Cleanup Action Report

Rufus 2.0 Development
Block 18
Seattle, Washington

for
Acorn Development LLC

April 2, 2020

GeoEngineers
Earth Science + Technology

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File No. 20434-001-32

April 2, 2020

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EXECUTIVE SUMMARY

This report summarizes a Cleanup Action completed at the Block 18 project site located in the Denny Triangle Neighborhood in downtown Seattle, Washington. Block 18 is bounded by 7th Avenue to the north, Blanchard Street to the east, an alley to the south and Bell Street to the west. Remedial excavations were conducted concurrent with property redevelopment with a high-rise structure with underground parking. Soil sampling prior to, and following, building demolition indicated the presence of carcinogenic polycyclic aromatic hydrocarbon (cPAHs) concentrations greater than the Washington State Model Toxics Control Act (MTCA) cleanup levels. The cPAH contamination in both areas was shallow and removed from within the bounds of the Subject Property. The cPAH contaminated soil was transported for permitted disposal to Waste Management's (WM) transfer station in Seattle, Washington for rail haul to the WM subtitle D landfill in Arlington, Oregon. The total tonnage of contaminated soil transported to WM from Block 18 was 1,037 tons. Based on chemical analytical testing from the two areas, PAH contaminants were not detected above laboratory reporting limits in the soil at the final limits of the remedial excavations.

This Executive Summary should be used only in the context of the full report for which it is intended.

1.0 INTRODUCTION

This report summarizes a Cleanup Action of carcinogenic polycyclic aromatic hydrocarbon (cPAH)-contaminated soil at the Block 18 redevelopment project (Subject Property) in the Denny Triangle Neighborhood in downtown Seattle, Washington. Block 18 is bounded by 7th Avenue to the north, Blanchard Street to the east, an alley to the south and Bell Street to the west. At the time of this report, Block 18 is being redeveloped. The former buildings on the Subject Property were demolished in 2018 and the Subject Property is being redeveloped with a high-rise structure with a parking garage including five below-grade levels (P1 through P5). Site characterization and analysis of soil samples by GeoEngineers prior to, and following, building demolition and Site-clearing activities identified cPAH concentration in soil greater than Model Toxics Control Act (MTCA) Method A Cleanup Level (CUL) at two localized areas (Area A and Area B) at Block 18.

The Site is shown relative to surrounding physical features on the Vicinity Map, Figure 1. The Block 18 layout and exploration locations are shown in Figure 2. The locations of the remedial excavations conducted on Block 18 are detailed in Figure 3.

2.0 SITE CHARACTERIZATION

2.1. Historic Operations and Property Uses

Based on the results of our Phase I Environmental Site Assessment (GeoEngineers, 2012a), Block 18 was developed with residential buildings from the 1900s to 1930s, and retail/commercial from the 1940s to the present including Schuck's Auto Supply (1940 to 2007), Fastenal Company (2000s to 2011), and the Towne Motel/Day's Inn (1958 to 2000s). No recognized environmental conditions (RECs) were identified as part of the Phase I ESA. However, based on historical research, it is likely that imported soil from an unknown source was placed on portions of the Site during the early 1900s Denny Hill Cut and Regrade activities.

The potential contaminants of concern for the Site based on the presence of unknown fill include the following:

- Gasoline-, diesel-, and heavy oil-range total petroleum hydrocarbons (TPH);
- Polycyclic aromatic hydrocarbons (PAHs), including carcinogenic PAHs (cPAHs);
- Volatile organic compounds (VOCs); and,
- Metals.

2.2. 2017 Phase II ESA Summary and Subsurface Conditions

GeoEngineers conducted a Phase II ESA at Block 18 in 2017 (GeoEngineers, 2017) prior to building demolition and property-clearing activities. Four hollow-stem auger (HSA) borings (B18-1 through B18-3 and MW18-1) and six direct-push borings (B18-4 through B18-9) were completed at the property. A monitoring well was installed in one of the HSA borings (MW18-1). A summary of the findings is presented below.

2.2.1. Soil Conditions

Soil encountered at Block 18 consists of:

- Relatively shallow fill (loose to dense silty sand and silt with variable gravel and cobble content and occasional brick, charcoal or wood debris) overlying,
- Recent deposits (stiff to very stiff silt and clay with occasional sand interbeds and variable gravel content or medium dense to dense sand with variable silt and gravel content), and
- Competent glacially consolidated soils (cohesive silt and clay, cohesionless sand and gravel, and till-like deposits).

2.2.2. Soil Chemical Analytical Results

One or more soil samples from each of the four HSA, and six direct push borings, were submitted to Fremont Analytical in Seattle, Washington for potential chemical analysis. Soil sampling at boring B18-2 indicated a cPAH toxic equivalency (TEQ) concentration (189.9 micrograms per kilogram [µg/kg]), which is greater than the MTCA Method A CUL for cPAHs of 100 µg/kg in the upper 2.5 feet below ground surface (bgs) of the soil near the southeast corner of the Site. However, cPAHs were not detected in soil from the underlying native material at 5 feet bgs (sample B18-2-5.0). Other potential contaminants of concern (TPH, PAHs, VOCs, and metals) were either not detected, or were detected at concentrations less than MTCA CULs.

No potential contaminants of concern (TPH, PAHs, VOCs, and metals) exceeded MTCA CULs in the soil samples tested from native soil, and detected metals concentrations were similar to published values for natural background metals concentrations in Puget Sound soils.

The laboratory analytical results for the soil samples are summarized in Table 1 through Table 3, presented on Figure 2, and complete laboratory reports are included in Appendix B.

2.2.3. Groundwater Analytical Results

One boring (MW18-1) from the 2017 Phase II ESA study was completed as a groundwater monitoring well, screened from 85 to 95 feet bgs (approximately elevation 12 to 22 feet) to evaluate the potential for contaminants in the regional groundwater aquifer beneath the Site.

Contaminants of concern including TPH, PAHs, VOCs, and metals were not detected above MTCA CULs, with one exception. Total arsenic was detected at a concentration greater than the MTCA Method A CUL from the deep monitoring well (MW18-1) on May 23, 2017. Follow-up groundwater sampling from the same well on June 27, 2017 indicated total and dissolved arsenic concentrations were less than the MTCA Method A CUL. Elevated total arsenic in sample MW18-1-170523 was likely due to the presence of suspended solids (silt and sand) in the collected sample and not representative of arsenic concentrations in groundwater.

Groundwater chemical analytical results from the 2017 Phase II ESA study are summarized in Table 3.

2.3. 2018 Test Pit Exploration Summary

Test pit excavations were completed in 2018 following the building demolition to further delineate the horizontal and vertical extents of impacted and contaminated soil categories identified during the Phase II ESA (2017) and summarized in the Block 18 Environmental Construction Contingency Plan (GeoEngineers, 2018). The 19 soil samples collected from the 14 test pit explorations were submitted to Fremont Analytical (Seattle, Washington) for laboratory analysis for one or more of the following:

- Gasoline-range total petroleum hydrocarbons analyzed using Northwest Method NWTPH-Gx;
- Diesel- and heavy oil-range total petroleum hydrocarbons analyzed using Northwest Method NWTPH-Dx;
- PAHs analyzed using Environmental Protection Agency (EPA) method 8270;
- Resource Conservation and Recovery Act (RCRA) 8 Metals analyzed using EPA Methods 6000/7000 Series; and
- Volatile Organic Compound (VOCs) analyzed using EPA Method 8260C.

2.3.1. Soil Chemical Analytical Results

The laboratory analytical results for the soil samples are summarized in Table 1, presented on Figure 3, complete laboratory reports included in Appendix B, and are as follows:

- One soil sample from test pit location TP-8 indicated a cPAH concentration (124.1 µg/kg) greater than the MTCA Method A CUL for total TEQ for cPAHs in the upper 2.5 feet bgs of the soil (sample TP-8-2.5). However, cPAHs were not detected in soil from the underlying native material at 5 feet bgs (sample TP-8-5.0).
- No potential contaminants of concern (TPH, PAHs, VOCs, and metals) exceeded MTCA CULs in the soil samples tested from the other 18 soil samples collected, and detected metals concentrations were similar to published values for natural background metals concentrations in Puget Sound soils.

3.0 EXCAVATION ACTIVITIES

Two remedial excavations were completed by Northwest Construction (Northwest), the excavation contractor working with Sellen Construction, at Block 18 to remove PAH-contaminated soil encountered at test pit TP-8 (Area A) and boring B18-2 (Area B) in shallow fill soil at 2.5 feet bgs. Northwest removed a total of 905 tons (according to weight tickets provided by Waste Management) of PAH-contaminated soil from Area A and Area B concurrent with property redevelopment activities. Soil samples were obtained throughout remedial excavation activities for field screening using visual, water sheen, and headspace vapor screening methods. Field screening methods are described in Appendix A. Soil samples were submitted for chemical analysis on a rush turn around time during remedial excavation activities to confirm the final vertical and lateral limits of the contaminated soil identified during the site characterization activities.

Soil chemical analytical results of the remedial excavation areas are summarized in Table 2. The approximate final limits of the remedial excavations to remove contaminated soil from Areas A and B, and the approximate confirmation sample locations are shown on Figure 3. The complete laboratory reports and our review of the laboratory quality control data are presented in Appendix B.

3.1. Area A

Northwest excavated soil from location TP-8 on November 29, 2018 where a shallow (2.5 feet bgs) sample indicated a cPAH concentration greater than MTCA Method A CULs. Approximately 300 cubic yards of soil was removed from the area surrounding TP-8 using an excavator and hauled to Waste Management, Inc.'s transfer facility in Seattle, Washington. The final limits of the excavation measured approximately 40 feet by 40 feet by 5 feet deep.

3.1.1. Confirmation Soil Sampling

Confirmation soil samples (TP-8-N-2.5, TP-8-E-2.5, TP-8-S-2.5, TP-8-W-2.5) were collected for chemical analysis following remedial excavation activities to document the cPAH concentrations in soil at the final limits of excavation. cPAHs were not detected at concentrations greater than the laboratory reporting limits in the confirmation soil samples obtained at the final vertical limits of the remedial excavation.

3.2. Area B

Northwest excavated soil from location B18-2 on November 18, 2018 where previous soil sampling indicated cPAH concentrations greater than MTCA CULs. Approximately 135 cubic yards of soil was removed from the area surrounding TP-8 using an excavator and hauled to Waste Management, Inc.'s transfer facility in Seattle, Washington. The final limts of the excavation measured approximately 25 feet by 25 feet by 5 feet deep.

3.2.1. Confirmation Soil Sampling

Subsurface conditions surrounding B18-2 were evaluated based on the results of the test pit explorations and soil sampling that occurred during November, 2018. Test pit locations TP-13 and TP-14 (completed approximately 25 feet to the north and to the west; respectively) of boring location B18-2. Two additional confirmation soil samples (EX-1-2.5 and EX-2-2.5) were collected from the adjacent sidewalls from the southeast corner of the property. Chemical analytical results from soil samples TP-13-2.5, TP-14-2.5, EX-1-2.5 and EX-2-2.5 indicate that cPAHs were not detected at concentrations greater than the laboratory reporting limits.

3.3. Contaminated Soil Disposal

Contaminated soil removed from the two remedial excavation areas was transported to Waste Management's transfer station in Seattle, Washington for permitted disposal at their Subtitle D landfill located in Arlington, Oregon and Cadman's treatment and disposal facility in Everett, Washington. Approximately 1,037 tons (according to weight summaries provided by the disposal facilities) of cPAH contaminated soil was removed from the site during remedial excavations performed by Northwest. Contaminated soil tonnage summary provided by the disposal facilities is included in Appendix C.

3.4. Impacted Soil Disposal

Impacted soil, soil with detectable concentrations of contaminants less than the MTCA Method A CULs was identified during site characterization activities. Approximately 3,203 tons (based on disposal receipts provided by Cadman) were transported to Cadman's disposal facility in Everett, Washington. The impacted soil tonnage summary provided by the disposal facility is included in Appendix C.

4.0 CONCLUSIONS

Soil with cPAHs at concentrations greater than MTCA Method A cleanup levels was encountered during construction activities at Block 18. Two remedial excavations were conducted from two localized areas (Areas A and Area B) to remove contaminated soil encountered during the redevelopment construction activities in November 2018.

Based on the chemical analytical results of the soil samples obtained at the final limits of the two remedial excavations, soil with cPAH concentrations greater than the MTCA Method A cleanup levels was successfully removed from the Subject Property. Additionally, our site observations, characterization soil samples and confirmation soil samples confirmed that the contaminated soil encountered did not extend off of the Subject Property into the ROWs. Based on the weight tickets provided by Waste Management and Cadman, the total quantity of contaminated soil removed Block 18 for permitted disposal was 990 tons. The remedial actions completed resulted in site conditions that are protective of human health and the environment.

5.0 REFERENCES

GeoEngineers, 2012a. Phase I Environmental Site Assessment, Rufus 2.0, Denny Triangle, Blocks 14, 19, 20, 18 and 21, Seattle Washington, dated June 7, 2012.

GeoEngineers, 2018. Block 18 Construction Contingency Plan, Soil and Groundwater Management, Rufus 2.0 Development, Block 18, Denny Triangle, Seattle, Washington 98101, dated January 10, 2018.

6.0 LIMITATIONS

We have prepared this report for the exclusive use of Acorn Development LLC, their authorized agents and regulatory agencies. This report is not intended for use by others and the information contained herein is not applicable to other sites. No other party may rely on the product of our services unless we agree 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.

Our conclusions are based on our site observations, field screening results and chemical analysis of a limited number of soil samples at the site. It is always possible that contaminants remain in areas that were not observed, sampled or tested.

Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted environmental science practices in this area at the time this report was prepared. No warranty or other conditions, express or implied, should be understood.

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Please refer to Appendix D, titled "Report Limitations and Guidelines for Use," for additional information pertaining to use of this report.

TABLES

GeoEngineers

Table 1

Soil Field Screening and Chemical Analytical Data (Petroleum Hydrocarbons, Metals, VOCs and cPAHs)

Project Rufus 2.0 - Block 18

Seattle, Washington

Sample Date	Exploration Location[1]	Sample ID	Depth (feet bgs)	Sample Horizon	Field Screening[2]		Petroleum Hydrocarbons (mg/kg)			Resource Conservation and Recovery Act (RCRA) Metals[5] (mg/kg)								VOC's[6] (mg/kg)	cPAHs[7] (µg/kg)
					Sheen	Headspace (ppm)	Gasoline Range[3]	Diesel Range[4]	Heavy Oil Range[4]	Arsenic	Barium	Cadmium	Chromium	Lead	Selenium	Silver	Mercury		
Hollow Stem Auger Borings Completed May 2017																			
05/09/17	B18-1	B18-1-2.5	2.5	Fill	NS	<1	<4.98	<22.9	<57.3	**6.5**	**99.6**	<0.182	**53.9**	**3.68**	**1.95**	<0.0909	<0.293	ND	ND
05/09/17		B18-1-7.5	7.5	Native	NS	<1	<5.63	<21.0	<52.4	**2.79**	**25.7**	<0.171	**21.3**	**1.23**	**0.713**	<0.0856	<0.26	ND	ND
05/09/17	B18-2	B18-2-2.5	2.5	Fill	NS	<1	<7.66	<23.6	**125**	**5.3**	**135**	<0.204	**70.8**	**6.29**	**2.06**	<0.102	<0.286	**D**[6]	**189.9**
05/09/17		B18-2-5.0	5.0	Native	NS	<1	<5.70	<22.6	<56.4	**5.42**	**141**	<0.188	**68.7**	**5.30**	**1.86**	<0.0942	<0.325	ND	ND
05/09/17		B18-2-10.0	10	Native	NS	<1	<5.84	<23.6	<58.9	**5.48**	**124**	<0.2	**67.3**	**4.68**	**2.25**	<0.0999	<0.312	ND	ND
05/08/17	B18-3	B18-3-5.0	5.0	Fill	NS	<1	<5.0	<22.9	**104**	**4.57**	**103**	<0.183	**55.2**	**5.03**	**1.77**	<0.0921	<0.278	ND	ND
05/08/17		B18-3-15.0	15	Native	NS	<1	<11.1	<20.5	<51.3	**1.48**	**48.2**	<0.164	**32.3**	**1.66**	**0.966**	<0.0818	<0.241	ND	ND
05/10/17	MW18-1	MW18-1-2.5	2.5	Fill	NS	<1	<6.28	<19.9	**138**	**1.94**	**39.9**	<0.168	**32.7**	**1.86**	**0.98**	<0.084	<0.226	**D**[6 8]	ND
05/10/17		MW18-1-7.5	7.5	Native	NS	<1	<5.99	<20.9	<52.2	**3.19**	**45.1**	<0.155	**30.4**	**1.93**	**1.12**	<0.0777	<0.259	ND	ND
Direct Push Borings Completed May 2017																			
05/16/17	B18-4	B18-4-5.0	5.0	Fill	NS	<1	<7.95	<24.0	<60.1	**4.98**	**93.1**	<0.195	**61**	**4.19**	**1.67**	<0.0973	<0.302	ND	ND
05/16/17		B18-4-15.0	15	Native	NS	<1	<4.51	<20.5	<51.3	**2.58**	**51.5**	<0.169	**38.1**	**1.94**	**1.05**	<0.0847	<0.253	ND	ND
05/16/17	B18-5	B18-5-2.5	2.5	Native	NS	<1	<4.91	<19	<47.6	**2.69**	**38.6**	<0.173	**34.6**	**2.07**	**1.08**	<0.0863	<0.264	ND	ND
05/16/17		B18-5-10.0	10	Native	NS	<1	<6.22	<20.7	<51.8	**1.82**	**31.5**	<0.161	**35.9**	**1.54**	**1**	<0.0806	<0.260	ND	ND
05/16/17	B18-6	B18-6-5.0	5.0	Native	NS	<1	<4.23	<19.5	<48.8	**2.18**	**30.2**	<0.170	**28.8**	**1.61**	**1.06**	<0.0851	<0.267	ND	ND
05/16/17		B18-6-10.0	10	Native	NS	<1	<4.91	<19.5	**127**	**3.3**	**52.6**	<0.174	**88.3**	**2.43**	**1.37**	<0.0870	<0251	ND	ND
05/16/17	B18-7	B18-7-2.5	2.5	Fill	NS	<1	<4.65	<19.5	<48.8	**1.75**	**26.4**	<0.155	**26.9**	**1.49**	**0.827**	<0.0775	<0.256	ND	ND
05/16/17	B18-8	B18-8-2.5	2.5	Fill	NS	<1	<7.96	<19.4	<48.4	**2.39**	**31.2**	<0.172	**28.0**	**1.55**	**1.02**	<0.0858	<0.268	ND	ND
05/16/17		B18-8-10.0	10	Native	SS	<1	<5.26	<19.9	<49.8	**2.73**	**49.4**	<0.182	**59.9**	**2.13**	**1.2**	<0.0908	<0.261	ND	ND
05/16/17		B18-8-15.0	15	Native	NS	<1	<6.21	<20.1	<50.4	**2.36**	**34.4**	<0.154	**33.4**	**1.7**	**1.01**	<0.0772	<0.263	ND	ND
05/16/17	B18-9	B18-9-5.0	5.0	Native	NS	<1	<7.93	<23.8	<59.5	**5.03**	**136**	<0.203	**88.5**	**5.91**	**2.21**	**0.102**	**0.0324**	ND	ND
05/16/17		B18-9-10.0	10	Native	NS	<1	<5.43	<25.0	<62.5	**5.02**	**121**	<0.189	**85.6**	**5.6**	**2.11**	<0.0943	<0.0315	ND	ND
Test Pits Completed November 2018																			
11/13/18	TP-1	TP-1-2.5	2.5	Fill	NS	1.3	**10.1**	<19.4	<48.5	1.75	--	<0.159	**24.0**	**1.37**	--	--	<0.259	ND	ND
11/13/18		TP-1-5.0	5.0	Native	NS	3.3	<5.18	--	--	--	--	--	--	--	--	--	--	--	--
11/15/18	TP-2	TP-2-2.5	2.5	Fill	NS	1.4	<5.14	<19.8	<49.4	1.66	--	<0.153	**24.2**	**1.17**	--	--	<0.249	ND	ND
11/13/18	TP-3	TP-3-2.5	2.5	Fill	NS	11.1	**16.3**	<21.2	<52.9	1.89	--	<0.170	**26.4**	**1.55**	--	--	<0.252	ND	ND
11/13/18		TP-3-5.0	5.0	Fill	NS	10.9	<4.96	--	--	--	--	--	--	--	--	--	--	--	--
11/13/18	TP-4	TP-4-2.5	2.5	Fill	NS	13.3	<5.47	<21.1	<52.8	2.04	--	<0.165	**49.7**	**1.40**	--	--	<0.245	ND	ND
11/15/18	TP-5	TP-5-2.5	2.5	Fill	NS	3.0	<5.46	<20.1	<50.3	1.57	--	<0.160	**24.2**	**1.49**	--	--	<0.233	ND	ND
11/13/18	TP-6	TP-6-2.5	2.5	Fill	NS	23.3	<6.78	<21.8	<54.5	1.38	--	<0.171	**27**	**1.43**	--	--	<0.286	ND	ND
11/15/18	TP-7	TP-7-2.5	2.5	Fill	NS	15.5	<6.89	<23.5	75.8	5.31	--	<0.203	**62.2**	**4.49**	--	--	<0.317	ND	ND
11/15/18		TP-7-5.0	5.0	Native	NS	27.5	--	<20.1	<50.3	--	--	--	--	--	--	--	--	--	--

Sample Date	Exploration Location[1]	Sample ID	Depth (feet bgs)	Sample Horizon	Field Screening[2]		Petroleum Hydrocarbons (mg/kg)			Resource Conservation and Recovery Act (RCRA) Metals[5] (mg/kg)								VOC's[6] (mg/kg)	cPAHs[7] (µg/kg)
					Sheen	Headspace (ppm)	Gasoline Range[3]	Diesel Range[4]	Heavy Oil Range[4]	Arsenic	Barium	Cadmium	Chromium	Lead	Selenium	Silver	Mercury		
11/15/18	TP-8	TP-8-2.5	2.5	Fill	NS	15.7	<6.32	<23.0	**399**	**5.45**	--	<0.193	**64.6**	**4.81**	--	--	<0.326	**D[6]**	**124.1**
11/15/18		TP-8-5.0	5	Fill	NS	15.3	--	<23.0	<57.4	--	--	--	--	--	--	--	--	--	ND
11/29/18		TP-8-N-2.5	2.5	Fill	NS	<1	--	<23.3	<58.4	--	--	--	--	--	--	--	--	--	ND
11/29/18		TP-8-E-2.5	2.5	Fill	NS	<1	--	<22.4	<56.1	--	--	--	--	--	--	--	--	--	ND
11/29/18		TP-8-W-2.5	2.5	Fill	NS	<1	--	<23.4	<58.5	--	--	--	--	--	--	--	--	--	ND
11/29/18		TP-8-S-2.5	2.5	Fill	NS	<1	--	<23.5	<58.6	--	--	--	--	--	--	--	--	--	ND
11/07/18	TP-9	TP-9-2.5	2.5	Fill	NS	3.1	<6.23	<24.4	<61.0	**5.25**	--	<0.203	**67.3**	**4.38**	--	--	<0.319	ND	ND
11/07/18	TP-10	TP-10-2.5	2.5	Fill	NS	<1	<7.38	<25.4	<63.6	**4.43**	--	<0.194	**64.1**	**7.81**	--	--	<0.335	ND	ND
11/15/18	TP-11	TP-11-2.5	2.5	Fill	NS	<1	<6.67	<23.7	<59.3	**4.48**		<0.188	**37.1**	**2.69**	--	--	<0.285	ND	ND
11/15/18	TP-12	TP-12-2.5	2.5	Fill	NS	2.3	<5.93	<22.5	<56.3	**4.02**	--	<0.173	**30.2**	**2.36**	--	--	<0.287	ND	ND
11/07/18	TP-13	TP-13-2.5	2.5	Fill	NS	3.7	<7.16	<26.8	<67.0	**3.86**	--	<0.201	**67.5**	**5.95**	--	--	<0.318	ND	ND
11/07/18	TP-14	TP-14-2.5	2.5	Fill	SS	7.3	<6.36	<25.3	<63.2	**4.23**	--	<0.196	**73.0**	**6.57**	--	--	<0.320	**D[6]**	ND
11/07/18		TP-14-5.0	5	Native	SS	7.1	--	--	--	--	--	--	--	--	--	--	--	**D[6]**	--
Model Toxics Cleanup Act (MTCA) Method A or B Cleanup Level for Unrestricted Land Use							30/100[9]	2,000	2,000	20	16,000	2	2,000[10]	250	400	400	2	--	100
Puget Sound Natural Background Concentration							N/A	N/A	N/A	7	0.6	1		24	--	--	0.07	N/A	N/A

Notes:

[1]Approximate exploration locations shown on the attached figures. Chemical analytical testing by Fremont Analytical in Seattle, Washington.

[2]Field screening methods are described in Appendix A.

[3]Gasoline-range hydrocarbons analyzed by Northwest Method NWTPH-Gx.

[4]Diesel- and heavy oil-range hydrocarbons analyzed by Northwest Method NWTPH-Dx.

[5]Total RCRA metals analyzed by EPA Method 6000/7000 Series.

[6]Volatile Organic Compounds (VOCs) analyzed by Environmental Protection Agency's (EPA) Method 8260. For VOCs, detected compounds are represented with a 'D,' see lab report for full list of analytes.

[7] Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) analysis by EPA Method 8270 SIM. Reporting the Total TEQ (Total Toxic equivalent concentration) for cPAHs, see lab report for full list of analytes.

[8]Methylene chloride was detected in this sample at concentrations greater than the MTCA Method A cleanup level. Methylene chloride is a common laboratory contaminant and since no history of prior site use of methylene chloride has been identified at the site, it is not a contaminant of concern.

[9]When benzene is present, the gasoline range cleanup level is 30 mg/kg. When benzene is not present the gasoline range cleanup level is 100 mg/kg.

[10]MTCA Method A cleanup level for Chromium III (Trivalent Chromium).

D = Detected ND = Not Detected

mg/kg = milligrams per kilogram

µg/kg = micrograms per kilogram

N/A= Not Applicable

-- = not analyzed

NS = no sheen, SS = slight sheen

bgs = below ground surface

Bolding indicates analyte was detected.

Shading indicates analyte was detected at a concentration greater than the MTCA Method A cleanup level.

Table 2

Remedial Excavation Soil Samples and Chemical Analytical Data

Project Rufus 2.0 - Block 18

Seattle, Washington

Exploration Location[1]	Sample ID	Depth (feet bgs)	Non-Carcinogenic PAHs[2]										Carcinogenic PAHs[2]								
			Naphthalene	2-Methylnaphthalene	1-Methylnaphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benz(a)anthracene	Chrysene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-cd)pyrene	Dibenz(a,h)anthracene	Benzo(g,h,i)perylene	Total TEQ[3] (mg/kg)
Area A																					
TP-8	**Characterization Soil Sample**																				
	TP-8-2.5	2.5	<45.6	<45.6	<45.6	<45.6	<45.6	<45.6	**164**	<45.6	**289**	**208**	**101**	**173**	**88.4**	**77.5**	**88.4**	**49.8**	<45.6	**60.9**	**124.1**
	Confirmation Soil Samples																				
	TP-8-N-2.5	2.5	<43.6	<43.6	<43.6	<43.6	<43.6	<43.6	<43.6	<43.6	<43.6	<43.6	<43.6	<43.6	<43.6	<43.6	<43.6	<43.6	<43.6	<43.6	<32.9
	TP-8-E-2.5	2.5	<43.4	<43.4	<43.4	<43.4	<43.4	<43.4	<43.4	<43.4	<43.4	<43.4	<43.4	<43.4	<43.4	<43.4	<43.4	<43.4	<43.4	<43.4	<32.8
	TP-8-W-2.5	2.5	<44.4	<44.4	<44.4	<44.4	<44.4	<44.4	<44.4	<44.4	<44.4	<44.4	<44.4	<44.4	<44.4	<44.4	<44.4	<44.4	<44.4	<44.4	<33.5
	TP-8-S-2.5	2.5	<50.1	<50.1	<50.1	<50.1	<50.1	<50.1	<50.1	<50.1	<50.1	<50.1	<50.1	<50.1	<50.1	<50.1	<50.1	<50.1	<50.1	<50.1	<37.8
	TP-8-5.0	5.0	<46.2	<46.2	<46.2	<46.2	<46.2	<46.2	<46.2	<46.2	<46.2	<46.2	<46.2	<46.2	<46.2	<46.2	<46.2	<46.2	<46.2	<46.2	<34.9
Area B																					
B18-2	**Characterization Soil Sample**																				
	B18-2-2.5	2.5	<44.8	<44.8	<44.8	<44.8	<44.8	<44.8	**218**	<44.8	**343**	**273**	**139**	**137**	**182**	**63.5**	**141**	**68.6**	<44.8	**71.7**	**189.9**
	Confirmation Soil Samples																				
	TP-13-2.5	2.5	<54.7	<54.7	<54.7	<54.7	<54.7	<54.7	<54.7	<54.7	<54.7	<54.7	<54.7	<54.7	<54.7	<54.7	<54.7	<54.7	<54.7	<54.7	<41.3
	TP-14-2.5	2.5	<49.8	<49.8	<49.8	<49.8	<49.8	<49.8	<49.8	<49.8	<49.8	<49.8	<49.8	<49.8	<49.8	<49.8	<49.8	<49.8	<49.8	<49.8	<37.6
	EX-1-2.5	2.5	<53.6	<53.6	<53.6	<53.6	<53.6	<53.6	<53.6	<53.6	<53.6	<53.6	<53.6	<53.6	<53.6	<53.6	<53.6	<53.6	<53.6	<53.6	<40.5
	EX-2-2.5	2.5	<37.2	<37.2	<37.2	<37.2	<37.2	<37.2	<37.2	<37.2	<37.2	<37.2	<37.2	<37.2	<37.2	<37.2	<37.2	<37.2	<37.2	<37.2	<28.1
	B18-2-5.0	5.0	<49.3	<49.3	<49.3	<49.3	<49.3	<49.3	<49.3	<49.3	<49.3	<49.3	<49.3	<49.3	<49.3	<49.3	<49.3	<49.3	<49.3	<49.3	<37.2

Notes:

[1]Approximate exploration locations shown on Figure 2 and Figure 3. Chemical analytical testing by Fremont Analytical in Seattle, Washington.

[2]Polycyclic Aromatic Hydrocarbons (PAH) analysis by EPA Method 8270 SIM.

[3]Reporting the Total TEQ (Total Toxic equivalent concentration) for Carcinogenic PAHs, for a complete list of PAH's tested see the PAH table.

µg/kg = micrograms per kilogram

bgs = below ground surface

Bolding indicates analyte was detected.

Shading indicates analyte was detected at a concentration greater than the MTCA Method A cleanup level.

Table 3

Groundwater Chemical Analytical Data

Project Rufus 2.0 - Block 18

Seattle, Washington

Exploration Location[1]	Sample ID	Sample Date	Depth to Water (feet bgs)	Petroleum Hydrocarbons (µg/L)			Resource Conservation and Recovery Act (RCRA) Metals[4] (mg/L)									VOC's[5]	Total cPAHs[6] TEQ
				Gasoline Range[2]	Diesel Range[3]	Heavy Oil Range[3]	Total Arsenic	Dissolved Arsenic	Barium	Cadmium	Chromium	Lead	Selenium	Silver	Mercury		
MW18-1	MW18-1-170523	05/23/17	88.9	<50.0	<49.9	<99.8	**22.5**	**--**	**2,210**	**1.46**	**33.3**	**8.08**	**19.5**	<0.2	<0.1	ND	ND
	MW18-1-06272017	06/27/17	--	--	--	--	**1.27**	**1.05**	--	--	--	--	--	--	--	--	--
Model Toxics Cleanup Act (MTCA) Method A or B Cleanup Level for Unrestricted Land Use				800/1000[7]	500	500	5	5	3,200	5	50[8]	15	80	80	2	N/A	100

Notes:

[1]Approximate monitoring well location shown on the attached figures. Chemical analytical testing by Fremont Analytical in Seattle, Washington.

[2]Gasoline-range hydrocarbons analyzed by Northwest Method NWTPH-Gx.

[3]Diesel- and heavy oil-range hydrocarbons analyzed by Northwest Method NWTPH-Dx.

[4]Total RCRA metals analyzed by EPA Method 6000/7000 Series.

[5]Volatile Organic Compounds (VOCs) analyzed by Environmental Protection Agency's (EPA) Method 8260. For a complete list of VOC's analyzed, see the laboratory report.

[6]Reporting the Total TEQ (Total Toxic equivalent concentration) for Carcinogenic Polycyclic Aromatic Hydrocarbons. For a complete list of PAH's analyzed, see the laboratory report.

[7]When benzene is present, the gasoline range cleanup level is 800 mg/kg. When benzene is not present the gasoline range cleanup level is 1000 mg/kg.

[8]MTCA Method A cleanup level for Chromium III (Trivalent Chromium).

ND = Not Detected

-- = not analyzed

mg/L = milligrams per Liter

µg/L = micrograms per Liter

bgs = below ground surface

N/A= Not Applicable

Bolding indicates analyte was detected.

Shading indicates analyte was detected at a concentration greater than the MTCA Method A cleanup level.

FIGURES

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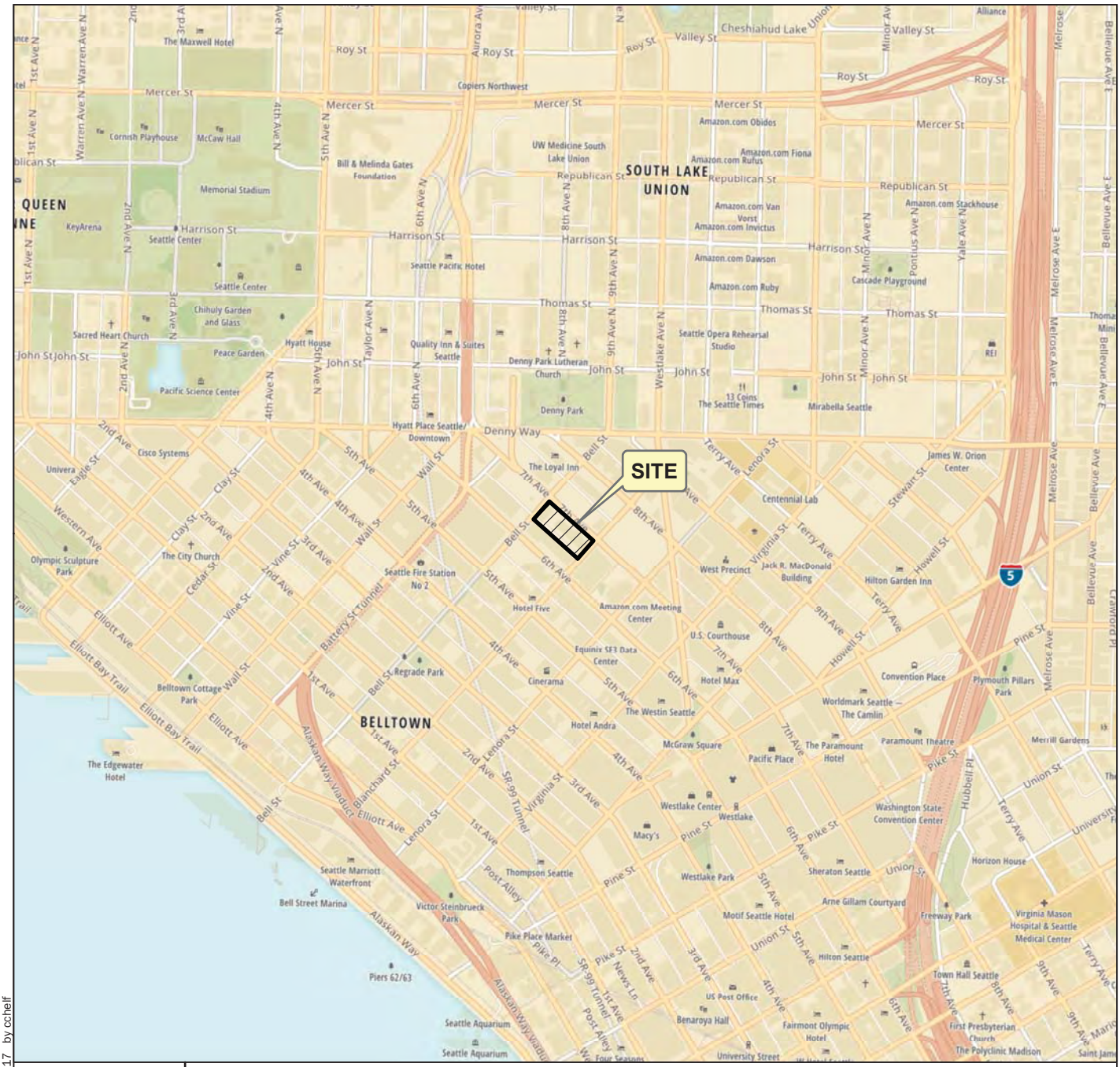

Notes:

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, 2016

Projection: NAD 1983 StatePlane Washington North FIPS 4601 Feet

Vicinity Map

Rufus 2.0 Development - Block 18
Seattle, Washington

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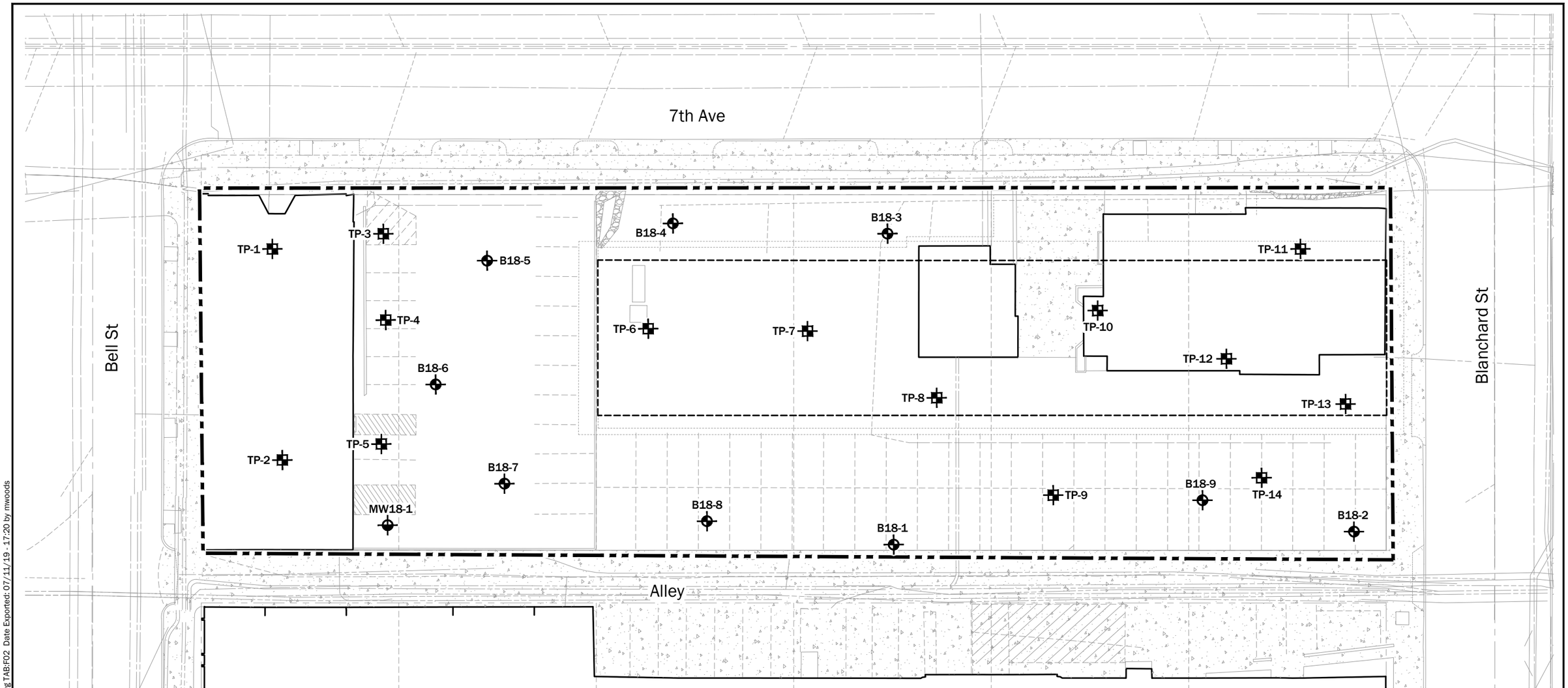
Figure 1

P:\20\20434001\GIS\2043400131_F01_VicinityMap.mxd Date Exported: 05/09/17 by cchelf



Actual

Project

30 0 30

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: Base map was taken from BRH, Dated 12/21/2016

Projection: WA State Plane, North Zone, NAD83, US Foot

Legend

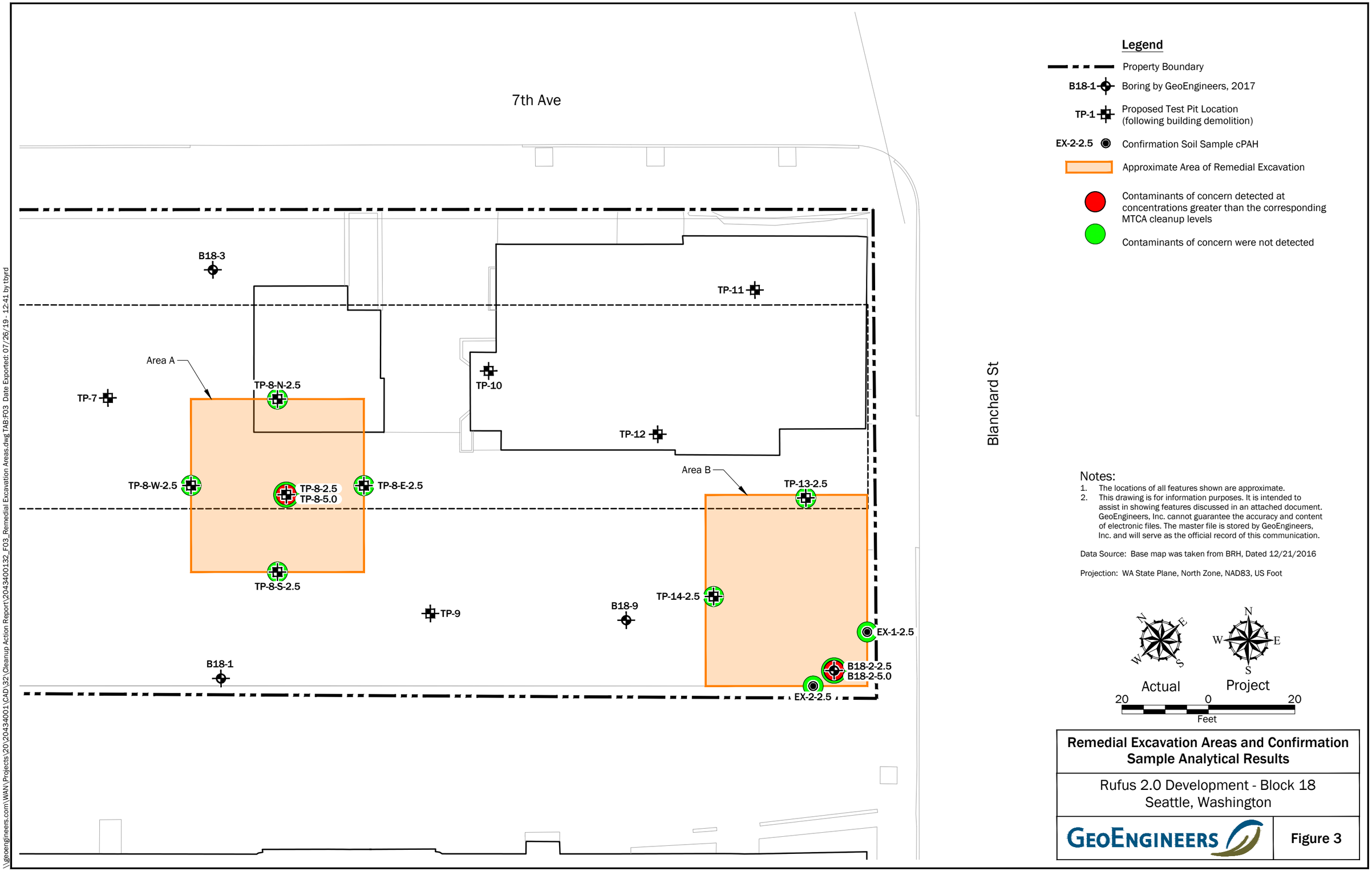
- Property Boundary
- TP-1 — Test Pit Location by GeoEngineers, 2018
- MW18-1 — Boring with Monitoring Well by GeoEngineers, 2017
- B18-1 — Boring by GeoEngineers, 2017
- B19-1 — Boring by GeoEngineers, 2012

Site Plan

Rufus 2.0 Development - Block 18
Seattle, Washington

GeoEngineers

Figure 2



Legend

- Property Boundary
- B18-1 — Boring by GeoEngineers, 2017
- TP-1 — Proposed Test Pit Location (following building demolition)
- EX-2-2.5 — Confirmation Soil Sample cPAH
- Approximate Area of Remedial Excavation
- Contaminants of concern detected at concentrations greater than the corresponding MTCA cleanup levels
- Contaminants of concern were not detected

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: Base map was taken from BRH, Dated 12/21/2016

Projection: WA State Plane, North Zone, NAD83, US Foot

Actual / Project

20 0 20

Feet

Remedial Excavation Areas and Confirmation Sample Analytical Results

Rufus 2.0 Development - Block 18
Seattle, Washington

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Figure 3

APPENDICES

GeoEngineers

APPENDIX A
Field Methods

APPENDIX A
FIELD METHODS

Sample Collection and Handling

Soil samples were obtained from the excavation area using a clean nitrile-gloved hand from the excavator bucket. Each sample was placed in a 4-ounce laboratory-prepared jar filled to minimize headspace. Gloves were changed between samples to prevent cross-contamination. The samples were placed in an iced cooler pending transport to the analytical laboratory.

Each sample submitted for chemical analysis was identified by a unique sample designation that corresponded to its mapped sample location and depth below ground surface. Chain-of-custody procedures were followed in transporting the samples to the laboratory.

Field Screening of Soil Samples

A representative from our staff performed field screening of soil samples obtained from the excavation. Field screening results are used as a general guideline to delineate areas with possible petroleum hydrocarbons. In addition, screening results are used to aid in the selection of soil samples for chemical analysis. The screening methods used include: (1) visual screening, and (2) water sheen screening.

Visual screening consists of inspecting the soil for stains indicative of petroleum hydrocarbons. Visual screening is generally more effective when hydrocarbons are heavier, such as motor oil, or when hydrocarbon concentrations are high. Water sheen screening is a more sensitive methods that can be effective in detecting contamination at concentrations less than regulatory cleanup levels. However, field screening results are site-specific. The effectiveness of field screening varies with temperature, moisture content, organic content, soil type and age of contaminant. The presence or absence of a sheen does not necessarily indicate the presence or absence of petroleum hydrocarbons.

Water sheen screening involves placing soil in water and observing the water surface for signs of sheen. Sheen screening may detect both volatile and nonvolatile petroleum hydrocarbons. Sheen classifications are as follows:

No Sheen (NS)	No visible sheen on water surface.
Slight Sheen (SS)	Light, colorless, dull sheen; spread is irregular, not rapid; sheen dissipates rapidly. Natural organic matter in the soil may produce a slight sheen.
Moderate Sheen (MS)	Light to heavy sheen; may have some color/iridescence; spread is irregular to flowing, may be rapid; few remaining areas of no sheen on water surface.
Heavy Sheen (HS)	Heavy sheen with color/iridescence; spread is rapid; entire water surface may be covered with sheen.

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
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE			GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES
		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

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 density
Mohs	Mohs hardness scale
OC	Organic content
PM	Permeability or hydraulic conductivity
PI	Plasticity index
PP	Pocket penetrometer
SA	Sieve analysis
TX	Triaxial compression
UC	Unconfined 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	End	Total Depth (ft)		Logged By	CJK	Driller	Drilling Method
	5/10/2017	5/11/2017	96.5		Checked By	JDB	Geologic Drill Exploration, Inc.	Hollow-stem Auger

Hammer Data	Automatic 140 (lbs) / 30 (in) Drop	Drilling Equipment	Diedrich D50 Turbo
Surface Elevation (ft) Vertical Datum	107.2 NAVD88	Top of Casing Elevation (ft)	107.00
Easting (X) Northing (Y)	1268481 228671	Horizontal Datum	WA State Plane North NAD83 (feet)

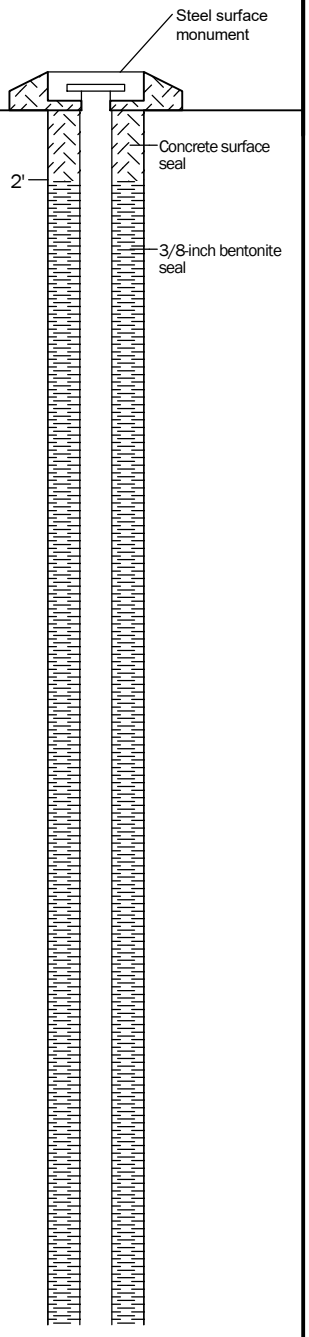
DOE Well I.D.: BIK 776
A 2-in well was installed on 5/11/2017 to a depth of 95 ft.

Groundwater Date Measured	Depth to Water (ft)	Elevation (ft)
5/18/2017	88.90	18.10

Notes: Field screening consisting of sheen and headspace vapor testing was completed on soil samples. No sheen or headspace vapor was observed unless otherwise noted.

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				1			AC	4 inches asphalt concrete pavement	NS	<1
105								SM	Gray silty fine to medium sand with gravel (very dense, moist) (till-like deposits)		
		11	50/5"		2					NS	<1
	5										
		18	84		3					NS	<1
100											
		12	50/6"		4					NS	<1
	10							SP-SM	Gray fine to medium sand with silt and gravel (very dense, moist) (cohesionless sand and gravel)		
		18	74		5 %F					NS	<1
95								SM	Gray silty fine to medium sand with occasional gravel (dense, moist)		
	15										
		18	41		6					NS	<1
90								ML	Gray sandy silt (hard, moist) (till-like deposits)		
	20										
		18	56		7A					NS	<1
					7B					NS	<1
85								SP-SM	Brown fine to medium sand with silt (very dense, moist) (cohesionless sand and gravel)		
								SM	Brown silty fine to medium sand (very dense, moist) (till-like deposits)		
	25										
		18	66		8					NS	<1
80											
	30										
		6	50/6"		9				Becomes wet	NS	<1
75											
	35							SM	Brown silty fine to medium sand with gravel (very dense, moist)		

WELL LOG



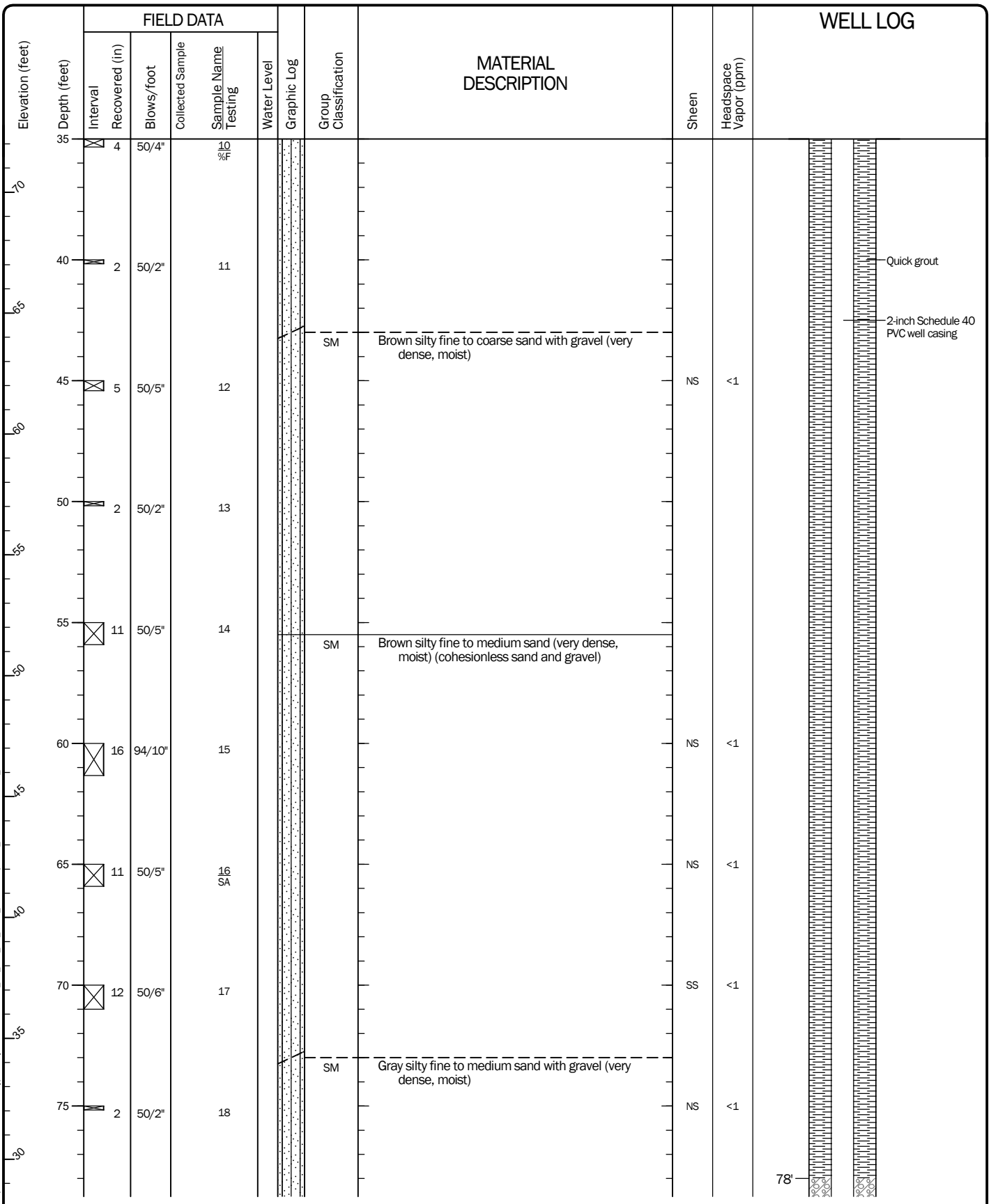
Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on BRH Survey. Vertical approximated based on Topographic Survey.

Log of Boring with Monitoring Well MW18-1

GeoEngineers

Project: Rufus 2.0 Development - Block 18
Project Location: Seattle, Washington
Project Number: 20434-001-32

Figure B-2
Sheet 1 of 3



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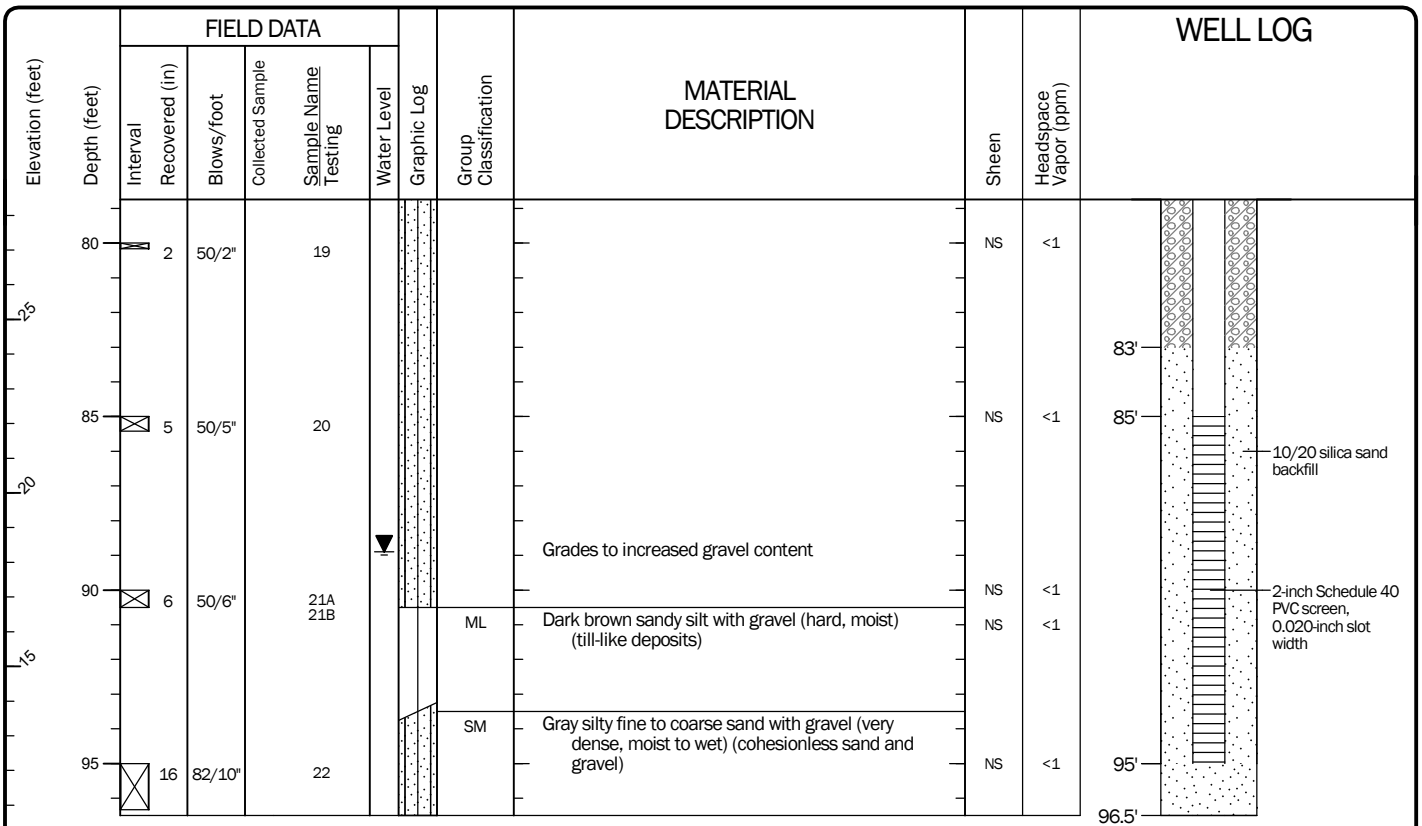
Log of Boring with Monitoring Well MW18-1 (continued)

GeoEngineers

Project: Rufus 2.0 Development - Block 18
Project Location: Seattle, Washington
Project Number: 20434-001-32

Figure B-2
Sheet 2 of 3



Log of Boring with Monitoring Well MW18-1 (continued)

GeoEngineers

Project: Rufus 2.0 Development - Block 18
Project Location: Seattle, Washington
Project Number: 20434-001-32

Figure B-2
Sheet 3 of 3

Drilled: Start 5/9/2017 End 5/9/2017	Total Depth (ft) 80.5	Logged By CJK Checked By JDB	Driller Geologic Drill Exploration, Inc.	Drilling Method Hollow-stem Auger	
Surface Elevation (ft) 109 Vertical Datum NAVD88		Hammer Data Automatic 140 (lbs) / 30 (in) Drop		Drilling Equipment Diedrich D50 Turbo	
Easting (X) 1268591 Northing (Y) 228564		System Datum WA State Plane North NAD83 (feet)		Groundwater not observed at time of exploration	

Notes: Field screening consisting of sheen and headspace vapor testing was completed on soil samples. No sheen or headspace vapor was observed unless otherwise noted.

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	0				1		AC	6 inches asphalt concrete pavement	NS	<1	
							ML	Gray sandy silt with occasional gravel (fill)			
105		18	17		2		ML	Gray silt with occasional sand lenses, massive (very stiff, moist) (cohesive silt and clay)	NS	<1	
	5	18	36		3		ML	Gray silt with sand and gravel (hard, moist)	NS	3	Headspace vapor = 3 ppm
		18	75		4		ML	Gray silt (hard, moist)	NS	<1	
100	10	12	50/6"		5A 5B		SM	Gray silty fine to medium sand with gravel (very dense, moist) (till-like deposits)			
							SP-SM	Gray fine to medium sand with silt and gravel (very dense, moist) (cohesionless sand and gravel)			Driller noted smooth drilling at 12 feet
95	15	18	55		6 %F			Occasional gravel and silt lenses	NS	<1	
							SM	Gray silty fine to medium sand with occasional gravel (very dense, moist) (till-like deposits)			Driller noted gravel at 18 feet
90	20	18	73		7				NS	<1	
							SM	Gray silty fine to coarse sand with gravel (very dense, moist) (cohesionless sand and gravel)			
85	25	15	83		8				NS		
80	30	12	50/6"		9 SA				NS		
75	35										

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

Date:4/11/19 Path:P:\20\20434001\GINT\20434001320.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_ENVIRONMENTAL_STANDARD_NO_GW

Log of Boring B18-1

GeoEngineers

Project: Rufus 2.0 Development - Block 18
Project Location: Seattle, Washington
Project Number: 20434-001-32

Figure B-3
Sheet 1 of 3

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	35	6	50/6"		10				NS		
-70											Driller noted increased density at 39 feet
	40	5.5	50/5.5"		11				NS		
-65											
	45	6	50/6"		12				NS		
-60							SP-SM	Brown fine to coarse sand with silt and gravel (very dense, moist)			Driller noted getting sandier
	50	11	50/5"		13			Iron oxide staining	NS		
-55							SP-SM	Brown fine to medium sand with silt and gravel (very dense, moist)			
	55	4	50/4"		14						
-50							SM	Brown silty fine to medium sand with occasional gravel (very dense, moist)			
	60	11	50/5"		15						
-45											
	65	11	50/5"		16 %F			Iron oxide staining	NS		1 foot of gray silty sand in sampler
-40											
	70	11	50/5"		17						
-35											
	75	12	50/6"		18				NS		

Log of Boring B18-1 (continued)

GeoEngineers

Project: Rufus 2.0 Development - Block 18
Project Location: Seattle, Washington
Project Number: 20434-001-32

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	FIELD DATA: Blows/foot	FIELD DATA: Collected Sample / Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
-30	80	5	50/5"	19				NS		

Log of Boring B18-1 (continued)

GeoEngineers

Project: Rufus 2.0 Development - Block 18
Project Location: Seattle, Washington
Project Number: 20434-001-32

Figure B-3
Sheet 3 of 3

Drilled Start 5/9/2017 End 5/10/2017	Total Depth (ft) 85.25	Logged By CJK Checked By JDB	Driller Geologic Drill Exploration, Inc.	Drilling Method Hollow-stem Auger	
Surface Elevation (ft) 106 Vertical Datum NAVD88		Hammer Data Automatic 140 (lbs) / 30 (in) Drop		Drilling Equipment Diedrich D50 Turbo	
Easting (X) 1268697 Northing (Y) 228472		System Datum WA State Plane North NAD83 (feet)		Groundwater not observed at time of exploration	

Notes: Field screening consisting of sheen and headspace vapor testing was completed on soil samples. No sheen or headspace vapor was observed unless otherwise noted.

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
105	0						AC	4 inches asphalt concrete pavement			
					1		GP	2 inches crushed gravel base course	NS	<1	
							ML	Gray silt with sand (moist)			
		16	9		2		CH	Gray fat clay, fissured, occasional slickensides (stiff to very stiff, moist) (cohesive silt and clay)			
100	5	18	12		3			Becomes massive	NS	<1	
		18	18		4 AL						AL (LL = 63; PI = 35)
95	10	18	19		5						
							SP-SM	Gray fine to medium sand with silt (dense, moist) (cohesionless sand and gravel)			
90	15	18	49		6A				NS	<1	
					6B		SM	Brown silty fine to coarse sand with occasional gravel (dense, moist) (till-like deposits)	NS		
							SM	Gray silty fine to medium sand with gravel (very dense, moist)			
85	20	12	67		7						
80	25	12	60		8 %F				NS		
							SP-SM	Gray fine to medium sand with silt (very dense, moist) (cohesionless sand and gravel)			
75	30	11	80		9 %F				NS		
	35										Driller noted hard drilling at 34 feet

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

Log of Boring B18-2

GeoEngineers

Project: Rufus 2.0 Development - Block 18
Project Location: Seattle, Washington
Project Number: 20434-001-32

Figure B-4
Sheet 1 of 3

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	FIELD DATA: Blows/foot	FIELD DATA: Collected Sample	FIELD DATA: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
-70	35	10	82		10			Grades to with gravel	NS		
	40	6	50/6"		11						Driller noted hard drilling at 39 feet
-60	45	11	50/5"		12				NS		
							SM	Gray silty fine to coarse sand with gravel (very dense, moist) (till-like deposits)			
-50	50	18	82		13				NS		
							SM	Gray silty fine to medium sand with gravel (very dense, moist) (cohesionless sand and gravel)			
	55	6	50/6"		14 %F			Iron oxide staining	NS		
-40	60	11	50/5"		15			Becomes brown			
	65	16	94/10"		16			Grades to with occasional gravel	NS		Driller added water 1-foot wet silt in sampler
-30	70	12	50/6"		17			Grades to without gravel	NS		
	75	11	50/5"		18				NS		

Log of Boring B18-2 (continued)

GeoEngineers

Project: Rufus 2.0 Development - Block 18
Project Location: Seattle, Washington
Project Number: 20434-001-32

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	FIELD DATA: Blows/foot	FIELD DATA: Collected Sample	FIELD DATA: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	80	10	50/4"		19			Grades to with occasional gravel	NS		
	85	0	50/0.5"		20						Driller noted bouncing on a rock

Date:4/11/19 Path:P:\20\20434001\GINT\20434001320.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_ENVIRONMENTAL_STANDARD_NO_GW

Log of Boring B18-2 (continued)

GeoEngineers

Project: Rufus 2.0 Development - Block 18
Project Location: Seattle, Washington
Project Number: 20434-001-32

Figure B-4
Sheet 3 of 3

Drilled Start 5/8/2017 End 5/8/2017	Total Depth (ft) 80.25	Logged By CJK Checked By JDB	Driller Geologic Drill Exploration, Inc.	Drilling Method Hollow-stem Auger	
Surface Elevation (ft) 104 Vertical Datum NAVD88		Hammer Data Automatic 140 (lbs) / 30 (in) Drop		Drilling Equipment Diedrich D50 Turbo	
Easting (X) 1268653 Northing (Y) 228635		System Datum WA State Plane North NAD83 (feet)		Groundwater not observed at time of exploration	

Notes: Field screening consisting of sheen and headspace vapor testing was completed on soil samples. No sheen or headspace vapor was observed unless otherwise noted.

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	0				1		AC	3½ inches asphalt concrete pavement			
							ML	Gray silt with sand (stiff, moist) (cohesive silt and clay)			
100		18	17		2				NS	<1	
	5	18	42		3A 3B		SM	Gray silty fine to medium sand with gravel (dense to very dense, moist) (till-like deposits)	NS	1.1	Headspace vapor = 1.1 ppm Driller noted gravels at 6 feet bgs; harder drilling
		18	74		4				NS	12.5	Headspace vapor = 12.5 ppm
95	10	18	43		5				NS	<1	Driller noted sandier at 9½ feet
							SP-SM	Gray fine to medium sand with silt (dense to very dense, moist) (cohesionless sand and gravel)			
90	15	12	48		6 %F						
85											
	20	12	50/6"		7			Grades to with gravel	NS	<1	
80											
	25	12	94/10"		8				NS	5.6	Headspace vapor = 5.6 ppm
75							SM	Gray silty fine to medium sand with occasional gravel (very dense, moist)			
	30	10	50/4"		9 %F				NS	6.9	Driller noted gravels at 30 feet Headspace vapor = 6.9 ppm
70	35										

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

Date:4/11/19 Path:P:\20\20434001\GINT\20434000132.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_ENVIRONMENTAL_STANDARD_NO_GW

Log of Boring B18-3

GeoEngineers

Project: Rufus 2.0 Development - Block 18
Project Location: Seattle, Washington
Project Number: 20434-001-32

Figure B-5
Sheet 1 of 3

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	FIELD DATA: Blows/foot	FIELD DATA: Collected Sample	FIELD DATA: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	35	10	50/4"		10				NS	<1	
											Driller noted cobbles and rough drilling from 37 to 45 feet
65	40	3	50/3"		11			Grades to with gravel	NS	<1	
60							SM	Gray silty fine to coarse sand with gravel (very dense, moist)			
	45	16	85		12				NS	<1	Driller noted easier drilling starting at 45 feet Iron oxide staining
55	50	11	50/5"		13						
50							SM	Gray silty fine sand (very dense, moist)			
											Driller noted sand layer at 54 feet
	55	11	50/5"		14 %F						
45	60	4	50/4"		15			Grades to with gravel	NS	2	Headspace vapor = 2 ppm
40	65	11.5	50/5.5"		16			Grades to with occasional gravel	NS	<1	Added water at 65 feet
35	70	12	50/6"		17			Becomes brown	NS	<1	Added more water at 70 feet
30	75	17	90/11"		18				NS	<1	

Date:4/11/19 Path:P:\20\20434001\GINT\20434001-32.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_ENVIRONMENTAL_STANDARD_NO_GW

Log of Boring B18-3 (continued)

GeoEngineers

Project: Rufus 2.0 Development - Block 18
Project Location: Seattle, Washington
Project Number: 20434-001-32

Figure B-5
Sheet 2 of 3

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	FIELD DATA: Blows/foot	FIELD DATA: Collected Sample / Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
-25	80	3	100/3"	19			Becomes gray			

Date:4/11/19 Path:P:\20\20434001\GINT\20434001320.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_ENVIRONMENTAL_STANDARD_NO_GW

Log of Boring B18-3 (continued)

GeoEngineers

Project: Rufus 2.0 Development - Block 18
Project Location: Seattle, Washington
Project Number: 20434-001-32

Figure B-5
Sheet 3 of 3

Drilled Start 5/16/2017 End 5/16/2017	Total Depth (ft) 15	Logged By LJK Checked By SJB	Driller Cascade Drilling, LP	Drilling Method Direct Push	
Surface Elevation (ft) 105 Vertical Datum NAVD88		Hammer Data		Drilling Equipment Truck-mounted GeoProbe	
Easting (X) 1268607 Northing (Y) 228681		System Datum WA State Plane North NAD83 (feet)		Groundwater not observed at time of exploration	

Notes:

Elevation (feet)	Depth (feet)	FIELD DATA: Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	0		42					AC	Asphalt concrete pavement			
								ML	Gray silt with sand (stiff, moist) (fill)	NS	<1	
									Grades to black			
								SM	Gray silty fine to medium sand (dense, moist)	NS	<1	
						B18-4-5.0 CA						
100	5		60						Grades to black	NS	<1	
								ML	Gray sandy silt (stiff, moist) (native)			
								SP-SM	Gray fine to medium sand with silt (dense, moist)			
								SP-SM	Brown fine to medium sand with silt and gravel (very dense, moist)			
95	10		60							NS	<1	
									Grades to gray with no gravel			
								SM	Gray to brown silty fine to coarse sand with gravel			
90	15					B18-4-15.0 CA				NS	<1	

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

Log of Boring B18-4

GeoEngineers

Project: Rufus 2.0 Development - Block 18
Project Location: Seattle, Washington
Project Number: 20434-001-32

Figure B-6
Sheet 1 of 1

Drilled Start 5/16/2017 End 5/16/2017	Total Depth (ft) 15	Logged By LJK Checked By SJB	Driller Cascade Drilling, LP	Drilling Method Direct Push	
Surface Elevation (ft) 106 Vertical Datum NAVD88		Hammer Data		Drilling Equipment Truck-mounted GeoProbe	
Easting (X) 1268557 Northing (Y) 228710		System Datum WA State Plane North NAD83 (feet)		Groundwater not observed at time of exploration	

Notes:

Elevation (feet)	Depth (feet)	FIELD DATA: Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	0		42					AC	Asphalt concrete pavement			
105								SM	Brown to gray silty fine to medium sand with gravel (very dense, moist) (native)	NS	<1	
						B18-5-2.5 CA						
	5		60							NS	<1	
100												
								SP-SM	Gray fine to medium sand with silt (very dense, moist)	NS	<1	
								SM	Gray silty fine to medium sand with occasional gravel (very dense, moist)			
	10		60			B18-5-10.0 CA				NS	<1	
95												
	15									NS	<1	

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

Log of Boring B18-5

GeoEngineers

Project: Rufus 2.0 Development - Block 18
Project Location: Seattle, Washington
Project Number: 20434-001-32

Figure B-7
Sheet 1 of 1

Drilled Start 5/16/2017 End 5/16/2017	Total Depth (ft) 15	Logged By LJK Checked By SJB	Driller Cascade Drilling, LP	Drilling Method Direct Push	
Surface Elevation (ft) 106 Vertical Datum NAVD88		Hammer Data		Drilling Equipment Truck-mounted GeoProbe	
Easting (X) 1268520 Northing (Y) 228693		System Datum WA State Plane North NAD83 (feet)		Groundwater not observed at time of exploration	

Notes:

Elevation (feet)	Depth (feet)	FIELD DATA: Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	0		42					AC	Asphalt concrete pavement	NS	<1	
105								SP-SM	Brown to gray fine to medium sand with silt and gravel (very dense, moist) (fill)			
										NS	<1	
	5		60			B18-6-5.0 CA				NS	<1	
100												
										NS	<1	
	10		60			B18-6-10.0 CA				NS	<1	
95								SM	Gray silty fine to medium sand with occasional gravel 9very dense, moist) (native)			
										NS	<1	
	15											

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

Log of Boring B18-6

GeoEngineers

Project: Rufus 2.0 Development - Block 18
Project Location: Seattle, Washington
Project Number: 20434-001-32

Figure B-8
Sheet 1 of 1

Drilled: Start 5/16/2017 End 5/16/2017	Total Depth (ft): 15	Logged By: LJK Checked By: SJB	Driller: Cascade Drilling, LP	Drilling Method: Direct Push	
Surface Elevation (ft): 107 Vertical Datum: NAVD88		Hammer Data:		Drilling Equipment: Truck-mounted GeoProbe	
Easting (X): 1268516 Northing (Y): 228657		System Datum: WA State Plane North NAD83 (feet)		Groundwater not observed at time of exploration	
Notes:					

Elevation (feet)	Depth (feet)	FIELD DATA: Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	0		42					AC	Asphalt concrete pavement			
								GP	Gravel base course			
105						B18-7-2.5 CA		SM	Gray silty fine to medium sand with gravel (medium dense, moist) (fill)	NS	<1	
	5		60					SP-SM	Gray fine to medium sand with silt (dense, moist) (native)	NS	<1	
										NS	<1	
100									Grades with gravel and to very dense			
	10		60							NS	<1	
95												
	15											

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

Log of Boring B18-7

GeoEngineers

Project: Rufus 2.0 Development - Block 18
Project Location: Seattle, Washington
Project Number: 20434-001-32

Figure B-9
Sheet 1 of 1

Drilled Start 5/16/2017 End 5/16/2017	Total Depth (ft) 15	Logged By LJK Checked By SJB	Driller Cascade Drilling, LP	Drilling Method Direct Push	
Surface Elevation (ft) 108 Vertical Datum NAVD88		Hammer Data		Drilling Equipment Truck-mounted GeoProbe	
Easting (X) 1268553 Northing (Y) 228607		System Datum WA State Plane North NAD83 (feet)		Groundwater not observed at time of exploration	

Notes:

Elevation (feet)	Depth (feet)	FIELD DATA: Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	0		42					AC	Asphalt concrete pavement			
								SM	Gray silty fine to medium sand with gravel (medium dense, moist) (fill)	NS	<1	
105						B18-8-2.5 CA		SP-SM	Gray fine to medium sand with silt (dense, moist) (native)			
	5		60							NS	<1	
								ML	Gray sandy silt (hard, moist)			
100								SP-SM	Gray fine to medium sand with silt and occasional gravel (very dense, moist) (till-like deposits)			
	10		60			B18-8-10.0 CA				SS	<1	
95										NS	<1	
	15					B18-8-15.0 CA						

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

Log of Boring B18-8

GeoEngineers

Project: Rufus 2.0 Development - Block 18
Project Location: Seattle, Washington
Project Number: 20434-001-32

Figure B-10
Sheet 1 of 1

Drilled Start 5/16/2017 End 5/16/2017	Total Depth (ft) 15	Logged By LJK Checked By SJB	Driller Cascade Drilling, LP	Drilling Method Direct Push	
Surface Elevation (ft) 106 Vertical Datum NAVD88		Hammer Data		Drilling Equipment Truck-mounted GeoProbe	
Easting (X) 1268669 Northing (Y) 228510		System Datum WA State Plane North NAD83 (feet)		Groundwater not observed at time of exploration	

Notes:

Elevation (feet)	Depth (feet)	FIELD DATA: Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	0		42					AC	Asphalt concrete pavement			
								CR	Crushed gravel base course			
105								ML	Gray silt with sand (stiff, moist) (native)	NS	<1	
	5		60			B18-9-5.0 CA				NS	<1	
100										NS	<1	
	10		60			B18-9-10.0 CA			Grades to very stiff			
95												
	15											

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

Log of Boring B18-9

GeoEngineers

Project: Rufus 2.0 Development - Block 18
Project Location: Seattle, Washington
Project Number: 20434-001-32

Figure B-11
Sheet 1 of 1

Date Excavated 11/13/2018	Total Depth (ft) 7	Logged By AWC Checked By CJG	Excavator Equipment Excavator	Groundwater not observed Caving not observed	
Surface Elevation (ft) Vertical Datum Undetermined NAVD88	Easting (X) Northing (Y)	Coordinate System WA State Plane North Horizontal Datum NAD83 (feet)			

Elevation (feet)	Depth (feet)	SAMPLE: Testing Sample	SAMPLE: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	Notes
					CC	Concrete, approximately 3 to 4 inches thick			
	1				SM	Gray-brown silty fine to coarse sand with gravel and organic matter (roots) (moist) (fill)			Copper pipe observed at 1½ feet
	2								
	3		1		SM	Gray-brown silty fine to coarse sand with occasional gravel (transitioning to glacially consolidated soils) (moist) (native)			
	4						NS	1.3	
	5		2		SM	Gray-brown silty fine to medium sand with occasional gravel and cobbles (moist) (glacially consolidated soils)			
	6								
	7						NS	3.3	

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to ½ foot.
Coordinates Data Source: Horizontal approximated based on Other. Vertical approximated based on Topographic Survey.

