Annual Groundwater Monitoring Report 2021

KCHA Former Park Lake Homes
Maintenance Center Site
9800 8th Avenue SW
Seattle, Washington
VCP No. NW3033

for
King County Housing Authority

April 1, 2022

GeoEngineers
Earth Science + Technology

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File No. 1329-003-28

April 1, 2022

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KRA:DLC:leh:mce

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1.0 INTRODUCTION AND BACKGROUND

This report presents cleanup actions and quarterly groundwater monitoring completed between May and December 2021 at King County Housing Authority's (KCHA) Former Park Lake Homes Maintenance Center Site located at 9800 8th Avenue SW in Seattle, Washington. The Site is entered into Washington State Department of Ecology's (Ecology) Voluntary Cleanup Program (VCP), VCP Site No. NW3033. KCHA intends to own and manage the areas within the Site for the foreseeable future. The location of the Site relative to surrounding physical features is shown in the Vicinity Map, Figure 1. The general layout of the Site and surrounding areas is shown in the Site Plan, Figure 2.

The Maintenance Center was removed in 2004/2005 and an independent Model Toxics Control Act (MTCA) cleanup of contaminated soil was completed by KCHA in 2005 (GeoEngineers 2005). After the 2005 cleanup action, the majority of soil underlying the former Maintenance Center was subsequently removed to depths up to 16 feet below original grade for the temporary CV4 construction stormwater pond (later backfilled, area shown in orange shading in Figure 2) and for the permanent CV3 water quality vault (area shown in yellow shading in Figure 2). The Site was substantially redeveloped in 2006 including housing, parking, new underground utilities and common areas associated with KCHA's Greenbridge project. No evidence of contaminated soil was reported by KCHA representatives or contractors, or by GeoEngineers, Inc. (GeoEngineers) during geotechnical construction observation, and during soil removal for the CV4 construction stormwater pond and the CV3 water quality vault.

The Site was entered into the VCP in late 2015, with a request for a No Further Action (NFA) determination on the former Maintenance Center cleanup completed by KCHA. Ecology provided a "Further Action" letter to KCHA dated June 6, 2016, requesting groundwater characterization at the Site. In 2017, Ecology approved KCHA's scope of work for Site groundwater characterization. KCHA installed two monitoring wells (MW-1 and MW-2) in July 2017 to monitor groundwater conditions downgradient of the completed soil cleanup at the Maintenance Center. The results of 2017 and 2018 groundwater monitoring were submitted to Ecology (GeoEngineers 2018). In 2019 Ecology concurred that chemical analytical sampling of MW-1 groundwater was no longer required. KCHA submitted the 2019 Annual Groundwater Monitoring Report to Ecology dated January 22, 2020 (GeoEngineers 2020). In June 2020, Ecology concurred with KCHA's request to discontinue testing organochlorine pesticides from MW-2 based on four consecutive quarterly samples meeting cleanup levels. As of mid-2020, the only contaminant at the Site exceeding the MTCA cleanup level was petroleum hydrocarbons in MW-2 groundwater.

An in-situ injection program was conducted on Site during the 2nd and 3rd quarters of 2020 to treat petroleum-impacted groundwater around monitoring well MW-2. Two mobilizations of treatment using Petrofix®, a milled carbon absorption product, were performed to treat the area surrounding the well as the contamination source location was locally undefined. Quarterly groundwater monitoring continued at MW-2. As explained in the 2021 groundwater monitoring report, diesel- and heavy oil-range petroleum hydrocarbons (DRPH and heavy ORPH, respectively) were non-detect in the first 2021 groundwater sampling event at MW-2(GeoEngineers, 2021).

This monitoring report summarizes May to December 2021 quarterly groundwater elevation data at MW-1 and MW-2 and groundwater sampling at MW-2. This report also describes the in-situ treatment at MW-2 using an Oxygen Releasing Compound (ORC) sock.

2.0 SCOPE OF SERVICES

The scope of services included the following:

1. Measure groundwater water levels in MW-1 and MW-2 for three quarterly events.
2. Collect groundwater samples and measure groundwater parameters from MW-2 using low-flow sampling methods and submit the groundwater samples for chemical analysis of DRPH and heavy ORPH by Northwest Method NWTPH-Dx.
3. Continue enhanced in-situ treatment of groundwater in MW-2 using an ORC sock to increase dissolved oxygen levels to facilitate petroleum degradation.

3.0 GROUNDWATER MONITORING

3.1. Groundwater Conditions

Quarterly groundwater monitoring events were conducted on May 4, September 22, and December 15, 2021. Depth to groundwater and groundwater elevations (NAVD88 datum) are summarized in Table 1. The local groundwater flow direction beneath the Site is likely to the south; however, groundwater gradient maps have not been prepared because only two groundwater elevation data points are available at this time. Field procedures are described in Appendix A.

3.2. Groundwater and Wastewater pH

Groundwater parameters obtained during each monitoring event are reported in Table 2. Purge water generated from quarterly monitoring events was either drummed and stored at a KCHA property nearby or taken to Marine Vacuum Services Inc. for permitted disposal. pH of groundwater and wastewater pH has consistently been below the dangerous waste threshold (<12.5 pH) for the past 10 quarterly monitoring events (May 2019 through December 2021).

3.3. Groundwater Chemical Analytical Results

Groundwater samples were analyzed by OnSite Environmental, Inc. in Redmond, Washington. Groundwater analytical results are summarized in Table 3. Groundwater Data and Treatment Plot, Figure 3, illustrates groundwater chemical analytical results over time in relation to KCHA's active treatment events. Laboratory chemical analytical reports are provided in Appendix B.

MW-2 was sampled on a quarterly basis during 2021. DRPH were non-detect for three of the events and detected at a concentration less than the MTCA Method A cleanup level in one event (0.34 milligrams per liter [mg/L]). The December 2021 event marked the 4th consecutive quarter that DRPH concentrations in groundwater at MW-2 have been below cleanup levels. Based on MW-2 groundwater analytical data trends for the past few years, DRPH tend to be the lowest during dry season months (May through August) when groundwater levels are at their lowest elevations.

Heavy ORPH were not detected in MW-2 groundwater during the January and September 2021 sampling events and were detected at concentrations greater than the MTCA Method A cleanup level during the May and December 2021 quarterly sampling events (0.59 and 0.81 mg/L, respectively). Based on MW-2 groundwater analytical data trends for the past few years, heavy ORPH tend to be the lowest when groundwater levels are at their lowest elevations.

4.0 TREATMENTS AND IDW DISPOSAL

4.1. ORC Treatment Sock

A new ORC treatment sock was installed in MW-2 during in May 2021. After the ORC sock installation, background dissolved oxygen (DO) concentrations in MW-2 were sustained at levels similar to DO at MW-1 (4 to 6 mg/L), a well outside of the dissolved-phase petroleum plume (Table 2), until the December 2021 sampling event. DO levels at MW-2 had decreased to less than 1 mg/L by December 2021.

4.2. IDW Disposal

Soil cuttings, decontamination water, purge water, and residual PetroFix® from the 2020 in-situ remediation activities were stored in 55-gallon steel drums that were placed in a locked KCHA facility near the Site. Prior to disposal at a permitted Subtitle D landfill, Marine Vacuum Services Inc. siphoned free water from the drums to reduce the total number of drums of solids to be transported for disposal. A waste disposal profile and radiation waiver were completed before Waste Management transported 6 drums to a Subtitle D landfill for permitted disposal. The drum transport manifest and waiver are presented in Appendix C.

Purge water generated after the drum pick-up event was brought directly to Marine Vacuum Services Inc. for permitted disposal. No drums containing remediation waste remain in the KCHA owned storage facility. The disposal ticket is provided in Appendix C.

5.0 SUMMARY

Quarterly groundwater monitoring at MW-2 was completed in 2021 at the Former Park Lake Homes Maintenance Center. Groundwater pH levels remained below the dangerous waste threshold (<12.5 pH) for all quarterly sampling events and no dangerous waste wastewater was generated. Independent cleanup activities in 2021 involved use of an ORC sock in monitoring well MW-2 to increase DO levels in groundwater and facilitate the degradation of petroleum hydrocarbons at the only location where contamination is known to remain.

Concentrations of DRPH were either non-detect or the detected concentrations were below the MTCA Method A cleanup level for four consecutive quarters in 2021. Heavy ORPH concentrations were non-detect for two quarters (January and September 2021) and were detected at concentrations above the MTCA Method A cleanup level in May and December 2021.

Routine quarterly groundwater sampling at MW-2 is planned during 2022 along with the replacement of the existing ORC sock.

Please refer to Appendix D “Report Limitations And Guidelines For Use” for additional information pertaining to the use of this report.

