7' bgs	
10				20"	Bentonite Seal from 0 to 5' 0.75" Diameter Casing; 0 to 5' Well Screen Sand Pack from 5' to 15' 0.75" Diameter Prepacked Well Screen; 5' to 15'	10
15		Bottom of boring at 15 feet bgs.				15
20						20

MONITOR WELL NO. M -11



Note: See Figure A-2 for Explanation of Symbols

0372-34-4 KRF:DWA:GD 10/12/88

GeoEngineers

LOG OF MONITOR WELL

FIGURE A-13

Parametrix

Boring Log

Boring ID: MW-13R

Project Name: Chevron Interim Action

Project #: 255-1896-063 / 04-1304

Location: Bremerton, WA

Drilling Company:

Drilling Method: Direct Push

Logged by: Lily Vagelatos

Checked by: Ingmar Saul, L.G.

Sheet 1 of 1

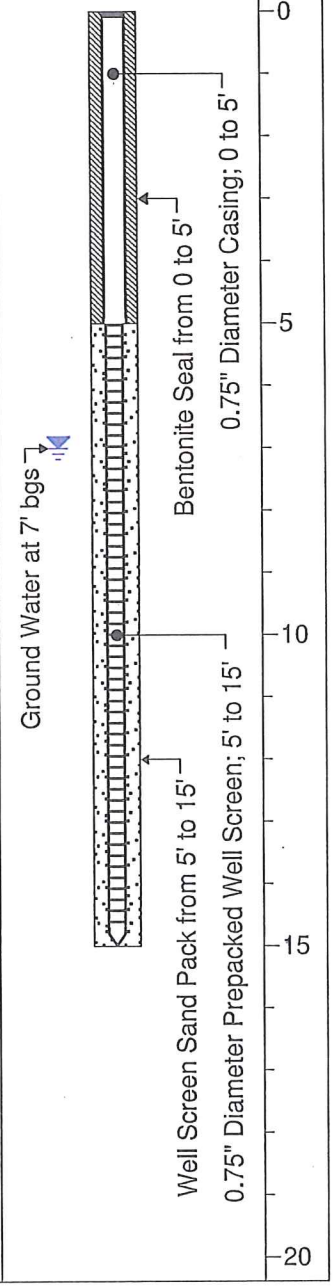
Starting Date: 12/14/09

Ending Date: 12/14/09

Boring Depth: 15 ft

Depth to Water: 7 ft

Depth (ft)	Lithologic Symbol	Description/Classification of Materials	Sample ID	Recovery	Boring Diagram	Depth (ft)
0		Ground Surface				0
		MIXED TREATMENT ZONE Sandy silt with gravel, tan brown, very moist.		45"		
5				50"		5
10		Silty sand and gravel, tan brown, saturated, at approximately 10 ft bgs.		30"		10
15		Bottom of boring at 15 feet bgs.				15
20						20



Parametrix

Boring Log

Boring ID: MW-16R

Project Name: Chevron Interim Action

Project #: 255-1896-063 / 04-1304

Location: Bremerton, WA

Drilling Company:

Drilling Method: Direct Push

Logged by: Lily Vagelatos

Checked by: Ingmar Saul, L.G.

Sheet 1 of 1

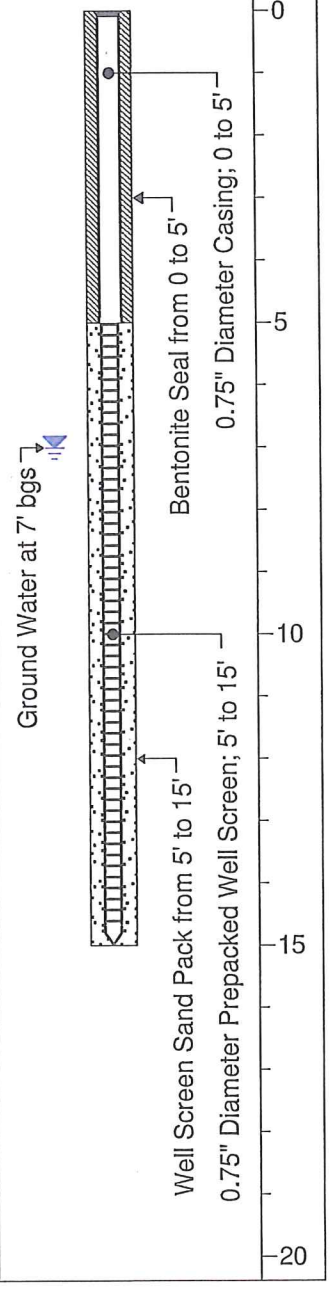
Starting Date: 12/29/09

Ending Date: 12/29/09

Boring Depth: 15 ft

Depth to Water: 7 ft

Depth (ft)	Lithologic Symbol	Description/Classification of Materials	Sample ID	Recovery	Boring Diagram	Depth (ft)
0		Ground Surface				0
		SILTY GRAVELLY SAND Gray brown, damp, fill.				
5						5
10						10
15		Bottom of boring at 15 feet bgs.				15
20						20



Parametrix

Boring Log

Boring ID: MW-18R

Project Name: Chevron Interim Action

Project #: 255-1896-063 / 04-1304

Location: Bremerton, WA

Drilling Company:

Drilling Method: Direct Push

Logged by: Lily Vagelatos

Checked by: Ingmar Saul, L.G.

Sheet 1 of 1

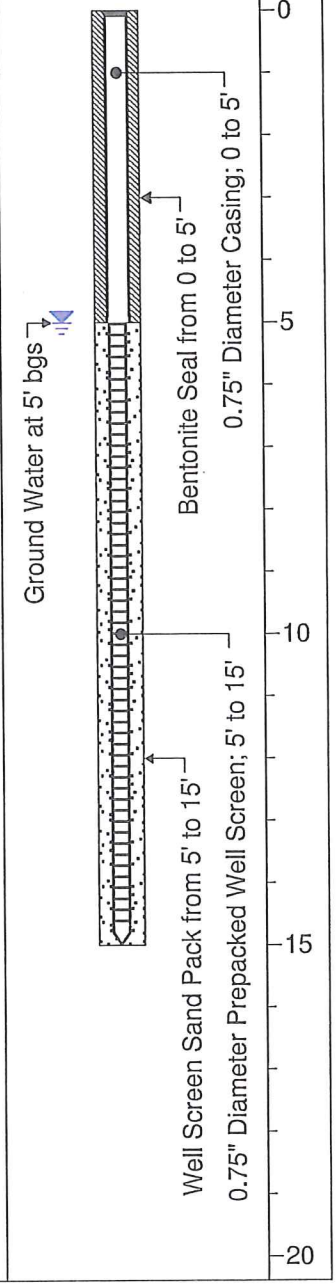
Starting Date: 12/29/09

Ending Date: 12/29/09

Boring Depth: 15 ft

Depth to Water: 5 ft

Depth (ft)	Lithologic Symbol	Description/Classification of Materials	Sample ID	Recovery	Boring Diagram	Depth (ft)
0		Ground Surface				0
		SILTY GRAVELLY SAND Gray brown, damp, fill.				
5						5
10						10
15		Bottom of boring at 15 feet bgs.				15
20						20



Parametrix

Boring Log

Boring ID: MW-19R

Project Name: Chevron Interim Action

Project #: 255-1896-063 / 04-1304

Location: Bremerton, WA

Drilling Company:

Drilling Method: Direct Push

Logged by: Lily Vagelatos

Checked by: Ingmar Saul, L.G.

Sheet 1 of 1

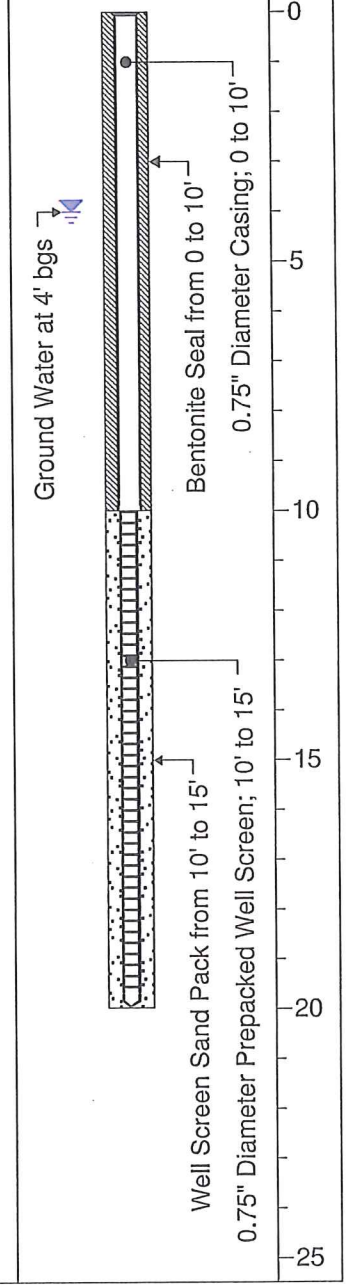
Starting Date: 12/29/09

Ending Date: 12/29/09

Boring Depth: 15 ft

Depth to Water: 4 ft

Depth (ft)	Lithologic Symbol	Description/Classification of Materials	Sample ID	Recovery	Boring Diagram	Depth (ft)
0		Ground Surface				0
		SILTY GRAVELLY SAND Gray brown, damp, fill.				
5						5
10						10
15						15
20		Bottom of boring at 20 feet bgs.				20
25						25



Parametrix

Boring

Boring ID: MW-20R

Project Name: Chevron LTM

Project #: 233-1896-107

Location: Bremerton, WA

Drilling Method: HSA

Sample Method: Sprit Spoon

Logged by: Lara Linde, L.G.

Checked by: Ingmar Saul, L.G.