Log of Test Pit TP-1

GeoEngineers

Project: Rufus 2.0 Development - Block 18
Project Location: Seattle, Washington
Project Number: 20434-001-32

Figure B-12
Sheet 1 of 1

Date Excavated 11/15/2018	Total Depth (ft) 5	Logged By AWC Checked By CJG	Excavator Equipment Excavator	Groundwater not observed Caving not observed
Surface Elevation (ft) Vertical Datum Undetermined NAVD88	Easting (X) Northing (Y)		Coordinate System WA State Plane North Horizontal Datum NAD83 (feet)	

Elevation (feet)	Depth (feet)	SAMPLE: Testing Sample	SAMPLE: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	Notes
					CC	Concrete, approximately 3 inches thick			
	1				SM	Light brown silty fine to medium sand with occasional gravel (moist) (native)			
	2								
	3		1		SM	Light brown silty fine to medium sand with occasional gravel (moist) (glacially consolidated soils)			
	4						NS	1.4	
	5				SM	Light brown silty fine to coarse sand with occasional gravel (moist) (glacially consolidated soils)	NS	1.5	

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to ½ foot.
Coordinates Data Source: Horizontal approximated based on Other. Vertical approximated based on Topographic Survey.

Log of Test Pit TP-2

GeoEngineers

Project: Rufus 2.0 Development - Block 18
Project Location: Seattle, Washington
Project Number: 20434-001-32

Figure B-13
Sheet 1 of 1

Date Excavated 11/13/2018	Total Depth (ft) 5	Logged By AWC Checked By CJG	Excavator Equipment Excavator	Groundwater not observed Caving not observed
Surface Elevation (ft) Vertical Datum Undetermined NAVD88		Easting (X) Northing (Y)	Coordinate System WA State Plane North Horizontal Datum NAD83 (feet)	

Elevation (feet)	Depth (feet)	SAMPLE: Testing Sample	SAMPLE: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	Notes
					SM	Gray silt with silty fine to medium sand and gravel (moist) (fill)			
	1				SM	Light brown silty fine to medium sand with occasional gravel and occasional cobbles (moist) (glacially consolidated soils)			
	2								
	3		1						
	4						NS	11.1	
	5						NS	10.9	
			2						

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to ½ foot.
Coordinates Data Source: Horizontal approximated based on Other. Vertical approximated based on Topographic Survey.

Log of Test Pit TP-3

GeoEngineers

Project: Rufus 2.0 Development - Block 18
Project Location: Seattle, Washington
Project Number: 20434-001-32

Figure B-14
Sheet 1 of 1

Date Excavated 11/13/2018	Total Depth (ft) 5	Logged By AWC Checked By CJG	Excavator Equipment Excavator	Groundwater not observed Caving not observed
Surface Elevation (ft) Vertical Datum Undetermined NAVD88		Easting (X) Northing (Y)	Coordinate System WA State Plane North Horizontal Datum NAD83 (feet)	

Elevation (feet)	Depth (feet)	SAMPLE: Testing Sample	SAMPLE: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	Notes
	0				AC	Asphalt concrete pavement, approximately 2 inches thick			
					SP-SM	Dark brown fine to coarse sand with silt and gravel (moist) (fill)			
	1								
	2								
	3		1		SM	Light brown silty fine to medium sand with occasional gravel (moist) (native)			
	4						NS	13.3	
	5				SM	Light brown silty fine sand with occasional gravel and cobbles (moist) (glacially consolidated soils)	SS	22.0	

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to ½ foot.
Coordinates Data Source: Horizontal approximated based on Other. Vertical approximated based on Topographic Survey.

Log of Test Pit TP-4

GeoEngineers

Project: Rufus 2.0 Development - Block 18
Project Location: Seattle, Washington
Project Number: 20434-001-32

Figure B-15
Sheet 1 of 1

Date Excavated 11/15/2018	Total Depth (ft) 5	Logged By AWC Checked By CJG	Excavator Equipment Excavator	Groundwater not observed Caving not observed
Surface Elevation (ft) Vertical Datum Undetermined NAVD88		Easting (X) Northing (Y)	Coordinate System WA State Plane North Horizontal Datum NAD83 (feet)	

Elevation (feet)	Depth (feet)	SAMPLE: Testing Sample	SAMPLE: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	Notes
	0				AC	Asphalt concrete pavement, approximately 3 inches thick			
					SM	Brown silty fine to coarse sand with gravel (moist) (native)			
	1								
	2						NS	3.0	
			1		SM	Brown silty fine to coarse sand with gravel and occasional cobbles (native)			
	3								
	4								
	5								

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to ½ foot.
Coordinates Data Source: Horizontal approximated based on Other. Vertical approximated based on Topographic Survey.

Log of Test Pit TP-5

GeoEngineers

Project: Rufus 2.0 Development - Block 18
Project Location: Seattle, Washington
Project Number: 20434-001-32

Figure B-16
Sheet 1 of 1

Date Excavated 11/13/2018	Total Depth (ft) 8	Logged By AWC Checked By CJG	Excavator Equipment Excavator	Groundwater not observed Caving not observed
Surface Elevation (ft) Vertical Datum Undetermined NAVD88		Easting (X) Northing (Y)	Coordinate System WA State Plane North Horizontal Datum NAD83 (feet)	

Elevation (feet)	Depth (feet)	SAMPLE: Testing Sample	SAMPLE: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	Notes
	0				SM	Brown silty fine to coarse sand with gravel (moist)			4-inch steel pipe observed (abandoned), pea gravel bedding around pipe, steel rebar
	1								
	2								
	2.5	☒	1		SM	Gray silty fine sand (moist) (native)			Dense
	3								
	3.5						NS	21.5	
	4								
	5				SM	Gray silty fine sand (moist) (native)			
	6								
	7								
	7.5				SM	Gray silty fine sand with occasional gravel (moist) (native)	NS	17.3	
	8								

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to ½ foot.
Coordinates Data Source: Horizontal approximated based on Other. Vertical approximated based on Topographic Survey.

Log of Test Pit TP-6

GeoEngineers

Project: Rufus 2.0 Development - Block 18
Project Location: Seattle, Washington
Project Number: 20434-001-32

Figure B-17
Sheet 1 of 1

Date Excavated 11/15/2018	Total Depth (ft) 9	Logged By AWC Checked By CJG	Excavator Equipment Excavator	Groundwater not observed Caving not observed
Surface Elevation (ft) Vertical Datum Undetermined NAVD88	Easting (X) Northing (Y)	Coordinate System WA State Plane North Horizontal Datum NAD83 (feet)		

Elevation (feet)	Depth (feet)	SAMPLE: Testing Sample	SAMPLE: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	Notes
	0				SW	Dark brown gravelly fine to coarse sand (moist) (fill)			4-inch steel pipe
	1								
	2								
	3		1		ML	Gray silt with fine sand (moist) (native)	NS	15.5	
	4						NS	27.5	
	5		2		SM	Light brown silty fine sand with gravel (moist) (glacially consolidated soils)			
	6								
	7								
	8								
	9								

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to ½ foot.
Coordinates Data Source: Horizontal approximated based on Other. Vertical approximated based on Topographic Survey.

Log of Test Pit TP-7

GeoEngineers

Project: Rufus 2.0 Development - Block 18
Project Location: Seattle, Washington
Project Number: 20434-001-32

Figure B-18
Sheet 1 of 1

Date Excavated 11/15/2018	Total Depth (ft) 7.5	Logged By AWC Checked By CJG	Excavator Equipment Excavator	Groundwater not observed Caving not observed
Surface Elevation (ft) Vertical Datum Undetermined NAVD88		Easting (X) Northing (Y)	Coordinate System WA State Plane North Horizontal Datum NAD83 (feet)	

Elevation (feet)	Depth (feet)	SAMPLE: Testing Sample	SAMPLE: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	Notes
	0				SM	Gray-brown silty fine to coarse sand with gravel and silt (moist) (fill)			3-inch abandoned metal piping
	1								
	2								
	3		1		SM	Gray silty fine sand with silt (moist) (native)	NS	15.7	
	4								
	5		2		SM	Light brown silty fine sand with occasional gravel (moist) (native)			
	6								
	7						NS	16.7	
					SM	Brown silty fine sand with occasional gravel (moist) (glacially consolidated soils)			

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to ½ foot.
Coordinates Data Source: Horizontal approximated based on Other. Vertical approximated based on Topographic Survey.

Log of Test Pit TP-8

GeoEngineers

Project: Rufus 2.0 Development - Block 18
Project Location: Seattle, Washington
Project Number: 20434-001-32

Figure B-19
Sheet 1 of 1

Date Excavated 11/7/2018	Total Depth (ft) 10	Logged By AWC Checked By CJG	Excavator Equipment Excavator	Groundwater not observed Caving not observed
Surface Elevation (ft) Vertical Datum Undetermined NAVD88	Easting (X) Northing (Y)	Coordinate System WA State Plane North Horizontal Datum NAD83 (feet)		

Elevation (feet)	Depth (feet)	SAMPLE: Testing Sample	SAMPLE: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	Notes
	0				ML	Gray brown silt with fine to medium sand and occasional gravel (moist) (fill)			
	1								
	2								
	3		1		ML	Gray silt with fine to medium sand (moist) (native)	NS	3.1	
	4								
	5								
	6						NS	2.6	
	7								
	8						NS	6.7	
	9				SM	Brown-gray silty fine sand (moist) (till-like)			
	10								

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to ½ foot.
Coordinates Data Source: Horizontal approximated based on Other. Vertical approximated based on Topographic Survey.

Log of Test Pit TP-9

GeoEngineers

Project: Rufus 2.0 Development - Block 18
Project Location: Seattle, Washington
Project Number: 20434-001-32

Figure B-20
Sheet 1 of 1

Date Excavated	11/7/2018	Total Depth (ft)	7.5	Logged By AWC Checked By CJG	Excavator Equipment Excavator	Groundwater not observed Caving not observed
Surface Elevation (ft) Vertical Datum	Undetermined NAVD88	Easting (X) Northing (Y)		Coordinate System Horizontal Datum	WA State Plane North NAD83 (feet)	

Elevation (feet)	Depth (feet)	SAMPLE: Testing Sample	SAMPLE: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	Notes
	0				SM	Gray-brown silty fine to coarse sand with gravel and debris (moist) (fill)			Concrete fragments, wood debris and abandoned piping
	1								Fill debris, cast iron pipe, red oxidation staining
	2								
	3		1		ML	Light brown-gray silt with fine to medium sand and occasional gravel (moist) (fill)			
	4					(native)			
	5				ML	Gray silt with fine sand (moist) (native)			
	6								
	7								

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to ½ foot.
Coordinates Data Source: Horizontal approximated based on Other. Vertical approximated based on Topographic Survey.

Log of Test Pit TP-10

GeoEngineers

Project: Rufus 2.0 Development - Block 18
Project Location: Seattle, Washington
Project Number: 20434-001-32

Figure B-21
Sheet 1 of 1

Date Excavated 11/15/2018	Total Depth (ft) 10	Logged By AWC Checked By CJG	Excavator Equipment Excavator	Groundwater not observed Caving not observed
Surface Elevation (ft) Vertical Datum Undetermined NAVD88	Easting (X) Northing (Y)		Coordinate System WA State Plane North Horizontal Datum NAD83 (feet)	

Elevation (feet)	Depth (feet)	SAMPLE: Testing Sample	SAMPLE: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	Notes
	0				SP-SM	Brown silty fine to coarse sand with silt and occasional gravel (moist) (fill)			4-inch steel abandoned pipe, pea gravel bedding, concrete fragments
	1								
	2								
	3		1		ML	Light brown silt (moist) (native)	NS	<1	
	4								
	5				ML	Light brown silt (moist) (native)	NS	2.1	
	6								
	7								
	8								
	9								
	10								

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to ½ foot.
Coordinates Data Source: Horizontal approximated based on Other. Vertical approximated based on Topographic Survey.

Log of Test Pit TP-11

GeoEngineers

Project: Rufus 2.0 Development - Block 18
Project Location: Seattle, Washington
Project Number: 20434-001-32

Figure B-22
Sheet 1 of 1

Date Excavated 11/15/2018	Total Depth (ft) 7	Logged By AWC Checked By CJG	Excavator Equipment Excavator	Groundwater not observed Caving not observed
Surface Elevation (ft) Vertical Datum Undetermined NAVD88	Easting (X) Northing (Y)		Coordinate System WA State Plane North Horizontal Datum NAD83 (feet)	

Elevation (feet)	Depth (feet)	SAMPLE: Testing Sample	SAMPLE: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	Notes
	0				SP-SM	Brown fine to medium sand with silt and gravel and debris (moist) (fill)			Brick fragments; small abondoned metal pipe
	1								
	2								
	3		1		SM	Brown silty fine sand (moist) (native)	NS	2.3	
	4								
	5				SM	Brown silty fine sand with occasional gravel (moist) (native)	NS	1.5	
	6								
	7								

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to ½ foot.
Coordinates Data Source: Horizontal approximated based on Other. Vertical approximated based on Topographic Survey.

Log of Test Pit TP-12

GeoEngineers

Project: Rufus 2.0 Development - Block 18
Project Location: Seattle, Washington
Project Number: 20434-001-32

Figure B-23
Sheet 1 of 1

Date Excavated	11/7/2018	Total Depth (ft)	7.5	Logged By AWC Checked By CJG	Excavator Equipment Excavator	Groundwater not observed Caving not observed
Surface Elevation (ft) Vertical Datum	Undetermined NAVD88	Easting (X) Northing (Y)		Coordinate System Horizontal Datum	WA State Plane North NAD83 (feet)	

Elevation (feet)	Depth (feet)	SAMPLE: Testing Sample	SAMPLE: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	Notes
					ML	Gray-brown silt with fine to coarse sand and occasional gravel (moist) (fill)			Steel pipe abandoned
	1								
	2								
			1		ML	Gray silt with fine to medium sand (moist) (native)			
	3						NS	3.7	
	4								
	5								
							NS	1.7	
	6								
	7						NS	3.2	

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to ½ foot.
Coordinates Data Source: Horizontal approximated based on Other. Vertical approximated based on Topographic Survey.

Log of Test Pit TP-13

GeoEngineers

Project: Rufus 2.0 Development - Block 18
Project Location: Seattle, Washington
Project Number: 20434-001-32

Figure B-24
Sheet 1 of 1

Date Excavated 11/7/2018	Total Depth (ft) 12.5	Logged By AWC Checked By CJG	Excavator Equipment Excavator	Groundwater not observed Caving not observed
Surface Elevation (ft) Vertical Datum Undetermined NAVD88		Easting (X) Northing (Y)	Coordinate System WA State Plane North Horizontal Datum NAD83 (feet)	

Elevation (feet)	Depth (feet)	SAMPLE: Testing Sample	SAMPLE: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	Notes
	0				SP-SM	Gray-brown fine to medium sand with silt and occasional gravel (moist) (fill)			
	1								
	2								
	3		1		ML	Gray silt with fine sand (moist) (native)	SS	7.3	
	4								
	5		2				SS	7.1	
	6								
	7						NS	4.4	
	8								
	9								
	10								
	11								
	12								

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to ½ foot.
Coordinates Data Source: Horizontal approximated based on Other. Vertical approximated based on Topographic Survey.

Log of Test Pit TP-14

GeoEngineers

Project: Rufus 2.0 Development - Block 18
Project Location: Seattle, Washington
Project Number: 20434-001-32

Figure B-25
Sheet 1 of 1

APPENDIX B
Chemical Analytical Program

APPENDIX B
CHEMICAL ANALYTICAL PROGRAM

Analytical Methods

Chain-of-custody procedures were followed during the transport of the field 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 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.

Analytical Data Review Summary

No quality control exceptions were noted by the testing laboratory. It is our opinion that the analytical data are of acceptable quality for their intended use in this report.

3600 Fremont Ave. N.
Seattle, WA 98103
T: (206) 352-3790
F: (206) 352-7178
info@fremontanalytical.com

GeoEngineers
Chris Brown
2101 4th Ave, Suite 950
Seattle, WA 98121

RE: Rufus Block 18
Work Order Number: 1811173

December 04, 2018

Attention Chris Brown:

Fremont Analytical, Inc. received 12 sample(s) on 11/7/2018 for the analyses presented in the following report.

Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.
Gasoline by NWTPH-Gx
Mercury by EPA Method 7471
Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)
Sample Moisture (Percent Moisture)
Total Metals by EPA Method 6020
Volatile Organic Compounds by EPA Method 8260C

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Mike Ridgeway
Laboratory Director

Date: *12/04/2018*

CLIENT: GeoEngineers
Project: Rufus Block 18
Work Order: 1811173

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
1811173-001	TP-9-2.5	11/07/2018 8:40 AM	11/07/2018 3:45 PM
1811173-002	TP-9-5.0	11/07/2018 8:48 AM	11/07/2018 3:45 PM
1811173-003	TP-9-8.0	11/07/2018 8:54 AM	11/07/2018 3:45 PM
1811173-004	TP-14-2.5	11/07/2018 9:05 AM	11/07/2018 3:45 PM
1811173-005	TP-14-5.0	11/07/2018 9:11 AM	11/07/2018 3:45 PM
1811173-006	TP-14-7.5	11/07/2018 9:16 AM	11/07/2018 3:45 PM
1811173-007	TP-10-2.5	11/07/2018 10:07 AM	11/07/2018 3:45 PM
1811173-008	TP-10-5.0	11/07/2018 10:15 AM	11/07/2018 3:45 PM
1811173-009	TP-13-2.5	11/07/2018 2:22 PM	11/07/2018 3:45 PM
1811173-010	TP-13-5.0	11/07/2018 2:28 PM	11/07/2018 3:45 PM
1811173-011	TP-13-7.5	11/07/2018 2:35 PM	11/07/2018 3:45 PM
1811173-012	Trip Blank	11/06/2018 4:31 PM	11/07/2018 3:45 PM

Note: If no "Time Collected" is supplied, a default of 12:00AM is assigned

Case Narrative

WO#: **1811173**
Date: **12/4/2018**

CLIENT: GeoEngineers
Project: Rufus Block 18

I. SAMPLE RECEIPT:
Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:
Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:
Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

Qualifiers:

* - Flagged value is not within established control limits
B - Analyte detected in the associated Method Blank
D - Dilution was required
E - Value above quantitation range
H - Holding times for preparation or analysis exceeded
I - Analyte with an internal standard that does not meet established acceptance criteria
J - Analyte detected below Reporting Limit
N - Tentatively Identified Compound (TIC)
Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF)
S - Spike recovery outside accepted recovery limits
ND - Not detected at the Reporting Limit
R - High relative percent difference observed

Acronyms:

%Rec - Percent Recovery
CCB - Continued Calibration Blank
CCV - Continued Calibration Verification
DF - Dilution Factor
HEM - Hexane Extractable Material
ICV - Initial Calibration Verification
LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
MB or MBLANK - Method Blank
MDL - Method Detection Limit
MS/MSD - Matrix Spike / Matrix Spike Duplicate
PDS - Post Digestion Spike
Ref Val - Reference Value
RL - Reporting Limit
RPD - Relative Percent Difference
SD - Serial Dilution
SGT - Silica Gel Treatment
SPK - Spike
Surr - Surrogate

Analytical Report

Work Order: **1811173**
Date Reported: **12/4/2018**

Client: GeoEngineers
Collection Date: 11/7/2018 8:40:00 AM
Project: Rufus Block 18
Lab ID: 1811173-001
Matrix: Soil
Client Sample ID: **TP-9-2.5**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.				Batch ID: 22698		Analyst: DW
Diesel (Fuel Oil)	ND	24.4		mg/Kg-dry	1	11/23/2018 5:41:43 AM
Heavy Oil	ND	61.0		mg/Kg-dry	1	11/23/2018 5:41:43 AM
Surr: 2-Fluorobiphenyl	89.2	50 - 150		%Rec	1	11/23/2018 5:41:43 AM
Surr: o-Terphenyl	90.8	50 - 150		%Rec	1	11/23/2018 5:41:43 AM
Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)				Batch ID: 22699		Analyst: IH
Naphthalene	ND	48.6		µg/Kg-dry	1	11/21/2018 11:53:22 AM
2-Methylnaphthalene	ND	48.6		µg/Kg-dry	1	11/21/2018 11:53:22 AM
1-Methylnaphthalene	ND	48.6		µg/Kg-dry	1	11/21/2018 11:53:22 AM
Acenaphthylene	ND	48.6		µg/Kg-dry	1	11/21/2018 11:53:22 AM
Acenaphthene	ND	48.6		µg/Kg-dry	1	11/21/2018 11:53:22 AM
Fluorene	ND	48.6		µg/Kg-dry	1	11/21/2018 11:53:22 AM
Phenanthrene	ND	48.6		µg/Kg-dry	1	11/21/2018 11:53:22 AM
Anthracene	ND	48.6		µg/Kg-dry	1	11/21/2018 11:53:22 AM
Fluoranthene	ND	48.6		µg/Kg-dry	1	11/21/2018 11:53:22 AM
Pyrene	ND	48.6		µg/Kg-dry	1	11/21/2018 11:53:22 AM
Benz(a)anthracene	ND	48.6		µg/Kg-dry	1	11/21/2018 11:53:22 AM
Chrysene	ND	48.6		µg/Kg-dry	1	11/21/2018 11:53:22 AM
Benzo(b)fluoranthene	ND	48.6		µg/Kg-dry	1	11/21/2018 11:53:22 AM
Benzo(k)fluoranthene	ND	48.6		µg/Kg-dry	1	11/21/2018 11:53:22 AM
Benzo(a)pyrene	ND	48.6		µg/Kg-dry	1	11/21/2018 11:53:22 AM
Indeno(1,2,3-cd)pyrene	ND	48.6	Q	µg/Kg-dry	1	11/21/2018 11:53:22 AM
Dibenz(a,h)anthracene	ND	48.6	Q	µg/Kg-dry	1	11/21/2018 11:53:22 AM
Benzo(g,h,i)perylene	ND	48.6	Q	µg/Kg-dry	1	11/21/2018 11:53:22 AM
Surr: 2-Fluorobiphenyl	64.0	12.5 - 140		%Rec	1	11/21/2018 11:53:22 AM
Surr: Terphenyl-d14 (surr)	73.9	45.7 - 172		%Rec	1	11/21/2018 11:53:22 AM

NOTES:
Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria

Gasoline by NWTPH-Gx				Batch ID: 22755		Analyst: KT
Gasoline	ND	6.23	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM
Surr: Toluene-d8	97.6	65 - 135	H	%Rec	1	11/28/2018 5:51:58 PM
Surr: 4-Bromofluorobenzene	99.3	65 - 135	H	%Rec	1	11/28/2018 5:51:58 PM
Volatile Organic Compounds by EPA Method 8260C				Batch ID: 22755		Analyst: KT
Dichlorodifluoromethane (CFC-12)	ND	0.0249	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM

Client: GeoEngineers
Collection Date: 11/7/2018 8:40:00 AM
Project: Rufus Block 18
Lab ID: 1811173-001
Matrix: Soil
Client Sample ID: **TP-9-2.5**

Volatile Organic Compounds by EPA Method 8260C

Batch ID: 22755 Analyst: KT

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Chloromethane	ND	0.0623	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM
Vinyl chloride	ND	0.0311	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM
Bromomethane	ND	0.0623	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM
Trichlorofluoromethane (CFC-11)	ND	0.0249	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM
Chloroethane	ND	0.0623	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM
1,1-Dichloroethene	ND	0.0249	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM
Methylene chloride	ND	0.0249	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM
trans-1,2-Dichloroethene	ND	0.0249	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM
Methyl tert-butyl ether (MTBE)	ND	0.0623	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM
1,1-Dichloroethane	ND	0.0249	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM
2,2-Dichloropropane	ND	0.125	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM
cis-1,2-Dichloroethene	ND	0.0249	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM
Chloroform	ND	0.0249	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM
1,1,1-Trichloroethane (TCA)	ND	0.0311	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM
1,1-Dichloropropene	ND	0.0249	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM
Carbon tetrachloride	ND	0.0311	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM
1,2-Dichloroethane (EDC)	ND	0.0249	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM
Benzene	ND	0.0249	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM
Trichloroethene (TCE)	ND	0.0249	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM
1,2-Dichloropropane	ND	0.0249	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM
Bromodichloromethane	ND	0.0249	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM
Dibromomethane	ND	0.0249	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM
cis-1,3-Dichloropropene	ND	0.0249	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM
Toluene	ND	0.0249	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM
trans-1,3-Dichloropropylene	ND	0.0249	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM
1,1,2-Trichloroethane	ND	0.0249	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM
1,3-Dichloropropane	ND	0.0311	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM
Tetrachloroethene (PCE)	ND	0.0311	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM
Dibromochloromethane	ND	0.0311	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM
1,2-Dibromoethane (EDB)	ND	0.00623	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM
Chlorobenzene	ND	0.0311	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM
1,1,1,2-Tetrachloroethane	ND	0.0311	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM
Ethylbenzene	ND	0.0311	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM
m,p-Xylene	ND	0.0623	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM
o-Xylene	ND	0.0311	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM
Styrene	ND	0.0311	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM
Isopropylbenzene	ND	0.0311	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM
Bromoform	ND	0.0623	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM
1,1,2,2-Tetrachloroethane	ND	0.0249	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM

Client: GeoEngineers
Collection Date: 11/7/2018 8:40:00 AM
Project: Rufus Block 18
Lab ID: 1811173-001
Matrix: Soil
Client Sample ID: **TP-9-2.5**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Volatile Organic Compounds by EPA Method 8260C				Batch ID: 22755		Analyst: KT
n-Propylbenzene	ND	0.0311	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM
Bromobenzene	ND	0.0249	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM
1,3,5-Trimethylbenzene	ND	0.0311	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM
2-Chlorotoluene	ND	0.0311	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM
4-Chlorotoluene	ND	0.0311	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM
tert-Butylbenzene	ND	0.0311	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM
1,2,3-Trichloropropane	ND	0.0311	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM
1,2,4-Trichlorobenzene	ND	0.0311	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM
sec-Butylbenzene	ND	0.0623	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM
4-Isopropyltoluene	ND	0.0623	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM
1,3-Dichlorobenzene	ND	0.0249	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM
1,4-Dichlorobenzene	ND	0.0249	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM
n-Butylbenzene	ND	0.0311	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM
1,2-Dichlorobenzene	ND	0.0249	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM
1,2-Dibromo-3-chloropropane	ND	0.623	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM
1,2,4-Trimethylbenzene	ND	0.0249	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM
Hexachlorobutadiene	ND	0.0623	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM
Naphthalene	ND	0.0623	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM
1,2,3-Trichlorobenzene	ND	0.0249	H	mg/Kg-dry	1	11/28/2018 5:51:58 PM
Surr: Dibromofluoromethane	99.0	56.5 - 129	H	%Rec	1	11/28/2018 5:51:58 PM
Surr: Toluene-d8	100	64.5 - 151	H	%Rec	1	11/28/2018 5:51:58 PM
Surr: 1-Bromo-4-fluorobenzene	96.2	54.8 - 168	H	%Rec	1	11/28/2018 5:51:58 PM
Mercury by EPA Method 7471				Batch ID: 22708		Analyst: WF
Mercury	ND	0.319		mg/Kg-dry	1	11/21/2018 12:23:27 PM
Total Metals by EPA Method 6020				Batch ID: 22717		Analyst: WC
Arsenic	5.25	0.254		mg/Kg-dry	1	11/26/2018 2:03:57 PM
Cadmium	ND	0.203		mg/Kg-dry	1	11/26/2018 2:03:57 PM
Chromium	67.3	0.102		mg/Kg-dry	1	11/26/2018 2:03:57 PM
Lead	4.38	0.203		mg/Kg-dry	1	11/26/2018 2:03:57 PM
Sample Moisture (Percent Moisture)				Batch ID: R47753		Analyst: CG
Percent Moisture	23.1	0.500		wt%	1	11/20/2018 9:06:24 AM

Analytical Report

Work Order: **1811173**
Date Reported: **12/4/2018**

Client: GeoEngineers
Collection Date: 11/7/2018 9:05:00 AM
Project: Rufus Block 18
Lab ID: 1811173-004
Matrix: Soil
Client Sample ID: **TP-14-2.5**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.				Batch ID: 22614		Analyst: DW
Diesel (Fuel Oil)	ND	25.3		mg/Kg-dry	1	11/14/2018 1:05:03 PM
Heavy Oil	ND	63.2		mg/Kg-dry	1	11/14/2018 1:05:03 PM
Surr: 2-Fluorobiphenyl	78.8	50 - 150		%Rec	1	11/14/2018 1:05:03 PM
Surr: o-Terphenyl	82.5	50 - 150		%Rec	1	11/14/2018 1:05:03 PM
Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)				Batch ID: 22627		Analyst: IH
Naphthalene	ND	49.8		µg/Kg-dry	1	11/15/2018 4:44:17 PM
2-Methylnaphthalene	ND	49.8		µg/Kg-dry	1	11/15/2018 4:44:17 PM
1-Methylnaphthalene	ND	49.8		µg/Kg-dry	1	11/15/2018 4:44:17 PM
Acenaphthylene	ND	49.8		µg/Kg-dry	1	11/15/2018 4:44:17 PM
Acenaphthene	ND	49.8		µg/Kg-dry	1	11/15/2018 4:44:17 PM
Fluorene	ND	49.8		µg/Kg-dry	1	11/15/2018 4:44:17 PM
Phenanthrene	ND	49.8		µg/Kg-dry	1	11/15/2018 4:44:17 PM
Anthracene	ND	49.8		µg/Kg-dry	1	11/15/2018 4:44:17 PM
Fluoranthene	ND	49.8		µg/Kg-dry	1	11/15/2018 4:44:17 PM
Pyrene	ND	49.8		µg/Kg-dry	1	11/15/2018 4:44:17 PM
Benz(a)anthracene	ND	49.8		µg/Kg-dry	1	11/15/2018 4:44:17 PM
Chrysene	ND	49.8		µg/Kg-dry	1	11/15/2018 4:44:17 PM
Benzo(b)fluoranthene	ND	49.8		µg/Kg-dry	1	11/15/2018 4:44:17 PM
Benzo(k)fluoranthene	ND	49.8		µg/Kg-dry	1	11/15/2018 4:44:17 PM
Benzo(a)pyrene	ND	49.8		µg/Kg-dry	1	11/15/2018 4:44:17 PM
Indeno(1,2,3-cd)pyrene	ND	49.8		µg/Kg-dry	1	11/15/2018 4:44:17 PM
Dibenz(a,h)anthracene	ND	49.8		µg/Kg-dry	1	11/15/2018 4:44:17 PM
Benzo(g,h,i)perylene	ND	49.8		µg/Kg-dry	1	11/15/2018 4:44:17 PM
Surr: 2-Fluorobiphenyl	85.9	12.5 - 140		%Rec	1	11/15/2018 4:44:17 PM
Surr: Terphenyl-d14 (surr)	106	45.7 - 172		%Rec	1	11/15/2018 4:44:17 PM
Gasoline by NWTPH-Gx				Batch ID: 22755		Analyst: KT
Gasoline	ND	6.36	H	mg/Kg-dry	1	11/28/2018 6:54:37 PM
Surr: Toluene-d8	97.3	65 - 135	H	%Rec	1	11/28/2018 6:54:37 PM
Surr: 4-Bromofluorobenzene	99.6	65 - 135	H	%Rec	1	11/28/2018 6:54:37 PM
Volatile Organic Compounds by EPA Method 8260C				Batch ID: 22655		Analyst: KT
Dichlorodifluoromethane (CFC-12)	ND	0.0398		mg/Kg-dry	1	11/16/2018 7:22:28 PM
Chloromethane	ND	0.0995		mg/Kg-dry	1	11/16/2018 7:22:28 PM
Vinyl chloride	ND	0.0497		mg/Kg-dry	1	11/16/2018 7:22:28 PM

Client: GeoEngineers
Collection Date: 11/7/2018 9:05:00 AM
Project: Rufus Block 18
Lab ID: 1811173-004
Matrix: Soil
Client Sample ID: **TP-14-2.5**

Volatile Organic Compounds by EPA Method 8260C

Batch ID: 22655 Analyst: KT

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Bromomethane	ND	0.0995		mg/Kg-dry	1	11/16/2018 7:22:28 PM
Trichlorofluoromethane (CFC-11)	ND	0.0398		mg/Kg-dry	1	11/16/2018 7:22:28 PM
Chloroethane	ND	0.0995		mg/Kg-dry	1	11/16/2018 7:22:28 PM
1,1-Dichloroethene	ND	0.0398		mg/Kg-dry	1	11/16/2018 7:22:28 PM
Methylene chloride	ND	0.0398		mg/Kg-dry	1	11/16/2018 7:22:28 PM
trans-1,2-Dichloroethene	ND	0.0398		mg/Kg-dry	1	11/16/2018 7:22:28 PM
Methyl tert-butyl ether (MTBE)	ND	0.0995		mg/Kg-dry	1	11/16/2018 7:22:28 PM
1,1-Dichloroethane	ND	0.0398		mg/Kg-dry	1	11/16/2018 7:22:28 PM
2,2-Dichloropropane	ND	0.199		mg/Kg-dry	1	11/16/2018 7:22:28 PM
cis-1,2-Dichloroethene	ND	0.0398		mg/Kg-dry	1	11/16/2018 7:22:28 PM
Chloroform	ND	0.0398		mg/Kg-dry	1	11/16/2018 7:22:28 PM
1,1,1-Trichloroethane (TCA)	ND	0.0497		mg/Kg-dry	1	11/16/2018 7:22:28 PM
1,1-Dichloropropene	ND	0.0398		mg/Kg-dry	1	11/16/2018 7:22:28 PM
Carbon tetrachloride	ND	0.0497		mg/Kg-dry	1	11/16/2018 7:22:28 PM
1,2-Dichloroethane (EDC)	ND	0.0398		mg/Kg-dry	1	11/16/2018 7:22:28 PM
Benzene	ND	0.0398		mg/Kg-dry	1	11/16/2018 7:22:28 PM
Trichloroethene (TCE)	ND	0.0398		mg/Kg-dry	1	11/16/2018 7:22:28 PM
1,2-Dichloropropane	ND	0.0398		mg/Kg-dry	1	11/16/2018 7:22:28 PM
Bromodichloromethane	ND	0.0398		mg/Kg-dry	1	11/16/2018 7:22:28 PM
Dibromomethane	ND	0.0398		mg/Kg-dry	1	11/16/2018 7:22:28 PM
cis-1,3-Dichloropropene	ND	0.0398		mg/Kg-dry	1	11/16/2018 7:22:28 PM
Toluene	ND	0.0398		mg/Kg-dry	1	11/16/2018 7:22:28 PM
trans-1,3-Dichloropropylene	ND	0.0398		mg/Kg-dry	1	11/16/2018 7:22:28 PM
1,1,2-Trichloroethane	ND	0.0398		mg/Kg-dry	1	11/16/2018 7:22:28 PM
1,3-Dichloropropane	ND	0.0497		mg/Kg-dry	1	11/16/2018 7:22:28 PM
Tetrachloroethene (PCE)	ND	0.0497		mg/Kg-dry	1	11/16/2018 7:22:28 PM
Dibromochloromethane	ND	0.0497		mg/Kg-dry	1	11/16/2018 7:22:28 PM
1,2-Dibromoethane (EDB)	ND	0.00995		mg/Kg-dry	1	11/16/2018 7:22:28 PM
Chlorobenzene	ND	0.0497		mg/Kg-dry	1	11/16/2018 7:22:28 PM
1,1,1,2-Tetrachloroethane	ND	0.0497		mg/Kg-dry	1	11/16/2018 7:22:28 PM
Ethylbenzene	ND	0.0497		mg/Kg-dry	1	11/16/2018 7:22:28 PM
m,p-Xylene	0.179	0.0995		mg/Kg-dry	1	11/16/2018 7:22:28 PM
o-Xylene	0.0508	0.0497		mg/Kg-dry	1	11/16/2018 7:22:28 PM
Styrene	ND	0.0497		mg/Kg-dry	1	11/16/2018 7:22:28 PM
Isopropylbenzene	ND	0.0497		mg/Kg-dry	1	11/16/2018 7:22:28 PM
Bromoform	ND	0.0995		mg/Kg-dry	1	11/16/2018 7:22:28 PM
1,1,2,2-Tetrachloroethane	ND	0.0398		mg/Kg-dry	1	11/16/2018 7:22:28 PM
n-Propylbenzene	ND	0.0497		mg/Kg-dry	1	11/16/2018 7:22:28 PM
Bromobenzene	ND	0.0398		mg/Kg-dry	1	11/16/2018 7:22:28 PM

Analytical Report

Work Order: **1811173**
Date Reported: **12/4/2018**

Client: GeoEngineers
Collection Date: 11/7/2018 9:05:00 AM
Project: Rufus Block 18
Lab ID: 1811173-004
Matrix: Soil
Client Sample ID: **TP-14-2.5**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Volatile Organic Compounds by EPA Method 8260C				Batch ID: 22655		Analyst: KT
1,3,5-Trimethylbenzene	ND	0.0497		mg/Kg-dry	1	11/16/2018 7:22:28 PM
2-Chlorotoluene	ND	0.0497		mg/Kg-dry	1	11/16/2018 7:22:28 PM
4-Chlorotoluene	ND	0.0497		mg/Kg-dry	1	11/16/2018 7:22:28 PM
tert-Butylbenzene	ND	0.0497		mg/Kg-dry	1	11/16/2018 7:22:28 PM
1,2,3-Trichloropropane	ND	0.0497		mg/Kg-dry	1	11/16/2018 7:22:28 PM
1,2,4-Trichlorobenzene	ND	0.0497		mg/Kg-dry	1	11/16/2018 7:22:28 PM
sec-Butylbenzene	ND	0.0995		mg/Kg-dry	1	11/16/2018 7:22:28 PM
4-Isopropyltoluene	ND	0.0995		mg/Kg-dry	1	11/16/2018 7:22:28 PM
1,3-Dichlorobenzene	ND	0.0398		mg/Kg-dry	1	11/16/2018 7:22:28 PM
1,4-Dichlorobenzene	ND	0.0398		mg/Kg-dry	1	11/16/2018 7:22:28 PM
n-Butylbenzene	ND	0.0497		mg/Kg-dry	1	11/16/2018 7:22:28 PM
1,2-Dichlorobenzene	ND	0.0398		mg/Kg-dry	1	11/16/2018 7:22:28 PM
1,2-Dibromo-3-chloropropane	ND	0.995		mg/Kg-dry	1	11/16/2018 7:22:28 PM
1,2,4-Trimethylbenzene	ND	0.0398		mg/Kg-dry	1	11/16/2018 7:22:28 PM
Hexachlorobutadiene	ND	0.0995		mg/Kg-dry	1	11/16/2018 7:22:28 PM
Naphthalene	ND	0.0995		mg/Kg-dry	1	11/16/2018 7:22:28 PM
1,2,3-Trichlorobenzene	ND	0.0398		mg/Kg-dry	1	11/16/2018 7:22:28 PM
Surr: Dibromofluoromethane	100	56.5 - 129		%Rec	1	11/16/2018 7:22:28 PM
Surr: Toluene-d8	104	64.5 - 151		%Rec	1	11/16/2018 7:22:28 PM
Surr: 1-Bromo-4-fluorobenzene	96.9	54.8 - 168		%Rec	1	11/16/2018 7:22:28 PM
Mercury by EPA Method 7471				Batch ID: 22708		Analyst: WF
Mercury	ND	0.320		mg/Kg-dry	1	11/21/2018 12:25:04 PM
Total Metals by EPA Method 6020				Batch ID: 22717		Analyst: WC
Arsenic	4.23	0.245		mg/Kg-dry	1	11/26/2018 2:28:07 PM
Cadmium	ND	0.196		mg/Kg-dry	1	11/26/2018 2:28:07 PM
Chromium	73.0	0.0979		mg/Kg-dry	1	11/26/2018 2:28:07 PM
Lead	6.57	0.196		mg/Kg-dry	1	11/26/2018 2:28:07 PM
Sample Moisture (Percent Moisture)				Batch ID: R47634		Analyst: NG
Percent Moisture	24.9	0.500		wt%	1	11/14/2018 1:18:13 PM

Analytical Report

Work Order: **1811173**
Date Reported: **12/4/2018**

Client: GeoEngineers
Collection Date: 11/7/2018 9:11:00 AM
Project: Rufus Block 18
Lab ID: 1811173-005
Matrix: Soil
Client Sample ID: **TP-14-5.0**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Volatile Organic Compounds by EPA Method 8260C				Batch ID: 22755		Analyst: KT
Benzene	ND	0.0266	H	mg/Kg-dry	1	11/28/2018 7:25:53 PM
Toluene	ND	0.0266	H	mg/Kg-dry	1	11/28/2018 7:25:53 PM
Ethylbenzene	ND	0.0332	H	mg/Kg-dry	1	11/28/2018 7:25:53 PM
m,p-Xylene	0.0905	0.0664	H	mg/Kg-dry	1	11/28/2018 7:25:53 PM
o-Xylene	ND	0.0332	H	mg/Kg-dry	1	11/28/2018 7:25:53 PM
Surr: Dibromofluoromethane	97.8	56.5 - 129	H	%Rec	1	11/28/2018 7:25:53 PM
Surr: Toluene-d8	101	64.5 - 151	H	%Rec	1	11/28/2018 7:25:53 PM
Surr: 1-Bromo-4-fluorobenzene	96.4	54.8 - 168	H	%Rec	1	11/28/2018 7:25:53 PM
Sample Moisture (Percent Moisture)				Batch ID: R47753		Analyst: CG
Percent Moisture	24.1	0.500		wt%	1	11/20/2018 9:06:24 AM

Client: GeoEngineers
Collection Date: 11/7/2018 10:07:00 AM
Project: Rufus Block 18
Lab ID: 1811173-007
Matrix: Soil
Client Sample ID: **TP-10-2.5**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.				Batch ID: 22698		Analyst: DW
Diesel (Fuel Oil)	ND	25.4		mg/Kg-dry	1	11/26/2018 3:15:37 PM
Heavy Oil	ND	63.6		mg/Kg-dry	1	11/26/2018 3:15:37 PM
Surr: 2-Fluorobiphenyl	86.1	50 - 150		%Rec	1	11/26/2018 3:15:37 PM
Surr: o-Terphenyl	89.1	50 - 150		%Rec	1	11/26/2018 3:15:37 PM
Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)				Batch ID: 22699		Analyst: IH
Naphthalene	ND	50.7		µg/Kg-dry	1	11/21/2018 1:47:57 PM
2-Methylnaphthalene	ND	50.7		µg/Kg-dry	1	11/21/2018 1:47:57 PM
1-Methylnaphthalene	ND	50.7		µg/Kg-dry	1	11/21/2018 1:47:57 PM
Acenaphthylene	ND	50.7		µg/Kg-dry	1	11/21/2018 1:47:57 PM
Acenaphthene	ND	50.7		µg/Kg-dry	1	11/21/2018 1:47:57 PM
Fluorene	ND	50.7		µg/Kg-dry	1	11/21/2018 1:47:57 PM
Phenanthrene	ND	50.7		µg/Kg-dry	1	11/21/2018 1:47:57 PM
Anthracene	ND	50.7		µg/Kg-dry	1	11/21/2018 1:47:57 PM
Fluoranthene	ND	50.7		µg/Kg-dry	1	11/21/2018 1:47:57 PM
Pyrene	ND	50.7		µg/Kg-dry	1	11/21/2018 1:47:57 PM
Benz(a)anthracene	ND	50.7		µg/Kg-dry	1	11/21/2018 1:47:57 PM
Chrysene	ND	50.7		µg/Kg-dry	1	11/21/2018 1:47:57 PM
Benzo(b)fluoranthene	ND	50.7		µg/Kg-dry	1	11/21/2018 1:47:57 PM
Benzo(k)fluoranthene	ND	50.7		µg/Kg-dry	1	11/21/2018 1:47:57 PM
Benzo(a)pyrene	ND	50.7		µg/Kg-dry	1	11/21/2018 1:47:57 PM
Indeno(1,2,3-cd)pyrene	ND	50.7	Q	µg/Kg-dry	1	11/21/2018 1:47:57 PM
Dibenz(a,h)anthracene	ND	50.7	Q	µg/Kg-dry	1	11/21/2018 1:47:57 PM
Benzo(g,h,i)perylene	ND	50.7	Q	µg/Kg-dry	1	11/21/2018 1:47:57 PM
Surr: 2-Fluorobiphenyl	68.3	12.5 - 140		%Rec	1	11/21/2018 1:47:57 PM
Surr: Terphenyl-d14 (surr)	79.7	45.7 - 172		%Rec	1	11/21/2018 1:47:57 PM

NOTES:
Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria

Gasoline by NWTPH-Gx				Batch ID: 22755		Analyst: KT
Gasoline	ND	7.38	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM
Surr: Toluene-d8	98.3	65 - 135	H	%Rec	1	11/28/2018 7:57:09 PM
Surr: 4-Bromofluorobenzene	99.6	65 - 135	H	%Rec	1	11/28/2018 7:57:09 PM
Volatile Organic Compounds by EPA Method 8260C				Batch ID: 22755		Analyst: KT
Dichlorodifluoromethane (CFC-12)	ND	0.0295	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM

Client: GeoEngineers
Collection Date: 11/7/2018 10:07:00 AM
Project: Rufus Block 18
Lab ID: 1811173-007
Matrix: Soil
Client Sample ID: **TP-10-2.5**

Volatile Organic Compounds by EPA Method 8260C

Batch ID: 22755 Analyst: KT

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Chloromethane	ND	0.0738	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM
Vinyl chloride	ND	0.0369	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM
Bromomethane	ND	0.0738	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM
Trichlorofluoromethane (CFC-11)	ND	0.0295	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM
Chloroethane	ND	0.0738	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM
1,1-Dichloroethene	ND	0.0295	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM
Methylene chloride	ND	0.0295	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM
trans-1,2-Dichloroethene	ND	0.0295	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM
Methyl tert-butyl ether (MTBE)	ND	0.0738	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM
1,1-Dichloroethane	ND	0.0295	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM
2,2-Dichloropropane	ND	0.148	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM
cis-1,2-Dichloroethene	ND	0.0295	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM
Chloroform	ND	0.0295	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM
1,1,1-Trichloroethane (TCA)	ND	0.0369	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM
1,1-Dichloropropene	ND	0.0295	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM
Carbon tetrachloride	ND	0.0369	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM
1,2-Dichloroethane (EDC)	ND	0.0295	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM
Benzene	ND	0.0295	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM
Trichloroethene (TCE)	ND	0.0295	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM
1,2-Dichloropropane	ND	0.0295	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM
Bromodichloromethane	ND	0.0295	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM
Dibromomethane	ND	0.0295	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM
cis-1,3-Dichloropropene	ND	0.0295	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM
Toluene	ND	0.0295	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM
trans-1,3-Dichloropropylene	ND	0.0295	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM
1,1,2-Trichloroethane	ND	0.0295	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM
1,3-Dichloropropane	ND	0.0369	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM
Tetrachloroethene (PCE)	ND	0.0369	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM
Dibromochloromethane	ND	0.0369	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM
1,2-Dibromoethane (EDB)	ND	0.00738	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM
Chlorobenzene	ND	0.0369	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM
1,1,1,2-Tetrachloroethane	ND	0.0369	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM
Ethylbenzene	ND	0.0369	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM
m,p-Xylene	ND	0.0738	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM
o-Xylene	ND	0.0369	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM
Styrene	ND	0.0369	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM
Isopropylbenzene	ND	0.0369	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM
Bromoform	ND	0.0738	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM
1,1,2,2-Tetrachloroethane	ND	0.0295	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM

Client: GeoEngineers **Collection Date:** 11/7/2018 10:07:00 AM
Project: Rufus Block 18
Lab ID: 1811173-007 **Matrix:** Soil
Client Sample ID: **TP-10-2.5**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Volatile Organic Compounds by EPA Method 8260C				Batch ID: 22755		Analyst: KT
n-Propylbenzene	ND	0.0369	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM
Bromobenzene	ND	0.0295	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM
1,3,5-Trimethylbenzene	ND	0.0369	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM
2-Chlorotoluene	ND	0.0369	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM
4-Chlorotoluene	ND	0.0369	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM
tert-Butylbenzene	ND	0.0369	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM
1,2,3-Trichloropropane	ND	0.0369	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM
1,2,4-Trichlorobenzene	ND	0.0369	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM
sec-Butylbenzene	ND	0.0738	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM
4-Isopropyltoluene	ND	0.0738	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM
1,3-Dichlorobenzene	ND	0.0295	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM
1,4-Dichlorobenzene	ND	0.0295	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM
n-Butylbenzene	ND	0.0369	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM
1,2-Dichlorobenzene	ND	0.0295	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM
1,2-Dibromo-3-chloropropane	ND	0.738	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM
1,2,4-Trimethylbenzene	ND	0.0295	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM
Hexachlorobutadiene	ND	0.0738	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM
Naphthalene	ND	0.0738	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM
1,2,3-Trichlorobenzene	ND	0.0295	H	mg/Kg-dry	1	11/28/2018 7:57:09 PM
Surr: Dibromofluoromethane	96.9	56.5 - 129	H	%Rec	1	11/28/2018 7:57:09 PM
Surr: Toluene-d8	100	64.5 - 151	H	%Rec	1	11/28/2018 7:57:09 PM
Surr: 1-Bromo-4-fluorobenzene	97.4	54.8 - 168	H	%Rec	1	11/28/2018 7:57:09 PM
Mercury by EPA Method 7471				Batch ID: 22708		Analyst: WF
Mercury	ND	0.335		mg/Kg-dry	1	11/21/2018 12:26:41 PM
Total Metals by EPA Method 6020				Batch ID: 22717		Analyst: WC
Arsenic	4.43	0.242		mg/Kg-dry	1	11/26/2018 2:32:09 PM
Cadmium	ND	0.194		mg/Kg-dry	1	11/26/2018 2:32:09 PM
Chromium	64.1	0.0969		mg/Kg-dry	1	11/26/2018 2:32:09 PM
Lead	7.81	0.194		mg/Kg-dry	1	11/26/2018 2:32:09 PM
Sample Moisture (Percent Moisture)				Batch ID: R47753		Analyst: CG
Percent Moisture	26.8	0.500		wt%	1	11/20/2018 9:06:24 AM

Client: GeoEngineers
Collection Date: 11/7/2018 2:22:00 PM
Project: Rufus Block 18
Lab ID: 1811173-009
Matrix: Soil
Client Sample ID: **TP-13-2.5**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.				Batch ID: 22614		Analyst: DW
Diesel (Fuel Oil)	ND	26.8		mg/Kg-dry	1	11/14/2018 1:35:00 PM
Heavy Oil	ND	67.0		mg/Kg-dry	1	11/14/2018 1:35:00 PM
Surr: 2-Fluorobiphenyl	77.9	50 - 150		%Rec	1	11/14/2018 1:35:00 PM
Surr: o-Terphenyl	81.9	50 - 150		%Rec	1	11/14/2018 1:35:00 PM
Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)				Batch ID: 22627		Analyst: IH
Naphthalene	ND	54.7		µg/Kg-dry	1	11/15/2018 5:05:07 PM
2-Methylnaphthalene	ND	54.7		µg/Kg-dry	1	11/15/2018 5:05:07 PM
1-Methylnaphthalene	ND	54.7		µg/Kg-dry	1	11/15/2018 5:05:07 PM
Acenaphthylene	ND	54.7		µg/Kg-dry	1	11/15/2018 5:05:07 PM
Acenaphthene	ND	54.7		µg/Kg-dry	1	11/15/2018 5:05:07 PM
Fluorene	ND	54.7		µg/Kg-dry	1	11/15/2018 5:05:07 PM
Phenanthrene	ND	54.7		µg/Kg-dry	1	11/15/2018 5:05:07 PM
Anthracene	ND	54.7		µg/Kg-dry	1	11/15/2018 5:05:07 PM
Fluoranthene	ND	54.7		µg/Kg-dry	1	11/15/2018 5:05:07 PM
Pyrene	ND	54.7		µg/Kg-dry	1	11/15/2018 5:05:07 PM
Benz(a)anthracene	ND	54.7		µg/Kg-dry	1	11/15/2018 5:05:07 PM
Chrysene	ND	54.7		µg/Kg-dry	1	11/15/2018 5:05:07 PM
Benzo(b)fluoranthene	ND	54.7		µg/Kg-dry	1	11/15/2018 5:05:07 PM
Benzo(k)fluoranthene	ND	54.7		µg/Kg-dry	1	11/15/2018 5:05:07 PM
Benzo(a)pyrene	ND	54.7		µg/Kg-dry	1	11/15/2018 5:05:07 PM
Indeno(1,2,3-cd)pyrene	ND	54.7		µg/Kg-dry	1	11/15/2018 5:05:07 PM
Dibenz(a,h)anthracene	ND	54.7		µg/Kg-dry	1	11/15/2018 5:05:07 PM
Benzo(g,h,i)perylene	ND	54.7		µg/Kg-dry	1	11/15/2018 5:05:07 PM
Surr: 2-Fluorobiphenyl	82.6	12.5 - 140		%Rec	1	11/15/2018 5:05:07 PM
Surr: Terphenyl-d14 (surr)	105	45.7 - 172		%Rec	1	11/15/2018 5:05:07 PM
Gasoline by NWTPH-Gx				Batch ID: 22655		Analyst: CR
Gasoline	ND	7.16	H	mg/Kg-dry	1	12/4/2018 12:48:23 PM
Surr: Toluene-d8	97.8	65 - 135	H	%Rec	1	12/4/2018 12:48:23 PM
Surr: 4-Bromofluorobenzene	97.6	65 - 135	H	%Rec	1	12/4/2018 12:48:23 PM
Volatile Organic Compounds by EPA Method 8260C				Batch ID: 22655		Analyst: KT
Dichlorodifluoromethane (CFC-12)	ND	0.0287		mg/Kg-dry	1	11/16/2018 8:24:53 PM
Chloromethane	ND	0.0716		mg/Kg-dry	1	11/16/2018 8:24:53 PM
Vinyl chloride	ND	0.0358		mg/Kg-dry	1	11/16/2018 8:24:53 PM

Client: GeoEngineers
Collection Date: 11/7/2018 2:22:00 PM
Project: Rufus Block 18
Lab ID: 1811173-009
Matrix: Soil
Client Sample ID: **TP-13-2.5**

Volatile Organic Compounds by EPA Method 8260C

Batch ID: 22655 Analyst: KT

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Bromomethane	ND	0.0716		mg/Kg-dry	1	11/16/2018 8:24:53 PM
Trichlorofluoromethane (CFC-11)	ND	0.0287		mg/Kg-dry	1	11/16/2018 8:24:53 PM
Chloroethane	ND	0.0716		mg/Kg-dry	1	11/16/2018 8:24:53 PM
1,1-Dichloroethene	ND	0.0287		mg/Kg-dry	1	11/16/2018 8:24:53 PM
Methylene chloride	ND	0.0287		mg/Kg-dry	1	11/16/2018 8:24:53 PM
trans-1,2-Dichloroethene	ND	0.0287		mg/Kg-dry	1	11/16/2018 8:24:53 PM
Methyl tert-butyl ether (MTBE)	ND	0.0716		mg/Kg-dry	1	11/16/2018 8:24:53 PM
1,1-Dichloroethane	ND	0.0287		mg/Kg-dry	1	11/16/2018 8:24:53 PM
2,2-Dichloropropane	ND	0.143		mg/Kg-dry	1	11/16/2018 8:24:53 PM
cis-1,2-Dichloroethene	ND	0.0287		mg/Kg-dry	1	11/16/2018 8:24:53 PM
Chloroform	ND	0.0287		mg/Kg-dry	1	11/16/2018 8:24:53 PM
1,1,1-Trichloroethane (TCA)	ND	0.0358		mg/Kg-dry	1	11/16/2018 8:24:53 PM
1,1-Dichloropropene	ND	0.0287		mg/Kg-dry	1	11/16/2018 8:24:53 PM
Carbon tetrachloride	ND	0.0358		mg/Kg-dry	1	11/16/2018 8:24:53 PM
1,2-Dichloroethane (EDC)	ND	0.0287		mg/Kg-dry	1	11/16/2018 8:24:53 PM
Benzene	ND	0.0287		mg/Kg-dry	1	11/16/2018 8:24:53 PM
Trichloroethene (TCE)	ND	0.0287		mg/Kg-dry	1	11/16/2018 8:24:53 PM
1,2-Dichloropropane	ND	0.0287		mg/Kg-dry	1	11/16/2018 8:24:53 PM
Bromodichloromethane	ND	0.0287		mg/Kg-dry	1	11/16/2018 8:24:53 PM
Dibromomethane	ND	0.0287		mg/Kg-dry	1	11/16/2018 8:24:53 PM
cis-1,3-Dichloropropene	ND	0.0287		mg/Kg-dry	1	11/16/2018 8:24:53 PM
Toluene	ND	0.0287		mg/Kg-dry	1	11/16/2018 8:24:53 PM
trans-1,3-Dichloropropylene	ND	0.0287		mg/Kg-dry	1	11/16/2018 8:24:53 PM
1,1,2-Trichloroethane	ND	0.0287		mg/Kg-dry	1	11/16/2018 8:24:53 PM
1,3-Dichloropropane	ND	0.0358		mg/Kg-dry	1	11/16/2018 8:24:53 PM
Tetrachloroethene (PCE)	ND	0.0358		mg/Kg-dry	1	11/16/2018 8:24:53 PM
Dibromochloromethane	ND	0.0358		mg/Kg-dry	1	11/16/2018 8:24:53 PM
1,2-Dibromoethane (EDB)	ND	0.00716		mg/Kg-dry	1	11/16/2018 8:24:53 PM
Chlorobenzene	ND	0.0358		mg/Kg-dry	1	11/16/2018 8:24:53 PM
1,1,1,2-Tetrachloroethane	ND	0.0358		mg/Kg-dry	1	11/16/2018 8:24:53 PM
Ethylbenzene	ND	0.0358		mg/Kg-dry	1	11/16/2018 8:24:53 PM
m,p-Xylene	ND	0.0716		mg/Kg-dry	1	11/16/2018 8:24:53 PM
o-Xylene	ND	0.0358		mg/Kg-dry	1	11/16/2018 8:24:53 PM
Styrene	ND	0.0358		mg/Kg-dry	1	11/16/2018 8:24:53 PM
Isopropylbenzene	ND	0.0358		mg/Kg-dry	1	11/16/2018 8:24:53 PM
Bromoform	ND	0.0716		mg/Kg-dry	1	11/16/2018 8:24:53 PM
1,1,2,2-Tetrachloroethane	ND	0.0287		mg/Kg-dry	1	11/16/2018 8:24:53 PM
n-Propylbenzene	ND	0.0358		mg/Kg-dry	1	11/16/2018 8:24:53 PM
Bromobenzene	ND	0.0287		mg/Kg-dry	1	11/16/2018 8:24:53 PM

Analytical Report

Work Order: **1811173**
Date Reported: **12/4/2018**

Client: GeoEngineers
Collection Date: 11/7/2018 2:22:00 PM
Project: Rufus Block 18
Lab ID: 1811173-009
Matrix: Soil
Client Sample ID: **TP-13-2.5**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Volatile Organic Compounds by EPA Method 8260C				Batch ID: 22655		Analyst: KT
1,3,5-Trimethylbenzene	ND	0.0358		mg/Kg-dry	1	11/16/2018 8:24:53 PM
2-Chlorotoluene	ND	0.0358		mg/Kg-dry	1	11/16/2018 8:24:53 PM
4-Chlorotoluene	ND	0.0358		mg/Kg-dry	1	11/16/2018 8:24:53 PM
tert-Butylbenzene	ND	0.0358		mg/Kg-dry	1	11/16/2018 8:24:53 PM
1,2,3-Trichloropropane	ND	0.0358		mg/Kg-dry	1	11/16/2018 8:24:53 PM
1,2,4-Trichlorobenzene	ND	0.0358		mg/Kg-dry	1	11/16/2018 8:24:53 PM
sec-Butylbenzene	ND	0.0716		mg/Kg-dry	1	11/16/2018 8:24:53 PM
4-Isopropyltoluene	ND	0.0716		mg/Kg-dry	1	11/16/2018 8:24:53 PM
1,3-Dichlorobenzene	ND	0.0287		mg/Kg-dry	1	11/16/2018 8:24:53 PM
1,4-Dichlorobenzene	ND	0.0287		mg/Kg-dry	1	11/16/2018 8:24:53 PM
n-Butylbenzene	ND	0.0358		mg/Kg-dry	1	11/16/2018 8:24:53 PM
1,2-Dichlorobenzene	ND	0.0287		mg/Kg-dry	1	11/16/2018 8:24:53 PM
1,2-Dibromo-3-chloropropane	ND	0.716		mg/Kg-dry	1	11/16/2018 8:24:53 PM
1,2,4-Trimethylbenzene	ND	0.0287		mg/Kg-dry	1	11/16/2018 8:24:53 PM
Hexachlorobutadiene	ND	0.0716		mg/Kg-dry	1	11/16/2018 8:24:53 PM
Naphthalene	ND	0.0716		mg/Kg-dry	1	11/16/2018 8:24:53 PM
1,2,3-Trichlorobenzene	ND	0.0287		mg/Kg-dry	1	11/16/2018 8:24:53 PM
Surr: Dibromofluoromethane	100	56.5 - 129		%Rec	1	11/16/2018 8:24:53 PM
Surr: Toluene-d8	102	64.5 - 151		%Rec	1	11/16/2018 8:24:53 PM
Surr: 1-Bromo-4-fluorobenzene	97.0	54.8 - 168		%Rec	1	11/16/2018 8:24:53 PM
Mercury by EPA Method 7471				Batch ID: 22821		Analyst: WF
Mercury	ND	0.318		mg/Kg-dry	1	12/4/2018 1:57:38 PM
Total Metals by EPA Method 6020				Batch ID: 22824		Analyst: WC
Arsenic	3.86	0.252		mg/Kg-dry	1	12/4/2018 2:18:44 PM
Cadmium	ND	0.201		mg/Kg-dry	1	12/4/2018 2:18:44 PM
Chromium	67.5	0.101		mg/Kg-dry	1	12/4/2018 2:18:44 PM
Lead	5.95	0.201		mg/Kg-dry	1	12/4/2018 2:18:44 PM
Sample Moisture (Percent Moisture)				Batch ID: R47634		Analyst: NG
Percent Moisture	28.5	0.500		wt%	1	11/14/2018 1:18:13 PM

Work Order: 1811173
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Total Metals by EPA Method 6020

Sample ID	**MB-22717**	SampType: **MBLK**			Units: **mg/Kg**		Prep Date: **11/26/2018**		RunNo: **47865**		
Client ID:	**MBLKS**	Batch ID: **22717**					Analysis Date: **11/26/2018**		SeqNo: **934471**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	0.191									
Cadmium	ND	0.153									
Chromium	ND	0.0763									
Lead	ND	0.153									

Sample ID	**LCS-22717**	SampType: **LCS**			Units: **mg/Kg**		Prep Date: **11/26/2018**		RunNo: **47865**		
Client ID:	**LCSS**	Batch ID: **22717**					Analysis Date: **11/26/2018**		SeqNo: **934472**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	39.0	0.188	37.59	0	104	80	120				
Cadmium	1.92	0.150	1.880	0	102	80	120				
Chromium	40.8	0.0752	37.59	0	109	80	120				
Lead	19.7	0.150	18.80	0	105	80	120				

Sample ID	**1811173-001ADUP**	SampType: **DUP**			Units: **mg/Kg-dry**		Prep Date: **11/26/2018**		RunNo: **47865**		
Client ID:	**TP-9-2.5**	Batch ID: **22717**					Analysis Date: **11/26/2018**		SeqNo: **934476**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	5.54	0.252						5.251	5.26	20	
Cadmium	ND	0.201						0		20	
Chromium	69.6	0.101						67.31	3.30	20	
Lead	4.63	0.201						4.377	5.71	20	

Sample ID	**1811173-001AMS**	SampType: **MS**			Units: **mg/Kg-dry**		Prep Date: **11/26/2018**		RunNo: **47865**		
Client ID:	**TP-9-2.5**	Batch ID: **22717**					Analysis Date: **11/26/2018**		SeqNo: **934478**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	50.6	0.254	50.76	5.251	89.3	75	125				
Cadmium	2.44	0.203	2.538	0.1800	89.1	75	125				

Work Order: 1811173
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Total Metals by EPA Method 6020

Sample ID **1811173-001AMS** SampType: **MS** Units: **mg/Kg-dry** Prep Date: **11/26/2018** RunNo: **47865**
Client ID: **TP-9-2.5** Batch ID: **22717** Analysis Date: **11/26/2018** SeqNo: **934478**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	112	0.102	50.76	67.31	87.8	75	125				
Lead	24.0	0.203	25.38	4.377	77.4	75	125				

Sample ID **1811173-001AMSD** SampType: **MSD** Units: **mg/Kg-dry** Prep Date: **11/26/2018** RunNo: **47865**
Client ID: **TP-9-2.5** Batch ID: **22717** Analysis Date: **11/26/2018** SeqNo: **934479**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	52.7	0.254	50.76	5.251	93.5	75	125	50.56	4.18	20	
Cadmium	2.62	0.203	2.538	0.1800	96.3	75	125	2.443	7.14	20	
Chromium	115	0.102	50.76	67.31	94.3	75	125	111.9	2.91	20	
Lead	25.4	0.203	25.38	4.377	82.7	75	125	24.02	5.49	20	

Sample ID **1811173-001APDS** SampType: **PDS** Units: **mg/Kg-dry** Prep Date: **11/26/2018** RunNo: **47865**
Client ID: **TP-9-2.5** Batch ID: **22717** Analysis Date: **11/26/2018** SeqNo: **934480**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	60.5	0.254	50.76	5.251	109	75	125				
Cadmium	2.98	0.203	2.538	0.1800	110	75	125				
Chromium	124	0.102	50.76	67.31	112	75	125				
Lead	28.4	0.203	25.38	4.377	94.8	75	125				

NOTES:
S - Spike recovery indicates a possible matrix effect. The method is in control as indicated by the Laboratory Control Sample (LCS).

Sample ID **MB-22824** SampType: **MBLK** Units: **mg/Kg** Prep Date: **12/4/2018** RunNo: **48076**
Client ID: **MBLKS** Batch ID: **22824** Analysis Date: **12/4/2018** SeqNo: **938988**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	0.181									
Cadmium	ND	0.145									
Chromium	ND	0.0725									

Work Order: 1811173
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Total Metals by EPA Method 6020

Sample ID	**MB-22824**	SampType: **MBLK**			Units: **mg/Kg**		Prep Date: **12/4/2018**		RunNo: **48076**		
Client ID:	**MBLKS**	Batch ID: **22824**					Analysis Date: **12/4/2018**		SeqNo: **938988**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	0.145									

Sample ID	**LCS-22824**	SampType: **LCS**			Units: **mg/Kg**		Prep Date: **12/4/2018**		RunNo: **48076**		
Client ID:	**LCSS**	Batch ID: **22824**					Analysis Date: **12/4/2018**		SeqNo: **938989**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	35.7	0.182	36.50	0	97.8	80	120				
Cadmium	1.93	0.146	1.825	0	106	80	120				
Chromium	37.5	0.0730	36.50	0	103	80	120				
Lead	18.6	0.146	18.25	0	102	80	120				

Sample ID	**1811173-009ADUP**	SampType: **DUP**			Units: **mg/Kg-dry**		Prep Date: **12/4/2018**		RunNo: **48076**		
Client ID:	**TP-13-2.5**	Batch ID: **22824**					Analysis Date: **12/4/2018**		SeqNo: **938991**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	5.45	0.252						3.862	34.0	20	R
Cadmium	ND	0.201						0		20	
Chromium	91.1	0.101						67.49	29.8	20	R
Lead	5.72	0.201						5.949	3.87	20	

NOTES:
R - High RPD observed. The method is in control as indicated by the LCS.

Sample ID	**1811173-009AMS**	SampType: **MS**			Units: **mg/Kg-dry**		Prep Date: **12/4/2018**		RunNo: **48076**		
Client ID:	**TP-13-2.5**	Batch ID: **22824**					Analysis Date: **12/4/2018**		SeqNo: **938993**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	47.0	0.250	49.94	3.862	86.4	75	125				
Cadmium	2.65	0.200	2.497	0.1530	100	75	125				
Chromium	134	0.0999	49.94	67.49	134	75	125				S
Lead	24.0	0.200	24.97	5.949	72.4	75	125				S

Work Order: 1811173
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Total Metals by EPA Method 6020

Sample ID **1811173-009AMS** SampType: **MS** Units: **mg/Kg-dry** Prep Date: **12/4/2018** RunNo: **48076**
Client ID: **TP-13-2.5** Batch ID: **22824** Analysis Date: **12/4/2018** SeqNo: **938993**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

NOTES:
S - Outlying spike recovery(ies) observed. A duplicate analysis was performed with similar results indicating a possible matrix effect.
S - Outlying spike recovery(ies) observed. A duplicate analysis was performed and recovered within range.

Sample ID **1811173-009AMSD** SampType: **MSD** Units: **mg/Kg-dry** Prep Date: **12/4/2018** RunNo: **48076**
Client ID: **TP-13-2.5** Batch ID: **22824** Analysis Date: **12/4/2018** SeqNo: **938994**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	52.1	0.250	49.94	3.862	96.5	75	125	47.02	10.2	20	
Cadmium	2.91	0.200	2.497	0.1530	110	75	125	2.650	9.18	20	
Chromium	143	0.0999	49.94	67.49	151	75	125	134.5	5.96	20	S
Lead	26.1	0.200	24.97	5.949	80.8	75	125	24.02	8.44	20	

NOTES:
S - Outlying spike recovery(ies) observed. A duplicate analysis was performed with similar results indicating a possible matrix effect.

