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MEMORANDUM

TO: Roger Nye – Department of Ecology

FROM: Matt Dalton

DATE: September 24, 2019

SUBJECT: Results of Additional Testing
Triumph Structures Aerostructures
1415 75th Street, Everett, Washington
VCP No. NW3183

REF. NO: SAB-006-00

CC: Mikel Hansen – Sabey Corp.
Dave Cooper - DOF

On behalf of Everett Technical Park II (ETPII), we are submitting this memorandum to provide supplemental data to support a request for a No Further Action (NFA) designation for the referenced site. Triumph Structures Aerostructures was a former tenant of ETPII who released cutting oil to soil beneath the building floor slab. Extensive cleanup has been completed at the site. The results of the cleanup were submitted to the Washington State Department of Ecology (Ecology) under the Voluntary Cleanup Program (VCP) in December 2017 (DOF 2017).

ECOLOGY OPINION LETTER AND REMAINING ISSUES

An opinion letter was received from Ecology dated March 25, 2019 (Ecology 2019). The letter indicated Ecology concurred that diesel-range hydrocarbons (TPHd) and oil range hydrocarbons (TPHo) were the contaminants of concern for the site (components of cutting oil). The letter indicated that Ecology could not issue an NFA designation for the site based on the following:

- The presence (or not) of a shallow continuous zone of groundwater saturation beneath the site should be established, and if so, whether or not it [groundwater] has been impacted. A DOF memorandum presenting an analysis of shallow groundwater conditions beneath the site was submitted on April 3, 2019 (DOF 2019a). A follow-up memorandum was submitted in June 2019 (DOF 2019b) that presented the results of the drilling of two soil boring. These memoranda are included in Attachment A.

- Areas of contaminated soil remain in three of the remedial excavations because of building structural constraints. Ecology indicated that to receive an NFA either soil needed to meet cleanup levels or institutional controls be implemented and recorded.

- Applicable data needed to be uploaded to Ecology's Environmental Information System (EIM).

SUPPLEMENTAL TESTING AND ANALYSIS

Based on the March 2019 Ecology opinion letter and subsequent discussions, additional sampling, testing and data analysis were completed. This work included the following:

- Two borings were drilled on the northeast side of the building to explore for a shallow groundwater zone. The results of this testing were submitted to Ecology in a DOF memorandum (DOF 2019b). The memorandum is presented in Attachment A. Based on the borings and observations made during the site cleanup (DOF 2019a), DOF concluded that a shallow groundwater zone does not exist beneath the site.

- Two soil samples were obtained from areas where the Method A cleanup level (CUL) of 2,000 mg/kg was exceeded. The samples were submitted to Analytical Resources Inc. (ARI) for analysis of extractable petroleum hydrocarbons (EPH) using Ecology Method WA EPH to allow calculation of a site specific Method B CUL and to assess possible impacts to groundwater. Analysis of polycyclic aromatic hydrocarbons (PAHs) were also analyzed using EPA Method SW8270D-SIM. The ARI data sheets are included as Attachment B. The sampling and results are discussed below.

EPH Sampling Locations and Collection. As discussed in DOF 2017, soil containing cutting oil residues with diesel+ heavy oil range organic (D+O) concentrations above the Method A CUL (2,000 mg/kg) could not be removed because of building structural support issues. The locations, estimated soil volumes, and residual concentrations are summarized in Table 1 below and the locations are shown on Figure 1. In total, it is estimated that approximately five to ten cubic yards of soil containing residual concentrations above 2,000 mg/kg remain at the site.