Sheet 1 of 1

Drilling Date: 1/10/13

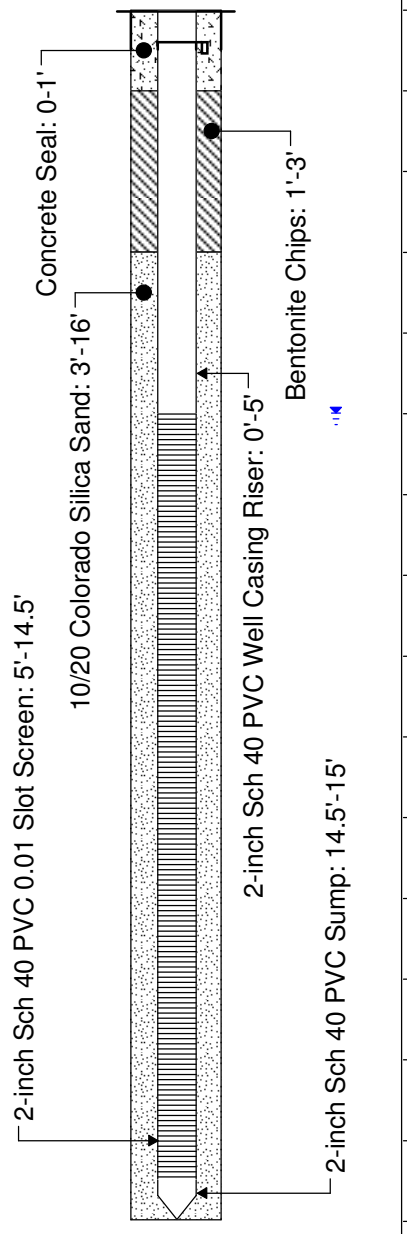
Boring Depth: 15 ft

Depth to Water: 4.99 ft

Ecology Tag #: BHK 398

Elevation (ft)	Lithologic Symbol	U.S.C.S.	Description/Classification of Materials; Soil: Group name, group symbol, color, plasticity, grain size, moisture, density, misc.	PID (PPM)	Recovery (in)
0.0			Ground Surface		
	SM		**SAND (SM)** Brown-gray, nonplastic, medium to fine, moist, loose, trace of fine rounded gravel, no petroleum odor.		36"/60"
-8.0			Increasing silt content starting at approx. 8 ft bgs.		
-9.0			Strong petroleum odor starting at approx. 9 ft bgs.		30"/60"
-9.5	SP		**SAND (SP)** Gray, low plasticity, fine to medium grained, wet, loose, some fine rounded gravel, strong petroleum odor.		
-14.0					36"/60"
-15.0	ML		**SILT (ML)** Brown-gray, high plasticity, moist, soft, some fine rounded gravel, slight petroleum odor.		
			Bottom of boring at 15 feet bgs.		

Well Diagram



Depth (ft)

0
5
10
15

Parametrix

Boring Log

Boring ID: MW-21R

Project Name: Chevron Interim Action

Project #: 255-1896-063 / 04-1304

Location: Bremerton, WA

Drilling Company:

Drilling Method: Direct Push

Logged by: Lily Vagelatos

Checked by: Ingmar Saul, L.G.

Sheet 1 of 1

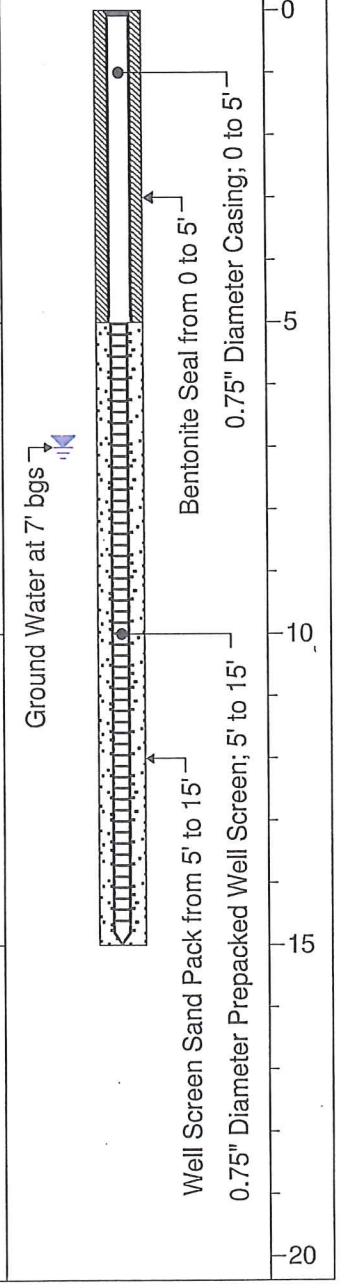
Starting Date: 12/15/09

Ending Date: 12/15/09

Boring Depth: 15 ft

Depth to Water: 7 ft

Depth (ft)	Lithologic Symbol	Description/Classification of Materials	Sample ID	Recovery	Boring Diagram	Depth (ft)
0		Ground Surface				0
		MIXED TREATMENT ZONE Sandy silt with gravel, tan brown, very moist.		50"		
5				50"		5
10		Silty sand and gravel, tan brown, saturated, starting at approximately 10 ft bgs.	CHEV-SO-MW21R-0100	40"		10
15		Bottom of boring at 15 feet bgs.				15
20						20



Parametrix

Boring Log

Boring ID: MW-22R

Project Name: Chevron Interim Action

Project #: 255-1896-063 / 04-1304

Location: Bremerton, WA

Drilling Company:

Drilling Method: Direct Push

Logged by: Lily Vagelatos

Checked by: Ingmar Saul, L.G.

Sheet 1 of 1

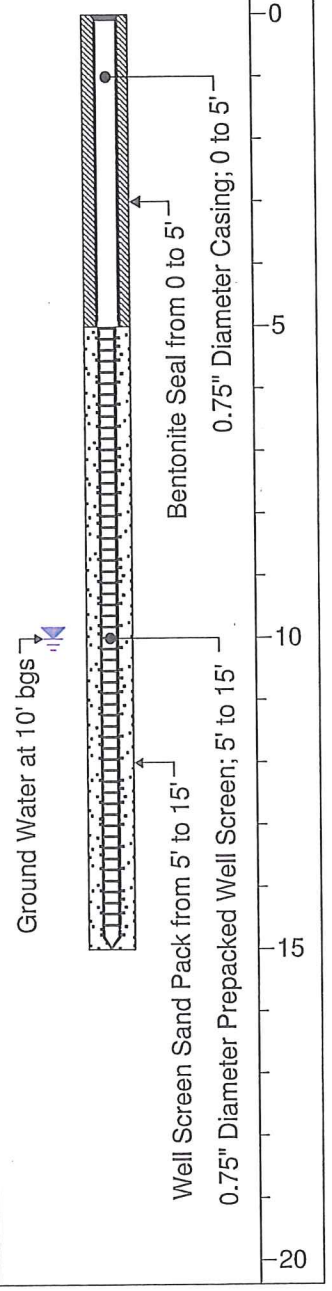
Starting Date: 12/14/09

Ending Date: 12/14/09

Boring Depth: 15 ft

Depth to Water: 10 ft

Depth (ft)	Lithologic Symbol	Description/Classification of Materials	Sample ID	Recovery	Boring Diagram	Depth (ft)
0		Ground Surface				0
		MIXED TREATMENT ZONE Sandy silt with gravel, tan brown, very moist.		50"		
5				55"		5
10		Silty sand and gravel, tan brown, saturated, starting at approximately 10 ft bgs.	CHEV-SO-MW22R-0100	45"		10
15		Bottom of boring at 15 feet bgs.				15
20						20



Boring ID: MW-25

Project Name: Chevron Prop RI/FS

Project #: 255-1896-063

Location: SEE MAP

Drilling Company: ESN

Drilling Method: Auger

Logged by: David Dinkuhn, P.E.

Checked by: David Dinkuhn, P.E.

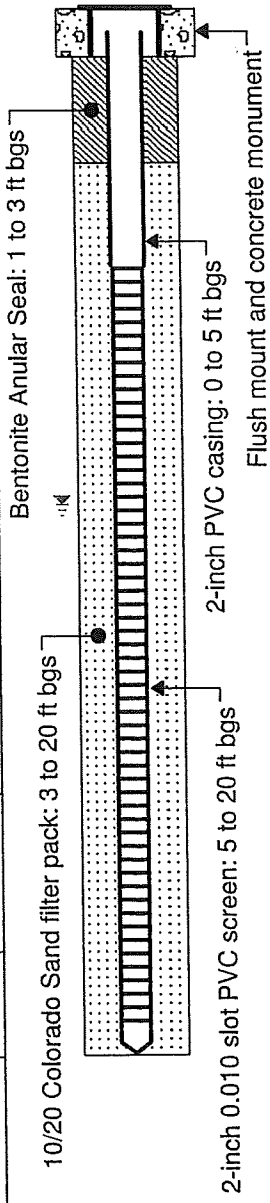
Sheet 1 of 1

Drilling Date: 3/7/08

Boring Depth: 20 ft

Depth to Water: 9.5 ft

Depth (ft)	Description/Classification of Materials	Sample: PID Reading	Sample: Sample ID	Sample: Recovery (ft)
0	Ground Surface			
	Silty Sandy Gravel Gray brown, damp, No petroleum hydrocarbon odor (FILL)			4
		0		
5				3
		0		3
	Silty Gravelly Sand Gray, wet, moderate petroleum hydrocarbon odor (FILL)	1400	CHEV-SO -MW25-0100	3
	Silty Gravelly Sand Wet, No petroleum hydrocarbon odor (OUTWASH)			3
15		4		3
				--
20	Bottom of boring at 20 feet bgs.			