6.0 REFERENCES

GeoEngineers, Inc. 2005. Independent Cleanup of Petroleum-Contaminated Soil, KCHA Maintenance Center Former Park Lake Homes, King County, Washington dated September 12, 2005.

GeoEngineers, Inc. 2016. Letter to Michael Warfel, KCHA Response to Ecology's June 2016 Further Action Letter, Former Park Lake Homes Maintenance Shop Site, VCP #NW3033, dated November 21, 2016.

GeoEngineers, Inc. 2018. Supplemental Groundwater Characterization Report, KCHA Former Park Lake Homes Maintenance Facility, Seattle, Washington, dated December 21, 2018.

GeoEngineers, Inc. 2020. Annual Groundwater Characterization Report 2019, KCHA Former Park Lake Homes Maintenance Facility, Seattle, Washington, dated January 22, 2020.

GeoEngineers, Inc. 2021. Groundwater Monitoring and Independent Cleanup Report, KCHA Former Park Lake Homes Maintenance Facility, Seattle, Washington, dated February 5, 2021.

Washington State Department of Ecology (Ecology). 2017. Email response from Warfel, Michael, Site Manager of Voluntary Cleanup Program, "VCP NW3033, Park Lake Homes Maintenance Facility - Follow up", dated May 30, 2017.

Washington State Department of Ecology (Ecology). 2019. Warfel, Michael, Site Manager of Voluntary Cleanup Program, "NW3033 Opinion Letter," dated March 19, 2019.

TABLES

GeoEngineers

Table 1

Monitoring Well Elevation Data

Former Park Lake Homes Maintenance Center

Seattle, Washington

Monitoring Well Identification[1] (TOC elevation in feet NAVD88)[2]	Date measured	Depth to Water (feet bgs)	Groundwater Elevation (feet NAVD88)	Well Screen (feet bgs)	
				Top	Bottom
MW-1 (407.41)	08/28/17	9.64	397.77	5	20
	12/01/17	7.37	400.04		
	04/30/18	8.12	399.29		
	07/18/18	9.81	397.60		
	10/18/18	10.18	397.23		
	02/19/19	7.19	400.22		
	05/15/19	9.33	398.08		
	08/16/19	10.64	396.77		
	11/22/19	10.66	396.75		
	02/14/20	6.71	400.7		
	05/05/20	9.33	398.08		
	08/21/20	10.70	396.71		
	01/08/21	6.41	401.00		
	05/04/21	7.66	399.75		
	09/22/21	10.43	396.98		
	12/15/21	7.49	399.92		
MW-2 (408.58)	08/28/17	7.99	400.59	5	20
	12/01/17	6.57	402.01		
	04/30/18	7.27	401.31		
	07/18/18	8.96	399.62		
	10/18/18	9.15	399.43		
	02/19/19	7.00	401.58		
	05/15/19	8.20	400.38		
	08/16/19	9.47	399.11		
	11/22/19	10.09	398.49		
	02/14/20	6.20	402.38		
	04/10/20	7.72	400.86		
	05/05/20	8.27	400.31		
	08/21/20	9.56	399.02		
	01/08/21	6.69	401.89		
	05/04/21	7.97	400.61		
	09/22/21	9.33	399.25		
	12/15/21	6.90	401.68		

Notes:

[1] Monitoring well locations are shown on Figure 2.

[2] Elevations measured by Goldsmith Land Development Services on May 19, 2019.

NAVD88 = North American Vertical Datum of 1988

TOC = top of casing

bgs = below ground surface

Table 2

Groundwater Field Parameter Data

Former Park Lake Homes Maintenance Center

Seattle, Washington

Sample ID[1]		MW-2-170828	MW-2-171201	MW-2-180430	MW-2-180718	MW-2-181018	MW-2-190219	MW-2-190515	MW-2-190816	MW-2-191122	MW-2-200214	MW-2-200507	MW-2-200822	MW-2-200214	MW-2-200507	MW-2-200214	MW-2-200507
Sample Date	**Units**	**08/28/17**	**12/01/17**	**04/30/18**	**07/18/18**	**10/18/18**	**02/19/19**	**05/15/19**	**08/16/19**	**11/22/19**	**02/14/20**	**05/07/20**	**08/21/20**	**01/08/21**	**05/04/21**	**09/22/21**	**12/15/21**
Groundwater Field Parameters																	
pH	pH	12.59	12.72	12.88	12.84	12.64	12.95	12.31	11.70	12.12	11.33	10.19	10.44	11.58	11.88	11.02	11.90
Specific Conductivity	µS/cm	2,463	2,106	1,839	2,081	2,121	1,742	1,795	1,986	1,872	1,622	1,747	2,197	1,827	1,360	1,240	1,700
Dissolved Oxygen	mg/L	0.06	0.07	0.17	0.08	0.07	0.09	0.13	0.08	0.08	0.20	0.27	4.80	5.23	7.48	5.96	0.44
Redox Potential	mV	-324.9	-202.5	-91.3	-213.6	-311.8	-212.3	-220.2	-235.9	-254.3	-226.1	20.5	105.3	102.1	-151.1	-170.1	-88.9
Turbidity	NTU	3.1	3.7	3.1	4.7	4.1	3.6	3.3	3.2	4.2	4.8	3.2	8.6	24	5.8	5.0	8.8
Purge Water Field Parameters																	
Drummed Wastewater[2]	pH	--	--	--	--	--	--	--	11.76	11.79	11.63	11.03	10.89	10.98	10.70	NA	NA

Notes:

[1] Monitoring well locations are shown on Figure 2.

[2] Bulk pH measured from drum water grab sample.

NA = Not Applicable

NTU = nephelometric turbidity units;

µS/cm = microSiemens per centimeter

mg/L = milligrams per liter

mV = millivolts

-- = Not Measured

Table 3

Summary of Groundwater Chemical Analytical Data

Former Park Lake Homes Maintenance Center

Seattle, Washington

Sample ID[1]		MW-2-170828	MW-2-171201	MW-2-180430	MW-2-180718	MW-2-181018	MW-2-190219	MW-2-190515	MW-2-190816	MW-2-191122	MW-2-200214	MW-2-200214	MW-2-200821	MW-2-210108	MW-2-210504	MW-2-210921	MW-2-211215	MTCA Method A or B Cleanup Level
Sample Year		2107		2018			2019				2020			2021				
Sample Date	Units	08/28/17	12/01/17	04/30/18	07/18/18	10/18/18	02/19/19	05/15/19	08/16/19	11/22/19	02/14/20	05/07/20	08/21/20	01/08/21	05/04/21	09/22/21	12/15/21	
Petroleum Hydrocarbons by NWTPH-G or NWTPH-Dx																		
Gasoline-Range	µg/L	<100	<100	<100	<100	<100	<100	--	--	--	--	--	--	--	--	--	--	800[2]
Diesel-Range	mg/L	**0.89**	**0.83**	**0.52**	**0.49**	**0.70**	**0.55**	**0.37**	**0.53**	**0.83**	**0.50**	**0.56**	**0.50**	<0.20	<0.20	<0.20	**0.34**	0.5
Oil-Range	mg/L	**2.5**	**2.2**	**2.0**	**1.4**	**1.7**	**1.8**	**0.89**	**1.1**	**1.9**	**1.5**	**1.2**	**1.2**	<0.21	**0.59**	<0.20	**0.81**	0.5
Totals Metals by EPA 6000/7000 Series or EPA 200.8																		
Arsenic	µg/L	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	--	--	--	--	--	--	--	--	--	--	5
Chromium	µg/L	<11	<11	<11	<11	<11	<11	--	--	--	--	--	--	--	--	--	--	50
Nickel	µg/L	**23**	<22	<22	<22	<22	<22	--	--	--	--	--	--	--	--	--	--	320
Other (Cadium, Lead, Zinc)	µg/L	ND	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--	Lead - 15
Volatile Organic Compounds (VOCs) by EPA 8260[4]																		
Benzene	µg/L	**0.77**	**0.68**	**0.40**	**0.47**	**0.47**	**0.37**	--	--	--	--	--	--	--	--	--	--	5
Toluene	µg/L	**1.1**	**1.0**	<1.0	<1.0	<1.0	<1.0	--	--	--	--	--	--	--	--	--	--	1,000
Ethylbenzene	µg/L	**0.24**	**0.24**	<0.20	**0.23**	**0.23**	**0.28**	--	--	--	--	--	--	--	--	--	--	700
Total Xylenes[3]	µg/L	**0.75**	**0.74**	**0.22**	**0.68**	**0.24**	**0.86**	--	--	--	--	--	--	--	--	--	--	1,000
Acetone[4]	µg/L	**11**	**6.6**	**10**	**9.6**	**7.0**	**5.2**	--	--	--	--	--	--	--	--	--	--	720
Carbon Disulfide	µg/L	**0.33**	<0.20	<0.20	<0.20	<0.20	<0.20	--	--	--	--	--	--	--	--	--	--	800
1,2,4-Trimethylbenzene	µg/L	**0.27**	**0.27**	**0.23**	**0.26**	<0.20	**0.33**	--	--	--	--	--	--	--	--	--	--	NE
Naphthalene	µg/L	**1.2**	<1.3	<2.3	<1.5	<1.0	<1.0	--	--	--	--	--	--	--	--	--	--	160[5]
p-Isopropyltoluene	µg/L	**4.7**	**5.7**	**6.8**	**7.8**	**7.7**	**11.0**	--	--	--	--	--	--	--	--	--	--	NE
Polychlorinated Biphenyls (PCBs) by EPA 8082A																		
PCBs	µg/L	ND	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	varies
Organochlorine Pesticides by EPA 8081B[6]																		
Endosulfan I	µg/L	<0.0047	<0.0047	<0.0047	<0.0047	<0.0047	<0.0047	--[6]	<0.0051	<0.0047	<0.0047	<0.0047	--	--	--	--	--	NE
Heptachlor Epoxide	µg/L	<0.0047	**0.011**	<0.0047	**0.0053**	**0.0050**	<0.0047	--[6]	<0.0031	<0.0028	<0.0028	<0.0028	--	--	--	--	--	0.00479