TABLE 1 – Remaining Locations w/ Soil Greater than 2,000 mg/kg (D+O)

Location	Estimated Soil Volume Remaining (CY)	Residual Concentration (mg/kg)	Comment
ERM Excavation Area 2	2	37,000	Structural support column
ERM Excavation Area 6	2.5	8,400	Structural support column
DOF Area 5	2.5	19,000	West sidewall below footing

CY – Cubic Yard

On August 23, 2019 Dave Cooper Principal Geologist with DOF collected soil samples from Excavation Areas 2 and 6 (Figure 1). At each location, a concrete core was removed to provide access to underlying soil. Samples were obtained using clean stainless steel spoons. Collected samples were placed in clean glass jars provided by ARI and transported to the laboratory in chilled coolers. Sample handling was documented using standard chain-of-custody procedures.

EPH Analytical Results. The D+O Method A CUL (2,000 mg/kg) was set to be protective of a wide range of petroleum products (one size fits all) which vary widely. The EPH analysis allows

calculation of two site specific values that account for the specific nature of the released material (in this case cutting oil). The site specific values include:

- Method B CUL based on direct soil contact, and
- Predicted groundwater concentration (assuming groundwater leaching from contaminated soil).

Data is analyzed using Excel worksheets available on Ecology's web site. The completed worksheets and results are presented in Attachment C for the two soil samples. The calculated Method B soil CUL for each sample is summarized in Table 2 below. The average of the two calculated Method B values is approximately 20,230 mg/kg.

Table 2 – Calculated Method B CULs

Location	Sample Residual Concentration (mg/kg)	Method B CUL (Protective Condition) (mg/kg)
ERM Excavation Area 2	8473	19,526
ERM Excavation Area 6	13,456	20,938
Average	-----	20,232

The Method A CUL for diesel range organics and heavy oils dissolved in groundwater is 500 ug/l (Table 720-1 in WAC 173-340-900). Using the results of the EPH analyses, the predicted groundwater concentrations were less than 1 ug/l as summarized in Table 3 below. The calculations assumed contact with groundwater and the default assumptions included with the Ecology worksheet. The predicted groundwater concentrations are hundreds of times lower than the CUL.

Table 3 – Predicted Groundwater Concentrations

Location	Predicted Groundwater Conc. – Porewater (ug/l)	Predicted Groundwater Conc. – At Well (ug/l)
ERM Excavation Area 2	0.967	0.0017
ERM Excavation Area 6	0.721	0.0014
Average	0.844	0.0016

PAH Analytical Results. As summarized in Appendix B, only three individual PAHs were detected in the soil samples at a reporting limit of 15.8 ug/kg as summarized below in Table 4. The sample concentrations are well below direct contact Method B CULs based on unrestricted site use.

Table 4 – Detected PAHs

PAH Constituent	Area2_SW-06(R)	Area6_SW-15(R)	Method B CUL
2-Methylnaphthalene	Nd (<15.6 ug/kg)	11.4 J ug/kg	320,000
1-Methylnaphthalene	4.2 J ug/kg	8.95 J ug/kg	34,500
Benzo(g,h,i)perylene	Nd (<15.6 ug/kg)	28.8 ug/kg	Not available

COMPARISON TO CLEANUP LEVELS

Soil Contact. Soil CULs are applied using the criteria in WAC 173-340-740(7). The three criteria pertinent to the site are as follows:

- The upper95% confidence limit (UCL95%) on the true mean concentration shall be less than the CUL,
- No single sample can exceed two times the CUL, and
- Less than 10% of the samples can exceed the CUL.

To assess whether soil beneath the site meets the Method B CUL of 20,230 mg/kg, available post-remedy soil data was compiled from Table 4 in DOF 2017 and ERM Table 6 (in Attachment A to DOF 2017). The data compilation is presented as attached Table 5 and consists of the results of 131 samples. Petroleum hydrocarbons were not detected in most (approximately 59%) of the samples. Using the data in Table 5, the cleanup criteria were applied to the site using the calculated Method B CUL. The results are summarized below in Table 6 and indicate that the site meets the Method B CUL as discussed below.