Parametrix

Boring Log

Boring ID: MW-26R

Project Name: Chevron Interim Action

Project #: 255-1896-063 / 04-1304

Location: Bremerton, WA

Drilling Company:

Drilling Method: Direct Push

Logged by: Lily Vagelatos

Checked by: Ingmar Saul, L.G.

Sheet 1 of 1

Starting Date: 12/14/09

Ending Date: 12/14/09

Boring Depth: 15 ft

Depth to Water: 9.5 ft

Depth (ft)	Lithologic Symbol	Description/Classification of Materials	Sample ID	Recovery	Boring Diagram	Depth (ft)
0		Ground Surface				0
		MIXED TREATMENT ZONE Sandy silt with gravel, tan brown, very moist.		50"		
5				45"		5
			CHEV-SO-MW26R-0095			
10		Silty sand and gravel, tan brown, saturated, untreated fill in saturation zone, starting at approximately 10 ft bgs.		40"		10
15		Bottom of boring at 15 feet bgs.				15
20						20

Ground Water at 9.5' bgs

Bentonite Seal from 0 to 5'

0.75" Diameter Casing; 0 to 5'

Well Screen Sand Pack from 5' to 15'

0.75" Diameter Prepacked Well Screen; 5' to 15'

Parametrix

Boring

Boring ID: MW-27

Project Name: Former Cheveron Prop. Remediation

Project #: 233-1896-098 / 01-03

Location: 1310 Highland Drive, Bremerton

Drilling Method: Probe/HSA Combo

Sample Method: Split Spoon

Logged by: Lara Linde

Checked by: Ingmar Saul, R.G.

Sheet 1 of 1

Drilling Date: 3/11/11

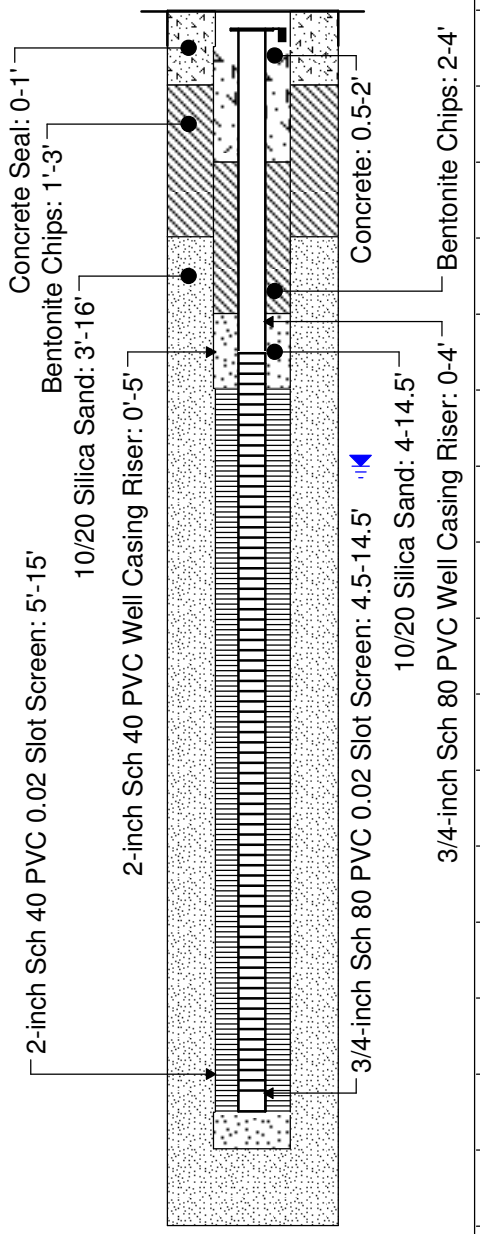
Boring Depth: 16 ft

Depth to Water: 6 ft

Ecology Tag #: BCN 891

Elevation (ft)	Lithologic Symbol	U.S.C.S.	Description/Classification of Materials; Soil: Group name, group symbol, color, plasticity, grain size, moisture, density, misc.	PID (PPM)	Recovery (in)
12.0			Ground Surface		
11.5	GW		**RIP RAP** Coarse gravel to cobbles (beach reinforcement)		
			SAND Brown, fine to medium grained, dry, loose, occassional fine gravel, no odor.	0	36/48
9.0					
	SP		Red, moist, iron staining starting at approximately 3 ft bgs.		
				0	18/48
6.0			Moist to wet, few fine gravels, no odor, starting at approximately 6 ft bgs.		
3.5					
			SAND Brown to gray, fine to medium grained, wet, loose, organic odor, no sheen.	0	40/48
	SM				
			Gray, fine grained, wet to saturated, 5% shell fragments, moderate petroleum odor at approximately 16 ft bgs.	0	42/48
-4.0					
			Bottom of boring at 16 feet bgs.		

Well Diagram



Depth (ft)

0
5
10
15

PARAMETRIX

Form 07-EN-215/Rev. 02/07

Field Report/Well Data

TO:

DATE	JOB NO.
7/18/18	233-1896-107
PROJECT: Former Chevron Property Long-Term Monitoring	
LOCATION: Bremerton, WA	
CONTRACTOR: Parametrix	OWNER: City of Bremerton
WEATHER: 78°, sunny clear	TEMP ° at AM / ° at PM
PRESENT AT SITE: Sarah Miller (PMX)	

THE FOLLOWING WAS NOTED:

WN (WELL NUMBER)	Time	DTW (DEPTH TO WATER)	MP (MEASURE POINT)	TD (TOTAL DEPTH OF WELL)	WD (WELL DIAMETER)	Notes
MW 11	1045	8.40'				
MW 10R	1046	8.70'				
MW 25	1048	8.41'				
MW4R	1049	9.52'				
MW13R	1050	7.74'				
MW22R	1052	7.83'				
MW26R	1053	8.80'				
MW21R	1055	7.35'				
MW27	1057	6.47'				
MW20R	1059	6.89				

TOC (Top of PVC Well Casing)

COPIES _____

SIGNED _____

Parametrix, Inc.

Well #: MW4R
Sample #: Chev-gw-MW4R-0120

Groundwater Sampling Field Data Sheet

Project Number	236-2542-038	Date	7/18/18
Project Name	Former Chevron Property	Location	Evergreen Rotary Park
Project Address	1310 Highland Drive, Bremerton	Sampled By	Sarah Miller
Client Name	City of Bremerton	Purged By	Sarah Miller

Casing Diameter: 2" ____ 4" ____ 6" ____ Other 1"

Depth to Water (feet)	9.75'	Purge Vol. Meas.Method	grad. cyl.
Depth of Well (feet)		Date Purged	7/18/18
Reference Point (surveyors notch/etc)		Purge Time (from/to)	1552 - 1620 (dry)
Date/Time Sampled	7/18/18 1620	Flow Rate (ml/min)	~160 ml/min

Purge Volume Calculation: $(\pi r^2 h)(7.48\ gal/ft^3)$(# Casing volumes)
Purge Volume (gallons) for 2" = (0.16)(h)(#Cv); 4" = (0.653)(h)(#Cv); 6" = (1.48)(h)(#Cv)
Calculated Purge Volume (gallons) ____ Actual Purge Volume (gallons) ____

TIME (2400 hr)	WATER LEVEL (ft) ± 0.3	pH (units) ± 0.1	COND (mS/m) ± 3%	DO (mg/L) ±10%	TEMP °C	TURB. ±10% if > 10 NTU	ORP (mV) ± 10 mV	CUM. VOL. (gal)
1557	9.98	7.11	.440	4.70	17.22	dry	-121.8	0.8
								1.3
								1.8
								2.3
								2.3

ran dry at 15:58 pm, turned off, allowed time for recovery

able to fill 3 VOAs at 1620

2 more VOAs at 1640 (labeled as 1620)

Purge Equipment	peristaltic pump	Sampling Equipment	" "
Laboratory	Onsite/ARI	Date Sent to Lab	7/19/18
Chain-of-Custody (yes/no)	yes	Field QC Sample Number	
Shipment Method	courier	Split with (name(s)/organization)	

Well Integrity: good
Remarks: brown, murky, slight hydrocarbon odor
Signature: [signature] Page ____ of ____

extremely effervescent...

Parametrix, Inc.

Well #: MW10R
Sample #: Chev-gw-MW10R-0120

Groundwater Sampling Field Data Sheet

Project Number	236-2542-038	Date	7/18/18
Project Name	Former Chevron Property	Location	evergreen rotary park
Project Address	1310 Highland Drive, Bremerton	Sampled By	sarah miller
Client Name	City of Bremerton	Purged By	sarah miller

Casing Diameter: 2" ____ 4" ____ 6" ____ Other 1"

Depth to Water (feet)	8.45	Purge Vol. Meas.Method	grad. cyl.
Depth of Well (feet)		Date Purged	7/18/18
Reference Point (surveyors notch/etc)		Purge Time (from/to)	1305
Date/Time Sampled	7/18/18 1325	Flow Rate (ml/min)	~ 160 ml/min

Purge Volume Calculation: $(\pi r^2 h)(7.48\ gal/ft^3)$(# Casing volumes)
Purge Volume (gallons) for 2" = (0.16)(h)(#Cv); 4" = (0.653)(h)(#Cv); 6" = (1.48)(h)(#Cv)
Calculated Purge Volume (gallons) _____ Actual Purge Volume (gallons) _____

TIME (2400 hr)	WATER LEVEL (ft) ± 0.3	pH (units) ± 0.1	COND (mS/m) ± 3%	DO (mg/L) ±10%	TEMP °C	TURB. ±10% if > 10 NTU	ORP (mV) ± 10 mV	CUM. VOL. (gal)
1310	8.48	6.46	.378	1.28	15.47	5.21	-73.3	0.8
1313		6.46	.377	1.08	15.39	5.08	-79.5	1.3
1316		6.50	.375	0.98	15.26	1.11	-85.0	1.8
1319	8.23	6.50	.378	0.98	15.23	0.46	-88.2	2.3
								2.8

Purge Equipment	peristaltic pump	Sampling Equipment	" "
Laboratory	Onsite/ARI	Date Sent to Lab	7/19/18
Chain-of-Custody (yes/no)	yes	Field QC Sample Number	
Shipment Method	courier	Split with (name(s)/organization)	

Well Integrity: good
Remarks: clear, strong hydrocarbon odor, slight oil sheen, slight effervescence
Signature: SM Page ____ of ____

Parametrix, Inc.