Sample ID[1]		MW-2-170828	MW-2-171201	MW-2-180430	MW-2-180718	MW-2-181018	MW-2-190219	MW-2-190515	MW-2-190816	MW-2-191122	MW-2-200214	MW-2-200214	MW-2-200821	MW-2-210108	MW-2-210504	MW-2-210921	MW-2-211215	MTCA Method A or B Cleanup Level
Sample Year		2107		2018			2019				2020			2021				
Sample Date	Units	08/28/17	12/01/17	04/30/18	07/18/18	10/18/18	02/19/19	05/15/19	08/16/19	11/22/19	02/14/20	05/07/20	08/21/20	01/08/21	05/04/21	09/22/21	12/15/21	
Polycyclic Aromatic Hydrocarbons (PAHs) by EPA 8270D/SIM[7]																		
Naphthalene	µg/L	**0.46**	**0.60**	**0.44**	**0.51**	**0.60**	**0.48**	--	--	--	--	--	--	--	--	--	--	160[5]
1-Methylnaphthalene	µg/L	**0.30**	**0.37**	**0.30**	**0.35**	**0.39**	**0.35**	--	--	--	--	--	--	--	--	--	--	
2-Methylnaphthalene	µg/L	**0.30**	**0.42**	**0.27**	**0.37**	**0.40**	**0.32**	--	--	--	--	--	--	--	--	--	--	
Benzo[a]anthracene (cPAH)	µg/L	<0.094	<0.0094	**0.012**	<0.0096	<0.047	<0.0094	--	--	--	--	--	--	--	--	--	--	see cPAHs (TEQ)
Benzo[a]pyrene (cPAH)	µg/L	<0.0094	<0.0094	<0.0097	<0.0096	<0.0094	<0.0094	--	--	--	--	--	--	--	--	--	--	
Benzo[b]fluoranthene (cPAH)	µg/L	<0.0094	<0.0094	**0.0100**	<0.0096	<0.0094	**0.014**	--	--	--	--	--	--	--	--	--	--	
Benzo(k)fluoranthene (cPAH)	µg/L	<0.0094	<0.0094	<0.0097	<0.0096	<0.0094	**0.015**	--	--	--	--	--	--	--	--	--	--	
Chrysene (cPAH)	µg/L	<0.094	<0.0094	<0.0097	<0.0096	<0.047	<0.0094	--	--	--	--	--	--	--	--	--	--	
Dibenz[a,h]anthracene (cPAH)	µg/L	<0.0094	<0.0094	<0.0097	<0.0096	<0.0094	<0.0094	--	--	--	--	--	--	--	--	--	--	
Indeno(1,2,3-c,d)pyrene (cPAH)	µg/L	<0.0094	<0.0094	<0.0097	<0.0096	<0.0094	<0.0094	--	--	--	--	--	--	--	--	--	--	
Total cPAHs (TEQ)[8]	µg/L	ND	ND	**0.008**	ND	ND	**0.009**	--	--	--	--	--	--	--	--	--	--	0.1

Notes:

[1] Monitoring well locations are shown on Figure 2.

[2] When benzene is present the gasoline range cleanup level is 800 µg/L. When benzene is not present, the range cleanup level is 1000 µg/L.

[3] Total xylenes is of the sum of m,p- and o- xylene. The higher detection limit is shown when xylenes were not detected.

[4] Acetone is a common laboratory solvent.

[5] Cleanup level for naphthalenes is the sum of naphthalene, 1-methylnaphthalene and 2-methylnaphthalene.

[6] Laboratory error on hold time for pesticide analyses; data not produced.

[7] Only analytes detected in one or more samples were listed. See Laboratory reports in Appendix B for complete list of method analytes and detection limits.

[8] Total carcinogenic polycyclic aromatic hydrocarbons (cPAHs) calculated using the toxicity equivalency (TEQ) methodology defined in WAC 173-340-708 (e)(iii)(A)(II). Where analytes were not detected, one half the detected limit was used for the calculation, except when all analytes were non-detect.

EPA = U.S. Environmental Protection Agency

MTCA = Model Toxics Control Act

mg/L = milligrams per liter

µg/L = micrograms per liter

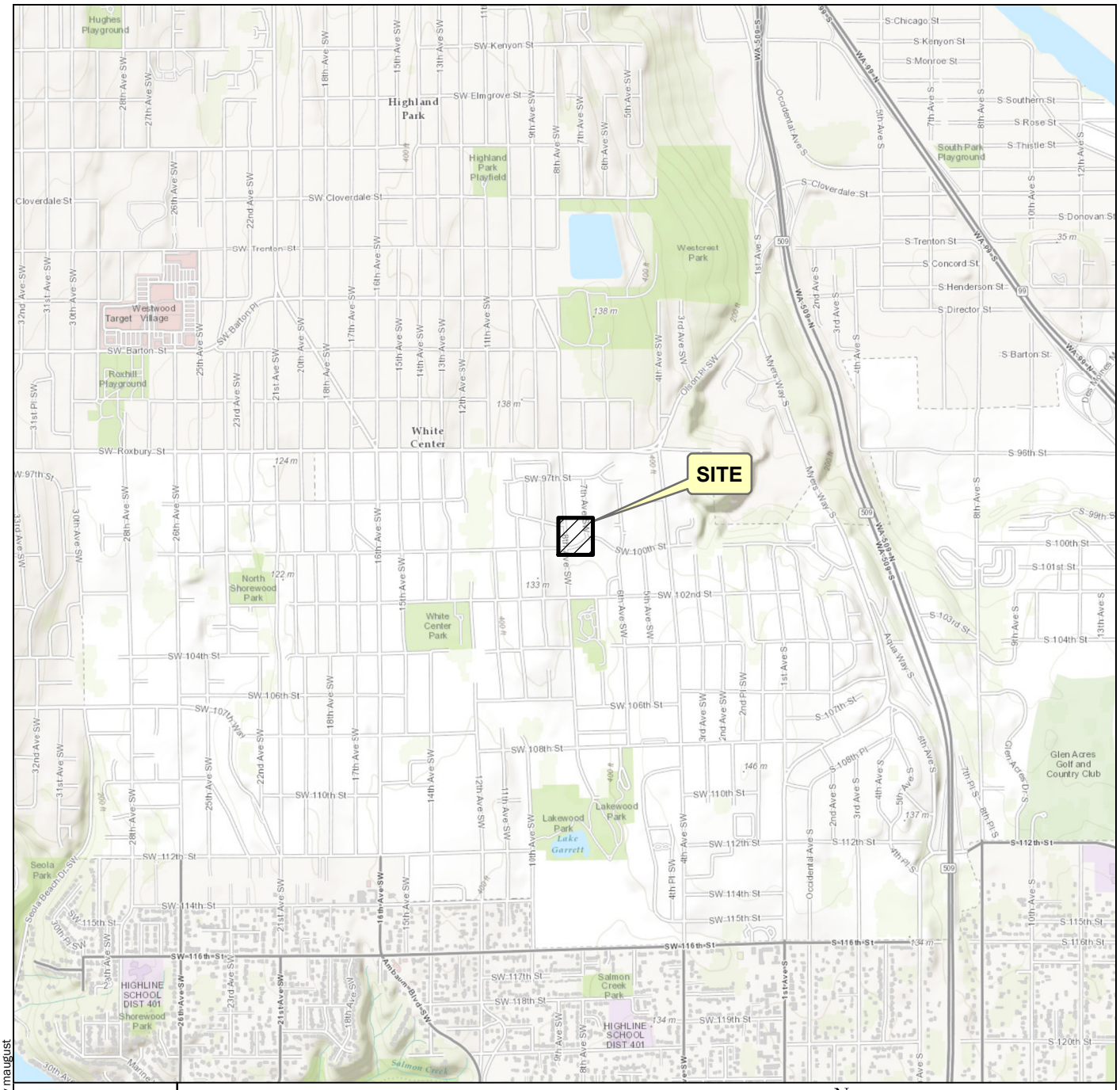
ND = Not Detected; NA = Not Applicable; '"–" = Not tested

Bold indicates analyte was detected.