Table 6 – Results of Cleanup Compliance Analysis

Criteria	Result	Comment
UCL95%	2090 mg/kg	Calculated using detected D+O concentrations
Number of Samples > 2x CUL	None	No sample exceeded 40,460 mg/kg
Percent of Samples >CUL	<1%	Only one sample (37,000 mg/kg) >CUL

- The UCL95% concentration was estimated using the Ecology statistical program MTCA-Stat. The entire data set (131 samples) is neither normally nor log-normally distributed, likely as a result of the large number of non-detects. Petroleum hydrocarbons were detected in 54 of the 131 samples. An analysis was completed that assumed that the 54 samples represent the entire site. Such an approach overestimates the UCL95% concentration as the large number of non-detects are not factored into the analysis. The 54 sample data set is log-normally distributed and a UCL95% concentration of 2,090 mg/kg was calculated (see Attachment D).
- Two times the Method B CUL is approximately 40,460 mg/kg. The highest remaining concentration is 37,000 mg/kg, so this criteria is satisfied.
- Only one of the 131 soil samples exceeds the Method B CUL or less than 1% of the samples, therefore the "10%" criteria is satisfied.

Protection of Groundwater. As noted above and in Attachment A, available data indicate a continuous shallow groundwater zone is not present beneath the site. The EPH analyses indicate that even if such a zone existed and was in contact with soil containing residual cutting oil, the

D+O Method A CUL of 500 ug/l would not be exceeded, as predicted concentrations are less than 1 ug/l.

SUMMARY

Based on the EPH and PAH soil analyses and application of the cleanup criteria in the Model Toxics Control Act, the site meets Method B CULs based on unrestricted site uses. Observations made during the soil cleanup and in two soil borings indicate that a shallow continuous groundwater zone is not present beneath the site. Furthermore, the EPH analyses indicate that even if a shallow groundwater zone existed in contact with the cutting oil residues, the groundwater CUL would not be exceeded.

Post-remedy data is being formatted for upload to Ecology's EIM. Once the site technical issues are resolved, the data will be uploaded.

CLOSING

The services described in this memorandum were performed consistent with generally accepted professional consulting principles and practices. No other warranty, expressed or implied, is made. These services were performed consistent with our agreement with our client. This report is solely for the use and information of our client unless otherwise noted. Any reliance on this report by a third party is at such party's sole risk.

Opinions and recommendations contained in this report apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, or the use of segregated portions of this document.

REFERENCES

- DOF (Dalton Olmsted & Fuglevand, Inc.), 2017, Cleanup Reports, Former Triumph-Structures Facility, Everett Technical Park II, 1415 75th Street SW, Everett, Washington; prepared for ETPII, December 2017.

- DOF, 2019a, DOF Memorandum to Ecology; Subject Ecology Opinion Letter Dated March 25, 2019, [former] Triumph Structures Aerostructures,1415 75th Street SW, Everett, Washington, VCP No. NW3183; April 4, 2019.

- DOF, 2019b, Results of Additional Subsurface Drilling, Triumph Structures Aerostructures, 1415 75th Street SW, Everett, Washington, VCP No. NW3183; June 3, 2019.

- Ecology (Washington State Department of Ecology), 2019, Opinion pursuant to WAC 173-340-515(5) on Remedial Actions for the Following Hazardous Waste Site: Triumph Structures Aerostructures, 1415 75th Street SW, Everett, WA 98203, Facility/Site No.: 9273878; VCP No. NW3183; Cleanup Site ID No.: 14462; March 25, 2019.

Attachments
Table 5 – Post-Remedy Soil Analytical Data
Figure 1 – EPH Sample Locations

Attachment A – DOF Memoranda, April 4 and June 3, 2019.
Attachment B – EPH Laboratory Data Sheets – August 2019
Attachment C – EPH Worksheets
Attachment D – MTCAStat Data Output