Sample ID **1811173-009APDS** SampType: **PDS** Units: **mg/Kg-dry** Prep Date: **12/4/2018** RunNo: **48076**
Client ID: **TP-13-2.5** Batch ID: **22824** Analysis Date: **12/4/2018** SeqNo: **938995**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	57.0	0.252	50.30	3.862	106	75	125				
Cadmium	3.08	0.201	2.515	0.1530	117	75	125				
Chromium	125	0.101	50.30	67.49	115	75	125				
Lead	27.8	0.201	25.15	5.949	86.8	75	125				

Work Order: 1811173
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Mercury by EPA Method 7471

Sample ID	MB-22708	SampType:	MBLK			Units:	mg/Kg	Prep Date:	11/21/2018		RunNo:	47825	
Client ID:	MBLKS	Batch ID:	22708					Analysis Date:	11/21/2018		SeqNo:	933781	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Mercury		ND	0.250										

Sample ID	LCS-22708	SampType:	LCS			Units:	mg/Kg	Prep Date:	11/21/2018		RunNo:	47825	
Client ID:	LCSS	Batch ID:	22708					Analysis Date:	11/21/2018		SeqNo:	933782	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Mercury		0.551	0.250	0.5000	0	110	80	120					

Sample ID	1811251-001ADUP	SampType:	DUP			Units:	mg/Kg-dry	Prep Date:	11/21/2018		RunNo:	47825	
Client ID:	BATCH	Batch ID:	22708					Analysis Date:	11/21/2018		SeqNo:	933784	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Mercury		ND	0.260						0		20		

Sample ID	1811251-001AMS	SampType:	MS			Units:	mg/Kg-dry	Prep Date:	11/21/2018		RunNo:	47825	
Client ID:	BATCH	Batch ID:	22708					Analysis Date:	11/21/2018		SeqNo:	933785	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Mercury		0.589	0.275	0.5509	0.01305	105	70	130					

Sample ID	1811251-001AMSD	SampType:	MSD			Units:	mg/Kg-dry	Prep Date:	11/21/2018		RunNo:	47825	
Client ID:	BATCH	Batch ID:	22708					Analysis Date:	11/21/2018		SeqNo:	933786	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Mercury		0.559	0.260	0.5209	0.01305	105	70	130	0.5895	5.23	20		

Work Order: 1811173
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Mercury by EPA Method 7471

Sample ID	MB-22821	SampType:	MBLK			Units:	mg/Kg	Prep Date:	12/3/2018		RunNo:	48069	
Client ID:	MBLKS	Batch ID:	22821					Analysis Date:	12/4/2018		SeqNo:	938899	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Mercury		ND	0.250										

Sample ID	LCS-22821	SampType:	LCS			Units:	mg/Kg	Prep Date:	12/3/2018		RunNo:	48069	
Client ID:	LCSS	Batch ID:	22821					Analysis Date:	12/4/2018		SeqNo:	938900	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Mercury		0.521	0.250	0.5000	0	104	80	120					

Sample ID	1811378-002ADUP	SampType:	DUP			Units:	mg/Kg-dry	Prep Date:	12/3/2018		RunNo:	48069	
Client ID:	BATCH	Batch ID:	22821					Analysis Date:	12/4/2018		SeqNo:	938902	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Mercury		ND	0.273						0		20		

Sample ID	1811378-002AMS	SampType:	MS			Units:	mg/Kg-dry	Prep Date:	12/3/2018		RunNo:	48069	
Client ID:	BATCH	Batch ID:	22821					Analysis Date:	12/4/2018		SeqNo:	938903	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Mercury		0.550	0.263	0.5259	0.01735	101	70	130					

Sample ID	1811378-002AMSD	SampType:	MSD			Units:	mg/Kg-dry	Prep Date:	12/3/2018		RunNo:	48069	
Client ID:	BATCH	Batch ID:	22821					Analysis Date:	12/4/2018		SeqNo:	938904	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Mercury		0.627	0.278	0.5562	0.01735	110	70	130	0.5500	13.1	20		

Work Order: 1811173
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Sample ID **MB-22614**	SampType: **MBLK**			Units: **mg/Kg**		Prep Date: **11/13/2018**		RunNo: **47594**		
Client ID: **MBLKS**	Batch ID: **22614**					Analysis Date: **11/13/2018**		SeqNo: **927313**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel (Fuel Oil)	ND	20.0									
Heavy Oil	ND	50.0									
Surr: 2-Fluorobiphenyl	17.5		20.00		87.4	50	150				
Surr: o-Terphenyl	17.6		20.00		88.0	50	150				

Sample ID **LCS-22614**	SampType: **LCS**			Units: **mg/Kg**		Prep Date: **11/13/2018**		RunNo: **47594**		
Client ID: **LCSS**	Batch ID: **22614**					Analysis Date: **11/13/2018**		SeqNo: **927655**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel (Fuel Oil)	583	20.0	500.0	0	117	65	135				
Surr: 2-Fluorobiphenyl	10.0		20.00		50.2	50	150				
Surr: o-Terphenyl	11.1		20.00		55.7	50	150				

Sample ID **1811172-001ADUP**	SampType: **DUP**			Units: **mg/Kg-dry**		Prep Date: **11/13/2018**		RunNo: **47594**		
Client ID: **BATCH**	Batch ID: **22614**					Analysis Date: **11/13/2018**		SeqNo: **928453**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel (Fuel Oil)	ND	20.8						0		30	
Heavy Oil	ND	51.9						0		30	
Surr: 2-Fluorobiphenyl	17.5		20.76		84.2	50	150		0		
Surr: o-Terphenyl	18.3		20.76		87.9	50	150		0		

Sample ID **1811172-001AMS**	SampType: **MS**			Units: **mg/Kg-dry**		Prep Date: **11/13/2018**		RunNo: **47594**		
Client ID: **BATCH**	Batch ID: **22614**					Analysis Date: **11/13/2018**		SeqNo: **928454**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel (Fuel Oil)	607	20.7	518.1	0	117	65	135				
Surr: 2-Fluorobiphenyl	19.0		20.72		91.7	50	150				
Surr: o-Terphenyl	20.8		20.72		101	50	150				

Work Order: 1811173
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Sample ID **1811172-001AMS** SampType: **MS** Units: **mg/Kg-dry** Prep Date: **11/13/2018** RunNo: **47594**
Client ID: **BATCH** Batch ID: **22614** Analysis Date: **11/13/2018** SeqNo: **928454**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Sample ID **1811172-001AMSD** SampType: **MSD** Units: **mg/Kg-dry** Prep Date: **11/13/2018** RunNo: **47594**
Client ID: **BATCH** Batch ID: **22614** Analysis Date: **11/13/2018** SeqNo: **928455**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel (Fuel Oil)	629	22.2	555.4	0	113	65	135	606.6	3.61	30	
Surr: 2-Fluorobiphenyl	20.2		22.22		90.7	50	150		0		
Surr: o-Terphenyl	22.4		22.22		101	50	150		0		

Sample ID **1811167-004ADUP** SampType: **DUP** Units: **mg/Kg-dry** Prep Date: **11/13/2018** RunNo: **47594**
Client ID: **BATCH** Batch ID: **22614** Analysis Date: **11/14/2018** SeqNo: **928608**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel (Fuel Oil)	ND	17.6						0		30	
Heavy Oil	ND	44.0						0		30	
Surr: 2-Fluorobiphenyl	15.0		17.59		85.3	50	150		0		
Surr: o-Terphenyl	15.7		17.59		89.2	50	150		0		

Sample ID **MB-22698** SampType: **MBLK** Units: **mg/Kg** Prep Date: **11/20/2018** RunNo: **47857**
Client ID: **MBLKS** Batch ID: **22698** Analysis Date: **11/22/2018** SeqNo: **934324**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel (Fuel Oil)	ND	20.0									
Heavy Oil	ND	50.0									
Surr: 2-Fluorobiphenyl	17.7		20.00		88.6	50	150				
Surr: o-Terphenyl	17.9		20.00		89.4	50	150				

Work Order: 1811173
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Sample ID	LCS-22698	SampType:	LCS			Units:	mg/Kg	Prep Date:	11/20/2018	RunNo:	47857	
Client ID:	LCSS	Batch ID:	22698					Analysis Date:	11/22/2018	SeqNo:	934325	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Diesel (Fuel Oil)	589	20.0	500.0	0	118	65	135					
Surr: 2-Fluorobiphenyl	18.9		20.00		94.4	50	150					
Surr: o-Terphenyl	21.2		20.00		106	50	150					

Sample ID	1811251-001ADUP	SampType:	DUP			Units:	mg/Kg-dry	Prep Date:	11/20/2018	RunNo:	47857	
Client ID:	BATCH	Batch ID:	22698					Analysis Date:	11/22/2018	SeqNo:	934327	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Diesel (Fuel Oil)	ND	19.7						0		30		
Heavy Oil	ND	49.3						0		30		
Surr: 2-Fluorobiphenyl	17.8		19.71		90.1	50	150		0			
Surr: o-Terphenyl	18.0		19.71		91.3	50	150		0			

Sample ID	1811251-001AMS	SampType:	MS			Units:	mg/Kg-dry	Prep Date:	11/20/2018	RunNo:	47857	
Client ID:	BATCH	Batch ID:	22698					Analysis Date:	11/22/2018	SeqNo:	934328	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Diesel (Fuel Oil)	617	21.4	536.0	0	115	65	135					
Surr: 2-Fluorobiphenyl	20.0		21.44		93.5	50	150					
Surr: o-Terphenyl	22.1		21.44		103	50	150					

Sample ID	1811251-001AMSD	SampType:	MSD			Units:	mg/Kg-dry	Prep Date:	11/20/2018	RunNo:	47857	
Client ID:	BATCH	Batch ID:	22698					Analysis Date:	11/22/2018	SeqNo:	934329	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Diesel (Fuel Oil)	629	21.4	536.0	0	117	65	135	616.8	1.93	30		
Surr: 2-Fluorobiphenyl	20.0		21.44		93.1	50	150		0			
Surr: o-Terphenyl	22.3		21.44		104	50	150		0			

Work Order: 1811173
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Sample ID **1811173-001ADUP** SampType: **DUP** Units: **mg/Kg-dry** Prep Date: **11/20/2018** RunNo: **47857**
Client ID: **TP-9-2.5** Batch ID: **22698** Analysis Date: **11/23/2018** SeqNo: **934352**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel (Fuel Oil)	ND	23.6						0		30	
Heavy Oil	ND	59.1						0		30	
Surr: 2-Fluorobiphenyl	21.1		23.65		89.4	50	150		0		
Surr: o-Terphenyl	21.4		23.65		90.4	50	150		0		

Work Order: 1811173
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID **MB-22627** SampType: **MBLK** Units: **µg/Kg** Prep Date: **11/14/2018** RunNo: **47680**
Client ID: **MBLKS** Batch ID: **22627** Analysis Date: **11/15/2018** SeqNo: **929384**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	40.0									
2-Methylnaphthalene	ND	40.0									
1-Methylnaphthalene	ND	40.0									
Acenaphthylene	ND	40.0									
Acenaphthene	ND	40.0									
Fluorene	ND	40.0									
Phenanthrene	ND	40.0									
Anthracene	ND	40.0									
Fluoranthene	ND	40.0									
Pyrene	ND	40.0									
Benz(a)anthracene	ND	40.0									
Chrysene	ND	40.0									
Benzo(b)fluoranthene	ND	40.0									
Benzo(k)fluoranthene	ND	40.0									
Benzo(a)pyrene	ND	40.0									
Indeno(1,2,3-cd)pyrene	ND	40.0									
Dibenz(a,h)anthracene	ND	40.0									
Benzo(g,h,i)perylene	ND	40.0									
Surr: 2-Fluorobiphenyl	553		500.0		111	12.5	140				
Surr: Terphenyl-d14 (surr)	607		500.0		121	45.7	172				

Sample ID **LCS-22627** SampType: **LCS** Units: **µg/Kg** Prep Date: **11/14/2018** RunNo: **47680**
Client ID: **LCSS** Batch ID: **22627** Analysis Date: **11/15/2018** SeqNo: **929385**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	857	40.0	1,000	0	85.7	50.6	131				
2-Methylnaphthalene	863	40.0	1,000	0	86.3	45.1	135				
1-Methylnaphthalene	888	40.0	1,000	0	88.8	46.2	133				
Acenaphthylene	883	40.0	1,000	0	88.3	32.8	136				
Acenaphthene	884	40.0	1,000	0	88.4	42	137				

Work Order: 1811173
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID **LCS-22627** SampType: **LCS** Units: **µg/Kg** Prep Date: **11/14/2018** RunNo: **47680**
Client ID: **LCSS** Batch ID: **22627** Analysis Date: **11/15/2018** SeqNo: **929385**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluorene	940	40.0	1,000	0	94.0	41.4	144				
Phenanthrene	896	40.0	1,000	0	89.6	36.6	141				
Anthracene	948	40.0	1,000	0	94.8	42.5	157				
Fluoranthene	880	40.0	1,000	0	88.0	43.4	144				
Pyrene	928	40.0	1,000	0	92.8	39.6	146				
Benz(a)anthracene	794	40.0	1,000	0	79.4	36.6	142				
Chrysene	882	40.0	1,000	0	88.2	43	165				
Benzo(b)fluoranthene	923	40.0	1,000	0	92.3	41	155				
Benzo(k)fluoranthene	812	40.0	1,000	0	81.2	30.6	164				
Benzo(a)pyrene	839	40.0	1,000	0	83.9	30.2	171				
Indeno(1,2,3-cd)pyrene	907	40.0	1,000	0	90.7	31.3	159				
Dibenz(a,h)anthracene	908	40.0	1,000	0	90.8	28	158				
Benzo(g,h,i)perylene	907	40.0	1,000	0	90.7	32.4	144				
Surr: 2-Fluorobiphenyl	530		500.0		106	12.5	140				
Surr: Terphenyl-d14 (surr)	638		500.0		128	45.7	172				

Sample ID **1811036-004ADUP** SampType: **DUP** Units: **µg/Kg-dry** Prep Date: **11/14/2018** RunNo: **47680**
Client ID: **BATCH** Batch ID: **22627** Analysis Date: **11/15/2018** SeqNo: **929387**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	43.7						0		30	
2-Methylnaphthalene	ND	43.7						0		30	
1-Methylnaphthalene	ND	43.7						0		30	
Acenaphthylene	ND	43.7						0		30	
Acenaphthene	ND	43.7						0		30	
Fluorene	ND	43.7						0		30	
Phenanthrene	ND	43.7						0		30	
Anthracene	ND	43.7						0		30	
Fluoranthene	ND	43.7						0		30	
Pyrene	ND	43.7						0		30	

Work Order: 1811173
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID **1811036-004ADUP** SampType: **DUP** Units: **µg/Kg-dry** Prep Date: **11/14/2018** RunNo: **47680**
Client ID: **BATCH** Batch ID: **22627** Analysis Date: **11/15/2018** SeqNo: **929387**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benz(a)anthracene	ND	43.7						0		30	
Chrysene	ND	43.7						0		30	
Benzo(b)fluoranthene	ND	43.7						0		30	
Benzo(k)fluoranthene	ND	43.7						0		30	
Benzo(a)pyrene	ND	43.7						0		30	
Indeno(1,2,3-cd)pyrene	ND	43.7						0		30	
Dibenz(a,h)anthracene	ND	43.7						0		30	
Benzo(g,h,i)perylene	ND	43.7						0		30	
Surr: 2-Fluorobiphenyl	577		545.9		106	12.5	140		0		
Surr: Terphenyl-d14 (surr)	570		545.9		104	45.7	172		0		

Sample ID **1811197-004AMS** SampType: **MS** Units: **µg/Kg-dry** Prep Date: **11/14/2018** RunNo: **47680**
Client ID: **BATCH** Batch ID: **22627** Analysis Date: **11/15/2018** SeqNo: **929404**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	685	46.5	1,161	0	58.9	42.9	138				
2-Methylnaphthalene	685	46.5	1,161	0	58.9	42.8	151				
1-Methylnaphthalene	707	46.5	1,161	0	60.9	41.6	148				
Acenaphthylene	689	46.5	1,161	3.330	59.0	32.6	160				
Acenaphthene	680	46.5	1,161	1.274	58.5	31.7	126				
Fluorene	715	46.5	1,161	1.536	61.4	43.4	153				
Phenanthrene	695	46.5	1,161	0	59.9	23.8	135				
Anthracene	713	46.5	1,161	3.538	61.1	32.6	160				
Fluoranthene	686	46.5	1,161	0	59.1	28	144				
Pyrene	718	46.5	1,161	0	61.8	27.8	141				
Benz(a)anthracene	626	46.5	1,161	0	53.9	34.9	139				
Chrysene	672	46.5	1,161	4.325	57.4	45.2	146				
Benzo(b)fluoranthene	603	46.5	1,161	0	51.9	42.2	168				
Benzo(k)fluoranthene	686	46.5	1,161	0	59.0	20.5	150				
Benzo(a)pyrene	618	46.5	1,161	0	53.2	34.4	179				

Work Order: 1811173
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID **1811197-004AMS** SampType: **MS** Units: **µg/Kg-dry** Prep Date: **11/14/2018** RunNo: **47680**
Client ID: **BATCH** Batch ID: **22627** Analysis Date: **11/15/2018** SeqNo: **929404**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Indeno(1,2,3-cd)pyrene	638	46.5	1,161	0	55.0	11.8	140				
Dibenz(a,h)anthracene	641	46.5	1,161	0	55.2	17.3	156				
Benzo(g,h,i)perylene	618	46.5	1,161	0	53.2	24.9	119				
Surr: 2-Fluorobiphenyl	456		580.7		78.6	12.5	140				
Surr: Terphenyl-d14 (surr)	499		580.7		85.9	45.7	172				

Sample ID **1811197-004AMSD** SampType: **MSD** Units: **µg/Kg-dry** Prep Date: **11/14/2018** RunNo: **47680**
Client ID: **BATCH** Batch ID: **22627** Analysis Date: **11/15/2018** SeqNo: **929405**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	919	47.2	1,181	0	77.8	42.9	138	684.6	29.2	30	
2-Methylnaphthalene	915	47.2	1,181	0	77.5	42.8	151	684.6	28.9	30	
1-Methylnaphthalene	948	47.2	1,181	0	80.3	41.6	148	707.2	29.0	30	
Acenaphthylene	934	47.2	1,181	3.330	78.8	32.6	160	688.8	30.2	30	R
Acenaphthene	911	47.2	1,181	1.274	77.1	31.7	126	680.3	29.0	30	
Fluorene	962	47.2	1,181	1.536	81.4	43.4	153	715.2	29.4	30	
Phenanthrene	947	47.2	1,181	0	80.2	23.8	135	695.2	30.6	30	R
Anthracene	971	47.2	1,181	3.538	81.9	32.6	160	712.6	30.6	30	R
Fluoranthene	944	47.2	1,181	0	80.0	28	144	686.2	31.6	30	R
Pyrene	980	47.2	1,181	0	83.0	27.8	141	718.3	30.8	30	R
Benz(a)anthracene	840	47.2	1,181	0	71.1	34.9	139	625.8	29.2	30	
Chrysene	914	47.2	1,181	4.325	77.1	45.2	146	671.5	30.6	30	R
Benzo(b)fluoranthene	811	47.2	1,181	0	68.7	42.2	168	603.1	29.4	30	
Benzo(k)fluoranthene	906	47.2	1,181	0	76.8	20.5	150	685.6	27.7	30	
Benzo(a)pyrene	832	47.2	1,181	0	70.5	34.4	179	617.6	29.6	30	
Indeno(1,2,3-cd)pyrene	852	47.2	1,181	0	72.1	11.8	140	638.4	28.6	30	
Dibenz(a,h)anthracene	852	47.2	1,181	0	72.2	17.3	156	640.8	28.3	30	
Benzo(g,h,i)perylene	828	47.2	1,181	0	70.2	24.9	119	618.3	29.0	30	
Surr: 2-Fluorobiphenyl	596		590.3		101	12.5	140		0		
Surr: Terphenyl-d14 (surr)	662		590.3		112	45.7	172		0		

Work Order: 1811173
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID **1811197-004AMSD**	SampType: **MSD**			Units: **µg/Kg-dry**		Prep Date: **11/14/2018**		RunNo: **47680**			
Client ID: **BATCH**	Batch ID: **22627**					Analysis Date: **11/15/2018**		SeqNo: **929405**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

NOTES:
R - High RPD observed, spike recoveries are within range.

Sample ID **MB-22699**	SampType: **MBLK**			Units: **µg/Kg**		Prep Date: **11/20/2018**		RunNo: **47819**			
Client ID: **MBLKS**	Batch ID: **22699**					Analysis Date: **11/21/2018**		SeqNo: **933214**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	40.0									
2-Methylnaphthalene	ND	40.0									
1-Methylnaphthalene	ND	40.0									
Acenaphthylene	ND	40.0									
Acenaphthene	ND	40.0									
Fluorene	ND	40.0									
Phenanthrene	ND	40.0									
Anthracene	ND	40.0									
Fluoranthene	ND	40.0									
Pyrene	ND	40.0									
Benz(a)anthracene	ND	40.0									
Chrysene	ND	40.0									
Benzo(b)fluoranthene	ND	40.0									
Benzo(k)fluoranthene	ND	40.0									
Benzo(a)pyrene	ND	40.0									
Indeno(1,2,3-cd)pyrene	ND	40.0									Q
Dibenz(a,h)anthracene	ND	40.0									Q
Benzo(g,h,i)perylene	ND	40.0									Q
Surr: 2-Fluorobiphenyl	545		500.0		109	12.5	140				
Surr: Terphenyl-d14 (surr)	585		500.0		117	45.7	172				

NOTES:
Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria

Work Order: 1811173
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID **LCS-22699** SampType: **LCS** Units: **µg/Kg** Prep Date: **11/20/2018** RunNo: **47819**
Client ID: **LCSS** Batch ID: **22699** Analysis Date: **11/21/2018** SeqNo: **933215**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	663	40.0	1,000	0	66.3	50.6	131				
2-Methylnaphthalene	661	40.0	1,000	0	66.1	45.1	135				
1-Methylnaphthalene	678	40.0	1,000	0	67.8	46.2	133				
Acenaphthylene	659	40.0	1,000	0	65.9	32.8	136				
Acenaphthene	656	40.0	1,000	0	65.6	42	137				
Fluorene	686	40.0	1,000	0	68.6	41.4	144				
Phenanthrene	656	40.0	1,000	0	65.6	36.6	141				
Anthracene	664	40.0	1,000	0	66.4	42.5	157				
Fluoranthene	647	40.0	1,000	0	64.7	43.4	144				
Pyrene	670	40.0	1,000	0	67.0	39.6	146				
Benz(a)anthracene	597	40.0	1,000	0	59.7	36.6	142				
Chrysene	637	40.0	1,000	0	63.7	43	165				
Benzo(b)fluoranthene	588	40.0	1,000	0	58.8	41	155				
Benzo(k)fluoranthene	572	40.0	1,000	0	57.2	30.6	164				
Benzo(a)pyrene	533	40.0	1,000	0	53.3	30.2	171				
Indeno(1,2,3-cd)pyrene	494	40.0	1,000	0	49.4	31.3	159				
Dibenz(a,h)anthracene	507	40.0	1,000	0	50.7	28	158				
Benzo(g,h,i)perylene	444	40.0	1,000	0	44.4	32.4	144				
Surr: 2-Fluorobiphenyl	489		500.0		97.8	12.5	140				
Surr: Terphenyl-d14 (surr)	506		500.0		101	45.7	172				

Sample ID **1811173-001ADUP** SampType: **DUP** Units: **µg/Kg-dry** Prep Date: **11/20/2018** RunNo: **47819**
Client ID: **TP-9-2.5** Batch ID: **22699** Analysis Date: **11/21/2018** SeqNo: **934361**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	45.2						0		30	
2-Methylnaphthalene	ND	45.2						0		30	
1-Methylnaphthalene	ND	45.2						0		30	
Acenaphthylene	ND	45.2						0		30	
Acenaphthene	ND	45.2						0		30	

Work Order: 1811173
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID **1811173-001ADUP** SampType: **DUP** Units: **µg/Kg-dry** Prep Date: **11/20/2018** RunNo: **47819**
Client ID: **TP-9-2.5** Batch ID: **22699** Analysis Date: **11/21/2018** SeqNo: **934361**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluorene	ND	45.2						0		30	
Phenanthrene	ND	45.2						0		30	
Anthracene	ND	45.2						0		30	
Fluoranthene	ND	45.2						0		30	
Pyrene	ND	45.2						0		30	
Benz(a)anthracene	ND	45.2						0		30	
Chrysene	ND	45.2						0		30	
Benzo(b)fluoranthene	ND	45.2						0		30	
Benzo(k)fluoranthene	ND	45.2						0		30	
Benzo(a)pyrene	ND	45.2						0		30	
Indeno(1,2,3-cd)pyrene	ND	45.2						0		30	Q
Dibenz(a,h)anthracene	ND	45.2						0		30	Q
Benzo(g,h,i)perylene	ND	45.2						0		30	Q
Surr: 2-Fluorobiphenyl	434		565.5		76.8	12.5	140		0		
Surr: Terphenyl-d14 (surr)	471		565.5		83.2	45.7	172		0		

NOTES:
Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria

Sample ID **1811173-001AMS** SampType: **MS** Units: **µg/Kg-dry** Prep Date: **11/20/2018** RunNo: **47819**
Client ID: **TP-9-2.5** Batch ID: **22699** Analysis Date: **11/21/2018** SeqNo: **934362**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	693	46.7	1,169	0	59.3	42.9	138				
2-Methylnaphthalene	687	46.7	1,169	0	58.8	42.8	151				
1-Methylnaphthalene	704	46.7	1,169	0	60.3	41.6	148				
Acenaphthylene	679	46.7	1,169	3.955	57.7	32.6	160				
Acenaphthene	673	46.7	1,169	1.667	57.4	31.7	126				
Fluorene	710	46.7	1,169	2.181	60.5	43.4	153				
Phenanthrene	687	46.7	1,169	0	58.8	23.8	135				
Anthracene	686	46.7	1,169	4.301	58.3	32.6	160				
Fluoranthene	676	46.7	1,169	0	57.8	28	144				

Work Order: 1811173
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID **1811173-001AMS** SampType: **MS** Units: **µg/Kg-dry** Prep Date: **11/20/2018** RunNo: **47819**
Client ID: **TP-9-2.5** Batch ID: **22699** Analysis Date: **11/21/2018** SeqNo: **934362**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Pyrene	705	46.7	1,169	0	60.3	27.8	141				
Benz(a)anthracene	622	46.7	1,169	5.972	52.8	34.9	139				
Chrysene	644	46.7	1,169	6.163	54.5	45.2	146				
Benzo(b)fluoranthene	578	46.7	1,169	0	49.5	42.2	168				
Benzo(k)fluoranthene	602	46.7	1,169	0	51.5	20.5	150				
Benzo(a)pyrene	530	46.7	1,169	0	45.4	34.4	179				
Indeno(1,2,3-cd)pyrene	481	46.7	1,169	0	41.1	11.8	140				
Dibenz(a,h)anthracene	499	46.7	1,169	0	42.7	17.3	156				
Benzo(g,h,i)perylene	433	46.7	1,169	0	37.1	24.9	119				
Surr: 2-Fluorobiphenyl	512		584.3		87.7	12.5	140				
Surr: Terphenyl-d14 (surr)	522		584.3		89.3	45.7	172				

Sample ID **1811173-001AMSD** SampType: **MSD** Units: **µg/Kg-dry** Prep Date: **11/20/2018** RunNo: **47819**
Client ID: **TP-9-2.5** Batch ID: **22699** Analysis Date: **11/21/2018** SeqNo: **934363**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	746	49.9	1,247	0	59.8	42.9	138	692.8	7.37	30	
2-Methylnaphthalene	736	49.9	1,247	0	59.0	42.8	151	686.6	6.89	30	
1-Methylnaphthalene	763	49.9	1,247	0	61.1	41.6	148	704.2	7.97	30	
Acenaphthylene	732	49.9	1,247	3.955	58.4	32.6	160	678.8	7.60	30	
Acenaphthene	737	49.9	1,247	1.667	59.0	31.7	126	672.7	9.13	30	
Fluorene	782	49.9	1,247	2.181	62.5	43.4	153	709.7	9.64	30	
Phenanthrene	749	49.9	1,247	0	60.1	23.8	135	686.7	8.75	30	
Anthracene	758	49.9	1,247	4.301	60.4	32.6	160	685.7	10.0	30	
Fluoranthene	734	49.9	1,247	0	58.8	28	144	675.7	8.27	30	
Pyrene	764	49.9	1,247	0	61.2	27.8	141	704.5	8.05	30	
Benz(a)anthracene	671	49.9	1,247	5.972	53.3	34.9	139	622.5	7.50	30	
Chrysene	713	49.9	1,247	6.163	56.7	45.2	146	643.6	10.3	30	
Benzo(b)fluoranthene	605	49.9	1,247	0	48.5	42.2	168	578.1	4.53	30	
Benzo(k)fluoranthene	683	49.9	1,247	0	54.8	20.5	150	601.9	12.6	30	

Work Order: 1811173
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID **1811173-001AMSD** SampType: **MSD** Units: **µg/Kg-dry** Prep Date: **11/20/2018** RunNo: **47819**
Client ID: **TP-9-2.5** Batch ID: **22699** Analysis Date: **11/21/2018** SeqNo: **934363**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzo(a)pyrene	579	49.9	1,247	0	46.4	34.4	179	530.1	8.73	30	
Indeno(1,2,3-cd)pyrene	531	49.9	1,247	0	42.6	11.8	140	480.9	9.89	30	
Dibenz(a,h)anthracene	549	49.9	1,247	0	44.0	17.3	156	498.6	9.55	30	
Benzo(g,h,i)perylene	471	49.9	1,247	0	37.8	24.9	119	433.1	8.34	30	
Surr: 2-Fluorobiphenyl	509		623.6		81.6	12.5	140		0		
Surr: Terphenyl-d14 (surr)	572		623.6		91.7	45.7	172		0		

Work Order: 1811173
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Gasoline by NWTPH-Gx

Sample ID	LCS-22655	SampType:	LCS	Units:	mg/Kg	Prep Date:	11/16/2018	RunNo:	47712
Client ID:	LCSS	Batch ID:	22655			Analysis Date:	11/16/2018	SeqNo:	930398

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline	24.4	5.00	25.00	0	97.7	65	135				
Surr: Toluene-d8	1.26		1.250		101	65	135				
Surr: 4-Bromofluorobenzene	1.14		1.250		91.5	65	135				

Sample ID	MB-22655	SampType:	MBLK	Units:	mg/Kg	Prep Date:	11/16/2018	RunNo:	47712
Client ID:	MBLKS	Batch ID:	22655			Analysis Date:	11/16/2018	SeqNo:	930399

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline	ND	5.00									
Surr: Toluene-d8	1.25		1.250		99.9	65	135				
Surr: 4-Bromofluorobenzene	1.10		1.250		88.2	65	135				

Sample ID	1811173-004BDUP	SampType:	DUP	Units:	mg/Kg-dry	Prep Date:	11/16/2018	RunNo:	47712
Client ID:	TP-14-2.5	Batch ID:	22655			Analysis Date:	11/16/2018	SeqNo:	930386

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline	ND	9.95						0		30	
Surr: Toluene-d8	2.45		2.486		98.7	65	135		0		
Surr: 4-Bromofluorobenzene	2.55		2.486		102	65	135		0		

Sample ID	1811167-001BDUP	SampType:	DUP	Units:	mg/Kg-dry	Prep Date:	11/16/2018	RunNo:	47712
Client ID:	BATCH	Batch ID:	22655			Analysis Date:	11/16/2018	SeqNo:	930381

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline	ND	6.33						0		30	
Surr: Toluene-d8	1.59		1.582		100	65	135		0		
Surr: 4-Bromofluorobenzene	1.36		1.582		85.8	65	135		0		

Work Order: 1811173
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Gasoline by NWTPH-Gx

Sample ID	1811167-002BMS	SampType:	MS	Units:	mg/Kg-dry	Prep Date:	11/16/2018	RunNo:	47712
Client ID:	BATCH	Batch ID:	22655			Analysis Date:	11/17/2018	SeqNo:	930383

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline	28.7	5.60	28.00	0	102	65	135				
Surr: Toluene-d8	1.37		1.400		98.2	65	135				
Surr: 4-Bromofluorobenzene	1.46		1.400		104	65	135				

Sample ID	1811167-002BMSD	SampType:	MSD	Units:	mg/Kg-dry	Prep Date:	11/16/2018	RunNo:	47712
Client ID:	BATCH	Batch ID:	22655			Analysis Date:	11/17/2018	SeqNo:	930384

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline	23.7	5.60	28.00	0	84.6	65	135	28.66	18.9	30	
Surr: Toluene-d8	1.41		1.400		100	65	135		0		
Surr: 4-Bromofluorobenzene	1.46		1.400		104	65	135		0		

Sample ID	LCS-22755	SampType:	LCS	Units:	mg/Kg	Prep Date:	11/27/2018	RunNo:	47941
Client ID:	LCSS	Batch ID:	22755			Analysis Date:	11/28/2018	SeqNo:	936172

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline	22.0	5.00	25.00	0	88.1	65	135				
Surr: Toluene-d8	1.25		1.250		99.6	65	135				
Surr: 4-Bromofluorobenzene	1.22		1.250		97.7	65	135				

Sample ID	MB-22755	SampType:	MBLK	Units:	mg/Kg	Prep Date:	11/27/2018	RunNo:	47941
Client ID:	MBLKS	Batch ID:	22755			Analysis Date:	11/28/2018	SeqNo:	936173

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline	ND	5.00									
Surr: Toluene-d8	1.25		1.250		99.8	65	135				
Surr: 4-Bromofluorobenzene	1.25		1.250		100	65	135				

Work Order: 1811173
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Gasoline by NWTPH-Gx

Sample ID	1811173-001BDUP	SampType:	DUP	Units:	mg/Kg-dry	Prep Date:	11/27/2018	RunNo:	47941
Client ID:	TP-9-2.5	Batch ID:	22755			Analysis Date:	11/28/2018	SeqNo:	936148

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline	ND	6.23						0		30	H
Surr: Toluene-d8	1.53		1.556		98.2	65	135		0		H
Surr: 4-Bromofluorobenzene	1.55		1.556		99.8	65	135		0		H

Sample ID	1811247-001BDUP	SampType:	DUP	Units:	mg/Kg-dry	Prep Date:	11/27/2018	RunNo:	47941
Client ID:	BATCH	Batch ID:	22755			Analysis Date:	11/28/2018	SeqNo:	936152

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline	ND	4.41						0		30	
Surr: Toluene-d8	1.08		1.101		98.4	65	135		0		
Surr: 4-Bromofluorobenzene	1.10		1.101		99.8	65	135		0		

Sample ID	1811247-002BMS	SampType:	MS	Units:	mg/Kg-dry	Prep Date:	11/27/2018	RunNo:	47941
Client ID:	BATCH	Batch ID:	22755			Analysis Date:	11/29/2018	SeqNo:	936154

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline	22.6	4.37	21.83	0	104	65	135				
Surr: Toluene-d8	1.07		1.092		98.3	65	135				
Surr: 4-Bromofluorobenzene	1.08		1.092		98.7	65	135				

Sample ID	1811247-002BMSD	SampType:	MSD	Units:	mg/Kg-dry	Prep Date:	11/27/2018	RunNo:	47941
Client ID:	BATCH	Batch ID:	22755			Analysis Date:	11/29/2018	SeqNo:	936155

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline	22.7	4.37	21.83	0	104	65	135	22.63	0.324	30	
Surr: Toluene-d8	1.08		1.092		98.5	65	135		0		
Surr: 4-Bromofluorobenzene	1.08		1.092		99.2	65	135		0		

Work Order: 1811173
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID **LCS-22655** SampType: **LCS** Units: **mg/Kg** Prep Date: **11/16/2018** RunNo: **47715**
Client ID: **LCSS** Batch ID: **22655** Analysis Date: **11/16/2018** SeqNo: **930431**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dichlorodifluoromethane (CFC-12)	0.932	0.0200	1.000	0	93.2	14.3	167				
Chloromethane	0.935	0.0500	1.000	0	93.5	32	156				
Vinyl chloride	0.948	0.0250	1.000	0	94.8	43.4	151				
Bromomethane	0.880	0.0500	1.000	0	88.0	35	155				
Trichlorofluoromethane (CFC-11)	0.834	0.0200	1.000	0	83.4	33.8	156				
Chloroethane	0.928	0.0500	1.000	0	92.8	33.1	147				
1,1-Dichloroethene	1.05	0.0200	1.000	0	105	30.9	145				
Methylene chloride	0.994	0.0200	1.000	0	99.4	46.3	140				
trans-1,2-Dichloroethene	0.963	0.0200	1.000	0	96.3	68	130				
Methyl tert-butyl ether (MTBE)	0.983	0.0500	1.000	0	98.3	44.1	152				
1,1-Dichloroethane	0.969	0.0200	1.000	0	96.9	61.9	137				
2,2-Dichloropropane	0.979	0.100	1.000	0	97.9	35.5	186				
cis-1,2-Dichloroethene	0.963	0.0200	1.000	0	96.3	71.3	135				
Chloroform	0.963	0.0200	1.000	0	96.3	69	145				
1,1,1-Trichloroethane (TCA)	0.961	0.0250	1.000	0	96.1	69	132				
1,1-Dichloropropene	0.960	0.0200	1.000	0	96.0	72.7	131				
Carbon tetrachloride	0.949	0.0250	1.000	0	94.9	63.4	137				
1,2-Dichloroethane (EDC)	0.957	0.0200	1.000	0	95.7	50.9	162				
Benzene	0.970	0.0200	1.000	0	97.0	64.3	133				
Trichloroethene (TCE)	0.967	0.0200	1.000	0	96.7	65.5	137				
1,2-Dichloropropane	0.963	0.0200	1.000	0	96.3	63.2	142				
Bromodichloromethane	0.951	0.0200	1.000	0	95.1	53.4	131				
Dibromomethane	0.971	0.0200	1.000	0	97.1	60.1	146				
cis-1,3-Dichloropropene	0.962	0.0200	1.000	0	96.2	59.1	143				
Toluene	0.957	0.0200	1.000	0	95.7	67.3	138				
trans-1,3-Dichloropropylene	0.952	0.0200	1.000	0	95.2	49.2	149				
1,1,2-Trichloroethane	0.974	0.0200	1.000	0	97.4	56.9	147				
1,3-Dichloropropane	0.965	0.0250	1.000	0	96.5	56.1	153				
Tetrachloroethene (PCE)	0.955	0.0250	1.000	0	95.5	52.7	150				
Dibromochloromethane	0.945	0.0250	1.000	0	94.5	70.6	144				
1,2-Dibromoethane (EDB)	0.968	0.00500	1.000	0	96.8	50.5	154				

Work Order: 1811173
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID **LCS-22655** SampType: **LCS** Units: **mg/Kg** Prep Date: **11/16/2018** RunNo: **47715**
Client ID: **LCSS** Batch ID: **22655** Analysis Date: **11/16/2018** SeqNo: **930431**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chlorobenzene	0.957	0.0250	1.000	0	95.7	84.9	125				
1,1,1,2-Tetrachloroethane	0.943	0.0250	1.000	0	94.3	65.9	141				
Ethylbenzene	0.954	0.0250	1.000	0	95.4	74	129				
m,p-Xylene	1.92	0.0500	2.000	0	95.8	70	124				
o-Xylene	0.888	0.0250	1.000	0	88.8	68.1	139				
Styrene	0.878	0.0250	1.000	0	87.8	73.3	146				
Isopropylbenzene	0.846	0.0250	1.000	0	84.6	70	130				
Bromoform	0.869	0.0500	1.000	0	86.9	44.3	130				
1,1,2,2-Tetrachloroethane	0.840	0.0200	1.000	0	84.0	44.8	165				
n-Propylbenzene	0.862	0.0250	1.000	0	86.2	75.8	139				
Bromobenzene	0.865	0.0200	1.000	0	86.5	49.2	144				
1,3,5-Trimethylbenzene	0.873	0.0250	1.000	0	87.3	76.5	135				
2-Chlorotoluene	0.977	0.0250	1.000	0	97.7	76.7	129				
4-Chlorotoluene	0.848	0.0250	1.000	0	84.8	77.5	125				
tert-Butylbenzene	0.866	0.0250	1.000	0	86.6	66.2	130				
1,2,3-Trichloropropane	0.851	0.0250	1.000	0	85.1	67.9	136				
1,2,4-Trichlorobenzene	1.04	0.0250	1.000	0	104	65.5	150				
sec-Butylbenzene	0.863	0.0500	1.000	0	86.3	75.6	133				
4-Isopropyltoluene	0.882	0.0500	1.000	0	88.2	76.8	131				
1,3-Dichlorobenzene	0.986	0.0200	1.000	0	98.6	48.6	144				
1,4-Dichlorobenzene	0.985	0.0200	1.000	0	98.5	72.6	126				
n-Butylbenzene	1.00	0.0250	1.000	0	100	78.4	140				
1,2-Dichlorobenzene	1.01	0.0200	1.000	0	101	72.8	126				
1,2-Dibromo-3-chloropropane	1.02	0.500	1.000	0	102	40.2	155				
1,2,4-Trimethylbenzene	0.875	0.0200	1.000	0	87.5	77.5	129				
Hexachlorobutadiene	1.02	0.0500	1.000	0	102	42	151				
Naphthalene	1.04	0.0500	1.000	0	104	46.5	167				
1,2,3-Trichlorobenzene	1.04	0.0200	1.000	0	104	64.5	149				
Surr: Dibromofluoromethane	1.30		1.250		104	56.5	129				
Surr: Toluene-d8	1.29		1.250		103	64.5	151				
Surr: 1-Bromo-4-fluorobenzene	1.10		1.250		88.1	54.8	168				

Work Order: 1811173
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID	**LCS-22655**	SampType:	**LCS**		Units:	**mg/Kg**	Prep Date:	**11/16/2018**	RunNo:	**47715**	
Client ID:	**LCSS**	Batch ID:	**22655**				Analysis Date:	**11/16/2018**	SeqNo:	**930431**	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Sample ID	**MB-22655**	SampType:	**MBLK**		Units:	**mg/Kg**	Prep Date:	**11/16/2018**	RunNo:	**47715**	
Client ID:	**MBLKS**	Batch ID:	**22655**				Analysis Date:	**11/16/2018**	SeqNo:	**930432**	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dichlorodifluoromethane (CFC-12)	ND	0.0200									
Chloromethane	ND	0.0500									
Vinyl chloride	ND	0.0250									
Bromomethane	ND	0.0500									
Trichlorofluoromethane (CFC-11)	ND	0.0200									
Chloroethane	ND	0.0500									
1,1-Dichloroethene	ND	0.0200									
Methylene chloride	ND	0.0200									
trans-1,2-Dichloroethene	ND	0.0200									
Methyl tert-butyl ether (MTBE)	ND	0.0500									
1,1-Dichloroethane	ND	0.0200									
2,2-Dichloropropane	ND	0.100									
cis-1,2-Dichloroethene	ND	0.0200									
Chloroform	ND	0.0200									
1,1,1-Trichloroethane (TCA)	ND	0.0250									
1,1-Dichloropropene	ND	0.0200									
Carbon tetrachloride	ND	0.0250									
1,2-Dichloroethane (EDC)	ND	0.0200									
Benzene	ND	0.0200									
Trichloroethene (TCE)	ND	0.0200									
1,2-Dichloropropane	ND	0.0200									
Bromodichloromethane	ND	0.0200									
Dibromomethane	ND	0.0200									
cis-1,3-Dichloropropene	ND	0.0200									
Toluene	ND	0.0200									

Work Order: 1811173
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID **MB-22655** SampType: **MBLK** Units: **mg/Kg** Prep Date: **11/16/2018** RunNo: **47715**
Client ID: **MBLKS** Batch ID: **22655** Analysis Date: **11/16/2018** SeqNo: **930432**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
trans-1,3-Dichloropropylene	ND	0.0200									
1,1,2-Trichloroethane	ND	0.0200									
1,3-Dichloropropane	ND	0.0250									
Tetrachloroethene (PCE)	ND	0.0250									
Dibromochloromethane	ND	0.0250									
1,2-Dibromoethane (EDB)	ND	0.00500									
Chlorobenzene	ND	0.0250									
1,1,1,2-Tetrachloroethane	ND	0.0250									
Ethylbenzene	ND	0.0250									
m,p-Xylene	ND	0.0500									
o-Xylene	ND	0.0250									
Styrene	ND	0.0250									
Isopropylbenzene	ND	0.0250									
Bromoform	ND	0.0500									
1,1,2,2-Tetrachloroethane	ND	0.0200									
n-Propylbenzene	ND	0.0250									
Bromobenzene	ND	0.0200									
1,3,5-Trimethylbenzene	ND	0.0250									
2-Chlorotoluene	ND	0.0250									
4-Chlorotoluene	ND	0.0250									
tert-Butylbenzene	ND	0.0250									
1,2,3-Trichloropropane	ND	0.0250									
1,2,4-Trichlorobenzene	ND	0.0250									
sec-Butylbenzene	ND	0.0500									
4-Isopropyltoluene	ND	0.0500									
1,3-Dichlorobenzene	ND	0.0200									
1,4-Dichlorobenzene	ND	0.0200									
n-Butylbenzene	ND	0.0250									
1,2-Dichlorobenzene	ND	0.0200									
1,2-Dibromo-3-chloropropane	ND	0.500									
1,2,4-Trimethylbenzene	ND	0.0200									

Work Order: 1811173
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID **MB-22655** SampType: **MBLK** Units: **mg/Kg** Prep Date: **11/16/2018** RunNo: **47715**
Client ID: **MBLKS** Batch ID: **22655** Analysis Date: **11/16/2018** SeqNo: **930432**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Hexachlorobutadiene	ND	0.0500									
Naphthalene	ND	0.0500									
1,2,3-Trichlorobenzene	ND	0.0200									
Surr: Dibromofluoromethane	1.28		1.250		102	56.5	129				
Surr: Toluene-d8	1.30		1.250		104	64.5	151				
Surr: 1-Bromo-4-fluorobenzene	1.03		1.250		82.5	54.8	168				

Sample ID **1811173-004BDUP** SampType: **DUP** Units: **mg/Kg-dry** Prep Date: **11/16/2018** RunNo: **47715**
Client ID: **TP-14-2.5** Batch ID: **22655** Analysis Date: **11/16/2018** SeqNo: **930423**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dichlorodifluoromethane (CFC-12)	ND	0.0398						0		30	
Chloromethane	ND	0.0995						0		30	
Vinyl chloride	ND	0.0497						0		30	
Bromomethane	ND	0.0995						0		30	
Trichlorofluoromethane (CFC-11)	ND	0.0398						0		30	
Chloroethane	ND	0.0995						0		30	
1,1-Dichloroethene	ND	0.0398						0		30	
Methylene chloride	ND	0.0398						0		30	
trans-1,2-Dichloroethene	ND	0.0398						0		30	
Methyl tert-butyl ether (MTBE)	ND	0.0995						0		30	
1,1-Dichloroethane	ND	0.0398						0		30	
2,2-Dichloropropane	ND	0.199						0		30	
cis-1,2-Dichloroethene	ND	0.0398						0		30	
Chloroform	ND	0.0398						0		30	
1,1,1-Trichloroethane (TCA)	ND	0.0497						0		30	
1,1-Dichloropropene	ND	0.0398						0		30	
Carbon tetrachloride	ND	0.0497						0		30	
1,2-Dichloroethane (EDC)	ND	0.0398						0		30	
Benzene	ND	0.0398						0		30	

Work Order: 1811173
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID **1811173-004BDUP** SampType: **DUP** Units: **mg/Kg-dry** Prep Date: **11/16/2018** RunNo: **47715**
Client ID: **TP-14-2.5** Batch ID: **22655** Analysis Date: **11/16/2018** SeqNo: **930423**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Trichloroethene (TCE)	ND	0.0398						0		30	
1,2-Dichloropropane	ND	0.0398						0		30	
Bromodichloromethane	ND	0.0398						0		30	
Dibromomethane	ND	0.0398						0		30	
cis-1,3-Dichloropropene	ND	0.0398						0		30	
Toluene	ND	0.0398						0		30	
trans-1,3-Dichloropropylene	ND	0.0398						0		30	
1,1,2-Trichloroethane	ND	0.0398						0		30	
1,3-Dichloropropane	ND	0.0497						0		30	
Tetrachloroethene (PCE)	ND	0.0497						0		30	
Dibromochloromethane	ND	0.0497						0		30	
1,2-Dibromoethane (EDB)	ND	0.00995						0		30	
Chlorobenzene	ND	0.0497						0		30	
1,1,1,2-Tetrachloroethane	ND	0.0497						0		30	
Ethylbenzene	ND	0.0497						0		30	
m,p-Xylene	0.173	0.0995						0.1785	3.42	30	
o-Xylene	0.0511	0.0497						0.05083	0.515	30	
Styrene	ND	0.0497						0		30	
Isopropylbenzene	ND	0.0497						0		30	
Bromoform	ND	0.0995						0		30	
1,1,2,2-Tetrachloroethane	ND	0.0398						0		30	
n-Propylbenzene	ND	0.0497						0		30	
Bromobenzene	ND	0.0398						0		30	
1,3,5-Trimethylbenzene	ND	0.0497						0		30	
2-Chlorotoluene	ND	0.0497						0		30	
4-Chlorotoluene	ND	0.0497						0		30	
tert-Butylbenzene	ND	0.0497						0		30	
1,2,3-Trichloropropane	ND	0.0497						0		30	
1,2,4-Trichlorobenzene	ND	0.0497						0		30	
sec-Butylbenzene	ND	0.0995						0		30	
4-Isopropyltoluene	ND	0.0995						0		30	

Work Order: 1811173
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID **1811173-004BDUP** SampType: **DUP** Units: **mg/Kg-dry** Prep Date: **11/16/2018** RunNo: **47715**
Client ID: **TP-14-2.5** Batch ID: **22655** Analysis Date: **11/16/2018** SeqNo: **930423**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,3-Dichlorobenzene	ND	0.0398						0		30	
1,4-Dichlorobenzene	ND	0.0398						0		30	
n-Butylbenzene	ND	0.0497						0		30	
1,2-Dichlorobenzene	ND	0.0398						0		30	
1,2-Dibromo-3-chloropropane	ND	0.995						0		30	
1,2,4-Trimethylbenzene	ND	0.0398						0		30	
Hexachlorobutadiene	ND	0.0995						0		30	
Naphthalene	ND	0.0995						0		30	
1,2,3-Trichlorobenzene	ND	0.0398						0		30	
Surr: Dibromofluoromethane	2.54		2.486		102	56.5	129		0		
Surr: Toluene-d8	2.55		2.486		103	64.5	151		0		
Surr: 1-Bromo-4-fluorobenzene	2.38		2.486		95.9	54.8	168		0		

Sample ID **1811167-001BDUP** SampType: **DUP** Units: **mg/Kg-dry** Prep Date: **11/16/2018** RunNo: **47715**
Client ID: **BATCH** Batch ID: **22655** Analysis Date: **11/16/2018** SeqNo: **930415**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dichlorodifluoromethane (CFC-12)	ND	0.0253						0		30	
Chloromethane	ND	0.0633						0		30	
Vinyl chloride	ND	0.0316						0		30	
Bromomethane	ND	0.0633						0		30	
Trichlorofluoromethane (CFC-11)	ND	0.0253						0		30	
Chloroethane	ND	0.0633						0		30	
1,1-Dichloroethene	ND	0.0253						0		30	
Methylene chloride	ND	0.0253						0		30	
trans-1,2-Dichloroethene	ND	0.0253						0		30	
Methyl tert-butyl ether (MTBE)	ND	0.0633						0		30	
1,1-Dichloroethane	ND	0.0253						0		30	
2,2-Dichloropropane	ND	0.127						0		30	
cis-1,2-Dichloroethene	ND	0.0253						0		30	

Work Order: 1811173
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID **1811167-001BDUP** SampType: **DUP** Units: **mg/Kg-dry** Prep Date: **11/16/2018** RunNo: **47715**
Client ID: **BATCH** Batch ID: **22655** Analysis Date: **11/16/2018** SeqNo: **930415**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloroform	ND	0.0253						0		30	
1,1,1-Trichloroethane (TCA)	ND	0.0316						0		30	
1,1-Dichloropropene	ND	0.0253						0		30	
Carbon tetrachloride	ND	0.0316						0		30	
1,2-Dichloroethane (EDC)	ND	0.0253						0		30	
Benzene	ND	0.0253						0		30	
Trichloroethene (TCE)	ND	0.0253						0		30	
1,2-Dichloropropane	ND	0.0253						0		30	
Bromodichloromethane	ND	0.0253						0		30	
Dibromomethane	ND	0.0253						0		30	
cis-1,3-Dichloropropene	ND	0.0253						0		30	
Toluene	ND	0.0253						0		30	
trans-1,3-Dichloropropylene	ND	0.0253						0		30	
1,1,2-Trichloroethane	ND	0.0253						0		30	
1,3-Dichloropropane	ND	0.0316						0		30	
Tetrachloroethene (PCE)	ND	0.0316						0		30	
Dibromochloromethane	ND	0.0316						0		30	
1,2-Dibromoethane (EDB)	ND	0.00633						0		30	
Chlorobenzene	ND	0.0316						0		30	
1,1,1,2-Tetrachloroethane	ND	0.0316						0		30	
Ethylbenzene	ND	0.0316						0		30	
m,p-Xylene	ND	0.0633						0		30	
o-Xylene	ND	0.0316						0		30	
Styrene	ND	0.0316						0		30	
Isopropylbenzene	ND	0.0316						0		30	
Bromoform	ND	0.0633						0		30	
1,1,2,2-Tetrachloroethane	ND	0.0253						0		30	
n-Propylbenzene	ND	0.0316						0		30	
Bromobenzene	ND	0.0253						0		30	
1,3,5-Trimethylbenzene	ND	0.0316						0		30	
2-Chlorotoluene	ND	0.0316						0		30	

Work Order: 1811173
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID **1811167-001BDUP** SampType: **DUP** Units: **mg/Kg-dry** Prep Date: **11/16/2018** RunNo: **47715**
Client ID: **BATCH** Batch ID: **22655** Analysis Date: **11/16/2018** SeqNo: **930415**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4-Chlorotoluene	ND	0.0316						0		30	
tert-Butylbenzene	ND	0.0316						0		30	
1,2,3-Trichloropropane	ND	0.0316						0		30	
1,2,4-Trichlorobenzene	ND	0.0316						0		30	
sec-Butylbenzene	ND	0.0633						0		30	
4-Isopropyltoluene	ND	0.0633						0		30	
1,3-Dichlorobenzene	ND	0.0253						0		30	
1,4-Dichlorobenzene	ND	0.0253						0		30	
n-Butylbenzene	ND	0.0316						0		30	
1,2-Dichlorobenzene	ND	0.0253						0		30	
1,2-Dibromo-3-chloropropane	ND	0.633						0		30	
1,2,4-Trimethylbenzene	ND	0.0253						0		30	
Hexachlorobutadiene	ND	0.0633						0		30	
Naphthalene	ND	0.0633						0		30	
1,2,3-Trichlorobenzene	ND	0.0253						0		30	
Surr: Dibromofluoromethane	1.62		1.582		102	56.5	129		0		
Surr: Toluene-d8	1.66		1.582		105	64.5	151		0		
Surr: 1-Bromo-4-fluorobenzene	1.27		1.582		80.3	54.8	168		0		

Sample ID **1811173-009BMS** SampType: **MS** Units: **mg/Kg-dry** Prep Date: **11/16/2018** RunNo: **47715**
Client ID: **TP-13-2.5** Batch ID: **22655** Analysis Date: **11/17/2018** SeqNo: **930425**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dichlorodifluoromethane (CFC-12)	1.44	0.0287	1.433	0	100	43.5	121				
Chloromethane	1.33	0.0716	1.433	0	93.0	45	130				
Vinyl chloride	1.45	0.0358	1.433	0	101	43.6	150				
Bromomethane	1.44	0.0716	1.433	0	101	21.3	120				
Trichlorofluoromethane (CFC-11)	1.45	0.0287	1.433	0	101	35	131				
Chloroethane	1.43	0.0716	1.433	0	99.7	31.9	123				
1,1-Dichloroethene	1.83	0.0287	1.433	0	127	47.3	147				

Work Order: 1811173
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID **1811173-009BMS** SampType: **MS** Units: **mg/Kg-dry** Prep Date: **11/16/2018** RunNo: **47715**
Client ID: **TP-13-2.5** Batch ID: **22655** Analysis Date: **11/17/2018** SeqNo: **930425**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Methylene chloride	1.44	0.0287	1.433	0	101	54.7	142				
trans-1,2-Dichloroethene	1.49	0.0287	1.433	0	104	52	136				
Methyl tert-butyl ether (MTBE)	1.40	0.0716	1.433	0	97.8	58.5	167				
1,1-Dichloroethane	1.44	0.0287	1.433	0	101	51.8	141				
2,2-Dichloropropane	0.663	0.143	1.433	0	46.3	36	123				
cis-1,2-Dichloroethene	1.45	0.0287	1.433	0	101	58.6	136				
Chloroform	1.47	0.0287	1.433	0	103	53.2	129				
1,1,1-Trichloroethane (TCA)	1.53	0.0358	1.433	0	106	58.3	145				
1,1-Dichloropropene	1.53	0.0287	1.433	0	107	55.1	138				
Carbon tetrachloride	1.53	0.0358	1.433	0	107	53.3	144				
1,2-Dichloroethane (EDC)	1.45	0.0287	1.433	0	101	51.3	139				
Benzene	1.50	0.0287	1.433	0	105	63.5	133				
Trichloroethene (TCE)	1.62	0.0287	1.433	0	113	61.6	147				
1,2-Dichloropropane	1.49	0.0287	1.433	0	104	59	136				
Bromodichloromethane	1.47	0.0287	1.433	0	103	50.7	141				
Dibromomethane	1.47	0.0287	1.433	0	103	50.6	137				
cis-1,3-Dichloropropene	1.29	0.0287	1.433	0	89.9	50.4	138				
Toluene	1.52	0.0287	1.433	0	106	63.4	132				
trans-1,3-Dichloropropylene	1.26	0.0287	1.433	0	88.2	44.1	147				
1,1,2-Trichloroethane	1.46	0.0287	1.433	0	102	51.6	137				
1,3-Dichloropropane	1.45	0.0358	1.433	0	101	53.1	134				
Tetrachloroethene (PCE)	1.49	0.0358	1.433	0	104	35.6	158				
Dibromochloromethane	1.44	0.0358	1.433	0	101	55.3	140				
1,2-Dibromoethane (EDB)	1.44	0.00716	1.433	0	100	50.4	136				
Chlorobenzene	1.47	0.0358	1.433	0	103	60	133				
1,1,1,2-Tetrachloroethane	1.46	0.0358	1.433	0	102	53.1	142				
Ethylbenzene	1.48	0.0358	1.433	0	103	54.5	134				
m,p-Xylene	2.96	0.0716	2.865	0	103	53.1	132				
o-Xylene	1.46	0.0358	1.433	0	102	53.3	139				
Styrene	1.47	0.0358	1.433	0	103	51.1	132				
Isopropylbenzene	1.49	0.0358	1.433	0	104	58.9	138				

Work Order: 1811173
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID **1811173-009BMS** SampType: **MS** Units: **mg/Kg-dry** Prep Date: **11/16/2018** RunNo: **47715**
Client ID: **TP-13-2.5** Batch ID: **22655** Analysis Date: **11/17/2018** SeqNo: **930425**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Bromoform	1.37	0.0716	1.433	0	95.8	57.9	130				
1,1,2,2-Tetrachloroethane	1.24	0.0287	1.433	0	86.7	51.9	131				
n-Propylbenzene	1.49	0.0358	1.433	0	104	53.6	140				
Bromobenzene	1.43	0.0287	1.433	0	100	54.2	140				
1,3,5-Trimethylbenzene	1.48	0.0358	1.433	0	103	51.8	136				
2-Chlorotoluene	1.66	0.0358	1.433	0	116	51.6	136				
4-Chlorotoluene	1.45	0.0358	1.433	0	101	50.1	139				
tert-Butylbenzene	1.47	0.0358	1.433	0	103	50.5	135				
1,2,3-Trichloropropane	1.31	0.0358	1.433	0	91.4	50.5	131				
1,2,4-Trichlorobenzene	1.36	0.0358	1.433	0	94.6	50.8	130				
sec-Butylbenzene	1.48	0.0716	1.433	0	104	52.6	141				
4-Isopropyltoluene	1.45	0.0716	1.433	0	101	52.9	134				
1,3-Dichlorobenzene	1.47	0.0287	1.433	0	103	52.6	131				
1,4-Dichlorobenzene	1.51	0.0287	1.433	0	105	52.9	129				
n-Butylbenzene	1.51	0.0358	1.433	0	106	52.6	130				
1,2-Dichlorobenzene	1.54	0.0287	1.433	0	107	55.8	129				
1,2-Dibromo-3-chloropropane	1.33	0.716	1.433	0	92.8	40.5	131				
1,2,4-Trimethylbenzene	1.45	0.0287	1.433	0	102	50.6	137				
Hexachlorobutadiene	1.34	0.0716	1.433	0	93.7	40.6	158				
Naphthalene	1.33	0.0716	1.433	0	92.5	52.3	124				
1,2,3-Trichlorobenzene	1.34	0.0287	1.433	0	93.8	54.4	124				
Surr: Dibromofluoromethane	1.85		1.791		103	56.5	129				
Surr: Toluene-d8	1.86		1.791		104	64.5	151				
Surr: 1-Bromo-4-fluorobenzene	1.77		1.791		99.0	54.8	168				

Sample ID **1811173-009BMSD** SampType: **MSD** Units: **mg/Kg-dry** Prep Date: **11/16/2018** RunNo: **47715**
Client ID: **TP-13-2.5** Batch ID: **22655** Analysis Date: **11/17/2018** SeqNo: **930426**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dichlorodifluoromethane (CFC-12)	1.45	0.0287	1.433	0	101	43.5	121	1.436	0.646	30	

Work Order: 1811173
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID **1811173-009BMSD** SampType: **MSD** Units: **mg/Kg-dry** Prep Date: **11/16/2018** RunNo: **47715**
Client ID: **TP-13-2.5** Batch ID: **22655** Analysis Date: **11/17/2018** SeqNo: **930426**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloromethane	1.43	0.0716	1.433	0	99.6	45	130	1.332	6.89	30	
Vinyl chloride	1.45	0.0358	1.433	0	102	43.6	150	1.453	0.133	30	
Bromomethane	1.40	0.0716	1.433	0	97.9	21.3	120	1.442	2.79	30	
Trichlorofluoromethane (CFC-11)	1.41	0.0287	1.433	0	98.6	35	131	1.450	2.58	30	
Chloroethane	1.46	0.0716	1.433	0	102	31.9	123	1.429	2.15	30	
1,1-Dichloroethene	1.78	0.0287	1.433	0	124	47.3	147	1.826	2.80	30	
Methylene chloride	1.45	0.0287	1.433	0	101	54.7	142	1.442	0.376	30	
trans-1,2-Dichloroethene	1.48	0.0287	1.433	0	103	52	136	1.490	0.665	30	
Methyl tert-butyl ether (MTBE)	1.38	0.0716	1.433	0	96.0	58.5	167	1.401	1.83	30	
1,1-Dichloroethane	1.45	0.0287	1.433	0	101	51.8	141	1.445	0.565	30	
2,2-Dichloropropane	0.652	0.143	1.433	0	45.5	36	123	0.6634	1.79	30	
cis-1,2-Dichloroethene	1.44	0.0287	1.433	0	101	58.6	136	1.450	0.672	30	
Chloroform	1.42	0.0287	1.433	0	99.4	53.2	129	1.474	3.47	30	
1,1,1-Trichloroethane (TCA)	1.48	0.0358	1.433	0	103	58.3	145	1.526	3.19	30	
1,1-Dichloropropene	1.50	0.0287	1.433	0	105	55.1	138	1.526	1.42	30	
Carbon tetrachloride	1.49	0.0358	1.433	0	104	53.3	144	1.534	2.59	30	
1,2-Dichloroethane (EDC)	1.39	0.0287	1.433	0	97.0	51.3	139	1.446	4.01	30	
Benzene	1.46	0.0287	1.433	0	102	63.5	133	1.499	2.50	30	
Trichloroethene (TCE)	1.66	0.0287	1.433	0	116	61.6	147	1.622	2.35	30	
1,2-Dichloropropane	1.44	0.0287	1.433	0	100	59	136	1.490	3.50	30	
Bromodichloromethane	1.42	0.0287	1.433	0	98.9	50.7	141	1.468	3.58	30	
Dibromomethane	1.41	0.0287	1.433	0	98.3	50.6	137	1.471	4.34	30	
cis-1,3-Dichloropropene	1.25	0.0287	1.433	0	87.2	50.4	138	1.287	2.98	30	
Toluene	1.49	0.0287	1.433	0	104	63.4	132	1.518	2.11	30	
trans-1,3-Dichloropropylene	1.23	0.0287	1.433	0	85.9	44.1	147	1.263	2.65	30	
1,1,2-Trichloroethane	1.42	0.0287	1.433	0	99.2	51.6	137	1.461	2.76	30	
1,3-Dichloropropane	1.41	0.0358	1.433	0	98.2	53.1	134	1.452	3.16	30	
Tetrachloroethene (PCE)	1.47	0.0358	1.433	0	103	35.6	158	1.494	1.48	30	
Dibromochloromethane	1.40	0.0358	1.433	0	97.8	55.3	140	1.443	2.91	30	
1,2-Dibromoethane (EDB)	1.42	0.00716	1.433	0	98.9	50.4	136	1.439	1.53	30	
Chlorobenzene	1.43	0.0358	1.433	0	99.7	60	133	1.473	3.10	30	

Work Order: 1811173
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID **1811173-009BMSD** SampType: **MSD** Units: **mg/Kg-dry** Prep Date: **11/16/2018** RunNo: **47715**
Client ID: **TP-13-2.5** Batch ID: **22655** Analysis Date: **11/17/2018** SeqNo: **930426**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	1.41	0.0358	1.433	0	98.4	53.1	142	1.457	3.32	30	
Ethylbenzene	1.44	0.0358	1.433	0	100	54.5	134	1.480	2.85	30	
m,p-Xylene	2.87	0.0716	2.865	0	100	53.1	132	2.955	2.99	30	
o-Xylene	1.43	0.0358	1.433	0	100	53.3	139	1.461	1.96	30	
Styrene	1.42	0.0358	1.433	0	99.3	51.1	132	1.471	3.30	30	
Isopropylbenzene	1.46	0.0358	1.433	0	102	58.9	138	1.495	2.34	30	
Bromoform	1.34	0.0716	1.433	0	93.4	57.9	130	1.372	2.49	30	
1,1,2,2-Tetrachloroethane	1.08	0.0287	1.433	0	75.1	51.9	131	1.242	14.3	30	
n-Propylbenzene	1.44	0.0358	1.433	0	100	53.6	140	1.486	3.41	30	
Bromobenzene	1.40	0.0287	1.433	0	97.5	54.2	140	1.435	2.67	30	
1,3,5-Trimethylbenzene	1.44	0.0358	1.433	0	101	51.8	136	1.477	2.37	30	
2-Chlorotoluene	1.61	0.0358	1.433	0	113	51.6	136	1.663	3.05	30	
4-Chlorotoluene	1.41	0.0358	1.433	0	98.1	50.1	139	1.449	3.07	30	
tert-Butylbenzene	1.46	0.0358	1.433	0	102	50.5	135	1.474	0.921	30	
1,2,3-Trichloropropane	1.19	0.0358	1.433	0	83.3	50.5	131	1.310	9.27	30	
1,2,4-Trichlorobenzene	1.36	0.0358	1.433	0	94.7	50.8	130	1.355	0.154	30	
sec-Butylbenzene	1.46	0.0716	1.433	0	102	52.6	141	1.483	1.66	30	
4-Isopropyltoluene	1.44	0.0716	1.433	0	101	52.9	134	1.447	0.344	30	
1,3-Dichlorobenzene	1.45	0.0287	1.433	0	102	52.6	131	1.473	1.27	30	
1,4-Dichlorobenzene	1.46	0.0287	1.433	0	102	52.9	129	1.505	2.84	30	
n-Butylbenzene	1.37	0.0358	1.433	0	95.6	52.6	130	1.512	9.89	30	
1,2-Dichlorobenzene	1.40	0.0287	1.433	0	97.5	55.8	129	1.537	9.61	30	
1,2-Dibromo-3-chloropropane	1.29	0.716	1.433	0	90.4	40.5	131	1.329	2.63	30	
1,2,4-Trimethylbenzene	1.43	0.0287	1.433	0	100	50.6	137	1.455	1.56	30	
Hexachlorobutadiene	1.38	0.0716	1.433	0	96.2	40.6	158	1.342	2.59	30	
Naphthalene	1.34	0.0716	1.433	0	93.7	52.3	124	1.325	1.31	30	
1,2,3-Trichlorobenzene	1.36	0.0287	1.433	0	94.8	54.4	124	1.343	1.07	30	
Surr: Dibromofluoromethane	1.85		1.791		103	56.5	129		0		
Surr: Toluene-d8	1.87		1.791		105	64.5	151		0		
Surr: 1-Bromo-4-fluorobenzene	1.75		1.791		97.9	54.8	168		0		

Work Order: 1811173
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID **LCS-22755** SampType: **LCS** Units: **mg/Kg** Prep Date: **11/28/2018** RunNo: **47938**
Client ID: **LCSS** Batch ID: **22755** Analysis Date: **11/28/2018** SeqNo: **936129**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dichlorodifluoromethane (CFC-12)	1.36	0.0200	1.000	0	136	14.3	167				
Chloromethane	1.15	0.0500	1.000	0	115	32	156				
Vinyl chloride	1.09	0.0250	1.000	0	109	43.4	151				
Bromomethane	1.12	0.0500	1.000	0	112	35	155				
Trichlorofluoromethane (CFC-11)	1.17	0.0200	1.000	0	117	33.8	156				
Chloroethane	1.03	0.0500	1.000	0	103	33.1	147				
1,1-Dichloroethene	0.982	0.0200	1.000	0	98.2	30.9	145				
Methylene chloride	1.03	0.0200	1.000	0	103	46.3	140				
trans-1,2-Dichloroethene	0.989	0.0200	1.000	0	98.9	68	130				
Methyl tert-butyl ether (MTBE)	0.975	0.0500	1.000	0	97.5	44.1	152				
1,1-Dichloroethane	1.00	0.0200	1.000	0	100	61.9	137				
2,2-Dichloropropane	0.994	0.100	1.000	0	99.4	35.5	186				
cis-1,2-Dichloroethene	0.984	0.0200	1.000	0	98.4	71.3	135				
Chloroform	0.991	0.0200	1.000	0	99.1	69	145				
1,1,1-Trichloroethane (TCA)	0.963	0.0250	1.000	0	96.3	69	132				
1,1-Dichloropropene	0.982	0.0200	1.000	0	98.2	72.7	131				
Carbon tetrachloride	0.943	0.0250	1.000	0	94.3	63.4	137				
1,2-Dichloroethane (EDC)	1.00	0.0200	1.000	0	100	50.9	162				
Benzene	0.988	0.0200	1.000	0	98.8	64.3	133				
Trichloroethene (TCE)	0.972	0.0200	1.000	0	97.2	65.5	137				
1,2-Dichloropropane	0.976	0.0200	1.000	0	97.6	63.2	142				
Bromodichloromethane	0.927	0.0200	1.000	0	92.7	53.4	131				
Dibromomethane	0.976	0.0200	1.000	0	97.6	60.1	146				
cis-1,3-Dichloropropene	0.945	0.0200	1.000	0	94.5	59.1	143				
Toluene	0.984	0.0200	1.000	0	98.4	67	144				
trans-1,3-Dichloropropylene	0.923	0.0200	1.000	0	92.3	49.2	149				
1,1,2-Trichloroethane	0.979	0.0200	1.000	0	97.9	56.9	147				
1,3-Dichloropropane	0.973	0.0250	1.000	0	97.3	56.1	153				
Tetrachloroethene (PCE)	0.962	0.0250	1.000	0	96.2	52.7	150				
Dibromochloromethane	0.896	0.0250	1.000	0	89.6	70.6	144				
1,2-Dibromoethane (EDB)	0.972	0.00500	1.000	0	97.2	50.5	154				

Work Order: 1811173
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID **LCS-22755** SampType: **LCS** Units: **mg/Kg** Prep Date: **11/28/2018** RunNo: **47938**
Client ID: **LCSS** Batch ID: **22755** Analysis Date: **11/28/2018** SeqNo: **936129**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chlorobenzene	0.974	0.0250	1.000	0	97.4	84.9	125				
1,1,1,2-Tetrachloroethane	0.935	0.0250	1.000	0	93.5	65.9	141				
Ethylbenzene	1.04	0.0250	1.000	0	104	74	129				
m,p-Xylene	1.97	0.0500	2.000	0	98.7	70	124				
o-Xylene	0.952	0.0250	1.000	0	95.2	68.1	139				
Styrene	0.961	0.0250	1.000	0	96.1	73.3	146				
Isopropylbenzene	0.992	0.0250	1.000	0	99.2	70	130				
Bromoform	0.839	0.0500	1.000	0	83.9	44.3	130				
1,1,2,2-Tetrachloroethane	1.00	0.0200	1.000	0	100	44.8	165				
n-Propylbenzene	1.02	0.0250	1.000	0	102	75.8	139				
Bromobenzene	0.966	0.0200	1.000	0	96.6	49.2	144				
1,3,5-Trimethylbenzene	1.02	0.0250	1.000	0	102	76.5	135				
2-Chlorotoluene	1.11	0.0250	1.000	0	111	76.7	129				
4-Chlorotoluene	0.984	0.0250	1.000	0	98.4	77.5	125				
tert-Butylbenzene	0.980	0.0250	1.000	0	98.0	66.2	130				
1,2,3-Trichloropropane	0.952	0.0250	1.000	0	95.2	67.9	136				
1,2,4-Trichlorobenzene	0.995	0.0250	1.000	0	99.5	65.5	150				
sec-Butylbenzene	1.01	0.0500	1.000	0	101	75.6	133				
4-Isopropyltoluene	1.00	0.0500	1.000	0	100	76.8	131				
1,3-Dichlorobenzene	1.01	0.0200	1.000	0	101	48.6	144				
1,4-Dichlorobenzene	1.00	0.0200	1.000	0	100	72.6	126				
n-Butylbenzene	0.973	0.0250	1.000	0	97.3	78.4	140				
1,2-Dichlorobenzene	1.00	0.0200	1.000	0	100	72.8	126				
1,2-Dibromo-3-chloropropane	0.910	0.500	1.000	0	91.0	40.2	155				
1,2,4-Trimethylbenzene	1.03	0.0200	1.000	0	103	77.5	129				
Hexachlorobutadiene	0.985	0.0500	1.000	0	98.5	42	151				
Naphthalene	1.03	0.0500	1.000	0	103	46.5	167				
1,2,3-Trichlorobenzene	1.00	0.0200	1.000	0	100	64.5	149				
Surr: Dibromofluoromethane	1.27		1.250		101	56.5	129				
Surr: Toluene-d8	1.26		1.250		100	64.5	151				
Surr: 1-Bromo-4-fluorobenzene	1.27		1.250		101	54.8	168				

Work Order: 1811173
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID	**LCS-22755**	SampType:	**LCS**		Units:	**mg/Kg**	Prep Date:	**11/28/2018**	RunNo:	**47938**
Client ID:	**LCSS**	Batch ID:	**22755**				Analysis Date:	**11/28/2018**	SeqNo:	**936129**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Sample ID	**MB-22755**	SampType:	**MBLK**		Units:	**mg/Kg**	Prep Date:	**11/27/2018**	RunNo:	**47938**
Client ID:	**MBLKS**	Batch ID:	**22755**				Analysis Date:	**11/28/2018**	SeqNo:	**936130**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dichlorodifluoromethane (CFC-12)	ND	0.0200									
Chloromethane	ND	0.0500									
Vinyl chloride	ND	0.0250									
Bromomethane	ND	0.0500									
Trichlorofluoromethane (CFC-11)	ND	0.0200									
Chloroethane	ND	0.0500									
1,1-Dichloroethene	ND	0.0200									
Methylene chloride	ND	0.0200									
trans-1,2-Dichloroethene	ND	0.0200									
Methyl tert-butyl ether (MTBE)	ND	0.0500									
1,1-Dichloroethane	ND	0.0200									
2,2-Dichloropropane	ND	0.100									
cis-1,2-Dichloroethene	ND	0.0200									
Chloroform	ND	0.0200									
1,1,1-Trichloroethane (TCA)	ND	0.0250									
1,1-Dichloropropene	ND	0.0200									
Carbon tetrachloride	ND	0.0250									
1,2-Dichloroethane (EDC)	ND	0.0200									
Benzene	ND	0.0200									
Trichloroethene (TCE)	ND	0.0200									
1,2-Dichloropropane	ND	0.0200									
Bromodichloromethane	ND	0.0200									
Dibromomethane	ND	0.0200									
cis-1,3-Dichloropropene	ND	0.0200									
Toluene	ND	0.0200									

