April 1, 2022

Washington State Department of Ecology
PO Box 47600
Olympia, Washington 98503

Attention: Arianne Fernandez

Subject: Post-Interim Action Groundwater Monitoring Progress Report – February 2022 Monitoring Event
Quiet Cove Site
Anacortes, Washington
Agreed Order No. DE 11346

INTRODUCTION

Pursuant to Agreed Order No. DE11346 and the Washington Department of Ecology (Ecology) approved Post-Interim Action Construction Groundwater Monitoring Plan (GeoEngineers 2021a), post-interim action groundwater monitoring activities are being performed by the Port of Anacortes (Port) to evaluate groundwater conditions for four quarters following completion of cleanup actions at the Quiet Cove Site (Site). The Site is situated along the shoreline of Guemes Channel at 202 O Avenue (the intersection of 2nd Street and O Avenue) in Anacortes, Washington as shown in the Vicinity Map (Figure 1).

In accordance with the Ecology-approved Interim Action Work Plan (IAWP; GeoEngineers 2020), petroleum hydrocarbon-related contamination from historical land use was excavated from part of the Site and transported for permitted landfill disposal between August 2020 to February 2021. Details of the Interim Action Cleanup are described in the Interim Action Construction Completion Report (Completion Report; GeoEngineers 2021b).

This progress report is being provided to document groundwater monitoring results for the second quarterly post-interim action groundwater monitoring event. Upon completion of the required quarterly monitoring (four quarters total), groundwater monitoring activities will be summarized in a final report and submitted to Ecology.

SUMMARY OF GROUNDWATER MONITORING ACTIVITIES

Monitoring Well Installation

Monitoring well MW-2A was installed on February 3, 2022, in accordance with the Post-Interim Action Construction Groundwater Monitoring Plan and the construction log for the new monitoring well is attached. As documented in the previous quarter progress report for the October 2021 sampling event monitoring well MW-2A was not previously installed due to an inadvertent discovery at this location. Following review by the Department of Archeological and Historical Preservation (DAHP) and local tribes, approval for installation of this well was granted by the applicable agencies.

Additionally, on February 3, 2022, the well monument for MW-3 was replaced by drillers to repair damage to the original monument resulting from vehicle traffic.

Monitoring well locations are shown on Figure 2.

Well Development

Prior to sampling, the new monitoring well, MW-2A, was developed to remove water that may have been introduced during drilling, to stabilize the filter pack and formation materials surrounding the well screen and to restore the hydraulic connection between the well screen and the surrounding soil. The well screen intervals were gently surged with a decontaminated surge block and purged of water. Development continued until a minimum of five casing volumes of water were removed and the turbidity of the discharged water was relatively low. Water removed from the wells during development activities was transferred to a 55-gallon drum for temporary storage pending off-site disposal at a permitted facility.

Sampling Procedures

Prior to sampling, groundwater levels were measured in each monitoring well using an electric water level indicator (e-tape). Measurements were made to the nearest 0.01 foot relative to the well casing rim elevations[1]. Measured groundwater levels are summarized in Table 1.

Groundwater samples were obtained from new (MW-1A, MW-2A MW-13, MW-14, and MW-15) and existing (MW-3, MW-4, and MW-8) monitoring wells (Figure 2) using low-flow/low-turbidity sampling techniques to minimize the potential for suspension of sediment in groundwater. Samples for shoreline wells were collected around low tide during the monitoring event. Groundwater was pumped at 0.5 liter per minute or less using a peristaltic pump through disposable polyethylene tubing that was placed at the screened interval. A water quality meter with flow-through cell was used to monitor groundwater parameters during purging. Groundwater samples were obtained after ambient groundwater conditions were achieved at each well location. Groundwater field parameters measured at the time of sampling are presented in Table 1.

Chemical Analysis

The groundwater samples that were collected were submitted to OnSite Environmental, Inc. in Redmond, Washington for a combination of the following chemical analysis:

- Gasoline-range petroleum hydrocarbons by Ecology Method NWTPH-Gx;
- Diesel- and heavy oil-range petroleum hydrocarbons by Ecology Method NWTPH-Dx with and without the silica gel cleanup preparation method;
- Volatile organic compounds (VOCs) including benzene, toluene, ethylbenzene, and xylenes (BTEX), n-hexane, methyl tert-butyl ether (MTBE), ethylene dibromide (EDB) and ethylene dichloride (EDC) by United States Environmental Protection Agency (EPA) Method 8260;
- Total and dissolved metals including arsenic, cadmium, chromium, lead, and mercury by EPA Method 6000/7000 series;
- Total alkalinity by SM 2420 B-97;

[1] The survey for the new monitoring well rim casing elevations is currently pending.

- Ferrous iron by SM 3500-Fe B-97;
- Nitrate and sulfate by EPA 300.0;
- Dissolved manganese by EPA 6020A; and
- Dissolved methane by EPA RSK-175.

Groundwater analytical results from the February 2022 groundwater monitoring event are summarized in Table 1. Analytes exceeding the preliminary screening levels during one or more post-interim action groundwater monitoring event, including diesel- and heavy oil-range total petroleum hydrocarbons (TPH) and benzene have been plotted on graphs to present groundwater trends over time. Trend plots comparing the relationship between gasoline-range TPH and benzene are shown on Figure 3. Trend plots for diesel- and heavy oil-range TPH are shown on Figure 4. Table 1 includes historical groundwater analytical data that is presented in the trend plots.

LIMITATIONS

This progress report has been prepared for the exclusive use of the Port of Anacortes and the Washington State Department of Ecology. No other party may rely on the product of our services unless we agree in advance and in writing to such reliance. Any use of information, conclusions, and recommendations provided herein for extensions of the project or for any other project, without review and written authorization by GeoEngineers, Inc., shall be at the user's sole risk. Any unauthorized use of (or reliance on) this report shall release GeoEngineers from any liability resulting from such use (or reliance). Within the limitations of scope, schedule, and budget, GeoEngineers, Inc.'s respective services have been provided in a manner consistent with that level of care and skill exercised by members of the profession currently practicing in the same locality under similar conditions as this project. No warranty or other conditions, expressed or implied, should be understood. GeoEngineers, Inc. assumes no responsibility for any consequence arising from any information or condition that was concealed, withheld, misrepresented, or otherwise not fully disclosed or available.

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REFERENCES

GeoEngineers, Inc. 2020. Interim Action Work Plan; Quiet Cove Site; Anacortes, Washington; Ecology Agreed Order No. DE 11346, GeoEngineers File No. 5147-024-07, January 9, 2020.

GeoEngineers, Inc. 2021a. Post-Interim Action Construction Groundwater Monitoring Plan; Quiet Cove Site; Anacortes, Washington; Ecology Agreed Order No. DE 11346, GeoEngineers File No. 5147-024-10, August 19, 2021.

GeoEngineers, Inc. 2021b. Interim Action Construction Completion Report; Quiet Cove Interim Action; Anacortes, Washington; Ecology Agreed Order No. DE 11346, GeoEngineers File No. 5147-024-10, June 22, 2021.

Groundwater monitoring activities will continue to be completed by the Port to evaluate post-interim action groundwater conditions.