Well #: MW11
Sample #: Chev-GW-MW11-0160

Groundwater Sampling Field Data Sheet

Project Number	236-2542-038	Date	7/18/18
Project Name	Former Chevron Property	Location	evergreen plant par
Project Address	1310 Highland Drive, Bremerton	Sampled By	Sarah Miller
Client Name	City of Bremerton	Purged By	Sarah Miller

Casing Diameter: 2" ✓ 4" ____ 6" ____ Other ____

Depth to Water (feet)	8.4'	Purge Vol. Meas.Method	grad cyl.
Depth of Well (feet)		Date Purged	7/18/18
Reference Point (surveyors notch/etc)		Purge Time (from/to)	1200 –
Date/Time Sampled	7/18/18 1220	Flow Rate (ml/min)	~160 ml/min

Purge Volume Calculation: $(\pi r^2 h)(7.48\ gal/ft^3)$(# Casing volumes)
Purge Volume (gallons) for 2" = (0.16)(h)(#Cv); 4" = (0.653)(h)(#Cv); 6" = (1.48)(h)(#Cv)
Calculated Purge Volume (gallons) _____ Actual Purge Volume (gallons) _____

TIME (2400 hr)	WATER LEVEL (ft) ± 0.3	pH (units) ± 0.1	COND (mS/m) ± 3%	DO (mg/L) ±10%	TEMP °C	TURB. ±10% if > 10 NTU	ORP (mV) ± 10 mV	CUM. VOL. ~~(gal)~~ liter
1205	8.65	6.29	.446	3.61	14.05	27.2	-96.6	0.8 L
1208	8.82	6.31	.445	1.48	13.96	18.1	-101.9	1.3 L
1211	9.02	6.35	.444	1.11	14.06	9.64	-106.3	1.8
1214	9.22	6.36	.443	1.20	14.10	7.12	-107.0	2.3
1217	9.35	6.36	.443	1.21	14.14	6.89	-106.7	2.8

Purge Equipment	peristaltic pmp	Sampling Equipment	same
Laboratory	Onsite/ARI	Date Sent to Lab	7/19/18
Chain-of-Custody (yes/no)	yes	Field QC Sample Number	
Shipment Method	courier	Split with (name(s)/organization)	

Well Integrity: good
Remarks: clear, slight effervescence, hydrocarb. odor
Signature: [signature] Page ____ of ____

Parametrix, Inc.

Well #: MW13R
Sample #: Chev-gw-MW13R-0120

Groundwater Sampling Field Data Sheet

Project Number	236-2542-038	Date	7/18/18
Project Name	Former Chevron Property	Location	Evergreen Rotary Park
Project Address	1310 Highland Drive, Bremerton	Sampled By	Sarah miller
Client Name	City of Bremerton	Purged By	Sarah miller

Casing Diameter: 2" ____ 4" ____ 6" ____ Other 1"

Depth to Water (feet)	8.0	Purge Vol. Meas.Method	grad. cylin.
Depth of Well (feet)		Date Purged	7/18/18
Reference Point (surveyors notch/etc)		Purge Time (from/to)	1655 - 1715
Date/Time Sampled	7/18/18 1715	Flow Rate (ml/min)	

Purge Volume Calculation: $(\pi r^2 h)(7.48\ gal/ft^3)$(# Casing volumes)
Purge Volume (gallons) for 2" = (0.16)(h)(#Cv); 4" = (0.653)(h)(#Cv); 6" = (1.48)(h)(#Cv)
Calculated Purge Volume (gallons) _____ Actual Purge Volume (gallons) _____

TIME (2400 hr)	WATER LEVEL (ft) ± 0.3	pH (units) ± 0.1	COND (mS/m) ± 3%	DO (mg/L) ±10%	TEMP °C	TURB. ±10% if > 10 NTU	ORP (mV) ± 10 mV	CUM. VOL. (gal)
1658	8.0	7.00	.023	12.65	19.93	N/A	-110.1	?

purged dry @ 16:38, wait for recovery

1715, only filled 2 vom, barely.

Purge Equipment	peristaltic pump	Sampling Equipment	" "
Laboratory	Onsite/ARI	Date Sent to Lab	7/19/18
Chain-of-Custody (yes/no)	yes	Field QC Sample Number	
Shipment Method		Split with (name(s)/organization)	

Well Integrity: OK
Remarks: very efferv., slight yellow/brown
Signature: _____ Page _____ of _____

Parametrix, Inc.

Groundwater Sampling Field Data Sheet

Well #: MW20R
Sample #: CHEV-GW-MW20R-0120

Project Number	236-2542-038	Date	7/19/18
Project Name	Former Chevron Property	Location	Evergreen Rotary Pk.
Project Address	1310 Highland Drive, Bremerton	Sampled By	S. Miller
Client Name	City of Bremerton	Purged By	S. Miller

Casing Diameter: 2" X 4" ____ 6" ____ Other ____

Depth to Water (feet)	6.56	Purge Vol. Meas.Method	grad. cyl.
Depth of Well (feet)		Date Purged	7/19/18
Reference Point (surveyors notch/etc)		Purge Time (from/to)	1225 - 1250
Date/Time Sampled	7.19.18/1245	Flow Rate (ml/min)	~200 ml/min

Purge Volume Calculation: $(\pi r^2 h)(7.48\ gal/ft^3)$(# Casing volumes)
Purge Volume (gallons) for 2" = (0.16)(h)(#Cv); 4" = (0.653)(h)(#Cv); 6" = (1.48)(h)(#Cv)
Calculated Purge Volume (gallons) _____ Actual Purge Volume (gallons) _____

TIME (2400 hr)	WATER LEVEL (ft) ± 0.3	pH (units) ± 0.1	COND (mS/m) ± 3%	DO (mg/L) ±10%	TEMP °C	TURB. ±10% if > 10 NTU	ORP (mV) ± 10 mV	CUM. VOL. ~~(gal)~~ liter
1230	6.57	7.13	.418	4.44	14.38	8.81	-103.8	1.0
1233	6.57	7.07	.417	4.25	14.39	8.82	-103.7	1.6
1236	6.60	7.03	.419	3.88	14.38	8.47	-103.9	2.2
1239	6.64	7.01	.418	3.80	14.37	8.39	-104.7	2.8
1242	6.65	6.95	.418	3.79	14.38	8.01	-105.4	3.4

Purge Equipment	peristaltic pmp	Sampling Equipment	" "
Laboratory	Onsite/ARI	Date Sent to Lab	7/19/19
Chain-of-Custody (yes/no)	yes	Field QC Sample Number	
Shipment Method	courier	Split with (name(s)/organization)	

Well Integrity good
Remarks Water started orange/red, but not murky, slight odor
Signature _____ Page ____ of ____

eventually ran clear

Parametrix, Inc.

Well #: MW21R
Sample #: Chev-gw-MW21R-0120

Groundwater Sampling Field Data Sheet

Project Number	236-2542-038	Date	7.19.18
Project Name	Former Chevron Property	Location	Evergreen Rotary Pk.
Project Address	1310 Highland Drive, Bremerton	Sampled By	S. Miller
Client Name	City of Bremerton	Purged By	S. Miller

Casing Diameter: 2" ____ 4" ____ 6" ____ Other 0.75"

Depth to Water (feet)	7.71'	Purge Vol. Meas.Method	grad. cyl.
Depth of Well (feet)		Date Purged	7/19/18
Reference Point (surveyors notch/etc)		Purge Time (from/to)	1130-1215
Date/Time Sampled	7.19.18 1205	Flow Rate (ml/min)	200ml/min

Purge Volume Calculation: $(\pi r^2 h)(7.48\ gal/ft^3)$(# Casing volumes)
Purge Volume (gallons) for 2" = (0.16)(h)(#Cv); 4" = (0.653)(h)(#Cv); 6" = (1.48)(h)(#Cv)
Calculated Purge Volume (gallons) _____ Actual Purge Volume (gallons) _____

TIME (2400 hr)	WATER LEVEL (ft) ± 0.3	pH (units) ± 0.1	COND (mS/m) ± 3%	DO (mg/L) ±10%	TEMP °C	TURB. ±10% if > 10 NTU	ORP (mV) ± 10 mV	CUM. VOL. (gal)
1135	7.84	7.24	1.534	6.00	13.81	8.56	-146.0	1.0
1138		7.18	1.604	1.82	13.69	4.62	-146.8	1.6
1141		7.17	1.651	1.18	13.63	4.30	-147.8	2.2
1144		7.16	1.640	1.05	13.58	4.31	-148.7	2.8
1147		7.15	1.657	0.97	13.57	4.20	-149.1	3.4
1200	7.71	7.15	1.696	0.95	13.58	4.11	-149.0	4.0

Purge Equipment	peristaltic pump	Sampling Equipment	" "
Laboratory	Onsite/ARI	Date Sent to Lab	7.19.18
Chain-of-Custody (yes/no)	yes	Field QC Sample Number	chev.gw.MW21R.1120
Shipment Method	courier	Split with (name(s)/organization)	

Well Integrity good
Remarks fairly clear, slight brown tint, strong odor, very effervescent
Signature _____ Page _____ of _____

Parametrix, Inc.