Shading indicates analyte was detected at a concentration greater than the MTCA Cleanup Level.

FIGURES

GeoEngineers



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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.

Data Source: Mapbox Open Street Map, 2015

Projection: NAD 1983 UTM Zone 10N

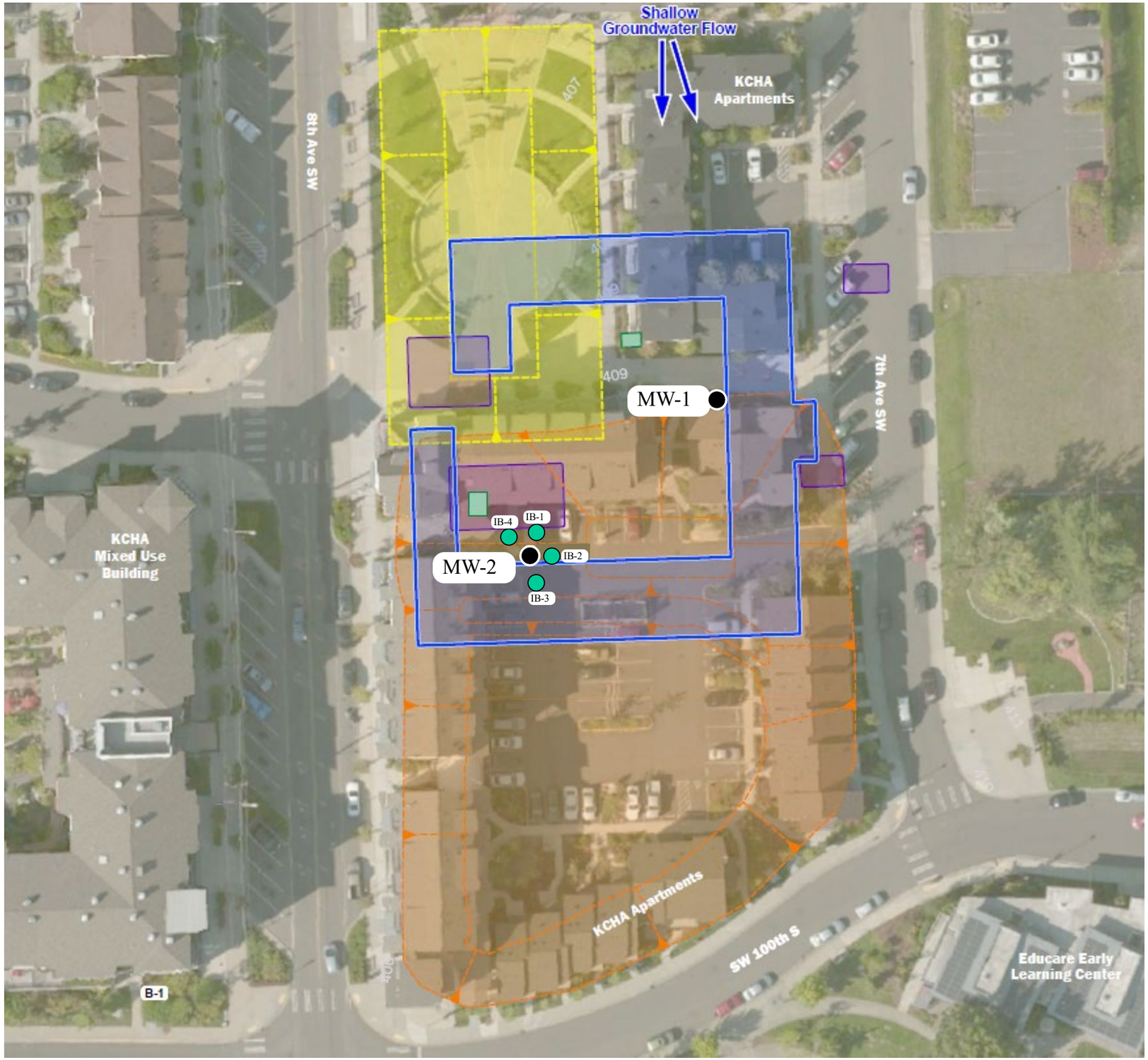
Vicinity Map

Former Park Lake Homes Maintenance Center
Seattle, Washington

GeoEngineers

Figure 1

P:\1\1329003\GIS\1329003320_VicinityMap.mxd Date Exported: 10/21/15 by maugust



Map Legend:

- MW-1 — Monitoring Well Location (GeoEngineers, 2017)
- IB-1 — Injection Boring Location (GeoEngineers, 2020)
- Approximate Footprint of Former Park Lake Homes Maintenance Center Building
- Approximate Location of 2005 Remedial Excavations – MTCA Cleanup at Maintenance Center
- Approximate Location of Removed UST
- Approximate Boundary of Backfilled CV4 Stormwater Pond Excavation
- Excavation for Existing Water Quality Vault

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Feet

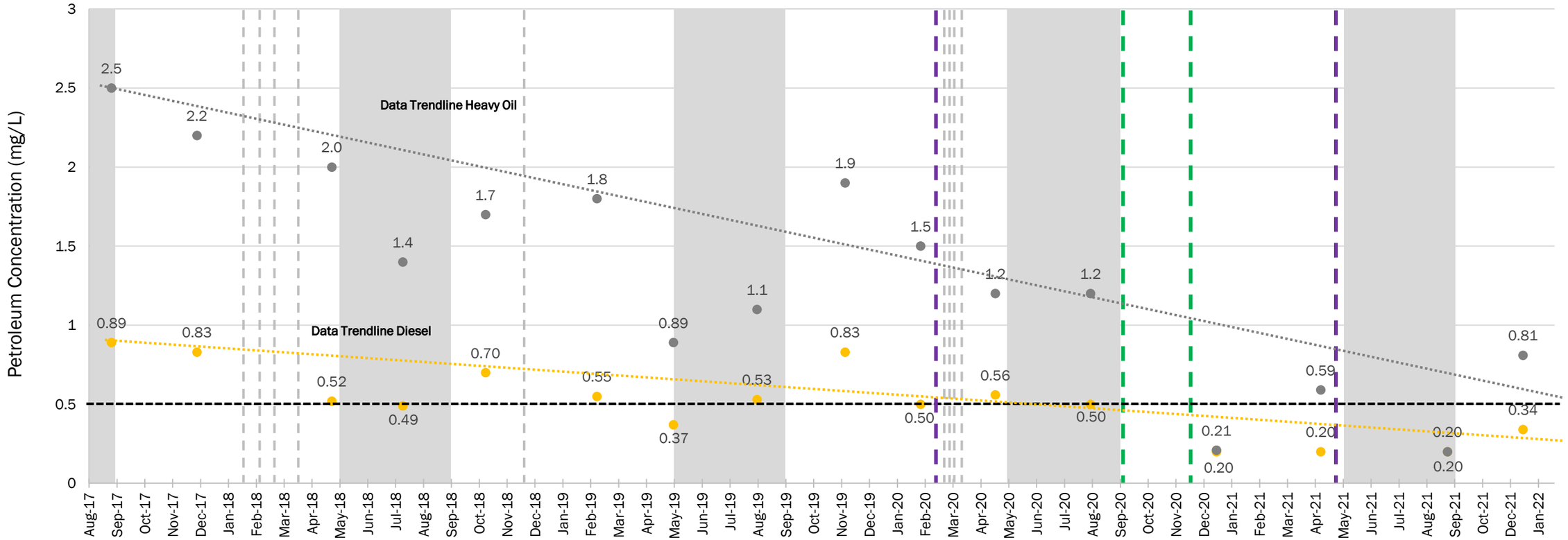
NOTES:

1. The locations of all features shown are approximate.
2. Abbreviations are defined as follows: IB = Injection boring, mg/L = milligrams per liter, MTCA = Model Toxics Control Act, MW = monitoring well, and UST = underground storage tank
3. This drawing is only 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.