Sincerely,

Port of Anacortes

Attachments:

Table 1. Post-Interim Action Groundwater Field Parameters, Groundwater Levels and Chemical Analytical Data

Figure 1. Vicinity Map

Figure 2. Groundwater Sampling Locations

Figure 3. Groundwater Summary - Gasoline-Range Hydrocarbons and Benzene

Figure 4. Groundwater Summary – Diesel- and Heavy Oil-Range Hydrocarbons

Attachment 1. Well Completion Log MW-2A

cc: Brad Tesch (1) Port of Anacortes

Tim Bishop (1) Chevron Environmental Management and Real Estate Co. (CEMREC)

TABLES

Table 1

Post-Interim Action Groundwater Field Parameters, Groundwater Levels and Chemical Analytical Data

Quiet Cove Site

Anacortes, Washington

Sample Location[1]		MW-1					MW-1A		MW-2					MW-2A	MW-3						MW-4							MW_8						MW-13		MW-14		MW-15	
Sample Identification	Preliminary Screening Level[2]	MW-1-7.1.14	MW-1_110917	MW-1_031918	MW-1_103118	MW-1_060519	MW-1A_102521	MW-1A_020222	QC-MW-2-7.1.14	MW-2-110917	MW-2-032018	MW-2_103118	MW-2_060419	MW-2A_020722	MW-3-101817	MW-3-032018	MW-3_103018	MW-3_060419	MW-3_102521	MW-3_020722	QC-MW-4-7.1.14	MW-4-101817	MW-4-031918	MW-4_102918	MW-4_060519	MW-4_102521	MW-4_020322	MW-8-110917	MW-8-031918	MW-8_102918	MW-8_060519	MW-8_102521	MW-8_020122	MW-13_102521	MW-13_020222	MW-14_102521	MW-14_020222	MW-15_102521	MW-15_020322
Date Sampled		07/01/14	11/09/17	03/19/18	10/31/18	06/05/19	10/25/21	02/02/22	7/1/2014	11/09/17	03/20/18	10/31/18	06/04/19	02/07/22	10/18/17	03/20/18	10/30/18	06/04/19	10/25/21	02/07/22	7/1/2014	10/18/17	03/19/18	10/29/18	06/05/19	10/25/21	02/03/22	11/09/17	03/19/18	10/29/18	6/5/19	10/25/21	02/01/22	10/25/21	02/02/22	10/25/21	02/02/22	10/25/21	02/03/22
Field Measured Parameters																																					
Top of Casing Elevation[3] (feet NAVD88)	NE	--	11.91	11.91	11.91	--	12.49	12.49	--	12.01	12.01	12.01	--	12.20	12.42	12.42	12.42	--	12.33	12.33	--	12.43	12.43	12.43	--	12.34	12.34	13.13	13.13	13.13	--	13.58	13.58	11.94	11.94	12.14	12.14	12.20	11.20
Depth to Groundwater[4] (feet)	NE	--	3.93	4.56	4.35	--	4.26	4.76	--	5.12	5.48	5.70	--	4.93	6.32	5.82	6.21	--	4.91	5.78	--	5.68	5.62	5.71	--	4.54	6.30	4.60	4.89	5.97	--	4.06	4.50	3.91	4.56	1.70	4.76	4.38	4.78
Groundwater Elevation (feet NAVD88)	NE	--	7.98	7.35	7.56	--	8.23	7.73	--	6.89	6.53	6.31	--	7.27	6.10	6.60	6.21	--	7.42	6.55	--	6.75	6.81	6.72	--	7.80	6.04	8.53	8.24	7.16	--	9.52	9.08	8.03	7.38	10.44	7.38	7.82	6.42
pH	NE	--	7.46	5.89	6.33	--	6.67	7.02	--	7.41	6.21	6.55	--	6.88	6.36	6.21	6.61	--	6.51	5.90	--	6.15	6.05	6.04	--	6.49	8.32	7.26	6.49	6.78	--	6.91	6.41	7.12	7.15	7.96	6.67	6.23	6.63
Conductivity (µS/cm)	NE	--	195	132	162.90	--	0.55	0.46	--	493	362	452.70	--	0.47	740	520	1457.00	--	1.38	0.26	--	860	367	528.00	--	0.63	0.16	567	283	324.60	--	0.37	0.36	0.52	0.37	0.51	0.93	1.73	1.33
Turbidity (NTU)	NE	--	4.0	3.3	10.0	--	4.89	3.50	--	3.8	4.8	7.63	--	17.1	9.3	6.8	8.5	--	12.1	14.2	--	5.0	8.5	10.5	--	5.41	14.20	5.7	2.7	120.61	--	15.1	9.1	3.91	4.25	14.3	12.8	4.44	10.90
Dissolved Oxygen (mg/l)	NE	--	1.27	1.53	2.99	--	0.14	0.53	--	0.28	2.02	1.07	--	3.35	0.40	0.11	0.76	--	0.11	1.65	--	0.06	0.16	0.90	--	0.55	5.01	0.28	0.22	0.87	--	0.16	1.09	0.16	0.68	1.91	1.48	0.18	0.52
Temperature (°C)	NE	--	11.5	8.0	13.3	--	14.3	10.4	--	13.5	9.8	14.1	--	9.3	15.0	10.9	15.3	--	15.4	10.8	--	15.4	11.1	15.2	--	15.5	7.8	15.0	10.3	16.0	--	15.8	10.6	14.1	9.3	13.8	10.8	14.5	8.6
Total Dissolved Solids (mg/l)	NE	--	171.0	126.7	136.0	--	448.5	408.6	--	411.5	332.8	367.0	--	438.3	591.5	468.0	1170.0	--	1150.4	231.4	--	682.5	324.6	423.0	--	500.5	156.6	294.5	260.0	259.0	--	295.1	331.4	429.0	342.6	423.0	832.0	1384.9	1258.5
Oxidation Reduction Potential (mV)	NE	--	113.9	39.2	31.4	--	-35.1	20.9	--	93.2	70.1	-22.4	--	16.2	75.6	64.9	-78.7	--	-8.5	49.8	--	66.5	76.9	-82.6	--	70.1	35.1	30.8	19.4	-65.0	--	-40.1	62.9	-42.3	29.8	137.4	126.8	-18.0	47.1
Salinity (ppt)	NE	--	0.13	0.09	0.10	--	0.34	0.31	--	0.31	0.24	0.27	--	0.33	0.45	0.35	0.92	--	0.91	0.17	--	0.52	0.24	0.32	--	0.38	0.11	0.22	0.19	0.19	--	0.22	0.25	0.32	0.26	0.32	0.64	1.12	0.99
Conventionals																																							
Alkalinity as CaCO3 (mg/L as CaCO3)	NE	--	--	--	**69**	**124**	**310**	**280**	--	--	--	**253**	**326**	**310**	--	--	**406**	**234**	**190**	**130**	--	--	--	**168**	**192**	**200**	**190**	--	--	**185**	**238**	**210**	**260**	**270**	**220**	**120**	**100**	**570**	**440**
Iron, Ferrous, Fe+2 (mg/L)	NE	--	--	--	**0.598**	**1.21**	**2.38 J**	**2.86**	--	--	--	**4.21**	**--**	**1.01**	--	--	**3.05**	**--**	**0.936**	**0.595**	--	--	--	**16.7**	**12.7**	**0.152**	**3.38**	--	--	**5.61**	**17.7**	**15**	**24.3**	**1.66**	**2.92 J**	0.1 U	**0.29**	**51.2**	**53.4**
Nitrate (mg/L)	NE	--	--	--	**0.501**	0.100 U	0.025 U	**0.549 J**	--	--	--	**1.73**	**0.119**	**0.584 J**	--	--	0.100 U	**0.100 U**	**0.234**	**1.3 J**	--	--	--	**0.454**	0.100 U	**1.28**	0.5 U	--	--	**0.242**	0.100 U	**0.098**	**1.14**	**0.053**	0.1 U	**1.55**	**0.979**	0.025 U	**0.415 J**
Sulfate (mg/L)	NE	--	--	--	**25.8**	**4.05**	**7.14**	**16.6**	--	--	--	**20.7**	**6.11**	**54.5**	--	--	**24.2**	**635**	**91**	**33.5**	--	--	--	**72.2**	**51.8**	**42.6**	**6.82**	--	--	**10.5**	**4.23**	**4.69**	**9.08**	**56.6**	**40.2**	**176**	**19**	**1.48**	**4.13**
Methane (ug/L)	NE	--	--	--	**264**	**1,000**	**730**	**800**	--	--	--	**2,830**	**2,660**	**220**	--	--	**9,880**	**6,000**	**710**	**140**	--	--	--	**7,560**	**2920**	**420**	**1,700**	--	--	**1,000**	**1920**	**430**	**1000**	**440**	**490**	**3.9**	**28**	**10,000**	**14,000**
Total Metals by EPA 200.8/1631 (µg/L)																																						
Arsenic	8[5]	--	**2.42 J**	**0.86**	--	--	3.3 U	3.3 U	--	**7.69**	**5.69**	--	--	**4.6**	**--**	**1.84**	**2.51**	**--**	**3.7**	3.3 U	**--**	**1.5**	**1.97**	**--**	**--**	3.3 U	3.3 U	**5.96**	**6.75**	**--**	**--**	**6.9**	**6.6**	**3.6**	3.3 U	3.3 U	**6.2**	**6.2**	3.3 U
Cadmium	8.8	--	**0.0420 J**	0.100 U	--	--	4.4 U	4.4 U	--	**0.0410 J**	**0.0350 J**	--	--	4.4 U	--	**0.0710 J**	**0.0470 J**	--	4.4 U	4.4 U	--	0.500 U	0.118	--	--	4.4 U	4.4 U	0.100 U	0.100 U	--	--	4.4 U	4.4 U	4.4 U	4.4 U	4.4 U	4.4 U	4.4 U	4.4 U