Work Order: 1811173
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID **MB-22755** SampType: **MBLK** Units: **mg/Kg** Prep Date: **11/27/2018** RunNo: **47938**
Client ID: **MBLKS** Batch ID: **22755** Analysis Date: **11/28/2018** SeqNo: **936130**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
trans-1,3-Dichloropropylene	ND	0.0200									
1,1,2-Trichloroethane	ND	0.0200									
1,3-Dichloropropane	ND	0.0250									
Tetrachloroethene (PCE)	ND	0.0250									
Dibromochloromethane	ND	0.0250									
1,2-Dibromoethane (EDB)	ND	0.00500									
Chlorobenzene	ND	0.0250									
1,1,1,2-Tetrachloroethane	ND	0.0250									
Ethylbenzene	ND	0.0250									
m,p-Xylene	ND	0.0500									
o-Xylene	ND	0.0250									
Styrene	ND	0.0250									
Isopropylbenzene	ND	0.0250									
Bromoform	ND	0.0500									
1,1,2,2-Tetrachloroethane	ND	0.0200									
n-Propylbenzene	ND	0.0250									
Bromobenzene	ND	0.0200									
1,3,5-Trimethylbenzene	ND	0.0250									
2-Chlorotoluene	ND	0.0250									
4-Chlorotoluene	ND	0.0250									
tert-Butylbenzene	ND	0.0250									
1,2,3-Trichloropropane	ND	0.0250									
1,2,4-Trichlorobenzene	ND	0.0250									
sec-Butylbenzene	ND	0.0500									
4-Isopropyltoluene	ND	0.0500									
1,3-Dichlorobenzene	ND	0.0200									
1,4-Dichlorobenzene	ND	0.0200									
n-Butylbenzene	ND	0.0250									
1,2-Dichlorobenzene	ND	0.0200									
1,2-Dibromo-3-chloropropane	ND	0.500									
1,2,4-Trimethylbenzene	ND	0.0200									

Work Order: 1811173
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID **MB-22755** SampType: **MBLK** Units: **mg/Kg** Prep Date: **11/27/2018** RunNo: **47938**
Client ID: **MBLKS** Batch ID: **22755** Analysis Date: **11/28/2018** SeqNo: **936130**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Hexachlorobutadiene	ND	0.0500									
Naphthalene	ND	0.0500									
1,2,3-Trichlorobenzene	ND	0.0200									
Surr: Dibromofluoromethane	1.23		1.250		98.6	56.5	129				
Surr: Toluene-d8	1.23		1.250		98.8	64.5	151				
Surr: 1-Bromo-4-fluorobenzene	1.22		1.250		97.4	54.8	168				

Sample ID **1811173-001BDUP** SampType: **DUP** Units: **mg/Kg-dry** Prep Date: **11/27/2018** RunNo: **47938**
Client ID: **TP-9-2.5** Batch ID: **22755** Analysis Date: **11/28/2018** SeqNo: **936104**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dichlorodifluoromethane (CFC-12)	ND	0.0249						0		30	H
Chloromethane	ND	0.0623						0		30	H
Vinyl chloride	ND	0.0311						0		30	H
Bromomethane	ND	0.0623						0		30	H
Trichlorofluoromethane (CFC-11)	ND	0.0249						0		30	H
Chloroethane	ND	0.0623						0		30	H
1,1-Dichloroethene	ND	0.0249						0		30	H
Methylene chloride	ND	0.0249						0		30	H
trans-1,2-Dichloroethene	ND	0.0249						0		30	H
Methyl tert-butyl ether (MTBE)	ND	0.0623						0		30	H
1,1-Dichloroethane	ND	0.0249						0		30	H
2,2-Dichloropropane	ND	0.125						0		30	H
cis-1,2-Dichloroethene	ND	0.0249						0		30	H
Chloroform	ND	0.0249						0		30	H
1,1,1-Trichloroethane (TCA)	ND	0.0311						0		30	H
1,1-Dichloropropene	ND	0.0249						0		30	H
Carbon tetrachloride	ND	0.0311						0		30	H
1,2-Dichloroethane (EDC)	ND	0.0249						0		30	H
Benzene	ND	0.0249						0		30	H

Work Order: 1811173
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID **1811173-001BDUP** SampType: **DUP** Units: **mg/Kg-dry** Prep Date: **11/27/2018** RunNo: **47938**
Client ID: **TP-9-2.5** Batch ID: **22755** Analysis Date: **11/28/2018** SeqNo: **936104**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Trichloroethene (TCE)	ND	0.0249						0		30	H
1,2-Dichloropropane	ND	0.0249						0		30	H
Bromodichloromethane	ND	0.0249						0		30	H
Dibromomethane	ND	0.0249						0		30	H
cis-1,3-Dichloropropene	ND	0.0249						0		30	H
Toluene	ND	0.0249						0		30	H
trans-1,3-Dichloropropylene	ND	0.0249						0		30	H
1,1,2-Trichloroethane	ND	0.0249						0		30	H
1,3-Dichloropropane	ND	0.0311						0		30	H
Tetrachloroethene (PCE)	ND	0.0311						0		30	H
Dibromochloromethane	ND	0.0311						0		30	H
1,2-Dibromoethane (EDB)	ND	0.00623						0		30	H
Chlorobenzene	ND	0.0311						0		30	H
1,1,1,2-Tetrachloroethane	ND	0.0311						0		30	H
Ethylbenzene	ND	0.0311						0		30	H
m,p-Xylene	ND	0.0623						0		30	H
o-Xylene	ND	0.0311						0		30	H
Styrene	ND	0.0311						0		30	H
Isopropylbenzene	ND	0.0311						0		30	H
Bromoform	ND	0.0623						0		30	H
1,1,2,2-Tetrachloroethane	ND	0.0249						0		30	H
n-Propylbenzene	ND	0.0311						0		30	H
Bromobenzene	ND	0.0249						0		30	H
1,3,5-Trimethylbenzene	ND	0.0311						0		30	H
2-Chlorotoluene	ND	0.0311						0		30	H
4-Chlorotoluene	ND	0.0311						0		30	H
tert-Butylbenzene	ND	0.0311						0		30	H
1,2,3-Trichloropropane	0.677	0.0311						0	200	30	H
1,2,4-Trichlorobenzene	ND	0.0311						0		30	H
sec-Butylbenzene	ND	0.0623						0		30	H
4-Isopropyltoluene	ND	0.0623						0		30	H

Work Order: 1811173
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID **1811173-001BDUP** SampType: **DUP** Units: **mg/Kg-dry** Prep Date: **11/27/2018** RunNo: **47938**
Client ID: **TP-9-2.5** Batch ID: **22755** Analysis Date: **11/28/2018** SeqNo: **936104**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,3-Dichlorobenzene	ND	0.0249						0		30	H
1,4-Dichlorobenzene	ND	0.0249						0		30	H
n-Butylbenzene	ND	0.0311						0		30	H
1,2-Dichlorobenzene	ND	0.0249						0		30	H
1,2-Dibromo-3-chloropropane	ND	0.623						0		30	H
1,2,4-Trimethylbenzene	ND	0.0249						0		30	H
Hexachlorobutadiene	ND	0.0623						0		30	H
Naphthalene	ND	0.0623						0		30	H
1,2,3-Trichlorobenzene	ND	0.0249						0		30	H
Surr: Dibromofluoromethane	1.54		1.556		98.7	56.5	129		0		H
Surr: Toluene-d8	1.57		1.556		101	64.5	151		0		H
Surr: 1-Bromo-4-fluorobenzene	1.51		1.556		96.8	54.8	168		0		H

Sample ID **1811247-001BDUP** SampType: **DUP** Units: **mg/Kg-dry** Prep Date: **11/27/2018** RunNo: **47938**
Client ID: **BATCH** Batch ID: **22755** Analysis Date: **11/28/2018** SeqNo: **936110**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dichlorodifluoromethane (CFC-12)	ND	0.0176						0		30	
Chloromethane	ND	0.0441						0		30	
Vinyl chloride	ND	0.0220						0		30	
Bromomethane	ND	0.0441						0		30	
Trichlorofluoromethane (CFC-11)	ND	0.0176						0		30	
Chloroethane	ND	0.0441						0		30	
1,1-Dichloroethene	ND	0.0176						0		30	
Methylene chloride	ND	0.0176						0		30	
trans-1,2-Dichloroethene	ND	0.0176						0		30	
Methyl tert-butyl ether (MTBE)	ND	0.0441						0		30	
1,1-Dichloroethane	ND	0.0176						0		30	
2,2-Dichloropropane	ND	0.0881						0		30	
cis-1,2-Dichloroethene	ND	0.0176						0		30	

Work Order: 1811173
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID **1811247-001BDUP** SampType: **DUP** Units: **mg/Kg-dry** Prep Date: **11/27/2018** RunNo: **47938**
Client ID: **BATCH** Batch ID: **22755** Analysis Date: **11/28/2018** SeqNo: **936110**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloroform	ND	0.0176						0		30	
1,1,1-Trichloroethane (TCA)	ND	0.0220						0		30	
1,1-Dichloropropene	ND	0.0176						0		30	
Carbon tetrachloride	ND	0.0220						0		30	
1,2-Dichloroethane (EDC)	ND	0.0176						0		30	
Benzene	ND	0.0176						0		30	
Trichloroethene (TCE)	ND	0.0176						0		30	
1,2-Dichloropropane	ND	0.0176						0		30	
Bromodichloromethane	ND	0.0176						0		30	
Dibromomethane	ND	0.0176						0		30	
cis-1,3-Dichloropropene	ND	0.0176						0		30	
Toluene	ND	0.0176						0		30	
trans-1,3-Dichloropropylene	ND	0.0176						0		30	
1,1,2-Trichloroethane	ND	0.0176						0		30	
1,3-Dichloropropane	ND	0.0220						0		30	
Tetrachloroethene (PCE)	ND	0.0220						0		30	
Dibromochloromethane	ND	0.0220						0		30	
1,2-Dibromoethane (EDB)	ND	0.00441						0		30	
Chlorobenzene	ND	0.0220						0		30	
1,1,1,2-Tetrachloroethane	ND	0.0220						0		30	
Ethylbenzene	ND	0.0220						0		30	
m,p-Xylene	ND	0.0441						0		30	
o-Xylene	ND	0.0220						0		30	
Styrene	ND	0.0220						0		30	
Isopropylbenzene	ND	0.0220						0		30	
Bromoform	ND	0.0441						0		30	
1,1,2,2-Tetrachloroethane	ND	0.0176						0		30	
n-Propylbenzene	ND	0.0220						0		30	
Bromobenzene	ND	0.0176						0		30	
1,3,5-Trimethylbenzene	ND	0.0220						0		30	
2-Chlorotoluene	ND	0.0220						0		30	

Work Order: 1811173
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID **1811247-001BDUP** SampType: **DUP** Units: **mg/Kg-dry** Prep Date: **11/27/2018** RunNo: **47938**
Client ID: **BATCH** Batch ID: **22755** Analysis Date: **11/28/2018** SeqNo: **936110**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4-Chlorotoluene	ND	0.0220						0		30	
tert-Butylbenzene	ND	0.0220						0		30	
1,2,3-Trichloropropane	ND	0.0220						0		30	
1,2,4-Trichlorobenzene	ND	0.0220						0		30	
sec-Butylbenzene	ND	0.0441						0		30	
4-Isopropyltoluene	ND	0.0441						0		30	
1,3-Dichlorobenzene	ND	0.0176						0		30	
1,4-Dichlorobenzene	ND	0.0176						0		30	
n-Butylbenzene	ND	0.0220						0		30	
1,2-Dichlorobenzene	ND	0.0176						0		30	
1,2-Dibromo-3-chloropropane	ND	0.441						0		30	
1,2,4-Trimethylbenzene	ND	0.0176						0		30	
Hexachlorobutadiene	ND	0.0441						0		30	
Naphthalene	ND	0.0441						0		30	
1,2,3-Trichlorobenzene	ND	0.0176						0		30	
Surr: Dibromofluoromethane	1.07		1.101		96.9	56.5	129		0		
Surr: Toluene-d8	1.10		1.101		99.8	64.5	151		0		
Surr: 1-Bromo-4-fluorobenzene	1.07		1.101		96.9	54.8	168		0		

Sample ID **1811173-005BMS** SampType: **MS** Units: **mg/Kg-dry** Prep Date: **11/27/2018** RunNo: **47938**
Client ID: **TP-14-5.0** Batch ID: **22755** Analysis Date: **11/29/2018** SeqNo: **936106**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dichlorodifluoromethane (CFC-12)	2.08	0.0266	1.328	0	156	43.5	121				SH
Chloromethane	1.63	0.0664	1.328	0	123	45	130				H
Vinyl chloride	1.73	0.0332	1.328	0	131	43.6	150				H
Bromomethane	1.90	0.0664	1.328	0	143	21.3	120				SH
Trichlorofluoromethane (CFC-11)	2.16	0.0266	1.328	0	163	35	131				SH
Chloroethane	1.68	0.0664	1.328	0	126	31.9	123				SH
1,1-Dichloroethene	1.58	0.0266	1.328	0	119	47.3	147				H

Work Order: 1811173
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID **1811173-005BMS** SampType: **MS** Units: **mg/Kg-dry** Prep Date: **11/27/2018** RunNo: **47938**
Client ID: **TP-14-5.0** Batch ID: **22755** Analysis Date: **11/29/2018** SeqNo: **936106**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Methylene chloride	1.56	0.0266	1.328	0	117	54.7	142				H
trans-1,2-Dichloroethene	1.53	0.0266	1.328	0	115	52	136				H
Methyl tert-butyl ether (MTBE)	1.42	0.0664	1.328	0	107	58.5	167				H
1,1-Dichloroethane	1.55	0.0266	1.328	0	116	51.8	141				H
2,2-Dichloropropane	0.972	0.133	1.328	0	73.2	36	123				H
cis-1,2-Dichloroethene	1.50	0.0266	1.328	0	113	58.6	136				H
Chloroform	1.52	0.0266	1.328	0	114	53.2	129				H
1,1,1-Trichloroethane (TCA)	1.52	0.0332	1.328	0	114	58.3	145				H
1,1-Dichloropropene	1.53	0.0266	1.328	0	115	55.1	138				H
Carbon tetrachloride	1.49	0.0332	1.328	0	112	53.3	144				H
1,2-Dichloroethane (EDC)	1.52	0.0266	1.328	0	114	51.3	139				H
Benzene	1.52	0.0266	1.328	0	115	63.5	133				H
Trichloroethene (TCE)	1.51	0.0266	1.328	0	113	61.6	147				H
1,2-Dichloropropane	1.48	0.0266	1.328	0	111	59	136				H
Bromodichloromethane	1.37	0.0266	1.328	0	103	50.7	141				H
Dibromomethane	1.46	0.0266	1.328	0	110	50.6	137				H
cis-1,3-Dichloropropene	1.29	0.0266	1.328	0	97.2	50.4	138				H
Toluene	1.49	0.0266	1.328	0	112	63.4	132				H
trans-1,3-Dichloropropylene	1.24	0.0266	1.328	0	93.2	44.1	147				H
1,1,2-Trichloroethane	1.45	0.0266	1.328	0	109	51.6	137				H
1,3-Dichloropropane	1.45	0.0332	1.328	0	109	53.1	134				H
Tetrachloroethene (PCE)	1.47	0.0332	1.328	0	111	35.6	158				H
Dibromochloromethane	1.29	0.0332	1.328	0	97.4	55.3	140				H
1,2-Dibromoethane (EDB)	1.43	0.00664	1.328	0	108	50.4	136				H
Chlorobenzene	1.46	0.0332	1.328	0	110	60	133				H
1,1,1,2-Tetrachloroethane	1.39	0.0332	1.328	0	104	53.1	142				H
Ethylbenzene	1.60	0.0332	1.328	0.01966	119	54.5	134				H
m,p-Xylene	3.08	0.0664	2.656	0.09054	113	53.1	132				H
o-Xylene	1.45	0.0332	1.328	0.02031	107	53.3	139				H
Styrene	1.43	0.0332	1.328	0	107	51.1	132				H
Isopropylbenzene	1.51	0.0332	1.328	0	113	58.9	138				H

Work Order: 1811173
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID **1811173-005BMS** SampType: **MS** Units: **mg/Kg-dry** Prep Date: **11/27/2018** RunNo: **47938**
Client ID: **TP-14-5.0** Batch ID: **22755** Analysis Date: **11/29/2018** SeqNo: **936106**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Bromoform	1.17	0.0664	1.328	0	88.2	57.9	130				H
1,1,2,2-Tetrachloroethane	1.38	0.0266	1.328	0	104	51.9	131				H
n-Propylbenzene	1.53	0.0332	1.328	0	115	53.6	140				H
Bromobenzene	1.39	0.0266	1.328	0	105	54.2	140				H
1,3,5-Trimethylbenzene	1.46	0.0332	1.328	0	110	51.8	136				H
2-Chlorotoluene	1.58	0.0332	1.328	0	119	51.6	136				H
4-Chlorotoluene	1.40	0.0332	1.328	0	105	50.1	139				H
tert-Butylbenzene	1.42	0.0332	1.328	0	107	50.5	135				H
1,2,3-Trichloropropane	1.27	0.0332	1.328	0	95.4	50.5	131				H
1,2,4-Trichlorobenzene	1.39	0.0332	1.328	0	105	50.8	130				H
sec-Butylbenzene	1.49	0.0664	1.328	0	112	52.6	141				H
4-Isopropyltoluene	1.43	0.0664	1.328	0	108	52.9	134				H
1,3-Dichlorobenzene	1.44	0.0266	1.328	0	108	52.6	131				H
1,4-Dichlorobenzene	1.45	0.0266	1.328	0	109	52.9	129				H
n-Butylbenzene	1.43	0.0332	1.328	0	108	52.6	130				H
1,2-Dichlorobenzene	1.48	0.0266	1.328	0	111	55.8	129				H
1,2-Dibromo-3-chloropropane	1.22	0.664	1.328	0	91.7	40.5	131				H
1,2,4-Trimethylbenzene	1.45	0.0266	1.328	0	109	50.6	137				H
Hexachlorobutadiene	1.45	0.0664	1.328	0	109	40.6	158				H
Naphthalene	1.48	0.0664	1.328	0	111	52.3	124				H
1,2,3-Trichlorobenzene	1.43	0.0266	1.328	0	108	54.4	124				H
Surr: Dibromofluoromethane	1.70		1.660		102	56.5	129				H
Surr: Toluene-d8	1.66		1.660		100	64.5	151				H
Surr: 1-Bromo-4-fluorobenzene	1.59		1.660		95.6	54.8	168				H

NOTES:
S - Outlying spike recovery(ies) observed. A duplicate analysis was performed with similar results indicating a possible matrix effect.

Work Order: 1811173
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID **1811173-005BMSD** SampType: **MSD** Units: **mg/Kg-dry** Prep Date: **11/27/2018** RunNo: **47938**
Client ID: **TP-14-5.0** Batch ID: **22755** Analysis Date: **11/29/2018** SeqNo: **936107**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dichlorodifluoromethane (CFC-12)	1.94	0.0266	1.328	0	146	43.5	121	2.077	6.81	30	SH
Chloromethane	1.71	0.0664	1.328	0	129	45	130	1.635	4.39	30	H
Vinyl chloride	1.67	0.0332	1.328	0	126	43.6	150	1.734	3.89	30	H
Bromomethane	1.83	0.0664	1.328	0	138	21.3	120	1.905	4.09	30	SH
Trichlorofluoromethane (CFC-11)	2.06	0.0266	1.328	0	155	35	131	2.160	4.77	30	SH
Chloroethane	1.66	0.0664	1.328	0	125	31.9	123	1.677	1.26	30	SH
1,1-Dichloroethene	1.51	0.0266	1.328	0	113	47.3	147	1.576	4.47	30	H
Methylene chloride	1.51	0.0266	1.328	0	113	54.7	142	1.555	3.23	30	H
trans-1,2-Dichloroethene	1.49	0.0266	1.328	0	112	52	136	1.526	2.22	30	H
Methyl tert-butyl ether (MTBE)	1.37	0.0664	1.328	0	103	58.5	167	1.420	3.86	30	H
1,1-Dichloroethane	1.50	0.0266	1.328	0	113	51.8	141	1.545	2.96	30	H
2,2-Dichloropropane	0.913	0.133	1.328	0	68.8	36	123	0.9721	6.25	30	H
cis-1,2-Dichloroethene	1.45	0.0266	1.328	0	109	58.6	136	1.501	3.69	30	H
Chloroform	1.46	0.0266	1.328	0	110	53.2	129	1.519	3.69	30	H
1,1,1-Trichloroethane (TCA)	1.48	0.0332	1.328	0	111	58.3	145	1.520	2.84	30	H
1,1-Dichloropropene	1.48	0.0266	1.328	0	112	55.1	138	1.533	3.24	30	H
Carbon tetrachloride	1.45	0.0332	1.328	0	109	53.3	144	1.488	2.58	30	H
1,2-Dichloroethane (EDC)	1.45	0.0266	1.328	0	109	51.3	139	1.516	4.55	30	H
Benzene	1.46	0.0266	1.328	0	110	63.5	133	1.524	4.49	30	H
Trichloroethene (TCE)	1.44	0.0266	1.328	0	109	61.6	147	1.505	4.20	30	H
1,2-Dichloropropane	1.41	0.0266	1.328	0	106	59	136	1.480	5.07	30	H
Bromodichloromethane	1.33	0.0266	1.328	0	100	50.7	141	1.369	2.57	30	H
Dibromomethane	1.39	0.0266	1.328	0	105	50.6	137	1.461	5.07	30	H
cis-1,3-Dichloropropene	1.24	0.0266	1.328	0	93.0	50.4	138	1.290	4.35	30	H
Toluene	1.43	0.0266	1.328	0	108	63.4	132	1.488	3.81	30	H
trans-1,3-Dichloropropylene	1.19	0.0266	1.328	0	89.5	44.1	147	1.238	4.05	30	H
1,1,2-Trichloroethane	1.37	0.0266	1.328	0	104	51.6	137	1.445	5.01	30	H
1,3-Dichloropropane	1.38	0.0332	1.328	0	104	53.1	134	1.445	4.88	30	H
Tetrachloroethene (PCE)	1.42	0.0332	1.328	0	107	35.6	158	1.475	3.70	30	H
Dibromochloromethane	1.26	0.0332	1.328	0	95.1	55.3	140	1.294	2.34	30	H
1,2-Dibromoethane (EDB)	1.38	0.00664	1.328	0	104	50.4	136	1.431	3.78	30	H

Work Order: 1811173
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID **1811173-005BMSD** SampType: **MSD** Units: **mg/Kg-dry** Prep Date: **11/27/2018** RunNo: **47938**
Client ID: **TP-14-5.0** Batch ID: **22755** Analysis Date: **11/29/2018** SeqNo: **936107**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chlorobenzene	1.42	0.0332	1.328	0	107	60	133	1.463	3.32	30	H
1,1,1,2-Tetrachloroethane	1.35	0.0332	1.328	0	101	53.1	142	1.387	2.91	30	H
Ethylbenzene	1.54	0.0332	1.328	0.01966	114	54.5	134	1.599	3.82	30	H
m,p-Xylene	2.97	0.0664	2.656	0.09054	108	53.1	132	3.082	3.76	30	H
o-Xylene	1.40	0.0332	1.328	0.02031	104	53.3	139	1.446	3.06	30	H
Styrene	1.37	0.0332	1.328	0	104	51.1	132	1.426	3.67	30	H
Isopropylbenzene	1.45	0.0332	1.328	0	109	58.9	138	1.506	3.59	30	H
Bromoform	1.15	0.0664	1.328	0	86.8	57.9	130	1.171	1.57	30	H
1,1,2,2-Tetrachloroethane	1.33	0.0266	1.328	0	100	51.9	131	1.381	3.87	30	H
n-Propylbenzene	1.47	0.0332	1.328	0	111	53.6	140	1.526	3.61	30	H
Bromobenzene	1.35	0.0266	1.328	0	102	54.2	140	1.392	3.17	30	H
1,3,5-Trimethylbenzene	1.47	0.0332	1.328	0	111	51.8	136	1.463	0.504	30	H
2-Chlorotoluene	1.58	0.0332	1.328	0	119	51.6	136	1.579	0.328	30	H
4-Chlorotoluene	1.40	0.0332	1.328	0	106	50.1	139	1.397	0.411	30	H
tert-Butylbenzene	1.45	0.0332	1.328	0	109	50.5	135	1.425	1.79	30	H
1,2,3-Trichloropropane	1.22	0.0332	1.328	0	91.8	50.5	131	1.267	3.86	30	H
1,2,4-Trichlorobenzene	1.36	0.0332	1.328	0	103	50.8	130	1.393	2.05	30	H
sec-Butylbenzene	1.52	0.0664	1.328	0	114	52.6	141	1.486	2.02	30	H
4-Isopropyltoluene	1.49	0.0664	1.328	0	112	52.9	134	1.428	3.97	30	H
1,3-Dichlorobenzene	1.43	0.0266	1.328	0	107	52.6	131	1.435	0.693	30	H
1,4-Dichlorobenzene	1.41	0.0266	1.328	0	106	52.9	129	1.454	3.14	30	H
n-Butylbenzene	1.38	0.0332	1.328	0	104	52.6	130	1.429	3.38	30	H
1,2-Dichlorobenzene	1.42	0.0266	1.328	0	107	55.8	129	1.475	4.15	30	H
1,2-Dibromo-3-chloropropane	1.21	0.664	1.328	0	91.0	40.5	131	1.218	0.821	30	H
1,2,4-Trimethylbenzene	1.48	0.0266	1.328	0	111	50.6	137	1.451	1.89	30	H
Hexachlorobutadiene	1.43	0.0664	1.328	0	107	40.6	158	1.453	1.85	30	H
Naphthalene	1.44	0.0664	1.328	0	108	52.3	124	1.478	2.75	30	H
1,2,3-Trichlorobenzene	1.41	0.0266	1.328	0	106	54.4	124	1.433	1.44	30	H
Surr: Dibromofluoromethane	1.70		1.660		103	56.5	129		0		H
Surr: Toluene-d8	1.65		1.660		99.5	64.5	151		0		H
Surr: 1-Bromo-4-fluorobenzene	1.61		1.660		96.9	54.8	168		0		H

Work Order: 1811173
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID	**1811173-005BMSD**	SampType:	**MSD**		Units:	**mg/Kg-dry**	Prep Date:	**11/27/2018**		RunNo:	**47938**
Client ID:	**TP-14-5.0**	Batch ID:	**22755**				Analysis Date:	**11/29/2018**		SeqNo:	**936107**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

NOTES:
S - Outlying spike recovery(ies) observed. A duplicate analysis was performed with similar results indicating a possible matrix effect.

Work Order: 1811173
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Sample Moisture (Percent Moisture)

Sample ID **1811036-021ADUP** SampType: **DUP** Units: **wt%** Prep Date: **11/14/2018** RunNo: **47634**
Client ID: **BATCH** Batch ID: **R47634** Analysis Date: **11/14/2018** SeqNo: **928275**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Percent Moisture	8.93	0.500						9.140	2.32	20	

Sample ID **1811167-005ADUP** SampType: **DUP** Units: **wt%** Prep Date: **11/14/2018** RunNo: **47634**
Client ID: **BATCH** Batch ID: **R47634** Analysis Date: **11/14/2018** SeqNo: **928288**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Percent Moisture	3.04	0.500						2.284	28.4	20	R

Sample ID **1811248-012ADUP** SampType: **DUP** Units: **wt%** Prep Date: **11/20/2018** RunNo: **47753**
Client ID: **BATCH** Batch ID: **R47753** Analysis Date: **11/20/2018** SeqNo: **931243**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Percent Moisture	10.1	0.500						11.35	12.0	20	

Sample ID **1811251-008ADUP** SampType: **DUP** Units: **wt%** Prep Date: **11/20/2018** RunNo: **47753**
Client ID: **BATCH** Batch ID: **R47753** Analysis Date: **11/20/2018** SeqNo: **931257**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Percent Moisture	16.0	0.500						11.72	31.0	20	R

Sample Log-In Check List

Client Name:	**GEI**	Work Order Number:	**1811173**
Logged by:	**Clare Griggs**	Date Received:	**11/7/2018 3:45:00 PM**

Chain of Custody

1.	Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2.	How was the sample delivered?	Client		

Log In

3.	Coolers are present?	Yes ☑	No ☐	NA ☐
4.	Shipping container/cooler in good condition?	Yes ☑	No ☐	
5.	Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact)	Yes ☐	No ☐	Not Required ☑
6.	Was an attempt made to cool the samples?	Yes ☐	No ☑	NA ☐
		Unknown prior to receipt.		
7.	Were all items received at a temperature of >0°C to 10.0°C *	Yes ☐	No ☑	NA ☐
		Refer to item information.		
8.	Sample(s) in proper container(s)?	Yes ☑	No ☐	
9.	Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
10.	Are samples properly preserved?	Yes ☑	No ☐	
11.	Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
12.	Is there headspace in the VOA vials?	Yes ☐	No ☐	NA ☑
13.	Did all samples containers arrive in good condition(unbroken)?	Yes ☑	No ☐	
14.	Does paperwork match bottle labels?	Yes ☑	No ☐	
15.	Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
16.	Is it clear what analyses were requested?	Yes ☑	No ☐	
17.	Were all holding times able to be met?	Yes ☑	No ☐	

Special Handling (if applicable)

18.	Was client notified of all discrepancies with this order?	Yes ☐	No ☐	NA ☑

Person Notified: _____ Date _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

19. Additional remarks:

Item Information

Item #	Temp ºC
Cooler	13.6
Sample	17.3
Temp Blank	12.2

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

Chain of Custody Record & Laboratory Services Agreement

Fremont Analytical
3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Date: 11.7.18 Page: 1 of: 2

Laboratory Project No (internal): 1811173

Project Name: Rufus Block 18

Special Remarks:

Project No: 20434-001-32

Collected by: A. Clauss

Client: GEI

Address: 2101 4th Ave, #950

City, State, Zip: Seattle, WA

Telephone:

Fax:

Location: Block 18

Report To (PM): Chris Brown

PM Email: ~~cbrown@gmail.com~~ cbrown@geoengineers.com

@Rumper CB 11/12/18, STD TAT. BB

Sample Disposal: ☐ Return to client ☐ Disposal by lab (after 30 days)

	Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	VOCs (EPA 8260 / 624)	GX/BTEX	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	Diesel/Heavy Oil Range Organics (DX)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8)	Total (T)	Dissolved (D)	Anions (IC)***	EDB (8011)	Hold				Comments
1	TP-9-2.5	11.7.18	0840															X					
2	TP-9-5.0		0848															X					
3	TP-9-8.0		0854															X					
4	TP-14-2.5		0905		X					X		X						X					
5	TP-14-5.0		0911															X					
6	TP-14-7.5		0916															X					
7	TP-10-2.5		1007															X					
8	TP-10-5.0		1015															X					
9	TP-13-2.5		1422		X					X		X						X					
10	TP-13-5.0		1428															X					

*Matrix: A = Air, AQ = Aqueous, B = Bulk, O = Other, P = Product, S = Soil, SD = Sediment, SL = Solid, W = Water, DW = Drinking Water, GW = Ground Water, SW = Storm Water, WW = Waste Water

**Metals (Circle): MTCA-5 RCRA-8 Priority Pollutants TAL *Individual:* Ag Al As B Ba Be Ca Cd Co Cr Cu Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sr Sn Ti Tl U V Zn

***Anions (Circle): Nitrate Nitrite Chloride Sulfate Bromide O-Phosphate Fluoride Nitrate+Nitrite

I represent that I am authorized to enter into this Agreement with Fremont Analytical on behalf of the Client named above and that I have verified Client's agreement to each of the terms on the front and backside of this Agreement.

Relinquished x [signature] Date/Time 11.7.18 1545

Relinquished x Date/Time

Received x [signature] Date/Time 11/7/18 1545

Received x Date/Time

Turn-around Time:

☐ Standard
☐ 3 Day
☐ 2 Day
☐ Next Day
Same Day ____ (specify)

Fremont Analytical
3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Chain of Custody Record & Laboratory Services Agreement

Date: 11.7.18 Page: 2 of: 2

Project Name: Rufus Block 18

Project No: 20434-001-32

Collected by: A. Clauss

Location: Block 18

Report To (PM): Chris Brown

PM Email: cbrown@[redacted]geoengineers.com

Laboratory Project No (internal):

Special Remarks:

Sample Disposal: ☐ Return to client ☐ Disposal by lab (after 30 days)

Client: GEI

Address: 2101 4th Ave, #950

City, State, Zip: Seattle, WA

Telephone:

Fax:

	Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	VOCs (EPA 8260 / 624)	GX/BTEX	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	Diesel/Heavy Oil Range Organics (DX)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8) Total (T) | Dissolved (D)	Anions (IC)***	EDB (8011)	Hold	Comments
1	TP-13-7.5	11.7.18	1435														X	
2																		
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		

*Matrix: A = Air, AQ = Aqueous, B = Bulk, O = Other, P = Product, S = Soil, SD = Sediment, SL = Solid, W = Water, DW = Drinking Water, GW = Ground Water, SW = Storm Water, WW = Waste Water

**Metals (Circle): MTCA-5 RCRA-8 Priority Pollutants TAL *Individual:* Ag Al As B Ba Be Ca Cd Co Cr Cu Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sr Sn Ti Tl U V Zn

***Anions (Circle): Nitrate Nitrite Chloride Sulfate Bromide O-Phosphate Fluoride Nitrate+Nitrite

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Relinquished	Date/Time	Received	Date/Time
x [signature]	11.7.18 1545	x [signature]	11/7/18 1545
Relinquished	Date/Time	Received	Date/Time
x		x	

Turn-around Time:

☐ Standard
☐ 3 Day
☐ 2 Day
☐ Next Day
Same Day _____ (specify)

Chain of Custody Record & Laboratory Services Agreement

Fremont Analytical
3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Date: 11.7.18 Page: 1 of: 2

Laboratory Project No (internal): 1811173

Project Name: Rufus Block 18

Project No: 20434-001-32

Special Remarks:

X Add analysis per CB 11/19/18 STD. BRB
@ Run per CB 11/12/18, STD TAT. BRB

Client: GEI

Collected by: A. Clauss

Address: 2101 4th Ave, #950

Location: Block 18

City, State, Zip: Seattle, WA

Report To (PM): Chris Brown

Sample Disposal: ☐ Return to client ☐ Disposal by lab (after 30 days)

Telephone:

PM Email: ~~cbrown@gmail.com~~ cbrown@geoengineers.com

Fax:

	Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	VOCs (EPA 8260 / 624)	GX/BTEX	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	Diesel/Heavy Oil Range Organics (DX)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8) Total (T)	Dissolved (D)	Anions (IC)***	EDB (8011)	Hold	Comments
1	TP-9-2.5	11.7.18	0840		X			X		X	X		X				X		
2	TP-9-5.0		0848														X		
3	TP-9-8.0		0854														X		
4	TP-14-2.5		0905		X			X		X	X		X				X		
5	TP-14-5.0		0911				X										X		
6	TP-14-7.5		0916														X		
7	TP-10-2.5		1007		X			X		X	X		X				X		
8	TP-10-5.0		1015														X		
9	TP-13-2.5		1422		X			X		X	X						X		
10	TP-13-5.0	↓	1428														X		

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☐ 2 Day
☐ Next Day
Same Day ____ (specify)

Relinquished x	Date/Time 11.7.18 1545	Received x	Date/Time 11/7/18 1545
Relinquished x	Date/Time	Received x	Date/Time

Chain of Custody Record & Laboratory Services Agreement

Fremont Analytical
3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Date: 11.7.18 Page: 2 of: 2

Project Name: Rufus Block 18

Project No: 20434-001-32

Collected by: A. Clauss

Location: Block 18

Report To (PM): Chris Brown

PM Email: cbrown@[redacted]geoengineers.com

Laboratory Project No (internal):

Special Remarks:

Sample Disposal: ☐ Return to client ☐ Disposal by lab (after 30 days)

Client: GEI

Address: 2101 4th Ave, #950

City, State, Zip: Seattle, WA

Telephone:

Fax:

	Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	VOCs (EPA 8260 / 624)	GX/BTEX	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	Diesel/Heavy Oil Range Organics (DX)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8) Total (T) | Dissolved (D)	Anions (IC)***	EDB (8011)	Hold	Comments
1	TP-13-7.5	11.7.18	1435														X	
2																		
3																		
4																		
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6																		
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Relinquished x	Date/Time	Received x	Date/Time

Turn-around Time:

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- ☐ 3 Day
- ☐ 2 Day
- ☐ Next Day
- Same Day _____ (specify)

Fremont Analytical

3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Chain of Custody Record & Laboratory Services Agreement

Date: 11.7.18 | Page: 1 of: 2 | Laboratory Project No (Internal): 181173

Project Name: Rufus Block 18

Project No: 20434-001-32

Special Remarks:

☒Add Analysis per CB 12/3/18 Next Day TAT
XAdd Analysis per CB 11/19/18 STD. BMB
☒Run per CB 11/12/18, STD TAT. BMB

Client: GEI

Address: 2101 4th Ave, #950

City, State, Zip: Seattle, WA

Telephone:

Fax:

Collected by: A. Clauss

Location: Block 18

Report To (PM): Chris Brown

PM Email: ~~cbrown@gmail.com~~ cbrown@geoengineers.com

Sample Disposal: ☐ Return to client ☐ Disposal by lab (after 30 days)

	Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	VOCs (EPA 8260 / 624)	GX/BTEX	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	Diesel/Heavy Oil Range Organics (DX)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8)	Total (T)	Dissolved (D)	Anions (IC)***	EDB (8011)	Hold	Comments
1	TP-9-2.5	11.7.18	0840		X			X	X	X	X	X						X		
2	TP-9-5.0		0848															X		
3	TP-9-8.0		0854															X		
4	TP-14-2.5		0905		X			X	X	X	X	X						X		
5	TP-14-5.0		0911				X											X		
6	TP-14-7.5		0916															X		
7	TP-10-2.5		1007		X			X	X	X	X	X						X		
8	TP-10-5.0		1015															X		
9	TP-13-2.5		1422		X			X	X	X	X	X						X		
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x [signature]	11.7.18 1545	x [signature]	11/7/18 1545
Relinquished	Date/Time	Received	Date/Time
x		x	

Fremont Analytical
3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Chain of Custody Record & Laboratory Services Agreement

Date: 11.7.18 Page: 2 of: 2

Laboratory Project No (Internal):

Special Remarks:

Project Name: Rufus Block 18

Project No: 20434-001-32

Collected by: A. Clauss

Location: Block 18

Report To (PM): Chris Brown

Sample Disposal: ☐ Return to client ☐ Disposal by lab (after 30 days)

PM Email: cbrown@[redacted]geoengineers.com

Client: GEI

Address: 2101 4th Ave, #950

City, State, Zip: Seattle, WA

Telephone:

Fax:

	Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	VOCs (EPA 8260 / 624)	GX/BTEX	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	Diesel/Heavy Oil Range Organics (DX)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8) Total (T) | Dissolved (D)	Anions (IC)***	EDB (8011)	Hold	Comments
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Relinquished x [signature] Date/Time 11.7.18 1545

Relinquished x Date/Time

Received x [signature] Date/Time 11/7/18 1545

Received x Date/Time

Turn-around Time:
- ☐ Standard
- ☐ 3 Day
- ☐ 2 Day
- ☐ Next Day
- Same Day (specify)

3600 Fremont Ave. N.
Seattle, WA 98103
T: (206) 352-3790
F: (206) 352-7178
info@fremontanalytical.com

GeoEngineers
Chris Brown
2101 4th Ave, Suite 950
Seattle, WA 98121

RE: Rufus Block 18
Work Order Number: 1811281

December 04, 2018

Attention Chris Brown:

Fremont Analytical, Inc. received 9 sample(s) on 11/13/2018 for the analyses presented in the following report.

Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.
Gasoline by NWTPH-Gx
Mercury by EPA Method 7471
Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)
Sample Moisture (Percent Moisture)
Total Metals by EPA Method 6020
Volatile Organic Compounds by EPA Method 8260C

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Mike Ridgeway
Laboratory Director

Date: *12/04/2018*

CLIENT: GeoEngineers
Project: Rufus Block 18
Work Order: 1811281

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
1811281-001	TP-1-2.5	11/13/2018 11:53 AM	11/13/2018 3:20 PM
1811281-002	TP-1-5.0	11/13/2018 12:03 PM	11/13/2018 3:20 PM
1811281-003	TP-3-2.5	11/13/2018 12:20 PM	11/13/2018 3:20 PM
1811281-004	TP-3-5.0	11/13/2018 12:28 PM	11/13/2018 3:20 PM
1811281-005	TP-4-2.5	11/13/2018 12:36 PM	11/13/2018 3:20 PM
1811281-006	TP-4-5.0	11/13/2018 12:45 PM	11/13/2018 3:20 PM
1811281-007	TP-6-2.5	11/13/2018 12:55 PM	11/13/2018 3:20 PM
1811281-008	TP-6-5.0	11/13/2018 1:01 PM	11/13/2018 3:20 PM
1811281-009	TP-6-8.0	11/13/2018 1:05 PM	11/13/2018 3:20 PM

Note: If no "Time Collected" is supplied, a default of 12:00AM is assigned

Case Narrative

WO#: **1811281**
Date: **12/4/2018**

CLIENT: GeoEngineers
Project: Rufus Block 18

I. SAMPLE RECEIPT:
Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:
Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:
Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

Qualifiers:

* - Flagged value is not within established control limits
B - Analyte detected in the associated Method Blank
D - Dilution was required
E - Value above quantitation range
H - Holding times for preparation or analysis exceeded
I - Analyte with an internal standard that does not meet established acceptance criteria
J - Analyte detected below Reporting Limit
N - Tentatively Identified Compound (TIC)
Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF)
S - Spike recovery outside accepted recovery limits
ND - Not detected at the Reporting Limit
R - High relative percent difference observed

Acronyms:

%Rec - Percent Recovery
CCB - Continued Calibration Blank
CCV - Continued Calibration Verification
DF - Dilution Factor
HEM - Hexane Extractable Material
ICV - Initial Calibration Verification
LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
MB or MBLANK - Method Blank
MDL - Method Detection Limit
MS/MSD - Matrix Spike / Matrix Spike Duplicate
PDS - Post Digestion Spike
Ref Val - Reference Value
RL - Reporting Limit
RPD - Relative Percent Difference
SD - Serial Dilution
SGT - Silica Gel Treatment
SPK - Spike
Surr - Surrogate

Analytical Report

Work Order: **1811281**
Date Reported: **12/4/2018**

Client: GeoEngineers
Collection Date: 11/13/2018 11:53:00 AM
Project: Rufus Block 18
Lab ID: 1811281-001
Matrix: Soil
Client Sample ID: **TP-1-2.5**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.				Batch ID: 22702		Analyst: DW
Diesel (Fuel Oil)	ND	19.4		mg/Kg-dry	1	11/22/2018 6:42:21 PM
Heavy Oil	ND	48.5		mg/Kg-dry	1	11/22/2018 6:42:21 PM
Surr: 2-Fluorobiphenyl	82.6	50 - 150		%Rec	1	11/22/2018 6:42:21 PM
Surr: o-Terphenyl	80.0	50 - 150		%Rec	1	11/22/2018 6:42:21 PM
Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)				Batch ID: 22710		Analyst: IH
Naphthalene	ND	38.3		µg/Kg-dry	1	11/27/2018 2:23:46 PM
2-Methylnaphthalene	ND	38.3		µg/Kg-dry	1	11/27/2018 2:23:46 PM
1-Methylnaphthalene	ND	38.3		µg/Kg-dry	1	11/27/2018 2:23:46 PM
Acenaphthylene	ND	38.3		µg/Kg-dry	1	11/27/2018 2:23:46 PM
Acenaphthene	ND	38.3		µg/Kg-dry	1	11/27/2018 2:23:46 PM
Fluorene	ND	38.3		µg/Kg-dry	1	11/27/2018 2:23:46 PM
Phenanthrene	ND	38.3		µg/Kg-dry	1	11/27/2018 2:23:46 PM
Anthracene	ND	38.3		µg/Kg-dry	1	11/27/2018 2:23:46 PM
Fluoranthene	ND	38.3		µg/Kg-dry	1	11/27/2018 2:23:46 PM
Pyrene	ND	38.3		µg/Kg-dry	1	11/27/2018 2:23:46 PM
Benz(a)anthracene	ND	38.3	Q	µg/Kg-dry	1	11/27/2018 2:23:46 PM
Chrysene	ND	38.3		µg/Kg-dry	1	11/27/2018 2:23:46 PM
Benzo(b)fluoranthene	ND	38.3		µg/Kg-dry	1	11/27/2018 2:23:46 PM
Benzo(k)fluoranthene	ND	38.3		µg/Kg-dry	1	11/27/2018 2:23:46 PM
Benzo(a)pyrene	ND	38.3		µg/Kg-dry	1	11/27/2018 2:23:46 PM
Indeno(1,2,3-cd)pyrene	ND	38.3		µg/Kg-dry	1	11/27/2018 2:23:46 PM
Dibenz(a,h)anthracene	ND	38.3		µg/Kg-dry	1	11/27/2018 2:23:46 PM
Benzo(g,h,i)perylene	ND	38.3		µg/Kg-dry	1	11/27/2018 2:23:46 PM
Surr: 2-Fluorobiphenyl	55.6	12.5 - 140		%Rec	1	11/27/2018 2:23:46 PM
Surr: Terphenyl-d14 (surr)	110	45.7 - 172		%Rec	1	11/27/2018 2:23:46 PM

NOTES:
Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria

Gasoline by NWTPH-Gx				Batch ID: 22768		Analyst: EM
Gasoline	ND	5.88	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
Gasoline Range Organics (C6-C12)	10.1	5.88	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
Surr: Toluene-d8	98.3	65 - 135	H	%Rec	1	11/29/2018 12:04:15 PM
Surr: 4-Bromofluorobenzene	98.2	65 - 135	H	%Rec	1	11/29/2018 12:04:15 PM

NOTES:
GRO - Indicates the presence of unresolved compounds eluting from toluene to dodecane (~C6-C12).

Client: GeoEngineers
Collection Date: 11/13/2018 11:53:00 AM
Project: Rufus Block 18
Lab ID: 1811281-001
Matrix: Soil
Client Sample ID: **TP-1-2.5**

Volatile Organic Compounds by EPA Method 8260C

Batch ID: 22768 Analyst: EM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dichlorodifluoromethane (CFC-12)	ND	0.0235	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
Chloromethane	ND	0.0588	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
Vinyl chloride	ND	0.0294	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
Bromomethane	ND	0.0588	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
Trichlorofluoromethane (CFC-11)	ND	0.0235	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
Chloroethane	ND	0.0588	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
1,1-Dichloroethene	ND	0.0235	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
Methylene chloride	ND	0.0235	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
trans-1,2-Dichloroethene	ND	0.0235	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
Methyl tert-butyl ether (MTBE)	ND	0.0588	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
1,1-Dichloroethane	ND	0.0235	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
2,2-Dichloropropane	ND	0.118	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
cis-1,2-Dichloroethene	ND	0.0235	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
Chloroform	ND	0.0235	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
1,1,1-Trichloroethane (TCA)	ND	0.0294	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
1,1-Dichloropropene	ND	0.0235	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
Carbon tetrachloride	ND	0.0294	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
1,2-Dichloroethane (EDC)	ND	0.0235	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
Benzene	ND	0.0235	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
Trichloroethene (TCE)	ND	0.0235	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
1,2-Dichloropropane	ND	0.0235	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
Bromodichloromethane	ND	0.0235	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
Dibromomethane	ND	0.0235	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
cis-1,3-Dichloropropene	ND	0.0235	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
Toluene	ND	0.0235	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
trans-1,3-Dichloropropylene	ND	0.0235	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
1,1,2-Trichloroethane	ND	0.0235	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
1,3-Dichloropropane	ND	0.0294	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
Tetrachloroethene (PCE)	ND	0.0294	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
Dibromochloromethane	ND	0.0294	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
1,2-Dibromoethane (EDB)	ND	0.00588	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
Chlorobenzene	ND	0.0294	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
1,1,1,2-Tetrachloroethane	ND	0.0294	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
Ethylbenzene	ND	0.0294	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
m,p-Xylene	ND	0.0588	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
o-Xylene	ND	0.0294	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
Styrene	ND	0.0294	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
Isopropylbenzene	ND	0.0294	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
Bromoform	ND	0.0588	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM

Client: GeoEngineers
Collection Date: 11/13/2018 11:53:00 AM
Project: Rufus Block 18
Lab ID: 1811281-001
Matrix: Soil
Client Sample ID: **TP-1-2.5**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Volatile Organic Compounds by EPA Method 8260C				Batch ID: 22768		Analyst: EM
1,1,2,2-Tetrachloroethane	ND	0.0235	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
n-Propylbenzene	ND	0.0294	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
Bromobenzene	ND	0.0235	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
1,3,5-Trimethylbenzene	ND	0.0294	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
2-Chlorotoluene	ND	0.0294	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
4-Chlorotoluene	ND	0.0294	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
tert-Butylbenzene	ND	0.0294	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
1,2,3-Trichloropropane	ND	0.0294	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
1,2,4-Trichlorobenzene	ND	0.0294	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
sec-Butylbenzene	ND	0.0588	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
4-Isopropyltoluene	ND	0.0588	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
1,3-Dichlorobenzene	ND	0.0235	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
1,4-Dichlorobenzene	ND	0.0235	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
n-Butylbenzene	ND	0.0294	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
1,2-Dichlorobenzene	ND	0.0235	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
1,2-Dibromo-3-chloropropane	ND	0.588	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
1,2,4-Trimethylbenzene	ND	0.0235	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
Hexachlorobutadiene	ND	0.0588	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
Naphthalene	ND	0.0588	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
1,2,3-Trichlorobenzene	ND	0.0235	H	mg/Kg-dry	1	11/29/2018 12:04:15 PM
Surr: Dibromofluoromethane	98.0	56.5 - 129	H	%Rec	1	11/29/2018 12:04:15 PM
Surr: Toluene-d8	100	64.5 - 151	H	%Rec	1	11/29/2018 12:04:15 PM
Surr: 1-Bromo-4-fluorobenzene	95.0	54.8 - 168	H	%Rec	1	11/29/2018 12:04:15 PM
Mercury by EPA Method 7471				Batch ID: 22719		Analyst: TN
Mercury	ND	0.259		mg/Kg-dry	1	11/26/2018 1:17:32 PM
Total Metals by EPA Method 6020				Batch ID: 22717		Analyst: WC
Arsenic	1.75	0.199		mg/Kg-dry	1	11/26/2018 2:36:11 PM
Cadmium	ND	0.159		mg/Kg-dry	1	11/26/2018 2:36:11 PM
Chromium	24.0	0.0796		mg/Kg-dry	1	11/26/2018 2:36:11 PM
Lead	1.37	0.159		mg/Kg-dry	1	11/26/2018 2:36:11 PM
Sample Moisture (Percent Moisture)				Batch ID: R47787		Analyst: EAS
Percent Moisture	9.00	0.500		wt%	1	11/20/2018 3:55:02 PM

Analytical Report

Work Order: **1811281**
Date Reported: **12/4/2018**

Client: GeoEngineers
Collection Date: 11/13/2018 12:03:00 PM
Project: Rufus Block 18
Lab ID: 1811281-002
Matrix: Soil
Client Sample ID: **TP-1-5.0**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Gasoline by NWTPH-Gx				Batch ID: 22815		Analyst: CR
Gasoline	ND	5.18	H	mg/Kg-dry	1	12/4/2018 6:01:54 AM
Surr: Toluene-d8	98.8	65 - 135	H	%Rec	1	12/4/2018 6:01:54 AM
Surr: 4-Bromofluorobenzene	97.9	65 - 135	H	%Rec	1	12/4/2018 6:01:54 AM
Sample Moisture (Percent Moisture)				Batch ID: R48055		Analyst: SS
Percent Moisture	8.29	0.500		wt%	1	12/4/2018 8:39:07 AM

Analytical Report

Work Order: **1811281**
Date Reported: **12/4/2018**

Client: GeoEngineers
Collection Date: 11/13/2018 12:20:00 PM
Project: Rufus Block 18
Lab ID: 1811281-003
Matrix: Soil
Client Sample ID: **TP-3-2.5**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.				Batch ID: 22702		Analyst: DW
Diesel (Fuel Oil)	ND	21.2		mg/Kg-dry	1	11/22/2018 9:12:28 PM
Heavy Oil	ND	52.9		mg/Kg-dry	1	11/22/2018 9:12:28 PM
Surr: 2-Fluorobiphenyl	84.2	50 - 150		%Rec	1	11/22/2018 9:12:28 PM
Surr: o-Terphenyl	82.9	50 - 150		%Rec	1	11/22/2018 9:12:28 PM
Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)				Batch ID: 22710		Analyst: IH
Naphthalene	ND	39.5		µg/Kg-dry	1	11/27/2018 2:44:00 PM
2-Methylnaphthalene	ND	39.5		µg/Kg-dry	1	11/27/2018 2:44:00 PM
1-Methylnaphthalene	ND	39.5		µg/Kg-dry	1	11/27/2018 2:44:00 PM
Acenaphthylene	ND	39.5		µg/Kg-dry	1	11/27/2018 2:44:00 PM
Acenaphthene	ND	39.5		µg/Kg-dry	1	11/27/2018 2:44:00 PM
Fluorene	ND	39.5		µg/Kg-dry	1	11/27/2018 2:44:00 PM
Phenanthrene	ND	39.5		µg/Kg-dry	1	11/27/2018 2:44:00 PM
Anthracene	ND	39.5		µg/Kg-dry	1	11/27/2018 2:44:00 PM
Fluoranthene	ND	39.5		µg/Kg-dry	1	11/27/2018 2:44:00 PM
Pyrene	ND	39.5		µg/Kg-dry	1	11/27/2018 2:44:00 PM
Benz(a)anthracene	ND	39.5	Q	µg/Kg-dry	1	11/27/2018 2:44:00 PM
Chrysene	ND	39.5		µg/Kg-dry	1	11/27/2018 2:44:00 PM
Benzo(b)fluoranthene	ND	39.5		µg/Kg-dry	1	11/27/2018 2:44:00 PM
Benzo(k)fluoranthene	ND	39.5		µg/Kg-dry	1	11/27/2018 2:44:00 PM
Benzo(a)pyrene	ND	39.5		µg/Kg-dry	1	11/27/2018 2:44:00 PM
Indeno(1,2,3-cd)pyrene	ND	39.5		µg/Kg-dry	1	11/27/2018 2:44:00 PM
Dibenz(a,h)anthracene	ND	39.5		µg/Kg-dry	1	11/27/2018 2:44:00 PM
Benzo(g,h,i)perylene	ND	39.5		µg/Kg-dry	1	11/27/2018 2:44:00 PM
Surr: 2-Fluorobiphenyl	63.4	12.5 - 140		%Rec	1	11/27/2018 2:44:00 PM
Surr: Terphenyl-d14 (surr)	131	45.7 - 172		%Rec	1	11/27/2018 2:44:00 PM

NOTES:
Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria

Gasoline by NWTPH-Gx				Batch ID: 22768		Analyst: EM
Gasoline	ND	6.08	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
Gasoline Range Organics (C6-C12)	16.3	6.08	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
Surr: Toluene-d8	97.2	65 - 135	H	%Rec	1	11/29/2018 1:07:00 PM
Surr: 4-Bromofluorobenzene	102	65 - 135	H	%Rec	1	11/29/2018 1:07:00 PM

NOTES:
GRO - Indicates the presence of unresolved compounds eluting from toluene to dodecane (~C6-C12).

Client: GeoEngineers
Collection Date: 11/13/2018 12:20:00 PM
Project: Rufus Block 18
Lab ID: 1811281-003
Matrix: Soil
Client Sample ID: **TP-3-2.5**

Volatile Organic Compounds by EPA Method 8260C

Batch ID: 22768 Analyst: EM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dichlorodifluoromethane (CFC-12)	ND	0.0243	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
Chloromethane	ND	0.0608	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
Vinyl chloride	ND	0.0304	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
Bromomethane	ND	0.0608	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
Trichlorofluoromethane (CFC-11)	ND	0.0243	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
Chloroethane	ND	0.0608	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
1,1-Dichloroethene	ND	0.0243	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
Methylene chloride	ND	0.0243	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
trans-1,2-Dichloroethene	ND	0.0243	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
Methyl tert-butyl ether (MTBE)	ND	0.0608	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
1,1-Dichloroethane	ND	0.0243	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
2,2-Dichloropropane	ND	0.122	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
cis-1,2-Dichloroethene	ND	0.0243	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
Chloroform	ND	0.0243	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
1,1,1-Trichloroethane (TCA)	ND	0.0304	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
1,1-Dichloropropene	ND	0.0243	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
Carbon tetrachloride	ND	0.0304	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
1,2-Dichloroethane (EDC)	ND	0.0243	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
Benzene	ND	0.0243	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
Trichloroethene (TCE)	ND	0.0243	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
1,2-Dichloropropane	ND	0.0243	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
Bromodichloromethane	ND	0.0243	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
Dibromomethane	ND	0.0243	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
cis-1,3-Dichloropropene	ND	0.0243	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
Toluene	ND	0.0243	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
trans-1,3-Dichloropropylene	ND	0.0243	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
1,1,2-Trichloroethane	ND	0.0243	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
1,3-Dichloropropane	ND	0.0304	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
Tetrachloroethene (PCE)	ND	0.0304	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
Dibromochloromethane	ND	0.0304	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
1,2-Dibromoethane (EDB)	ND	0.00608	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
Chlorobenzene	ND	0.0304	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
1,1,1,2-Tetrachloroethane	ND	0.0304	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
Ethylbenzene	ND	0.0304	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
m,p-Xylene	ND	0.0608	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
o-Xylene	ND	0.0304	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
Styrene	ND	0.0304	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
Isopropylbenzene	ND	0.0304	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
Bromoform	ND	0.0608	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM

Client: GeoEngineers
Collection Date: 11/13/2018 12:20:00 PM
Project: Rufus Block 18
Lab ID: 1811281-003
Matrix: Soil
Client Sample ID: **TP-3-2.5**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Volatile Organic Compounds by EPA Method 8260C				Batch ID: 22768		Analyst: EM
1,1,2,2-Tetrachloroethane	ND	0.0243	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
n-Propylbenzene	ND	0.0304	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
Bromobenzene	ND	0.0243	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
1,3,5-Trimethylbenzene	ND	0.0304	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
2-Chlorotoluene	ND	0.0304	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
4-Chlorotoluene	ND	0.0304	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
tert-Butylbenzene	ND	0.0304	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
1,2,3-Trichloropropane	ND	0.0304	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
1,2,4-Trichlorobenzene	ND	0.0304	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
sec-Butylbenzene	ND	0.0608	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
4-Isopropyltoluene	ND	0.0608	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
1,3-Dichlorobenzene	ND	0.0243	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
1,4-Dichlorobenzene	ND	0.0243	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
n-Butylbenzene	ND	0.0304	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
1,2-Dichlorobenzene	ND	0.0243	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
1,2-Dibromo-3-chloropropane	ND	0.608	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
1,2,4-Trimethylbenzene	ND	0.0243	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
Hexachlorobutadiene	ND	0.0608	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
Naphthalene	ND	0.0608	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
1,2,3-Trichlorobenzene	ND	0.0243	H	mg/Kg-dry	1	11/29/2018 1:07:00 PM
Surr: Dibromofluoromethane	95.9	56.5 - 129	H	%Rec	1	11/29/2018 1:07:00 PM
Surr: Toluene-d8	98.6	64.5 - 151	H	%Rec	1	11/29/2018 1:07:00 PM
Surr: 1-Bromo-4-fluorobenzene	98.0	54.8 - 168	H	%Rec	1	11/29/2018 1:07:00 PM
Mercury by EPA Method 7471				Batch ID: 22719		Analyst: TN
Mercury	ND	0.252		mg/Kg-dry	1	11/26/2018 1:19:09 PM
Total Metals by EPA Method 6020				Batch ID: 22717		Analyst: WC
Arsenic	1.89	0.213		mg/Kg-dry	1	11/26/2018 2:40:12 PM
Cadmium	ND	0.170		mg/Kg-dry	1	11/26/2018 2:40:12 PM
Chromium	26.4	0.0850		mg/Kg-dry	1	11/26/2018 2:40:12 PM
Lead	1.55	0.170		mg/Kg-dry	1	11/26/2018 2:40:12 PM
Sample Moisture (Percent Moisture)				Batch ID: R47787		Analyst: EAS
Percent Moisture	8.12	0.500		wt%	1	11/20/2018 3:55:02 PM

Analytical Report

Work Order: **1811281**
Date Reported: **12/4/2018**

Client: GeoEngineers
Collection Date: 11/13/2018 12:28:00 PM
Project: Rufus Block 18
Lab ID: 1811281-004
Matrix: Soil
Client Sample ID: **TP-3-5.0**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Gasoline by NWTPH-Gx				Batch ID: 22815		Analyst: CR
Gasoline	ND	4.96	H	mg/Kg-dry	1	12/4/2018 6:32:56 AM
Surr: Toluene-d8	99.2	65 - 135	H	%Rec	1	12/4/2018 6:32:56 AM
Surr: 4-Bromofluorobenzene	97.6	65 - 135	H	%Rec	1	12/4/2018 6:32:56 AM
Sample Moisture (Percent Moisture)				Batch ID: R48055		Analyst: SS
Percent Moisture	8.06	0.500		wt%	1	12/4/2018 8:39:07 AM

Client: GeoEngineers
Collection Date: 11/13/2018 12:36:00 PM
Project: Rufus Block 18
Lab ID: 1811281-005
Matrix: Soil
Client Sample ID: **TP-4-2.5**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.				Batch ID: 22702		Analyst: DW
Diesel (Fuel Oil)	ND	21.1		mg/Kg-dry	1	11/22/2018 9:42:32 PM
Heavy Oil	ND	52.8		mg/Kg-dry	1	11/22/2018 9:42:32 PM
Surr: 2-Fluorobiphenyl	82.7	50 - 150		%Rec	1	11/22/2018 9:42:32 PM
Surr: o-Terphenyl	80.9	50 - 150		%Rec	1	11/22/2018 9:42:32 PM
Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)				Batch ID: 22710		Analyst: IH
Naphthalene	ND	40.1		µg/Kg-dry	1	11/27/2018 3:06:00 PM
2-Methylnaphthalene	ND	40.1		µg/Kg-dry	1	11/27/2018 3:06:00 PM
1-Methylnaphthalene	ND	40.1		µg/Kg-dry	1	11/27/2018 3:06:00 PM
Acenaphthylene	ND	40.1		µg/Kg-dry	1	11/27/2018 3:06:00 PM
Acenaphthene	ND	40.1		µg/Kg-dry	1	11/27/2018 3:06:00 PM
Fluorene	ND	40.1		µg/Kg-dry	1	11/27/2018 3:06:00 PM
Phenanthrene	ND	40.1		µg/Kg-dry	1	11/27/2018 3:06:00 PM
Anthracene	ND	40.1		µg/Kg-dry	1	11/27/2018 3:06:00 PM
Fluoranthene	ND	40.1		µg/Kg-dry	1	11/27/2018 3:06:00 PM
Pyrene	ND	40.1		µg/Kg-dry	1	11/27/2018 3:06:00 PM
Benz(a)anthracene	ND	40.1	Q	µg/Kg-dry	1	11/27/2018 3:06:00 PM
Chrysene	ND	40.1		µg/Kg-dry	1	11/27/2018 3:06:00 PM
Benzo(b)fluoranthene	ND	40.1		µg/Kg-dry	1	11/27/2018 3:06:00 PM
Benzo(k)fluoranthene	ND	40.1		µg/Kg-dry	1	11/27/2018 3:06:00 PM
Benzo(a)pyrene	ND	40.1		µg/Kg-dry	1	11/27/2018 3:06:00 PM
Indeno(1,2,3-cd)pyrene	ND	40.1		µg/Kg-dry	1	11/27/2018 3:06:00 PM
Dibenz(a,h)anthracene	ND	40.1		µg/Kg-dry	1	11/27/2018 3:06:00 PM
Benzo(g,h,i)perylene	ND	40.1		µg/Kg-dry	1	11/27/2018 3:06:00 PM
Surr: 2-Fluorobiphenyl	62.3	12.5 - 140		%Rec	1	11/27/2018 3:06:00 PM
Surr: Terphenyl-d14 (surr)	120	45.7 - 172		%Rec	1	11/27/2018 3:06:00 PM

NOTES:
Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria

Gasoline by NWTPH-Gx				Batch ID: 22768		Analyst: EM
Gasoline	ND	5.47	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM
Surr: Toluene-d8	99.6	65 - 135	H	%Rec	1	11/29/2018 1:38:25 PM
Surr: 4-Bromofluorobenzene	98.8	65 - 135	H	%Rec	1	11/29/2018 1:38:25 PM
Volatile Organic Compounds by EPA Method 8260C				Batch ID: 22768		Analyst: EM
Dichlorodifluoromethane (CFC-12)	ND	0.0219	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM

Client: GeoEngineers
Collection Date: 11/13/2018 12:36:00 PM
Project: Rufus Block 18
Lab ID: 1811281-005
Matrix: Soil
Client Sample ID: **TP-4-2.5**

Volatile Organic Compounds by EPA Method 8260C

Batch ID: 22768 Analyst: EM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Chloromethane	ND	0.0547	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM
Vinyl chloride	ND	0.0273	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM
Bromomethane	ND	0.0547	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM
Trichlorofluoromethane (CFC-11)	ND	0.0219	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM
Chloroethane	ND	0.0547	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM
1,1-Dichloroethene	ND	0.0219	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM
Methylene chloride	ND	0.0219	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM
trans-1,2-Dichloroethene	ND	0.0219	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM
Methyl tert-butyl ether (MTBE)	ND	0.0547	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM
1,1-Dichloroethane	ND	0.0219	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM
2,2-Dichloropropane	ND	0.109	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM
cis-1,2-Dichloroethene	ND	0.0219	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM
Chloroform	ND	0.0219	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM
1,1,1-Trichloroethane (TCA)	ND	0.0273	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM
1,1-Dichloropropene	ND	0.0219	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM
Carbon tetrachloride	ND	0.0273	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM
1,2-Dichloroethane (EDC)	ND	0.0219	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM
Benzene	ND	0.0219	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM
Trichloroethene (TCE)	ND	0.0219	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM
1,2-Dichloropropane	ND	0.0219	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM
Bromodichloromethane	ND	0.0219	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM
Dibromomethane	ND	0.0219	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM
cis-1,3-Dichloropropene	ND	0.0219	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM
Toluene	ND	0.0219	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM
trans-1,3-Dichloropropylene	ND	0.0219	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM
1,1,2-Trichloroethane	ND	0.0219	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM
1,3-Dichloropropane	ND	0.0273	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM
Tetrachloroethene (PCE)	ND	0.0273	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM
Dibromochloromethane	ND	0.0273	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM
1,2-Dibromoethane (EDB)	ND	0.00547	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM
Chlorobenzene	ND	0.0273	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM
1,1,1,2-Tetrachloroethane	ND	0.0273	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM
Ethylbenzene	ND	0.0273	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM
m,p-Xylene	ND	0.0547	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM
o-Xylene	ND	0.0273	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM
Styrene	ND	0.0273	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM
Isopropylbenzene	ND	0.0273	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM
Bromoform	ND	0.0547	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM
1,1,2,2-Tetrachloroethane	ND	0.0219	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM

Client: GeoEngineers
Collection Date: 11/13/2018 12:36:00 PM
Project: Rufus Block 18
Lab ID: 1811281-005
Matrix: Soil
Client Sample ID: **TP-4-2.5**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Volatile Organic Compounds by EPA Method 8260C				Batch ID: 22768		Analyst: EM
n-Propylbenzene	ND	0.0273	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM
Bromobenzene	ND	0.0219	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM
1,3,5-Trimethylbenzene	ND	0.0273	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM
2-Chlorotoluene	ND	0.0273	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM
4-Chlorotoluene	ND	0.0273	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM
tert-Butylbenzene	ND	0.0273	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM
1,2,3-Trichloropropane	ND	0.0273	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM
1,2,4-Trichlorobenzene	ND	0.0273	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM
sec-Butylbenzene	ND	0.0547	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM
4-Isopropyltoluene	ND	0.0547	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM
1,3-Dichlorobenzene	ND	0.0219	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM
1,4-Dichlorobenzene	ND	0.0219	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM
n-Butylbenzene	ND	0.0273	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM
1,2-Dichlorobenzene	ND	0.0219	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM
1,2-Dibromo-3-chloropropane	ND	0.547	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM
1,2,4-Trimethylbenzene	ND	0.0219	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM
Hexachlorobutadiene	ND	0.0547	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM
Naphthalene	ND	0.0547	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM
1,2,3-Trichlorobenzene	ND	0.0219	H	mg/Kg-dry	1	11/29/2018 1:38:25 PM
Surr: Dibromofluoromethane	96.6	56.5 - 129	H	%Rec	1	11/29/2018 1:38:25 PM
Surr: Toluene-d8	99.7	64.5 - 151	H	%Rec	1	11/29/2018 1:38:25 PM
Surr: 1-Bromo-4-fluorobenzene	95.8	54.8 - 168	H	%Rec	1	11/29/2018 1:38:25 PM
Mercury by EPA Method 7471				Batch ID: 22719		Analyst: TN
Mercury	ND	0.245		mg/Kg-dry	1	11/26/2018 1:20:47 PM
Total Metals by EPA Method 6020				Batch ID: 22717		Analyst: WC
Arsenic	2.04	0.206		mg/Kg-dry	1	11/26/2018 2:52:19 PM
Cadmium	ND	0.165		mg/Kg-dry	1	11/26/2018 2:52:19 PM
Chromium	49.7	0.0824		mg/Kg-dry	1	11/26/2018 2:52:19 PM
Lead	1.40	0.165		mg/Kg-dry	1	11/26/2018 2:52:19 PM
Sample Moisture (Percent Moisture)				Batch ID: R47787		Analyst: EAS
Percent Moisture	8.75	0.500		wt%	1	11/20/2018 3:55:02 PM

Client: GeoEngineers
Collection Date: 11/13/2018 12:55:00 PM
Project: Rufus Block 18
Lab ID: 1811281-007
Matrix: Soil
Client Sample ID: **TP-6-2.5**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.				Batch ID: 22702		Analyst: DW
Diesel (Fuel Oil)	ND	21.8		mg/Kg-dry	1	11/22/2018 10:12:45 PM
Heavy Oil	ND	54.5		mg/Kg-dry	1	11/22/2018 10:12:45 PM
Surr: 2-Fluorobiphenyl	80.9	50 - 150		%Rec	1	11/22/2018 10:12:45 PM
Surr: o-Terphenyl	78.9	50 - 150		%Rec	1	11/22/2018 10:12:45 PM
Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)				Batch ID: 22722		Analyst: SB
Naphthalene	ND	44.1		µg/Kg-dry	1	11/28/2018 5:20:52 AM
2-Methylnaphthalene	ND	44.1		µg/Kg-dry	1	11/28/2018 5:20:52 AM
1-Methylnaphthalene	ND	44.1		µg/Kg-dry	1	11/28/2018 5:20:52 AM
Acenaphthylene	ND	44.1		µg/Kg-dry	1	11/28/2018 5:20:52 AM
Acenaphthene	ND	44.1		µg/Kg-dry	1	11/28/2018 5:20:52 AM
Fluorene	ND	44.1		µg/Kg-dry	1	11/28/2018 5:20:52 AM
Phenanthrene	ND	44.1		µg/Kg-dry	1	11/28/2018 5:20:52 AM
Anthracene	ND	44.1		µg/Kg-dry	1	11/28/2018 5:20:52 AM
Fluoranthene	ND	44.1		µg/Kg-dry	1	11/28/2018 5:20:52 AM
Pyrene	ND	44.1		µg/Kg-dry	1	11/28/2018 5:20:52 AM
Benz(a)anthracene	ND	44.1		µg/Kg-dry	1	11/28/2018 5:20:52 AM
Chrysene	ND	44.1		µg/Kg-dry	1	11/28/2018 5:20:52 AM
Benzo(b)fluoranthene	ND	44.1		µg/Kg-dry	1	11/28/2018 5:20:52 AM
Benzo(k)fluoranthene	ND	44.1		µg/Kg-dry	1	11/28/2018 5:20:52 AM
Benzo(a)pyrene	ND	44.1		µg/Kg-dry	1	11/28/2018 5:20:52 AM
Indeno(1,2,3-cd)pyrene	ND	44.1		µg/Kg-dry	1	11/28/2018 5:20:52 AM
Dibenz(a,h)anthracene	ND	44.1		µg/Kg-dry	1	11/28/2018 5:20:52 AM
Benzo(g,h,i)perylene	ND	44.1		µg/Kg-dry	1	11/28/2018 5:20:52 AM
Surr: 2-Fluorobiphenyl	91.9	12.5 - 140		%Rec	1	11/28/2018 5:20:52 AM
Surr: Terphenyl-d14 (surr)	102	45.7 - 172		%Rec	1	11/28/2018 5:20:52 AM
Gasoline by NWTPH-Gx				Batch ID: 22768		Analyst: EM
Gasoline	ND	6.78	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM
Surr: Toluene-d8	97.9	65 - 135	H	%Rec	1	11/29/2018 2:09:52 PM
Surr: 4-Bromofluorobenzene	99.7	65 - 135	H	%Rec	1	11/29/2018 2:09:52 PM
Volatile Organic Compounds by EPA Method 8260C				Batch ID: 22768		Analyst: EM
Dichlorodifluoromethane (CFC-12)	ND	0.0271	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM
Chloromethane	ND	0.0678	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM
Vinyl chloride	ND	0.0339	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM

Client: GeoEngineers
Collection Date: 11/13/2018 12:55:00 PM
Project: Rufus Block 18
Lab ID: 1811281-007
Matrix: Soil
Client Sample ID: **TP-6-2.5**

Volatile Organic Compounds by EPA Method 8260C

Batch ID: 22768 Analyst: EM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Bromomethane	ND	0.0678	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM
Trichlorofluoromethane (CFC-11)	ND	0.0271	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM
Chloroethane	ND	0.0678	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM
1,1-Dichloroethene	ND	0.0271	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM
Methylene chloride	ND	0.0271	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM
trans-1,2-Dichloroethene	ND	0.0271	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM
Methyl tert-butyl ether (MTBE)	ND	0.0678	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM
1,1-Dichloroethane	ND	0.0271	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM
2,2-Dichloropropane	ND	0.136	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM
cis-1,2-Dichloroethene	ND	0.0271	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM
Chloroform	ND	0.0271	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM
1,1,1-Trichloroethane (TCA)	ND	0.0339	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM
1,1-Dichloropropene	ND	0.0271	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM
Carbon tetrachloride	ND	0.0339	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM
1,2-Dichloroethane (EDC)	ND	0.0271	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM
Benzene	ND	0.0271	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM
Trichloroethene (TCE)	ND	0.0271	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM
1,2-Dichloropropane	ND	0.0271	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM
Bromodichloromethane	ND	0.0271	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM
Dibromomethane	ND	0.0271	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM
cis-1,3-Dichloropropene	ND	0.0271	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM
Toluene	ND	0.0271	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM
trans-1,3-Dichloropropylene	ND	0.0271	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM
1,1,2-Trichloroethane	ND	0.0271	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM
1,3-Dichloropropane	ND	0.0339	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM
Tetrachloroethene (PCE)	ND	0.0339	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM
Dibromochloromethane	ND	0.0339	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM
1,2-Dibromoethane (EDB)	ND	0.00678	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM
Chlorobenzene	ND	0.0339	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM
1,1,1,2-Tetrachloroethane	ND	0.0339	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM
Ethylbenzene	ND	0.0339	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM
m,p-Xylene	ND	0.0678	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM
o-Xylene	ND	0.0339	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM
Styrene	ND	0.0339	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM
Isopropylbenzene	ND	0.0339	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM
Bromoform	ND	0.0678	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM
1,1,2,2-Tetrachloroethane	ND	0.0271	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM
n-Propylbenzene	ND	0.0339	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM
Bromobenzene	ND	0.0271	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM

Client: GeoEngineers
Collection Date: 11/13/2018 12:55:00 PM
Project: Rufus Block 18
Lab ID: 1811281-007
Matrix: Soil
Client Sample ID: **TP-6-2.5**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Volatile Organic Compounds by EPA Method 8260C				Batch ID: 22768		Analyst: EM
1,3,5-Trimethylbenzene	ND	0.0339	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM
2-Chlorotoluene	ND	0.0339	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM
4-Chlorotoluene	ND	0.0339	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM
tert-Butylbenzene	ND	0.0339	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM
1,2,3-Trichloropropane	ND	0.0339	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM
1,2,4-Trichlorobenzene	ND	0.0339	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM
sec-Butylbenzene	ND	0.0678	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM
4-Isopropyltoluene	ND	0.0678	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM
1,3-Dichlorobenzene	ND	0.0271	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM
1,4-Dichlorobenzene	ND	0.0271	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM
n-Butylbenzene	ND	0.0339	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM
1,2-Dichlorobenzene	ND	0.0271	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM
1,2-Dibromo-3-chloropropane	ND	0.678	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM
1,2,4-Trimethylbenzene	ND	0.0271	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM
Hexachlorobutadiene	ND	0.0678	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM
Naphthalene	ND	0.0678	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM
1,2,3-Trichlorobenzene	ND	0.0271	H	mg/Kg-dry	1	11/29/2018 2:09:52 PM
Surr: Dibromofluoromethane	96.7	56.5 - 129	H	%Rec	1	11/29/2018 2:09:52 PM
Surr: Toluene-d8	99.5	64.5 - 151	H	%Rec	1	11/29/2018 2:09:52 PM
Surr: 1-Bromo-4-fluorobenzene	96.7	54.8 - 168	H	%Rec	1	11/29/2018 2:09:52 PM
Mercury by EPA Method 7471				Batch ID: 22719		Analyst: TN
Mercury	ND	0.286		mg/Kg-dry	1	11/26/2018 1:22:26 PM
Total Metals by EPA Method 6020				Batch ID: 22717		Analyst: WC
Arsenic	1.38	0.214		mg/Kg-dry	1	11/26/2018 2:56:21 PM
Cadmium	ND	0.171		mg/Kg-dry	1	11/26/2018 2:56:21 PM
Chromium	27.0	0.0855		mg/Kg-dry	1	11/26/2018 2:56:21 PM
Lead	1.43	0.171		mg/Kg-dry	1	11/26/2018 2:56:21 PM
Sample Moisture (Percent Moisture)				Batch ID: R47808		Analyst: EAS
Percent Moisture	12.7	0.500		wt%	1	11/21/2018 8:48:25 AM

Work Order: 1811281
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Total Metals by EPA Method 6020

Sample ID	**MB-22717**	SampType: **MBLK**			Units: **mg/Kg**		Prep Date: **11/26/2018**		RunNo: **47865**		
Client ID:	**MBLKS**	Batch ID: **22717**					Analysis Date: **11/26/2018**		SeqNo: **934471**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	0.191									
Cadmium	ND	0.153									
Chromium	ND	0.0763									
Lead	ND	0.153									

Sample ID	**LCS-22717**	SampType: **LCS**			Units: **mg/Kg**		Prep Date: **11/26/2018**		RunNo: **47865**		
Client ID:	**LCSS**	Batch ID: **22717**					Analysis Date: **11/26/2018**		SeqNo: **934472**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	39.0	0.188	37.59	0	104	80	120				
Cadmium	1.92	0.150	1.880	0	102	80	120				
Chromium	40.8	0.0752	37.59	0	109	80	120				
Lead	19.7	0.150	18.80	0	105	80	120				

Sample ID	**1811173-001ADUP**	SampType: **DUP**			Units: **mg/Kg-dry**		Prep Date: **11/26/2018**		RunNo: **47865**		
Client ID:	**BATCH**	Batch ID: **22717**					Analysis Date: **11/26/2018**		SeqNo: **934476**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	5.54	0.252						5.251	5.26	20	
Cadmium	ND	0.201						0		20	
Chromium	69.6	0.101						67.31	3.30	20	
Lead	4.63	0.201						4.377	5.71	20	

Sample ID	**1811173-001AMS**	SampType: **MS**			Units: **mg/Kg-dry**		Prep Date: **11/26/2018**		RunNo: **47865**		
Client ID:	**BATCH**	Batch ID: **22717**					Analysis Date: **11/26/2018**		SeqNo: **934478**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	50.6	0.254	50.76	5.251	89.3	75	125				
Cadmium	2.44	0.203	2.538	0.1800	89.1	75	125				

Work Order: 1811281
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Total Metals by EPA Method 6020

Sample ID **1811173-001AMS** SampType: **MS** Units: **mg/Kg-dry** Prep Date: **11/26/2018** RunNo: **47865**
Client ID: **BATCH** Batch ID: **22717** Analysis Date: **11/26/2018** SeqNo: **934478**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	112	0.102	50.76	67.31	87.8	75	125				
Lead	24.0	0.203	25.38	4.377	77.4	75	125				

Sample ID **1811173-001AMSD** SampType: **MSD** Units: **mg/Kg-dry** Prep Date: **11/26/2018** RunNo: **47865**
Client ID: **BATCH** Batch ID: **22717** Analysis Date: **11/26/2018** SeqNo: **934479**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	52.7	0.254	50.76	5.251	93.5	75	125	50.56	4.18	20	
Cadmium	2.62	0.203	2.538	0.1800	96.3	75	125	2.443	7.14	20	
Chromium	115	0.102	50.76	67.31	94.3	75	125	111.9	2.91	20	
Lead	25.4	0.203	25.38	4.377	82.7	75	125	24.02	5.49	20	

Work Order: 1811281
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Mercury by EPA Method 7471

Sample ID	MB-22719	SampType:	MBLK			Units:	mg/Kg	Prep Date:	11/26/2018		RunNo:	47854	
Client ID:	MBLKS	Batch ID:	22719					Analysis Date:	11/26/2018		SeqNo:	934216	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Mercury		ND	0.219										

Sample ID	LCS-22719	SampType:	LCS			Units:	mg/Kg	Prep Date:	11/26/2018		RunNo:	47854	
Client ID:	LCSS	Batch ID:	22719					Analysis Date:	11/26/2018		SeqNo:	934217	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Mercury		0.456	0.227	0.4545	0	100	80	120					

Sample ID	1811254-002ADUP	SampType:	DUP			Units:	mg/Kg-dry	Prep Date:	11/26/2018		RunNo:	47854	
Client ID:	BATCH	Batch ID:	22719					Analysis Date:	11/26/2018		SeqNo:	934178	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Mercury		ND	0.304						0		20		

Sample ID	1811254-002AMS	SampType:	MS			Units:	mg/Kg-dry	Prep Date:	11/26/2018		RunNo:	47854	
Client ID:	BATCH	Batch ID:	22719					Analysis Date:	11/26/2018		SeqNo:	934179	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Mercury		0.592	0.310	0.6196	0.05564	86.6	70	130					

Sample ID	1811254-002AMSD	SampType:	MSD			Units:	mg/Kg-dry	Prep Date:	11/26/2018		RunNo:	47854	
Client ID:	BATCH	Batch ID:	22719					Analysis Date:	11/26/2018		SeqNo:	934180	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Mercury		0.602	0.315	0.6309	0.05564	86.6	70	130	0.5924	1.59	20		

Work Order: 1811281
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Sample ID **MB-22702**	SampType: **MBLK**	Units: **mg/Kg**	Prep Date: **11/20/2018**	RunNo: **47862**
Client ID: **MBLKS**	Batch ID: **22702**		Analysis Date: **11/22/2018**	SeqNo: **934385**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel (Fuel Oil)	ND	20.0									
Heavy Oil	ND	50.0									
Surr: 2-Fluorobiphenyl	16.8		20.00		84.2	50	150				
Surr: o-Terphenyl	16.7		20.00		83.4	50	150				

Sample ID **LCS-22702**	SampType: **LCS**	Units: **mg/Kg**	Prep Date: **11/20/2018**	RunNo: **47862**
Client ID: **LCSS**	Batch ID: **22702**		Analysis Date: **11/22/2018**	SeqNo: **934386**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel (Fuel Oil)	564	20.0	500.0	0	113	65	135				
Surr: 2-Fluorobiphenyl	18.6		20.00		92.8	50	150				
Surr: o-Terphenyl	17.4		20.00		87.0	50	150				

Sample ID **1811273-003ADUP**	SampType: **DUP**	Units: **mg/Kg-dry**	Prep Date: **11/20/2018**	RunNo: **47862**
Client ID: **BATCH**	Batch ID: **22702**		Analysis Date: **11/22/2018**	SeqNo: **934388**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel (Fuel Oil)	ND	19.5						0		30	
Heavy Oil	ND	48.8						0		30	
Surr: 2-Fluorobiphenyl	16.1		19.54		82.2	50	150		0		
Surr: o-Terphenyl	15.7		19.54		80.1	50	150		0		

Sample ID **1811273-003AMS**	SampType: **MS**	Units: **mg/Kg-dry**	Prep Date: **11/20/2018**	RunNo: **47862**
Client ID: **BATCH**	Batch ID: **22702**		Analysis Date: **11/22/2018**	SeqNo: **934389**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel (Fuel Oil)	484	18.2	455.8	0	106	65	135				
Surr: 2-Fluorobiphenyl	16.5		18.23		90.5	50	150				
Surr: o-Terphenyl	14.7		18.23		80.5	50	150				

Work Order: 1811281
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Sample ID **1811273-003AMS** SampType: **MS** Units: **mg/Kg-dry** Prep Date: **11/20/2018** RunNo: **47862**
Client ID: **BATCH** Batch ID: **22702** Analysis Date: **11/22/2018** SeqNo: **934389**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Sample ID **1811273-003AMSD** SampType: **MSD** Units: **mg/Kg-dry** Prep Date: **11/20/2018** RunNo: **47862**
Client ID: **BATCH** Batch ID: **22702** Analysis Date: **11/22/2018** SeqNo: **934390**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel (Fuel Oil)	510	18.5	461.3	0	110	65	135	484.5	5.04	30	
Surr: 2-Fluorobiphenyl	17.1		18.45		92.9	50	150		0		
Surr: o-Terphenyl	15.4		18.45		83.5	50	150		0		

Sample ID **1811282-011ADUP** SampType: **DUP** Units: **mg/Kg-dry** Prep Date: **11/20/2018** RunNo: **47862**
Client ID: **BATCH** Batch ID: **22702** Analysis Date: **11/23/2018** SeqNo: **934407**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel (Fuel Oil)	ND	22.2						0		30	
Heavy Oil	ND	55.5						0		30	
Surr: 2-Fluorobiphenyl	16.2		22.20		72.9	50	150		0		
Surr: o-Terphenyl	16.0		22.20		72.2	50	150		0		

Work Order: 1811281
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID **MB-22710**	SampType: **MBLK**	Units: **µg/Kg**	Prep Date: **11/21/2018**	RunNo: **47897**
Client ID: **MBLKS**	Batch ID: **22710**		Analysis Date: **11/27/2018**	SeqNo: **935185**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	40.0									
2-Methylnaphthalene	ND	40.0									
1-Methylnaphthalene	ND	40.0									
Acenaphthylene	ND	40.0									
Acenaphthene	ND	40.0									
Fluorene	ND	40.0									
Phenanthrene	ND	40.0									
Anthracene	ND	40.0									
Fluoranthene	ND	40.0									
Pyrene	ND	40.0									
Benz(a)anthracene	ND	40.0									Q
Chrysene	ND	40.0									
Benzo(b)fluoranthene	ND	40.0									
Benzo(k)fluoranthene	ND	40.0									
Benzo(a)pyrene	ND	40.0									
Indeno(1,2,3-cd)pyrene	ND	40.0									
Dibenz(a,h)anthracene	ND	40.0									
Benzo(g,h,i)perylene	ND	40.0									
Surr: 2-Fluorobiphenyl	481		500.0		96.3	12.5	140				
Surr: Terphenyl-d14 (surr)	729		500.0		146	45.7	172				

NOTES:
Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria

Sample ID **LCS-22710**	SampType: **LCS**	Units: **µg/Kg**	Prep Date: **11/21/2018**	RunNo: **47897**
Client ID: **LCSS**	Batch ID: **22710**		Analysis Date: **11/27/2018**	SeqNo: **935186**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	917	40.0	1,000	0	91.7	50.6	131				
2-Methylnaphthalene	914	40.0	1,000	0	91.4	45.1	135				
1-Methylnaphthalene	970	40.0	1,000	0	97.0	46.2	133				
Acenaphthylene	952	40.0	1,000	0	95.2	32.8	136				

Work Order: 1811281
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID **LCS-22710** SampType: **LCS** Units: **µg/Kg** Prep Date: **11/21/2018** RunNo: **47897**
Client ID: **LCSS** Batch ID: **22710** Analysis Date: **11/27/2018** SeqNo: **935186**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Acenaphthene	953	40.0	1,000	0	95.3	42	137				
Fluorene	968	40.0	1,000	0	96.8	41.4	144				
Phenanthrene	974	40.0	1,000	0	97.4	36.6	141				
Anthracene	955	40.0	1,000	0	95.5	42.5	157				
Fluoranthene	1,010	40.0	1,000	0	101	43.4	144				
Pyrene	1,050	40.0	1,000	0	105	39.6	146				
Benz(a)anthracene	867	40.0	1,000	0	86.7	36.6	142				
Chrysene	999	40.0	1,000	0	99.9	43	165				
Benzo(b)fluoranthene	937	40.0	1,000	0	93.7	41	155				
Benzo(k)fluoranthene	1,040	40.0	1,000	0	104	30.6	164				
Benzo(a)pyrene	955	40.0	1,000	0	95.5	30.2	171				
Indeno(1,2,3-cd)pyrene	956	40.0	1,000	0	95.6	31.3	159				
Dibenz(a,h)anthracene	939	40.0	1,000	0	93.9	28	158				
Benzo(g,h,i)perylene	988	40.0	1,000	0	98.8	32.4	144				
Surr: 2-Fluorobiphenyl	715		500.0		143	12.5	140				S
Surr: Terphenyl-d14 (surr)	815		500.0		163	45.7	172				

NOTES:
S - Outlying surrogate recovery(ies) observed. All other laboratory and field samples recovered within range.

Sample ID **1811262-009ADUP** SampType: **DUP** Units: **µg/Kg-dry** Prep Date: **11/21/2018** RunNo: **47897**
Client ID: **BATCH** Batch ID: **22710** Analysis Date: **11/27/2018** SeqNo: **935188**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	61.0	50.1						96.78	45.4	30	
2-Methylnaphthalene	119	50.1						200.3	50.9	30	R
1-Methylnaphthalene	184	50.1						256.7	33.3	30	R
Acenaphthylene	ND	50.1						0		30	
Acenaphthene	ND	50.1						0		30	
Fluorene	ND	50.1						0		30	
Phenanthrene	84.6	50.1						134.8	45.7	30	R
Anthracene	ND	50.1						0		30	

Work Order: 1811281
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID **1811262-009ADUP** SampType: **DUP** Units: **µg/Kg-dry** Prep Date: **11/21/2018** RunNo: **47897**
Client ID: **BATCH** Batch ID: **22710** Analysis Date: **11/27/2018** SeqNo: **935188**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoranthene	51.6	50.1						84.56	48.4	30	
Pyrene	ND	50.1						61.57	46.6	30	
Benz(a)anthracene	ND	50.1						0		30	Q
Chrysene	ND	50.1						0		30	
Benzo(b)fluoranthene	ND	50.1						0		30	
Benzo(k)fluoranthene	ND	50.1						0		30	
Benzo(a)pyrene	ND	50.1						0		30	
Indeno(1,2,3-cd)pyrene	ND	50.1						0		30	
Dibenz(a,h)anthracene	ND	50.1						0		30	
Benzo(g,h,i)perylene	ND	50.1						0		30	
Surr: 2-Fluorobiphenyl	547		626.7		87.3	12.5	140		0		
Surr: Terphenyl-d14 (surr)	729		626.7		116	45.7	172		0		

NOTES:
R - High RPD due to suspected sample inhomogeneity.
Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria

Sample ID **1811262-009AMS** SampType: **MS** Units: **µg/Kg-dry** Prep Date: **11/21/2018** RunNo: **47897**
Client ID: **BATCH** Batch ID: **22710** Analysis Date: **11/27/2018** SeqNo: **935189**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	808	46.9	1,172	96.78	60.6	42.9	138				
2-Methylnaphthalene	916	46.9	1,172	200.3	61.1	42.8	151				
1-Methylnaphthalene	1,030	46.9	1,172	256.7	65.8	41.6	148				
Acenaphthylene	763	46.9	1,172	16.00	63.7	32.6	160				
Acenaphthene	783	46.9	1,172	6.760	66.2	31.7	126				
Fluorene	808	46.9	1,172	19.56	67.2	43.4	153				
Phenanthrene	947	46.9	1,172	134.8	69.3	23.8	135				
Anthracene	818	46.9	1,172	29.97	67.2	32.6	160				
Fluoranthene	993	46.9	1,172	84.56	77.5	28	144				
Pyrene	974	46.9	1,172	61.57	77.8	27.8	141				
Benz(a)anthracene	780	46.9	1,172	30.45	63.9	34.9	139				

Work Order: 1811281
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID **1811262-009AMS** SampType: **MS** Units: **µg/Kg-dry** Prep Date: **11/21/2018** RunNo: **47897**
Client ID: **BATCH** Batch ID: **22710** Analysis Date: **11/27/2018** SeqNo: **935189**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chrysene	797	46.9	1,172	36.81	64.9	45.2	146				
Benzo(b)fluoranthene	835	46.9	1,172	22.08	69.3	42.2	168				
Benzo(k)fluoranthene	696	46.9	1,172	11.01	58.4	20.5	150				
Benzo(a)pyrene	713	46.9	1,172	9.578	60.0	34.4	179				
Indeno(1,2,3-cd)pyrene	674	46.9	1,172	10.55	56.6	11.8	140				
Dibenz(a,h)anthracene	672	46.9	1,172	0	57.4	17.3	156				
Benzo(g,h,i)perylene	652	46.9	1,172	8.793	54.9	24.9	119				
Surr: 2-Fluorobiphenyl	543		586.1		92.6	12.5	140				
Surr: Terphenyl-d14 (surr)	676		586.1		115	45.7	172				

Sample ID **1811262-009AMSD** SampType: **MSD** Units: **µg/Kg-dry** Prep Date: **11/21/2018** RunNo: **47897**
Client ID: **BATCH** Batch ID: **22710** Analysis Date: **11/27/2018** SeqNo: **935190**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	693	50.1	1,253	96.78	47.6	42.9	138	807.6	15.2	30	
2-Methylnaphthalene	763	50.1	1,253	200.3	44.9	42.8	151	916.0	18.3	30	
1-Methylnaphthalene	851	50.1	1,253	256.7	47.4	41.6	148	1,028	18.8	30	
Acenaphthylene	711	50.1	1,253	16.00	55.4	32.6	160	762.7	7.08	30	
Acenaphthene	715	50.1	1,253	6.760	56.5	31.7	126	782.6	8.98	30	
Fluorene	732	50.1	1,253	19.56	56.8	43.4	153	807.7	9.89	30	
Phenanthrene	783	50.1	1,253	134.8	51.8	23.8	135	946.7	18.9	30	
Anthracene	744	50.1	1,253	29.97	56.9	32.6	160	817.9	9.52	30	
Fluoranthene	796	50.1	1,253	84.56	56.7	28	144	993.0	22.1	30	
Pyrene	820	50.1	1,253	61.57	60.5	27.8	141	974.0	17.1	30	
Benz(a)anthracene	682	50.1	1,253	30.45	52.0	34.9	139	780.0	13.3	30	
Chrysene	717	50.1	1,253	36.81	54.2	45.2	146	797.1	10.6	30	
Benzo(b)fluoranthene	675	50.1	1,253	22.08	52.1	42.2	168	835.0	21.1	30	
Benzo(k)fluoranthene	758	50.1	1,253	11.01	59.6	20.5	150	695.9	8.55	30	
Benzo(a)pyrene	712	50.1	1,253	9.578	56.0	34.4	179	712.9	0.141	30	
Indeno(1,2,3-cd)pyrene	669	50.1	1,253	10.55	52.5	11.8	140	674.2	0.809	30	

Work Order: 1811281
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID **1811262-009AMSD** SampType: **MSD** Units: **µg/Kg-dry** Prep Date: **11/21/2018** RunNo: **47897**
Client ID: **BATCH** Batch ID: **22710** Analysis Date: **11/27/2018** SeqNo: **935190**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dibenz(a,h)anthracene	668	50.1	1,253	0	53.3	17.3	156	672.3	0.630	30	
Benzo(g,h,i)perylene	676	50.1	1,253	8.793	53.2	24.9	119	652.3	3.51	30	
Surr: 2-Fluorobiphenyl	475		626.7		75.7	12.5	140		0		
Surr: Terphenyl-d14 (surr)	598		626.7		95.4	45.7	172		0		

Sample ID **MB-22722** SampType: **MBLK** Units: **µg/Kg** Prep Date: **11/26/2018** RunNo: **47926**
Client ID: **MBLKS** Batch ID: **22722** Analysis Date: **11/28/2018** SeqNo: **935815**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	40.0									
2-Methylnaphthalene	ND	40.0									
1-Methylnaphthalene	ND	40.0									
Acenaphthylene	ND	40.0									
Acenaphthene	ND	40.0									
Fluorene	ND	40.0									
Phenanthrene	ND	40.0									
Anthracene	ND	40.0									
Fluoranthene	ND	40.0									
Pyrene	ND	40.0									
Benz(a)anthracene	ND	40.0									
Chrysene	ND	40.0									
Benzo(b)fluoranthene	ND	40.0									
Benzo(k)fluoranthene	ND	40.0									
Benzo(a)pyrene	ND	40.0									
Indeno(1,2,3-cd)pyrene	ND	40.0									
Dibenz(a,h)anthracene	ND	40.0									
Benzo(g,h,i)perylene	ND	40.0									
Surr: 2-Fluorobiphenyl	501		500.0		100	12.5	140				
Surr: Terphenyl-d14 (surr)	620		500.0		124	45.7	172				

Work Order: 1811281
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID **LCS-22722** SampType: **LCS** Units: **µg/Kg** Prep Date: **11/26/2018** RunNo: **47926**
Client ID: **LCSS** Batch ID: **22722** Analysis Date: **11/28/2018** SeqNo: **935816**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	942	40.0	1,000	0	94.2	50.6	131				
2-Methylnaphthalene	945	40.0	1,000	0	94.5	45.1	135				
1-Methylnaphthalene	920	40.0	1,000	0	92.0	46.2	133				
Acenaphthylene	946	40.0	1,000	0	94.6	32.8	136				
Acenaphthene	931	40.0	1,000	0	93.1	42	137				
Fluorene	937	40.0	1,000	0	93.7	41.4	144				
Phenanthrene	905	40.0	1,000	0	90.5	36.6	141				
Anthracene	914	40.0	1,000	0	91.4	42.5	157				
Fluoranthene	937	40.0	1,000	0	93.7	43.4	144				
Pyrene	921	40.0	1,000	0	92.1	39.6	146				
Benz(a)anthracene	938	40.0	1,000	0	93.8	36.6	142				
Chrysene	962	40.0	1,000	0	96.2	43	165				
Benzo(b)fluoranthene	1,030	40.0	1,000	0	103	41	155				
Benzo(k)fluoranthene	871	40.0	1,000	0	87.1	30.6	164				
Benzo(a)pyrene	919	40.0	1,000	0	91.9	30.2	171				
Indeno(1,2,3-cd)pyrene	916	40.0	1,000	0	91.6	31.3	159				
Dibenz(a,h)anthracene	926	40.0	1,000	0	92.6	28	158				
Benzo(g,h,i)perylene	914	40.0	1,000	0	91.4	32.4	144				
Surr: 2-Fluorobiphenyl	617		500.0		123	12.5	140				
Surr: Terphenyl-d14 (surr)	675		500.0		135	45.7	172				

Sample ID **1811281-007ADUP** SampType: **DUP** Units: **µg/Kg-dry** Prep Date: **11/26/2018** RunNo: **47926**
Client ID: **TP-6-2.5** Batch ID: **22722** Analysis Date: **11/28/2018** SeqNo: **935818**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	39.1						0		30	
2-Methylnaphthalene	ND	39.1						0		30	
1-Methylnaphthalene	ND	39.1						0		30	
Acenaphthylene	ND	39.1						0		30	
Acenaphthene	ND	39.1						0		30	

Work Order: 1811281
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID **1811281-007ADUP** SampType: **DUP** Units: **µg/Kg-dry** Prep Date: **11/26/2018** RunNo: **47926**
Client ID: **TP-6-2.5** Batch ID: **22722** Analysis Date: **11/28/2018** SeqNo: **935818**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluorene	ND	39.1						0		30	
Phenanthrene	ND	39.1						0		30	
Anthracene	ND	39.1						0		30	
Fluoranthene	ND	39.1						0		30	
Pyrene	ND	39.1						0		30	
Benz(a)anthracene	ND	39.1						0		30	
Chrysene	ND	39.1						0		30	
Benzo(b)fluoranthene	ND	39.1						0		30	
Benzo(k)fluoranthene	ND	39.1						0		30	
Benzo(a)pyrene	ND	39.1						0		30	
Indeno(1,2,3-cd)pyrene	ND	39.1						0		30	
Dibenz(a,h)anthracene	ND	39.1						0		30	
Benzo(g,h,i)perylene	ND	39.1						0		30	
Surr: 2-Fluorobiphenyl	443		489.3		90.6	12.5	140		0		
Surr: Terphenyl-d14 (surr)	532		489.3		109	45.7	172		0		

Sample ID **1811281-007AMS** SampType: **MS** Units: **µg/Kg-dry** Prep Date: **11/26/2018** RunNo: **47926**
Client ID: **TP-6-2.5** Batch ID: **22722** Analysis Date: **11/28/2018** SeqNo: **935819**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	875	43.7	1,092	0	80.1	42.9	138				
2-Methylnaphthalene	871	43.7	1,092	0	79.7	42.8	151				
1-Methylnaphthalene	856	43.7	1,092	0	78.3	41.6	148				
Acenaphthylene	878	43.7	1,092	0	80.4	32.6	160				
Acenaphthene	877	43.7	1,092	0	80.3	31.7	126				
Fluorene	866	43.7	1,092	1.797	79.1	43.4	153				
Phenanthrene	844	43.7	1,092	0	77.3	23.8	135				
Anthracene	857	43.7	1,092	2.434	78.3	32.6	160				
Fluoranthene	882	43.7	1,092	0	80.7	28	144				
Pyrene	867	43.7	1,092	0	79.4	27.8	141				

Work Order: 1811281
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID **1811281-007AMS** SampType: **MS** Units: **µg/Kg-dry** Prep Date: **11/26/2018** RunNo: **47926**
Client ID: **TP-6-2.5** Batch ID: **22722** Analysis Date: **11/28/2018** SeqNo: **935819**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benz(a)anthracene	868	43.7	1,092	6.474	78.8	34.9	139				
Chrysene	925	43.7	1,092	6.301	84.1	45.2	146				
Benzo(b)fluoranthene	900	43.7	1,092	0	82.4	42.2	168				
Benzo(k)fluoranthene	874	43.7	1,092	0	80.0	20.5	150				
Benzo(a)pyrene	851	43.7	1,092	0	77.9	34.4	179				
Indeno(1,2,3-cd)pyrene	820	43.7	1,092	0	75.1	11.8	140				
Dibenz(a,h)anthracene	814	43.7	1,092	0	74.5	17.3	156				
Benzo(g,h,i)perylene	791	43.7	1,092	0	72.4	24.9	119				
Surr: 2-Fluorobiphenyl	531		546.2		97.2	12.5	140				
Surr: Terphenyl-d14 (surr)	576		546.2		105	45.7	172				

Sample ID **1811281-007AMSD** SampType: **MSD** Units: **µg/Kg-dry** Prep Date: **11/26/2018** RunNo: **47926**
Client ID: **TP-6-2.5** Batch ID: **22722** Analysis Date: **11/28/2018** SeqNo: **935820**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	747	43.0	1,076	0	69.4	42.9	138	875.3	15.9	30	
2-Methylnaphthalene	736	43.0	1,076	0	68.4	42.8	151	870.9	16.8	30	
1-Methylnaphthalene	727	43.0	1,076	0	67.5	41.6	148	855.8	16.3	30	
Acenaphthylene	738	43.0	1,076	0	68.6	32.6	160	877.9	17.3	30	
Acenaphthene	746	43.0	1,076	0	69.3	31.7	126	877.2	16.2	30	
Fluorene	736	43.0	1,076	1.797	68.2	43.4	153	865.6	16.2	30	
Phenanthrene	728	43.0	1,076	0	67.7	23.8	135	844.2	14.8	30	
Anthracene	727	43.0	1,076	2.434	67.3	32.6	160	857.4	16.5	30	
Fluoranthene	774	43.0	1,076	0	71.9	28	144	881.6	13.0	30	
Pyrene	758	43.0	1,076	0	70.5	27.8	141	867.1	13.4	30	
Benz(a)anthracene	758	43.0	1,076	6.474	69.8	34.9	139	867.7	13.5	30	
Chrysene	818	43.0	1,076	6.301	75.4	45.2	146	924.9	12.3	30	
Benzo(b)fluoranthene	779	43.0	1,076	0	72.4	42.2	168	900.0	14.4	30	
Benzo(k)fluoranthene	777	43.0	1,076	0	72.2	20.5	150	873.8	11.8	30	
Benzo(a)pyrene	745	43.0	1,076	0	69.3	34.4	179	851.1	13.2	30	

Work Order: 1811281
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID **1811281-007AMSD** SampType: **MSD** Units: **µg/Kg-dry** Prep Date: **11/26/2018** RunNo: **47926**
Client ID: **TP-6-2.5** Batch ID: **22722** Analysis Date: **11/28/2018** SeqNo: **935820**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Indeno(1,2,3-cd)pyrene	713	43.0	1,076	0	66.3	11.8	140	820.0	14.0	30	
Dibenz(a,h)anthracene	725	43.0	1,076	0	67.4	17.3	156	813.6	11.5	30	
Benzo(g,h,i)perylene	702	43.0	1,076	0	65.2	24.9	119	791.1	12.0	30	
Surr: 2-Fluorobiphenyl	445		538.0		82.7	12.5	140		0		
Surr: Terphenyl-d14 (surr)	513		538.0		95.4	45.7	172		0		

Work Order: 1811281
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Gasoline by NWTPH-Gx

Sample ID	**LCS-22768**	SampType: **LCS**		Units: **mg/Kg**		Prep Date: **11/29/2018**		RunNo: **47969**			
Client ID:	**LCSS**	Batch ID: **22768**				Analysis Date: **11/29/2018**		SeqNo: **936811**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline	23.6	5.00	25.00	0	94.4	65	135				
Surr: Toluene-d8	1.24		1.250		99.4	65	135				
Surr: 4-Bromofluorobenzene	1.22		1.250		98.0	65	135				

Sample ID	**MB-22768**	SampType: **MBLK**		Units: **mg/Kg**		Prep Date: **11/29/2018**		RunNo: **47969**			
Client ID:	**MBLKS**	Batch ID: **22768**				Analysis Date: **11/29/2018**		SeqNo: **936812**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline	ND	5.00									
Surr: Toluene-d8	1.22		1.250		97.7	65	135				
Surr: 4-Bromofluorobenzene	1.23		1.250		98.3	65	135				

Sample ID	**1811281-001BDUP**	SampType: **DUP**		Units: **mg/Kg-dry**		Prep Date: **11/29/2018**		RunNo: **47969**			
Client ID:	**TP-1-2.5**	Batch ID: **22768**				Analysis Date: **11/29/2018**		SeqNo: **936797**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline	ND	5.88						0		30	H
Gasoline Range Organics (C6-C12)	26.0	5.88						10.11	88.0	30	RH
Surr: Toluene-d8	1.45		1.470		98.8	65	135		0		H
Surr: 4-Bromofluorobenzene	1.46		1.470		99.2	65	135		0		H

NOTES:
GRO - Indicates the presence of unresolved compounds eluting from toluene to dodecane (~C6-C12).
R - High RPD due to suspected sample inhomogeneity. The method is in control as indicated by the Laboratory Control Sample (LCS).

Sample ID	**1811282-011BMS**	SampType: **MS**		Units: **mg/Kg-dry**		Prep Date: **11/29/2018**		RunNo: **47969**			
Client ID:	**BATCH**	Batch ID: **22768**				Analysis Date: **11/29/2018**		SeqNo: **936807**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline	37.8	6.67	33.35	0	113	65	135				
Surr: Toluene-d8	1.63		1.667		98.0	65	135				

Work Order: 1811281
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Gasoline by NWTPH-Gx

Sample ID	1811282-011BMS	SampType:	MS	Units:	mg/Kg-dry	Prep Date:	11/29/2018	RunNo:	47969
Client ID:	BATCH	Batch ID:	22768			Analysis Date:	11/29/2018	SeqNo:	936807

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: 4-Bromofluorobenzene	1.64		1.667		98.4	65	135				

Sample ID	1811282-011BMSD	SampType:	MSD	Units:	mg/Kg-dry	Prep Date:	11/29/2018	RunNo:	47969
Client ID:	BATCH	Batch ID:	22768			Analysis Date:	11/29/2018	SeqNo:	936808

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline	35.3	6.67	33.35	0	106	65	135	37.77	6.84	30	
Surr: Toluene-d8	1.64		1.667		98.3	65	135		0		
Surr: 4-Bromofluorobenzene	1.64		1.667		98.3	65	135		0		

Sample ID	LCS-22815	SampType:	LCS	Units:	mg/Kg	Prep Date:	12/3/2018	RunNo:	48068
Client ID:	LCSS	Batch ID:	22815			Analysis Date:	12/4/2018	SeqNo:	938823

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline	23.2	5.00	25.00	0	92.9	65	135				
Surr: Toluene-d8	1.24		1.250		98.9	65	135				
Surr: 4-Bromofluorobenzene	1.22		1.250		97.5	65	135				

Sample ID	MB-22815	SampType:	MBLK	Units:	mg/Kg	Prep Date:	12/3/2018	RunNo:	48068
Client ID:	MBLKS	Batch ID:	22815			Analysis Date:	12/4/2018	SeqNo:	938824

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline	ND	5.00									
Surr: Toluene-d8	1.23		1.250		98.6	65	135				
Surr: 4-Bromofluorobenzene	1.22		1.250		97.7	65	135				

Work Order: 1811281
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Gasoline by NWTPH-Gx

Sample ID **1811449-021BDUP** SampType: **DUP** Units: **mg/Kg-dry** Prep Date: **12/3/2018** RunNo: **48068**
Client ID: **BATCH** Batch ID: **22815** Analysis Date: **12/4/2018** SeqNo: **938812**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline	ND	4.70						0		30	
Surr: Toluene-d8	1.17		1.175		99.9	65	135		0		
Surr: 4-Bromofluorobenzene	1.15		1.175		97.6	65	135		0		

Sample ID **1811456-001BDUP** SampType: **DUP** Units: **mg/Kg-dry** Prep Date: **12/3/2018** RunNo: **48068**
Client ID: **BATCH** Batch ID: **22815** Analysis Date: **12/4/2018** SeqNo: **938817**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline	ND	5.30						0		30	
Surr: Toluene-d8	1.31		1.326		98.5	65	135		0		
Surr: 4-Bromofluorobenzene	1.31		1.326		98.5	65	135		0		

Sample ID **1811456-002BMS** SampType: **MS** Units: **mg/Kg-dry** Prep Date: **12/3/2018** RunNo: **48068**
Client ID: **BATCH** Batch ID: **22815** Analysis Date: **12/4/2018** SeqNo: **938953**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline	20.8	4.67	23.36	0	89.1	65	135				
Surr: Toluene-d8	1.13		1.168		97.1	65	135				
Surr: 4-Bromofluorobenzene	1.13		1.168		96.7	65	135				

Sample ID **1811456-002BMSD** SampType: **MSD** Units: **mg/Kg-dry** Prep Date: **12/3/2018** RunNo: **48068**
Client ID: **BATCH** Batch ID: **22815** Analysis Date: **12/4/2018** SeqNo: **938954**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline	21.7	4.67	23.36	0	93.0	65	135	20.81	4.29	30	
Surr: Toluene-d8	1.15		1.168		98.3	65	135		0		
Surr: 4-Bromofluorobenzene	1.14		1.168		97.2	65	135		0		

Work Order: 1811281
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID **LCS-22768** SampType: **LCS** Units: **mg/Kg** Prep Date: **11/29/2018** RunNo: **47968**
Client ID: **LCSS** Batch ID: **22768** Analysis Date: **11/29/2018** SeqNo: **936793**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dichlorodifluoromethane (CFC-12)	1.73	0.0200	1.000	0	173	14.3	167				S
Chloromethane	1.42	0.0500	1.000	0	142	32	156				
Vinyl chloride	1.27	0.0250	1.000	0	127	43.4	151				
Bromomethane	1.46	0.0500	1.000	0	146	35	155				
Trichlorofluoromethane (CFC-11)	1.48	0.0200	1.000	0	148	33.8	156				
Chloroethane	1.17	0.0500	1.000	0	117	33.1	147				
1,1-Dichloroethene	0.949	0.0200	1.000	0	94.9	30.9	145				
Methylene chloride	1.13	0.0200	1.000	0	113	46.3	140				
trans-1,2-Dichloroethene	1.11	0.0200	1.000	0	111	68	130				
Methyl tert-butyl ether (MTBE)	1.08	0.0500	1.000	0	108	44.1	152				
1,1-Dichloroethane	1.10	0.0200	1.000	0	110	61.9	137				
2,2-Dichloropropane	1.07	0.100	1.000	0	107	35.5	186				
cis-1,2-Dichloroethene	1.09	0.0200	1.000	0	109	71.3	135				
Chloroform	1.09	0.0200	1.000	0	109	69	145				
1,1,1-Trichloroethane (TCA)	1.07	0.0250	1.000	0	107	69	132				
1,1-Dichloropropene	1.07	0.0200	1.000	0	107	72.7	131				
Carbon tetrachloride	1.04	0.0250	1.000	0	104	63.4	137				
1,2-Dichloroethane (EDC)	1.11	0.0200	1.000	0	111	50.9	162				
Benzene	1.10	0.0200	1.000	0	110	64.3	133				
Trichloroethene (TCE)	1.05	0.0200	1.000	0	105	65.5	137				
1,2-Dichloropropane	1.07	0.0200	1.000	0	107	63.2	142				
Bromodichloromethane	1.01	0.0200	1.000	0	101	53.4	131				
Dibromomethane	1.06	0.0200	1.000	0	106	60.1	146				
cis-1,3-Dichloropropene	1.02	0.0200	1.000	0	102	59.1	143				
Toluene	1.07	0.0200	1.000	0	107	67	144				
trans-1,3-Dichloropropylene	0.989	0.0200	1.000	0	98.9	49.2	149				
1,1,2-Trichloroethane	1.07	0.0200	1.000	0	107	56.9	147				
1,3-Dichloropropane	1.06	0.0250	1.000	0	106	56.1	153				
Tetrachloroethene (PCE)	1.06	0.0250	1.000	0	106	52.7	150				
Dibromochloromethane	0.969	0.0250	1.000	0	96.9	70.6	144				
1,2-Dibromoethane (EDB)	1.05	0.00500	1.000	0	105	50.5	154				

Work Order: 1811281
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID **LCS-22768** SampType: **LCS** Units: **mg/Kg** Prep Date: **11/29/2018** RunNo: **47968**
Client ID: **LCSS** Batch ID: **22768** Analysis Date: **11/29/2018** SeqNo: **936793**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chlorobenzene	1.06	0.0250	1.000	0	106	84.9	125				
1,1,1,2-Tetrachloroethane	1.00	0.0250	1.000	0	100	65.9	141				
Ethylbenzene	1.13	0.0250	1.000	0	113	74	129				
m,p-Xylene	2.15	0.0500	2.000	0	107	70	124				
o-Xylene	1.03	0.0250	1.000	0	103	68.1	139				
Styrene	1.03	0.0250	1.000	0	103	73.3	146				
Isopropylbenzene	1.07	0.0250	1.000	0	107	70	130				
Bromoform	0.901	0.0500	1.000	0	90.1	44.3	130				
1,1,2,2-Tetrachloroethane	1.07	0.0200	1.000	0	107	44.8	165				
n-Propylbenzene	1.08	0.0250	1.000	0	108	75.8	139				
Bromobenzene	1.03	0.0200	1.000	0	103	49.2	144				
1,3,5-Trimethylbenzene	1.06	0.0250	1.000	0	106	76.5	135				
2-Chlorotoluene	1.16	0.0250	1.000	0	116	76.7	129				
4-Chlorotoluene	1.02	0.0250	1.000	0	102	77.5	125				
tert-Butylbenzene	1.02	0.0250	1.000	0	102	66.2	130				
1,2,3-Trichloropropane	0.977	0.0250	1.000	0	97.7	67.9	136				
1,2,4-Trichlorobenzene	1.07	0.0250	1.000	0	107	65.5	150				
sec-Butylbenzene	1.09	0.0500	1.000	0	109	75.6	133				
4-Isopropyltoluene	1.10	0.0500	1.000	0	110	76.8	131				
1,3-Dichlorobenzene	1.09	0.0200	1.000	0	109	48.6	144				
1,4-Dichlorobenzene	1.09	0.0200	1.000	0	109	72.6	126				
n-Butylbenzene	1.08	0.0250	1.000	0	108	78.4	140				
1,2-Dichlorobenzene	1.09	0.0200	1.000	0	109	72.8	126				
1,2-Dibromo-3-chloropropane	0.943	0.500	1.000	0	94.3	40.2	155				
1,2,4-Trimethylbenzene	1.07	0.0200	1.000	0	107	77.5	129				
Hexachlorobutadiene	1.09	0.0500	1.000	0	109	42	151				
Naphthalene	1.11	0.0500	1.000	0	111	46.5	167				
1,2,3-Trichlorobenzene	1.11	0.0200	1.000	0	111	64.5	149				
Surr: Dibromofluoromethane	1.29		1.250		103	56.5	129				
Surr: Toluene-d8	1.25		1.250		100	64.5	151				
Surr: 1-Bromo-4-fluorobenzene	1.20		1.250		96.2	54.8	168				

Work Order: 1811281
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID	**LCS-22768**	SampType:	**LCS**	Units:	**mg/Kg**	Prep Date:	**11/29/2018**	RunNo:	**47968**
Client ID:	**LCSS**	Batch ID:	**22768**			Analysis Date:	**11/29/2018**	SeqNo:	**936793**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

NOTES:
S - Outlying spike recovery observed (high bias). Samples are non-detect for this analyte; no further action required.

Sample ID	**MB-22768**	SampType:	**MBLK**	Units:	**mg/Kg**	Prep Date:	**11/29/2018**	RunNo:	**47968**
Client ID:	**MBLKS**	Batch ID:	**22768**			Analysis Date:	**11/29/2018**	SeqNo:	**936794**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dichlorodifluoromethane (CFC-12)	ND	0.0200									
Chloromethane	ND	0.0500									
Vinyl chloride	ND	0.0250									
Bromomethane	ND	0.0500									
Trichlorofluoromethane (CFC-11)	ND	0.0200									
Chloroethane	ND	0.0500									
1,1-Dichloroethene	ND	0.0200									
Methylene chloride	ND	0.0200									
trans-1,2-Dichloroethene	ND	0.0200									
Methyl tert-butyl ether (MTBE)	ND	0.0500									
1,1-Dichloroethane	ND	0.0200									
2,2-Dichloropropane	ND	0.100									
cis-1,2-Dichloroethene	ND	0.0200									
Chloroform	ND	0.0200									
1,1,1-Trichloroethane (TCA)	ND	0.0250									
1,1-Dichloropropene	ND	0.0200									
Carbon tetrachloride	ND	0.0250									
1,2-Dichloroethane (EDC)	ND	0.0200									
Benzene	ND	0.0200									
Trichloroethene (TCE)	ND	0.0200									
1,2-Dichloropropane	ND	0.0200									
Bromodichloromethane	ND	0.0200									
Dibromomethane	ND	0.0200									
cis-1,3-Dichloropropene	ND	0.0200									

Work Order: 1811281
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID **MB-22768** SampType: **MBLK** Units: **mg/Kg** Prep Date: **11/29/2018** RunNo: **47968**
Client ID: **MBLKS** Batch ID: **22768** Analysis Date: **11/29/2018** SeqNo: **936794**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Toluene	ND	0.0200									
trans-1,3-Dichloropropylene	ND	0.0200									
1,1,2-Trichloroethane	ND	0.0200									
1,3-Dichloropropane	ND	0.0250									
Tetrachloroethene (PCE)	ND	0.0250									
Dibromochloromethane	ND	0.0250									
1,2-Dibromoethane (EDB)	ND	0.00500									
Chlorobenzene	ND	0.0250									
1,1,1,2-Tetrachloroethane	ND	0.0250									
Ethylbenzene	ND	0.0250									
m,p-Xylene	ND	0.0500									
o-Xylene	ND	0.0250									
Styrene	ND	0.0250									
Isopropylbenzene	ND	0.0250									
Bromoform	ND	0.0500									
1,1,2,2-Tetrachloroethane	ND	0.0200									
n-Propylbenzene	ND	0.0250									
Bromobenzene	ND	0.0200									
1,3,5-Trimethylbenzene	ND	0.0250									
2-Chlorotoluene	ND	0.0250									
4-Chlorotoluene	ND	0.0250									
tert-Butylbenzene	ND	0.0250									
1,2,3-Trichloropropane	ND	0.0250									
1,2,4-Trichlorobenzene	ND	0.0250									
sec-Butylbenzene	ND	0.0500									
4-Isopropyltoluene	ND	0.0500									
1,3-Dichlorobenzene	ND	0.0200									
1,4-Dichlorobenzene	ND	0.0200									
n-Butylbenzene	ND	0.0250									
1,2-Dichlorobenzene	ND	0.0200									
1,2-Dibromo-3-chloropropane	ND	0.500									

Work Order: 1811281
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID **MB-22768** SampType: **MBLK** Units: **mg/Kg** Prep Date: **11/29/2018** RunNo: **47968**
Client ID: **MBLKS** Batch ID: **22768** Analysis Date: **11/29/2018** SeqNo: **936794**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trimethylbenzene	ND	0.0200									
Hexachlorobutadiene	ND	0.0500									
Naphthalene	ND	0.0500									
1,2,3-Trichlorobenzene	ND	0.0200									
Surr: Dibromofluoromethane	1.23		1.250		98.3	56.5	129				
Surr: Toluene-d8	1.24		1.250		99.5	64.5	151				
Surr: 1-Bromo-4-fluorobenzene	1.19		1.250		95.2	54.8	168				

Sample ID **1811281-001BDUP** SampType: **DUP** Units: **mg/Kg-dry** Prep Date: **11/29/2018** RunNo: **47968**
Client ID: **TP-1-2.5** Batch ID: **22768** Analysis Date: **11/29/2018** SeqNo: **936779**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dichlorodifluoromethane (CFC-12)	ND	0.0235						0		30	H
Chloromethane	ND	0.0588						0		30	H
Vinyl chloride	ND	0.0294						0		30	H
Bromomethane	ND	0.0588						0		30	H
Trichlorofluoromethane (CFC-11)	ND	0.0235						0		30	H
Chloroethane	ND	0.0588						0		30	H
1,1-Dichloroethene	ND	0.0235						0		30	H
Methylene chloride	ND	0.0235						0		30	H
trans-1,2-Dichloroethene	ND	0.0235						0		30	H
Methyl tert-butyl ether (MTBE)	ND	0.0588						0		30	H
1,1-Dichloroethane	ND	0.0235						0		30	H
2,2-Dichloropropane	ND	0.118						0		30	H
cis-1,2-Dichloroethene	ND	0.0235						0		30	H
Chloroform	ND	0.0235						0		30	H
1,1,1-Trichloroethane (TCA)	ND	0.0294						0		30	H
1,1-Dichloropropene	ND	0.0235						0		30	H
Carbon tetrachloride	ND	0.0294						0		30	H
1,2-Dichloroethane (EDC)	ND	0.0235						0		30	H

Work Order: 1811281
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID **1811281-001BDUP** SampType: **DUP** Units: **mg/Kg-dry** Prep Date: **11/29/2018** RunNo: **47968**
Client ID: **TP-1-2.5** Batch ID: **22768** Analysis Date: **11/29/2018** SeqNo: **936779**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	ND	0.0235						0		30	H
Trichloroethene (TCE)	ND	0.0235						0		30	H
1,2-Dichloropropane	ND	0.0235						0		30	H
Bromodichloromethane	ND	0.0235						0		30	H
Dibromomethane	ND	0.0235						0		30	H
cis-1,3-Dichloropropene	ND	0.0235						0		30	H
Toluene	ND	0.0235						0		30	H
trans-1,3-Dichloropropylene	ND	0.0235						0		30	H
1,1,2-Trichloroethane	ND	0.0235						0		30	H
1,3-Dichloropropane	ND	0.0294						0		30	H
Tetrachloroethene (PCE)	ND	0.0294						0		30	H
Dibromochloromethane	ND	0.0294						0		30	H
1,2-Dibromoethane (EDB)	ND	0.00588						0		30	H
Chlorobenzene	ND	0.0294						0		30	H
1,1,1,2-Tetrachloroethane	ND	0.0294						0		30	H
Ethylbenzene	ND	0.0294						0		30	H
m,p-Xylene	ND	0.0588						0		30	H
o-Xylene	ND	0.0294						0		30	H
Styrene	ND	0.0294						0		30	H
Isopropylbenzene	ND	0.0294						0		30	H
Bromoform	ND	0.0588						0		30	H
1,1,2,2-Tetrachloroethane	ND	0.0235						0		30	H
n-Propylbenzene	ND	0.0294						0		30	H
Bromobenzene	ND	0.0235						0		30	H
1,3,5-Trimethylbenzene	ND	0.0294						0		30	H
2-Chlorotoluene	ND	0.0294						0		30	H
4-Chlorotoluene	ND	0.0294						0		30	H
tert-Butylbenzene	ND	0.0294						0		30	H
1,2,3-Trichloropropane	ND	0.0294						0		30	H
1,2,4-Trichlorobenzene	ND	0.0294						0		30	H
sec-Butylbenzene	ND	0.0588						0		30	H

Work Order: 1811281
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID **1811281-001BDUP** SampType: **DUP** Units: **mg/Kg-dry** Prep Date: **11/29/2018** RunNo: **47968**
Client ID: **TP-1-2.5** Batch ID: **22768** Analysis Date: **11/29/2018** SeqNo: **936779**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4-Isopropyltoluene	ND	0.0588						0		30	H
1,3-Dichlorobenzene	ND	0.0235						0		30	H
1,4-Dichlorobenzene	ND	0.0235						0		30	H
n-Butylbenzene	ND	0.0294						0		30	H
1,2-Dichlorobenzene	ND	0.0235						0		30	H
1,2-Dibromo-3-chloropropane	ND	0.588						0		30	H
1,2,4-Trimethylbenzene	ND	0.0235						0		30	H
Hexachlorobutadiene	ND	0.0588						0		30	H
Naphthalene	ND	0.0588						0		30	H
1,2,3-Trichlorobenzene	ND	0.0235						0		30	H
Surr: Dibromofluoromethane	1.43		1.470		97.6	56.5	129		0		H
Surr: Toluene-d8	1.47		1.470		99.9	64.5	151		0		H
Surr: 1-Bromo-4-fluorobenzene	1.41		1.470		95.7	54.8	168		0		H

Sample ID **1811281-003BMS** SampType: **MS** Units: **mg/Kg-dry** Prep Date: **11/29/2018** RunNo: **47968**
Client ID: **TP-3-2.5** Batch ID: **22768** Analysis Date: **11/29/2018** SeqNo: **936781**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dichlorodifluoromethane (CFC-12)	2.26	0.0243	1.216	0	186	43.5	121				SH
Chloromethane	1.65	0.0608	1.216	0	136	45	130				SH
Vinyl chloride	1.68	0.0304	1.216	0	138	43.6	150				H
Bromomethane	1.82	0.0608	1.216	0	150	21.3	120				SH
Trichlorofluoromethane (CFC-11)	2.05	0.0243	1.216	0	168	35	131				SH
Chloroethane	1.59	0.0608	1.216	0	130	31.9	123				SH
1,1-Dichloroethene	1.43	0.0243	1.216	0	118	47.3	147				H
Methylene chloride	1.43	0.0243	1.216	0	118	54.7	142				H
trans-1,2-Dichloroethene	1.41	0.0243	1.216	0	116	52	136				H
Methyl tert-butyl ether (MTBE)	1.30	0.0608	1.216	0	107	58.5	167				H
1,1-Dichloroethane	1.41	0.0243	1.216	0	116	51.8	141				H
2,2-Dichloropropane	1.13	0.122	1.216	0	93.2	36	123				H

Work Order: 1811281
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID **1811281-003BMS** SampType: **MS** Units: **mg/Kg-dry** Prep Date: **11/29/2018** RunNo: **47968**
Client ID: **TP-3-2.5** Batch ID: **22768** Analysis Date: **11/29/2018** SeqNo: **936781**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
cis-1,2-Dichloroethene	1.37	0.0243	1.216	0	113	58.6	136				H
Chloroform	1.38	0.0243	1.216	0	113	53.2	129				H
1,1,1-Trichloroethane (TCA)	1.39	0.0304	1.216	0	114	58.3	145				H
1,1-Dichloropropene	1.42	0.0243	1.216	0	116	55.1	138				H
Carbon tetrachloride	1.33	0.0304	1.216	0	110	53.3	144				H
1,2-Dichloroethane (EDC)	1.39	0.0243	1.216	0	114	51.3	139				H
Benzene	1.39	0.0243	1.216	0	114	63.5	133				H
Trichloroethene (TCE)	1.36	0.0243	1.216	0	112	61.6	147				H
1,2-Dichloropropane	1.35	0.0243	1.216	0	111	59	136				H
Bromodichloromethane	1.23	0.0243	1.216	0	101	50.7	141				H
Dibromomethane	1.34	0.0243	1.216	0	110	50.6	137				H
cis-1,3-Dichloropropene	1.21	0.0243	1.216	0	99.4	50.4	138				H
Toluene	1.36	0.0243	1.216	0	111	63.4	132				H
trans-1,3-Dichloropropylene	1.16	0.0243	1.216	0	95.6	44.1	147				H
1,1,2-Trichloroethane	1.33	0.0243	1.216	0	109	51.6	137				H
1,3-Dichloropropane	1.32	0.0304	1.216	0	109	53.1	134				H
Tetrachloroethene (PCE)	1.37	0.0304	1.216	0	113	35.6	158				H
Dibromochloromethane	1.16	0.0304	1.216	0	95.8	55.3	140				H
1,2-Dibromoethane (EDB)	1.31	0.00608	1.216	0	107	50.4	136				H
Chlorobenzene	1.34	0.0304	1.216	0	110	60	133				H
1,1,1,2-Tetrachloroethane	1.26	0.0304	1.216	0	104	53.1	142				H
Ethylbenzene	1.44	0.0304	1.216	0	119	54.5	134				H
m,p-Xylene	2.75	0.0608	2.431	0.01885	112	53.1	132				H
o-Xylene	1.32	0.0304	1.216	0	108	53.3	139				H
Styrene	1.31	0.0304	1.216	0	107	51.1	132				H
Isopropylbenzene	1.37	0.0304	1.216	0	113	58.9	138				H
Bromoform	1.06	0.0608	1.216	0	87.5	57.9	130				H
1,1,2,2-Tetrachloroethane	1.28	0.0243	1.216	0	106	51.9	131				H
n-Propylbenzene	1.39	0.0304	1.216	0	115	53.6	140				H
Bromobenzene	1.28	0.0243	1.216	0	105	54.2	140				H
1,3,5-Trimethylbenzene	1.35	0.0304	1.216	0	111	51.8	136				H

Work Order: 1811281
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID **1811281-003BMS** SampType: **MS** Units: **mg/Kg-dry** Prep Date: **11/29/2018** RunNo: **47968**
Client ID: **TP-3-2.5** Batch ID: **22768** Analysis Date: **11/29/2018** SeqNo: **936781**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
2-Chlorotoluene	1.46	0.0304	1.216	0	120	51.6	136				H
4-Chlorotoluene	1.29	0.0304	1.216	0	106	50.1	139				H
tert-Butylbenzene	1.33	0.0304	1.216	0	110	50.5	135				H
1,2,3-Trichloropropane	1.16	0.0304	1.216	0	95.8	50.5	131				H
1,2,4-Trichlorobenzene	1.27	0.0304	1.216	0	105	50.8	130				H
sec-Butylbenzene	1.45	0.0608	1.216	0	119	52.6	141				H
4-Isopropyltoluene	1.42	0.0608	1.216	0	117	52.9	134				H
1,3-Dichlorobenzene	1.34	0.0243	1.216	0	110	52.6	131				H
1,4-Dichlorobenzene	1.34	0.0243	1.216	0	110	52.9	129				H
n-Butylbenzene	1.35	0.0304	1.216	0	111	52.6	130				H
1,2-Dichlorobenzene	1.33	0.0243	1.216	0	109	55.8	129				H
1,2-Dibromo-3-chloropropane	1.11	0.608	1.216	0	91.0	40.5	131				H
1,2,4-Trimethylbenzene	1.39	0.0243	1.216	0	114	50.6	137				H
Hexachlorobutadiene	1.35	0.0608	1.216	0	111	40.6	158				H
Naphthalene	1.30	0.0608	1.216	0	107	52.3	124				H
1,2,3-Trichlorobenzene	1.29	0.0243	1.216	0	106	54.4	124				H
Surr: Dibromofluoromethane	1.54		1.520		101	56.5	129				H
Surr: Toluene-d8	1.52		1.520		100	64.5	151				H
Surr: 1-Bromo-4-fluorobenzene	1.47		1.520		96.5	54.8	168				H

NOTES:
S - Outlying spike recovery observed (high bias).

Sample ID **1811281-003BMSD** SampType: **MSD** Units: **mg/Kg-dry** Prep Date: **11/29/2018** RunNo: **47968**
Client ID: **TP-3-2.5** Batch ID: **22768** Analysis Date: **11/29/2018** SeqNo: **936782**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dichlorodifluoromethane (CFC-12)	2.25	0.0243	1.216	0	185	43.5	121	2.259	0.382	30	SH
Chloromethane	1.72	0.0608	1.216	0	141	45	130	1.650	3.97	30	SH
Vinyl chloride	1.66	0.0304	1.216	0	136	43.6	150	1.675	0.976	30	H
Bromomethane	1.84	0.0608	1.216	0	151	21.3	120	1.818	1.05	30	SH
Trichlorofluoromethane (CFC-11)	1.98	0.0243	1.216	0	163	35	131	2.046	3.49	30	SH

Work Order: 1811281
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID **1811281-003BMSD** SampType: **MSD** Units: **mg/Kg-dry** Prep Date: **11/29/2018** RunNo: **47968**
Client ID: **TP-3-2.5** Batch ID: **22768** Analysis Date: **11/29/2018** SeqNo: **936782**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloroethane	1.55	0.0608	1.216	0	128	31.9	123	1.586	2.17	30	SH
1,1-Dichloroethene	1.45	0.0243	1.216	0	119	47.3	147	1.431	1.42	30	H
Methylene chloride	1.39	0.0243	1.216	0	114	54.7	142	1.434	3.00	30	H
trans-1,2-Dichloroethene	1.39	0.0243	1.216	0	114	52	136	1.409	1.45	30	H
Methyl tert-butyl ether (MTBE)	1.27	0.0608	1.216	0	104	58.5	167	1.304	2.66	30	H
1,1-Dichloroethane	1.38	0.0243	1.216	0	113	51.8	141	1.409	2.19	30	H
2,2-Dichloropropane	1.10	0.122	1.216	0	90.3	36	123	1.132	3.08	30	H
cis-1,2-Dichloroethene	1.33	0.0243	1.216	0	109	58.6	136	1.369	3.01	30	H
Chloroform	1.34	0.0243	1.216	0	110	53.2	129	1.379	3.05	30	H
1,1,1-Trichloroethane (TCA)	1.35	0.0304	1.216	0	111	58.3	145	1.386	2.26	30	H
1,1-Dichloropropene	1.37	0.0243	1.216	0	113	55.1	138	1.415	3.41	30	H
Carbon tetrachloride	1.33	0.0304	1.216	0	109	53.3	144	1.332	0.0680	30	H
1,2-Dichloroethane (EDC)	1.33	0.0243	1.216	0	109	51.3	139	1.388	4.59	30	H
Benzene	1.34	0.0243	1.216	0	110	63.5	133	1.391	3.89	30	H
Trichloroethene (TCE)	1.31	0.0243	1.216	0	108	61.6	147	1.358	3.69	30	H
1,2-Dichloropropane	1.29	0.0243	1.216	0	106	59	136	1.346	4.56	30	H
Bromodichloromethane	1.21	0.0243	1.216	0	99.7	50.7	141	1.231	1.52	30	H
Dibromomethane	1.27	0.0243	1.216	0	105	50.6	137	1.340	4.96	30	H
cis-1,3-Dichloropropene	1.17	0.0243	1.216	0	96.2	50.4	138	1.208	3.21	30	H
Toluene	1.32	0.0243	1.216	0	109	63.4	132	1.355	2.49	30	H
trans-1,3-Dichloropropylene	1.12	0.0243	1.216	0	92.3	44.1	147	1.162	3.52	30	H
1,1,2-Trichloroethane	1.26	0.0243	1.216	0	104	51.6	137	1.328	4.90	30	H
1,3-Dichloropropane	1.26	0.0304	1.216	0	104	53.1	134	1.321	4.63	30	H
Tetrachloroethene (PCE)	1.32	0.0304	1.216	0	109	35.6	158	1.374	3.87	30	H
Dibromochloromethane	1.15	0.0304	1.216	0	94.4	55.3	140	1.164	1.42	30	H
1,2-Dibromoethane (EDB)	1.24	0.00608	1.216	0	102	50.4	136	1.305	4.97	30	H
Chlorobenzene	1.30	0.0304	1.216	0	107	60	133	1.341	3.07	30	H
1,1,1,2-Tetrachloroethane	1.22	0.0304	1.216	0	101	53.1	142	1.260	2.90	30	H
Ethylbenzene	1.41	0.0304	1.216	0	116	54.5	134	1.444	2.50	30	H
m,p-Xylene	2.68	0.0608	2.431	0.01885	110	53.1	132	2.752	2.61	30	H
o-Xylene	1.28	0.0304	1.216	0	105	53.3	139	1.316	2.82	30	H

Work Order: 1811281
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID **1811281-003BMSD** SampType: **MSD** Units: **mg/Kg-dry** Prep Date: **11/29/2018** RunNo: **47968**
Client ID: **TP-3-2.5** Batch ID: **22768** Analysis Date: **11/29/2018** SeqNo: **936782**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Styrene	1.27	0.0304	1.216	0	105	51.1	132	1.307	2.78	30	H
Isopropylbenzene	1.34	0.0304	1.216	0	111	58.9	138	1.375	2.22	30	H
Bromoform	1.05	0.0608	1.216	0	86.3	57.9	130	1.063	1.30	30	H
1,1,2,2-Tetrachloroethane	1.26	0.0243	1.216	0	104	51.9	131	1.284	1.76	30	H
n-Propylbenzene	1.36	0.0304	1.216	0	112	53.6	140	1.393	2.64	30	H
Bromobenzene	1.24	0.0243	1.216	0	102	54.2	140	1.280	3.00	30	H
1,3,5-Trimethylbenzene	1.33	0.0304	1.216	0	109	51.8	136	1.353	2.00	30	H
2-Chlorotoluene	1.43	0.0304	1.216	0	118	51.6	136	1.459	2.08	30	H
4-Chlorotoluene	1.27	0.0304	1.216	0	104	50.1	139	1.292	2.06	30	H
tert-Butylbenzene	1.33	0.0304	1.216	0	110	50.5	135	1.334	0.178	30	H
1,2,3-Trichloropropane	1.06	0.0304	1.216	0	87.5	50.5	131	1.164	9.02	30	H
1,2,4-Trichlorobenzene	1.31	0.0304	1.216	0	107	50.8	130	1.274	2.46	30	H
sec-Butylbenzene	1.42	0.0608	1.216	0	117	52.6	141	1.447	1.68	30	H
4-Isopropyltoluene	1.40	0.0608	1.216	0	115	52.9	134	1.422	1.84	30	H
1,3-Dichlorobenzene	1.33	0.0243	1.216	0	109	52.6	131	1.340	0.935	30	H
1,4-Dichlorobenzene	1.32	0.0243	1.216	0	109	52.9	129	1.341	1.33	30	H
n-Butylbenzene	1.35	0.0304	1.216	0	111	52.6	130	1.353	0.452	30	H
1,2-Dichlorobenzene	1.32	0.0243	1.216	0	109	55.8	129	1.328	0.457	30	H
1,2-Dibromo-3-chloropropane	1.11	0.608	1.216	0	90.9	40.5	131	1.106	0.0593	30	H
1,2,4-Trimethylbenzene	1.37	0.0243	1.216	0	113	50.6	137	1.387	0.965	30	H
Hexachlorobutadiene	1.41	0.0608	1.216	0	116	40.6	158	1.350	4.68	30	H
Naphthalene	1.33	0.0608	1.216	0	109	52.3	124	1.303	2.08	30	H
1,2,3-Trichlorobenzene	1.33	0.0243	1.216	0	109	54.4	124	1.294	2.80	30	H
Surr: Dibromofluoromethane	1.56		1.520		102	56.5	129		0		H
Surr: Toluene-d8	1.50		1.520		98.9	64.5	151		0		H
Surr: 1-Bromo-4-fluorobenzene	1.46		1.520		96.3	54.8	168		0		H

NOTES:
S - Outlying spike recovery observed (high bias).

Work Order: 1811281
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Sample Moisture (Percent Moisture)

Sample ID	1811263-009ADUP	SampType:	DUP			Units:	wt%	Prep Date:	11/20/2018	RunNo:	47787	
Client ID:	BATCH	Batch ID:	R47787					Analysis Date:	11/20/2018	SeqNo:	932140	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Percent Moisture	12.2	0.500						11.30	7.30	20		

Sample ID	1811264-001ADUP	SampType:	DUP			Units:	wt%	Prep Date:	11/20/2018	RunNo:	47787	
Client ID:	BATCH	Batch ID:	R47787					Analysis Date:	11/20/2018	SeqNo:	932142	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Percent Moisture	9.60	0.500						10.38	7.81	20		

Sample ID	1811281-007ADUP	SampType:	DUP			Units:	wt%	Prep Date:	11/21/2018	RunNo:	47808	
Client ID:	TP-6-2.5	Batch ID:	R47808					Analysis Date:	11/21/2018	SeqNo:	932751	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Percent Moisture	13.1	0.500						12.74	2.82	20		

Sample ID	1811282-001ADUP	SampType:	DUP			Units:	wt%	Prep Date:	11/21/2018	RunNo:	47808	
Client ID:	BATCH	Batch ID:	R47808					Analysis Date:	11/21/2018	SeqNo:	932753	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Percent Moisture	23.3	0.500						21.93	6.23	20		

Sample ID	1811281-004ADUP	SampType:	DUP			Units:	wt%	Prep Date:	12/4/2018	RunNo:	48055	
Client ID:	TP-3-5.0	Batch ID:	R48055					Analysis Date:	12/4/2018	SeqNo:	938656	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Percent Moisture	7.76	0.500						8.057	3.79	20		

Sample Log-In Check List

Client Name:	**GEI**	Work Order Number:	**1811281**
Logged by:	**Brianna Barnes**	Date Received:	**11/13/2018 3:20:00 PM**

Chain of Custody

1.	Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2.	How was the sample delivered?	Client		

Log In

3.	Coolers are present?	Yes ☑	No ☐	NA ☐
4.	Shipping container/cooler in good condition?	Yes ☑	No ☐	
5.	Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact)	Yes ☐	No ☐	Not Required ☑
6.	Was an attempt made to cool the samples?	Yes ☐	No ☑	NA ☐
	Samples received straight from field			
7.	Were all items received at a temperature of >0°C to 10.0°C *	Yes ☐	No ☐	NA ☑
8.	Sample(s) in proper container(s)?	Yes ☑	No ☐	
9.	Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
10.	Are samples properly preserved?	Yes ☑	No ☐	
11.	Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
12.	Is there headspace in the VOA vials?	Yes ☐	No ☐	NA ☑
13.	Did all samples containers arrive in good condition(unbroken)?	Yes ☑	No ☐	
14.	Does paperwork match bottle labels?	Yes ☑	No ☐	
15.	Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
16.	Is it clear what analyses were requested?	Yes ☑	No ☐	
17.	Were all holding times able to be met?	Yes ☑	No ☐	

Special Handling (if applicable)

18.	Was client notified of all discrepancies with this order?	Yes ☐	No ☐	NA ☑

Person Notified: _____ Date _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

19. Additional remarks:

Item Information

Item #	Temp ºC
Cooler	13.9
Sample	15.8
Temp Blank	12.8

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

Fremont Analytical
3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Chain of Custody Record & Laboratory Services Agreement

Date: 11.13.18 Page: 1 of: 1
Project Name: Rufus Block 18
Project No: 20434-001-32
Collected by: A. Clauss
Location: Block 18
Report To (PM): Chris Brown
PM Email: cbrown@geoengineers.com

Laboratory Project No (internal): 1811201
Special Remarks: edits per CB 11/19/18 BMS STD TAT
Sample Disposal: ☐ Return to client ☐ Disposal by lab (after 30 days)

Client: GEI
Address:
City, State, Zip:
Telephone:
Fax:

	Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	VOCs (EPA 8260 / 624)	GX/BTEX	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	Diesel/Heavy Oil Range Organics (DX)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8)	Total (T) | Dissolved (D)	Anions (IC)***	EDB (8011)	Hold	Comments
1	TP-1-2.5	11.13.18	1153		X			X		X	X		X				X		
2	TP-1-5.0		1203														X		
3	TP-3-2.5		1220		X			X		X	X		X				X		
4	TP-3-5.0		1228														X		
5	TP-4-2.5		1236		X			X		X	X		X				X		
6	TP-4-5.0		1245														X		
7	TP-6-2.5		1255		X			X		X	X		X				X		
8	TP-6-5.0		1301														X		
9	TP-6-8.0	↓	1305														X		
10																			

*Matrix: A = Air, AQ = Aqueous, B = Bulk, O = Other, P = Product, S = Soil, SD = Sediment, SL = Solid, W = Water, DW = Drinking Water, GW = Ground Water, SW = Storm Water, WW = Waste Water

**Metals (Circle): MTCA-5 RCRA-8 Priority Pollutants TAL *Individual:* Ag Al As B Ba Be Ca Cd Co Cr Cu Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sr Sn Ti Tl U V Zn

***Anions (Circle): Nitrate Nitrite Chloride Sulfate Bromide O-Phosphate Fluoride Nitrate+Nitrite

I represent that I am authorized to enter into this Agreement with Fremont Analytical on behalf of the Client named above and that I have verified Client's agreement to each of the terms on the front and backside of this Agreement.

Relinquished	Date/Time	Received	Date/Time
x [signature]	11.13.18 1520	x [signature]	11/13/18 1520
Relinquished	Date/Time	Received	Date/Time
x		x	

Turn-around Time:
☐ Standard
☐ 3 Day
☐ 2 Day
☐ Next Day
Same Day _____ (specify)

Fremont Analytical
3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Chain of Custody Record & Laboratory Services Agreement

Date: 11.13.18 Page: 1 of: 1

Laboratory Project No (internal): 1811281

Project Name: Rufus Block 18

Special Remarks:

Project No: 20434-001-32

Next+Day TAT
@Add analysis per CB 12/3/18 BMB
edits per CB 11/19/18 BMB STD TAT

Collected by: A. Clauss

Location: Block 18

Sample Disposal: ☐ Return to client ☐ Disposal by lab (after 30 days)

Client: GEI

Address:

City, State, Zip:

Telephone:

Fax:

Report To (PM): Chris Brown

PM Email: cbrown@geoengineers.com

	Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	VOCs (EPA 8260 / 624)	GX/BTEX	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	Diesel/Heavy Oil Range Organics (DX)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8)	Total (T)	Dissolved (D)	Anions (IC)***	EDB (8011)	Hold				Comments
1	TP-1-2.5	11.13.18	1153		X			X		X		X	X					X					
2	TP-1-5.0		1203					(X)										X					
3	TP-3-2.5		1220		X			X		X		X	X					X					
4	TP-3-5.0		1228					(X)										X					
5	TP-4-2.5		1236		X			X		X		X	X					X					
6	TP-4-5.0		1245															X					
7	TP-6-2.5		1255		X			X		X		X	X					X					
8	TP-6-5.0		1301															X					
9	TP-6-8.0	↓	1305															X					
10																							

*Matrix: A = Air, AQ = Aqueous, B = Bulk, O = Other, P = Product, S = Soil, SD = Sediment, SL = Solid, W = Water, DW = Drinking Water, GW = Ground Water, SW = Storm Water, WW = Waste Water

**Metals (Circle): MTCA-5 RCRA-8 Priority Pollutants TAL *Individual:* Ag Al As B Ba Be Ca Cd Co Cr Cu Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sr Sn Ti Tl U V Zn

***Anions (Circle): Nitrate Nitrite Chloride Sulfate Bromide O-Phosphate Fluoride Nitrate+Nitrite

Turn-around Time:

☐ Standard
☐ 3 Day
☐ 2 Day
☐ Next Day
Same Day ____ (specify)

I represent that I am authorized to enter into this Agreement with Fremont Analytical on behalf of the Client named above and that I have verified Client's agreement to each of the terms on the front and backside of this Agreement.

Relinquished x [signature]	Date/Time 11.13.18 1520	Received x [signature]	Date/Time 11/13/18 1520
Relinquished x	Date/Time	Received x	Date/Time

3600 Fremont Ave. N.
Seattle, WA 98103
T: (206) 352-3790
F: (206) 352-7178
info@fremontanalytical.com

GeoEngineers
Chris Brown
2101 4th Ave, Suite 950
Seattle, WA 98121

RE: Rufus - Block 18
Work Order Number: 1811282

November 30, 2018

Attention Chris Brown:

Fremont Analytical, Inc. received 12 sample(s) on 11/15/2018 for the analyses presented in the following report.

Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.
Gasoline by NWTPH-Gx
Mercury by EPA Method 7471
Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)
Sample Moisture (Percent Moisture)
Total Metals by EPA Method 6020
Volatile Organic Compounds by EPA Method 8260C

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Mike Ridgeway
Laboratory Director

Date: *11/30/2018*

CLIENT: GeoEngineers
Project: Rufus - Block 18
Work Order: 1811282

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
1811282-001	TP-8-2.5	11/15/2018 7:33 AM	11/15/2018 1:22 PM
1811282-002	TP-8-5.0	11/15/2018 7:37 AM	11/15/2018 1:22 PM
1811282-003	TP-8-7.5	11/15/2018 7:42 AM	11/15/2018 1:22 PM
1811282-004	TP-7-2.5	11/15/2018 7:53 AM	11/15/2018 1:22 PM
1811282-005	TP-7-5.0	11/15/2018 8:02 AM	11/15/2018 1:22 PM
1811282-006	TP-5-2.5	11/15/2018 9:07 AM	11/15/2018 1:22 PM
1811282-007	TP-2-2.5	11/15/2018 10:48 AM	11/15/2018 1:22 PM
1811282-008	TP-2-5.0	11/15/2018 10:55 AM	11/15/2018 1:22 PM
1811282-009	TP-12-2.5	11/15/2018 11:04 AM	11/15/2018 1:22 PM
1811282-010	TP-12-5.0	11/15/2018 11:11 AM	11/15/2018 1:22 PM
1811282-011	TP-11-2.5	11/15/2018 11:16 AM	11/15/2018 1:22 PM
1811282-012	TP-11-5.0	11/15/2018 11:22 AM	11/15/2018 1:22 PM

Case Narrative

WO#: **1811282**
Date: **11/30/2018**

CLIENT: GeoEngineers
Project: Rufus - Block 18

I. SAMPLE RECEIPT:
Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:
Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:
Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

Qualifiers:

* - Flagged value is not within established control limits
B - Analyte detected in the associated Method Blank
D - Dilution was required
E - Value above quantitation range
H - Holding times for preparation or analysis exceeded
I - Analyte with an internal standard that does not meet established acceptance criteria
J - Analyte detected below Reporting Limit
N - Tentatively Identified Compound (TIC)
Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF)
S - Spike recovery outside accepted recovery limits
ND - Not detected at the Reporting Limit
R - High relative percent difference observed

Acronyms:

%Rec - Percent Recovery
CCB - Continued Calibration Blank
CCV - Continued Calibration Verification
DF - Dilution Factor
HEM - Hexane Extractable Material
ICV - Initial Calibration Verification
LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
MB or MBLANK - Method Blank
MDL - Method Detection Limit
MS/MSD - Matrix Spike / Matrix Spike Duplicate
PDS - Post Digestion Spike
Ref Val - Reference Value
RL - Reporting Limit
RPD - Relative Percent Difference
SD - Serial Dilution
SGT - Silica Gel Treatment
SPK - Spike
Surr - Surrogate

Analytical Report

Work Order: **1811282**
Date Reported: **11/30/2018**

Client: GeoEngineers
Collection Date: 11/15/2018 7:33:00 AM
Project: Rufus - Block 18
Lab ID: 1811282-001
Matrix: Soil
Client Sample ID: **TP-8-2.5**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.				Batch ID: 22702		Analyst: DW
Diesel (Fuel Oil)	ND	23.0		mg/Kg-dry	1	11/22/2018 10:42:46 PM
Heavy Oil	399	57.6		mg/Kg-dry	1	11/22/2018 10:42:46 PM
Surr: 2-Fluorobiphenyl	85.7	50 - 150		%Rec	1	11/22/2018 10:42:46 PM
Surr: o-Terphenyl	87.3	50 - 150		%Rec	1	11/22/2018 10:42:46 PM
Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)				Batch ID: 22722		Analyst: SB
Naphthalene	ND	45.6		µg/Kg-dry	1	11/28/2018 7:10:38 AM
2-Methylnaphthalene	ND	45.6		µg/Kg-dry	1	11/28/2018 7:10:38 AM
1-Methylnaphthalene	ND	45.6		µg/Kg-dry	1	11/28/2018 7:10:38 AM
Acenaphthylene	ND	45.6		µg/Kg-dry	1	11/28/2018 7:10:38 AM
Acenaphthene	ND	45.6		µg/Kg-dry	1	11/28/2018 7:10:38 AM
Fluorene	ND	45.6		µg/Kg-dry	1	11/28/2018 7:10:38 AM
Phenanthrene	164	45.6		µg/Kg-dry	1	11/28/2018 7:10:38 AM
Anthracene	ND	45.6		µg/Kg-dry	1	11/28/2018 7:10:38 AM
Fluoranthene	289	45.6		µg/Kg-dry	1	11/28/2018 7:10:38 AM
Pyrene	208	45.6		µg/Kg-dry	1	11/28/2018 7:10:38 AM
Benz(a)anthracene	101	45.6		µg/Kg-dry	1	11/28/2018 7:10:38 AM
Chrysene	173	45.6		µg/Kg-dry	1	11/28/2018 7:10:38 AM
Benzo(b)fluoranthene	88.4	45.6		µg/Kg-dry	1	11/28/2018 7:10:38 AM
Benzo(k)fluoranthene	77.5	45.6		µg/Kg-dry	1	11/28/2018 7:10:38 AM
Benzo(a)pyrene	88.4	45.6		µg/Kg-dry	1	11/28/2018 7:10:38 AM
Indeno(1,2,3-cd)pyrene	49.8	45.6		µg/Kg-dry	1	11/28/2018 7:10:38 AM
Dibenz(a,h)anthracene	ND	45.6		µg/Kg-dry	1	11/28/2018 7:10:38 AM
Benzo(g,h,i)perylene	60.9	45.6		µg/Kg-dry	1	11/28/2018 7:10:38 AM
Surr: 2-Fluorobiphenyl	86.8	12.5 - 140		%Rec	1	11/28/2018 7:10:38 AM
Surr: Terphenyl-d14 (surr)	93.6	45.7 - 172		%Rec	1	11/28/2018 7:10:38 AM
Gasoline by NWTPH-Gx				Batch ID: 22768		Analyst: EM
Gasoline	ND	6.32		mg/Kg-dry	1	11/29/2018 2:41:14 PM
Surr: Toluene-d8	98.4	65 - 135		%Rec	1	11/29/2018 2:41:14 PM
Surr: 4-Bromofluorobenzene	99.4	65 - 135		%Rec	1	11/29/2018 2:41:14 PM
Volatile Organic Compounds by EPA Method 8260C				Batch ID: 22768		Analyst: EM
Dichlorodifluoromethane (CFC-12)	ND	0.0253		mg/Kg-dry	1	11/29/2018 2:41:14 PM
Chloromethane	ND	0.0632		mg/Kg-dry	1	11/29/2018 2:41:14 PM
Vinyl chloride	ND	0.0316		mg/Kg-dry	1	11/29/2018 2:41:14 PM

Client: GeoEngineers
Collection Date: 11/15/2018 7:33:00 AM
Project: Rufus - Block 18
Lab ID: 1811282-001
Matrix: Soil
Client Sample ID: **TP-8-2.5**

Volatile Organic Compounds by EPA Method 8260C

Batch ID: 22768 Analyst: EM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Bromomethane	ND	0.0632		mg/Kg-dry	1	11/29/2018 2:41:14 PM
Trichlorofluoromethane (CFC-11)	ND	0.0253		mg/Kg-dry	1	11/29/2018 2:41:14 PM
Chloroethane	ND	0.0632		mg/Kg-dry	1	11/29/2018 2:41:14 PM
1,1-Dichloroethene	ND	0.0253		mg/Kg-dry	1	11/29/2018 2:41:14 PM
Methylene chloride	ND	0.0253		mg/Kg-dry	1	11/29/2018 2:41:14 PM
trans-1,2-Dichloroethene	ND	0.0253		mg/Kg-dry	1	11/29/2018 2:41:14 PM
Methyl tert-butyl ether (MTBE)	ND	0.0632		mg/Kg-dry	1	11/29/2018 2:41:14 PM
1,1-Dichloroethane	ND	0.0253		mg/Kg-dry	1	11/29/2018 2:41:14 PM
2,2-Dichloropropane	ND	0.126		mg/Kg-dry	1	11/29/2018 2:41:14 PM
cis-1,2-Dichloroethene	ND	0.0253		mg/Kg-dry	1	11/29/2018 2:41:14 PM
Chloroform	ND	0.0253		mg/Kg-dry	1	11/29/2018 2:41:14 PM
1,1,1-Trichloroethane (TCA)	ND	0.0316		mg/Kg-dry	1	11/29/2018 2:41:14 PM
1,1-Dichloropropene	ND	0.0253		mg/Kg-dry	1	11/29/2018 2:41:14 PM
Carbon tetrachloride	ND	0.0316		mg/Kg-dry	1	11/29/2018 2:41:14 PM
1,2-Dichloroethane (EDC)	ND	0.0253		mg/Kg-dry	1	11/29/2018 2:41:14 PM
Benzene	ND	0.0253		mg/Kg-dry	1	11/29/2018 2:41:14 PM
Trichloroethene (TCE)	ND	0.0253		mg/Kg-dry	1	11/29/2018 2:41:14 PM
1,2-Dichloropropane	ND	0.0253		mg/Kg-dry	1	11/29/2018 2:41:14 PM
Bromodichloromethane	ND	0.0253		mg/Kg-dry	1	11/29/2018 2:41:14 PM
Dibromomethane	ND	0.0253		mg/Kg-dry	1	11/29/2018 2:41:14 PM
cis-1,3-Dichloropropene	ND	0.0253		mg/Kg-dry	1	11/29/2018 2:41:14 PM
Toluene	ND	0.0253		mg/Kg-dry	1	11/29/2018 2:41:14 PM
trans-1,3-Dichloropropylene	ND	0.0253		mg/Kg-dry	1	11/29/2018 2:41:14 PM
1,1,2-Trichloroethane	ND	0.0253		mg/Kg-dry	1	11/29/2018 2:41:14 PM
1,3-Dichloropropane	ND	0.0316		mg/Kg-dry	1	11/29/2018 2:41:14 PM
Tetrachloroethene (PCE)	ND	0.0316		mg/Kg-dry	1	11/29/2018 2:41:14 PM
Dibromochloromethane	ND	0.0316		mg/Kg-dry	1	11/29/2018 2:41:14 PM
1,2-Dibromoethane (EDB)	ND	0.00632		mg/Kg-dry	1	11/29/2018 2:41:14 PM
Chlorobenzene	ND	0.0316		mg/Kg-dry	1	11/29/2018 2:41:14 PM
1,1,1,2-Tetrachloroethane	ND	0.0316		mg/Kg-dry	1	11/29/2018 2:41:14 PM
Ethylbenzene	0.0381	0.0316		mg/Kg-dry	1	11/29/2018 2:41:14 PM
m,p-Xylene	0.188	0.0632		mg/Kg-dry	1	11/29/2018 2:41:14 PM
o-Xylene	0.0522	0.0316		mg/Kg-dry	1	11/29/2018 2:41:14 PM
Styrene	ND	0.0316		mg/Kg-dry	1	11/29/2018 2:41:14 PM
Isopropylbenzene	ND	0.0316		mg/Kg-dry	1	11/29/2018 2:41:14 PM
Bromoform	ND	0.0632		mg/Kg-dry	1	11/29/2018 2:41:14 PM
1,1,2,2-Tetrachloroethane	ND	0.0253		mg/Kg-dry	1	11/29/2018 2:41:14 PM
n-Propylbenzene	ND	0.0316		mg/Kg-dry	1	11/29/2018 2:41:14 PM
Bromobenzene	ND	0.0253		mg/Kg-dry	1	11/29/2018 2:41:14 PM

Analytical Report

Work Order: **1811282**
Date Reported: **11/30/2018**

Client: GeoEngineers
Collection Date: 11/15/2018 7:33:00 AM
Project: Rufus - Block 18
Lab ID: 1811282-001
Matrix: Soil
Client Sample ID: **TP-8-2.5**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Volatile Organic Compounds by EPA Method 8260C				Batch ID: 22768		Analyst: EM
1,3,5-Trimethylbenzene	ND	0.0316		mg/Kg-dry	1	11/29/2018 2:41:14 PM
2-Chlorotoluene	ND	0.0316		mg/Kg-dry	1	11/29/2018 2:41:14 PM
4-Chlorotoluene	ND	0.0316		mg/Kg-dry	1	11/29/2018 2:41:14 PM
tert-Butylbenzene	ND	0.0316		mg/Kg-dry	1	11/29/2018 2:41:14 PM
1,2,3-Trichloropropane	ND	0.0316		mg/Kg-dry	1	11/29/2018 2:41:14 PM
1,2,4-Trichlorobenzene	ND	0.0316		mg/Kg-dry	1	11/29/2018 2:41:14 PM
sec-Butylbenzene	ND	0.0632		mg/Kg-dry	1	11/29/2018 2:41:14 PM
4-Isopropyltoluene	ND	0.0632		mg/Kg-dry	1	11/29/2018 2:41:14 PM
1,3-Dichlorobenzene	ND	0.0253		mg/Kg-dry	1	11/29/2018 2:41:14 PM
1,4-Dichlorobenzene	ND	0.0253		mg/Kg-dry	1	11/29/2018 2:41:14 PM
n-Butylbenzene	ND	0.0316		mg/Kg-dry	1	11/29/2018 2:41:14 PM
1,2-Dichlorobenzene	ND	0.0253		mg/Kg-dry	1	11/29/2018 2:41:14 PM
1,2-Dibromo-3-chloropropane	ND	0.632		mg/Kg-dry	1	11/29/2018 2:41:14 PM
1,2,4-Trimethylbenzene	ND	0.0253		mg/Kg-dry	1	11/29/2018 2:41:14 PM
Hexachlorobutadiene	ND	0.0632		mg/Kg-dry	1	11/29/2018 2:41:14 PM
Naphthalene	ND	0.0632		mg/Kg-dry	1	11/29/2018 2:41:14 PM
1,2,3-Trichlorobenzene	ND	0.0253		mg/Kg-dry	1	11/29/2018 2:41:14 PM
Surr: Dibromofluoromethane	95.5	56.5 - 129		%Rec	1	11/29/2018 2:41:14 PM
Surr: Toluene-d8	99.1	64.5 - 151		%Rec	1	11/29/2018 2:41:14 PM
Surr: 1-Bromo-4-fluorobenzene	96.1	54.8 - 168		%Rec	1	11/29/2018 2:41:14 PM
Mercury by EPA Method 7471				Batch ID: 22719		Analyst: TN
Mercury	ND	0.326		mg/Kg-dry	1	11/26/2018 1:24:02 PM
Total Metals by EPA Method 6020				Batch ID: 22717		Analyst: WC
Arsenic	5.45	0.242		mg/Kg-dry	1	11/26/2018 3:00:22 PM
Cadmium	ND	0.193		mg/Kg-dry	1	11/26/2018 3:00:22 PM
Chromium	64.6	0.0966		mg/Kg-dry	1	11/26/2018 3:00:22 PM
Lead	4.81	0.193		mg/Kg-dry	1	11/26/2018 3:00:22 PM
Sample Moisture (Percent Moisture)				Batch ID: R47808		Analyst: EAS
Percent Moisture	21.9			wt%	1	11/21/2018 8:48:25 AM

Analytical Report

Work Order: **1811282**
Date Reported: **11/30/2018**

Client: GeoEngineers
Collection Date: 11/15/2018 7:37:00 AM
Project: Rufus - Block 18
Lab ID: 1811282-002
Matrix: Soil
Client Sample ID: **TP-8-5.0**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.				Batch ID: 22786		Analyst: DW
Diesel (Fuel Oil)	ND	23.0		mg/Kg-dry	1	11/30/2018 1:04:39 PM
Heavy Oil	ND	57.4		mg/Kg-dry	1	11/30/2018 2:05:03 PM
Surr: 2-Fluorobiphenyl	79.2	50 - 150		%Rec	1	11/30/2018 1:04:39 PM
Surr: o-Terphenyl	90.0	50 - 150		%Rec	1	11/30/2018 1:04:39 PM
Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)				Batch ID: 22785		Analyst: SB
Naphthalene	ND	46.2		µg/Kg-dry	1	11/30/2018 1:15:29 AM
2-Methylnaphthalene	ND	46.2		µg/Kg-dry	1	11/30/2018 1:15:29 AM
1-Methylnaphthalene	ND	46.2		µg/Kg-dry	1	11/30/2018 1:15:29 AM
Acenaphthylene	ND	46.2		µg/Kg-dry	1	11/30/2018 1:15:29 AM
Acenaphthene	ND	46.2		µg/Kg-dry	1	11/30/2018 1:15:29 AM
Fluorene	ND	46.2		µg/Kg-dry	1	11/30/2018 1:15:29 AM
Phenanthrene	ND	46.2		µg/Kg-dry	1	11/30/2018 1:15:29 AM
Anthracene	ND	46.2		µg/Kg-dry	1	11/30/2018 1:15:29 AM
Fluoranthene	ND	46.2		µg/Kg-dry	1	11/30/2018 1:15:29 AM
Pyrene	ND	46.2		µg/Kg-dry	1	11/30/2018 1:15:29 AM
Benz(a)anthracene	ND	46.2		µg/Kg-dry	1	11/30/2018 1:15:29 AM
Chrysene	ND	46.2		µg/Kg-dry	1	11/30/2018 1:15:29 AM
Benzo(b)fluoranthene	ND	46.2		µg/Kg-dry	1	11/30/2018 1:15:29 AM
Benzo(k)fluoranthene	ND	46.2		µg/Kg-dry	1	11/30/2018 1:15:29 AM
Benzo(a)pyrene	ND	46.2		µg/Kg-dry	1	11/30/2018 1:15:29 AM
Indeno(1,2,3-cd)pyrene	ND	46.2	Q	µg/Kg-dry	1	11/30/2018 1:15:29 AM
Dibenz(a,h)anthracene	ND	46.2	Q	µg/Kg-dry	1	11/30/2018 1:15:29 AM
Benzo(g,h,i)perylene	ND	46.2	Q	µg/Kg-dry	1	11/30/2018 1:15:29 AM
Surr: 2-Fluorobiphenyl	69.6	12.5 - 140		%Rec	1	11/30/2018 1:15:29 AM
Surr: Terphenyl-d14 (surr)	82.8	45.7 - 172		%Rec	1	11/30/2018 1:15:29 AM

NOTES:
Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria

Sample Moisture (Percent Moisture)				Batch ID: R47974		Analyst: EAS
Percent Moisture	20.5			wt%	1	11/30/2018 9:41:19 AM

Analytical Report

Work Order: **1811282**
Date Reported: **11/30/2018**

Client: GeoEngineers
Collection Date: 11/15/2018 7:53:00 AM
Project: Rufus - Block 18
Lab ID: 1811282-004
Matrix: Soil
Client Sample ID: **TP-7-2.5**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.				Batch ID: 22702		Analyst: DW
Diesel (Fuel Oil)	ND	23.5		mg/Kg-dry	1	11/22/2018 11:12:38 PM
Heavy Oil	75.8	58.6		mg/Kg-dry	1	11/22/2018 11:12:38 PM
Surr: 2-Fluorobiphenyl	88.4	50 - 150		%Rec	1	11/22/2018 11:12:38 PM
Surr: o-Terphenyl	88.7	50 - 150		%Rec	1	11/22/2018 11:12:38 PM
Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)				Batch ID: 22722		Analyst: SB
Naphthalene	ND	50.4		µg/Kg-dry	1	11/28/2018 7:53:00 AM
2-Methylnaphthalene	ND	50.4		µg/Kg-dry	1	11/28/2018 7:53:00 AM
1-Methylnaphthalene	ND	50.4		µg/Kg-dry	1	11/28/2018 7:53:00 AM
Acenaphthylene	ND	50.4		µg/Kg-dry	1	11/28/2018 7:53:00 AM
Acenaphthene	ND	50.4		µg/Kg-dry	1	11/28/2018 7:53:00 AM
Fluorene	ND	50.4		µg/Kg-dry	1	11/28/2018 7:53:00 AM
Phenanthrene	ND	50.4		µg/Kg-dry	1	11/28/2018 7:53:00 AM
Anthracene	ND	50.4		µg/Kg-dry	1	11/28/2018 7:53:00 AM
Fluoranthene	ND	50.4		µg/Kg-dry	1	11/28/2018 7:53:00 AM
Pyrene	ND	50.4		µg/Kg-dry	1	11/28/2018 7:53:00 AM
Benz(a)anthracene	ND	50.4		µg/Kg-dry	1	11/28/2018 7:53:00 AM
Chrysene	ND	50.4		µg/Kg-dry	1	11/28/2018 7:53:00 AM
Benzo(b)fluoranthene	ND	50.4		µg/Kg-dry	1	11/28/2018 7:53:00 AM
Benzo(k)fluoranthene	ND	50.4		µg/Kg-dry	1	11/28/2018 7:53:00 AM
Benzo(a)pyrene	ND	50.4		µg/Kg-dry	1	11/28/2018 7:53:00 AM
Indeno(1,2,3-cd)pyrene	ND	50.4		µg/Kg-dry	1	11/28/2018 7:53:00 AM
Dibenz(a,h)anthracene	ND	50.4		µg/Kg-dry	1	11/28/2018 7:53:00 AM
Benzo(g,h,i)perylene	ND	50.4		µg/Kg-dry	1	11/28/2018 7:53:00 AM
Surr: 2-Fluorobiphenyl	75.4	12.5 - 140		%Rec	1	11/28/2018 7:53:00 AM
Surr: Terphenyl-d14 (surr)	83.0	45.7 - 172		%Rec	1	11/28/2018 7:53:00 AM
Gasoline by NWTPH-Gx				Batch ID: 22768		Analyst: EM
Gasoline	ND	6.89		mg/Kg-dry	1	11/29/2018 3:12:42 PM
Surr: Toluene-d8	97.2	65 - 135		%Rec	1	11/29/2018 3:12:42 PM
Surr: 4-Bromofluorobenzene	97.9	65 - 135		%Rec	1	11/29/2018 3:12:42 PM
Volatile Organic Compounds by EPA Method 8260C				Batch ID: 22768		Analyst: EM
Dichlorodifluoromethane (CFC-12)	ND	0.0275		mg/Kg-dry	1	11/29/2018 3:12:42 PM
Chloromethane	ND	0.0689		mg/Kg-dry	1	11/29/2018 3:12:42 PM
Vinyl chloride	ND	0.0344		mg/Kg-dry	1	11/29/2018 3:12:42 PM

Client: GeoEngineers
Collection Date: 11/15/2018 7:53:00 AM
Project: Rufus - Block 18
Lab ID: 1811282-004
Matrix: Soil
Client Sample ID: **TP-7-2.5**

Volatile Organic Compounds by EPA Method 8260C

Batch ID: 22768 Analyst: EM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Bromomethane	ND	0.0689		mg/Kg-dry	1	11/29/2018 3:12:42 PM
Trichlorofluoromethane (CFC-11)	ND	0.0275		mg/Kg-dry	1	11/29/2018 3:12:42 PM
Chloroethane	ND	0.0689		mg/Kg-dry	1	11/29/2018 3:12:42 PM
1,1-Dichloroethene	ND	0.0275		mg/Kg-dry	1	11/29/2018 3:12:42 PM
Methylene chloride	ND	0.0275		mg/Kg-dry	1	11/29/2018 3:12:42 PM
trans-1,2-Dichloroethene	ND	0.0275		mg/Kg-dry	1	11/29/2018 3:12:42 PM
Methyl tert-butyl ether (MTBE)	ND	0.0689		mg/Kg-dry	1	11/29/2018 3:12:42 PM
1,1-Dichloroethane	ND	0.0275		mg/Kg-dry	1	11/29/2018 3:12:42 PM
2,2-Dichloropropane	ND	0.138		mg/Kg-dry	1	11/29/2018 3:12:42 PM
cis-1,2-Dichloroethene	ND	0.0275		mg/Kg-dry	1	11/29/2018 3:12:42 PM
Chloroform	ND	0.0275		mg/Kg-dry	1	11/29/2018 3:12:42 PM
1,1,1-Trichloroethane (TCA)	ND	0.0344		mg/Kg-dry	1	11/29/2018 3:12:42 PM
1,1-Dichloropropene	ND	0.0275		mg/Kg-dry	1	11/29/2018 3:12:42 PM
Carbon tetrachloride	ND	0.0344		mg/Kg-dry	1	11/29/2018 3:12:42 PM
1,2-Dichloroethane (EDC)	ND	0.0275		mg/Kg-dry	1	11/29/2018 3:12:42 PM
Benzene	ND	0.0275		mg/Kg-dry	1	11/29/2018 3:12:42 PM
Trichloroethene (TCE)	ND	0.0275		mg/Kg-dry	1	11/29/2018 3:12:42 PM
1,2-Dichloropropane	ND	0.0275		mg/Kg-dry	1	11/29/2018 3:12:42 PM
Bromodichloromethane	ND	0.0275		mg/Kg-dry	1	11/29/2018 3:12:42 PM
Dibromomethane	ND	0.0275		mg/Kg-dry	1	11/29/2018 3:12:42 PM
cis-1,3-Dichloropropene	ND	0.0275		mg/Kg-dry	1	11/29/2018 3:12:42 PM
Toluene	ND	0.0275		mg/Kg-dry	1	11/29/2018 3:12:42 PM
trans-1,3-Dichloropropylene	ND	0.0275		mg/Kg-dry	1	11/29/2018 3:12:42 PM
1,1,2-Trichloroethane	ND	0.0275		mg/Kg-dry	1	11/29/2018 3:12:42 PM
1,3-Dichloropropane	ND	0.0344		mg/Kg-dry	1	11/29/2018 3:12:42 PM
Tetrachloroethene (PCE)	ND	0.0344		mg/Kg-dry	1	11/29/2018 3:12:42 PM
Dibromochloromethane	ND	0.0344		mg/Kg-dry	1	11/29/2018 3:12:42 PM
1,2-Dibromoethane (EDB)	ND	0.00689		mg/Kg-dry	1	11/29/2018 3:12:42 PM
Chlorobenzene	ND	0.0344		mg/Kg-dry	1	11/29/2018 3:12:42 PM
1,1,1,2-Tetrachloroethane	ND	0.0344		mg/Kg-dry	1	11/29/2018 3:12:42 PM
Ethylbenzene	ND	0.0344		mg/Kg-dry	1	11/29/2018 3:12:42 PM
m,p-Xylene	ND	0.0689		mg/Kg-dry	1	11/29/2018 3:12:42 PM
o-Xylene	ND	0.0344		mg/Kg-dry	1	11/29/2018 3:12:42 PM
Styrene	ND	0.0344		mg/Kg-dry	1	11/29/2018 3:12:42 PM
Isopropylbenzene	ND	0.0344		mg/Kg-dry	1	11/29/2018 3:12:42 PM
Bromoform	ND	0.0689		mg/Kg-dry	1	11/29/2018 3:12:42 PM
1,1,2,2-Tetrachloroethane	ND	0.0275		mg/Kg-dry	1	11/29/2018 3:12:42 PM
n-Propylbenzene	ND	0.0344		mg/Kg-dry	1	11/29/2018 3:12:42 PM
Bromobenzene	ND	0.0275		mg/Kg-dry	1	11/29/2018 3:12:42 PM

Analytical Report

Work Order: **1811282**
Date Reported: **11/30/2018**

Client: GeoEngineers
Collection Date: 11/15/2018 7:53:00 AM
Project: Rufus - Block 18
Lab ID: 1811282-004
Matrix: Soil
Client Sample ID: **TP-7-2.5**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Volatile Organic Compounds by EPA Method 8260C				Batch ID: 22768		Analyst: EM
1,3,5-Trimethylbenzene	ND	0.0344		mg/Kg-dry	1	11/29/2018 3:12:42 PM
2-Chlorotoluene	ND	0.0344		mg/Kg-dry	1	11/29/2018 3:12:42 PM
4-Chlorotoluene	ND	0.0344		mg/Kg-dry	1	11/29/2018 3:12:42 PM
tert-Butylbenzene	ND	0.0344		mg/Kg-dry	1	11/29/2018 3:12:42 PM
1,2,3-Trichloropropane	ND	0.0344		mg/Kg-dry	1	11/29/2018 3:12:42 PM
1,2,4-Trichlorobenzene	ND	0.0344		mg/Kg-dry	1	11/29/2018 3:12:42 PM
sec-Butylbenzene	ND	0.0689		mg/Kg-dry	1	11/29/2018 3:12:42 PM
4-Isopropyltoluene	ND	0.0689		mg/Kg-dry	1	11/29/2018 3:12:42 PM
1,3-Dichlorobenzene	ND	0.0275		mg/Kg-dry	1	11/29/2018 3:12:42 PM
1,4-Dichlorobenzene	ND	0.0275		mg/Kg-dry	1	11/29/2018 3:12:42 PM
n-Butylbenzene	ND	0.0344		mg/Kg-dry	1	11/29/2018 3:12:42 PM
1,2-Dichlorobenzene	ND	0.0275		mg/Kg-dry	1	11/29/2018 3:12:42 PM
1,2-Dibromo-3-chloropropane	ND	0.689		mg/Kg-dry	1	11/29/2018 3:12:42 PM
1,2,4-Trimethylbenzene	ND	0.0275		mg/Kg-dry	1	11/29/2018 3:12:42 PM
Hexachlorobutadiene	ND	0.0689		mg/Kg-dry	1	11/29/2018 3:12:42 PM
Naphthalene	ND	0.0689		mg/Kg-dry	1	11/29/2018 3:12:42 PM
1,2,3-Trichlorobenzene	ND	0.0275		mg/Kg-dry	1	11/29/2018 3:12:42 PM
Surr: Dibromofluoromethane	96.9	56.5 - 129		%Rec	1	11/29/2018 3:12:42 PM
Surr: Toluene-d8	101	64.5 - 151		%Rec	1	11/29/2018 3:12:42 PM
Surr: 1-Bromo-4-fluorobenzene	94.7	54.8 - 168		%Rec	1	11/29/2018 3:12:42 PM
Mercury by EPA Method 7471				Batch ID: 22719		Analyst: TN
Mercury	ND	0.317		mg/Kg-dry	1	11/26/2018 1:25:38 PM
Total Metals by EPA Method 6020				Batch ID: 22717		Analyst: WC
Arsenic	5.31	0.254		mg/Kg-dry	1	11/26/2018 3:04:24 PM
Cadmium	ND	0.203		mg/Kg-dry	1	11/26/2018 3:04:24 PM
Chromium	62.2	0.102		mg/Kg-dry	1	11/26/2018 3:04:24 PM
Lead	4.49	0.203		mg/Kg-dry	1	11/26/2018 3:04:24 PM
Sample Moisture (Percent Moisture)				Batch ID: R47808		Analyst: EAS
Percent Moisture	24.3			wt%	1	11/21/2018 8:48:25 AM

Analytical Report

Work Order: **1811282**
Date Reported: **11/30/2018**

Client: GeoEngineers
Collection Date: 11/15/2018 8:02:00 AM
Project: Rufus - Block 18
Lab ID: 1811282-005
Matrix: Soil
Client Sample ID: **TP-7-5.0**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.				Batch ID: 22786		Analyst: DW
Diesel (Fuel Oil)	ND	20.1		mg/Kg-dry	1	11/30/2018 1:34:47 PM
Heavy Oil	ND	50.3		mg/Kg-dry	1	11/30/2018 1:34:47 PM
Surr: 2-Fluorobiphenyl	86.0	50 - 150		%Rec	1	11/30/2018 1:34:47 PM
Surr: o-Terphenyl	97.2	50 - 150		%Rec	1	11/30/2018 1:34:47 PM
Sample Moisture (Percent Moisture)				Batch ID: R47974		Analyst: EAS
Percent Moisture	7.20			wt%	1	11/30/2018 9:41:19 AM

Client: GeoEngineers
Collection Date: 11/15/2018 9:07:00 AM
Project: Rufus - Block 18
Lab ID: 1811282-006
Matrix: Soil
Client Sample ID: **TP-5-2.5**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.				Batch ID: 22702		Analyst: DW
Diesel (Fuel Oil)	ND	20.1		mg/Kg-dry	1	11/22/2018 11:42:37 PM
Heavy Oil	ND	50.3		mg/Kg-dry	1	11/22/2018 11:42:37 PM
Surr: 2-Fluorobiphenyl	83.3	50 - 150		%Rec	1	11/22/2018 11:42:37 PM
Surr: o-Terphenyl	83.2	50 - 150		%Rec	1	11/22/2018 11:42:37 PM
Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)				Batch ID: 22722		Analyst: SB
Naphthalene	ND	39.9		µg/Kg-dry	1	11/28/2018 8:13:44 AM
2-Methylnaphthalene	ND	39.9		µg/Kg-dry	1	11/28/2018 8:13:44 AM
1-Methylnaphthalene	ND	39.9		µg/Kg-dry	1	11/28/2018 8:13:44 AM
Acenaphthylene	ND	39.9		µg/Kg-dry	1	11/28/2018 8:13:44 AM
Acenaphthene	ND	39.9		µg/Kg-dry	1	11/28/2018 8:13:44 AM
Fluorene	ND	39.9		µg/Kg-dry	1	11/28/2018 8:13:44 AM
Phenanthrene	ND	39.9		µg/Kg-dry	1	11/28/2018 8:13:44 AM
Anthracene	ND	39.9		µg/Kg-dry	1	11/28/2018 8:13:44 AM
Fluoranthene	ND	39.9		µg/Kg-dry	1	11/28/2018 8:13:44 AM
Pyrene	ND	39.9		µg/Kg-dry	1	11/28/2018 8:13:44 AM
Benz(a)anthracene	ND	39.9		µg/Kg-dry	1	11/28/2018 8:13:44 AM
Chrysene	ND	39.9		µg/Kg-dry	1	11/28/2018 8:13:44 AM
Benzo(b)fluoranthene	ND	39.9		µg/Kg-dry	1	11/28/2018 8:13:44 AM
Benzo(k)fluoranthene	ND	39.9		µg/Kg-dry	1	11/28/2018 8:13:44 AM
Benzo(a)pyrene	ND	39.9		µg/Kg-dry	1	11/28/2018 8:13:44 AM
Indeno(1,2,3-cd)pyrene	ND	39.9		µg/Kg-dry	1	11/28/2018 8:13:44 AM
Dibenz(a,h)anthracene	ND	39.9		µg/Kg-dry	1	11/28/2018 8:13:44 AM
Benzo(g,h,i)perylene	ND	39.9		µg/Kg-dry	1	11/28/2018 8:13:44 AM
Surr: 2-Fluorobiphenyl	98.9	12.5 - 140		%Rec	1	11/28/2018 8:13:44 AM
Surr: Terphenyl-d14 (surr)	108	45.7 - 172		%Rec	1	11/28/2018 8:13:44 AM
Gasoline by NWTPH-Gx				Batch ID: 22768		Analyst: EM
Gasoline	ND	5.46		mg/Kg-dry	1	11/29/2018 3:44:09 PM
Surr: Toluene-d8	97.9	65 - 135		%Rec	1	11/29/2018 3:44:09 PM
Surr: 4-Bromofluorobenzene	99.1	65 - 135		%Rec	1	11/29/2018 3:44:09 PM
Volatile Organic Compounds by EPA Method 8260C				Batch ID: 22768		Analyst: EM
Dichlorodifluoromethane (CFC-12)	ND	0.0218		mg/Kg-dry	1	11/29/2018 3:44:09 PM
Chloromethane	ND	0.0546		mg/Kg-dry	1	11/29/2018 3:44:09 PM
Vinyl chloride	ND	0.0273		mg/Kg-dry	1	11/29/2018 3:44:09 PM

Client: GeoEngineers
Collection Date: 11/15/2018 9:07:00 AM
Project: Rufus - Block 18
Lab ID: 1811282-006
Matrix: Soil
Client Sample ID: **TP-5-2.5**

Volatile Organic Compounds by EPA Method 8260C

Batch ID: 22768 Analyst: EM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Bromomethane	ND	0.0546		mg/Kg-dry	1	11/29/2018 3:44:09 PM
Trichlorofluoromethane (CFC-11)	ND	0.0218		mg/Kg-dry	1	11/29/2018 3:44:09 PM
Chloroethane	ND	0.0546		mg/Kg-dry	1	11/29/2018 3:44:09 PM
1,1-Dichloroethene	ND	0.0218		mg/Kg-dry	1	11/29/2018 3:44:09 PM
Methylene chloride	ND	0.0218		mg/Kg-dry	1	11/29/2018 3:44:09 PM
trans-1,2-Dichloroethene	ND	0.0218		mg/Kg-dry	1	11/29/2018 3:44:09 PM
Methyl tert-butyl ether (MTBE)	ND	0.0546		mg/Kg-dry	1	11/29/2018 3:44:09 PM
1,1-Dichloroethane	ND	0.0218		mg/Kg-dry	1	11/29/2018 3:44:09 PM
2,2-Dichloropropane	ND	0.109		mg/Kg-dry	1	11/29/2018 3:44:09 PM
cis-1,2-Dichloroethene	ND	0.0218		mg/Kg-dry	1	11/29/2018 3:44:09 PM
Chloroform	ND	0.0218		mg/Kg-dry	1	11/29/2018 3:44:09 PM
1,1,1-Trichloroethane (TCA)	ND	0.0273		mg/Kg-dry	1	11/29/2018 3:44:09 PM
1,1-Dichloropropene	ND	0.0218		mg/Kg-dry	1	11/29/2018 3:44:09 PM
Carbon tetrachloride	ND	0.0273		mg/Kg-dry	1	11/29/2018 3:44:09 PM
1,2-Dichloroethane (EDC)	ND	0.0218		mg/Kg-dry	1	11/29/2018 3:44:09 PM
Benzene	ND	0.0218		mg/Kg-dry	1	11/29/2018 3:44:09 PM
Trichloroethene (TCE)	ND	0.0218		mg/Kg-dry	1	11/29/2018 3:44:09 PM
1,2-Dichloropropane	ND	0.0218		mg/Kg-dry	1	11/29/2018 3:44:09 PM
Bromodichloromethane	ND	0.0218		mg/Kg-dry	1	11/29/2018 3:44:09 PM
Dibromomethane	ND	0.0218		mg/Kg-dry	1	11/29/2018 3:44:09 PM
cis-1,3-Dichloropropene	ND	0.0218		mg/Kg-dry	1	11/29/2018 3:44:09 PM
Toluene	ND	0.0218		mg/Kg-dry	1	11/29/2018 3:44:09 PM
trans-1,3-Dichloropropylene	ND	0.0218		mg/Kg-dry	1	11/29/2018 3:44:09 PM
1,1,2-Trichloroethane	ND	0.0218		mg/Kg-dry	1	11/29/2018 3:44:09 PM
1,3-Dichloropropane	ND	0.0273		mg/Kg-dry	1	11/29/2018 3:44:09 PM
Tetrachloroethene (PCE)	ND	0.0273		mg/Kg-dry	1	11/29/2018 3:44:09 PM
Dibromochloromethane	ND	0.0273		mg/Kg-dry	1	11/29/2018 3:44:09 PM
1,2-Dibromoethane (EDB)	ND	0.00546		mg/Kg-dry	1	11/29/2018 3:44:09 PM
Chlorobenzene	ND	0.0273		mg/Kg-dry	1	11/29/2018 3:44:09 PM
1,1,1,2-Tetrachloroethane	ND	0.0273		mg/Kg-dry	1	11/29/2018 3:44:09 PM
Ethylbenzene	ND	0.0273		mg/Kg-dry	1	11/29/2018 3:44:09 PM
m,p-Xylene	ND	0.0546		mg/Kg-dry	1	11/29/2018 3:44:09 PM
o-Xylene	ND	0.0273		mg/Kg-dry	1	11/29/2018 3:44:09 PM
Styrene	ND	0.0273		mg/Kg-dry	1	11/29/2018 3:44:09 PM
Isopropylbenzene	ND	0.0273		mg/Kg-dry	1	11/29/2018 3:44:09 PM
Bromoform	ND	0.0546		mg/Kg-dry	1	11/29/2018 3:44:09 PM
1,1,2,2-Tetrachloroethane	ND	0.0218		mg/Kg-dry	1	11/29/2018 3:44:09 PM
n-Propylbenzene	ND	0.0273		mg/Kg-dry	1	11/29/2018 3:44:09 PM
Bromobenzene	ND	0.0218		mg/Kg-dry	1	11/29/2018 3:44:09 PM

Analytical Report

Work Order: **1811282**
Date Reported: **11/30/2018**

Client: GeoEngineers
Collection Date: 11/15/2018 9:07:00 AM
Project: Rufus - Block 18
Lab ID: 1811282-006
Matrix: Soil
Client Sample ID: **TP-5-2.5**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Volatile Organic Compounds by EPA Method 8260C				Batch ID: 22768		Analyst: EM
1,3,5-Trimethylbenzene	ND	0.0273		mg/Kg-dry	1	11/29/2018 3:44:09 PM
2-Chlorotoluene	ND	0.0273		mg/Kg-dry	1	11/29/2018 3:44:09 PM
4-Chlorotoluene	ND	0.0273		mg/Kg-dry	1	11/29/2018 3:44:09 PM
tert-Butylbenzene	ND	0.0273		mg/Kg-dry	1	11/29/2018 3:44:09 PM
1,2,3-Trichloropropane	ND	0.0273		mg/Kg-dry	1	11/29/2018 3:44:09 PM
1,2,4-Trichlorobenzene	ND	0.0273		mg/Kg-dry	1	11/29/2018 3:44:09 PM
sec-Butylbenzene	ND	0.0546		mg/Kg-dry	1	11/29/2018 3:44:09 PM
4-Isopropyltoluene	ND	0.0546		mg/Kg-dry	1	11/29/2018 3:44:09 PM
1,3-Dichlorobenzene	ND	0.0218		mg/Kg-dry	1	11/29/2018 3:44:09 PM
1,4-Dichlorobenzene	ND	0.0218		mg/Kg-dry	1	11/29/2018 3:44:09 PM
n-Butylbenzene	ND	0.0273		mg/Kg-dry	1	11/29/2018 3:44:09 PM
1,2-Dichlorobenzene	ND	0.0218		mg/Kg-dry	1	11/29/2018 3:44:09 PM
1,2-Dibromo-3-chloropropane	ND	0.546		mg/Kg-dry	1	11/29/2018 3:44:09 PM
1,2,4-Trimethylbenzene	ND	0.0218		mg/Kg-dry	1	11/29/2018 3:44:09 PM
Hexachlorobutadiene	ND	0.0546		mg/Kg-dry	1	11/29/2018 3:44:09 PM
Naphthalene	ND	0.0546		mg/Kg-dry	1	11/29/2018 3:44:09 PM
1,2,3-Trichlorobenzene	ND	0.0218		mg/Kg-dry	1	11/29/2018 3:44:09 PM
Surr: Dibromofluoromethane	95.7	56.5 - 129		%Rec	1	11/29/2018 3:44:09 PM
Surr: Toluene-d8	99.8	64.5 - 151		%Rec	1	11/29/2018 3:44:09 PM
Surr: 1-Bromo-4-fluorobenzene	96.2	54.8 - 168		%Rec	1	11/29/2018 3:44:09 PM
Mercury by EPA Method 7471				Batch ID: 22719		Analyst: TN
Mercury	ND	0.233		mg/Kg-dry	1	11/26/2018 1:27:15 PM
Total Metals by EPA Method 6020				Batch ID: 22717		Analyst: WC
Arsenic	1.57	0.200		mg/Kg-dry	1	11/26/2018 3:08:26 PM
Cadmium	ND	0.160		mg/Kg-dry	1	11/26/2018 3:08:26 PM
Chromium	24.2	0.0799		mg/Kg-dry	1	11/26/2018 3:08:26 PM
Lead	1.49	0.160		mg/Kg-dry	1	11/26/2018 3:08:26 PM
Sample Moisture (Percent Moisture)				Batch ID: R47808		Analyst: EAS
Percent Moisture	7.31			wt%	1	11/21/2018 8:48:25 AM

Client: GeoEngineers
Collection Date: 11/15/2018 10:48:00 AM
Project: Rufus - Block 18
Lab ID: 1811282-007
Matrix: Soil
Client Sample ID: **TP-2-2.5**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.				Batch ID: 22702		Analyst: DW
Diesel (Fuel Oil)	ND	19.8		mg/Kg-dry	1	11/23/2018 12:12:31 AM
Heavy Oil	ND	49.4		mg/Kg-dry	1	11/23/2018 12:12:31 AM
Surr: 2-Fluorobiphenyl	82.1	50 - 150		%Rec	1	11/23/2018 12:12:31 AM
Surr: o-Terphenyl	81.8	50 - 150		%Rec	1	11/23/2018 12:12:31 AM
Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)				Batch ID: 22722		Analyst: SB
Naphthalene	ND	39.1		µg/Kg-dry	1	11/28/2018 8:34:37 AM
2-Methylnaphthalene	ND	39.1		µg/Kg-dry	1	11/28/2018 8:34:37 AM
1-Methylnaphthalene	ND	39.1		µg/Kg-dry	1	11/28/2018 8:34:37 AM
Acenaphthylene	ND	39.1		µg/Kg-dry	1	11/28/2018 8:34:37 AM
Acenaphthene	ND	39.1		µg/Kg-dry	1	11/28/2018 8:34:37 AM
Fluorene	ND	39.1		µg/Kg-dry	1	11/28/2018 8:34:37 AM
Phenanthrene	ND	39.1		µg/Kg-dry	1	11/28/2018 8:34:37 AM
Anthracene	ND	39.1		µg/Kg-dry	1	11/28/2018 8:34:37 AM
Fluoranthene	ND	39.1		µg/Kg-dry	1	11/28/2018 8:34:37 AM
Pyrene	ND	39.1		µg/Kg-dry	1	11/28/2018 8:34:37 AM
Benz(a)anthracene	ND	39.1		µg/Kg-dry	1	11/28/2018 8:34:37 AM
Chrysene	ND	39.1		µg/Kg-dry	1	11/28/2018 8:34:37 AM
Benzo(b)fluoranthene	ND	39.1		µg/Kg-dry	1	11/28/2018 8:34:37 AM
Benzo(k)fluoranthene	ND	39.1		µg/Kg-dry	1	11/28/2018 8:34:37 AM
Benzo(a)pyrene	ND	39.1		µg/Kg-dry	1	11/28/2018 8:34:37 AM
Indeno(1,2,3-cd)pyrene	ND	39.1		µg/Kg-dry	1	11/28/2018 8:34:37 AM
Dibenz(a,h)anthracene	ND	39.1		µg/Kg-dry	1	11/28/2018 8:34:37 AM
Benzo(g,h,i)perylene	ND	39.1		µg/Kg-dry	1	11/28/2018 8:34:37 AM
Surr: 2-Fluorobiphenyl	106	12.5 - 140		%Rec	1	11/28/2018 8:34:37 AM
Surr: Terphenyl-d14 (surr)	117	45.7 - 172		%Rec	1	11/28/2018 8:34:37 AM
Gasoline by NWTPH-Gx				Batch ID: 22768		Analyst: EM
Gasoline	ND	5.14		mg/Kg-dry	1	11/29/2018 4:15:30 PM
Surr: Toluene-d8	98.6	65 - 135		%Rec	1	11/29/2018 4:15:30 PM
Surr: 4-Bromofluorobenzene	99.1	65 - 135		%Rec	1	11/29/2018 4:15:30 PM
Volatile Organic Compounds by EPA Method 8260C				Batch ID: 22768		Analyst: EM
Dichlorodifluoromethane (CFC-12)	ND	0.0206		mg/Kg-dry	1	11/29/2018 4:15:30 PM
Chloromethane	ND	0.0514		mg/Kg-dry	1	11/29/2018 4:15:30 PM
Vinyl chloride	ND	0.0257		mg/Kg-dry	1	11/29/2018 4:15:30 PM

Client: GeoEngineers
Collection Date: 11/15/2018 10:48:00 AM
Project: Rufus - Block 18
Lab ID: 1811282-007
Matrix: Soil
Client Sample ID: **TP-2-2.5**

Volatile Organic Compounds by EPA Method 8260C

Batch ID: 22768 Analyst: EM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Bromomethane	ND	0.0514		mg/Kg-dry	1	11/29/2018 4:15:30 PM
Trichlorofluoromethane (CFC-11)	ND	0.0206		mg/Kg-dry	1	11/29/2018 4:15:30 PM
Chloroethane	ND	0.0514		mg/Kg-dry	1	11/29/2018 4:15:30 PM
1,1-Dichloroethene	ND	0.0206		mg/Kg-dry	1	11/29/2018 4:15:30 PM
Methylene chloride	ND	0.0206		mg/Kg-dry	1	11/29/2018 4:15:30 PM
trans-1,2-Dichloroethene	ND	0.0206		mg/Kg-dry	1	11/29/2018 4:15:30 PM
Methyl tert-butyl ether (MTBE)	ND	0.0514		mg/Kg-dry	1	11/29/2018 4:15:30 PM
1,1-Dichloroethane	ND	0.0206		mg/Kg-dry	1	11/29/2018 4:15:30 PM
2,2-Dichloropropane	ND	0.103		mg/Kg-dry	1	11/29/2018 4:15:30 PM
cis-1,2-Dichloroethene	ND	0.0206		mg/Kg-dry	1	11/29/2018 4:15:30 PM
Chloroform	ND	0.0206		mg/Kg-dry	1	11/29/2018 4:15:30 PM
1,1,1-Trichloroethane (TCA)	ND	0.0257		mg/Kg-dry	1	11/29/2018 4:15:30 PM
1,1-Dichloropropene	ND	0.0206		mg/Kg-dry	1	11/29/2018 4:15:30 PM
Carbon tetrachloride	ND	0.0257		mg/Kg-dry	1	11/29/2018 4:15:30 PM
1,2-Dichloroethane (EDC)	ND	0.0206		mg/Kg-dry	1	11/29/2018 4:15:30 PM
Benzene	ND	0.0206		mg/Kg-dry	1	11/29/2018 4:15:30 PM
Trichloroethene (TCE)	ND	0.0206		mg/Kg-dry	1	11/29/2018 4:15:30 PM
1,2-Dichloropropane	ND	0.0206		mg/Kg-dry	1	11/29/2018 4:15:30 PM
Bromodichloromethane	ND	0.0206		mg/Kg-dry	1	11/29/2018 4:15:30 PM
Dibromomethane	ND	0.0206		mg/Kg-dry	1	11/29/2018 4:15:30 PM
cis-1,3-Dichloropropene	ND	0.0206		mg/Kg-dry	1	11/29/2018 4:15:30 PM
Toluene	ND	0.0206		mg/Kg-dry	1	11/29/2018 4:15:30 PM
trans-1,3-Dichloropropylene	ND	0.0206		mg/Kg-dry	1	11/29/2018 4:15:30 PM
1,1,2-Trichloroethane	ND	0.0206		mg/Kg-dry	1	11/29/2018 4:15:30 PM
1,3-Dichloropropane	ND	0.0257		mg/Kg-dry	1	11/29/2018 4:15:30 PM
Tetrachloroethene (PCE)	ND	0.0257		mg/Kg-dry	1	11/29/2018 4:15:30 PM
Dibromochloromethane	ND	0.0257		mg/Kg-dry	1	11/29/2018 4:15:30 PM
1,2-Dibromoethane (EDB)	ND	0.00514		mg/Kg-dry	1	11/29/2018 4:15:30 PM
Chlorobenzene	ND	0.0257		mg/Kg-dry	1	11/29/2018 4:15:30 PM
1,1,1,2-Tetrachloroethane	ND	0.0257		mg/Kg-dry	1	11/29/2018 4:15:30 PM
Ethylbenzene	ND	0.0257		mg/Kg-dry	1	11/29/2018 4:15:30 PM
m,p-Xylene	ND	0.0514		mg/Kg-dry	1	11/29/2018 4:15:30 PM
o-Xylene	ND	0.0257		mg/Kg-dry	1	11/29/2018 4:15:30 PM
Styrene	ND	0.0257		mg/Kg-dry	1	11/29/2018 4:15:30 PM
Isopropylbenzene	ND	0.0257		mg/Kg-dry	1	11/29/2018 4:15:30 PM
Bromoform	ND	0.0514		mg/Kg-dry	1	11/29/2018 4:15:30 PM
1,1,2,2-Tetrachloroethane	ND	0.0206		mg/Kg-dry	1	11/29/2018 4:15:30 PM
n-Propylbenzene	ND	0.0257		mg/Kg-dry	1	11/29/2018 4:15:30 PM
Bromobenzene	ND	0.0206		mg/Kg-dry	1	11/29/2018 4:15:30 PM

Analytical Report

Work Order: **1811282**
Date Reported: **11/30/2018**

Client: GeoEngineers
Collection Date: 11/15/2018 10:48:00 AM
Project: Rufus - Block 18
Lab ID: 1811282-007
Matrix: Soil
Client Sample ID: **TP-2-2.5**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Volatile Organic Compounds by EPA Method 8260C				Batch ID: 22768		Analyst: EM
1,3,5-Trimethylbenzene	ND	0.0257		mg/Kg-dry	1	11/29/2018 4:15:30 PM
2-Chlorotoluene	ND	0.0257		mg/Kg-dry	1	11/29/2018 4:15:30 PM
4-Chlorotoluene	ND	0.0257		mg/Kg-dry	1	11/29/2018 4:15:30 PM
tert-Butylbenzene	ND	0.0257		mg/Kg-dry	1	11/29/2018 4:15:30 PM
1,2,3-Trichloropropane	ND	0.0257		mg/Kg-dry	1	11/29/2018 4:15:30 PM
1,2,4-Trichlorobenzene	ND	0.0257		mg/Kg-dry	1	11/29/2018 4:15:30 PM
sec-Butylbenzene	ND	0.0514		mg/Kg-dry	1	11/29/2018 4:15:30 PM
4-Isopropyltoluene	ND	0.0514		mg/Kg-dry	1	11/29/2018 4:15:30 PM
1,3-Dichlorobenzene	ND	0.0206		mg/Kg-dry	1	11/29/2018 4:15:30 PM
1,4-Dichlorobenzene	ND	0.0206		mg/Kg-dry	1	11/29/2018 4:15:30 PM
n-Butylbenzene	ND	0.0257		mg/Kg-dry	1	11/29/2018 4:15:30 PM
1,2-Dichlorobenzene	ND	0.0206		mg/Kg-dry	1	11/29/2018 4:15:30 PM
1,2-Dibromo-3-chloropropane	ND	0.514		mg/Kg-dry	1	11/29/2018 4:15:30 PM
1,2,4-Trimethylbenzene	ND	0.0206		mg/Kg-dry	1	11/29/2018 4:15:30 PM
Hexachlorobutadiene	ND	0.0514		mg/Kg-dry	1	11/29/2018 4:15:30 PM
Naphthalene	ND	0.0514		mg/Kg-dry	1	11/29/2018 4:15:30 PM
1,2,3-Trichlorobenzene	ND	0.0206		mg/Kg-dry	1	11/29/2018 4:15:30 PM
Surr: Dibromofluoromethane	95.4	56.5 - 129		%Rec	1	11/29/2018 4:15:30 PM
Surr: Toluene-d8	100	64.5 - 151		%Rec	1	11/29/2018 4:15:30 PM
Surr: 1-Bromo-4-fluorobenzene	96.0	54.8 - 168		%Rec	1	11/29/2018 4:15:30 PM
Mercury by EPA Method 7471				Batch ID: 22719		Analyst: TN
Mercury	ND	0.249		mg/Kg-dry	1	11/26/2018 1:28:51 PM
Total Metals by EPA Method 6020				Batch ID: 22717		Analyst: WC
Arsenic	1.66	0.192		mg/Kg-dry	1	11/26/2018 3:12:27 PM
Cadmium	ND	0.153		mg/Kg-dry	1	11/26/2018 3:12:27 PM
Chromium	24.2	0.0767		mg/Kg-dry	1	11/26/2018 3:12:27 PM
Lead	1.17	0.153		mg/Kg-dry	1	11/26/2018 3:12:27 PM
Sample Moisture (Percent Moisture)				Batch ID: R47808		Analyst: EAS
Percent Moisture	6.85			wt%	1	11/21/2018 8:48:25 AM

Client: GeoEngineers
Collection Date: 11/15/2018 11:04:00 AM
Project: Rufus - Block 18
Lab ID: 1811282-009
Matrix: Soil
Client Sample ID: **TP-12-2.5**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.				Batch ID: 22702		Analyst: DW
Diesel (Fuel Oil)	ND	22.5		mg/Kg-dry	1	11/23/2018 12:42:29 AM
Heavy Oil	ND	56.3		mg/Kg-dry	1	11/23/2018 12:42:29 AM
Surr: 2-Fluorobiphenyl	80.5	50 - 150		%Rec	1	11/23/2018 12:42:29 AM
Surr: o-Terphenyl	80.1	50 - 150		%Rec	1	11/23/2018 12:42:29 AM
Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)				Batch ID: 22722		Analyst: SB
Naphthalene	ND	43.6		µg/Kg-dry	1	11/28/2018 8:55:34 AM
2-Methylnaphthalene	ND	43.6		µg/Kg-dry	1	11/28/2018 8:55:34 AM
1-Methylnaphthalene	ND	43.6		µg/Kg-dry	1	11/28/2018 8:55:34 AM
Acenaphthylene	ND	43.6		µg/Kg-dry	1	11/28/2018 8:55:34 AM
Acenaphthene	ND	43.6		µg/Kg-dry	1	11/28/2018 8:55:34 AM
Fluorene	ND	43.6		µg/Kg-dry	1	11/28/2018 8:55:34 AM
Phenanthrene	ND	43.6		µg/Kg-dry	1	11/28/2018 8:55:34 AM
Anthracene	ND	43.6		µg/Kg-dry	1	11/28/2018 8:55:34 AM
Fluoranthene	ND	43.6		µg/Kg-dry	1	11/28/2018 8:55:34 AM
Pyrene	ND	43.6		µg/Kg-dry	1	11/28/2018 8:55:34 AM
Benz(a)anthracene	ND	43.6		µg/Kg-dry	1	11/28/2018 8:55:34 AM
Chrysene	ND	43.6		µg/Kg-dry	1	11/28/2018 8:55:34 AM
Benzo(b)fluoranthene	ND	43.6		µg/Kg-dry	1	11/28/2018 8:55:34 AM
Benzo(k)fluoranthene	ND	43.6		µg/Kg-dry	1	11/28/2018 8:55:34 AM
Benzo(a)pyrene	ND	43.6		µg/Kg-dry	1	11/28/2018 8:55:34 AM
Indeno(1,2,3-cd)pyrene	ND	43.6		µg/Kg-dry	1	11/28/2018 8:55:34 AM
Dibenz(a,h)anthracene	ND	43.6		µg/Kg-dry	1	11/28/2018 8:55:34 AM
Benzo(g,h,i)perylene	ND	43.6		µg/Kg-dry	1	11/28/2018 8:55:34 AM
Surr: 2-Fluorobiphenyl	80.6	12.5 - 140		%Rec	1	11/28/2018 8:55:34 AM
Surr: Terphenyl-d14 (surr)	87.7	45.7 - 172		%Rec	1	11/28/2018 8:55:34 AM
Gasoline by NWTPH-Gx				Batch ID: 22768		Analyst: EM
Gasoline	ND	5.93		mg/Kg-dry	1	11/29/2018 4:46:51 PM
Surr: Toluene-d8	98.5	65 - 135		%Rec	1	11/29/2018 4:46:51 PM
Surr: 4-Bromofluorobenzene	98.4	65 - 135		%Rec	1	11/29/2018 4:46:51 PM
Volatile Organic Compounds by EPA Method 8260C				Batch ID: 22768		Analyst: EM
Dichlorodifluoromethane (CFC-12)	ND	0.0237		mg/Kg-dry	1	11/29/2018 4:46:51 PM
Chloromethane	ND	0.0593		mg/Kg-dry	1	11/29/2018 4:46:51 PM
Vinyl chloride	ND	0.0297		mg/Kg-dry	1	11/29/2018 4:46:51 PM

Client: GeoEngineers
Collection Date: 11/15/2018 11:04:00 AM
Project: Rufus - Block 18
Lab ID: 1811282-009
Matrix: Soil
Client Sample ID: **TP-12-2.5**

Volatile Organic Compounds by EPA Method 8260C

Batch ID: 22768 Analyst: EM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Bromomethane	ND	0.0593		mg/Kg-dry	1	11/29/2018 4:46:51 PM
Trichlorofluoromethane (CFC-11)	ND	0.0237		mg/Kg-dry	1	11/29/2018 4:46:51 PM
Chloroethane	ND	0.0593		mg/Kg-dry	1	11/29/2018 4:46:51 PM
1,1-Dichloroethene	ND	0.0237		mg/Kg-dry	1	11/29/2018 4:46:51 PM
Methylene chloride	ND	0.0237		mg/Kg-dry	1	11/29/2018 4:46:51 PM
trans-1,2-Dichloroethene	ND	0.0237		mg/Kg-dry	1	11/29/2018 4:46:51 PM
Methyl tert-butyl ether (MTBE)	ND	0.0593		mg/Kg-dry	1	11/29/2018 4:46:51 PM
1,1-Dichloroethane	ND	0.0237		mg/Kg-dry	1	11/29/2018 4:46:51 PM
2,2-Dichloropropane	ND	0.119		mg/Kg-dry	1	11/29/2018 4:46:51 PM
cis-1,2-Dichloroethene	ND	0.0237		mg/Kg-dry	1	11/29/2018 4:46:51 PM
Chloroform	ND	0.0237		mg/Kg-dry	1	11/29/2018 4:46:51 PM
1,1,1-Trichloroethane (TCA)	ND	0.0297		mg/Kg-dry	1	11/29/2018 4:46:51 PM
1,1-Dichloropropene	ND	0.0237		mg/Kg-dry	1	11/29/2018 4:46:51 PM
Carbon tetrachloride	ND	0.0297		mg/Kg-dry	1	11/29/2018 4:46:51 PM
1,2-Dichloroethane (EDC)	ND	0.0237		mg/Kg-dry	1	11/29/2018 4:46:51 PM
Benzene	ND	0.0237		mg/Kg-dry	1	11/29/2018 4:46:51 PM
Trichloroethene (TCE)	ND	0.0237		mg/Kg-dry	1	11/29/2018 4:46:51 PM
1,2-Dichloropropane	ND	0.0237		mg/Kg-dry	1	11/29/2018 4:46:51 PM
Bromodichloromethane	ND	0.0237		mg/Kg-dry	1	11/29/2018 4:46:51 PM
Dibromomethane	ND	0.0237		mg/Kg-dry	1	11/29/2018 4:46:51 PM
cis-1,3-Dichloropropene	ND	0.0237		mg/Kg-dry	1	11/29/2018 4:46:51 PM
Toluene	ND	0.0237		mg/Kg-dry	1	11/29/2018 4:46:51 PM
trans-1,3-Dichloropropylene	ND	0.0237		mg/Kg-dry	1	11/29/2018 4:46:51 PM
1,1,2-Trichloroethane	ND	0.0237		mg/Kg-dry	1	11/29/2018 4:46:51 PM
1,3-Dichloropropane	ND	0.0297		mg/Kg-dry	1	11/29/2018 4:46:51 PM
Tetrachloroethene (PCE)	ND	0.0297		mg/Kg-dry	1	11/29/2018 4:46:51 PM
Dibromochloromethane	ND	0.0297		mg/Kg-dry	1	11/29/2018 4:46:51 PM
1,2-Dibromoethane (EDB)	ND	0.00593		mg/Kg-dry	1	11/29/2018 4:46:51 PM
Chlorobenzene	ND	0.0297		mg/Kg-dry	1	11/29/2018 4:46:51 PM
1,1,1,2-Tetrachloroethane	ND	0.0297		mg/Kg-dry	1	11/29/2018 4:46:51 PM
Ethylbenzene	ND	0.0297		mg/Kg-dry	1	11/29/2018 4:46:51 PM
m,p-Xylene	ND	0.0593		mg/Kg-dry	1	11/29/2018 4:46:51 PM
o-Xylene	ND	0.0297		mg/Kg-dry	1	11/29/2018 4:46:51 PM
Styrene	ND	0.0297		mg/Kg-dry	1	11/29/2018 4:46:51 PM
Isopropylbenzene	ND	0.0297		mg/Kg-dry	1	11/29/2018 4:46:51 PM
Bromoform	ND	0.0593		mg/Kg-dry	1	11/29/2018 4:46:51 PM
1,1,2,2-Tetrachloroethane	ND	0.0237		mg/Kg-dry	1	11/29/2018 4:46:51 PM
n-Propylbenzene	ND	0.0297		mg/Kg-dry	1	11/29/2018 4:46:51 PM
Bromobenzene	ND	0.0237		mg/Kg-dry	1	11/29/2018 4:46:51 PM

Analytical Report

Work Order: **1811282**
Date Reported: **11/30/2018**

Client: GeoEngineers
Collection Date: 11/15/2018 11:04:00 AM
Project: Rufus - Block 18
Lab ID: 1811282-009
Matrix: Soil
Client Sample ID: **TP-12-2.5**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Volatile Organic Compounds by EPA Method 8260C				Batch ID: 22768		Analyst: EM
1,3,5-Trimethylbenzene	ND	0.0297		mg/Kg-dry	1	11/29/2018 4:46:51 PM
2-Chlorotoluene	ND	0.0297		mg/Kg-dry	1	11/29/2018 4:46:51 PM
4-Chlorotoluene	ND	0.0297		mg/Kg-dry	1	11/29/2018 4:46:51 PM
tert-Butylbenzene	ND	0.0297		mg/Kg-dry	1	11/29/2018 4:46:51 PM
1,2,3-Trichloropropane	ND	0.0297		mg/Kg-dry	1	11/29/2018 4:46:51 PM
1,2,4-Trichlorobenzene	ND	0.0297		mg/Kg-dry	1	11/29/2018 4:46:51 PM
sec-Butylbenzene	ND	0.0593		mg/Kg-dry	1	11/29/2018 4:46:51 PM
4-Isopropyltoluene	ND	0.0593		mg/Kg-dry	1	11/29/2018 4:46:51 PM
1,3-Dichlorobenzene	ND	0.0237		mg/Kg-dry	1	11/29/2018 4:46:51 PM
1,4-Dichlorobenzene	ND	0.0237		mg/Kg-dry	1	11/29/2018 4:46:51 PM
n-Butylbenzene	ND	0.0297		mg/Kg-dry	1	11/29/2018 4:46:51 PM
1,2-Dichlorobenzene	ND	0.0237		mg/Kg-dry	1	11/29/2018 4:46:51 PM
1,2-Dibromo-3-chloropropane	ND	0.593		mg/Kg-dry	1	11/29/2018 4:46:51 PM
1,2,4-Trimethylbenzene	ND	0.0237		mg/Kg-dry	1	11/29/2018 4:46:51 PM
Hexachlorobutadiene	ND	0.0593		mg/Kg-dry	1	11/29/2018 4:46:51 PM
Naphthalene	ND	0.0593		mg/Kg-dry	1	11/29/2018 4:46:51 PM
1,2,3-Trichlorobenzene	ND	0.0237		mg/Kg-dry	1	11/29/2018 4:46:51 PM
Surr: Dibromofluoromethane	96.3	56.5 - 129		%Rec	1	11/29/2018 4:46:51 PM
Surr: Toluene-d8	99.7	64.5 - 151		%Rec	1	11/29/2018 4:46:51 PM
Surr: 1-Bromo-4-fluorobenzene	95.3	54.8 - 168		%Rec	1	11/29/2018 4:46:51 PM
Mercury by EPA Method 7471				Batch ID: 22719		Analyst: TN
Mercury	ND	0.287		mg/Kg-dry	1	11/26/2018 1:30:29 PM
Total Metals by EPA Method 6020				Batch ID: 22717		Analyst: WC
Arsenic	4.02	0.217		mg/Kg-dry	1	11/26/2018 3:16:29 PM
Cadmium	ND	0.173		mg/Kg-dry	1	11/26/2018 3:16:29 PM
Chromium	30.2	0.0867		mg/Kg-dry	1	11/26/2018 3:16:29 PM
Lead	2.36	0.173		mg/Kg-dry	1	11/26/2018 3:16:29 PM
Sample Moisture (Percent Moisture)				Batch ID: R47808		Analyst: EAS
Percent Moisture	14.6			wt%	1	11/21/2018 8:48:25 AM

Analytical Report

Work Order: **1811282**
Date Reported: **11/30/2018**

Client: GeoEngineers
Collection Date: 11/15/2018 11:16:00 AM
Project: Rufus - Block 18
Lab ID: 1811282-011
Matrix: Soil
Client Sample ID: **TP-11-2.5**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.				Batch ID: 22702		Analyst: DW
Diesel (Fuel Oil)	ND	23.7		mg/Kg-dry	1	11/23/2018 1:12:21 AM
Heavy Oil	ND	59.3		mg/Kg-dry	1	11/23/2018 1:12:21 AM
Surr: 2-Fluorobiphenyl	65.5	50 - 150		%Rec	1	11/23/2018 1:12:21 AM
Surr: o-Terphenyl	65.3	50 - 150		%Rec	1	11/23/2018 1:12:21 AM
Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)				Batch ID: 22722		Analyst: SB
Naphthalene	ND	45.5		µg/Kg-dry	1	11/28/2018 9:16:27 AM
2-Methylnaphthalene	ND	45.5		µg/Kg-dry	1	11/28/2018 9:16:27 AM
1-Methylnaphthalene	ND	45.5		µg/Kg-dry	1	11/28/2018 9:16:27 AM
Acenaphthylene	ND	45.5		µg/Kg-dry	1	11/28/2018 9:16:27 AM
Acenaphthene	ND	45.5		µg/Kg-dry	1	11/28/2018 9:16:27 AM
Fluorene	ND	45.5		µg/Kg-dry	1	11/28/2018 9:16:27 AM
Phenanthrene	ND	45.5		µg/Kg-dry	1	11/28/2018 9:16:27 AM
Anthracene	ND	45.5		µg/Kg-dry	1	11/28/2018 9:16:27 AM
Fluoranthene	ND	45.5		µg/Kg-dry	1	11/28/2018 9:16:27 AM
Pyrene	ND	45.5		µg/Kg-dry	1	11/28/2018 9:16:27 AM
Benz(a)anthracene	ND	45.5		µg/Kg-dry	1	11/28/2018 9:16:27 AM
Chrysene	ND	45.5		µg/Kg-dry	1	11/28/2018 9:16:27 AM
Benzo(b)fluoranthene	ND	45.5		µg/Kg-dry	1	11/28/2018 9:16:27 AM
Benzo(k)fluoranthene	ND	45.5		µg/Kg-dry	1	11/28/2018 9:16:27 AM
Benzo(a)pyrene	ND	45.5		µg/Kg-dry	1	11/28/2018 9:16:27 AM
Indeno(1,2,3-cd)pyrene	ND	45.5		µg/Kg-dry	1	11/28/2018 9:16:27 AM
Dibenz(a,h)anthracene	ND	45.5		µg/Kg-dry	1	11/28/2018 9:16:27 AM
Benzo(g,h,i)perylene	ND	45.5		µg/Kg-dry	1	11/28/2018 9:16:27 AM
Surr: 2-Fluorobiphenyl	67.3	12.5 - 140		%Rec	1	11/28/2018 9:16:27 AM
Surr: Terphenyl-d14 (surr)	79.8	45.7 - 172		%Rec	1	11/28/2018 9:16:27 AM
Gasoline by NWTPH-Gx				Batch ID: 22768		Analyst: EM
Gasoline	ND	6.67		mg/Kg-dry	1	11/29/2018 5:18:14 PM
Surr: Toluene-d8	98.6	65 - 135		%Rec	1	11/29/2018 5:18:14 PM
Surr: 4-Bromofluorobenzene	98.3	65 - 135		%Rec	1	11/29/2018 5:18:14 PM
Volatile Organic Compounds by EPA Method 8260C				Batch ID: 22768		Analyst: EM
Dichlorodifluoromethane (CFC-12)	ND	0.0267		mg/Kg-dry	1	11/29/2018 5:18:14 PM
Chloromethane	ND	0.0667		mg/Kg-dry	1	11/29/2018 5:18:14 PM
Vinyl chloride	ND	0.0333		mg/Kg-dry	1	11/29/2018 5:18:14 PM

Client: GeoEngineers
Collection Date: 11/15/2018 11:16:00 AM
Project: Rufus - Block 18
Lab ID: 1811282-011
Matrix: Soil
Client Sample ID: **TP-11-2.5**

Volatile Organic Compounds by EPA Method 8260C

Batch ID: 22768 Analyst: EM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Bromomethane	ND	0.0667		mg/Kg-dry	1	11/29/2018 5:18:14 PM
Trichlorofluoromethane (CFC-11)	ND	0.0267		mg/Kg-dry	1	11/29/2018 5:18:14 PM
Chloroethane	ND	0.0667		mg/Kg-dry	1	11/29/2018 5:18:14 PM
1,1-Dichloroethene	ND	0.0267		mg/Kg-dry	1	11/29/2018 5:18:14 PM
Methylene chloride	ND	0.0267		mg/Kg-dry	1	11/29/2018 5:18:14 PM
trans-1,2-Dichloroethene	ND	0.0267		mg/Kg-dry	1	11/29/2018 5:18:14 PM
Methyl tert-butyl ether (MTBE)	ND	0.0667		mg/Kg-dry	1	11/29/2018 5:18:14 PM
1,1-Dichloroethane	ND	0.0267		mg/Kg-dry	1	11/29/2018 5:18:14 PM
2,2-Dichloropropane	ND	0.133		mg/Kg-dry	1	11/29/2018 5:18:14 PM
cis-1,2-Dichloroethene	ND	0.0267		mg/Kg-dry	1	11/29/2018 5:18:14 PM
Chloroform	ND	0.0267		mg/Kg-dry	1	11/29/2018 5:18:14 PM
1,1,1-Trichloroethane (TCA)	ND	0.0333		mg/Kg-dry	1	11/29/2018 5:18:14 PM
1,1-Dichloropropene	ND	0.0267		mg/Kg-dry	1	11/29/2018 5:18:14 PM
Carbon tetrachloride	ND	0.0333		mg/Kg-dry	1	11/29/2018 5:18:14 PM
1,2-Dichloroethane (EDC)	ND	0.0267		mg/Kg-dry	1	11/29/2018 5:18:14 PM
Benzene	ND	0.0267		mg/Kg-dry	1	11/29/2018 5:18:14 PM
Trichloroethene (TCE)	ND	0.0267		mg/Kg-dry	1	11/29/2018 5:18:14 PM
1,2-Dichloropropane	ND	0.0267		mg/Kg-dry	1	11/29/2018 5:18:14 PM
Bromodichloromethane	ND	0.0267		mg/Kg-dry	1	11/29/2018 5:18:14 PM
Dibromomethane	ND	0.0267		mg/Kg-dry	1	11/29/2018 5:18:14 PM
cis-1,3-Dichloropropene	ND	0.0267		mg/Kg-dry	1	11/29/2018 5:18:14 PM
Toluene	ND	0.0267		mg/Kg-dry	1	11/29/2018 5:18:14 PM
trans-1,3-Dichloropropylene	ND	0.0267		mg/Kg-dry	1	11/29/2018 5:18:14 PM
1,1,2-Trichloroethane	ND	0.0267		mg/Kg-dry	1	11/29/2018 5:18:14 PM
1,3-Dichloropropane	ND	0.0333		mg/Kg-dry	1	11/29/2018 5:18:14 PM
Tetrachloroethene (PCE)	ND	0.0333		mg/Kg-dry	1	11/29/2018 5:18:14 PM
Dibromochloromethane	ND	0.0333		mg/Kg-dry	1	11/29/2018 5:18:14 PM
1,2-Dibromoethane (EDB)	ND	0.00667		mg/Kg-dry	1	11/29/2018 5:18:14 PM
Chlorobenzene	ND	0.0333		mg/Kg-dry	1	11/29/2018 5:18:14 PM
1,1,1,2-Tetrachloroethane	ND	0.0333		mg/Kg-dry	1	11/29/2018 5:18:14 PM
Ethylbenzene	ND	0.0333		mg/Kg-dry	1	11/29/2018 5:18:14 PM
m,p-Xylene	ND	0.0667		mg/Kg-dry	1	11/29/2018 5:18:14 PM
o-Xylene	ND	0.0333		mg/Kg-dry	1	11/29/2018 5:18:14 PM
Styrene	ND	0.0333		mg/Kg-dry	1	11/29/2018 5:18:14 PM
Isopropylbenzene	ND	0.0333		mg/Kg-dry	1	11/29/2018 5:18:14 PM
Bromoform	ND	0.0667		mg/Kg-dry	1	11/29/2018 5:18:14 PM
1,1,2,2-Tetrachloroethane	ND	0.0267		mg/Kg-dry	1	11/29/2018 5:18:14 PM
n-Propylbenzene	ND	0.0333		mg/Kg-dry	1	11/29/2018 5:18:14 PM
Bromobenzene	ND	0.0267		mg/Kg-dry	1	11/29/2018 5:18:14 PM