TABLE 5 - POST-REMEDY SOIL ANALTYICAL DATA

Former Triumph Site
Sabey ETP II, Everett, WA

Area	Sample ID	Depth (feet)	Date Collected	NWTPH-DX Diesel Range	NWTPH-DX Oil Range	NWTPH-DX Diesel + Oil Range
				(mg/kg)	(mg/kg)	(mg/kg)
Sub Slab Cores	CC-1	0.5-1.0	8/28/17	<5.16	<10.3	<10.3
	CC-2	0.5-1.0	8/28/17	<5.35	<10.7	<10.7
	CC-3	0.5-1.0	8/28/17	**5.5**	<10.3	**5.5**
	CC-4	0.5-1.0	8/28/17	**40.6**	**41.2**	**81.8**
	CC-5	0.5-1.0	8/28/17	**1,390**	**676**	**2066**
	CC10	0.5-1.0	8/28/17	**21.5**	<10.9	**21.5**
Excavation CC-5	CC-5-ES	1.0-1.5	10/11/17	<25	<50	<50
	CC-5-S	1.0-1.5	10/11/17	<25	**69**	**69**
	CC-5-WS-(R)	-	10/13/17	<1000	**19,000****	**19000**
	CC-5-B	2.0	10/11/17	<25	**78**	**78**
	CC-5-ES+20	0.5-1.0	10/11/17	<25	<50	<50
	CC-5-B+20	2.0	10/11/17	<25	**330**	**330**
	CC-5-WS+20	0.5-1.0	10/11/17	<25	**110**	**110**
	CC-5-ES+45	1.0-1.5	10/11/17	<25	<50	<50
	CC-5-B+45	2.0	10/11/17	<25	<50	<50
	CC-5-WS+45	1.0-1.5	10/11/17	<25	<50	<50
	CC-5-N	1.5-2.0	10/11/17	<25	<50	<50
	CC-5-ES+60	1.0-1.5	10/11/17	<25	<50	<50
	CC-5-WS+60	1.0-1.5	10/11/17	<25	<50	<50
	CC-5-B+60	2.0	10/11/17	<25	<50	<50
Excavation CC-7	CC-7-NB	1.5-2.0	10/10/17	<25	<50	<50
	CC-7-WS	1.5-2.0	10/10/17	<25	<50	<50
	CC-7-S	1.5-2.0	10/10/17	<25	<50	<50
	CC-7-ES	1.5-2.0	10/10/17	<25	<50	<50
	CC-7-B	2.0	10/10/17	**41**	<50	41

TABLE 5 - POST-REMEDY SOIL ANALTYICAL DATA

Former Triumph Site
Sabey ETP II, Everett, WA

Area	Sample ID	Depth (feet)	Date Collected	NWTPH-DX Diesel Range	NWTPH-DX Oil Range	NWTPH-DX Diesel + Oil Range
				(mg/kg)	(mg/kg)	(mg/kg)
Excavation CC-8	CC-8-N	1.0-1.5	10/11/17	<25	<50	<50
	CC-8-ES	1.5-2.0	10/11/17	<25	<50	<50
	CC-8-S-(R)	-	10/13/17	<120	**1,000**	**1000**
	CC-8-WS	1.0-1.5	10/11/17	<25	**59**	**59**
	CC-8-B	2.0	10/11/17	<25	**470**	**470**
Excavation CC-9	CC-9-1N	1.5-2.0	10/10/17	<25	<50	<50
	CC-9-1ES	1.5-2.0	10/10/17	**110**	<50	**110**
	CC-9-1B	2.0	10/10/17	**98**	<50	**98**
	CC-9-1WS	1.5-2.0	10/10/17	**1,700**	<250	**1700**
	CC-9-1S	1.5-2.0	10/10/17	<25	<50	<50
	CC-9-2N	1.5-2.0	10/10/17	**1,500**	<50	**1500**
	CC-9-2WS	1.5-2.0	10/10/17	**490**	<50	**490**
	CC-9-2ES-(R)	-	10/11/17	<25	**84**	**84**
	CC-9-2NB	2.0	10/10/17	**1,900**	<250	**1900**
	CC-9-2SB	2.0	10/10/17	**470**	<50	<50
	CC-9-2S	1.0-1.5	10/10/17	<25	<50	<50
	CC-9-3N	1.0-1.5	10/10/17	<25	<50	<50
	CC-9-3ES	1.0-1.5	10/10/17	<25	<50	<50
	CC-9-3S-(R)	-	10/11/17	<25	**710**	**710**
	CC-9-3B-(R)	3.5	10/11/17	<25	**140**	**140**
East Gantry Trench	ET-NES-1.5	1.5	10/13/17	<120	**2,600**	**2600**
	ET-B+15-1.5	1.5	10/13/17	<25	**68**	**68**
	ET-ES+45-1.5	1.5	10/13/17	<25	**110**	**110**
	ET-ES+60-1.5	1.5	10/13/17	<25	**280**	**280**
Spot Exc. Spls.	CC-0-N	2.0	10/11/17	<25	<50	<50
	CC-0-S	2.0	10/11/17	<25	**57**	**57**
	CT-N	1.5	10/13/17	<25	**50**	**50**