Chromium	50	--	**0.520 J**	**0.323 J**	--	--	11 U	11 U	--	**2.23**	**1.28**	--	--	11 U	--	**7.32**	**4.9**	--	11 U	11 U	--	**3.29**	**0.394 J**	--	--	11 U	11 U	**1.92**	**1.09**	--	--	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
Lead	2.1	--	**0.403 J**	**0.361**	--	--	1.1 U	1.1 U	--	**0.261**	**0.204**	--	--	1.1 U	--	**0.227**	**0.276**	--	1.1 U	1.1 U	--	**3.75**	**0.0850 J**	--	--	1.1 U	1.1 U	**0.164**	**0.143**	--	--	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
Mercury	0.025	--	0.020 U	0.020 U	--	--	0.025 U	0.025 U	--	0.020 U	0.020 U	--	--	0.025 U	--	0.020 U	0.020 U	--	0.025 U	0.025 U	--	0.020 U	0.020 U	--	--	0.025 U	0.025 U	0.020 U	0.020 U	--	--	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U
Dissolved Metals by EPA 200.8/1631 (µg/L)																																						
Arsenic	8[5]	--	**1.2**	**0.614**	--	--	3.0 U	3.0 U	--	**7.57**	**4.66**	--	--	**3.8**	**1.13**	**1.42**	--	**--**	**3.2**	3.0 U	**--**	**1.13**	**1.42**	--	--	3.0 U	3.0 U	**6.29**	**3.91**	**--**	**--**	**5.6**	**3.5**	3.0 U	3.0 U	3.0 U	**4.7**	**5.4**	3.0 U
Cadmium	8.8	--	**0.0360 J**	**0.100 U**	--	--	4.0 U	4.0 U	--	0.100 U	0.100 U	--	--	4.0 U	0.100 U	0.100 U	--	--	4.0 U	4.0 U	--	0.100 U	0.100 U	--	--	4.0 U	4.0 U	0.100 U	0.100 U	--	--	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U
Chromium	50	--	**0.228 J**	**0.333 J**	--	--	10 U	10 U	--	**1.58**	**0.99**	--	--	10 U	**6.28**	**4.55**	--	--	10 U	10 U	--	**6.28**	**4.55**	--	--	10 U	10 U	**1.41**	**1.13**	--	--	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Lead	2.1	--	0.100 U	**0.209**	--	--	1.0 U	1.0 U	--	0.100 U	0.0860 J	--	--	1.0 U	**0.0950 J**	**0.113**	--	--	1.0 U	1.0 U	--	**0.0950 J**	**0.113**	--	--	1.0 U	1.0 U	0.100 U	0.100 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
Manganese	NE	--	--	--	**48.1**	**102**	**120**	**100**	--	**--**	**--**	**156**	**238**	**160**	--	--	**292**	--	**59**	**24**	--	--	--	**2570**	**1800**	**66**	**1600**	--	--	**1,130**	**2,450**	**2,000**	**2500**	**190**	**150**	**320**	**55**	**3,900**	**4800**
Mercury	0.025	--	0.020 U	0.020 U	--	--	0.025 U	0.025 U	--	0.020 U	0.020 U	--	--	0.025 U	0.020 U	0.020 U	--	--	0.025 U	0.025 U	--	0.020 U	0.020 U	--	--	0.025 U	0.025 U	0.020 U	0.020 U	--	--	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U
Petroleum Hydrocarbons by NWTPH-G/Dx (µg/L)																																						
Gasoline-Range Hydrocarbons	800[6]	100 U	100 U	100 U	--	--	100 U	100 U	**110**	100 U	100 U	**--**	**--**	100 U	**234**	100 U	--	--	100 U	100 U	**510**	**447**	100 U	--	--	100 U	100 U	**251**	**109**	**117**	**970**	**150**	**120**	100 U	100 U	100 U	100 U	100 U	110 U
Diesel-Range Hydrocarbons	500	**860**	**665 J**	**388**	**1,090**	**614**	**650**	**310**	**2,100**	**3,530**	**1,600**	**1,210**	**2600**	210 U	**1,940**	**1,270**	**1,420**	**1,080**	**600**	**580**	**1,300 J**	**1,460**	**293**	**584**	**391**	**210**	210 U	**828**	**455**	**415**	**881**	**530**	**650**	**470**	**210**	210 U	210 U	**1,600**	**1,200**
Heavy Oil-Range Hydrocarbons	500	410 U	200 UJ	200 U	**359**	**249**	**450**	**260**	**980**	**1,080**	**700**	**616**	**1210**	210 U	**461**	**279**	200 U	**202**	**460**	**270 J**	410 U	**285**	200 U	200 U	200 U	**230**	210 U	**342**	200 U	200 U	**264**	**400**	**730**	**560**	**230**	210 U	210 U	**1,100**	**520**
Petroleum Hydrocarbons by NWTPH-Dx with SGC (µg/L)																																						
Diesel-Range Hydrocarbons	500	--	--	--	100 U	--	200 U	210 U	--	--	--	100 U	--	210 U	--	--	100 U	--	220 U	220 U	--	--	--	100 U	--	200 U	210 U	--	--	100 U	--	200 U	200 U	200 U	210 U	210 U	210 U	210 U	210 U
Heavy Oil-Range Hydrocarbons	500	--	--	--	200 U	--	200 U	210 U	--	--	--	200 U	--	210 U	--	--	200 U	--	220 U	220 U	--	--	--	200 U	--	200 U	210 U	--	--	200 U	--	200 U	200 U	200 U	210 U	210 U	210 U	210 U	210 U
Volatile Organic Compounds (VOCs) by EPA 8360 (µg/L)																																						
1,2-Dibromoethane (EDB)	0.3	--	0.20 U	0.20 U	--	--	0.20 U	0.20 U		0.20 U	0.20 U	--	--	0.20 U	0.20 U	0.20 U	0.20 U	--	0.20 U	0.20 U	--	0.20 U	0.20 U	--	--	0.20 U	0.20 U	0.20 U	0.20 U	--	--	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,2-Dichloroethane (EDC)	4.20	--	0.20 U	0.20 U	--	--	0.35 U	0.20 U		0.20 U	0.20 U	--	--	0.20 U	0.20 U	0.20 U	0.20 U	--	--	0.35 U	0.20 U	--	0.20 U	0.20 U	--	--	0.35 U	0.20 U	0.20 U	**0.15 J**	--	--	0.35 U	0.20 U	**0.44**	**0.32**	0.35 U	0.20 U	0.35 U	0.20 U
Benzene	2.4	1 U	0.20 U	0.20 U	--	--	0.20 U	0.20 U	1 U	0.20 U	0.20 U	--	--	0.20 U	0.20 U	0.20 U	--	--	0.20 U	0.20 U	1 U	**0.11 J**	0.20 U	--	--	0.20 U	0.20 U	**5.83**	**3.03**	**2.19**	**13.9**	**7.4**	**6.3**	**4**	**2.7**	0.20 U	0.20 U	0.20 U	0.20 U
Ethylbenzene	130	1 U	0.20 U	0.20 U	--	--	0.20 U	0.20 U	1 U	0.20 U	0.20 U	--	--	0.20 U	0.20 U	0.20 U	--	--	0.20 U	0.20 U	1 U	0.20 U	0.20 U	--	--	0.20 U	0.20 U	**0.24**	0.20 U	0.06 J	**1.51**	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Hexane	8	--	0.20 U	0.20 U	--	--	1.0 U	1.0 U		0.20 U	0.20 U	--	--	1.0 U	0.20 U	0.20 U	--	--	1.0 U	1.0 U	--	0.20 U	0.20 U	--	--	1.0 U	1.0 U	**4.4**	**1.32**	--	--	**1.3**	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Methyl t-butyl ether (MTBE)	610	--	0.50 U	0.50 U	--	--	0.20 U	0.20 U		0.50 U	0.50 U	--	--	0.20 U	0.50 U	0.50 U	--	--	0.20 U	0.20 U	--	0.50 U	0.50 U	--	--	0.20 U	0.20 U	0.50 U	0.50 U	--	--	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Toluene	520	1 U	0.20 U	0.20 U	--	--	1.0 U	1.0 U	1 U	0.20 U	0.20 U	--	--	1.0 U	**0.04 J**	0.20 U	--	--	1.0 U	1.0 U	1 U	**0.09 J**	0.20 U	--	--	1.0 U	1.0 U	**0.54**	**0.12 J**	0.16 J	**3.35**	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Xylene, m-, p-	NE	--	--	--	--	--	0.40 U	0.40 U		--	--	--	--	0.40 U	--	--	--	--	0.40 U	0.40 U	--	--	--	--	--	0.40 U	0.40 U	--	--	--	--	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U
Xylene, o-	NE	--	--	--	--	--	0.20 U	0.20 U		--	--	--	--	0.20 U	--	--	--	--	0.20 U	0.20 U	--	--	--	--	--	0.20 U	0.20 U	--	--	--	--	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Total Xylenes	310	1 U	0.40 U	0.40 U	--	--	0.40 U	0.40 U	1 U	0.40 U	0.40 U	--	--	0.40 U	**0.25**	0.40 U	--	--	0.40 U	0.40 U	1 U	**0.21**	0.40 U	--	--	0.40 U	0.40 U	**0.64**	**0.11**	**0.19**	**1.56**	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U