Well #: MW22R
Sample #: chev-gw-MW22R-0120

Groundwater Sampling Field Data Sheet

Project Number	236-2542-038	Date	7/19/18
Project Name	Former Chevron Property	Location	Evergreen Rotary Park
Project Address	1310 Highland Drive, Bremerton	Sampled By	S. Miller
Client Name	City of Bremerton	Purged By	S. Miller

Casing Diameter: 2" ____ 4" ____ 6" ____ Other 1"

Depth to Water (feet)	8.04	Purge Vol. Meas.Method	grad. cyl.
Depth of Well (feet)		Date Purged	7/19/18
Reference Point (surveyors notch/etc)		Purge Time (from/to)	0925 - 0950
Date/Time Sampled	7/19/18 0950	Flow Rate (ml/min)	~180 ml/mn

Purge Volume Calculation: $(\pi r^2 h)(7.48\ gal/ft^3)$(# Casing volumes)
Purge Volume (gallons) for 2" = (0.16)(h)(#Cv); 4" = (0.653)(h)(#Cv); 6" = (1.48)(h)(#Cv)
Calculated Purge Volume (gallons) _____ Actual Purge Volume (gallons) _____

took for addtl reading before sampling

TIME (2400 hr)	WATER LEVEL (ft) ± 0.3	pH (units) ± 0.1	COND (mS/m) ± 3%	DO (mg/L) ±10%	TEMP °C	TURB. ±10% if > 10 NTU	ORP (mV) ± 10 mV	CUM. VOL. ~~(gal)~~ liter
0928	8.04	6.88	.120	11.99	14.70	3.08	-36.3	0.6
0948		7.01	.111	12.14	14.89	2.11	-14.5	N/A

purged dry @ 0929, wait for recovery

sample at 0950, got all 5 VOAs & one amber 500ml, one amber 250ml

sampled NWTPH-Gx/BTEX (3 VOA), methane & Dx (one container), & ~~fe~~ ferrous iron

Purge Equipment	peristaltic pump	Sampling Equipment	" "
Laboratory	Onsite/ARI	Date Sent to Lab	7.19.
Chain-of-Custody (yes/no)	yes	Field QC Sample Number	
Shipment Method	courier	Split with (name(s)/organization)	

Well Integrity OK
Remarks brown water, some petro. odor
Signature _____ Page _____ of _____

Parametrix, Inc.

Well #: MW25
Sample #: Chev-gw-MW25-0120

Groundwater Sampling Field Data Sheet

Project Number	236-2542-038	Date	7/18/18
Project Name	Former Chevron Property	Location	evergreen rotary
Project Address	1310 Highland Drive, Bremerton	Sampled By	Sarah Miller
Client Name	City of Bremerton	Purged By	Sarah Miller

Casing Diameter: 2" X 4" ____ 6" ____ Other ____

Depth to Water (feet)	8.45	Purge Vol. Meas.Method	grad. cyl.
Depth of Well (feet)		Date Purged	7/18/18
Reference Point (surveyors notch/etc)		Purge Time (from/to)	1435
Date/Time Sampled	7/18/18 1500	Flow Rate (ml/min)	~160 ml/min

Purge Volume Calculation: $(\pi r^2 h)(7.48\ gal/ft^3)$(# Casing volumes)
Purge Volume (gallons) for 2" = (0.16)(h)(#Cv); 4" = (0.653)(h)(#Cv); 6" = (1.48)(h)(#Cv)
Calculated Purge Volume (gallons) _____ Actual Purge Volume (gallons) _____

TIME (2400 hr)	WATER LEVEL (ft) ± 0.3	pH (units) ± 0.1	COND (mS/m) ± 3%	DO (mg/L) ±10%	TEMP °C	TURB. ±10% if > 10 NTU	ORP (mV) ± 10 mV	CUM. VOL. ~~(gal)~~ liter
1440	8.70	6.34	.422	3.81	14.77	23.9	-105.8	0.8
1443	8.88	6.28	.466	1.27	14.51	18.7	-103.6	1.3
1446	8.93	6.28	.435	1.15	14.50	15.1	-103.0	1.8
1449	8.99	6.26	.380	1.11	14.51	12.3	-102.7	2.3
1452	9.05	6.25	.389	1.11	14.74	9.55	-101.7	2.8
1455	9.31	6.29	.399	1.07	14.67	8.01	-104.2	3.3

Purge Equipment	peristaltic pump	Sampling Equipment	" "
Laboratory	Onsite/ARI	Date Sent to Lab	7-19-18
Chain-of-Custody (yes/no)	yes	Field QC Sample Number	
Shipment Method	courier	Split with (name(s)/organization)	

Well Integrity good
Remarks slight odor, murky
Signature _____ Page _____ of _____

Parametrix, Inc.

Well #: MW26R
Sample #: chev-gw-MW26R-0120

Groundwater Sampling Field Data Sheet

Project Number	236-2542-038	Date	7/19/18
Project Name	Former Chevron Property	Location	Evergreen Rotary Park
Project Address	1310 Highland Drive, Bremerton	Sampled By	S. Miller
Client Name	City of Bremerton	Purged By	S. Miller

Casing Diameter: 2" ____ 4" ____ 6" ____ Other .75"

Depth to Water (feet)	9.42	Purge Vol. Meas.Method	grad cyl.
Depth of Well (feet)		Date Purged	7/19/18
Reference Point (surveyors notch/etc)		Purge Time (from/to)	1020-1045
Date/Time Sampled	7/19/18 1045	Flow Rate (ml/min)	~ 200 ml/min

Purge Volume Calculation: $(\pi r^2 h)(7.48\ gal/ft^3)$(# Casing volumes)
Purge Volume (gallons) for 2" = (0.16)(h)(#Cv); 4" = (0.653)(h)(#Cv); 6" = (1.48)(h)(#Cv)
Calculated Purge Volume (gallons) _____ Actual Purge Volume (gallons) _____

TIME (2400 hr)	WATER LEVEL (ft) ± 0.3	pH (units) ± 0.1	COND (mS/m) ± 3%	DO (mg/L) ±10%	TEMP °C	TURB. ±10% if > 10 NTU	ORP (mV) ± 10 mV	CUM. VOL. (gal)
1025	9.50	6.75	346.79	6.37	14.06	6.85	-53.7	1 L
1028		6.78	35.622	6.41	13.46	6.65	-55.3	1.6
1031		6.77	35.361	5.60	13.33	6.35	-75.6	2.2
1034		6.75	35.349	6.79	13.32	6.22	-67.1	2.8
1037		6.76	35.808	6.76	13.28	6.30	-68.6	3.4
1040	9.38	6.77	35.022	6.77	13.25	5.21	-78.0	4.0

Purge Equipment	peristaltic pump	Sampling Equipment	" "
Laboratory	Onsite/ARI	Date Sent to Lab	7.19.18
Chain-of-Custody (yes/no)	yes	Field QC Sample Number	
Shipment Method	courier	Split with (name(s)/organization)	

Well Integrity OK - missing a screw, box crumbling a little
Remarks very murkey, suspended solids, slight odor, slight effervesc. (large)
Signature _____ Page ____ of ____

possibly iron bacteria?

Parametrix, Inc.

Well #: MW27
Sample #: chev-gw-MW27-0120

Groundwater Sampling Field Data Sheet

Project Number	236-2542-038	Date	7/19/18
Project Name	Former Chevron Property	Location	Evergreen Botany Park
Project Address	1310 Highland Drive, Bremerton	Sampled By	S. Miller
Client Name	City of Bremerton	Purged By	S. Miller

Casing Diameter: 2" ____ 4" ____ 6" ____ Other 0.75"

Depth to Water (feet)	5.57'	Purge Vol. Meas.Method	grad. cyl.
Depth of Well (feet)		Date Purged	7.19.18
Reference Point (surveyors notch/etc)		Purge Time (from/to)	1305 - 1330
Date/Time Sampled	7.19.18/1320	Flow Rate (ml/min)	~200 ml/min

Purge Volume Calculation: $(\pi r^2 h)(7.48\ gal/ft^3)$(# Casing volumes)
Purge Volume (gallons) for 2" = (0.16)(h)(#Cv); 4" = (0.653)(h)(#Cv); 6" = (1.48)(h)(#Cv)
Calculated Purge Volume (gallons) _____ Actual Purge Volume (gallons) _____

TIME (2400 hr)	WATER LEVEL (ft) ± 0.3	pH (units) ± 0.1	COND (mS/m) ± 3%	DO (mg/L) ±10%	TEMP °C	TURB. ±10% if > 10 NTU	ORP (mV) ± 10 mV	CUM. VOL. ~~(gal)~~ liter
1310	5.57'	6.84	0.431	1.01	14.56	11.2	-86.6	1.0
1313		6.85	0.439	0.52	14.60	7.77	-95.2	1.6
1316		6.85	0.442	0.46	14.50	7.90	-99.2	2.2
1319	5.72	6.83	0.445	0.45	14.55	6.01	-100.4	2.8

Purge Equipment	peristaltic pump	Sampling Equipment	" "
Laboratory	Onsite/ARI	Date Sent to Lab	7.19.18
Chain-of-Custody (yes/no)	yes	Field QC Sample Number	
Shipment Method	courier	Split with (name(s)/organization)	

Well Integrity: good, lots of pen. clay coming up
Remarks: clear, odor is low,
Signature: _____ Page _____ of _____

Parametrix, Inc.