Client: GeoEngineers
Collection Date: 11/15/2018 11:16:00 AM
Project: Rufus - Block 18
Lab ID: 1811282-011
Matrix: Soil
Client Sample ID: **TP-11-2.5**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Volatile Organic Compounds by EPA Method 8260C				Batch ID: 22768		Analyst: EM
1,3,5-Trimethylbenzene	ND	0.0333		mg/Kg-dry	1	11/29/2018 5:18:14 PM
2-Chlorotoluene	ND	0.0333		mg/Kg-dry	1	11/29/2018 5:18:14 PM
4-Chlorotoluene	ND	0.0333		mg/Kg-dry	1	11/29/2018 5:18:14 PM
tert-Butylbenzene	ND	0.0333		mg/Kg-dry	1	11/29/2018 5:18:14 PM
1,2,3-Trichloropropane	ND	0.0333		mg/Kg-dry	1	11/29/2018 5:18:14 PM
1,2,4-Trichlorobenzene	ND	0.0333		mg/Kg-dry	1	11/29/2018 5:18:14 PM
sec-Butylbenzene	ND	0.0667		mg/Kg-dry	1	11/29/2018 5:18:14 PM
4-Isopropyltoluene	ND	0.0667		mg/Kg-dry	1	11/29/2018 5:18:14 PM
1,3-Dichlorobenzene	ND	0.0267		mg/Kg-dry	1	11/29/2018 5:18:14 PM
1,4-Dichlorobenzene	ND	0.0267		mg/Kg-dry	1	11/29/2018 5:18:14 PM
n-Butylbenzene	ND	0.0333		mg/Kg-dry	1	11/29/2018 5:18:14 PM
1,2-Dichlorobenzene	ND	0.0267		mg/Kg-dry	1	11/29/2018 5:18:14 PM
1,2-Dibromo-3-chloropropane	ND	0.667		mg/Kg-dry	1	11/29/2018 5:18:14 PM
1,2,4-Trimethylbenzene	ND	0.0267		mg/Kg-dry	1	11/29/2018 5:18:14 PM
Hexachlorobutadiene	ND	0.0667		mg/Kg-dry	1	11/29/2018 5:18:14 PM
Naphthalene	ND	0.0667		mg/Kg-dry	1	11/29/2018 5:18:14 PM
1,2,3-Trichlorobenzene	ND	0.0267		mg/Kg-dry	1	11/29/2018 5:18:14 PM
Surr: Dibromofluoromethane	95.7	56.5 - 129		%Rec	1	11/29/2018 5:18:14 PM
Surr: Toluene-d8	99.7	64.5 - 151		%Rec	1	11/29/2018 5:18:14 PM
Surr: 1-Bromo-4-fluorobenzene	95.1	54.8 - 168		%Rec	1	11/29/2018 5:18:14 PM
Mercury by EPA Method 7471				Batch ID: 22719		Analyst: TN
Mercury	ND	0.285		mg/Kg-dry	1	11/26/2018 1:32:13 PM
Total Metals by EPA Method 6020				Batch ID: 22717		Analyst: WC
Arsenic	4.48	0.235		mg/Kg-dry	1	11/26/2018 3:20:31 PM
Cadmium	ND	0.188		mg/Kg-dry	1	11/26/2018 3:20:31 PM
Chromium	37.1	0.0938		mg/Kg-dry	1	11/26/2018 3:20:31 PM
Lead	2.69	0.188		mg/Kg-dry	1	11/26/2018 3:20:31 PM
Sample Moisture (Percent Moisture)				Batch ID: R47808		Analyst: EAS
Percent Moisture	21.6			wt%	1	11/21/2018 8:48:25 AM

Work Order: 1811282
CLIENT: GeoEngineers
Project: Rufus - Block 18

QC SUMMARY REPORT

Total Metals by EPA Method 6020

Sample ID	**MB-22717**	SampType:	**MBLK**	Units:	**mg/Kg**	Prep Date:	**11/26/2018**	RunNo:	**47865**
Client ID:	**MBLKS**	Batch ID:	**22717**			Analysis Date:	**11/26/2018**	SeqNo:	**934471**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	0.191									
Cadmium	ND	0.153									
Chromium	ND	0.0763									
Lead	ND	0.153									

Sample ID	**LCS-22717**	SampType:	**LCS**	Units:	**mg/Kg**	Prep Date:	**11/26/2018**	RunNo:	**47865**
Client ID:	**LCSS**	Batch ID:	**22717**			Analysis Date:	**11/26/2018**	SeqNo:	**934472**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	39.0	0.188	37.59	0	104	80	120				
Cadmium	1.92	0.150	1.880	0	102	80	120				
Chromium	40.8	0.0752	37.59	0	109	80	120				
Lead	19.7	0.150	18.80	0	105	80	120				

Sample ID	**1811173-001ADUP**	SampType:	**DUP**	Units:	**mg/Kg-dry**	Prep Date:	**11/26/2018**	RunNo:	**47865**
Client ID:	**BATCH**	Batch ID:	**22717**			Analysis Date:	**11/26/2018**	SeqNo:	**934476**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	5.54	0.252						5.251	5.26	20	
Cadmium	ND	0.201						0		20	
Chromium	69.6	0.101						67.31	3.30	20	
Lead	4.63	0.201						4.377	5.71	20	

Sample ID	**1811173-001AMS**	SampType:	**MS**	Units:	**mg/Kg-dry**	Prep Date:	**11/26/2018**	RunNo:	**47865**
Client ID:	**BATCH**	Batch ID:	**22717**			Analysis Date:	**11/26/2018**	SeqNo:	**934478**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	50.6	0.254	50.76	5.251	89.3	75	125				
Cadmium	2.44	0.203	2.538	0.1800	89.1	75	125				

Work Order: 1811282
CLIENT: GeoEngineers
Project: Rufus - Block 18

QC SUMMARY REPORT

Total Metals by EPA Method 6020

Sample ID **1811173-001AMS** SampType: **MS** Units: **mg/Kg-dry** Prep Date: **11/26/2018** RunNo: **47865**
Client ID: **BATCH** Batch ID: **22717** Analysis Date: **11/26/2018** SeqNo: **934478**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	112	0.102	50.76	67.31	87.8	75	125				
Lead	24.0	0.203	25.38	4.377	77.4	75	125				

Sample ID **1811173-001AMSD** SampType: **MSD** Units: **mg/Kg-dry** Prep Date: **11/26/2018** RunNo: **47865**
Client ID: **BATCH** Batch ID: **22717** Analysis Date: **11/26/2018** SeqNo: **934479**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	52.7	0.254	50.76	5.251	93.5	75	125	50.56	4.18	20	
Cadmium	2.62	0.203	2.538	0.1800	96.3	75	125	2.443	7.14	20	
Chromium	115	0.102	50.76	67.31	94.3	75	125	111.9	2.91	20	
Lead	25.4	0.203	25.38	4.377	82.7	75	125	24.02	5.49	20	

Work Order: 1811282
CLIENT: GeoEngineers
Project: Rufus - Block 18

QC SUMMARY REPORT

Mercury by EPA Method 7471

Sample ID	MB-22719	SampType:	MBLK			Units:	mg/Kg	Prep Date:	11/26/2018	RunNo:	47854	
Client ID:	MBLKS	Batch ID:	22719					Analysis Date:	11/26/2018	SeqNo:	934216	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury		ND	0.219									

Sample ID	LCS-22719	SampType:	LCS			Units:	mg/Kg	Prep Date:	11/26/2018	RunNo:	47854	
Client ID:	LCSS	Batch ID:	22719					Analysis Date:	11/26/2018	SeqNo:	934217	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury		0.456	0.227	0.4545	0	100	80	120				

Sample ID	1811254-002ADUP	SampType:	DUP			Units:	mg/Kg-dry	Prep Date:	11/26/2018	RunNo:	47854	
Client ID:	BATCH	Batch ID:	22719					Analysis Date:	11/26/2018	SeqNo:	934178	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury		ND	0.304						0		20	

Sample ID	1811254-002AMS	SampType:	MS			Units:	mg/Kg-dry	Prep Date:	11/26/2018	RunNo:	47854	
Client ID:	BATCH	Batch ID:	22719					Analysis Date:	11/26/2018	SeqNo:	934179	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury		0.592	0.310	0.6196	0.05564	86.6	70	130				

Sample ID	1811254-002AMSD	SampType:	MSD			Units:	mg/Kg-dry	Prep Date:	11/26/2018	RunNo:	47854	
Client ID:	BATCH	Batch ID:	22719					Analysis Date:	11/26/2018	SeqNo:	934180	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury		0.602	0.315	0.6309	0.05564	86.6	70	130	0.5924	1.59	20	

Work Order: 1811282
CLIENT: GeoEngineers
Project: Rufus - Block 18

QC SUMMARY REPORT

Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Sample ID **MB-22702**	SampType: **MBLK**	Units: **mg/Kg**	Prep Date: **11/20/2018**	RunNo: **47862**
Client ID: **MBLKS**	Batch ID: **22702**		Analysis Date: **11/22/2018**	SeqNo: **934385**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel (Fuel Oil)	ND	20.0									
Heavy Oil	ND	50.0									
Surr: 2-Fluorobiphenyl	16.8		20.00		84.2	50	150				
Surr: o-Terphenyl	16.7		20.00		83.4	50	150				

Sample ID **LCS-22702**	SampType: **LCS**	Units: **mg/Kg**	Prep Date: **11/20/2018**	RunNo: **47862**
Client ID: **LCSS**	Batch ID: **22702**		Analysis Date: **11/22/2018**	SeqNo: **934386**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel (Fuel Oil)	564	20.0	500.0	0	113	65	135				
Surr: 2-Fluorobiphenyl	18.6		20.00		92.8	50	150				
Surr: o-Terphenyl	17.4		20.00		87.0	50	150				

Sample ID **1811273-003ADUP**	SampType: **DUP**	Units: **mg/Kg-dry**	Prep Date: **11/20/2018**	RunNo: **47862**
Client ID: **BATCH**	Batch ID: **22702**		Analysis Date: **11/22/2018**	SeqNo: **934388**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel (Fuel Oil)	ND	19.5						0		30	
Heavy Oil	ND	48.8						0		30	
Surr: 2-Fluorobiphenyl	16.1		19.54		82.2	50	150		0		
Surr: o-Terphenyl	15.7		19.54		80.1	50	150		0		

Sample ID **1811273-003AMS**	SampType: **MS**	Units: **mg/Kg-dry**	Prep Date: **11/20/2018**	RunNo: **47862**
Client ID: **BATCH**	Batch ID: **22702**		Analysis Date: **11/22/2018**	SeqNo: **934389**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel (Fuel Oil)	484	18.2	455.8	0	106	65	135				
Surr: 2-Fluorobiphenyl	16.5		18.23		90.5	50	150				
Surr: o-Terphenyl	14.7		18.23		80.5	50	150				

Work Order: 1811282
CLIENT: GeoEngineers
Project: Rufus - Block 18

QC SUMMARY REPORT

Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Sample ID **1811273-003AMS** SampType: **MS** Units: **mg/Kg-dry** Prep Date: **11/20/2018** RunNo: **47862**
Client ID: **BATCH** Batch ID: **22702** Analysis Date: **11/22/2018** SeqNo: **934389**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Sample ID **1811273-003AMSD** SampType: **MSD** Units: **mg/Kg-dry** Prep Date: **11/20/2018** RunNo: **47862**
Client ID: **BATCH** Batch ID: **22702** Analysis Date: **11/22/2018** SeqNo: **934390**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel (Fuel Oil)	510	18.5	461.3	0	110	65	135	484.5	5.04	30	
Surr: 2-Fluorobiphenyl	17.1		18.45		92.9	50	150		0		
Surr: o-Terphenyl	15.4		18.45		83.5	50	150		0		

Sample ID **1811282-011ADUP** SampType: **DUP** Units: **mg/Kg-dry** Prep Date: **11/20/2018** RunNo: **47862**
Client ID: **TP-11-2.5** Batch ID: **22702** Analysis Date: **11/23/2018** SeqNo: **934407**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel (Fuel Oil)	ND	22.2						0		30	
Heavy Oil	ND	55.5						0		30	
Surr: 2-Fluorobiphenyl	16.2		22.20		72.9	50	150		0		
Surr: o-Terphenyl	16.0		22.20		72.2	50	150		0		

Sample ID **MB-22786** SampType: **MBLK** Units: **mg/Kg** Prep Date: **11/29/2018** RunNo: **47970**
Client ID: **MBLKS** Batch ID: **22786** Analysis Date: **11/30/2018** SeqNo: **937258**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel (Fuel Oil)	ND	20.0									
Heavy Oil	ND	50.0									
Surr: 2-Fluorobiphenyl	16.6		20.00		82.8	50	150				
Surr: o-Terphenyl	18.3		20.00		91.5	50	150				

Work Order: 1811282
CLIENT: GeoEngineers
Project: Rufus - Block 18

QC SUMMARY REPORT

Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Sample ID **LCS-22786** SampType: **LCS** Units: **mg/Kg** Prep Date: **11/29/2018** RunNo: **47970**
Client ID: **LCSS** Batch ID: **22786** Analysis Date: **11/30/2018** SeqNo: **937259**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel (Fuel Oil)	622	20.0	500.0	0	124	65	135				
Surr: 2-Fluorobiphenyl	18.7		20.00		93.6	50	150				
Surr: o-Terphenyl	18.6		20.00		93.1	50	150				

Sample ID **MB-22786** SampType: **MBLK** Units: **mg/Kg** Prep Date: **11/29/2018** RunNo: **47970**
Client ID: **MBLKS** Batch ID: **22786** Analysis Date: **11/30/2018** SeqNo: **937260**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel (Fuel Oil)	ND	20.0									SGT
Heavy Oil	ND	50.0									SGT
Surr: 2-Fluorobiphenyl	16.6		20.00		83.2	50	150				SGT
Surr: o-Terphenyl	18.4		20.00		91.9	50	150				SGT

NOTES:
SGT - Silica Gel Treatment

Work Order: 1811282
CLIENT: GeoEngineers
Project: Rufus - Block 18

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID **MB-22722**	SampType: **MBLK**	Units: **µg/Kg**	Prep Date: **11/26/2018**	RunNo: **47926**
Client ID: **MBLKS**	Batch ID: **22722**		Analysis Date: **11/28/2018**	SeqNo: **935815**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	40.0									
2-Methylnaphthalene	ND	40.0									
1-Methylnaphthalene	ND	40.0									
Acenaphthylene	ND	40.0									
Acenaphthene	ND	40.0									
Fluorene	ND	40.0									
Phenanthrene	ND	40.0									
Anthracene	ND	40.0									
Fluoranthene	ND	40.0									
Pyrene	ND	40.0									
Benz(a)anthracene	ND	40.0									
Chrysene	ND	40.0									
Benzo(b)fluoranthene	ND	40.0									
Benzo(k)fluoranthene	ND	40.0									
Benzo(a)pyrene	ND	40.0									
Indeno(1,2,3-cd)pyrene	ND	40.0									
Dibenz(a,h)anthracene	ND	40.0									
Benzo(g,h,i)perylene	ND	40.0									
Surr: 2-Fluorobiphenyl	501		500.0		100	12.5	140				
Surr: Terphenyl-d14 (surr)	620		500.0		124	45.7	172				

Sample ID **LCS-22722**	SampType: **LCS**	Units: **µg/Kg**	Prep Date: **11/26/2018**	RunNo: **47926**
Client ID: **LCSS**	Batch ID: **22722**		Analysis Date: **11/28/2018**	SeqNo: **935816**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	942	40.0	1,000	0	94.2	50.6	131				
2-Methylnaphthalene	945	40.0	1,000	0	94.5	45.1	135				
1-Methylnaphthalene	920	40.0	1,000	0	92.0	46.2	133				
Acenaphthylene	946	40.0	1,000	0	94.6	32.8	136				
Acenaphthene	931	40.0	1,000	0	93.1	42	137				

Work Order: 1811282
CLIENT: GeoEngineers
Project: Rufus - Block 18

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID **LCS-22722** SampType: **LCS** Units: **µg/Kg** Prep Date: **11/26/2018** RunNo: **47926**
Client ID: **LCSS** Batch ID: **22722** Analysis Date: **11/28/2018** SeqNo: **935816**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluorene	937	40.0	1,000	0	93.7	41.4	144				
Phenanthrene	905	40.0	1,000	0	90.5	36.6	141				
Anthracene	914	40.0	1,000	0	91.4	42.5	157				
Fluoranthene	937	40.0	1,000	0	93.7	43.4	144				
Pyrene	921	40.0	1,000	0	92.1	39.6	146				
Benz(a)anthracene	938	40.0	1,000	0	93.8	36.6	142				
Chrysene	962	40.0	1,000	0	96.2	43	165				
Benzo(b)fluoranthene	1,030	40.0	1,000	0	103	41	155				
Benzo(k)fluoranthene	871	40.0	1,000	0	87.1	30.6	164				
Benzo(a)pyrene	919	40.0	1,000	0	91.9	30.2	171				
Indeno(1,2,3-cd)pyrene	916	40.0	1,000	0	91.6	31.3	159				
Dibenz(a,h)anthracene	926	40.0	1,000	0	92.6	28	158				
Benzo(g,h,i)perylene	914	40.0	1,000	0	91.4	32.4	144				
Surr: 2-Fluorobiphenyl	617		500.0		123	12.5	140				
Surr: Terphenyl-d14 (surr)	675		500.0		135	45.7	172				

Sample ID **1811281-007ADUP** SampType: **DUP** Units: **µg/Kg-dry** Prep Date: **11/26/2018** RunNo: **47926**
Client ID: **BATCH** Batch ID: **22722** Analysis Date: **11/28/2018** SeqNo: **935818**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	39.1						0		30	
2-Methylnaphthalene	ND	39.1						0		30	
1-Methylnaphthalene	ND	39.1						0		30	
Acenaphthylene	ND	39.1						0		30	
Acenaphthene	ND	39.1						0		30	
Fluorene	ND	39.1						0		30	
Phenanthrene	ND	39.1						0		30	
Anthracene	ND	39.1						0		30	
Fluoranthene	ND	39.1						0		30	
Pyrene	ND	39.1						0		30	

Work Order: 1811282
CLIENT: GeoEngineers
Project: Rufus - Block 18

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID **1811281-007ADUP** SampType: **DUP** Units: **µg/Kg-dry** Prep Date: **11/26/2018** RunNo: **47926**
Client ID: **BATCH** Batch ID: **22722** Analysis Date: **11/28/2018** SeqNo: **935818**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benz(a)anthracene	ND	39.1						0		30	
Chrysene	ND	39.1						0		30	
Benzo(b)fluoranthene	ND	39.1						0		30	
Benzo(k)fluoranthene	ND	39.1						0		30	
Benzo(a)pyrene	ND	39.1						0		30	
Indeno(1,2,3-cd)pyrene	ND	39.1						0		30	
Dibenz(a,h)anthracene	ND	39.1						0		30	
Benzo(g,h,i)perylene	ND	39.1						0		30	
Surr: 2-Fluorobiphenyl	443		489.3		90.6	12.5	140		0		
Surr: Terphenyl-d14 (surr)	532		489.3		109	45.7	172		0		

Sample ID **1811281-007AMS** SampType: **MS** Units: **µg/Kg-dry** Prep Date: **11/26/2018** RunNo: **47926**
Client ID: **BATCH** Batch ID: **22722** Analysis Date: **11/28/2018** SeqNo: **935819**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	875	43.7	1,092	0	80.1	42.9	138				
2-Methylnaphthalene	871	43.7	1,092	0	79.7	42.8	151				
1-Methylnaphthalene	856	43.7	1,092	0	78.3	41.6	148				
Acenaphthylene	878	43.7	1,092	0	80.4	32.6	160				
Acenaphthene	877	43.7	1,092	0	80.3	31.7	126				
Fluorene	866	43.7	1,092	1.797	79.1	43.4	153				
Phenanthrene	844	43.7	1,092	0	77.3	23.8	135				
Anthracene	857	43.7	1,092	2.434	78.3	32.6	160				
Fluoranthene	882	43.7	1,092	0	80.7	28	144				
Pyrene	867	43.7	1,092	0	79.4	27.8	141				
Benz(a)anthracene	868	43.7	1,092	6.474	78.8	34.9	139				
Chrysene	925	43.7	1,092	6.301	84.1	45.2	146				
Benzo(b)fluoranthene	900	43.7	1,092	0	82.4	42.2	168				
Benzo(k)fluoranthene	874	43.7	1,092	0	80.0	20.5	150				
Benzo(a)pyrene	851	43.7	1,092	0	77.9	34.4	179				

Work Order: 1811282
CLIENT: GeoEngineers
Project: Rufus - Block 18

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID **1811281-007AMS** SampType: **MS** Units: **µg/Kg-dry** Prep Date: **11/26/2018** RunNo: **47926**
Client ID: **BATCH** Batch ID: **22722** Analysis Date: **11/28/2018** SeqNo: **935819**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Indeno(1,2,3-cd)pyrene	820	43.7	1,092	0	75.1	11.8	140				
Dibenz(a,h)anthracene	814	43.7	1,092	0	74.5	17.3	156				
Benzo(g,h,i)perylene	791	43.7	1,092	0	72.4	24.9	119				
Surr: 2-Fluorobiphenyl	531		546.2		97.2	12.5	140				
Surr: Terphenyl-d14 (surr)	576		546.2		105	45.7	172				

Sample ID **1811281-007AMSD** SampType: **MSD** Units: **µg/Kg-dry** Prep Date: **11/26/2018** RunNo: **47926**
Client ID: **BATCH** Batch ID: **22722** Analysis Date: **11/28/2018** SeqNo: **935820**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	747	43.0	1,076	0	69.4	42.9	138	875.3	15.9	30	
2-Methylnaphthalene	736	43.0	1,076	0	68.4	42.8	151	870.9	16.8	30	
1-Methylnaphthalene	727	43.0	1,076	0	67.5	41.6	148	855.8	16.3	30	
Acenaphthylene	738	43.0	1,076	0	68.6	32.6	160	877.9	17.3	30	
Acenaphthene	746	43.0	1,076	0	69.3	31.7	126	877.2	16.2	30	
Fluorene	736	43.0	1,076	1.797	68.2	43.4	153	865.6	16.2	30	
Phenanthrene	728	43.0	1,076	0	67.7	23.8	135	844.2	14.8	30	
Anthracene	727	43.0	1,076	2.434	67.3	32.6	160	857.4	16.5	30	
Fluoranthene	774	43.0	1,076	0	71.9	28	144	881.6	13.0	30	
Pyrene	758	43.0	1,076	0	70.5	27.8	141	867.1	13.4	30	
Benz(a)anthracene	758	43.0	1,076	6.474	69.8	34.9	139	867.7	13.5	30	
Chrysene	818	43.0	1,076	6.301	75.4	45.2	146	924.9	12.3	30	
Benzo(b)fluoranthene	779	43.0	1,076	0	72.4	42.2	168	900.0	14.4	30	
Benzo(k)fluoranthene	777	43.0	1,076	0	72.2	20.5	150	873.8	11.8	30	
Benzo(a)pyrene	745	43.0	1,076	0	69.3	34.4	179	851.1	13.2	30	
Indeno(1,2,3-cd)pyrene	713	43.0	1,076	0	66.3	11.8	140	820.0	14.0	30	
Dibenz(a,h)anthracene	725	43.0	1,076	0	67.4	17.3	156	813.6	11.5	30	
Benzo(g,h,i)perylene	702	43.0	1,076	0	65.2	24.9	119	791.1	12.0	30	
Surr: 2-Fluorobiphenyl	445		538.0		82.7	12.5	140		0		
Surr: Terphenyl-d14 (surr)	513		538.0		95.4	45.7	172		0		

Work Order: 1811282
CLIENT: GeoEngineers
Project: Rufus - Block 18

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID	**1811281-007AMSD**	SampType:	**MSD**		Units:	**µg/Kg-dry**	Prep Date:	**11/26/2018**	RunNo:	**47926**	
Client ID:	**BATCH**	Batch ID:	**22722**				Analysis Date:	**11/28/2018**	SeqNo:	**935820**	

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Sample ID	**MB-22785**	SampType:	**MBLK**		Units:	**µg/Kg**	Prep Date:	**11/29/2018**	RunNo:	**47995**	
Client ID:	**MBLKS**	Batch ID:	**22785**				Analysis Date:	**11/30/2018**	SeqNo:	**937266**	

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	40.0									
2-Methylnaphthalene	ND	40.0									
1-Methylnaphthalene	ND	40.0									
Acenaphthylene	ND	40.0									
Acenaphthene	ND	40.0									
Fluorene	ND	40.0									
Phenanthrene	ND	40.0									
Anthracene	ND	40.0									
Fluoranthene	ND	40.0									
Pyrene	ND	40.0									
Benz(a)anthracene	ND	40.0									
Chrysene	ND	40.0									
Benzo(b)fluoranthene	ND	40.0									
Benzo(k)fluoranthene	ND	40.0									
Benzo(a)pyrene	ND	40.0									
Indeno(1,2,3-cd)pyrene	ND	40.0									Q
Dibenz(a,h)anthracene	ND	40.0									Q
Benzo(g,h,i)perylene	ND	40.0									Q
Surr: 2-Fluorobiphenyl	456		500.0		91.3	12.5	140				
Surr: Terphenyl-d14 (surr)	480		500.0		95.9	45.7	172				

NOTES:
Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria

Work Order: 1811282
CLIENT: GeoEngineers
Project: Rufus - Block 18

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID **LCS-22785** SampType: **LCS** Units: **µg/Kg** Prep Date: **11/29/2018** RunNo: **47995**
Client ID: **LCSS** Batch ID: **22785** Analysis Date: **11/30/2018** SeqNo: **937267**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	853	40.0	1,000	0	85.3	50.6	131				
2-Methylnaphthalene	857	40.0	1,000	0	85.7	45.1	135				
1-Methylnaphthalene	829	40.0	1,000	0	82.9	46.2	133				
Acenaphthylene	859	40.0	1,000	0	85.9	32.8	136				
Acenaphthene	845	40.0	1,000	0	84.5	42	137				
Fluorene	854	40.0	1,000	0	85.4	41.4	144				
Phenanthrene	803	40.0	1,000	0	80.3	36.6	141				
Anthracene	850	40.0	1,000	0	85.0	42.5	157				
Fluoranthene	866	40.0	1,000	0	86.6	43.4	144				
Pyrene	846	40.0	1,000	0	84.6	39.6	146				
Benz(a)anthracene	893	40.0	1,000	0	89.3	36.6	142				
Chrysene	842	40.0	1,000	0	84.2	43	165				
Benzo(b)fluoranthene	767	40.0	1,000	0	76.7	41	155				
Benzo(k)fluoranthene	759	40.0	1,000	0	75.9	30.6	164				
Benzo(a)pyrene	712	40.0	1,000	0	71.2	30.2	171				
Indeno(1,2,3-cd)pyrene	568	40.0	1,000	0	56.8	31.3	159				
Dibenz(a,h)anthracene	605	40.0	1,000	0	60.5	28	158				
Benzo(g,h,i)perylene	475	40.0	1,000	0	47.5	32.4	144				
Surr: 2-Fluorobiphenyl	464		500.0		92.8	12.5	140				
Surr: Terphenyl-d14 (surr)	475		500.0		95.0	45.7	172				

Sample ID **1811282-002ADUP** SampType: **DUP** Units: **µg/Kg-dry** Prep Date: **11/29/2018** RunNo: **47995**
Client ID: **TP-8-5.0** Batch ID: **22785** Analysis Date: **11/30/2018** SeqNo: **937269**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	48.9						0		30	
2-Methylnaphthalene	ND	48.9						0		30	
1-Methylnaphthalene	ND	48.9						0		30	
Acenaphthylene	ND	48.9						0		30	
Acenaphthene	ND	48.9						0		30	

Work Order: 1811282
CLIENT: GeoEngineers
Project: Rufus - Block 18

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID **1811282-002ADUP** SampType: **DUP** Units: **µg/Kg-dry** Prep Date: **11/29/2018** RunNo: **47995**
Client ID: **TP-8-5.0** Batch ID: **22785** Analysis Date: **11/30/2018** SeqNo: **937269**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluorene	ND	48.9						0		30	
Phenanthrene	ND	48.9						0		30	
Anthracene	ND	48.9						0		30	
Fluoranthene	ND	48.9						0		30	
Pyrene	ND	48.9						0		30	
Benz(a)anthracene	ND	48.9						0		30	
Chrysene	ND	48.9						0		30	
Benzo(b)fluoranthene	ND	48.9						0		30	
Benzo(k)fluoranthene	ND	48.9						0		30	
Benzo(a)pyrene	ND	48.9						0		30	
Indeno(1,2,3-cd)pyrene	ND	48.9						0		30	Q
Dibenz(a,h)anthracene	ND	48.9						0		30	Q
Benzo(g,h,i)perylene	ND	48.9						0		30	Q
Surr: 2-Fluorobiphenyl	419		611.3		68.5	12.5	140		0		
Surr: Terphenyl-d14 (surr)	447		611.3		73.2	45.7	172		0		

NOTES:
Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria

Sample ID **1811282-002AMS** SampType: **MS** Units: **µg/Kg-dry** Prep Date: **11/29/2018** RunNo: **47995**
Client ID: **TP-8-5.0** Batch ID: **22785** Analysis Date: **11/30/2018** SeqNo: **937270**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	1,040	46.7	1,168	0	89.0	42.9	138				
2-Methylnaphthalene	1,040	46.7	1,168	0	89.3	42.8	151				
1-Methylnaphthalene	1,010	46.7	1,168	0	86.5	41.6	148				
Acenaphthylene	1,040	46.7	1,168	0	89.2	32.6	160				
Acenaphthene	1,030	46.7	1,168	0	88.4	31.7	126				
Fluorene	1,030	46.7	1,168	2.020	88.1	43.4	153				
Phenanthrene	994	46.7	1,168	0	85.1	23.8	135				
Anthracene	1,030	46.7	1,168	2.388	88.2	32.6	160				
Fluoranthene	1,050	46.7	1,168	0	90.3	28	144				

Work Order: 1811282
CLIENT: GeoEngineers
Project: Rufus - Block 18

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID **1811282-002AMS** SampType: **MS** Units: **µg/Kg-dry** Prep Date: **11/29/2018** RunNo: **47995**
Client ID: **TP-8-5.0** Batch ID: **22785** Analysis Date: **11/30/2018** SeqNo: **937270**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Pyrene	1,030	46.7	1,168	0	88.4	27.8	141				
Benz(a)anthracene	1,080	46.7	1,168	6.654	91.6	34.9	139				
Chrysene	1,040	46.7	1,168	6.248	88.6	45.2	146				
Benzo(b)fluoranthene	1,040	46.7	1,168	0	89.4	42.2	168				
Benzo(k)fluoranthene	819	46.7	1,168	0	70.1	20.5	150				
Benzo(a)pyrene	864	46.7	1,168	0	74.0	34.4	179				
Indeno(1,2,3-cd)pyrene	699	46.7	1,168	0	59.8	11.8	140				
Dibenz(a,h)anthracene	741	46.7	1,168	0	63.4	17.3	156				
Benzo(g,h,i)perylene	599	46.7	1,168	0	51.3	24.9	119				
Surr: 2-Fluorobiphenyl	486		584.1		83.2	12.5	140				
Surr: Terphenyl-d14 (surr)	509		584.1		87.2	45.7	172				

Sample ID **1811282-002AMSD** SampType: **MSD** Units: **µg/Kg-dry** Prep Date: **11/29/2018** RunNo: **47995**
Client ID: **TP-8-5.0** Batch ID: **22785** Analysis Date: **11/30/2018** SeqNo: **937271**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	961	48.7	1,218	0	78.9	42.9	138	1,039	7.80	30	
2-Methylnaphthalene	963	48.7	1,218	0	79.1	42.8	151	1,043	7.96	30	
1-Methylnaphthalene	935	48.7	1,218	0	76.7	41.6	148	1,010	7.81	30	
Acenaphthylene	963	48.7	1,218	0	79.1	32.6	160	1,043	7.94	30	
Acenaphthene	951	48.7	1,218	0	78.1	31.7	126	1,033	8.18	30	
Fluorene	945	48.7	1,218	2.020	77.4	43.4	153	1,031	8.70	30	
Phenanthrene	901	48.7	1,218	0	73.9	23.8	135	993.7	9.83	30	
Anthracene	939	48.7	1,218	2.388	76.9	32.6	160	1,032	9.48	30	
Fluoranthene	962	48.7	1,218	0	79.0	28	144	1,055	9.22	30	
Pyrene	941	48.7	1,218	0	77.3	27.8	141	1,033	9.29	30	
Benz(a)anthracene	982	48.7	1,218	6.654	80.0	34.9	139	1,077	9.23	30	
Chrysene	964	48.7	1,218	6.248	78.6	45.2	146	1,041	7.72	30	
Benzo(b)fluoranthene	978	48.7	1,218	0	80.3	42.2	168	1,044	6.57	30	
Benzo(k)fluoranthene	761	48.7	1,218	0	62.5	20.5	150	818.9	7.29	30	

Work Order: 1811282
CLIENT: GeoEngineers
Project: Rufus - Block 18

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID **1811282-002AMSD** SampType: **MSD** Units: **µg/Kg-dry** Prep Date: **11/29/2018** RunNo: **47995**
Client ID: **TP-8-5.0** Batch ID: **22785** Analysis Date: **11/30/2018** SeqNo: **937271**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzo(a)pyrene	816	48.7	1,218	0	67.0	34.4	179	864.0	5.68	30	
Indeno(1,2,3-cd)pyrene	673	48.7	1,218	0	55.3	11.8	140	699.0	3.80	30	
Dibenz(a,h)anthracene	709	48.7	1,218	0	58.2	17.3	156	740.8	4.40	30	
Benzo(g,h,i)perylene	590	48.7	1,218	0	48.4	24.9	119	599.0	1.57	30	
Surr: 2-Fluorobiphenyl	472		609.0		77.5	12.5	140		0		
Surr: Terphenyl-d14 (surr)	478		609.0		78.5	45.7	172		0		

Work Order: 1811282
CLIENT: GeoEngineers
Project: Rufus - Block 18

QC SUMMARY REPORT

Gasoline by NWTPH-Gx

Sample ID	**LCS-22768**	SampType: **LCS**		Units: **mg/Kg**		Prep Date: **11/29/2018**		RunNo: **47969**			
Client ID:	**LCSS**	Batch ID: **22768**				Analysis Date: **11/29/2018**		SeqNo: **936811**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline	23.6	5.00	25.00	0	94.4	65	135				
Surr: Toluene-d8	1.24		1.250		99.4	65	135				
Surr: 4-Bromofluorobenzene	1.22		1.250		98.0	65	135				

Sample ID	**MB-22768**	SampType: **MBLK**		Units: **mg/Kg**		Prep Date: **11/29/2018**		RunNo: **47969**			
Client ID:	**MBLKS**	Batch ID: **22768**				Analysis Date: **11/29/2018**		SeqNo: **936812**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline	ND	5.00									
Surr: Toluene-d8	1.22		1.250		97.7	65	135				
Surr: 4-Bromofluorobenzene	1.23		1.250		98.3	65	135				

Sample ID	**1811281-001BDUP**	SampType: **DUP**		Units: **mg/Kg-dry**		Prep Date: **11/29/2018**		RunNo: **47969**			
Client ID:	**BATCH**	Batch ID: **22768**				Analysis Date: **11/29/2018**		SeqNo: **936797**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline	ND	5.88						0		30	H
Gasoline Range Organics (C6-C12)	26.0	5.88						10.11	88.0	30	RH
Surr: Toluene-d8	1.45		1.470		98.8	65	135		0		H
Surr: 4-Bromofluorobenzene	1.46		1.470		99.2	65	135		0		H

NOTES:
GRO - Indicates the presence of unresolved compounds eluting from toluene to dodecane (~C6-C12).
R - High RPD due to suspected sample inhomogeneity. The method is in control as indicated by the Laboratory Control Sample (LCS).

Sample ID	**1811282-011BMS**	SampType: **MS**		Units: **mg/Kg-dry**		Prep Date: **11/29/2018**		RunNo: **47969**			
Client ID:	**TP-11-2.5**	Batch ID: **22768**				Analysis Date: **11/29/2018**		SeqNo: **936807**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline	37.8	6.67	33.35	0	113	65	135				
Surr: Toluene-d8	1.63		1.667		98.0	65	135				

Work Order: 1811282
CLIENT: GeoEngineers
Project: Rufus - Block 18

QC SUMMARY REPORT

Gasoline by NWTPH-Gx

Sample ID **1811282-011BMS**	SampType: **MS**	Units: **mg/Kg-dry**	Prep Date: **11/29/2018**	RunNo: **47969**
Client ID: **TP-11-2.5**	Batch ID: **22768**		Analysis Date: **11/29/2018**	SeqNo: **936807**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: 4-Bromofluorobenzene	1.64		1.667		98.4	65	135				

Sample ID **1811282-011BMSD**	SampType: **MSD**	Units: **mg/Kg-dry**	Prep Date: **11/29/2018**	RunNo: **47969**
Client ID: **TP-11-2.5**	Batch ID: **22768**		Analysis Date: **11/29/2018**	SeqNo: **936808**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline	35.3	6.67	33.35	0	106	65	135	37.77	6.84	30	
Surr: Toluene-d8	1.64		1.667		98.3	65	135		0		
Surr: 4-Bromofluorobenzene	1.64		1.667		98.3	65	135		0		

Work Order: 1811282
CLIENT: GeoEngineers
Project: Rufus - Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID **LCS-22768** SampType: **LCS** Units: **mg/Kg** Prep Date: **11/29/2018** RunNo: **47968**
Client ID: **LCSS** Batch ID: **22768** Analysis Date: **11/29/2018** SeqNo: **936793**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dichlorodifluoromethane (CFC-12)	1.73	0.0200	1.000	0	173	14.3	167				S
Chloromethane	1.42	0.0500	1.000	0	142	32	156				
Vinyl chloride	1.27	0.0250	1.000	0	127	43.4	151				
Bromomethane	1.46	0.0500	1.000	0	146	35	155				
Trichlorofluoromethane (CFC-11)	1.48	0.0200	1.000	0	148	33.8	156				
Chloroethane	1.17	0.0500	1.000	0	117	33.1	147				
1,1-Dichloroethene	0.949	0.0200	1.000	0	94.9	30.9	145				
Methylene chloride	1.13	0.0200	1.000	0	113	46.3	140				
trans-1,2-Dichloroethene	1.11	0.0200	1.000	0	111	68	130				
Methyl tert-butyl ether (MTBE)	1.08	0.0500	1.000	0	108	44.1	152				
1,1-Dichloroethane	1.10	0.0200	1.000	0	110	61.9	137				
2,2-Dichloropropane	1.07	0.100	1.000	0	107	35.5	186				
cis-1,2-Dichloroethene	1.09	0.0200	1.000	0	109	71.3	135				
Chloroform	1.09	0.0200	1.000	0	109	69	145				
1,1,1-Trichloroethane (TCA)	1.07	0.0250	1.000	0	107	69	132				
1,1-Dichloropropene	1.07	0.0200	1.000	0	107	72.7	131				
Carbon tetrachloride	1.04	0.0250	1.000	0	104	63.4	137				
1,2-Dichloroethane (EDC)	1.11	0.0200	1.000	0	111	50.9	162				
Benzene	1.10	0.0200	1.000	0	110	64.3	133				
Trichloroethene (TCE)	1.05	0.0200	1.000	0	105	65.5	137				
1,2-Dichloropropane	1.07	0.0200	1.000	0	107	63.2	142				
Bromodichloromethane	1.01	0.0200	1.000	0	101	53.4	131				
Dibromomethane	1.06	0.0200	1.000	0	106	60.1	146				
cis-1,3-Dichloropropene	1.02	0.0200	1.000	0	102	59.1	143				
Toluene	1.07	0.0200	1.000	0	107	67	144				
trans-1,3-Dichloropropylene	0.989	0.0200	1.000	0	98.9	49.2	149				
1,1,2-Trichloroethane	1.07	0.0200	1.000	0	107	56.9	147				
1,3-Dichloropropane	1.06	0.0250	1.000	0	106	56.1	153				
Tetrachloroethene (PCE)	1.06	0.0250	1.000	0	106	52.7	150				
Dibromochloromethane	0.969	0.0250	1.000	0	96.9	70.6	144				
1,2-Dibromoethane (EDB)	1.05	0.00500	1.000	0	105	50.5	154				

Work Order: 1811282
CLIENT: GeoEngineers
Project: Rufus - Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID **LCS-22768** SampType: **LCS** Units: **mg/Kg** Prep Date: **11/29/2018** RunNo: **47968**
Client ID: **LCSS** Batch ID: **22768** Analysis Date: **11/29/2018** SeqNo: **936793**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chlorobenzene	1.06	0.0250	1.000	0	106	84.9	125				
1,1,1,2-Tetrachloroethane	1.00	0.0250	1.000	0	100	65.9	141				
Ethylbenzene	1.13	0.0250	1.000	0	113	74	129				
m,p-Xylene	2.15	0.0500	2.000	0	107	70	124				
o-Xylene	1.03	0.0250	1.000	0	103	68.1	139				
Styrene	1.03	0.0250	1.000	0	103	73.3	146				
Isopropylbenzene	1.07	0.0250	1.000	0	107	70	130				
Bromoform	0.901	0.0500	1.000	0	90.1	44.3	130				
1,1,2,2-Tetrachloroethane	1.07	0.0200	1.000	0	107	44.8	165				
n-Propylbenzene	1.08	0.0250	1.000	0	108	75.8	139				
Bromobenzene	1.03	0.0200	1.000	0	103	49.2	144				
1,3,5-Trimethylbenzene	1.06	0.0250	1.000	0	106	76.5	135				
2-Chlorotoluene	1.16	0.0250	1.000	0	116	76.7	129				
4-Chlorotoluene	1.02	0.0250	1.000	0	102	77.5	125				
tert-Butylbenzene	1.02	0.0250	1.000	0	102	66.2	130				
1,2,3-Trichloropropane	0.977	0.0250	1.000	0	97.7	67.9	136				
1,2,4-Trichlorobenzene	1.07	0.0250	1.000	0	107	65.5	150				
sec-Butylbenzene	1.09	0.0500	1.000	0	109	75.6	133				
4-Isopropyltoluene	1.10	0.0500	1.000	0	110	76.8	131				
1,3-Dichlorobenzene	1.09	0.0200	1.000	0	109	48.6	144				
1,4-Dichlorobenzene	1.09	0.0200	1.000	0	109	72.6	126				
n-Butylbenzene	1.08	0.0250	1.000	0	108	78.4	140				
1,2-Dichlorobenzene	1.09	0.0200	1.000	0	109	72.8	126				
1,2-Dibromo-3-chloropropane	0.943	0.500	1.000	0	94.3	40.2	155				
1,2,4-Trimethylbenzene	1.07	0.0200	1.000	0	107	77.5	129				
Hexachlorobutadiene	1.09	0.0500	1.000	0	109	42	151				
Naphthalene	1.11	0.0500	1.000	0	111	46.5	167				
1,2,3-Trichlorobenzene	1.11	0.0200	1.000	0	111	64.5	149				
Surr: Dibromofluoromethane	1.29		1.250		103	56.5	129				
Surr: Toluene-d8	1.25		1.250		100	64.5	151				
Surr: 1-Bromo-4-fluorobenzene	1.20		1.250		96.2	54.8	168				

Work Order: 1811282
CLIENT: GeoEngineers
Project: Rufus - Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID	**LCS-22768**	SampType:	**LCS**	Units:	**mg/Kg**	Prep Date:	**11/29/2018**	RunNo:	**47968**
Client ID:	**LCSS**	Batch ID:	**22768**			Analysis Date:	**11/29/2018**	SeqNo:	**936793**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

NOTES:
S - Outlying spike recovery observed (high bias). Samples are non-detect for this analyte; no further action required.

Sample ID	**MB-22768**	SampType:	**MBLK**	Units:	**mg/Kg**	Prep Date:	**11/29/2018**	RunNo:	**47968**
Client ID:	**MBLKS**	Batch ID:	**22768**			Analysis Date:	**11/29/2018**	SeqNo:	**936794**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dichlorodifluoromethane (CFC-12)	ND	0.0200									
Chloromethane	ND	0.0500									
Vinyl chloride	ND	0.0250									
Bromomethane	ND	0.0500									
Trichlorofluoromethane (CFC-11)	ND	0.0200									
Chloroethane	ND	0.0500									
1,1-Dichloroethene	ND	0.0200									
Methylene chloride	ND	0.0200									
trans-1,2-Dichloroethene	ND	0.0200									
Methyl tert-butyl ether (MTBE)	ND	0.0500									
1,1-Dichloroethane	ND	0.0200									
2,2-Dichloropropane	ND	0.100									
cis-1,2-Dichloroethene	ND	0.0200									
Chloroform	ND	0.0200									
1,1,1-Trichloroethane (TCA)	ND	0.0250									
1,1-Dichloropropene	ND	0.0200									
Carbon tetrachloride	ND	0.0250									
1,2-Dichloroethane (EDC)	ND	0.0200									
Benzene	ND	0.0200									
Trichloroethene (TCE)	ND	0.0200									
1,2-Dichloropropane	ND	0.0200									
Bromodichloromethane	ND	0.0200									
Dibromomethane	ND	0.0200									
cis-1,3-Dichloropropene	ND	0.0200									

Work Order: 1811282
CLIENT: GeoEngineers
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QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID **MB-22768** SampType: **MBLK** Units: **mg/Kg** Prep Date: **11/29/2018** RunNo: **47968**
Client ID: **MBLKS** Batch ID: **22768** Analysis Date: **11/29/2018** SeqNo: **936794**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Toluene	ND	0.0200									
trans-1,3-Dichloropropylene	ND	0.0200									
1,1,2-Trichloroethane	ND	0.0200									
1,3-Dichloropropane	ND	0.0250									
Tetrachloroethene (PCE)	ND	0.0250									
Dibromochloromethane	ND	0.0250									
1,2-Dibromoethane (EDB)	ND	0.00500									
Chlorobenzene	ND	0.0250									
1,1,1,2-Tetrachloroethane	ND	0.0250									
Ethylbenzene	ND	0.0250									
m,p-Xylene	ND	0.0500									
o-Xylene	ND	0.0250									
Styrene	ND	0.0250									
Isopropylbenzene	ND	0.0250									
Bromoform	ND	0.0500									
1,1,2,2-Tetrachloroethane	ND	0.0200									
n-Propylbenzene	ND	0.0250									
Bromobenzene	ND	0.0200									
1,3,5-Trimethylbenzene	ND	0.0250									
2-Chlorotoluene	ND	0.0250									
4-Chlorotoluene	ND	0.0250									
tert-Butylbenzene	ND	0.0250									
1,2,3-Trichloropropane	ND	0.0250									
1,2,4-Trichlorobenzene	ND	0.0250									
sec-Butylbenzene	ND	0.0500									
4-Isopropyltoluene	ND	0.0500									
1,3-Dichlorobenzene	ND	0.0200									
1,4-Dichlorobenzene	ND	0.0200									
n-Butylbenzene	ND	0.0250									
1,2-Dichlorobenzene	ND	0.0200									
1,2-Dibromo-3-chloropropane	ND	0.500									

Work Order: 1811282
CLIENT: GeoEngineers
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QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID **MB-22768** SampType: **MBLK** Units: **mg/Kg** Prep Date: **11/29/2018** RunNo: **47968**
Client ID: **MBLKS** Batch ID: **22768** Analysis Date: **11/29/2018** SeqNo: **936794**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trimethylbenzene	ND	0.0200									
Hexachlorobutadiene	ND	0.0500									
Naphthalene	ND	0.0500									
1,2,3-Trichlorobenzene	ND	0.0200									
Surr: Dibromofluoromethane	1.23		1.250		98.3	56.5	129				
Surr: Toluene-d8	1.24		1.250		99.5	64.5	151				
Surr: 1-Bromo-4-fluorobenzene	1.19		1.250		95.2	54.8	168				

Sample ID **1811281-001BDUP** SampType: **DUP** Units: **mg/Kg-dry** Prep Date: **11/29/2018** RunNo: **47968**
Client ID: **BATCH** Batch ID: **22768** Analysis Date: **11/29/2018** SeqNo: **936779**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dichlorodifluoromethane (CFC-12)	ND	0.0235						0		30	H
Chloromethane	ND	0.0588						0		30	H
Vinyl chloride	ND	0.0294						0		30	H
Bromomethane	ND	0.0588						0		30	H
Trichlorofluoromethane (CFC-11)	ND	0.0235						0		30	H
Chloroethane	ND	0.0588						0		30	H
1,1-Dichloroethene	ND	0.0235						0		30	H
Methylene chloride	ND	0.0235						0		30	H
trans-1,2-Dichloroethene	ND	0.0235						0		30	H
Methyl tert-butyl ether (MTBE)	ND	0.0588						0		30	H
1,1-Dichloroethane	ND	0.0235						0		30	H
2,2-Dichloropropane	ND	0.118						0		30	H
cis-1,2-Dichloroethene	ND	0.0235						0		30	H
Chloroform	ND	0.0235						0		30	H
1,1,1-Trichloroethane (TCA)	ND	0.0294						0		30	H
1,1-Dichloropropene	ND	0.0235						0		30	H
Carbon tetrachloride	ND	0.0294						0		30	H
1,2-Dichloroethane (EDC)	ND	0.0235						0		30	H

Work Order: 1811282
CLIENT: GeoEngineers
Project: Rufus - Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID **1811281-001BDUP** SampType: **DUP** Units: **mg/Kg-dry** Prep Date: **11/29/2018** RunNo: **47968**
Client ID: **BATCH** Batch ID: **22768** Analysis Date: **11/29/2018** SeqNo: **936779**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	ND	0.0235						0		30	H
Trichloroethene (TCE)	ND	0.0235						0		30	H
1,2-Dichloropropane	ND	0.0235						0		30	H
Bromodichloromethane	ND	0.0235						0		30	H
Dibromomethane	ND	0.0235						0		30	H
cis-1,3-Dichloropropene	ND	0.0235						0		30	H
Toluene	ND	0.0235						0		30	H
trans-1,3-Dichloropropylene	ND	0.0235						0		30	H
1,1,2-Trichloroethane	ND	0.0235						0		30	H
1,3-Dichloropropane	ND	0.0294						0		30	H
Tetrachloroethene (PCE)	ND	0.0294						0		30	H
Dibromochloromethane	ND	0.0294						0		30	H
1,2-Dibromoethane (EDB)	ND	0.00588						0		30	H
Chlorobenzene	ND	0.0294						0		30	H
1,1,1,2-Tetrachloroethane	ND	0.0294						0		30	H
Ethylbenzene	ND	0.0294						0		30	H
m,p-Xylene	ND	0.0588						0		30	H
o-Xylene	ND	0.0294						0		30	H
Styrene	ND	0.0294						0		30	H
Isopropylbenzene	ND	0.0294						0		30	H
Bromoform	ND	0.0588						0		30	H
1,1,2,2-Tetrachloroethane	ND	0.0235						0		30	H
n-Propylbenzene	ND	0.0294						0		30	H
Bromobenzene	ND	0.0235						0		30	H
1,3,5-Trimethylbenzene	ND	0.0294						0		30	H
2-Chlorotoluene	ND	0.0294						0		30	H
4-Chlorotoluene	ND	0.0294						0		30	H
tert-Butylbenzene	ND	0.0294						0		30	H
1,2,3-Trichloropropane	ND	0.0294						0		30	H
1,2,4-Trichlorobenzene	ND	0.0294						0		30	H
sec-Butylbenzene	ND	0.0588						0		30	H

Work Order: 1811282
CLIENT: GeoEngineers
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QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID **1811281-001BDUP** SampType: **DUP** Units: **mg/Kg-dry** Prep Date: **11/29/2018** RunNo: **47968**
Client ID: **BATCH** Batch ID: **22768** Analysis Date: **11/29/2018** SeqNo: **936779**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4-Isopropyltoluene	ND	0.0588						0		30	H
1,3-Dichlorobenzene	ND	0.0235						0		30	H
1,4-Dichlorobenzene	ND	0.0235						0		30	H
n-Butylbenzene	ND	0.0294						0		30	H
1,2-Dichlorobenzene	ND	0.0235						0		30	H
1,2-Dibromo-3-chloropropane	ND	0.588						0		30	H
1,2,4-Trimethylbenzene	ND	0.0235						0		30	H
Hexachlorobutadiene	ND	0.0588						0		30	H
Naphthalene	ND	0.0588						0		30	H
1,2,3-Trichlorobenzene	ND	0.0235						0		30	H
Surr: Dibromofluoromethane	1.43		1.470		97.6	56.5	129		0		H
Surr: Toluene-d8	1.47		1.470		99.9	64.5	151		0		H
Surr: 1-Bromo-4-fluorobenzene	1.41		1.470		95.7	54.8	168		0		H

Sample ID **1811281-003BMS** SampType: **MS** Units: **mg/Kg-dry** Prep Date: **11/29/2018** RunNo: **47968**
Client ID: **BATCH** Batch ID: **22768** Analysis Date: **11/29/2018** SeqNo: **936781**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dichlorodifluoromethane (CFC-12)	2.26	0.0243	1.216	0	186	43.5	121				SH
Chloromethane	1.65	0.0608	1.216	0	136	45	130				SH
Vinyl chloride	1.68	0.0304	1.216	0	138	43.6	150				H
Bromomethane	1.82	0.0608	1.216	0	150	21.3	120				SH
Trichlorofluoromethane (CFC-11)	2.05	0.0243	1.216	0	168	35	131				SH
Chloroethane	1.59	0.0608	1.216	0	130	31.9	123				SH
1,1-Dichloroethene	1.43	0.0243	1.216	0	118	47.3	147				H
Methylene chloride	1.43	0.0243	1.216	0	118	54.7	142				H
trans-1,2-Dichloroethene	1.41	0.0243	1.216	0	116	52	136				H
Methyl tert-butyl ether (MTBE)	1.30	0.0608	1.216	0	107	58.5	167				H
1,1-Dichloroethane	1.41	0.0243	1.216	0	116	51.8	141				H
2,2-Dichloropropane	1.13	0.122	1.216	0	93.2	36	123				H

Work Order: 1811282
CLIENT: GeoEngineers
Project: Rufus - Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID **1811281-003BMS** SampType: **MS** Units: **mg/Kg-dry** Prep Date: **11/29/2018** RunNo: **47968**
Client ID: **BATCH** Batch ID: **22768** Analysis Date: **11/29/2018** SeqNo: **936781**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
cis-1,2-Dichloroethene	1.37	0.0243	1.216	0	113	58.6	136				H
Chloroform	1.38	0.0243	1.216	0	113	53.2	129				H
1,1,1-Trichloroethane (TCA)	1.39	0.0304	1.216	0	114	58.3	145				H
1,1-Dichloropropene	1.42	0.0243	1.216	0	116	55.1	138				H
Carbon tetrachloride	1.33	0.0304	1.216	0	110	53.3	144				H
1,2-Dichloroethane (EDC)	1.39	0.0243	1.216	0	114	51.3	139				H
Benzene	1.39	0.0243	1.216	0	114	63.5	133				H
Trichloroethene (TCE)	1.36	0.0243	1.216	0	112	61.6	147				H
1,2-Dichloropropane	1.35	0.0243	1.216	0	111	59	136				H
Bromodichloromethane	1.23	0.0243	1.216	0	101	50.7	141				H
Dibromomethane	1.34	0.0243	1.216	0	110	50.6	137				H
cis-1,3-Dichloropropene	1.21	0.0243	1.216	0	99.4	50.4	138				H
Toluene	1.36	0.0243	1.216	0	111	63.4	132				H
trans-1,3-Dichloropropylene	1.16	0.0243	1.216	0	95.6	44.1	147				H
1,1,2-Trichloroethane	1.33	0.0243	1.216	0	109	51.6	137				H
1,3-Dichloropropane	1.32	0.0304	1.216	0	109	53.1	134				H
Tetrachloroethene (PCE)	1.37	0.0304	1.216	0	113	35.6	158				H
Dibromochloromethane	1.16	0.0304	1.216	0	95.8	55.3	140				H
1,2-Dibromoethane (EDB)	1.31	0.00608	1.216	0	107	50.4	136				H
Chlorobenzene	1.34	0.0304	1.216	0	110	60	133				H
1,1,1,2-Tetrachloroethane	1.26	0.0304	1.216	0	104	53.1	142				H
Ethylbenzene	1.44	0.0304	1.216	0	119	54.5	134				H
m,p-Xylene	2.75	0.0608	2.431	0.01885	112	53.1	132				H
o-Xylene	1.32	0.0304	1.216	0	108	53.3	139				H
Styrene	1.31	0.0304	1.216	0	107	51.1	132				H
Isopropylbenzene	1.37	0.0304	1.216	0	113	58.9	138				H
Bromoform	1.06	0.0608	1.216	0	87.5	57.9	130				H
1,1,2,2-Tetrachloroethane	1.28	0.0243	1.216	0	106	51.9	131				H
n-Propylbenzene	1.39	0.0304	1.216	0	115	53.6	140				H
Bromobenzene	1.28	0.0243	1.216	0	105	54.2	140				H
1,3,5-Trimethylbenzene	1.35	0.0304	1.216	0	111	51.8	136				H

Work Order: 1811282
CLIENT: GeoEngineers
Project: Rufus - Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID **1811281-003BMS** SampType: **MS** Units: **mg/Kg-dry** Prep Date: **11/29/2018** RunNo: **47968**
Client ID: **BATCH** Batch ID: **22768** Analysis Date: **11/29/2018** SeqNo: **936781**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
2-Chlorotoluene	1.46	0.0304	1.216	0	120	51.6	136				H
4-Chlorotoluene	1.29	0.0304	1.216	0	106	50.1	139				H
tert-Butylbenzene	1.33	0.0304	1.216	0	110	50.5	135				H
1,2,3-Trichloropropane	1.16	0.0304	1.216	0	95.8	50.5	131				H
1,2,4-Trichlorobenzene	1.27	0.0304	1.216	0	105	50.8	130				H
sec-Butylbenzene	1.45	0.0608	1.216	0	119	52.6	141				H
4-Isopropyltoluene	1.42	0.0608	1.216	0	117	52.9	134				H
1,3-Dichlorobenzene	1.34	0.0243	1.216	0	110	52.6	131				H
1,4-Dichlorobenzene	1.34	0.0243	1.216	0	110	52.9	129				H
n-Butylbenzene	1.35	0.0304	1.216	0	111	52.6	130				H
1,2-Dichlorobenzene	1.33	0.0243	1.216	0	109	55.8	129				H
1,2-Dibromo-3-chloropropane	1.11	0.608	1.216	0	91.0	40.5	131				H
1,2,4-Trimethylbenzene	1.39	0.0243	1.216	0	114	50.6	137				H
Hexachlorobutadiene	1.35	0.0608	1.216	0	111	40.6	158				H
Naphthalene	1.30	0.0608	1.216	0	107	52.3	124				H
1,2,3-Trichlorobenzene	1.29	0.0243	1.216	0	106	54.4	124				H
Surr: Dibromofluoromethane	1.54		1.520		101	56.5	129				H
Surr: Toluene-d8	1.52		1.520		100	64.5	151				H
Surr: 1-Bromo-4-fluorobenzene	1.47		1.520		96.5	54.8	168				H

NOTES:
S - Outlying spike recovery observed (high bias).

Sample ID **1811281-003BMSD** SampType: **MSD** Units: **mg/Kg-dry** Prep Date: **11/29/2018** RunNo: **47968**
Client ID: **BATCH** Batch ID: **22768** Analysis Date: **11/29/2018** SeqNo: **936782**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dichlorodifluoromethane (CFC-12)	2.25	0.0243	1.216	0	185	43.5	121	2.259	0.382	30	SH
Chloromethane	1.72	0.0608	1.216	0	141	45	130	1.650	3.97	30	SH
Vinyl chloride	1.66	0.0304	1.216	0	136	43.6	150	1.675	0.976	30	H
Bromomethane	1.84	0.0608	1.216	0	151	21.3	120	1.818	1.05	30	SH
Trichlorofluoromethane (CFC-11)	1.98	0.0243	1.216	0	163	35	131	2.046	3.49	30	SH

Work Order: 1811282
CLIENT: GeoEngineers
Project: Rufus - Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID **1811281-003BMSD** SampType: **MSD** Units: **mg/Kg-dry** Prep Date: **11/29/2018** RunNo: **47968**
Client ID: **BATCH** Batch ID: **22768** Analysis Date: **11/29/2018** SeqNo: **936782**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloroethane	1.55	0.0608	1.216	0	128	31.9	123	1.586	2.17	30	SH
1,1-Dichloroethene	1.45	0.0243	1.216	0	119	47.3	147	1.431	1.42	30	H
Methylene chloride	1.39	0.0243	1.216	0	114	54.7	142	1.434	3.00	30	H
trans-1,2-Dichloroethene	1.39	0.0243	1.216	0	114	52	136	1.409	1.45	30	H
Methyl tert-butyl ether (MTBE)	1.27	0.0608	1.216	0	104	58.5	167	1.304	2.66	30	H
1,1-Dichloroethane	1.38	0.0243	1.216	0	113	51.8	141	1.409	2.19	30	H
2,2-Dichloropropane	1.10	0.122	1.216	0	90.3	36	123	1.132	3.08	30	H
cis-1,2-Dichloroethene	1.33	0.0243	1.216	0	109	58.6	136	1.369	3.01	30	H
Chloroform	1.34	0.0243	1.216	0	110	53.2	129	1.379	3.05	30	H
1,1,1-Trichloroethane (TCA)	1.35	0.0304	1.216	0	111	58.3	145	1.386	2.26	30	H
1,1-Dichloropropene	1.37	0.0243	1.216	0	113	55.1	138	1.415	3.41	30	H
Carbon tetrachloride	1.33	0.0304	1.216	0	109	53.3	144	1.332	0.0680	30	H
1,2-Dichloroethane (EDC)	1.33	0.0243	1.216	0	109	51.3	139	1.388	4.59	30	H
Benzene	1.34	0.0243	1.216	0	110	63.5	133	1.391	3.89	30	H
Trichloroethene (TCE)	1.31	0.0243	1.216	0	108	61.6	147	1.358	3.69	30	H
1,2-Dichloropropane	1.29	0.0243	1.216	0	106	59	136	1.346	4.56	30	H
Bromodichloromethane	1.21	0.0243	1.216	0	99.7	50.7	141	1.231	1.52	30	H
Dibromomethane	1.27	0.0243	1.216	0	105	50.6	137	1.340	4.96	30	H
cis-1,3-Dichloropropene	1.17	0.0243	1.216	0	96.2	50.4	138	1.208	3.21	30	H
Toluene	1.32	0.0243	1.216	0	109	63.4	132	1.355	2.49	30	H
trans-1,3-Dichloropropylene	1.12	0.0243	1.216	0	92.3	44.1	147	1.162	3.52	30	H
1,1,2-Trichloroethane	1.26	0.0243	1.216	0	104	51.6	137	1.328	4.90	30	H
1,3-Dichloropropane	1.26	0.0304	1.216	0	104	53.1	134	1.321	4.63	30	H
Tetrachloroethene (PCE)	1.32	0.0304	1.216	0	109	35.6	158	1.374	3.87	30	H
Dibromochloromethane	1.15	0.0304	1.216	0	94.4	55.3	140	1.164	1.42	30	H
1,2-Dibromoethane (EDB)	1.24	0.00608	1.216	0	102	50.4	136	1.305	4.97	30	H
Chlorobenzene	1.30	0.0304	1.216	0	107	60	133	1.341	3.07	30	H
1,1,1,2-Tetrachloroethane	1.22	0.0304	1.216	0	101	53.1	142	1.260	2.90	30	H
Ethylbenzene	1.41	0.0304	1.216	0	116	54.5	134	1.444	2.50	30	H
m,p-Xylene	2.68	0.0608	2.431	0.01885	110	53.1	132	2.752	2.61	30	H
o-Xylene	1.28	0.0304	1.216	0	105	53.3	139	1.316	2.82	30	H

Work Order: 1811282
CLIENT: GeoEngineers
Project: Rufus - Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID **1811281-003BMSD** SampType: **MSD** Units: **mg/Kg-dry** Prep Date: **11/29/2018** RunNo: **47968**
Client ID: **BATCH** Batch ID: **22768** Analysis Date: **11/29/2018** SeqNo: **936782**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Styrene	1.27	0.0304	1.216	0	105	51.1	132	1.307	2.78	30	H
Isopropylbenzene	1.34	0.0304	1.216	0	111	58.9	138	1.375	2.22	30	H
Bromoform	1.05	0.0608	1.216	0	86.3	57.9	130	1.063	1.30	30	H
1,1,2,2-Tetrachloroethane	1.26	0.0243	1.216	0	104	51.9	131	1.284	1.76	30	H
n-Propylbenzene	1.36	0.0304	1.216	0	112	53.6	140	1.393	2.64	30	H
Bromobenzene	1.24	0.0243	1.216	0	102	54.2	140	1.280	3.00	30	H
1,3,5-Trimethylbenzene	1.33	0.0304	1.216	0	109	51.8	136	1.353	2.00	30	H
2-Chlorotoluene	1.43	0.0304	1.216	0	118	51.6	136	1.459	2.08	30	H
4-Chlorotoluene	1.27	0.0304	1.216	0	104	50.1	139	1.292	2.06	30	H
tert-Butylbenzene	1.33	0.0304	1.216	0	110	50.5	135	1.334	0.178	30	H
1,2,3-Trichloropropane	1.06	0.0304	1.216	0	87.5	50.5	131	1.164	9.02	30	H
1,2,4-Trichlorobenzene	1.31	0.0304	1.216	0	107	50.8	130	1.274	2.46	30	H
sec-Butylbenzene	1.42	0.0608	1.216	0	117	52.6	141	1.447	1.68	30	H
4-Isopropyltoluene	1.40	0.0608	1.216	0	115	52.9	134	1.422	1.84	30	H
1,3-Dichlorobenzene	1.33	0.0243	1.216	0	109	52.6	131	1.340	0.935	30	H
1,4-Dichlorobenzene	1.32	0.0243	1.216	0	109	52.9	129	1.341	1.33	30	H
n-Butylbenzene	1.35	0.0304	1.216	0	111	52.6	130	1.353	0.452	30	H
1,2-Dichlorobenzene	1.32	0.0243	1.216	0	109	55.8	129	1.328	0.457	30	H
1,2-Dibromo-3-chloropropane	1.11	0.608	1.216	0	90.9	40.5	131	1.106	0.0593	30	H
1,2,4-Trimethylbenzene	1.37	0.0243	1.216	0	113	50.6	137	1.387	0.965	30	H
Hexachlorobutadiene	1.41	0.0608	1.216	0	116	40.6	158	1.350	4.68	30	H
Naphthalene	1.33	0.0608	1.216	0	109	52.3	124	1.303	2.08	30	H
1,2,3-Trichlorobenzene	1.33	0.0243	1.216	0	109	54.4	124	1.294	2.80	30	H
Surr: Dibromofluoromethane	1.56		1.520		102	56.5	129		0		H
Surr: Toluene-d8	1.50		1.520		98.9	64.5	151		0		H
Surr: 1-Bromo-4-fluorobenzene	1.46		1.520		96.3	54.8	168		0		H

NOTES:
S - Outlying spike recovery observed (high bias).

Work Order: 1811282
CLIENT: GeoEngineers
Project: Rufus - Block 18

QC SUMMARY REPORT

Sample Moisture (Percent Moisture)

Sample ID **1811281-007ADUP** SampType: **DUP** Units: **wt%** Prep Date: **11/21/2018** RunNo: **47808**
Client ID: **BATCH** Batch ID: **R47808** Analysis Date: **11/21/2018** SeqNo: **932751**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Percent Moisture	13.1	0.500						12.74	2.82	20	

Sample ID **1811282-001ADUP** SampType: **DUP** Units: **wt%** Prep Date: **11/21/2018** RunNo: **47808**
Client ID: **TP-8-2.5** Batch ID: **R47808** Analysis Date: **11/21/2018** SeqNo: **932753**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Percent Moisture	23.3	0.500						21.93	6.23	20	

Sample ID **1811430-001ADUP** SampType: **DUP** Units: **wt%** Prep Date: **11/30/2018** RunNo: **47974**
Client ID: **BATCH** Batch ID: **R47974** Analysis Date: **11/30/2018** SeqNo: **936867**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Percent Moisture	23.5	0.500						23.44	0.214	20	

Sample Log-In Check List

Client Name:	**GEI**	Work Order Number:	**1811282**
Logged by:	**Brianna Barnes**	Date Received:	**11/15/2018 1:22:00 PM**

Chain of Custody

1.	Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2.	How was the sample delivered?	Client		

Log In

3.	Coolers are present?	Yes ☑	No ☐	NA ☐
4.	Shipping container/cooler in good condition?	Yes ☑	No ☐	
5.	Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact)	Yes ☐	No ☐	Not Required ☑
6.	Was an attempt made to cool the samples?	Yes ☐	No ☑	NA ☐
		Unknown prior to receipt.		
7.	Were all items received at a temperature of >0°C to 10.0°C *	Yes ☐	No ☑	NA ☐
		Please refer to item information.		
8.	Sample(s) in proper container(s)?	Yes ☑	No ☐	
9.	Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
10.	Are samples properly preserved?	Yes ☑	No ☐	
11.	Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
12.	Is there headspace in the VOA vials?	Yes ☐	No ☐	NA ☑
13.	Did all samples containers arrive in good condition(unbroken)?	Yes ☑	No ☐	
14.	Does paperwork match bottle labels?	Yes ☑	No ☐	
15.	Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
16.	Is it clear what analyses were requested?	Yes ☑	No ☐	
17.	Were all holding times able to be met?	Yes ☑	No ☐	

Special Handling (if applicable)

18.	Was client notified of all discrepancies with this order?	Yes ☐	No ☐	NA ☑

Person Notified: _____ Date _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

19. Additional remarks:

Item Information

Item #	Temp ºC
Cooler	15.4
Sample	17.1
Temp Blank	13.6

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

Chain of Custody Record & Laboratory Services Agreement

Fremont Analytical
3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Date: 11.15.18 | Page: 1 of: 2

Laboratory Project No (Internal): 1811202

Project Name: Rufus - Block 18

Special Remarks:

Project No: 20434-001-32

Collected by: A. Clauss

edits per CB 11/19/18 mb STD TAT

Location: Block 18

Sample Disposal: ☐ Return to client ☐ Disposal by lab (after 30 days)

Report To (PM): Chris Brown

Client: GEI

Address:

City, State, Zip:

Telephone:

Fax:

PM Email: cbrown@geoengineers.com

	Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	VOCs (EPA 8260 / 624)	GX/BTEX	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	Diesel/Heavy Oil Range Organics (DX)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8)	Total (T) | Dissolved (D)	Anions (IC)***	EDB (8011)	Hold	Comments
1	TP-8-2.5	11.15.18	0733	soil	X			X		X		X		X					
2	TP-8-5.0		0737																
3	TP-8-7.5		0742																
4	TP-7-2.5		0753		X			X		X		X		X					
5	TP-7-5.0		0802																
6	TP-5-2.5		0907		X			X		X		X		X					
7	TP-2-2.5		1048		X			X		X		X		X					
8	TP-2-5.0		1055																
9	TP-12-2.5		1104		X			X		X		X		X					
10	TP-12-5.0		1111																

*Matrix: A = Air, AQ = Aqueous, B = Bulk, O = Other, P = Product, S = Soil, SD = Sediment, SL = Solid, W = Water, DW = Drinking Water, GW = Ground Water, SW = Storm Water, WW = Waste Water

**Metals (Circle): MTCA-5 RCRA-8 Priority Pollutants TAL *Individual:* Ag Al As B Ba Be Ca Cd Co Cr Cu Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sr Sn Ti Tl U V Zn

***Anions (Circle): Nitrate Nitrite Chloride Sulfate Bromide O-Phosphate Fluoride Nitrate+Nitrite

I represent that I am authorized to enter into this Agreement with Fremont Analytical on behalf of the Client named above and that I have verified Client's agreement to each of the terms on the front and backside of this Agreement.