Notes:

[1] Sample locations are shown on Figure 2.

[2] Preliminary screening levels referenced from the Post Interim Action Construction Groundwater Monitoring Plan (GeoEngineers, 2021).

[3] Vertical Datum is NAVD88 (US Survey Feet Units). Survey completed by Pacific Surveying and Engineering, Inc. on March 14, 2022.

[4] Depth measured from top of casing.

[5] The preliminary screening level for arsenic has been updated based on Ecology Publication 14-09-044 for Natural Background Groundwater Arsenic Concentrations in Washington State (Ecology 2022) for the Puget Sound Region.

[6] Preliminary screening level for gasoline-range petroleum hydrocarbons is 800 µg/L when benzene is present and 1,000 µg/L when not present.

µS/cm = microsiemens per centimeter

NTU = Nephelometric Turbidity Unit

mV = millivolt

C = Celsius

ppt = parts per thousand

mg/L = milligram per liter

µg/L = microgram per liter

µS/cm = microseimens per centimeter

NE = Not Established

SGC = Silica Gel Cleanup

-- = Analyte Not Analyzed

U = The analyte was not detected at a concentration greater than the value identified.

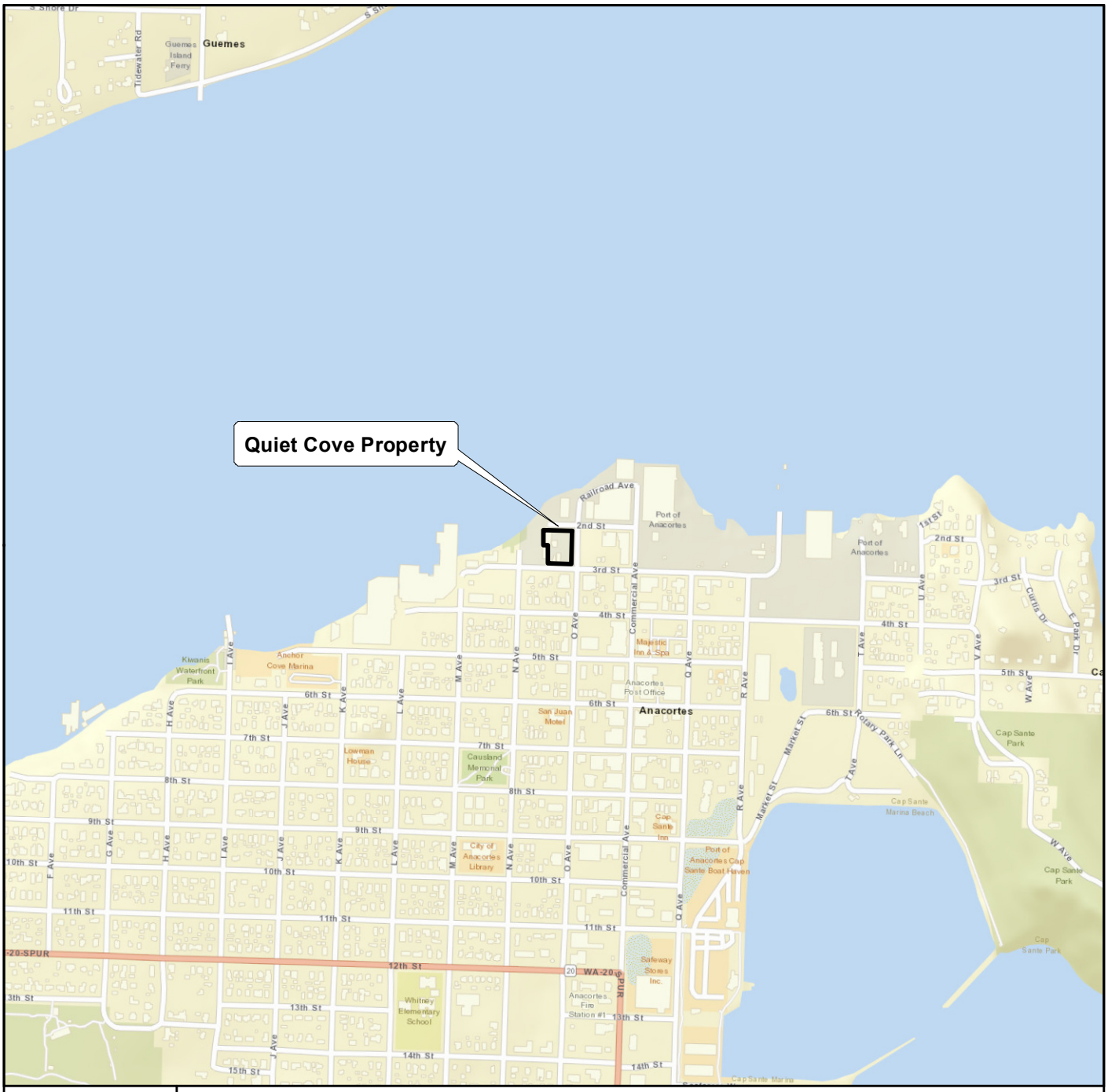
J = The analyte was detected and the detected concentration is considered an estimate.

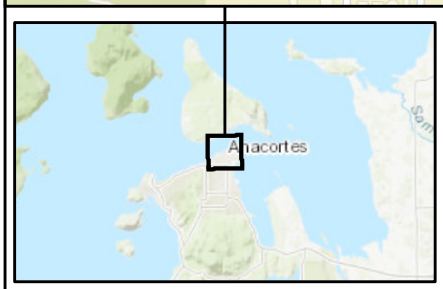
Yellow shading indicates that the identified concentration is greater than the preliminary screening level.

Blue shading indicates that the practical quantitation limit (PQL) is above screening level.

Bold font type indicates the analyte was detected at the reported concentration.

FIGURES





N
W E
S

1,000 0 1,000

Feet

Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
3. It is unlawful to copy or reproduce all or any part thereof, whether for personal use or resale, without permission.

Data Sources: ESRI Data & Maps, Street Data 2013.