Reference: King County iMAP, 2017

Site Plan	
Former Park Lake Homes Maintenance Center Seattle, Washington	
GeoEngineers	Figure 2

MW-2 Groundwater Analytical Data and Treatment Plot



Legend:

Groundwater Analytical Data and Cleanup Levels

- 0.52 — Diesel-Range Concentration (mg/L)
- 1.2 — Heavy oil-Range Concentration (mg/L)
- MTCA Method A Cleanup Level
- Dry Season (May through August)

Groundwater Treatment Events

- Groundwater Removal Event
- Injection Event
- ORC Sock Installed

Notes:

1. Groundwater sampling events presented above represent low-flow samples collected at monitoring well MW-2 located in the central portion of the site as presented in Figure 2.
2. Abbreviations: mg/L = milligrams per liter, MTCA = model toxics control act, MW = monitoring well, and ORC = oxygen reducing compound.
3. This plot 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: Groundwater samples were collected by low-flow sampling methods and analyzed at Onsite Environmental Laboratory in Redmond, Washington. Lab reports are presented in Appendix B.

Groundwater Data and Treatment Plot

Former Park Lake Homes Maintenance Center
Seattle, Washington

GeoEngineers

Figure 3

01329-003-28 Date Exported: 3/28/22

APPENDICES

GeoEngineers

APPENDIX A
Field Procedures

APPENDIX A
FIELD PROCEDURES

Groundwater Sample Collection and Handling

Groundwater samples were collected using a peristaltic pump with dedicated Teflon tubing at low-flow sampling rates. The groundwater was pumped at approximately 0.5 liter per minute until the water purged clear, after which the samples were collected at a flow rate of approximately 0.5 liter per minute (low-flow). A YSI water quality meter with flow-through-cell was used to monitor the following parameters during purging:

- Acidity (pH)
- Electrical conductivity (EC)
- Turbidity
- Dissolved oxygen (DO)
- Temperature
- Total dissolved solids (TDS)
- Oxygen reduction potential (ORP)
- Salinity

Collection of water samples began once these parameters were observed to vary by less than 10 percent on three consecutive measurements. Purge water generated during these activities was transferred to the onsite dedicated purge water drum labeled with the date and origin of contents. Incidental waste generated during sampling activities such as gloves, plastic sheeting, paper towels and similar expended and discarded field supplies were disposed of in the local trash receptacle.

The groundwater samples were transferred directly from the tubing outlet to laboratory-prepared sample containers. New nitrile gloves were worn when collecting the groundwater samples. The sample containers were filled completely and placed in a cooler with ice pending transport to the analytical laboratory. Sample labels were completed for each sample. Chain-of-custody procedures were followed in transporting the samples to the laboratory.

Investigative Waste Disposal for Groundwater and Soil

Groundwater purged during quarterly monitoring events was stored in 55-gallon steel drums. The drums were temporarily stored on KCHA property nearby. pH measurements of investigation wastewater are tabulated in Table 2; wastewater pH was below 12.5.

Drummed soil cuttings from the 2020 injection drilling were stored nearby on KCHA property. The drums were characterized for transport and disposal in May 2021.

APPENDIX B
Chemical Analytical Data

APPENDIX B
CHEMICAL ANALYTICAL DATA

Analytical Methods

Chain-of-custody procedures were followed during the transport of the soil and groundwater samples to the analytical laboratory. The samples were held in cold storage pending extraction and/or analysis. The analytical results, analytical methods reference and laboratory quality control (QC) records are included in this appendix. The analytical results are also summarized in the text and tables of this report.

Analytical Data Review

The laboratory maintains an internal quality assurance program as documented in its laboratory quality assurance manual. The laboratory uses a combination of blanks, surrogate recoveries, duplicates, matrix spike recoveries, matrix spike duplicate recoveries, blank spike recoveries and blank spike duplicate recoveries to evaluate the validity of the analytical results. The laboratory also uses data quality goals for individual chemicals or groups of chemicals based on the long-term performance of the test methods. The data quality goals were included in the laboratory reports. The laboratory compared each group of samples with the existing data quality goals and noted any exceptions in the laboratory report. Data quality exceptions documented by the accredited laboratory were reviewed by GeoEngineers. Based on our data quality review, it is our opinion that the laboratory data qualifiers listed are not significant with regard to the use of the data for characterization purposes. The samples/results were considered of acceptable quality for their intended use in this report.

OnSite Environmental Inc.
14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

May 12, 2021

Katy Atakturk
GeoEngineers, Inc.
2101 4th Avenue, Suite 950
Seattle, WA 98121

Re: Analytical Data for Project 1329-003-28
Laboratory Reference No. 2105-019

Dear Katy:

Enclosed are the analytical results and associated quality control data for samples submitted on May 4, 2021.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: May 12, 2021
Samples Submitted: May 4, 2021
Laboratory Reference: 2105-019
Project: 1329-003-28

Case Narrative

Samples were collected on May 4, 2021 and received by the laboratory on May 4, 2021. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Date of Report: May 12, 2021
Samples Submitted: May 4, 2021
Laboratory Reference: 2105-019
Project: 1329-003-28

ANALYTICAL REPORT FOR SAMPLES

Client ID	Laboratory ID	Matrix	Date Sampled	Date Received	Notes
MW-2	05-019-01	Water	5-4-21	5-4-21	

Date of Report: May 12, 2021
Samples Submitted: May 4, 2021
Laboratory Reference: 2105-019
Project: 1329-003-28

DIESEL AND HEAVY OIL RANGE ORGANICS
NWTPH-Dx

Matrix: Water
Units: mg/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-2**					
Laboratory ID:	05-019-01					
Diesel Range Organics	**ND**	0.20	NWTPH-Dx	5-5-21	5-5-21	
Lube Oil Range Organics	**0.59**	0.20	NWTPH-Dx	5-5-21	5-5-21	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*96*	*50-150*				

Date of Report: May 12, 2021
Samples Submitted: May 4, 2021
Laboratory Reference: 2105-019
Project: 1329-003-28

DIESEL AND HEAVY OIL RANGE ORGANICS
NWTPH-Dx
QUALITY CONTROL

Matrix: Water
Units: mg/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0505W1					
Diesel Range Organics	**ND**	0.20	NWTPH-Dx	5-5-21	5-5-21	
Lube Oil Range Organics	**ND**	0.20	NWTPH-Dx	5-5-21	5-5-21	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*108*	*50-150*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	SB0505W1										
	ORIG	DUP									
Diesel Fuel #2	**0.524**	**0.497**	NA	NA		NA		NA	5	NA	
Surrogate:											
o-Terphenyl						*112*	*107*	*50-150*			

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical _____.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

X1- Sample extract treated with a sulfuric acid/silica gel cleanup procedure.

Y - The calibration verification for this analyte exceeded the 20% drift specified in methods 8260 & 8270, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

Chain of Custody

OnSite Environmental Inc.
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Company: GEO
Project Number: 1329-003-28
Project Name: KCHA GREENBRIDGE
Project Manager: KATY ATAKTURK
Sampled by: BRIAN ANDERSON

Turnaround Request (in working days)

(Check One)

- ☐ Same Day
- ☐ 1 Day
- ☐ 2 Days
- ☐ 3 Days
- ☑ Standard (7 Days)
- ☐ _____ (other)

Laboratory Number: 05-019

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers
1	MW-2	5-4-21	~~1330~~ 1330	W	2

Lab ID	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Gx	NWTPH-Dx (☐ Acid / SG Clean-up)	Volatiles 8260D	Halogenated Volatiles 8260D	EDB EPA 8011 (Waters Only)	Semivolatiles 8270E/SIM (with low-level PAHs)	PAHs 8270E/SIM (low-level)	PCBs 8082A	Organochlorine Pesticides 8081B	Organophosphorus Pesticides 8270E/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664A					% Moisture
1				X																		