TABLE 5 - POST-REMEDY SOIL ANALTYICAL DATA

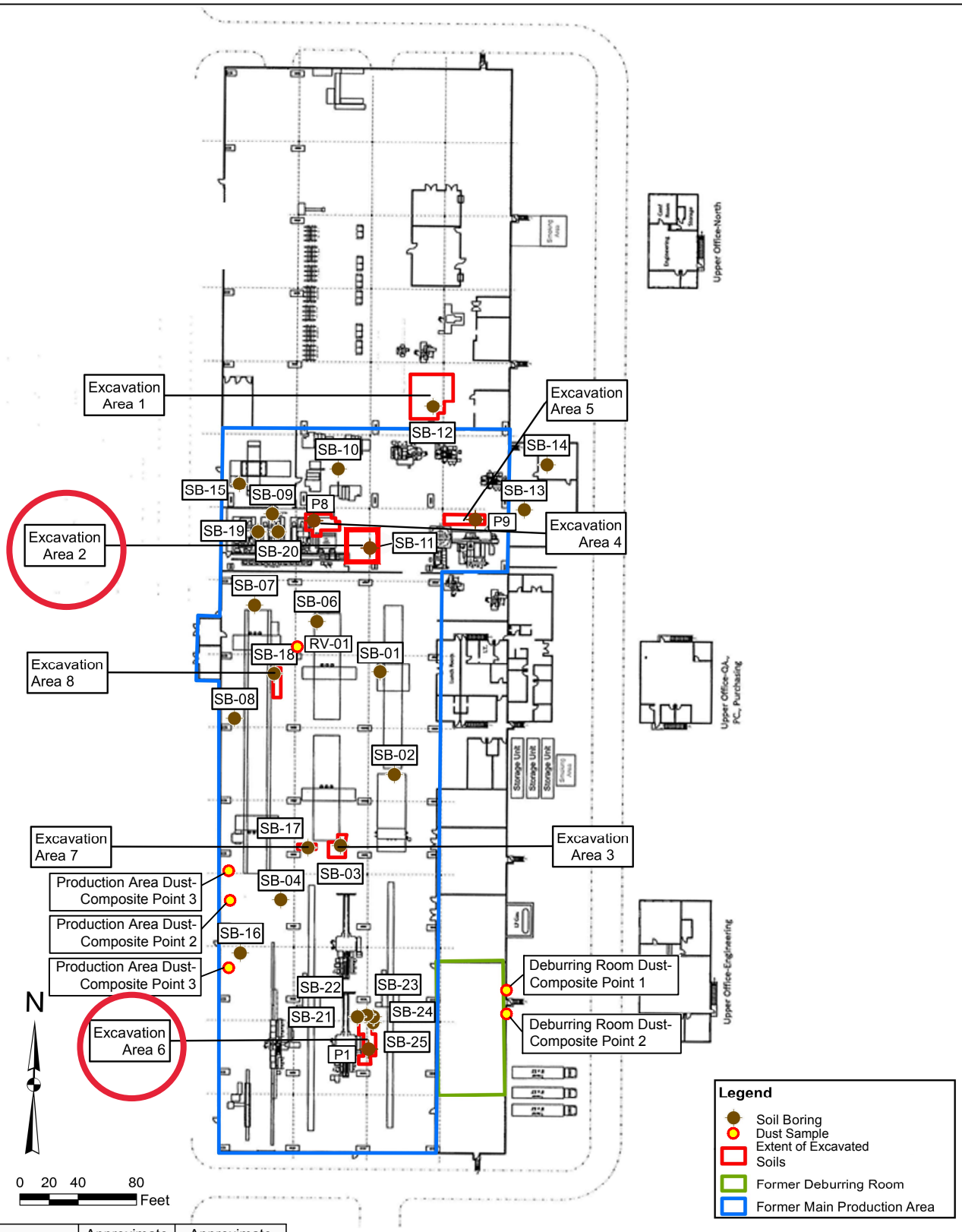
Former Triumph Site
Sabey ETP II, Everett, WA