Transverse Mercator, Zone 10 N North, North American Datum 1983
North arrow oriented to grid north

Vicinity Map

Quiet Cove Site
Anacortes, Washington

GeoEngineers

Figure 1

Office: Redmond Path:P:\5\5147024\GIS\MXD\0514702411_F1_VM.mxd Map Revised: 12/9/2021 MSA

Legend

- Port of Anacortes Properties at Quiet Cove Site
- 10 — Contour (Feet, NAVD 88)
- Interim Action Remedial Excavation Horizontal Limits
- Final Interim Action Excavation Sidewalls with the Presence of Petroleum Hydrocarbon-Related Contamination Exceeding Site Remediation Objectives
- MW-6 — Existing Monitoring Well Location
- MW-2 — Monitoring Well Decommissioned During Interim Action Construction
- Inferred groundwater flow direction
- Post Interim Action Groundwater Monitoring Location

Notes:

1. Interim action excavation limit based on surveys completed by Larry Steele & Associates, Inc. Dated 11/02/2020.
2. The locations of all features shown are approximate.
3. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Base survey by Sound Development Group on 10/11/2017
Imagery from Google Earth Pro dated 8/15/2020.

Horizontal Datum: NAD83 Washington State Planes, North Zone, US Foot

Vertical Datim: North American Vertical Datum, 1988, US Foot

N W E S

50 0 50
Feet

Groundwater Sampling Locations

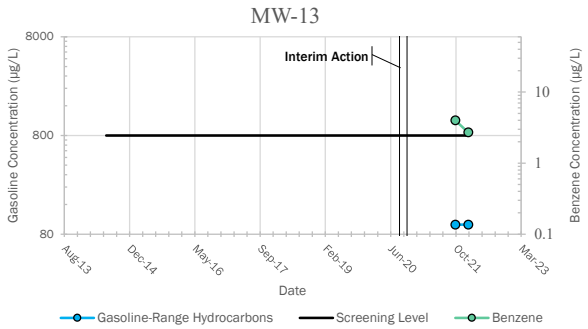
Quiet Cove Site
Anacortes, Washington

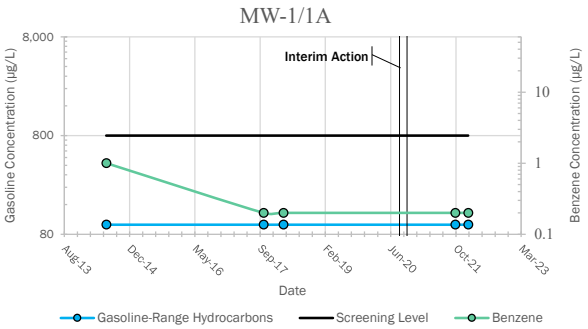
GeoEngineers

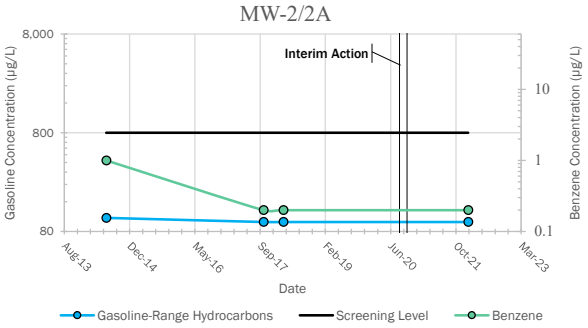
Figure 2

P:\5\5147024\CAD\11\Post Interim Action Construction Groundwater Monitoring\5147024111_F02_Groundwater Monitoring Well Sampling Locations.dwg TAB:F02 Date Exported: 03/02/22 - 11:21 by mwoods

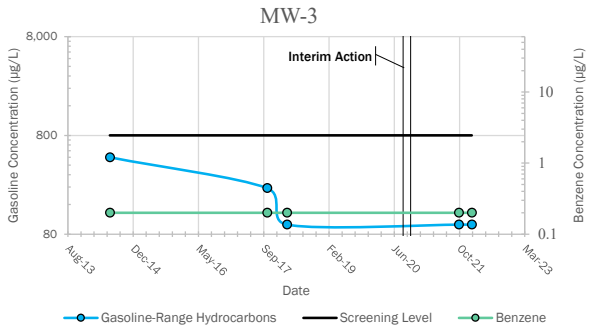
Shoreline Area Monitoring Wells

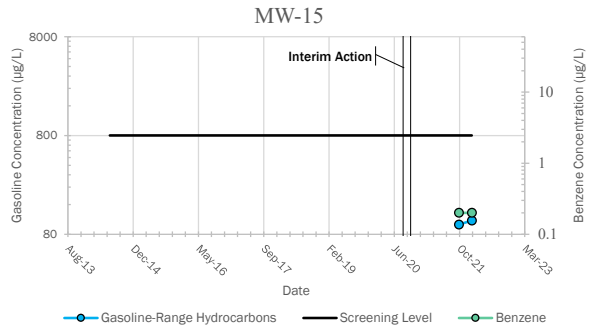


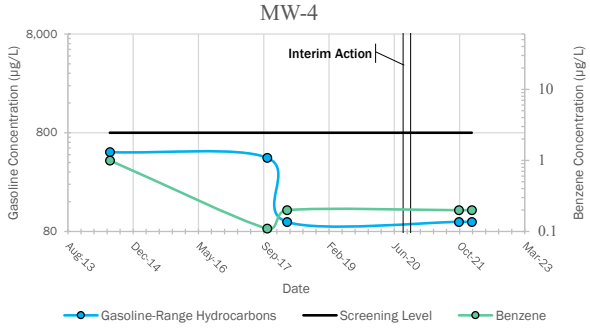




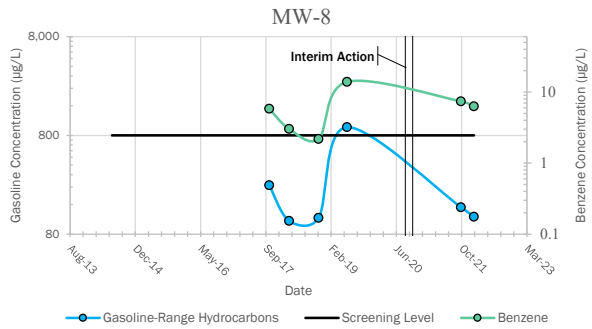
2nd Street Area Monitoring Wells

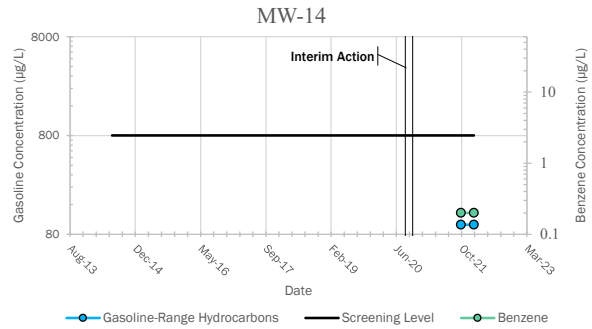






Southern Property Boundary Area Monitoring Wells





Notes:

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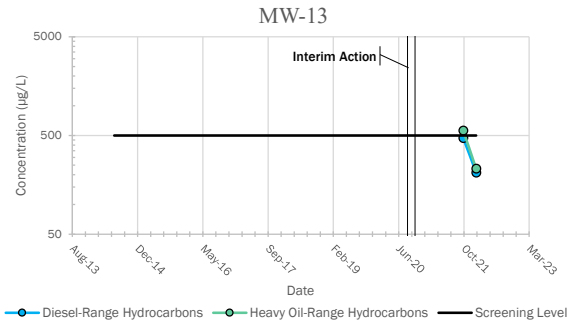
Data Source: Quiet Cove Groundwater Monitoring Data Resutls.