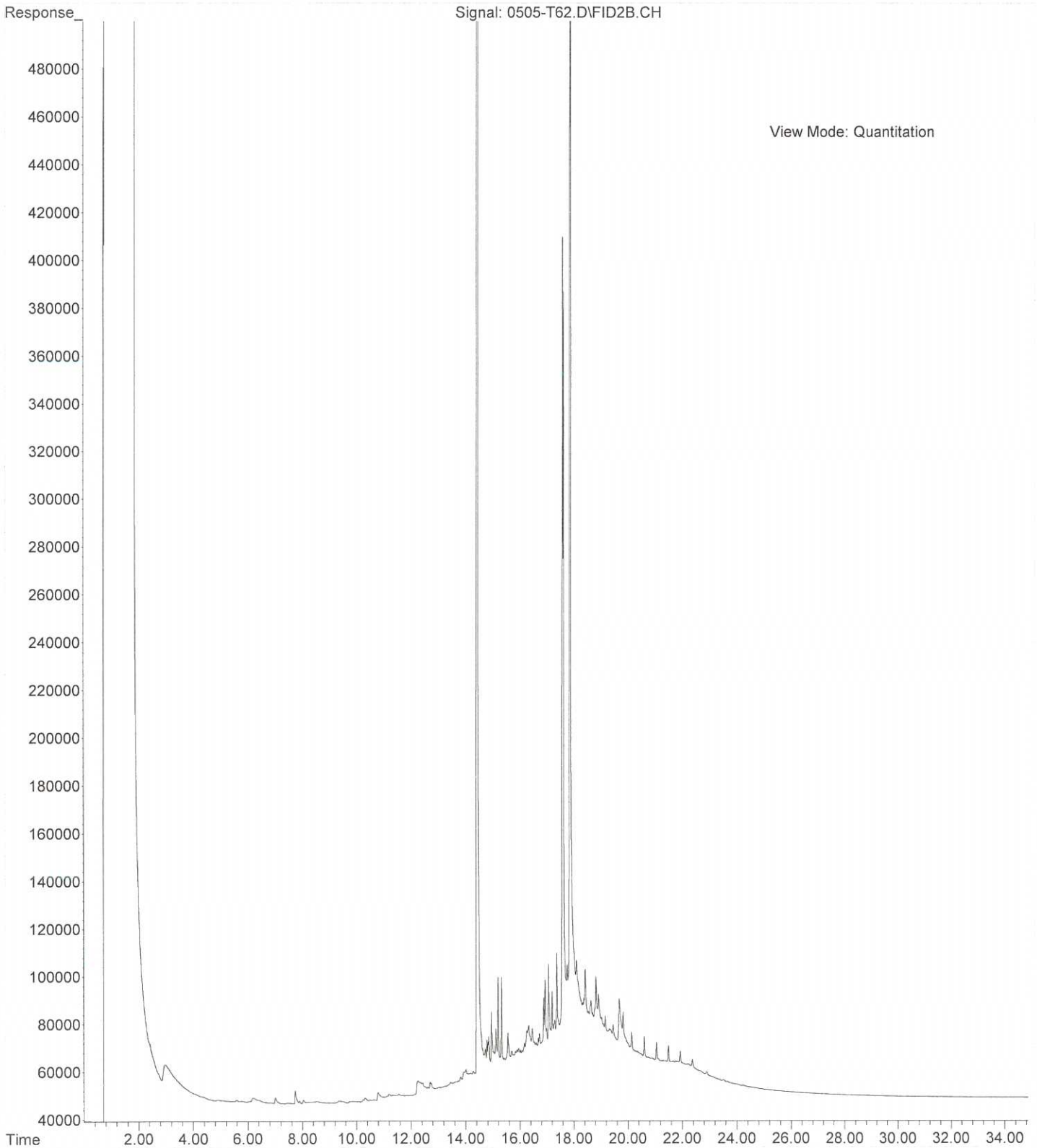
	Signature	Company	Date	Time
Relinquished		GEO ENGINEERS	5-4-21	1523
Received		OSE	5/4/21	1523
Relinquished				
Received				
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions

Data Package: Standard ☐ Level III ☐ Level IV ☐

Chromatograms with final report ☐ Electronic Data Deliverables (EDDs) ☐

File :X:\DIESELS\Teri\Data\T210505.SEC\0505-T62.D
Operator : JT
Acquired : 05 May 2021 14:44 using AcqMethod T210205F.M
Instrument : Teri
Sample Name: 05-019-01
Misc Info :
Vial Number: 62



OnSite Environmental Inc.
14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

September 30, 2021

Katy Atakturk
GeoEngineers, Inc.
2101 4th Avenue, Suite 950
Seattle, WA 98121

Re: Analytical Data for Project 1329-003-28
Laboratory Reference No. 2109-227

Dear Katy:

Enclosed are the analytical results and associated quality control data for samples submitted on September 22, 2021.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: September 30, 2021
Samples Submitted: September 22, 2021
Laboratory Reference: 2109-227
Project: 1329-003-28

Case Narrative

Samples were collected on September 22, 2021 and received by the laboratory on September 22, 2021. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Date of Report: September 30, 2021
Samples Submitted: September 22, 2021
Laboratory Reference: 2109-227
Project: 1329-003-28

ANALYTICAL REPORT FOR SAMPLES

Client ID	Laboratory ID	Matrix	Date Sampled	Date Received	Notes
MW-2	09-227-01	Water	9-22-21	9-22-21	

Date of Report: September 30, 2021
Samples Submitted: September 22, 2021
Laboratory Reference: 2109-227
Project: 1329-003-28

DIESEL AND HEAVY OIL RANGE ORGANICS
NWTPH-Dx

Matrix: Water
Units: mg/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-2**					
Laboratory ID:	09-227-01					
Diesel Range Organics	**ND**	0.22	NWTPH-Dx	9-28-21	9-28-21	
Lube Oil Range Organics	**ND**	0.22	NWTPH-Dx	9-28-21	9-28-21	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*98*	*50-150*				

Date of Report: September 30, 2021
Samples Submitted: September 22, 2021
Laboratory Reference: 2109-227
Project: 1329-003-28

DIESEL AND HEAVY OIL RANGE ORGANICS
NWTPH-Dx
QUALITY CONTROL

Matrix: Water
Units: mg/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0928W1					
Diesel Range Organics	**ND**	0.20	NWTPH-Dx	9-28-21	9-28-21	
Lube Oil Range Organics	**ND**	0.20	NWTPH-Dx	9-28-21	9-28-21	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*105*	*50-150*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	SB0928W1										
	ORIG	DUP									
Diesel Fuel #2	**0.430**	**0.421**	NA	NA		NA		NA	2	NA	
Surrogate:											
o-Terphenyl						*100*	*100*	*50-150*			

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical _____.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

X1- Sample extract treated with a sulfuric acid/silica gel cleanup procedure.

Y - The calibration verification for this analyte exceeded the 20% drift specified in methods 8260 & 8270, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.

Y1 - Negative effects of the matrix from this sample on the instrument caused values for this analyte in the bracketing continuing calibration verification standard (CCVs) to be outside of 20% acceptance criteria. Because of this, quantitation limits and sample concentrations should be considered estimates.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

Chain of Custody

OnSite Environmental Inc.
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Company: GEOENGINEERS
Project Number: 1329-003-28
Project Name: KCHA GREENBRIDGE
Project Manager: KATY ATAKTURK
Sampled by: BRIAN ANDERSON

Turnaround Request (in working days)

(Check One)

- ☐ Same Day
- ☐ 1 Day
- ☐ 2 Days
- ☐ 3 Days
- ☑ Standard (7 Days)
- ☐ _____ (other)

Laboratory Number: 09-227

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Gx	NWTPH-Dx (☐ Acid / SG Clean-up)	Volatiles 8260D	Halogenated Volatiles 8260D	EDB EPA 8011 (Waters Only)	Semivolatiles 8270E/SIM (with low-level PAHs)	PAHs 8270E/SIM (low-level)	PCBs 8082A	Organochlorine Pesticides 8081B	Organophosphorus Pesticides 8270E/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664A					% Moisture
1	MW-2	9-22-21	1025	W	3				X																		

	Signature	Company	Date	Time	Comments/Special Instructions
Relinquished	B. Golden	GEOENGINEERS	9-22-21	1220	
Received		OSE	9/22/21	1220	
Relinquished					
Received					
Relinquished					
Received					Data Package: Standard ☐ Level III ☐ Level IV ☐
Reviewed/Date		Reviewed/Date			Chromatograms with final report ☐ Electronic Data Deliverables (EDDs) ☐

OnSite Environmental Inc.
14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

December 27, 2021

Katy Atakturk
GeoEngineers, Inc.
2101 4th Avenue, Suite 950
Seattle, WA 98121

Re: Analytical Data for Project 1329-003-28
Laboratory Reference No. 2112-153

Dear Katy:

Enclosed are the analytical results and associated quality control data for samples submitted on December 15, 2021.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: December 27, 2021
Samples Submitted: December 15, 2021
Laboratory Reference: 2112-153
Project: 1329-003-28

Case Narrative

Samples were collected on December 15, 2021 and received by the laboratory on December 15, 2021. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Date of Report: December 27, 2021
Samples Submitted: December 15, 2021
Laboratory Reference: 2112-153
Project: 1329-003-28

ANALYTICAL REPORT FOR SAMPLES

Client ID	Laboratory ID	Matrix	Date Sampled	Date Received	Notes
MW-2-12/15/21	12-153-01	Water	12-15-21	12-15-21	

Date of Report: December 27, 2021
Samples Submitted: December 15, 2021
Laboratory Reference: 2112-153
Project: 1329-003-28

DIESEL AND HEAVY OIL RANGE ORGANICS
NWTPH-Dx

Matrix: Water
Units: mg/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-2-12/15/21**					
Laboratory ID:	12-153-01					
Diesel Range Organics	**0.34**	0.21	NWTPH-Dx	12-22-21	12-22-21	
Lube Oil Range Organics	**0.81**	0.21	NWTPH-Dx	12-22-21	12-22-21	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*105*	*50-150*				

Date of Report: December 27, 2021
Samples Submitted: December 15, 2021
Laboratory Reference: 2112-153
Project: 1329-003-28

DIESEL AND HEAVY OIL RANGE ORGANICS
NWTPH-Dx
QUALITY CONTROL

Matrix: Water
Units: mg/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB1222W1					
Diesel Range Organics	**ND**	0.16	NWTPH-Dx	12-22-21	12-22-21	
Lube Oil Range Organics	**ND**	0.16	NWTPH-Dx	12-22-21	12-22-21	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*100*	*50-150*				

Analyte	Result		Spike Level		Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE										
Laboratory ID:	SB1222W1									
	ORIG	DUP								
Diesel Fuel #2	**0.457**	**0.380**	NA	NA		NA	NA	18	NA	
Surrogate:										
o-Terphenyl						*96* *93*	*50-150*			

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical _____.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

X1- Sample extract treated with a sulfuric acid/silica gel cleanup procedure.