Well #: MW4R
Sample #: ~~MW4R-0120~~

Groundwater Sampling Field Data Sheet

Project Number	236-2542-038	Date	7/22/19
Project Name	Former Chevron Property	Location	EVERGREEN ROTARY PARK
Project Address	1310 Highland Drive, Bremerton	Sampled By	ARomey
Client Name	City of Bremerton	Purged By	ARomey

Casing Diameter: 2" ____ 4" ____ 6" ____ Other 1"

Depth to Water (feet)	9.91'	Purge Vol. Meas.Method	grad cyl.
Depth of Well (feet)	-	Date Purged	7/22/19
Reference Point (surveyors notch/etc)		Purge Time (from/to)	1515 - 1516
Date/Time Sampled	7/22/19 1540	Flow Rate (ml/min)	200ml/min

Purge Volume Calculation: $(\pi r^2 h)(7.48\ gal/ft^3)$(# Casing volumes)
Purge Volume (gallons) for 2" = (0.16)(h)(#Cv); 4" = (0.653)(h)(#Cv); 6" = (1.48)(h)(#Cv)
Calculated Purge Volume (gallons) _____ Actual Purge Volume (gallons) _____

TIME (2400 hr)	WATER LEVEL (ft) ± 0.3	pH (units) ± 0.1	COND (mS/m) ± 3%	DO (mg/L) ±10%	TEMP °C	TURB. ±10% if > 10 NTU	ORP (mV) ± 10 mV	CUM. VOL. (gal)
1516		Purged dry	-	Allowed to			Recover	UNTIL →
1540		Filled	3 vols	-	Allowed to		recover	
1610		Filled	2 more	vols				

Purge Equipment	Peristaltic Pump	Sampling Equipment	→
Laboratory	Onsite/~~ARI~~ FREMONT	Date Sent to Lab	7/23/19
Chain-of-Custody (yes/no)	Y	Field QC Sample Number	
Shipment Method	Courier	Split with (name(s)/organization)	-

Well Integrity OK
Remarks Yellow/brown/sl. odor / effervescent
Signature

Page 1 of 1

Parametrix, Inc.

Well #: MW10R
Sample #: MW10R-0120

Groundwater Sampling Field Data Sheet

Project Number	236-2542-038	Date	7/22/19
Project Name	Former Chevron Property	Location	EVERGREEN ROTARY PARK
Project Address	1310 Highland Drive, Bremerton	Sampled By	A. Romey
Client Name	City of Bremerton	Purged By	A. Romey

Casing Diameter: 2" ____ 4" ____ 6" ____ Other 1"

Depth to Water (feet)	10.02	Purge Vol. Meas.Method	grad. cyl.
Depth of Well (feet)	-	Date Purged	7/22/19
Reference Point (surveyors notch/etc)		Purge Time (from/to)	1429 - 1445
Date/Time Sampled	7/22/19 1450	Flow Rate (ml/min)	~ 220 ml/mn

Purge Volume Calculation: $(\pi r^2 h)(7.48\ gal/ft^3)$(# Casing volumes)
Purge Volume (gallons) for 2" = (0.16)(h)(#Cv); 4" = (0.653)(h)(#Cv); 6" = (1.48)(h)(#Cv)
Calculated Purge Volume (gallons) - Actual Purge Volume (gallons) -

TIME (2400 hr)	WATER LEVEL (ft) ± 0.3	pH (units) ± 0.1	COND ~~(mS/m)~~ µS/cm ± 3%	DO (mg/L) ±10%	TEMP °C	TURB. ±10% if > 10 NTU	ORP (mV) ± 10 mV	CUM. VOL. ~~(gal)~~ L
1439	-	6.47	376	1.33	15.18	4.43	-78.3	2.2
1442	-	6.45	376	1.28	15.40	2.01	-78.4	2.8
1445	-	6.44	376	1.26	15.37	1.11	-79.4	3.5
	9.91							

Purge Equipment	Peristaltic Pump	Sampling Equipment	S
Laboratory	Onsite/~~ARI~~ FREMONT	Date Sent to Lab	7/23/19
Chain-of-Custody (yes/no)	Y	Field QC Sample Number	
Shipment Method	COURIER	Split with (name(s)/organization)	-

Well Integrity OK
Remarks Clear, strong odor, slight effervescence
Signature

Parametrix, Inc.

Groundwater Sampling Field Data Sheet

Well #: MW11
Sample #: MW11-0160

Project Number	236-2542-038	Date	7/22/19
Project Name	Former Chevron Property	Location	Evergreen Romney Park
Project Address	1310 Highland Drive, Bremerton	Sampled By	A. Romney
Client Name	City of Bremerton	Purged By	A. Romney

Casing Diameter: 2" X 4" ____ 6" ____ Other ____

Depth to Water (feet)	8.60'	Purge Vol. Meas.Method	Grad. cyl.
Depth of Well (feet)	-	Date Purged	7/22/19
Reference Point (surveyors notch/etc)	N	Purge Time (from/to)	1342 - 1357
Date/Time Sampled	7/22/19 1400	Flow Rate (ml/min)	~ 160 ml/min

Purge Volume Calculation: $(\pi r^2 h)(7.48\ gal/ft^3)$(# Casing volumes)
Purge Volume (gallons) for 2" = (0.16)(h)(#Cv); 4" = (0.653)(h)(#Cv); 6" = (1.48)(h)(#Cv)
Calculated Purge Volume (gallons) _____ Actual Purge Volume (gallons) _____

TIME (2400 hr)	WATER LEVEL (ft) ± 0.3	pH (units) ± 0.1	COND ~~(mS/m)~~ ± 3%	DO (mg/L) ±10%	TEMP °C	TURB. ±10% if > 10 NTU	ORP (mV) ± 10 mV	CUM. VOL. ~~(gal)~~ L
								#
1351	9.32	6.26	411	2.46	14.26	10.6	-17.0	1.4
1354	9.45	6.28	412	2.49	14.53	9.86	-19.6	1.9
1357	9.52	6.28	415	2.39	14.99	7.22	-26.5	2.3

Purge Equipment	Peristaltic Pump	Sampling Equipment	→
Laboratory	Onsite/~~Kent~~ Fremont	Date Sent to Lab	7/23/19
Chain-of-Custody (yes/no)	Y	Field QC Sample Number	
Shipment Method	Courier	Split with (name(s)/organization)	-

Well Integrity OK
Remarks Slt effervescence
Signature _____ Page 1 of 1

Parametrix, Inc.

Well #: MW13R
Sample #: MW13R-0120

Groundwater Sampling Field Data Sheet

Project Number	236-2542-038	Date	7/23/19
Project Name	Former Chevron Property	Location	EVERGREEN ROTARY PARK
Project Address	1310 Highland Drive, Bremerton	Sampled By	A. Romey
Client Name	City of Bremerton	Purged By	A. Romey

Casing Diameter: 2" ____ 4" ____ 6" ____ Other 1"

Depth to Water (feet)	8.37	Purge Vol. Meas.Method	grad cyl
Depth of Well (feet)	-	Date Purged	7/23/19
Reference Point (surveyors notch/etc)	N	Purge Time (from/to)	0843 - 0846
Date/Time Sampled	7/23/19 1215	Flow Rate (ml/min)	200ml/mn

Purge Volume Calculation: $(\pi r^2 h)(7.48\ gal/ft^3)$(# Casing volumes)
Purge Volume (gallons) for 2" = (0.16)(h)(#Cv); 4" = (0.653)(h)(#Cv); 6" = (1.48)(h)(#Cv)
Calculated Purge Volume (gallons) ____ Actual Purge Volume (gallons) -

TIME (2400 hr)	WATER LEVEL (ft) ± 0.3	pH (units) ± 0.1	COND (mS/m) ± 3%	DO (mg/L) ±10%	TEMP °C	TURB. ±10% if > 10 NTU	ORP (mV) ± 10 mV	CUM. VOL. (gal)
0840	Purged DRY - will allow for Recovery & sample							
1215	Return to sample							
5	VOAs							

Purge Equipment	Peristaltic Pump	Sampling Equipment	
Laboratory	Onsite/~~APL~~ PROMONT	Date Sent to Lab	7/23/19
Chain-of-Custody (yes/no)	Y	Field QC Sample Number	
Shipment Method	COURIER	Split with (name(s)/organization)	-

Well Integrity OK
Remarks slightly yellow - effervescence
Signature

Parametrix, Inc.

Well #: MW20R
Sample #: MW20R-0120

Groundwater Sampling Field Data Sheet

Project Number	236-2542-038	Date	7/22/19
Project Name	Former Chevron Property	Location	Evergreen Rotary Park
Project Address	1310 Highland Drive, Bremerton	Sampled By	A. Romey
Client Name	City of Bremerton	Purged By	A. Romey

Casing Diameter: 2" X 4" ____ 6" ____ Other ____

Depth to Water (feet)	7.24'	Purge Vol. Meas.Method	Grad. cyl.
Depth of Well (feet)	-	Date Purged	7/22/19
Reference Point (surveyors notch/etc)	N	Purge Time (from/to)	1250 - 1306
Date/Time Sampled	7/22/19 1310	Flow Rate (ml/min)	200ml/min

Purge Volume Calculation: $(\pi r^2 h)(7.48\ gal/ft^3)$(# Casing volumes)
Purge Volume (gallons) for 2" = (0.16)(h)(#Cv); 4" = (0.653)(h)(#Cv); 6" = (1.48)(h)(#Cv)
Calculated Purge Volume (gallons) _____ Actual Purge Volume (gallons) _____

TIME (2400 hr)	WATER LEVEL (ft) ± 0.3	pH (units) ± 0.1	COND (~~mS~~/m) ± 3%	DO (mg/L) ±10%	TEMP °C	TURB. ±10% if > 10 NTU	ORP (mV) ± 10 mV	CUM. VOL. (~~gal~~) L
1300	7.24	6.60	436	1.34	14.62	6.82	-98.5	2.0
~~1303~~	7.24	6.60	436	1.44	14.91	5.44	-98.4	2.6
1306	7.24	6.61	436	1.55	14.87	5.62	-98.9	3.2

Purge Equipment: Peristaltic Pump → Sampling Equipment: _____

Laboratory: Onsite/~~ARI~~ Fremont
Chain-of-Custody (yes/no): Y
Shipment Method: Courier
Date Sent to Lab: 7/23/19
Field QC Sample Number: _____
Split with (name(s)/organization): _____

Well Integrity: OK
Remarks: SL odor
Signature: A. Romey
Page 1 of 1

Parametrix, Inc.