Relinquished	Date/Time	Received	Date/Time
x [signature]	11.15.18 / 1322	x [signature]	11/15/18 1322
Relinquished x	Date/Time	Received x	Date/Time

Turn-around Time:

- ☐ Standard
- ☐ 3 Day
- ☐ 2 Day
- ☐ Next Day
- Same Day ____ (specify)

Fremont Analytical
3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Chain of Custody Record & Laboratory Services Agreement

Date: 11.15.18 Page: 2 of: 2

Laboratory Project No (internal): 1911282

Project Name: Rufus - Block 18

Special Remarks:

Project No: 20434-001-32

Client: GEI

Collected by: A. Clevsr

Address:

Location: Block 18

City, State, Zip:

Report To (PM): Chris Brown

Telephone:

Sample Disposal: ☐ Return to client ☐ Disposal by lab (after 30 days)

PM Email: cbrown@geoengineers.com

Fax:

	Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	VOCs (EPA 8260 / 624)	GX/BTEX	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	Diesel/Heavy Oil Range Organics (DX)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8)	Total (T) | Dissolved (D)	Anions (IC)***	EDB (8011)	Hold	Comments
1	TP-11-2.5	11.15.18	1116	soil	X			X		X		X		X					
2	TP-11-5.0	↓	1122	↓															
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			

*Matrix: A = Air, AQ = Aqueous, B = Bulk, O = Other, P = Product, S = Soil, SD = Sediment, SL = Solid, W = Water, DW = Drinking Water, GW = Ground Water, SW = Storm Water, WW = Waste Water

**Metals (Circle): MTCA-5 RCRA-8 Priority Pollutants TAL *Individual:* Ag Al As B Ba Be Ca Cd Co Cr Cu Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sr Sn Ti Tl U V Zn

***Anions (Circle): Nitrate Nitrite Chloride Sulfate Bromide O-Phosphate Fluoride Nitrate+Nitrite

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x [signature]	11.15.18/1322	x [signature]	11/15/18 1322
Relinquished	Date/Time	Received	Date/Time
x		x	

Turn-around Time:

- ☐ Standard
- ☐ 3 Day
- ☐ 2 Day
- ☐ Next Day
- Same Day _____ (specify)

Chain of Custody Record & Laboratory Services Agreement

Fremont Analytical
3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Date: 11.15.18 Page: 1 of: 2

Laboratory Project No (internal): 1911292

Project Name: Rufus - Block 18

Special Remarks:

Project No: 20434-001-32

Collected by: A. Clauss

Location: Block 18

edits per CB 11/19/18 BMB STD TAT

Report To (PM): Chris Brown

Sample Disposal: ☐ Return to client ☐ Disposal by lab (after 30 days)

PM Email: cbrown@geoengineers.com

Client: GEI

Address:

City, State, Zip:

Telephone:

Fax:

	Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	VOCs (EPA 8260 / 624)	GX/BTEX	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	Diesel/Heavy Oil Range Organics (DX)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8)	Total (T)	Dissolved (D)	Anions (IC)***	EDB (8011)	Hold	Comments
1	TP-8-2.5	11.15.18	0733	soil	X			X	X	X	X		X					X		
2	TP-8-5.0		0737						X	X	X							X		X= Next Day per CB. 11/19/18 cg
3	TP-8-7.5		0742															X		
4	TP-7-2.5		0753		X			X	X	X	X		X					X		
5	TP-7-5.0		0802						X									X		
6	TP-5-2.5		0907		X			X	X	X	X		X					X		
7	TP-2-2.5		1048		X			X	X	X	X		X					X		
8	TP-2-5.0		1055															X		
9	TP-12-2.5		1104		X			X	X	X	X		X					X		
10	TP-12-5.0		1111															X		

*Matrix: A = Air, AQ = Aqueous, B = Bulk, O = Other, P = Product, S = Soil, SD = Sediment, SL = Solid, W = Water, DW = Drinking Water, GW = Ground Water, SW = Storm Water, WW = Waste Water

**Metals (Circle): (MTCA-5) RCRA-8 Priority Pollutants TAL Individual: Ag Al As B Ba Be Ca Cd Co Cr Cu Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sr Sn Ti Tl U V Zn

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x [signature]	11.15.18/ 1322	x [signature]	11/15/18 1322
Relinquished x	Date/Time	Received x	Date/Time

Fremont Analytical
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Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Chain of Custody Record & Laboratory Services Agreement

Date: 11.15.18 Page: 2 of: 2

Laboratory Project No (internal): B11282

Project Name: Rufus - Block 18

Special Remarks:

Client: GEI

Project No: 20434-001-32

Address:

Collected by: A. Clouse

City, State, Zip:

Location: Block 18

Telephone:

Report To (PM): Chris Brown

Sample Disposal: ☐ Return to client ☐ Disposal by lab (after 30 days)

Fax:

PM Email: cbrown@geoengineers.com

	Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	VOCs (EPA 8260 / 624)	GX/BTEX	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	Diesel/Heavy Oil Range Organics (DX)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8)	Total (T) | Dissolved (D)	Anions (IC)***	EDB (8011)	Hold	Comments
1	TP-11-2.5	11.15.18	1116	Soil	X			X		X		X		X				X	
2	TP-11-5.0	↓	1122	↓														X	
3																		[redacted]	
4																			
5																			
6																			
7																			
8																			
9																			
10																			

*Matrix: A = Air, AQ = Aqueous, B = Bulk, O = Other, P = Product, S = Soil, SD = Sediment, SL = Solid, W = Water, DW = Drinking Water, GW = Ground Water, SW = Storm Water, WW = Waste Water

**Metals (Circle): MTCA-5 RCRA-8 Priority Pollutants TAL *Individual:* Ag Al As B Ba Be Ca Cd Co Cr Cu Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sr Sn Ti Tl U V Zn

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x [signature]	11.15.18/1322	x [signature]	11/15/18 1322
Relinquished	Date/Time	Received	Date/Time
x		x	

Turn-around Time:
- ☐ Standard
- ☐ 3 Day
- ☐ 2 Day
- ☐ Next Day
- Same Day ____ (specify)

3600 Fremont Ave. N.
Seattle, WA 98103
T: (206) 352-3790
F: (206) 352-7178
info@fremontanalytical.com

GeoEngineers
Chris Brown
2101 4th Ave, Suite 950
Seattle, WA 98121

RE: Rufus Block 18
Work Order Number: 1811283

November 28, 2018

Attention Chris Brown:

Fremont Analytical, Inc. received 2 sample(s) on 11/19/2018 for the analyses presented in the following report.

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)
Sample Moisture (Percent Moisture)

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Mike Ridgeway
Laboratory Director

Date: *11/28/2018*

CLIENT: GeoEngineers
Project: Rufus Block 18
Work Order: 1811283

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
1811283-001	EX-1-2.5	11/19/2018 11:41 AM	11/19/2018 2:55 PM
1811283-002	EX-2-2.5	11/19/2018 1:55 PM	11/19/2018 2:55 PM

Case Narrative

WO#: **1811283**
Date: **11/28/2018**

CLIENT: GeoEngineers
Project: Rufus Block 18

I. SAMPLE RECEIPT:
Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:
Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:
Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

Qualifiers:

* - Flagged value is not within established control limits
B - Analyte detected in the associated Method Blank
D - Dilution was required
E - Value above quantitation range
H - Holding times for preparation or analysis exceeded
I - Analyte with an internal standard that does not meet established acceptance criteria
J - Analyte detected below Reporting Limit
N - Tentatively Identified Compound (TIC)
Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF)
S - Spike recovery outside accepted recovery limits
ND - Not detected at the Reporting Limit
R - High relative percent difference observed

Acronyms:

%Rec - Percent Recovery
CCB - Continued Calibration Blank
CCV - Continued Calibration Verification
DF - Dilution Factor
HEM - Hexane Extractable Material
ICV - Initial Calibration Verification
LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
MB or MBLANK - Method Blank
MDL - Method Detection Limit
MS/MSD - Matrix Spike / Matrix Spike Duplicate
PDS - Post Digestion Spike
Ref Val - Reference Value
RL - Reporting Limit
RPD - Relative Percent Difference
SD - Serial Dilution
SGT - Silica Gel Treatment
SPK - Spike
Surr - Surrogate

Analytical Report

Work Order: **1811283**
Date Reported: **11/28/2018**

Client: GeoEngineers
Collection Date: 11/19/2018 11:41:00 AM
Project: Rufus Block 18
Lab ID: 1811283-001
Matrix: Soil
Client Sample ID: **EX-1-2.5**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)				Batch ID: 22722		Analyst: SB
Naphthalene	ND	53.6		µg/Kg-dry	1	11/28/2018 9:37:24 AM
2-Methylnaphthalene	ND	53.6		µg/Kg-dry	1	11/28/2018 9:37:24 AM
1-Methylnaphthalene	ND	53.6		µg/Kg-dry	1	11/28/2018 9:37:24 AM
Acenaphthylene	ND	53.6		µg/Kg-dry	1	11/28/2018 9:37:24 AM
Acenaphthene	ND	53.6		µg/Kg-dry	1	11/28/2018 9:37:24 AM
Fluorene	ND	53.6		µg/Kg-dry	1	11/28/2018 9:37:24 AM
Phenanthrene	ND	53.6		µg/Kg-dry	1	11/28/2018 9:37:24 AM
Anthracene	ND	53.6		µg/Kg-dry	1	11/28/2018 9:37:24 AM
Fluoranthene	ND	53.6		µg/Kg-dry	1	11/28/2018 9:37:24 AM
Pyrene	ND	53.6		µg/Kg-dry	1	11/28/2018 9:37:24 AM
Benz(a)anthracene	ND	53.6		µg/Kg-dry	1	11/28/2018 9:37:24 AM
Chrysene	ND	53.6		µg/Kg-dry	1	11/28/2018 9:37:24 AM
Benzo(b)fluoranthene	ND	53.6		µg/Kg-dry	1	11/28/2018 9:37:24 AM
Benzo(k)fluoranthene	ND	53.6		µg/Kg-dry	1	11/28/2018 9:37:24 AM
Benzo(a)pyrene	ND	53.6		µg/Kg-dry	1	11/28/2018 9:37:24 AM
Indeno(1,2,3-cd)pyrene	ND	53.6		µg/Kg-dry	1	11/28/2018 9:37:24 AM
Dibenz(a,h)anthracene	ND	53.6		µg/Kg-dry	1	11/28/2018 9:37:24 AM
Benzo(g,h,i)perylene	ND	53.6		µg/Kg-dry	1	11/28/2018 9:37:24 AM
Surr: 2-Fluorobiphenyl	63.3	12.5 - 140		%Rec	1	11/28/2018 9:37:24 AM
Surr: Terphenyl-d14 (surr)	69.8	45.7 - 172		%Rec	1	11/28/2018 9:37:24 AM
Sample Moisture (Percent Moisture)				Batch ID: R47808		Analyst: EAS
Percent Moisture	29.3	0.500		wt%	1	11/21/2018 8:48:25 AM

Analytical Report

Work Order: **1811283**
Date Reported: **11/28/2018**

Client: GeoEngineers
Collection Date: 11/19/2018 1:55:00 PM
Project: Rufus Block 18
Lab ID: 1811283-002
Matrix: Soil
Client Sample ID: **EX-2-2.5**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)				Batch ID: 22722		Analyst: SB
Naphthalene	ND	37.2		µg/Kg-dry	1	11/28/2018 9:58:25 AM
2-Methylnaphthalene	ND	37.2		µg/Kg-dry	1	11/28/2018 9:58:25 AM
1-Methylnaphthalene	ND	37.2		µg/Kg-dry	1	11/28/2018 9:58:25 AM
Acenaphthylene	ND	37.2		µg/Kg-dry	1	11/28/2018 9:58:25 AM
Acenaphthene	ND	37.2		µg/Kg-dry	1	11/28/2018 9:58:25 AM
Fluorene	ND	37.2		µg/Kg-dry	1	11/28/2018 9:58:25 AM
Phenanthrene	ND	37.2		µg/Kg-dry	1	11/28/2018 9:58:25 AM
Anthracene	ND	37.2		µg/Kg-dry	1	11/28/2018 9:58:25 AM
Fluoranthene	ND	37.2		µg/Kg-dry	1	11/28/2018 9:58:25 AM
Pyrene	ND	37.2		µg/Kg-dry	1	11/28/2018 9:58:25 AM
Benz(a)anthracene	ND	37.2		µg/Kg-dry	1	11/28/2018 9:58:25 AM
Chrysene	ND	37.2		µg/Kg-dry	1	11/28/2018 9:58:25 AM
Benzo(b)fluoranthene	ND	37.2		µg/Kg-dry	1	11/28/2018 9:58:25 AM
Benzo(k)fluoranthene	ND	37.2		µg/Kg-dry	1	11/28/2018 9:58:25 AM
Benzo(a)pyrene	ND	37.2		µg/Kg-dry	1	11/28/2018 9:58:25 AM
Indeno(1,2,3-cd)pyrene	ND	37.2		µg/Kg-dry	1	11/28/2018 9:58:25 AM
Dibenz(a,h)anthracene	ND	37.2		µg/Kg-dry	1	11/28/2018 9:58:25 AM
Benzo(g,h,i)perylene	ND	37.2		µg/Kg-dry	1	11/28/2018 9:58:25 AM
Surr: 2-Fluorobiphenyl	88.0	12.5 - 140		%Rec	1	11/28/2018 9:58:25 AM
Surr: Terphenyl-d14 (surr)	95.4	45.7 - 172		%Rec	1	11/28/2018 9:58:25 AM
Sample Moisture (Percent Moisture)				Batch ID: R47808		Analyst: EAS
Percent Moisture	8.17	0.500		wt%	1	11/21/2018 8:48:25 AM

Work Order: 1811283
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID **MB-22722** SampType: **MBLK** Units: **µg/Kg** Prep Date: **11/26/2018** RunNo: **47926**
Client ID: **MBLKS** Batch ID: **22722** Analysis Date: **11/28/2018** SeqNo: **935815**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	40.0									
2-Methylnaphthalene	ND	40.0									
1-Methylnaphthalene	ND	40.0									
Acenaphthylene	ND	40.0									
Acenaphthene	ND	40.0									
Fluorene	ND	40.0									
Phenanthrene	ND	40.0									
Anthracene	ND	40.0									
Fluoranthene	ND	40.0									
Pyrene	ND	40.0									
Benz(a)anthracene	ND	40.0									
Chrysene	ND	40.0									
Benzo(b)fluoranthene	ND	40.0									
Benzo(k)fluoranthene	ND	40.0									
Benzo(a)pyrene	ND	40.0									
Indeno(1,2,3-cd)pyrene	ND	40.0									
Dibenz(a,h)anthracene	ND	40.0									
Benzo(g,h,i)perylene	ND	40.0									
Surr: 2-Fluorobiphenyl	501		500.0		100	12.5	140				
Surr: Terphenyl-d14 (surr)	620		500.0		124	45.7	172				

Sample ID **LCS-22722** SampType: **LCS** Units: **µg/Kg** Prep Date: **11/26/2018** RunNo: **47926**
Client ID: **LCSS** Batch ID: **22722** Analysis Date: **11/28/2018** SeqNo: **935816**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	942	40.0	1,000	0	94.2	50.6	131				
2-Methylnaphthalene	945	40.0	1,000	0	94.5	45.1	135				
1-Methylnaphthalene	920	40.0	1,000	0	92.0	46.2	133				
Acenaphthylene	946	40.0	1,000	0	94.6	32.8	136				
Acenaphthene	931	40.0	1,000	0	93.1	42	137				

Work Order: 1811283
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID **LCS-22722**	SampType: **LCS**	Units: **µg/Kg**	Prep Date: **11/26/2018**	RunNo: **47926**
Client ID: **LCSS**	Batch ID: **22722**		Analysis Date: **11/28/2018**	SeqNo: **935816**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluorene	937	40.0	1,000	0	93.7	41.4	144				
Phenanthrene	905	40.0	1,000	0	90.5	36.6	141				
Anthracene	914	40.0	1,000	0	91.4	42.5	157				
Fluoranthene	937	40.0	1,000	0	93.7	43.4	144				
Pyrene	921	40.0	1,000	0	92.1	39.6	146				
Benz(a)anthracene	938	40.0	1,000	0	93.8	36.6	142				
Chrysene	962	40.0	1,000	0	96.2	43	165				
Benzo(b)fluoranthene	1,030	40.0	1,000	0	103	41	155				
Benzo(k)fluoranthene	871	40.0	1,000	0	87.1	30.6	164				
Benzo(a)pyrene	919	40.0	1,000	0	91.9	30.2	171				
Indeno(1,2,3-cd)pyrene	916	40.0	1,000	0	91.6	31.3	159				
Dibenz(a,h)anthracene	926	40.0	1,000	0	92.6	28	158				
Benzo(g,h,i)perylene	914	40.0	1,000	0	91.4	32.4	144				
Surr: 2-Fluorobiphenyl	617		500.0		123	12.5	140				
Surr: Terphenyl-d14 (surr)	675		500.0		135	45.7	172				

Sample ID **1811281-007ADUP**	SampType: **DUP**	Units: **µg/Kg-dry**	Prep Date: **11/26/2018**	RunNo: **47926**
Client ID: **BATCH**	Batch ID: **22722**		Analysis Date: **11/28/2018**	SeqNo: **935818**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	39.1						0		30	
2-Methylnaphthalene	ND	39.1						0		30	
1-Methylnaphthalene	ND	39.1						0		30	
Acenaphthylene	ND	39.1						0		30	
Acenaphthene	ND	39.1						0		30	
Fluorene	ND	39.1						0		30	
Phenanthrene	ND	39.1						0		30	
Anthracene	ND	39.1						0		30	
Fluoranthene	ND	39.1						0		30	
Pyrene	ND	39.1						0		30	

Work Order: 1811283
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID **1811281-007ADUP** SampType: **DUP** Units: **µg/Kg-dry** Prep Date: **11/26/2018** RunNo: **47926**
Client ID: **BATCH** Batch ID: **22722** Analysis Date: **11/28/2018** SeqNo: **935818**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benz(a)anthracene	ND	39.1						0		30	
Chrysene	ND	39.1						0		30	
Benzo(b)fluoranthene	ND	39.1						0		30	
Benzo(k)fluoranthene	ND	39.1						0		30	
Benzo(a)pyrene	ND	39.1						0		30	
Indeno(1,2,3-cd)pyrene	ND	39.1						0		30	
Dibenz(a,h)anthracene	ND	39.1						0		30	
Benzo(g,h,i)perylene	ND	39.1						0		30	
Surr: 2-Fluorobiphenyl	443		489.3		90.6	12.5	140		0		
Surr: Terphenyl-d14 (surr)	532		489.3		109	45.7	172		0		

Sample ID **1811281-007AMS** SampType: **MS** Units: **µg/Kg-dry** Prep Date: **11/26/2018** RunNo: **47926**
Client ID: **BATCH** Batch ID: **22722** Analysis Date: **11/28/2018** SeqNo: **935819**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	875	43.7	1,092	0	80.1	42.9	138				
2-Methylnaphthalene	871	43.7	1,092	0	79.7	42.8	151				
1-Methylnaphthalene	856	43.7	1,092	0	78.3	41.6	148				
Acenaphthylene	878	43.7	1,092	0	80.4	32.6	160				
Acenaphthene	877	43.7	1,092	0	80.3	31.7	126				
Fluorene	866	43.7	1,092	1.797	79.1	43.4	153				
Phenanthrene	844	43.7	1,092	0	77.3	23.8	135				
Anthracene	857	43.7	1,092	2.434	78.3	32.6	160				
Fluoranthene	882	43.7	1,092	0	80.7	28	144				
Pyrene	867	43.7	1,092	0	79.4	27.8	141				
Benz(a)anthracene	868	43.7	1,092	6.474	78.8	34.9	139				
Chrysene	925	43.7	1,092	6.301	84.1	45.2	146				
Benzo(b)fluoranthene	900	43.7	1,092	0	82.4	42.2	168				
Benzo(k)fluoranthene	874	43.7	1,092	0	80.0	20.5	150				
Benzo(a)pyrene	851	43.7	1,092	0	77.9	34.4	179				

Work Order: 1811283
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID **1811281-007AMS** SampType: **MS** Units: **µg/Kg-dry** Prep Date: **11/26/2018** RunNo: **47926**
Client ID: **BATCH** Batch ID: **22722** Analysis Date: **11/28/2018** SeqNo: **935819**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Indeno(1,2,3-cd)pyrene	820	43.7	1,092	0	75.1	11.8	140				
Dibenz(a,h)anthracene	814	43.7	1,092	0	74.5	17.3	156				
Benzo(g,h,i)perylene	791	43.7	1,092	0	72.4	24.9	119				
Surr: 2-Fluorobiphenyl	531		546.2		97.2	12.5	140				
Surr: Terphenyl-d14 (surr)	576		546.2		105	45.7	172				

Sample ID **1811281-007AMSD** SampType: **MSD** Units: **µg/Kg-dry** Prep Date: **11/26/2018** RunNo: **47926**
Client ID: **BATCH** Batch ID: **22722** Analysis Date: **11/28/2018** SeqNo: **935820**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	747	43.0	1,076	0	69.4	42.9	138	875.3	15.9	30	
2-Methylnaphthalene	736	43.0	1,076	0	68.4	42.8	151	870.9	16.8	30	
1-Methylnaphthalene	727	43.0	1,076	0	67.5	41.6	148	855.8	16.3	30	
Acenaphthylene	738	43.0	1,076	0	68.6	32.6	160	877.9	17.3	30	
Acenaphthene	746	43.0	1,076	0	69.3	31.7	126	877.2	16.2	30	
Fluorene	736	43.0	1,076	1.797	68.2	43.4	153	865.6	16.2	30	
Phenanthrene	728	43.0	1,076	0	67.7	23.8	135	844.2	14.8	30	
Anthracene	727	43.0	1,076	2.434	67.3	32.6	160	857.4	16.5	30	
Fluoranthene	774	43.0	1,076	0	71.9	28	144	881.6	13.0	30	
Pyrene	758	43.0	1,076	0	70.5	27.8	141	867.1	13.4	30	
Benz(a)anthracene	758	43.0	1,076	6.474	69.8	34.9	139	867.7	13.5	30	
Chrysene	818	43.0	1,076	6.301	75.4	45.2	146	924.9	12.3	30	
Benzo(b)fluoranthene	779	43.0	1,076	0	72.4	42.2	168	900.0	14.4	30	
Benzo(k)fluoranthene	777	43.0	1,076	0	72.2	20.5	150	873.8	11.8	30	
Benzo(a)pyrene	745	43.0	1,076	0	69.3	34.4	179	851.1	13.2	30	
Indeno(1,2,3-cd)pyrene	713	43.0	1,076	0	66.3	11.8	140	820.0	14.0	30	
Dibenz(a,h)anthracene	725	43.0	1,076	0	67.4	17.3	156	813.6	11.5	30	
Benzo(g,h,i)perylene	702	43.0	1,076	0	65.2	24.9	119	791.1	12.0	30	
Surr: 2-Fluorobiphenyl	445		538.0		82.7	12.5	140		0		
Surr: Terphenyl-d14 (surr)	513		538.0		95.4	45.7	172		0		

Work Order: 1811283
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID **1811281-007AMSD**	SampType: **MSD**			Units: **µg/Kg-dry**	Prep Date: **11/26/2018**		RunNo: **47926**		
Client ID: **BATCH**	Batch ID: **22722**				Analysis Date: **11/28/2018**		SeqNo: **935820**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Work Order: 1811283
CLIENT: GeoEngineers
Project: Rufus Block 18

QC SUMMARY REPORT

Sample Moisture (Percent Moisture)

Sample ID	**1811281-007ADUP**	SampType: **DUP**		Units: **wt%**		Prep Date: **11/21/2018**		RunNo: **47808**		
Client ID:	**BATCH**	Batch ID: **R47808**				Analysis Date: **11/21/2018**		SeqNo: **932751**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Percent Moisture	13.1	0.500						12.74	2.82	20	

Sample ID	**1811282-001ADUP**	SampType: **DUP**		Units: **wt%**		Prep Date: **11/21/2018**		RunNo: **47808**		
Client ID:	**BATCH**	Batch ID: **R47808**				Analysis Date: **11/21/2018**		SeqNo: **932753**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Percent Moisture	23.3	0.500						21.93	6.23	20	

Sample Log-In Check List

Client Name:	**GEI**	Work Order Number:	**1811283**
Logged by:	**Brianna Barnes**	Date Received:	**11/19/2018 2:55:00 PM**

Chain of Custody

1.	Is Chain of Custody complete?	Yes	☑	No	☐	Not Present ☐
2.	How was the sample delivered?	Client				

Log In

3.	Coolers are present?	Yes	☐	No	☑	NA ☐
		Received straight from field.				
4.	Shipping container/cooler in good condition?	Yes	☑	No	☐	
5.	Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact)	Yes	☐	No	☐	Not Required ☑
6.	Was an attempt made to cool the samples?	Yes	☐	No	☐	NA ☑
7.	Were all items received at a temperature of >0°C to 10.0°C*	Yes	☐	No	☐	NA ☑
8.	Sample(s) in proper container(s)?	Yes	☑	No	☐	
9.	Sufficient sample volume for indicated test(s)?	Yes	☑	No	☐	
10.	Are samples properly preserved?	Yes	☑	No	☐	
11.	Was preservative added to bottles?	Yes	☐	No	☑	NA ☐
12.	Is there headspace in the VOA vials?	Yes	☐	No	☐	NA ☑
13.	Did all samples containers arrive in good condition(unbroken)?	Yes	☑	No	☐	
14.	Does paperwork match bottle labels?	Yes	☑	No	☐	
15.	Are matrices correctly identified on Chain of Custody?	Yes	☑	No	☐	
16.	Is it clear what analyses were requested?	Yes	☑	No	☐	
17.	Were all holding times able to be met?	Yes	☑	No	☐	

Special Handling (if applicable)

18.	Was client notified of all discrepancies with this order?	Yes	☐	No	☐	NA ☑

Person Notified: _____ Date _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

19. Additional remarks:

Item Information

Item #	Temp ºC
Sample	13.4

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

Fremont Analytical
3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Chain of Custody Record & Laboratory Services Agreement

Date: 11.19.18 Page: 1 of: 1

Laboratory Project No (internal): 1911283

Project Name: Rufus Block 18

Special Remarks:

Client: GEI

Project No: 20434-001-32

Address:

Collected by: A. Clauss

City, State, Zip:

Location: Block 18

Telephone:

Report To (PM): Chris Brown

Sample Disposal: ☐ Return to client ☐ Disposal by lab (after 30 days)

Fax:

PM Email: cbrown@geoengineers.com

	Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	VOCs (EPA 8260 / 624)	GX/BTEX	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	Diesel/Heavy Oil Range Organics (DX)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8)	Total (T) | Dissolved (D)	Anions (IC)***	EDB (8011)	Comments
1	Ex-1-2.5	11.19.18	1141	soil							X							
2	Ex-2-2.5	11.19.18	1355	soil							X							
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		

*Matrix: A = Air, AQ = Aqueous, B = Bulk, O = Other, P = Product, S = Soil, SD = Sediment, SL = Solid, W = Water, DW = Drinking Water, GW = Ground Water, SW = Storm Water, WW = Waste Water

**Metals (Circle): MTCA-5 RCRA-8 Priority Pollutants TAL *Individual:* Ag Al As B Ba Be Ca Cd Co Cr Cu Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sr Sn Ti Tl U V Zn

***Anions (Circle): Nitrate Nitrite Chloride Sulfate Bromide O-Phosphate Fluoride Nitrate+Nitrite

Turn-around Time:

- ☒ Standard
- ☐ 3 Day
- ☐ 2 Day
- ☐ Next Day
- Same Day _____ (specify)

I represent that I am authorized to enter into this Agreement with Fremont Analytical on behalf of the Client named above and that I have verified Client's agreement to each of the terms on the front and backside of this Agreement.

Relinquished	Date/Time	Received	Date/Time
x [signature]	1455/11.19.18	x [signature]	11/19/18 1455
Relinquished	Date/Time	Received	Date/Time
x		x	

3600 Fremont Ave. N.
Seattle, WA 98103
T: (206) 352-3790
F: (206) 352-7178
info@fremontanalytical.com

GeoEngineers
Chris Brown
2101 4th Ave, Suite 950
Seattle, WA 98121

RE: Block 18
Work Order Number: 1811430

December 03, 2018

Attention Chris Brown:

Fremont Analytical, Inc. received 4 sample(s) on 11/29/2018 for the analyses presented in the following report.

Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.
Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)
Sample Moisture (Percent Moisture)

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Mike Ridgeway
Laboratory Director

Date: *12/03/2018*

CLIENT: GeoEngineers
Project: Block 18
Work Order: 1811430

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
1811430-001	TP-8-N-2.5	11/29/2018 2:05 PM	11/29/2018 5:45 PM
1811430-002	TP-8-E-2.5	11/29/2018 2:20 PM	11/29/2018 5:45 PM
1811430-003	TP-8-W-2.5	11/29/2018 2:10 PM	11/29/2018 5:45 PM
1811430-004	TP-8-S-2.5	11/29/2018 2:25 PM	11/29/2018 5:45 PM

Case Narrative

WO#: **1811430**
Date: **12/3/2018**

CLIENT: GeoEngineers
Project: Block 18

I. SAMPLE RECEIPT:
Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:
Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:
Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

Qualifiers:

* - Flagged value is not within established control limits
B - Analyte detected in the associated Method Blank
D - Dilution was required
E - Value above quantitation range
H - Holding times for preparation or analysis exceeded
I - Analyte with an internal standard that does not meet established acceptance criteria
J - Analyte detected below Reporting Limit
N - Tentatively Identified Compound (TIC)
Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF)
S - Spike recovery outside accepted recovery limits
ND - Not detected at the Reporting Limit
R - High relative percent difference observed

Acronyms:

%Rec - Percent Recovery
CCB - Continued Calibration Blank
CCV - Continued Calibration Verification
DF - Dilution Factor
HEM - Hexane Extractable Material
ICV - Initial Calibration Verification
LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
MB or MBLANK - Method Blank
MDL - Method Detection Limit
MS/MSD - Matrix Spike / Matrix Spike Duplicate
PDS - Post Digestion Spike
Ref Val - Reference Value
RL - Reporting Limit
RPD - Relative Percent Difference
SD - Serial Dilution
SGT - Silica Gel Treatment
SPK - Spike
Surr - Surrogate

Analytical Report

Work Order: **1811430**
Date Reported: **12/3/2018**

Client: GeoEngineers
Collection Date: 11/29/2018 2:05:00 PM
Project: Block 18
Lab ID: 1811430-001
Matrix: Soil
Client Sample ID: **TP-8-N-2.5**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.				Batch ID: 22795		Analyst: DW
Diesel (Fuel Oil)	ND	23.3		mg/Kg-dry	1	11/30/2018 1:34:47 PM
Heavy Oil	ND	58.4		mg/Kg-dry	1	11/30/2018 1:34:47 PM
Surr: 2-Fluorobiphenyl	86.5	50 - 150		%Rec	1	11/30/2018 1:34:47 PM
Surr: o-Terphenyl	88.4	50 - 150		%Rec	1	11/30/2018 1:34:47 PM
Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)				Batch ID: 22796		Analyst: SB
Naphthalene	ND	43.6		µg/Kg-dry	1	11/30/2018 8:22:25 PM
2-Methylnaphthalene	ND	43.6		µg/Kg-dry	1	11/30/2018 8:22:25 PM
1-Methylnaphthalene	ND	43.6		µg/Kg-dry	1	11/30/2018 8:22:25 PM
Acenaphthylene	ND	43.6		µg/Kg-dry	1	11/30/2018 8:22:25 PM
Acenaphthene	ND	43.6		µg/Kg-dry	1	11/30/2018 8:22:25 PM
Fluorene	ND	43.6		µg/Kg-dry	1	11/30/2018 8:22:25 PM
Phenanthrene	ND	43.6		µg/Kg-dry	1	11/30/2018 8:22:25 PM
Anthracene	ND	43.6		µg/Kg-dry	1	11/30/2018 8:22:25 PM
Fluoranthene	ND	43.6		µg/Kg-dry	1	11/30/2018 8:22:25 PM
Pyrene	ND	43.6		µg/Kg-dry	1	11/30/2018 8:22:25 PM
Benz(a)anthracene	ND	43.6		µg/Kg-dry	1	11/30/2018 8:22:25 PM
Chrysene	ND	43.6		µg/Kg-dry	1	11/30/2018 8:22:25 PM
Benzo(b)fluoranthene	ND	43.6		µg/Kg-dry	1	11/30/2018 8:22:25 PM
Benzo(k)fluoranthene	ND	43.6		µg/Kg-dry	1	11/30/2018 8:22:25 PM
Benzo(a)pyrene	ND	43.6		µg/Kg-dry	1	11/30/2018 8:22:25 PM
Indeno(1,2,3-cd)pyrene	ND	43.6		µg/Kg-dry	1	11/30/2018 8:22:25 PM
Dibenz(a,h)anthracene	ND	43.6		µg/Kg-dry	1	11/30/2018 8:22:25 PM
Benzo(g,h,i)perylene	ND	43.6		µg/Kg-dry	1	11/30/2018 8:22:25 PM
Surr: 2-Fluorobiphenyl	84.8	12.5 - 140		%Rec	1	11/30/2018 8:22:25 PM
Surr: Terphenyl-d14 (surr)	88.2	45.7 - 172		%Rec	1	11/30/2018 8:22:25 PM
Sample Moisture (Percent Moisture)				Batch ID: R47974		Analyst: EAS
Percent Moisture	23.4	0.500		wt%	1	11/30/2018 9:41:19 AM

Analytical Report

Work Order: **1811430**
Date Reported: **12/3/2018**

Client: GeoEngineers
Collection Date: 11/29/2018 2:20:00 PM
Project: Block 18
Lab ID: 1811430-002
Matrix: Soil
Client Sample ID: **TP-8-E-2.5**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.				Batch ID: 22795		Analyst: DW
Diesel (Fuel Oil)	ND	22.4		mg/Kg-dry	1	11/30/2018 2:05:03 PM
Heavy Oil	ND	56.1		mg/Kg-dry	1	11/30/2018 2:05:03 PM
Surr: 2-Fluorobiphenyl	85.0	50 - 150		%Rec	1	11/30/2018 2:05:03 PM
Surr: o-Terphenyl	85.9	50 - 150		%Rec	1	11/30/2018 2:05:03 PM
Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)				Batch ID: 22796		Analyst: SB
Naphthalene	ND	43.4		µg/Kg-dry	1	11/30/2018 9:44:54 PM
2-Methylnaphthalene	ND	43.4		µg/Kg-dry	1	11/30/2018 9:44:54 PM
1-Methylnaphthalene	ND	43.4		µg/Kg-dry	1	11/30/2018 9:44:54 PM
Acenaphthylene	ND	43.4		µg/Kg-dry	1	11/30/2018 9:44:54 PM
Acenaphthene	ND	43.4		µg/Kg-dry	1	11/30/2018 9:44:54 PM
Fluorene	ND	43.4		µg/Kg-dry	1	11/30/2018 9:44:54 PM
Phenanthrene	ND	43.4		µg/Kg-dry	1	11/30/2018 9:44:54 PM
Anthracene	ND	43.4		µg/Kg-dry	1	11/30/2018 9:44:54 PM
Fluoranthene	ND	43.4		µg/Kg-dry	1	11/30/2018 9:44:54 PM
Pyrene	ND	43.4		µg/Kg-dry	1	11/30/2018 9:44:54 PM
Benz(a)anthracene	ND	43.4		µg/Kg-dry	1	11/30/2018 9:44:54 PM
Chrysene	ND	43.4		µg/Kg-dry	1	11/30/2018 9:44:54 PM
Benzo(b)fluoranthene	ND	43.4		µg/Kg-dry	1	11/30/2018 9:44:54 PM
Benzo(k)fluoranthene	ND	43.4		µg/Kg-dry	1	11/30/2018 9:44:54 PM
Benzo(a)pyrene	ND	43.4		µg/Kg-dry	1	11/30/2018 9:44:54 PM
Indeno(1,2,3-cd)pyrene	ND	43.4		µg/Kg-dry	1	11/30/2018 9:44:54 PM
Dibenz(a,h)anthracene	ND	43.4		µg/Kg-dry	1	11/30/2018 9:44:54 PM
Benzo(g,h,i)perylene	ND	43.4		µg/Kg-dry	1	11/30/2018 9:44:54 PM
Surr: 2-Fluorobiphenyl	84.6	12.5 - 140		%Rec	1	11/30/2018 9:44:54 PM
Surr: Terphenyl-d14 (surr)	88.1	45.7 - 172		%Rec	1	11/30/2018 9:44:54 PM
Sample Moisture (Percent Moisture)				Batch ID: R47974		Analyst: EAS
Percent Moisture	22.9	0.500		wt%	1	11/30/2018 9:41:19 AM

Analytical Report

Work Order: **1811430**
Date Reported: **12/3/2018**

Client: GeoEngineers
Collection Date: 11/29/2018 2:10:00 PM
Project: Block 18
Lab ID: 1811430-003
Matrix: Soil
Client Sample ID: **TP-8-W-2.5**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.				Batch ID: 22795		Analyst: DW
Diesel (Fuel Oil)	ND	23.4		mg/Kg-dry	1	11/30/2018 2:35:11 PM
Heavy Oil	ND	58.5		mg/Kg-dry	1	11/30/2018 2:35:11 PM
Surr: 2-Fluorobiphenyl	77.3	50 - 150		%Rec	1	11/30/2018 2:35:11 PM
Surr: o-Terphenyl	78.6	50 - 150		%Rec	1	11/30/2018 2:35:11 PM
Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)				Batch ID: 22796		Analyst: SB
Naphthalene	ND	44.4		µg/Kg-dry	1	11/30/2018 10:05:34 PM
2-Methylnaphthalene	ND	44.4		µg/Kg-dry	1	11/30/2018 10:05:34 PM
1-Methylnaphthalene	ND	44.4		µg/Kg-dry	1	11/30/2018 10:05:34 PM
Acenaphthylene	ND	44.4		µg/Kg-dry	1	11/30/2018 10:05:34 PM
Acenaphthene	ND	44.4		µg/Kg-dry	1	11/30/2018 10:05:34 PM
Fluorene	ND	44.4		µg/Kg-dry	1	11/30/2018 10:05:34 PM
Phenanthrene	ND	44.4		µg/Kg-dry	1	11/30/2018 10:05:34 PM
Anthracene	ND	44.4		µg/Kg-dry	1	11/30/2018 10:05:34 PM
Fluoranthene	ND	44.4		µg/Kg-dry	1	11/30/2018 10:05:34 PM
Pyrene	ND	44.4		µg/Kg-dry	1	11/30/2018 10:05:34 PM
Benz(a)anthracene	ND	44.4		µg/Kg-dry	1	11/30/2018 10:05:34 PM
Chrysene	ND	44.4		µg/Kg-dry	1	11/30/2018 10:05:34 PM
Benzo(b)fluoranthene	ND	44.4		µg/Kg-dry	1	11/30/2018 10:05:34 PM
Benzo(k)fluoranthene	ND	44.4		µg/Kg-dry	1	11/30/2018 10:05:34 PM
Benzo(a)pyrene	ND	44.4		µg/Kg-dry	1	11/30/2018 10:05:34 PM
Indeno(1,2,3-cd)pyrene	ND	44.4		µg/Kg-dry	1	11/30/2018 10:05:34 PM
Dibenz(a,h)anthracene	ND	44.4		µg/Kg-dry	1	11/30/2018 10:05:34 PM
Benzo(g,h,i)perylene	ND	44.4		µg/Kg-dry	1	11/30/2018 10:05:34 PM
Surr: 2-Fluorobiphenyl	88.5	12.5 - 140		%Rec	1	11/30/2018 10:05:34 PM
Surr: Terphenyl-d14 (surr)	93.9	45.7 - 172		%Rec	1	11/30/2018 10:05:34 PM
Sample Moisture (Percent Moisture)				Batch ID: R47974		Analyst: EAS
Percent Moisture	22.5	0.500		wt%	1	11/30/2018 9:41:19 AM

Analytical Report

Work Order: **1811430**
Date Reported: **12/3/2018**

Client: GeoEngineers
Collection Date: 11/29/2018 2:25:00 PM
Project: Block 18
Lab ID: 1811430-004
Matrix: Soil
Client Sample ID: **TP-8-S-2.5**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.				Batch ID: 22795		Analyst: DW
Diesel (Fuel Oil)	ND	23.5		mg/Kg-dry	1	11/30/2018 3:05:30 PM
Heavy Oil	ND	58.6		mg/Kg-dry	1	11/30/2018 3:05:30 PM
Surr: 2-Fluorobiphenyl	90.1	50 - 150		%Rec	1	11/30/2018 3:05:30 PM
Surr: o-Terphenyl	91.8	50 - 150		%Rec	1	11/30/2018 3:05:30 PM
Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)				Batch ID: 22796		Analyst: SB
Naphthalene	ND	50.1		µg/Kg-dry	1	11/30/2018 10:26:14 PM
2-Methylnaphthalene	ND	50.1		µg/Kg-dry	1	11/30/2018 10:26:14 PM
1-Methylnaphthalene	ND	50.1		µg/Kg-dry	1	11/30/2018 10:26:14 PM
Acenaphthylene	ND	50.1		µg/Kg-dry	1	11/30/2018 10:26:14 PM
Acenaphthene	ND	50.1		µg/Kg-dry	1	11/30/2018 10:26:14 PM
Fluorene	ND	50.1		µg/Kg-dry	1	11/30/2018 10:26:14 PM
Phenanthrene	ND	50.1		µg/Kg-dry	1	11/30/2018 10:26:14 PM
Anthracene	ND	50.1		µg/Kg-dry	1	11/30/2018 10:26:14 PM
Fluoranthene	ND	50.1		µg/Kg-dry	1	11/30/2018 10:26:14 PM
Pyrene	ND	50.1		µg/Kg-dry	1	11/30/2018 10:26:14 PM
Benz(a)anthracene	ND	50.1		µg/Kg-dry	1	11/30/2018 10:26:14 PM
Chrysene	ND	50.1		µg/Kg-dry	1	11/30/2018 10:26:14 PM
Benzo(b)fluoranthene	ND	50.1		µg/Kg-dry	1	11/30/2018 10:26:14 PM
Benzo(k)fluoranthene	ND	50.1		µg/Kg-dry	1	11/30/2018 10:26:14 PM
Benzo(a)pyrene	ND	50.1		µg/Kg-dry	1	11/30/2018 10:26:14 PM
Indeno(1,2,3-cd)pyrene	ND	50.1		µg/Kg-dry	1	11/30/2018 10:26:14 PM
Dibenz(a,h)anthracene	ND	50.1		µg/Kg-dry	1	11/30/2018 10:26:14 PM
Benzo(g,h,i)perylene	ND	50.1		µg/Kg-dry	1	11/30/2018 10:26:14 PM
Surr: 2-Fluorobiphenyl	74.5	12.5 - 140		%Rec	1	11/30/2018 10:26:14 PM
Surr: Terphenyl-d14 (surr)	80.1	45.7 - 172		%Rec	1	11/30/2018 10:26:14 PM
Sample Moisture (Percent Moisture)				Batch ID: R47974		Analyst: EAS
Percent Moisture	23.9	0.500		wt%	1	11/30/2018 9:41:19 AM

Work Order: 1811430
CLIENT: GeoEngineers
Project: Block 18

QC SUMMARY REPORT

Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Sample ID	**MB-22795**	SampType:	**MBLK**		Units:	**mg/Kg**	Prep Date:	**11/30/2018**	RunNo:	**47980**
Client ID:	**MBLKS**	Batch ID:	**22795**				Analysis Date:	**11/30/2018**	SeqNo:	**937292**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel (Fuel Oil)	ND	20.0									
Heavy Oil	ND	50.0									
Surr: 2-Fluorobiphenyl	18.3		20.00		91.3	50	150				
Surr: o-Terphenyl	18.6		20.00		93.3	50	150				

Sample ID	**LCS-22795**	SampType:	**LCS**		Units:	**mg/Kg**	Prep Date:	**11/30/2018**	RunNo:	**47980**
Client ID:	**LCSS**	Batch ID:	**22795**				Analysis Date:	**11/30/2018**	SeqNo:	**937293**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel (Fuel Oil)	635	20.0	500.0	0	127	65	135				
Surr: 2-Fluorobiphenyl	17.9		20.00		89.6	50	150				
Surr: o-Terphenyl	18.2		20.00		91.1	50	150				

Sample ID	**1811429-001ADUP**	SampType:	**DUP**		Units:	**mg/Kg-dry**	Prep Date:	**11/30/2018**	RunNo:	**47980**
Client ID:	**BATCH**	Batch ID:	**22795**				Analysis Date:	**11/30/2018**	SeqNo:	**937777**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel (Fuel Oil)	ND	18.8						0		30	
Heavy Oil	ND	47.0						0		30	
Surr: 2-Fluorobiphenyl	17.9		18.79		95.1	50	150		0		
Surr: o-Terphenyl	18.4		18.79		98.0	50	150		0		

Sample ID	**1811429-001AMS**	SampType:	**MS**		Units:	**mg/Kg-dry**	Prep Date:	**11/30/2018**	RunNo:	**47980**
Client ID:	**BATCH**	Batch ID:	**22795**				Analysis Date:	**11/30/2018**	SeqNo:	**937778**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel (Fuel Oil)	632	19.6	489.2	0	129	65	135				
Surr: 2-Fluorobiphenyl	19.2		19.57		98.3	50	150				
Surr: o-Terphenyl	21.6		19.57		110	50	150				

Work Order: 1811430
CLIENT: GeoEngineers
Project: Block 18

QC SUMMARY REPORT

Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Sample ID **1811429-001AMS** SampType: **MS** Units: **mg/Kg-dry** Prep Date: **11/30/2018** RunNo: **47980**
Client ID: **BATCH** Batch ID: **22795** Analysis Date: **11/30/2018** SeqNo: **937778**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Sample ID **1811429-001AMSD** SampType: **MSD** Units: **mg/Kg-dry** Prep Date: **11/30/2018** RunNo: **47980**
Client ID: **BATCH** Batch ID: **22795** Analysis Date: **11/30/2018** SeqNo: **937779**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel (Fuel Oil)	629	19.4	484.1	0	130	65	135	631.8	0.413	30	
Surr: 2-Fluorobiphenyl	19.1		19.36		98.5	50	150		0		
Surr: o-Terphenyl	19.5		19.36		101	50	150		0		

Work Order: 1811430
CLIENT: GeoEngineers
Project: Block 18

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID **MB-22796** SampType: **MBLK** Units: **µg/Kg** Prep Date: **11/30/2018** RunNo: **48040**
Client ID: **MBLKS** Batch ID: **22796** Analysis Date: **11/30/2018** SeqNo: **938191**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	40.0									
2-Methylnaphthalene	ND	40.0									
1-Methylnaphthalene	ND	40.0									
Acenaphthylene	ND	40.0									
Acenaphthene	ND	40.0									
Fluorene	ND	40.0									
Phenanthrene	ND	40.0									
Anthracene	ND	40.0									
Fluoranthene	ND	40.0									
Pyrene	ND	40.0									
Benz(a)anthracene	ND	40.0									
Chrysene	ND	40.0									
Benzo(b)fluoranthene	ND	40.0									
Benzo(k)fluoranthene	ND	40.0									
Benzo(a)pyrene	ND	40.0									
Indeno(1,2,3-cd)pyrene	ND	40.0									
Dibenz(a,h)anthracene	ND	40.0									
Benzo(g,h,i)perylene	ND	40.0									
Surr: 2-Fluorobiphenyl	526		500.0		105	12.5	140				
Surr: Terphenyl-d14 (surr)	543		500.0		109	45.7	172				

Sample ID **LCS-22796** SampType: **LCS** Units: **µg/Kg** Prep Date: **11/30/2018** RunNo: **48040**
Client ID: **LCSS** Batch ID: **22796** Analysis Date: **11/30/2018** SeqNo: **938192**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	975	40.0	1,000	0	97.5	50.6	131				
2-Methylnaphthalene	982	40.0	1,000	0	98.2	45.1	135				
1-Methylnaphthalene	959	40.0	1,000	0	95.9	46.2	133				
Acenaphthylene	975	40.0	1,000	0	97.5	32.8	136				
Acenaphthene	973	40.0	1,000	0	97.3	42	137				

Work Order: 1811430
CLIENT: GeoEngineers
Project: Block 18

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID **LCS-22796** SampType: **LCS** Units: **µg/Kg** Prep Date: **11/30/2018** RunNo: **48040**
Client ID: **LCSS** Batch ID: **22796** Analysis Date: **11/30/2018** SeqNo: **938192**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluorene	989	40.0	1,000	0	98.9	41.4	144				
Phenanthrene	940	40.0	1,000	0	94.0	36.6	141				
Anthracene	972	40.0	1,000	0	97.2	42.5	157				
Fluoranthene	973	40.0	1,000	0	97.3	43.4	144				
Pyrene	958	40.0	1,000	0	95.8	39.6	146				
Benz(a)anthracene	1,030	40.0	1,000	0	103	36.6	142				
Chrysene	964	40.0	1,000	0	96.4	43	165				
Benzo(b)fluoranthene	997	40.0	1,000	0	99.7	41	155				
Benzo(k)fluoranthene	951	40.0	1,000	0	95.1	30.6	164				
Benzo(a)pyrene	999	40.0	1,000	0	99.9	30.2	171				
Indeno(1,2,3-cd)pyrene	995	40.0	1,000	0	99.5	31.3	159				
Dibenz(a,h)anthracene	1,020	40.0	1,000	0	102	28	158				
Benzo(g,h,i)perylene	967	40.0	1,000	0	96.7	32.4	144				
Surr: 2-Fluorobiphenyl	493		500.0		98.5	12.5	140				
Surr: Terphenyl-d14 (surr)	496		500.0		99.3	45.7	172				

Sample ID **1811430-001ADUP** SampType: **DUP** Units: **µg/Kg-dry** Prep Date: **11/30/2018** RunNo: **48040**
Client ID: **TP-8-N-2.5** Batch ID: **22796** Analysis Date: **11/30/2018** SeqNo: **938194**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	68.0	49.4						33.71	67.5	30	
2-Methylnaphthalene	ND	49.4						0		30	
1-Methylnaphthalene	ND	49.4						0		30	
Acenaphthylene	ND	49.4						0		30	
Acenaphthene	ND	49.4						0		30	
Fluorene	ND	49.4						0		30	
Phenanthrene	ND	49.4						0		30	
Anthracene	ND	49.4						0		30	
Fluoranthene	ND	49.4						0		30	
Pyrene	ND	49.4						0		30	

Work Order: 1811430
CLIENT: GeoEngineers
Project: Block 18

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID **1811430-001ADUP** SampType: **DUP** Units: **µg/Kg-dry** Prep Date: **11/30/2018** RunNo: **48040**
Client ID: **TP-8-N-2.5** Batch ID: **22796** Analysis Date: **11/30/2018** SeqNo: **938194**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benz(a)anthracene	ND	49.4						0		30	
Chrysene	ND	49.4						0		30	
Benzo(b)fluoranthene	ND	49.4						0		30	
Benzo(k)fluoranthene	ND	49.4						0		30	
Benzo(a)pyrene	ND	49.4						0		30	
Indeno(1,2,3-cd)pyrene	ND	49.4						0		30	
Dibenz(a,h)anthracene	ND	49.4						0		30	
Benzo(g,h,i)perylene	ND	49.4						0		30	
Surr: 2-Fluorobiphenyl	515		617.9		83.4	12.5	140		0		
Surr: Terphenyl-d14 (surr)	619		617.9		100	45.7	172		0		

Sample ID **1811430-001AMS** SampType: **MS** Units: **µg/Kg-dry** Prep Date: **11/30/2018** RunNo: **48040**
Client ID: **TP-8-N-2.5** Batch ID: **22796** Analysis Date: **11/30/2018** SeqNo: **938195**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	1,030	51.0	1,274	33.71	78.5	42.9	138				
2-Methylnaphthalene	1,030	51.0	1,274	5.974	80.4	42.8	151				
1-Methylnaphthalene	996	51.0	1,274	0	78.2	41.6	148				
Acenaphthylene	1,020	51.0	1,274	0	79.7	32.6	160				
Acenaphthene	1,020	51.0	1,274	8.813	79.6	31.7	126				
Fluorene	1,030	51.0	1,274	7.629	80.2	43.4	153				
Phenanthrene	975	51.0	1,274	18.52	75.1	23.8	135				
Anthracene	994	51.0	1,274	3.529	77.7	32.6	160				
Fluoranthene	1,030	51.0	1,274	10.22	79.7	28	144				
Pyrene	1,000	51.0	1,274	9.214	77.8	27.8	141				
Benz(a)anthracene	1,080	51.0	1,274	8.303	83.7	34.9	139				
Chrysene	993	51.0	1,274	0	77.9	45.2	146				
Benzo(b)fluoranthene	1,020	51.0	1,274	0	79.7	42.2	168				
Benzo(k)fluoranthene	1,020	51.0	1,274	0	79.9	20.5	150				
Benzo(a)pyrene	1,050	51.0	1,274	0	82.5	34.4	179				

Work Order: 1811430
CLIENT: GeoEngineers
Project: Block 18

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID **1811430-001AMS** SampType: **MS** Units: **µg/Kg-dry** Prep Date: **11/30/2018** RunNo: **48040**
Client ID: **TP-8-N-2.5** Batch ID: **22796** Analysis Date: **11/30/2018** SeqNo: **938195**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Indeno(1,2,3-cd)pyrene	1,050	51.0	1,274	0	82.2	11.8	140				
Dibenz(a,h)anthracene	1,070	51.0	1,274	0	84.3	17.3	156				
Benzo(g,h,i)perylene	1,020	51.0	1,274	0	79.7	24.9	119				
Surr: 2-Fluorobiphenyl	523		637.2		82.1	12.5	140				
Surr: Terphenyl-d14 (surr)	531		637.2		83.3	45.7	172				

Sample ID **1811430-001AMSD** SampType: **MSD** Units: **µg/Kg-dry** Prep Date: **11/30/2018** RunNo: **48040**
Client ID: **TP-8-N-2.5** Batch ID: **22796** Analysis Date: **11/30/2018** SeqNo: **938196**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	849	46.0	1,151	33.71	70.9	42.9	138	1,034	19.6	30	
2-Methylnaphthalene	840	46.0	1,151	5.974	72.5	42.8	151	1,030	20.3	30	
1-Methylnaphthalene	805	46.0	1,151	0	70.0	41.6	148	996.5	21.2	30	
Acenaphthylene	837	46.0	1,151	0	72.7	32.6	160	1,015	19.3	30	
Acenaphthene	833	46.0	1,151	8.813	71.6	31.7	126	1,024	20.6	30	
Fluorene	843	46.0	1,151	7.629	72.6	43.4	153	1,030	20.0	30	
Phenanthrene	793	46.0	1,151	18.52	67.3	23.8	135	975.3	20.6	30	
Anthracene	820	46.0	1,151	3.529	71.0	32.6	160	993.6	19.1	30	
Fluoranthene	822	46.0	1,151	10.22	70.6	28	144	1,025	22.0	30	
Pyrene	805	46.0	1,151	9.214	69.2	27.8	141	1,001	21.7	30	
Benz(a)anthracene	875	46.0	1,151	8.303	75.3	34.9	139	1,075	20.5	30	
Chrysene	826	46.0	1,151	0	71.7	45.2	146	992.8	18.4	30	
Benzo(b)fluoranthene	825	46.0	1,151	0	71.7	42.2	168	1,016	20.7	30	
Benzo(k)fluoranthene	839	46.0	1,151	0	72.9	20.5	150	1,018	19.2	30	
Benzo(a)pyrene	854	46.0	1,151	0	74.2	34.4	179	1,052	20.8	30	
Indeno(1,2,3-cd)pyrene	842	46.0	1,151	0	73.2	11.8	140	1,047	21.7	30	
Dibenz(a,h)anthracene	855	46.0	1,151	0	74.3	17.3	156	1,075	22.8	30	
Benzo(g,h,i)perylene	806	46.0	1,151	0	70.0	24.9	119	1,015	23.0	30	
Surr: 2-Fluorobiphenyl	447		575.4		77.7	12.5	140		0		
Surr: Terphenyl-d14 (surr)	450		575.4		78.2	45.7	172		0		

Work Order: 1811430
CLIENT: GeoEngineers
Project: Block 18

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID **1811430-001AMSD** SampType: **MSD** Units: **µg/Kg-dry** Prep Date: **11/30/2018** RunNo: **48040**
Client ID: **TP-8-N-2.5** Batch ID: **22796** Analysis Date: **11/30/2018** SeqNo: **938196**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Work Order: 1811430
CLIENT: GeoEngineers
Project: Block 18

QC SUMMARY REPORT

Sample Moisture (Percent Moisture)

Sample ID **1811430-001ADUP** SampType: **DUP** Units: **wt%** Prep Date: **11/30/2018** RunNo: **47974**
Client ID: **TP-8-N-2.5** Batch ID: **R47974** Analysis Date: **11/30/2018** SeqNo: **936867**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Percent Moisture	23.5	0.500						23.44	0.214	20	

Sample Log-In Check List

Client Name:	**GEI**	Work Order Number:	**1811430**
Logged by:	**Brianna Barnes**	Date Received:	**11/29/2018 5:45:00 PM**

Chain of Custody

1.	Is Chain of Custody complete?	Yes	☑	No	☐	Not Present ☐
2.	How was the sample delivered?	Client				

Log In

3.	Coolers are present?	Yes	☐	No	☑	NA ☐
		Received straight from field.				
4.	Shipping container/cooler in good condition?	Yes	☑	No	☐	
5.	Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact)	Yes	☐	No	☐	Not Required ☑
6.	Was an attempt made to cool the samples?	Yes	☐	No	☐	NA ☑
7.	Were all items received at a temperature of >0°C to 10.0°C*	Yes	☐	No	☐	NA ☑
8.	Sample(s) in proper container(s)?	Yes	☑	No	☐	
9.	Sufficient sample volume for indicated test(s)?	Yes	☑	No	☐	
10.	Are samples properly preserved?	Yes	☑	No	☐	
11.	Was preservative added to bottles?	Yes	☐	No	☑	NA ☐
12.	Is there headspace in the VOA vials?	Yes	☐	No	☐	NA ☑
13.	Did all samples containers arrive in good condition(unbroken)?	Yes	☑	No	☐	
14.	Does paperwork match bottle labels?	Yes	☑	No	☐	
15.	Are matrices correctly identified on Chain of Custody?	Yes	☑	No	☐	
16.	Is it clear what analyses were requested?	Yes	☑	No	☐	
17.	Were all holding times able to be met?	Yes	☑	No	☐	

Special Handling (if applicable)

18.	Was client notified of all discrepancies with this order?	Yes	☐	No	☐	NA ☑

Person Notified:		Date	
By Whom:		Via:	☐ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding:			
Client Instructions:			

19. Additional remarks:

Item Information

Item #	Temp ºC
Sample	21.0

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

Chain of Custody Record & Laboratory Services Agreement

Fremont Analytical
3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Date: 11/29/18 Page: 1 of: 1

Project Name: Block 18

Project No: 20434-001-32

Collected by: Chris Brower

Location:

Report To (PM):

PM Email:

Client: GeoEngineers

Address:

City, State, Zip:

Telephone:

Fax:

Laboratory Project No (internal): 1811430

Special Remarks:

Sample Disposal: ☐ Return to client ☐ Disposal by lab (after 30 days)

	Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	VOCs (EPA 8260 / 624)	GX/BTEX	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	Diesel/Heavy Oil Range Organics (DX)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8)	Total (T) | Dissolved (D)	Anions (IC)***	EDB (8011)	Comments
1	TP-8-N-2.5	11/29/18	1405	S						X		X						
2	TP-8-E-2.5		1420	S						X		X						
3	TP-8-W-2.5		1410	S						X		X						
4	TP-8-S-2.5	↓	1425	S						X		X						
5																		
6																		
7																		
8																		
9																		
10																		

*Matrix: A = Air, AQ = Aqueous, B = Bulk, O = Other, P = Product, S = Soil, SD = Sediment, SL = Solid, W = Water, DW = Drinking Water, GW = Ground Water, SW = Storm Water, WW = Waste Water

**Metals (Circle): MTCA-5 RCRA-8 Priority Pollutants TAL *Individual:* Ag Al As B Ba Be Ca Cd Co Cr Cu Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sr Sn Ti Tl U V Zn

***Anions (Circle): Nitrate Nitrite Chloride Sulfate Bromide O-Phosphate Fluoride Nitrate+Nitrite

I represent that I am authorized to enter into this Agreement with Fremont Analytical on behalf of the Client named above and that I have verified Client's agreement to each of the terms on the front and backside of this Agreement.

Relinquished	Date/Time	Received	Date/Time
x [signature]	11/29/18 1745	x [signature]	11/29/18 1745
Relinquished	Date/Time	Received	Date/Time
x		x	

Turn-around Time:

- ☐ Standard
- ☐ 3 Day
- ☐ 2 Day
- ☒ Next Day
- Same Day _____ (specify)

APPENDIX C
Contaminated Soil Tonnage Summaries

Sellen

Rufus 2.0 Block 18 - Mass Excavation

Class II Contaminated Soil Tracking Log

Date	Disposal Site	Ticket ID	Truck #	Approx. CY	Tons	Cadman Ticket #
11/20/2018	Cadman	105275	214	22	29.15	1124043746
11/20/2018	Cadman	105743	73	22	29.38	1124043740
11/20/2018	Cadman	105743	73	22	31.58	1124043766
11/20/2018	Cadman	105515	76	22	29.56	1124043742
11/20/2018	Cadman	105382	51	22	31.89	1124043759
11/20/2018	Cadman	101178	78	22	30.52	1124043754
11/20/2018	Cadman	99007	211	22	29.62	1124043761
11/28/2018	Cadman	105279	71	22	27.6	1124044209
11/28/2018	Cadman	105279	71	22	23.82	1124044171
11/28/2018	Cadman	105279	71	22	26.72	1124044190
11/28/2018	Cadman	109301	72	22	25.5	1124044181
11/28/2018	Cadman	109301	72	22	31.16	1124044201
11/28/2018	Cadman	106838	63	22	23.95	1124044176
11/28/2018	Cadman	106838	63	22	28.13	1124044194
11/28/2018	Cadman	99670	75	22	28.24	1124044185
11/28/2018	Cadman	99670	75	22	31.3	1124044203
11/28/2018	Cadman	109302	212	22	23.97	1124044182
11/28/2018	Cadman	109302	212	22	28.02	1124044202
11/28/2018	Cadman	109276	70	22	23.82	1124044180
11/28/2018	Cadman	109276	70	22	27.77	1124044199
11/28/2018	Cadman	109034	215	22	21.26	1124044175
11/28/2018	Cadman	109034	215	22	27.16	1124044195
11/28/2018	Cadman	109200	218	22	23.65	1124044174
11/28/2018	Cadman	109200	218	22	27.65	1124044192
11/28/2018	Cadman	107276	213	22	25.67	1124044183
11/28/2018	Cadman	107276	213	22	27.59	1124044204
11/28/2018	Cadman	101182	78	22	27.89	1124044167
11/28/2018	Cadman	101182	78	22	25.69	1124044187
11/28/2018	Cadman	101182	78	22	32.28	1124044212
11/28/2018	Cadman	101750	80	22	28.08	1124044177
11/28/2018	Cadman	101750	80	22	31.27	1124044196
11/28/2018	Cadman	99011	211	22	24.65	1124044173
11/28/2018	Cadman	99011	211	22	24.66	1124044191
11/29/2018	Cadman	105280	71	22	26.36	1124044350
11/29/2018	Cadman	105280	71	22	24.59	1124044325
11/29/2018	Cadman	105280	71	22	27.57	1124044282
11/29/2018	Cadman	104632	65	22	26.44	1124044337
11/29/2018	Cadman	104632	65	22	24.56	1124044304
11/29/2018	Cadman	104632	65	22	23.91	1124044275
11/29/2018	Cadman	109304	213	22	26.83	1124044301
11/29/2018	Cadman	109304	213	22	29.8	1124044332
11/29/2018	Cadman	109304	213	22	29.88	1124044372
11/29/2018	Cadman	109052	64	22	24.59	1124044377
11/29/2018	Cadman	109052	64	22	22.18	1104044305
11/29/2018	Cadman	109052	64	22	25.3	1124044277
11/29/2018	Cadman	99671	75	22	25.67	1124044379

Rufus 2.0 Block 18 - Mass Excavation

Class II Contaminated Soil Tracking Log

Date	Disposal Site	Ticket ID	Truck #	Approx. CY	Tons	Cadman Ticket #
11/29/2018	Cadman	99671	75	22	26.33	1124044309
11/29/2018	Cadman	99671	75	22	26.97	1124044278
11/29/2018	Cadman	106079	212	22	24.07	1124044353
11/29/2018	Cadman	106079	212	22	22.81	1124044327
11/29/2018	Cadman	106079	212	22	25.4	1124044288
11/29/2018	Cadman	106949	218	22	25.28	1124044320
11/29/2018	Cadman	106949	218	22	27	1124044280
11/29/2018	Cadman	109277	70	22	26.36	1124044354
11/29/2018	Cadman	109277	70	22	25.42	1124044328
11/29/2018	Cadman	109277	70	22	22.17	1124044276
11/29/2018	Cadman	109035	215	22	22.56	1124044321
11/29/2018	Cadman	109035	215	22	23.61	1124044281
11/29/2018	Cadman	109230	53	22	19.98	1124044351
11/29/2018	Cadman	109230	53	22	20.74	1124044326
11/29/2018	Cadman	109230	53	22	22.11	1124044285
11/29/2018	Cadman	101183	78	22	26.08	1124044274
11/29/2018	Cadman	101183	78	22	24.22	1124044303
11/29/2018	Cadman	101183	78	22	26.5	1124044335
11/29/2018	Cadman	101183	78	22	26.54	1124044375
11/29/2018	Cadman	99012	211	22	25.15	1124044279
11/29/2018	Cadman	99012	211	22	23.77	1124044319
11/30/2018	Cadman	109305	72	22	25.17	1124044452
11/30/2018	Cadman	109305	72	22	34.94	1124044479
11/30/2018	Cadman	106200	45	22	26.46	1124044446
11/30/2018	Cadman	106200	45	22	30.46	1124044472
11/30/2018	Cadman	106200	45	22	33.17	1124044510
11/30/2018	Cadman	99672	75	22	25.47	1124044444
11/30/2018	Cadman	99672	75	22	37.46	112444501
11/30/2018	Cadman	106080	212	22	37.38	1124044492
11/30/2018	Cadman	106080	212	22	23.42	1124044445
11/30/2018	Cadman	106080	212	22	32.53	1124044520
11/30/2018	Cadman	109250	54	22	23.2	1124044443
11/30/2018	Cadman	109250	54	22	34.47	1124044490
11/30/2018	Cadman	109250	54	22	35.06	1124044518
11/30/2018	Cadman	109279	70	22	36.64	1124044498
11/30/2018	Cadman	109279	70	22	25.6	1124044442
11/30/2018	Cadman	109279	70	22	28.68	1124044525
11/30/2018	Cadman	109036	215	22	32.29	1124044475
11/30/2018	Cadman	109036	215	22	25	1124044449
11/30/2018	Cadman	109036	215	22	33.49	1124044523
11/30/2018	Cadman	109227	53	22	25.78	1124044473
11/30/2018	Cadman	109227	53	22	24.84	1124044447
11/30/2018	Cadman	109227	53	22	26.81	1124044512
11/30/2018	Cadman	107354	218	22	26.06	1124044454
11/30/2018	Cadman	107354	218	22	28.12	1124044483
11/30/2018	Cadman	107354	218	22	33.84	1124044500
11/30/2018	Cadman	107354	218	22	31.36	1124044527
11/30/2018	Cadman	107278	213	22	34.7	1124044499
11/30/2018	Cadman	107278	213	22	33.76	1124044480

Rufus 2.0 Block 18 - Mass Excavation

Class II Contaminated Soil Tracking Log

Date	Disposal Site	Ticket ID	Truck #	Approx. CY	Tons	Cadman Ticket #
11/30/2018	Cadman	107278	213	22	27.93	1124044453
11/30/2018	Cadman	107278	213	22	33.15	1124044526
11/30/2018	Cadman	101184	78	22	26.51	1124044441
11/30/2018	Cadman	101184	78	22	34.26	1124044495
11/30/2018	Cadman	101184	78	22	33.98	1124044522
11/30/2018	Cadman	101752	44	22	27.93	1124044474
11/30/2018	Cadman	101752	44	22	25.46	1124044448
11/30/2018	Cadman	101752	44	22	23.79	1124044508
12/21/2018	Cadman	112275	33	22	33.78	1124045546
12/21/2018	Cadman	105594	212	22	30.65	1124045550
12/21/2018	Cadman	107490	50	22	35.45	1124045541
12/21/2018	Cadman	109265	54	22	31.18	112404552
12/21/2018	Cadman	109296	70	22	32.72	11124045548
12/21/2018	Cadman	107362	48	22	36.55	1124045543
12/21/2018	Cadman	101197	78	22	35.36	1124045539
12/21/2018	Cadman	97323	55	22	34.68	1124045547
12/21/2018	Cadman	104412	59	22	32.81	1124045545
12/21/2018	Cadman	105986	73	22	29.29	1124045538
12/21/2018	Cadman	105292	71	22	30.93	1124045551
				Total Tons	**3202.52**	

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Rufus 2.0 Block 18 - Mass Excavation

Class III Contaminated Soil Tracking Log

Date	Disposal Site	Ticket ID	Truck #	Approx. CY	Tons	WM Ticket #
10/31/2018	WM - 8th Ave	N/A	PV415	5	6.12	24992
11/1/2018	WM - 8th Ave	N/A	BRAVO45	5	6.31	25003
11/2/2018	WM - 8th Ave	N/A	BRAVO16	5	6.99	25038
11/2/2018	WM - 8th Ave	N/A	BRAVO16	5	6.33	25059
11/3/2018	WM - 8th Ave	N/A	BRAVO16	6	7.66	25062
11/3/2018	WM - 8th Ave	N/A	BRAVO16	5	7.34	25068
11/5/2018	WM - 8th Ave	N/A	BRAVO16	6	8.63	25087
11/5/2018	WM - 8th Ave	N/A	BRAVO16	6	7.64	25108
11/6/2018	WM - 8th Ave	N/A	BRAVO16	6	7.95	25122
11/6/2018	WM - 8th Ave	N/A	BRAVO16	5	6.16	25133
11/12/2018	WM - 8th Ave	105721	212	22	29.61	25239
11/12/2018	WM - 8th Ave	105721	212	22	30.41	25274
11/19/2018	WM - 8th Ave	9965	75	22	33.76	25449
11/19/2018	WM - 8th Ave	9965	75	22	31.14	25463
11/19/2018	WM - 8th Ave	9965	75	22	32.14	25467
11/19/2018	WM - 8th Ave	9965	75	22	31.93	25477
11/19/2018	WM - 8th Ave	106943	54	22	33.98	25472
11/20/2018	WM - 8th Ave	105275	214	22	29.24	25496
11/20/2018	WM - 8th Ave	105275	214	22	27.73	25513
11/20/2018	WM - 8th Ave	105275	214	22	28.59	25530
11/20/2018	WM - 8th Ave	105743	73	22	28.85	25502
11/20/2018	WM - 8th Ave	105743	73	22	26.21	25520
11/20/2018	WM - 8th Ave	105743	73	22	30.7	25532
11/20/2018	WM - 8th Ave	105515	76	22	27.58	25494
11/20/2018	WM - 8th Ave	105515	76	22	26.84	25504
11/20/2018	WM - 8th Ave	105515	76	22	29.47	25526
11/20/2018	WM - 8th Ave	105382	51	22	29.75	25523
11/20/2018	WM - 8th Ave	105382	51	22	29.95	25539
11/20/2018	WM - 8th Ave	105382	51	22	28.9	25501
11/20/2018	WM - 8th Ave	101178	78	22	26.3	25499
11/20/2018	WM - 8th Ave	101178	78	22	27.02	25522
11/20/2018	WM - 8th Ave	101178	78	22	29.74	25534
11/20/2018	WM - 8th Ave	99007	211	22	31.29	25497
11/20/2018	WM - 8th Ave	99007	211	22	26.87	25516
11/20/2018	WM - 8th Ave	99007	211	22	30.2	25540
11/30/2018	WM - 8th Ave	99672	75	22	31.27	25781
11/30/2018	WM - 8th Ave	99672	75	22	29.39	25774
11/30/2018	WM - 8th Ave	106080	212	22	28.8	25775
11/30/2018	WM - 8th Ave	109250	54	22	24.36	25773
11/30/2018	WM - 8th Ave	109279	70	22	24.77	25772
11/30/2018	WM - 8th Ave	109279	70	22	27.03	25779
11/30/2018	WM - 8th Ave	101184	78	22	31.05	25771
11/30/2018	WM - 8th Ave	101184	78	22	30.92	25777
				Total Tons	**1036.92**	

Sellen

Rufus 2.0 Block 18 - Mass Excavation

Contaminated/Clean Soil Export Summary

Date	CLASS III CONTAMINATED SOIL			CLASS II CONTAMINATED SOIL			CLEAN SOIL		Daily Load Total	Daily TCY Total	Weekly TCY Total
	# Loads	Truck Cubic Yards	Tons	# Loads	Truck Cubic Yards	Tons	# Loads	Truck Cubic Yards			
10/31/18	1	5	6.12	0	0	0	0	0	1	5	
11/01/18	1	5	6.31	0	0	0	2	44	3	49	
11/02/18	2	10	13.32	0	0	0	0	0	2	10	***64***
11/03/18	2	11	15	0	0	0	0	0	2	11	
11/05/18	2	10	16.27	0	0	0	0	0	2	10	
11/06/18	2	11	14.11	0	0	0	0	0	2	11	
11/07/18	0	0	0	0	0	0	4	88	4	88	
11/08/18	0	0	0	0	0	0	8	176	8	176	
11/09/18	0	0	0	0	0	0	0	0	0	0	***296***
11/12/18	2	44	60.02	0	0	0	2	44	4	88	
11/13/18	0	0	0	0	0	0	3	66	3	66	
11/14/18	0	0	0	0	0	0	6	132	6	132	
11/15/18	0	0	0	0	0	0	8	176	8	176	
11/16/18	0	0	0	0	0	0	10	220	10	220	***682***
11/19/18	5	110	162.95	0	0	0	4	88	9	198	
11/20/18	18	396	515.23	7	154	211.7	2	44	27	594	
11/21/18	0	0	0	0	0	0	16	352	16	352	***1144***
11/22/18	**Thanksgiving**										
11/23/18											
11/26/18	0	0	0	0	0	0	33	726	33	726	
11/27/18	0	0	0	0	0	0	46	1012	46	1012	
11/28/18	0	0	0	26	572	697.5	12	264	12	836	
11/29/18	0	0	0	34	748	850.75	0	0	0	748	
11/30/18	8	176	227.59	36	792	1079.17	0	0	184	968	***4290***
12/03/18	0	0	0	0	0	0	0	0	0	0	
12/04/18	0	0	0	0	0	0	0	0	0	0	
12/05/18	0	0	0	0	0	0	0	0	0	0	
12/06/18	0	0	0	0	0	0	41	902	41	902	
12/07/18	0	0	0	0	0	0	48	1056	48	1056	***1958***
12/10/18	0	0	0	0	0	0	0	0	0	0	
12/11/18	0	0	0	0	0	0	0	0	0	0	
12/12/18	0	0	0	0	0	0	10	1166	10	1166	
12/13/18	0	0	0	0	0	0	0	1034	0	1034	
12/14/18	0	0	0	0	0	0	0	1518	0	1518	
12/15/18	0	0	0	0	0	0	0	1848	0	1848	***5566***
12/17/18	0	0	0	0	0	0	0	0	0	0	
12/18/18	0	0	0	0	0	0	0	0	0	0	
12/19/18	0	0	0	0	0	0	0	0	0	0	
12/20/18	0	0	0	0	0	0	0	0	0	0	
12/21/18	0	0	0	11	242	363.4	0	0	0	242	***242***
TOTALS:	**43**	**778**	**1,037**	**114**	**2,508**	**3,203**	**255**	**10,956**	**481**	**14,242**	

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 geoscience 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 Acorn Development LLC. This report may be provided to regulatory agencies for review. 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 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 Acorn Development LLC should rely on this environmental 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 has been prepared for the Block 18 Property 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 ASFE, Professional Firms Practicing in the Geosciences; www.asfe.org.

Reliance Conditions for Third Parties

Our report was prepared for the exclusive use of Acorn Development LLC. No other party may rely on the product of our services unless we agree in advance to such reliance in writing. 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. Within the limitations of scope, schedule and budget, our services have been executed in accordance with our Agreement with Acorn Development LLC and generally accepted environmental practices in this area at the time this report was prepared.

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.

Uncertainty May Remain after Completion of Remedial Activities

Remediation activity completed in a portion of a site cannot wholly eliminate uncertainty regarding the potential for contamination in connection with a property. Our interpretation of subsurface conditions in this study is based on field observations and chemical analytical data from widely-spaced sampling locations. It is always possible that contamination exists in areas that were not explored, sampled or analyzed.

Subsurface Conditions Can Change

This environmental report is based on conditions that existed at the time the study was 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, slope instability or groundwater fluctuations. Always contact GeoEngineers before applying this report to determine if it is still applicable.

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.

Geotechnical, Geologic and Geoenvironmental 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.

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

GeoEngineers