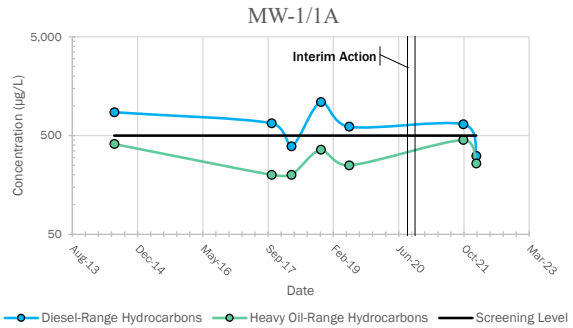
Groundwater Summary
Gasoline-Range Hydrocarbons and Benzene

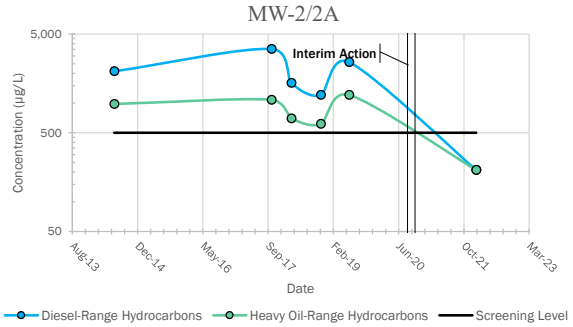
Quiet Cove
Anacortes, Washington

GeoEngineers | **Figure 3**

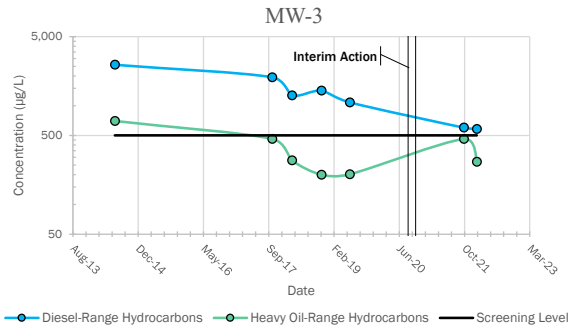
Shoreline Area Monitoring Wells

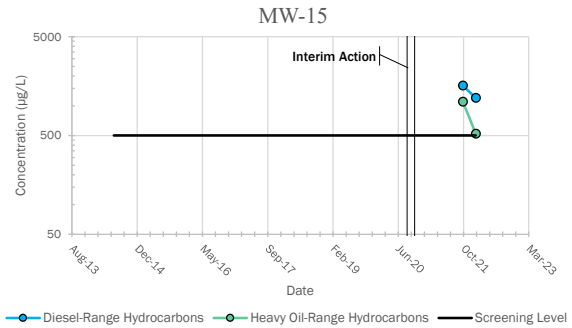


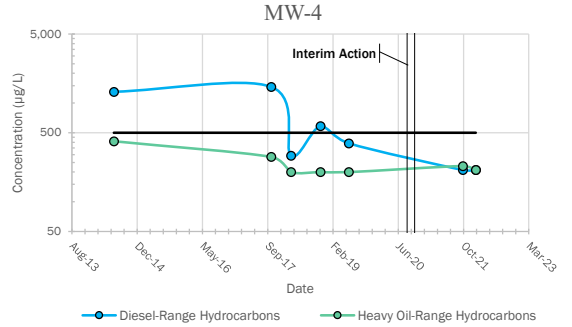




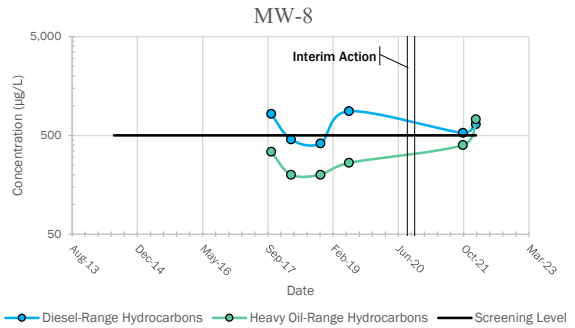
2nd Street Area Monitoring Wells

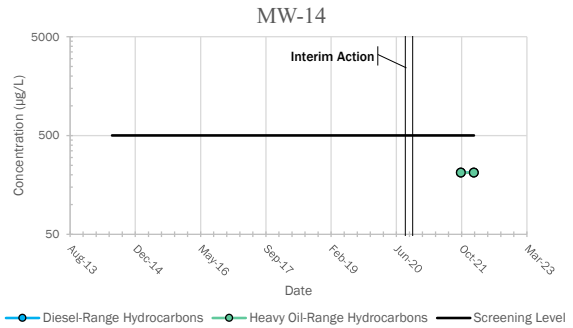






Southern Property Boundary Area Monitoring Wells





Notes:

1. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Quiet Cove Groundwater Monitoring Data Resutls.

Groundwater Summary
Diesel and Heavy Oil-Range Hydrocarbons

Quiet Cove
Anacortes, Washington

GeoEngineers

Figure 4

Date Exported: 03/10/22

https://geoengineers.sharepoint.com/sites/0514702411/Technical Analysis/Forms/AllItems.aspx

ATTACHMENT 1 – WELL COMPLETION LOG MW-2A

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
MORE THAN 50% RETAINED ON NO. 200 SIEVE	SAND AND SANDY SOILS	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS
				SP	POORLY-GRADED SANDS, GRAVELLY SAND
	MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS, ROCK FLOUR, CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% PASSING NO. 200 SIEVE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS AND SILTS OF MEDIUM TO HIGH PLASTICITY
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: Multiple symbols are used to indicate borderline or dual soil classifications

ADDITIONAL MATERIAL SYMBOLS

SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
	AC	Asphalt Concrete
	CC	Cement Concrete
	CR	Crushed Rock/ Quarry Spalls
	SOD	Sod/Forest Duff
	TS	Topsoil

Groundwater Contact

Measured groundwater level in exploration, well, or piezometer

Measured free product in well or piezometer

Graphic Log Contact

Distinct contact between soil strata

Approximate contact between soil strata

Material Description Contact

Contact between geologic units

Contact between soil of the same geologic unit

Sampler Symbol Descriptions

2.4-inch I.D. split barrel / Dames & Moore (D&M)

Standard Penetration Test (SPT)

Shelby tube

Piston

Direct-Push

Bulk or grab

Continuous Coring

Blowcount is recorded for driven samplers as the number of blows required to advance sampler 12 inches (or distance noted). See exploration log for hammer weight and drop.

"P" indicates sampler pushed using the weight of the drill rig.

"WOH" indicates sampler pushed using the weight of the hammer.

Laboratory / Field Tests

%F	Percent fines
%G	Percent gravel
AL	Atterberg limits
CA	Chemical analysis
CP	Laboratory compaction test
CS	Consolidation test
DD	Dry density
DS	Direct shear
HA	Hydrometer analysis
MC	Moisture content
MD	Moisture content and dry density
Mohs	Mohs hardness scale
OC	Organic content
PM	Permeability or hydraulic conductivity
PI	Plasticity index
PL	Point lead test
PP	Pocket penetrometer
SA	Sieve analysis
TX	Triaxial compression
UC	Unconfined compression
UU	Unconsolidated undrained triaxial compression
VS	Vane shear

Sheen Classification

NS	No Visible Sheen
SS	Slight Sheen
MS	Moderate Sheen
HS	Heavy Sheen

NOTE: The reader must refer to the discussion in the report text and the logs of explorations for a proper understanding of subsurface conditions. Descriptions on the logs apply only at the specific exploration locations and at the time the explorations were made; they are not warranted to be representative of subsurface conditions at other locations or times.