Well #: MW21R
Sample #: MW21R-0120

Groundwater Sampling Field Data Sheet

Project Number	236-2542-038	Date	7/23/19
Project Name	Former Chevron Property	Location	Evergreen Rotary Park
Project Address	1310 Highland Drive, Bremerton	Sampled By	ARomey
Client Name	City of Bremerton	Purged By	ARomey

Casing Diameter: 2" ____ 4" ____ 6" ____ Other 1"

Depth to Water (feet)	7.90	Purge Vol. Meas.Method	grad. cyl.
Depth of Well (feet)	-	Date Purged	7/23/19
Reference Point (surveyors notch/etc)	N	Purge Time (from/to)	1005 - 1027
Date/Time Sampled	7/23/19 1030	Flow Rate (ml/min)	200 ml/min

Purge Volume Calculation: $(\pi r^2 h)(7.48\ gal/ft^3)$(# Casing volumes)
Purge Volume (gallons) for 2" = (0.16)(h)(#Cv); 4" = (0.653)(h)(#Cv); 6" = (1.48)(h)(#Cv)
Calculated Purge Volume (gallons) _____ Actual Purge Volume (gallons) _____

TIME (2400 hr)	WATER LEVEL (ft) ± 0.3	pH (units) ± 0.1	COND (~~µS~~/m) ± 3%	DO (mg/L) ±10%	TEMP °C	TURB. ±10% if > 10 NTU	ORP (mV) ± 10 mV	CUM. VOL. (~~gal~~) L
1018	7.90	7.10	1676	5.09	14.08	10.9	-105.1	2.6
1021	-	6.99	1733	1.39	13.73	6.23	-113.1	3.2
1024	-	6.97	1739	1.64	13.69	4.45	-117.9	3.8
1027	-	6.96	1742	1.68	13.72	4.01	-121.1	4.4

Purge Equipment Peristaltic Pump → Sampling Equipment _____

Laboratory	Onsite/~~ARI~~ FREMONT	Date Sent to Lab	7/23/19
Chain-of-Custody (yes/no)	Y	Field QC Sample Number	MW21R-1120
Shipment Method	Courier	Split with (name(s)/organization)	-

7/23/19 1120

Well Integrity OK
Remarks Hydrocarbon odor / effervescent
Signature _____ Page 1 of 1

Parametrix, Inc.

Well #: MW22R
Sample #: MW22R-0120

Groundwater Sampling Field Data Sheet

Project Number	236-2542-038	Date	7/23/19
Project Name	Former Chevron Property	Location	Evergreen Rotary Park
Project Address	1310 Highland Drive, Bremerton	Sampled By	A. Romney
Client Name	City of Bremerton	Purged By	A. Romney

Casing Diameter: 2" ____ 4" ____ 6" ____ Other 1"

Depth to Water (feet)	8.89	Purge Vol. Meas.Method	grad. cyl.
Depth of Well (feet)	-	Date Purged	7/23/19
Reference Point (surveyors notch/etc)	N	Purge Time (from/to)	0853 – 0856
Date/Time Sampled	7/23/19 1205	Flow Rate (ml/min)	160ml/min

Purge Volume Calculation: $(\pi r^2 h)(7.48\ gal/ft^3)$(# Casing volumes)
Purge Volume (gallons) for 2" = (0.16)(h)(#Cv); 4" = (0.653)(h)(#Cv); 6" = (1.48)(h)(#Cv)
Calculated Purge Volume (gallons) _____ Actual Purge Volume (gallons) _____

TIME (2400 hr)	WATER LEVEL (ft) ± 0.3	pH (units) ± 0.1	COND (mS/m) ± 3%	DO (mg/L) ±10%	TEMP °C	TURB. ±10% if > 10 NTU	ORP (mV) ± 10 mV	CUM. VOL. (gal)
0856	Purged dry - will allow for Recovery then sample							
1205	Returned to sample							

Purge Equipment	Peristaltic Pump	Sampling Equipment	
Laboratory	Onsite/~~ARI~~ Fremont	Date Sent to Lab	7/23/19
Chain-of-Custody (yes/no)	Y	Field QC Sample Number	
Shipment Method	Courier	Split with (name(s)/organization)	-

Well Integrity OK
Remarks Black particulate; sl. odor
Signature

Page 1 of 1

Parametrix, Inc.

Well #: MW25
Sample #: ~~MW25~~-0120

Groundwater Sampling Field Data Sheet

Project Number	236-2542-038	Date	7/23/19
Project Name	Former Chevron Property	Location	EXCAVATOR ROTARY RACK
Project Address	1310 Highland Drive, Bremerton	Sampled By	A. Romey
Client Name	City of Bremerton	Purged By	A. Romey

Casing Diameter: 2" X 4" ____ 6" ____ Other ____

Depth to Water (feet)	9.19	Purge Vol. Meas.Method	Grad. Cyl.
Depth of Well (feet)		Date Purged	7/23/19
Reference Point (surveyors notch/etc)	N	Purge Time (from/to)	0910 - 0924
Date/Time Sampled	7/23/19 0930	Flow Rate (ml/min)	~ 180 ml/min

Purge Volume Calculation: $(\pi r^2 h)(7.48\ gal/ft^3)$(# Casing volumes)
Purge Volume (gallons) for 2" = (0.16)(h)(#Cv); 4" = (0.653)(h)(#Cv); 6" = (1.48)(h)(#Cv)
Calculated Purge Volume (gallons) _____ Actual Purge Volume (gallons) _____

TIME (2400 hr)	WATER LEVEL (ft) ± 0.3	pH (units) ± 0.1	COND ~~(mS/m)~~ µS/cm ± 3%	DO (mg/L) ±10%	TEMP °C	TURB. ±10% if > 10 NTU	ORP (mV) ± 10 mV	CUM. VOL. ~~(gal)~~ L
0915	9.52	6.35	618	2.22	13.61	18.1	-67.6	0.9
0918	9.70	6.34	592	2.02	13.72	12.3	-72.3	1.5
0921	10.00	6.32	607	1.97	13.77	9.83	-73.1	2.0
0924	10.18	6.32	621	1.93	13.77	8.62	-75.0	2.6

Purge Equipment	Peristaltic	Sampling Equipment	→
Laboratory	Onsite/~~ARI~~ FREMONT	Date Sent to Lab	7/23/19
Chain-of-Custody (yes/no)	Y	Field QC Sample Number	
Shipment Method	COURIER	Split with (name(s)/organization)	—

Well Integrity OK
Remarks
Signature

Parametrix, Inc.

Well #: MW26R
Sample #: _____

Groundwater Sampling Field Data Sheet

Project Number	236-2542-038	Date	7/23/19
Project Name	Former Chevron Property	Location	Chevron / Rotary Park
Project Address	1310 Highland Drive, Bremerton	Sampled By	AROMey
Client Name	City of Bremerton	Purged By	AROMey

Casing Diameter: 2" _____ 4" _____ 6" _____ Other 1"

Depth to Water (feet)	9.44'	Purge Vol. Meas.Method	grad cyl
Depth of Well (feet)	—	Date Purged	7/23/19
Reference Point (surveyors notch/etc)	N	Purge Time (from/to)	1113 - 1142
Date/Time Sampled	7/23/19 1150	Flow Rate (ml/min)	~ 200 ml/min

Purge Volume Calculation: $(\pi r^2 h)(7.48\ gal/ft^3)$(# Casing volumes)
Purge Volume (gallons) for 2" = (0.16)(h)(#Cv); 4" = (0.653)(h)(#Cv); 6" = (1.48)(h)(#Cv)
Calculated Purge Volume (gallons) _____ Actual Purge Volume (gallons) _____

TIME (2400 hr)	WATER LEVEL (ft) ± 0.3	pH (units) ± 0.1	COND (mS/m) ± 3%	DO (mg/L) ±10%	TEMP °C	TURB. ±10% if > 10 NTU	ORP (mV) ± 10 mV	CUM. VOL. (~~gal~~) L
1127	|	6.49	31.64	5.35	—	4.82	-36.8	2.8
1130	|	6.50	30.09	2.05	13.62	4.34	-33.5	3.4
1133	|	6.53	28.18	1.75	13.53	4.42	-37.4	4.0
1136	|	6.54	26.24	1.67	13.51	4.13	-44.3	4.6
1139	|	6.56	24.81	1.59	13.58	3.93	-50.3	5.2
1142	|	6.57	23.64	1.55	13.60	4.27	-53.8	5.8
	9.36'							

Purge Equipment	Peristaltic Pump	Sampling Equipment	
Laboratory	Onsite/~~ARI~~ Fremont	Date Sent to Lab	7/23/19
Chain-of-Custody (yes/no)	Y	Field QC Sample Number	—
Shipment Method	Courier	Split with (name(s)/organization)	

Well Integrity OK
Remarks Sl. odor, Sl effervescence
Signature _____ Page 1 of 1

Parametrix, Inc.