Y - The calibration verification for this analyte exceeded the 20% drift specified in methods 8260 & 8270, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.

Y1 - Negative effects of the matrix from this sample on the instrument caused values for this analyte in the bracketing continuing calibration verification standard (CCVs) to be outside of 20% acceptance criteria. Because of this, quantitation limits and sample concentrations should be considered estimates.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

Chain of Custody

Page 1 of 1

OnSite Environmental Inc.
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Company: GeoEngineers
Project Number: 1329-003-28
Project Name: KHCA - West Seattle
Project Manager: Katy Atatkirk
Sampled by: Brittany Davis

Turnaround Request (in working days)

(Check One)

☐ Same Day ☐ 1 Day
☐ 2 Days ☐ 3 Days
☒ Standard (7 Days)
☐ _____ (other)

Laboratory Number: 12-153

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Gx	NWTPH-Dx (☐ Acid / SG Clean-up)	Volatiles 8260D	Halogenated Volatiles 8260D	EDB EPA 8011 (Waters Only)	Semivolatiles 8270E/SIM (with low-level PAHs)	PAHs 8270E/SIM (low-level)	PCBs 8082A	Organochlorine Pesticides 8081B	Organophosphorus Pesticides 8270E/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664A					% Moisture
1	MW-2-12/15/21	12/15/21	1010	W	2				X																		

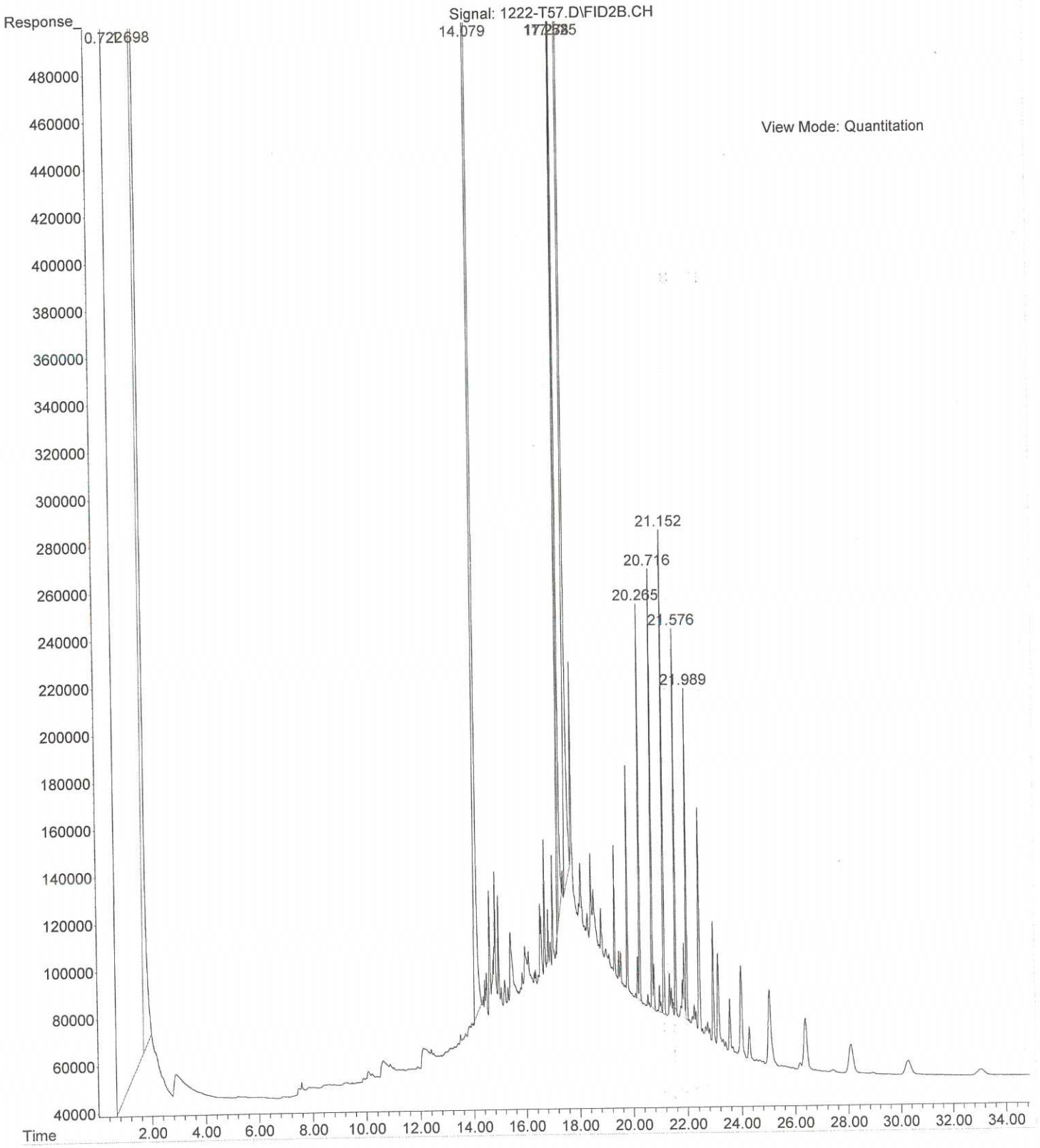
	Signature	Company	Date	Time
Relinquished	Brittany Davis	GeoEngineers	12/15/21	1325
Received	Richard Blum	OSE	12/15/21	1325
Relinquished				
Received				
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions

Data Package: Standard ☐ Level III ☐ Level IV ☐

Chromatograms with final report ☐ Electronic Data Deliverables (EDDs) ☐

File :X:\DIESELS\Teri\Data\T211222.SEC\1222-T57.D
Operator : JP
Acquired : 22 Dec 2021 13:07 using AcqMethod T210817F.M
Instrument : Teri
Sample Name: 12-153-01 REX
Misc Info : RearSamp
Vial Number: 57



APPENDIX C
Disposal Transport Manifests, Waiver and Tickets

CAMI

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
EXEMPT	2	(800)424-9300	KHA92221-ESP01

GENERATOR

5. Generator's Name and Mailing Address
KING COUNTY HOUSING AUTHORITY
9800 8TH AVE SW
SEATTLE WA 98106
Generator's Phone: (206)574-1196

Generator's Site Address (if different than mailing address)
613 SW 97th PLACE
SEATTLE WA 98106

6. Transporter 1 Company Name
CHEMICAL WASTE MANAGEMENT INC
U.S. EPA ID Number
ORD089452353

7. Transporter 2 Company Name
UNION PACIFIC RAILROAD
U.S. EPA ID Number
NED091792910

8. Designated Facility Name and Site Address
CHEMICAL WASTE MANAGEMENT, INC.
17629 CEDAR SPRINGS LANE
ARLINGTON OR 97812-9709
Facility's Phone: (503)454-2643
U.S. EPA ID Number
ORD089452353

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
1.	MATERIAL NOT REGULATED BY D.O.T. OR348155	5 6	DM	2,500	P	
2.						
3.						
4.						