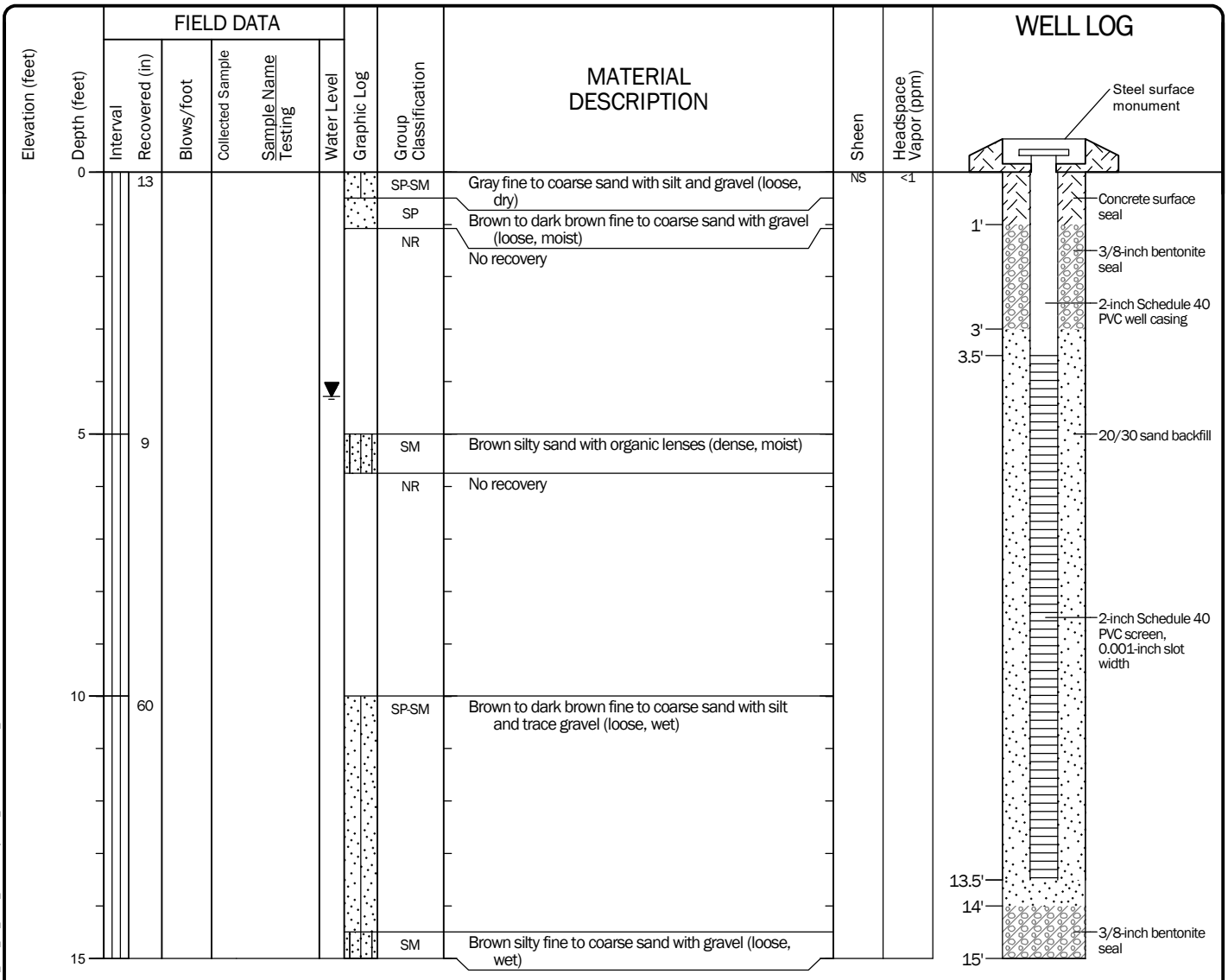
Key to Exploration Logs

GeoEngineers

Figure A-1

Drilled Start 10/21/2021 End 10/21/2021	Total Depth (ft) 15	Logged By NRS / Checked By	Driller Cascade Drilling, LP	Drilling Method Direct Push
Hammer Data N/A		Drilling Equipment Track-mounted Auger Rig		DOE Well I.D.: BMM-965 A 2-in well was installed on 10/21/2021 to a depth of 13.5 ft.
Surface Elevation (ft) Vertical Datum Undetermined		Top of Casing Elevation (ft)		Groundwater: Date Measured 10/22/2021; Depth to Water (ft) 4.28; Elevation (ft)
Easting (X) Northing (Y)		Horizontal Datum		

Notes:



Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Monitoring Well MW-1A

GeoEngineers

Project: Quiet Cove - Post Interim Action Construction Groundwater Monitoring
Project Location: Anacortes, Washington
Project Number: 5147-024-11

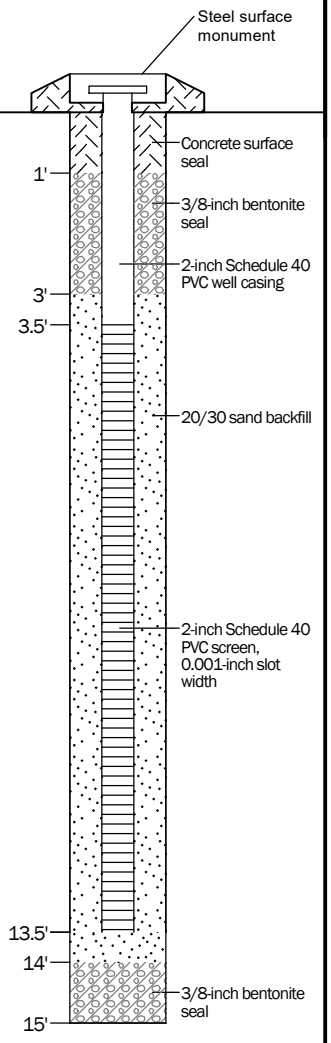
Figure A-2
Sheet 1 of 1

Drilled Start 10/21/2021 End 10/21/2021	Total Depth (ft) 15	Logged By NRS Checked By	Driller Cascade Drilling, LP	Drilling Method Direct Push	
Hammer Data N/A		Drilling Equipment Track-mounted Auger Rig		A 2-in well was installed on 10/21/2021 to a depth of 13.5 ft.	
Surface Elevation (ft) Vertical Datum Undetermined		Top of Casing Elevation (ft)		Groundwater Date Measured: 10/21/2021 Depth to Water (ft): 6.50 Elevation (ft):	
Easting (X) Northing (Y)		Horizontal Datum			

Notes: Due to shell midden no well was constructed

Elevation (feet)	Depth (feet)	FIELD DATA: Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)
	0		32						CR	Crushed base course gravel	NS	<1
									SM	Brown silty fine to coarse sand with occasional gravel and layers of coal throughout (dense, moist)		
											SS	<1
									SP	Light gray fine to medium sand with gravel		
									ML	Tan silt with orange oxidation staining	NS	<1
									SM	Black to dark gray silty fine to medium sand with shell fragments		
	5		49						SP-SM	Light gray to light brown fine to medium sand with silt Becomes gray, very dense, moist to wet	NS	<1
										Becomes wet		
										With trace gravel		
	10		60									
									SM	Dark gray silty fine to coarse sand with gravel		
	15											

WELL LOG



Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Monitoring Well MW-2A

GeoEngineers

Project: Quiet Cove - Post Interim Action Construction Groundwater Monitoring
Project Location: Anacortes, Washington
Project Number: 5147-024-11

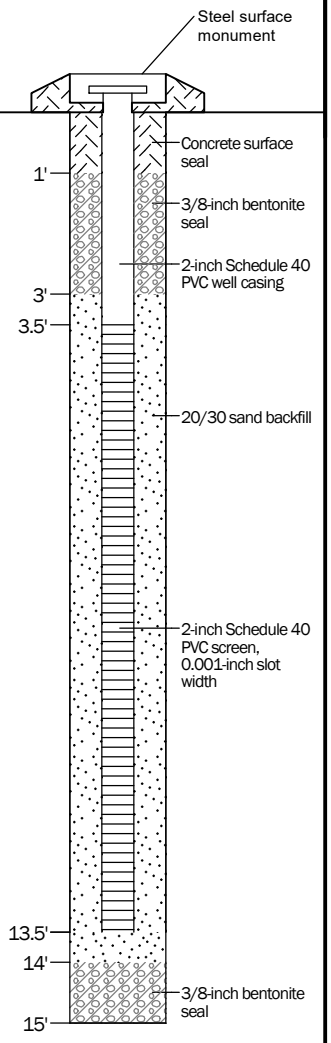
Figure A-3
Sheet 1 of 1

Drilled Start 10/20/2021 End 10/20/2021	Total Depth (ft) 15	Logged By NRS / Checked By	Driller Cascade Drilling, LP	Drilling Method Direct Push
Hammer Data N/A		Drilling Equipment Track-mounted Auger Rig	DOE Well I.D.: BMM-963 A 2-in well was installed on 10/20/2021 to a depth of 13.5 ft.	
Surface Elevation (ft) Vertical Datum Undetermined		Top of Casing Elevation (ft)	Groundwater Date Measured: 10/22/2021	Depth to Water (ft): 3.92 — Elevation (ft):
Easting (X) Northing (Y)		Horizontal Datum		