Well #: MW27
Sample #: MW27-0120

Groundwater Sampling Field Data Sheet

Project Number	236-2542-038	Date	7/22/19
Project Name	Former Chevron Property	Location	Evergreen Rotary Park
Project Address	1310 Highland Drive, Bremerton	Sampled By	ARamey
Client Name	City of Bremerton	Purged By	A Ramey

Casing Diameter: 2" ____ 4" ____ 6" ____ Other ~~4.5~~ 1"

Depth to Water (feet)	5.98	Purge Vol. Meas.Method	
Depth of Well (feet)		Date Purged	7/22/19
Reference Point (surveyors notch/etc)		Purge Time (from/to)	1132 - 1146
Date/Time Sampled	7/22/19 1150	Flow Rate (ml/min)	a 200ml/min

Purge Volume Calculation: $(\pi r^2 h)(7.48\ gal/ft^3)$(# Casing volumes)
Purge Volume (gallons) for 2" = (0.16)(h)(#Cv); 4" = (0.653)(h)(#Cv); 6" = (1.48)(h)(#Cv)
Calculated Purge Volume (gallons) _____ Actual Purge Volume (gallons) _____

TIME (2400 hr)	WATER LEVEL (ft) ± 0.3	pH (units) ± 0.1	COND ~~(mS/m)~~ ± 3%	DO (mg/L) ±10%	TEMP °C	TURB. ±10% if > 10 NTU	ORP (mV) ± 10 mV	CUM. VOL. ~~(gal)~~ L
1137	-	6.52	524	3.80	15.54	9.86	-84.7	1.0
1140	-	6.59	512	2.03	14.96	7.31	-99.5	1.6
1143	-	6.60	506	2.14	15.00	4.25	-102.5	2.2
1146	-	6.59	502	2.31	14.95	4.81	-102.2	2.8
	6.28							

Purge Equipment	Peristaltic Pump	Sampling Equipment	Peristaltic Pump
Laboratory	Onsite/~~ARI~~ Fremont	Date Sent to Lab	7/23/19
Chain-of-Custody (yes/no)	Y	Field QC Sample Number	-
Shipment Method	Courier	Split with (name(s)/organization)	-

Well Integrity OK
Remarks ~~RAS~~
Signature

PARAMETRIX Form 07-EN-215/Rev. 02/07

Field Report/Well Data

TO:

DATE	JOB NO.
7/22/19	233-1896-107
PROJECT: Former Chevron Property Long-Term Monitoring	
LOCATION: Bremerton, WA	
CONTRACTOR: PARAMETRIX	OWNER: City of Bremerton
WEATHER: SUNNY 80°F	TEMP ° at AM / ° at PM
PRESENT AT SITE: ADAM ROMSY (PMX)	

THE FOLLOWING WAS NOTED:

WN (WELL NUMBER)	Time	DTW (DEPTH TO WATER)	MP (MEASURE POINT)	TD (TOTAL DEPTH OF WELL)	WD (WELL DIAMETER)	Notes
MW27	1118	5.96'				
MW20R	1130	6.91'				
MW21R	1140	7.75'				
MW-11 ~~MW10R~~ AR	1142	8.61'				
MW10R ~~MW4R~~ AR	1144	9.72'				
MW25 ~~MW13R~~ AR	1147	9.05'				
MW4R	1149	9.79'				
~~MW~~ 13R	1150	7.82'				
MW22R	1152	8.45'				
MW26R	1155	9.40'				

TOC (Top of PVC Well Casing)

COPIES _____ SIGNED _____

Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

700 NE MULTNOMAH, SUITE 1000 | PORTLAND, OR 97232 | P 503.233.2400, 360.694.5020

TECHNICAL MEMORANDUM

DATE: August 30, 2018
TO: David Dinkuhn
FROM: Adam Romey
SUBJECT: Quality Assurance/Quality Control Review for Event 10
CC:
PROJECT NUMBER: 233-1896-107
PROJECT NAME: Former Chevron Property Remediation Performance Monitoring July 2018

Introduction

This technical memorandum summarizes the results of an internal quality assurance/quality control (QA/QC) review of analytical results for groundwater samples collected on July 18th and 19th, 2018. Eleven groundwater samples, including one field duplicate (CHEV-GW-MW21R-1120), and one trip blank, were submitted to OnSite Environmental, Inc. (Redmond, WA) for analysis (Reference 1807-133). Ferrous iron analyses were subcontracted to Analytical Resources, Inc. (Work Order 18G0224).

All samples were analyzed for gasoline/BTEX, diesel/lube oil, dissolved methane, dissolved manganese, nitrate, sulfate, alkalinity, chloride and total ferrous iron, with the following exceptions:

- CHEV-GW-MW22R-0120 was analyzed for gasoline/BTEX, diesel, ferrous iron, and dissolved methane only.
- CHEV-GW-MW13R-0120 and CHEV-GW-MW4R-0120 were analyzed for gasoline/BTEX and dissolved methane only.

Final laboratory data were submitted to Parametrix via a Tier II-type data report and EIM EDDs. All data and analytical QC elements were reviewed against laboratory and method QC criteria, and qualifiers were applied where judged appropriate.

DATA REVIEW SUMMARY

All samples collected were prepared and analyzed using standard methods. All analyses requested on the COC were conducted. No laboratory method or trip blank contamination was reported.

On-Site Environmental, Inc. noted the following:

- Hydrocarbons in the gasoline range impacted the diesel range result in sample CHEV-GW-MW25-0120.
- TPH diesel/lube oil sample extracts were treated with a sulfuric acid/silica gel cleanup procedure.
- Samples CHEV-GW-MW10R-0120, CHEV-GW-MW21R-0120, and CHEV-GW-MW21R-1120, hydrocarbons in the gasoline range (toluene-naphthalene) are present in the diesel range aliquot.

- The practical quantitation limit for diesel range hydrocarbons for samples CHEV-GW-MW10R-0120, CHEV-GW-MW21R-0120 and CHEV-GW-MW21R-1120 is elevated due to interferences present in the samples.

ARI noted the following:

- Samples CHEV-GW-MW11-0160, CHEV-GW-MW10R-0120, and CHEV-GW-MW25-0120 to be tested for ferrous iron were received out of recommended holding time.

A comparison of results between the sample and field duplicate results were within acceptable ranges of precision and no sample results were qualified.

CONCLUSION

Appropriate standard methods were used. No laboratory method blank contamination was observed. Analytical accuracy and precision were determined to be generally acceptable based on this review.

- All data reported should be considered valid as qualified and acceptable for further use.
- Results for ferrous iron in samples CHEV-GW-MW11-0160, CHEV-GW-MW10R-0120, and CHEV-GW-MW25-0120 will be qualified "J" as estimated due to analysis beyond recommended holding time.

Parametrix
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TECHNICAL MEMORANDUM

DATE: August 6, 2019
TO: David Dinkuhn
FROM: Lisa Gilbert
SUBJECT: Quality Assurance/Quality Control Review for Event 11
CC: Adam Romey
PROJECT NUMBER: 233-1896-107
PROJECT NAME: Former Chevron Property Remediation Performance Monitoring July 2019

Introduction

This technical memorandum summarizes the results of an internal quality assurance/quality control (QA/QC) review of analytical results for groundwater samples collected on July 22 and 23, 2019. Eleven groundwater samples, including one field duplicate (CHEV-GW-MW21R-1120), and one trip blank, were submitted to OnSite Environmental, Inc. (Redmond, WA) for analysis (Reference 1907-259). Ferrous iron analyses were subcontracted to Fremont Analytical.

All samples were analyzed for NWTPH-gasoline/BTEX, NWTPH-diesel/lube oil, dissolved methane, dissolved manganese, nitrate, sulfate, alkalinity, chloride and total ferrous iron, with the following exceptions:

- CHEV-GW-MW4R-0120, CHEV-GW-MW22R-0120, and CHEV-GW-MW13R-0120 were analyzed for NWTPH-gasoline/BTEX and dissolved methane only.

Final laboratory data were submitted to Parametrix via a Tier II-type data report and EIM EDDs. All data and analytical QC elements were reviewed against laboratory and method QC criteria, and qualifiers were applied where judged appropriate.

DATA REVIEW SUMMARY

All samples collected were prepared and analyzed using standard methods. All analyses requested on the COC were conducted. No laboratory method or trip blank contamination was reported.

On-Site Environmental, Inc. noted the following:

- Hydrocarbons in the gasoline range impacted the diesel range result in samples CHEV-GW-MW10R-120, CHEV-GW-MW25-120, CHEV-GW-MW21R-120, and CHEV-GW-MW21R-1120.
- TPH diesel/lube oil sample extracts were treated with a sulfuric acid/silica gel cleanup procedure.
- The practical quantitation limit for diesel range hydrocarbons for samples CHEV-GW-MW10R-0120, CHEV-GW-MW25-0120, CHEV-GW-MW21R-0120 and CHEV-GW-MW21R-1120 is elevated due to interferences present in the samples.

A comparison of results between the sample and field duplicate results were within acceptable ranges of precision and no sample results were qualified.

CONCLUSION

Appropriate standard methods were used. No laboratory method blank contamination was observed. Analytical accuracy and precision were determined to be generally acceptable based on this review.

- All data reported should be considered valid as qualified and acceptable for further use.
- Results for ferrous iron in all samples (CHEV-GW-MW27-0120, CHEV-GW-MW20R-0120, CHEV-GW-MW11-0160, CHEV-GW-MW10R-0120, CHEV-GW-MW25-0120, CHEV-GW-MW21R-0120, CHEV-GW-MW26R-0120, and CHEV-GW-MW21R-1120) will be qualified "J" as estimated due to analysis beyond recommended holding time.
- For all ferrous iron samples (CHEV-GW-MW27-0120, CHEV-GW-MW20R-0120, CHEV-GW-MW11-0160, CHEV-GW-MW10R-0120, CHEV-GW-MW25-0120, CHEV-GW-MW21R-0120, CHEV-GW-MW26R-0120, and CHEV-GW-MW21R-1120), initial or continuing calibration did not meet established acceptance criteria.