13. Special Handling Instructions and Additional Information
1. OR348155- Soil and Activated Carbon

14. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: King County Housing Authority
Signature:
Month: 9 Day: 22 Year: 21

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: G.PINAULA
Signature:
Month: 9 Day: 22 Year: 21

Transporter 2 Printed/Typed Name
Signature
Month Day Year

DESIGNATED FACILITY

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:

17c. Signature of Alternate Facility (or Generator)
Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name
Signature
Month Day Year

169-BLC-O 5 11977 (Rev. 9/09)

GENERATOR'S/SHIPPER'S INITIAL COPY

Generator Name King County Housing Authority Profile Number 115870WA

Waste Name Soil and Activated Carbon

Generator's NAICS Code 531190 Code Two;

Does the Generator's Facility manage, store, use, process, or discard any of the following materials in or from your production processes;

Yes[1]	No	Waste Classifications
○	◉	**Nuclear Materials**
○	◉	**Mineral Ore mining/overburden processing or extraction** *Uranium, Radium, Thorium, Plutonium, Cobalt, Strontium, Zirconium, Polonium, Beryllium*
○	◉	**Phosphate Fertilizer Production** *Phosphogypsum, Scale, Residuals, Slag*
○	◉	**Coal and Coal Burning Wastes** *Coal Fly/Bottom Ash*
○	◉	**Petroleum Refining/Production** *Filter Socks, Pipe Scale, Stratum Water, Refinery Process Sediments, Tank Bottoms*
○	◉	**Drinking Water and Wastewater Treatment Wastes** *Filter Socks, Pipe Scale, Stratum Water, Tank Bottoms, Bio-solids, Grit and Screenings, septic*
○	◉	**Other Processing Wastes** *Ceramic, Refractory, Zircon sand, Bauxite to Alumina processing, Titanium, Zirconium, Baghouse Dusts with refractory, "Mag-Thor" metals, Ceramic Insulators, Sand Blasting waste*
○	◉	**Geothermal Wastes** *Filter Socks, Pipe Scale, Stratum Water, Tank Bottoms*
○	◉	**Does the generator perform Metals Casting**
○	◉	**Are any of the Generator's wastes subject to an oil and gas exploration and production (E&P) exemption pursuant to section 3001(b)(2)(A)?**
○	◉	**Have any of the Generator's wastes been tested using isotopic testing, or known to contain radioactivity**
○	◉	**Does the Generator's facility have a Federal or State license to store, dispose or transport radioactive materials? Federal License No:** ____ **State License No:** ____

1- Any YES answers may require additional information, please contact your TSC representative at wmpnw2@wm.com

GENERATOR CERTIFICATION (PLEASE READ AND CERTIFY BY SIGNATURE)

By signing this form, I hereby certify that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

☐ I am an Authorized Agent signing on behalf of the Generator, and I have confirmed with the Generator that information contained in this profile, as well as supporting documents provided, are accurate and complete.

Name Print John E. Eliason Date 8/26/21

Title Development Director

Company King County Housing Authority

Certification Signature

BILL OF LADING

PRODUCT TRANSPORT MANIFEST

Nº 32118

MARINE VACUUM SERVICE, INC.

24 HOUR EMERGENCY PHONE NUMBER (206) 762-0240

FAX NUMBER 206-763-8084

TRUCK NUMBER _____ DATE 12/15/21

TO
DESTINATION
NAME Marine Vacuum Service, Inc.
STREET 1516 South Graham Street
CITY/STATE Seattle, WA 98108

FROM
SHIPPER
NAME GeoEngineers
STREET _____
CITY/STATE Seattle, WA

QUANTITY	PROPER SHIPPING NAME	UN (PLACARD) NUMBER
7 gallons	purge water	

SLUDGE

RECEIVER _____ DATE 12.15.21

SHIPPER Brittany Dow DATE 12/15/21

NOTE: 2 - 5 gallon buckets for disposal

Customer warrants that the waste petroleum products being transferred by the above collector do not contain any contaminates including without limitations, pesticides, chlorinated solvents at concentrations greater than 1000 PPM, any detectable levels of PCBs, or any other material classified as dangerous or hazardous waste by 40 CFR Part 261, Subpart C and D (implementing the Federal Resource Conservation and Recover Act), or by any equivalent state dangerous or hazardous substance classification programs. Should laboratory tests find this waste not in compliance with 40 CFR Part 261, customer (generator) agrees to pay for all disposal costs incurred.

APPENDIX D
Report Limitations and Guidelines for Use

APPENDIX D
REPORT LIMITATIONS AND GUIDELINES FOR USE[1]

This appendix provides information to help you manage your risks with respect to the use of this report.

Read These Provisions Closely

Some clients, design professionals and contractors may not recognize that the geosciences practices (geotechnical engineering, geology and environmental science) are far less exact than other engineering and natural science disciplines. This lack of understanding can create unrealistic expectations that could lead to disappointments, claims and disputes. GeoEngineers includes these explanatory "limitations" provisions in our reports to help reduce such risks. Please confer with GeoEngineers if you are unclear how these "Report Limitations and Guidelines for Use" apply to your project or site.

Environmental Services Are Performed for Specific Purposes, Persons and Projects

This report has been prepared for the exclusive use of King County Housing Authority (KCHA) and their authorized agents. This report may be reviewed by regulatory agencies. This report is not intended for use by others, and the information contained herein is not applicable to other sites.

GeoEngineers structures our services to meet the specific needs of our clients. For example, an environmental site assessment or remedial action study conducted for a property owner may not fulfill the needs of a prospective purchaser of the same property. Because each environmental study is unique, each environmental report is unique, prepared solely for the specific client and project site. No one except KCHA should rely on this report without first conferring with GeoEngineers. This report should not be applied for any purpose or project except the one originally contemplated.

This Environmental Report Is Based on a Unique Set of Project-Specific Factors

This report applies to the Former Park Lake Homes Maintenance Center Site located at 9800 8th Avenue SW located in Seattle, Washington. GeoEngineers considered a number of unique, project-specific factors when establishing the scope of services for this project and report. Unless GeoEngineers specifically indicates otherwise, do not rely on this report if it was:

- Not prepared for you,
- Not prepared for your project,
- Not prepared for the specific site explored, or
- Completed before important project changes were made.

If important changes are made after the date of this report, GeoEngineers should be given the opportunity to review our interpretations and recommendations and provide written modifications or confirmation, as appropriate.

[1] Developed based on material provided by GBA, The GeoProfessional Business Association; www.gba.org.

Reliance Conditions for Third Parties

No third party may rely on the product of our services unless GeoEngineers agrees in advance, and in writing to such reliance. This is to provide our firm with reasonable protection against open-ended liability claims by third parties with whom there would otherwise be no contractual limits to their actions.

Environmental Regulations Are Always Evolving

Some substances may be present in the site vicinity in quantities or under conditions that may have led, or may lead, to contamination of the subject site, but are not included in current local, state or federal regulatory definitions of hazardous substances or do not otherwise present current potential liability. GeoEngineers cannot be responsible if the standards for appropriate inquiry, or regulatory definitions of hazardous substance, change or if more stringent environmental standards are developed in the future.

Subsurface Conditions Can Change

This report is based on conditions that existed at the time our site studies were performed. The findings and conclusions of this report may be affected by the passage of time, by manmade events such as construction on or adjacent to the site, by new releases of hazardous substances, or by natural events such as floods, earthquakes and slope instability or groundwater fluctuations. Always contact GeoEngineers before applying this report to determine if it is still applicable.

Biological Pollutants

GeoEngineers' Scope of Work specifically excludes the investigation, detection, prevention or assessment of the presence of Biological Pollutants. Accordingly, this report does not include any interpretations, recommendations, findings, or conclusions regarding the detecting, assessing, preventing or abating of Biological Pollutants and no conclusions or inferences should be drawn regarding Biological Pollutants, as they may relate to this project. The term "Biological Pollutants" includes, but is not limited to, molds, fungi, spores, bacteria, and viruses, and/or any of their byproducts.

If Client desires these specialized services, they should be obtained from a consultant who offers services in this specialized field.

Geotechnical, Geologic and Environmental Reports Should Not Be Interchanged

The equipment, techniques and personnel used to perform an environmental study differ significantly from those used to perform a geotechnical or geologic study and vice versa. For that reason, a geotechnical engineering or geologic report does not usually relate any environmental findings, conclusions or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. Similarly, environmental reports are not used to address geotechnical or geologic concerns regarding a specific project.

Soil and Groundwater End Use

The cleanup levels referenced in this report are site- and situation-specific. The cleanup levels may not be applicable for other sites or for other on-site uses of the affected media (soil and/or groundwater). Note that hazardous substances may be present in some of the site soil and/or groundwater at detectable concentrations that are less than the referenced cleanup levels. GeoEngineers should be contacted prior to the export of soil or groundwater from the subject site or reuse of the affected media on site to evaluate

the potential for associated environmental liabilities. We cannot be responsible for potential environmental liability arising out of the transfer of soil and/or groundwater from the subject site to another location or its reuse on site in instances that we were not aware of or could not control.

Most Environmental Findings Are Professional Opinions

Our interpretations of subsurface conditions are based on field observations and chemical analytical data from widely spaced sampling locations at the site. Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. GeoEngineers reviewed field and laboratory data and then applied our professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ – sometimes significantly – from those indicated in this report. Our report, conclusions and interpretations should not be construed as a warranty of the subsurface conditions.

GeoEngineers