Notes:

Elevation (feet)	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)
	0		0				▼		NR	No recovery	NS	<1
	5		31						SP-SM	Dark brown fine to coarse sand with silt (loose, moist)		
									SP-SM	Gray fine to coarse sand with silt (loose, moist to wet)		
										Becomes gray to dark brown, wet		
	10		60									
										Becomes dark brown		
									SM	Brown silty fine to coarse sand with gravel (loose, wet)		
										Becomes gray		
	15								ML	Gray silt with sand and gravel (very stiff, moist)		

WELL LOG



Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Monitoring Well MW-13

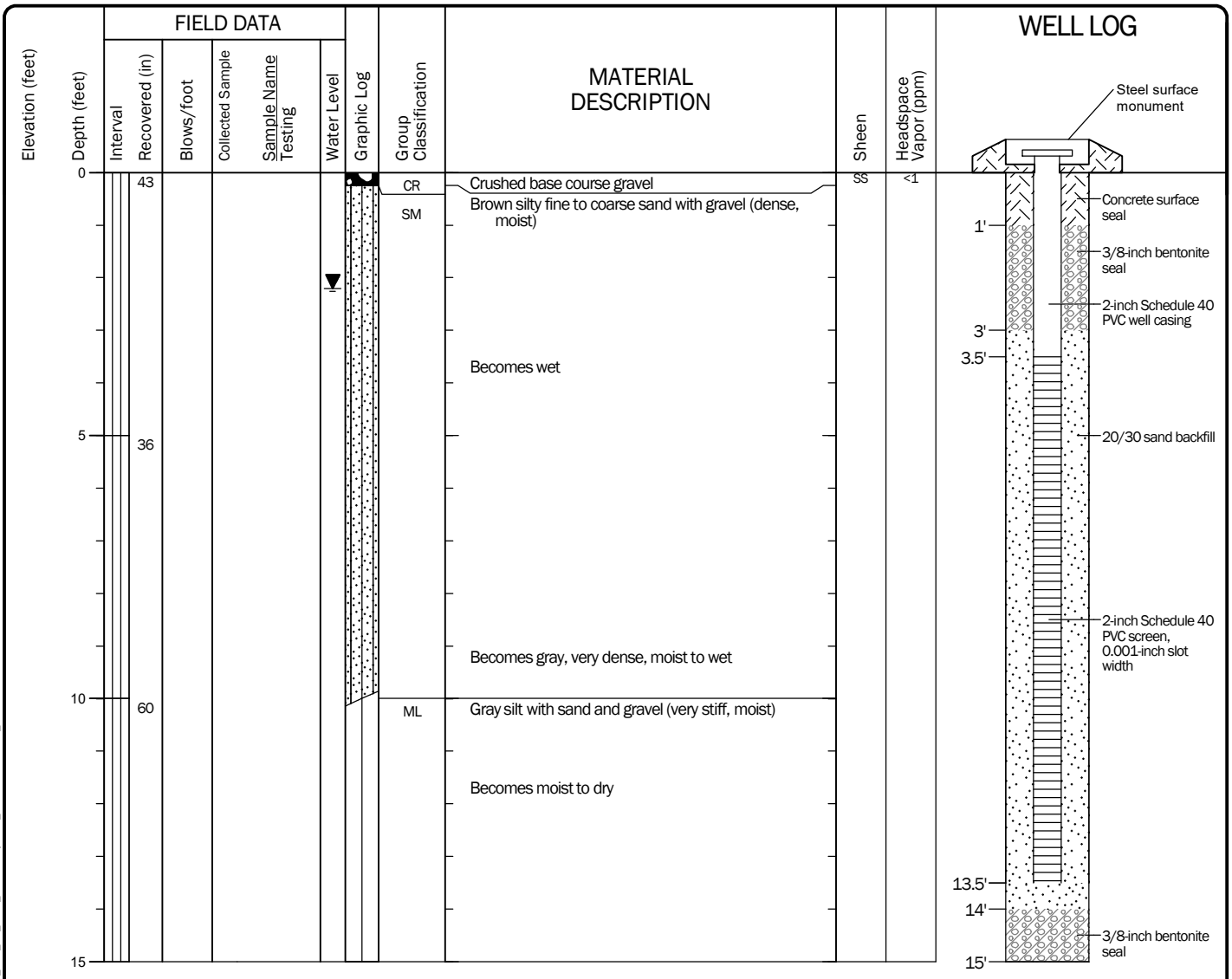
GeoEngineers

Project: Quiet Cove - Post Interim Action Construction Groundwater Monitoring
Project Location: Anacortes, Washington
Project Number: 5147-024-11

Figure A-4
Sheet 1 of 1

Drilled Start 10/20/2021 End 10/20/2021	Total Depth (ft) 15	Logged By NRS Checked By	Driller Cascade Drilling, LP	Drilling Method Direct Push
Hammer Data N/A		Drilling Equipment Track-mounted Auger Rig	DOE Well I.D.: BMM-966 A 2-in well was installed on 10/20/2021 to a depth of 13.5 ft.	
Surface Elevation (ft) Undetermined Vertical Datum		Top of Casing Elevation (ft)	Groundwater Date Measured: 10/22/2021	Depth to Water (ft): 2.21 Elevation (ft):
Easting (X) Northing (Y)		Horizontal Datum		

Notes:



Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Monitoring Well MW-14

GeoEngineers

Project: Quiet Cove - Post Interim Action Construction Groundwater Monitoring
Project Location: Anacortes, Washington
Project Number: 5147-024-11

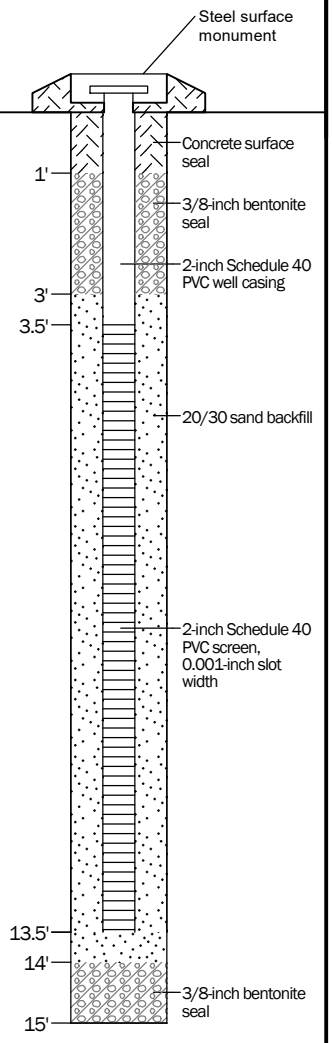
Figure A-5
Sheet 1 of 1

Drilled Start 10/20/2021 End 10/20/2021	Total Depth (ft) 15	Logged By NRS Checked By	Driller Cascade Drilling, LP	Drilling Method Direct Push
Hammer Data N/A		Drilling Equipment Track-mounted Auger Rig	DOE Well I.D.: BMM-964 A 2-in well was installed on 10/20/2021 to a depth of 13.5 ft.	
Surface Elevation (ft) Vertical Datum Undetermined		Top of Casing Elevation (ft)	Groundwater Date Measured: 10/22/2021	Depth to Water (ft): 5.93
Easting (X) Northing (Y)		Horizontal Datum		Elevation (ft)

Notes:

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)
	0	48						CR	Crushed base course gravel	NS	<1
								SM	Black silty fine to coarse sand with trace gravel (dense, moist)		
								ML	Gray silt with sand (stiff, moist)		
								CC	Concrete debris		
	5	32						SM	Brown silty fine to mediums and with organic matter (dense, moist)		
						▼		PT	Peat		
								SP-SM	Dark brown fine to coarse sand with silt and organic matter (dense, moist to wet)		
									Becomes wet		
	10	60							With trace gravel		
	15										

WELL LOG



Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Monitoring Well MW-15

GeoEngineers

Project: Quiet Cove - Post Interim Action Construction Groundwater Monitoring
Project Location: Anacortes, Washington
Project Number: 5147-024-11

Figure A-6
Sheet 1 of 1