Area	Sample ID	Depth (feet)	Date Collected	NWTPH-DX Diesel Range	NWTPH-DX Oil Range	NWTPH-DX Diesel + Oil Range
				(mg/kg)	(mg/kg)	(mg/kg)
Center Gantry Trench	CT-B+45	0.5	10/13/17	<25	**50**	**50**
	CT-B+20	0.5	10/16/17	<25	**84**	**84**
	CT-B+20-1.5	1.5	10/16/17	<25	<50	<50
West Gantry Trench	WT-B+15-1.5 (R)	2.5	10/18/17	<25	<50	<50
	WT-B+65-1.5	1.5	10/16/17	<25	**170**	**170**
	WT-B+90-1.5	1.5	10/18/17	<25	<50	<50
	WT-B+150-1.5	1.5	10/18/17	<25	<50	<50
	WT-N-1.5	1.5	10/18/17	<25	<50	<50
Excavation Area 1	EX1-FL-01	9.5	7/21/2017	<120	**1700**	**1700**
	EX1-FL-02	10	7/21/2017	**72**	**240**	**312**
	EX1-SW-02	3.5	7/21/2017	<25	<50	<50
	EX1-SW-05	3.5	7/21/2017	<25	**120**	**120**
	EX1-SW-6	3.5	7/21/2017	<25	<50	<50
	EX1-SW-7	5	7/24/2017	<25	<50	<50
	EX1-SW-8	7	7/24/2017	<25	<50	<50
	EX1-SW-9	5	7/24/2017	<25	**710**	**710**
	EX1-SW-10	7	7/24/2017	<25	<50	<50
	EX1-SW-11	5	7/24/2017	<25	**340**	**340**
	EX1-SW-12	7	7/24/2017	<50	**930**	**930**
	EX1-FL-03	5	7/26/2017	<25	<50	<50
	EX1-FL-04	5	7/26/2017	<25	**110**	**110**
	EX1-FL-05	5	7/26/2017	<25	<50	<50
	EX1-SW-13	3.5	7/26/2017	<25	**65**	**65**
	EX1-SW-14	3.5	7/26/2017	<50	**1800**	**1800**
	EX1-SW-15	3.5	7/26/2017	<25	<50	<50
Excavation Area 2	EX2-FL-01	5	7/21/2017	<25	<50	<50
	EX2-SW-01	2.5	7/21/2017	<25	<50	<50
	EX2-SW-02	2.5	7/21/2017	<25	<50	<50
	EX2-SW-03	2.5	7/21/2017	<25	<50	<50
	EX2-SW-04	0.75	7/21/2017	<25	<50	<50
	EX2-SW-06	0.75	7/21/2017	<50	**37000**	**37000**
Excavation Area 3	EX3-FL-01	5	7/20/2017	<25	<50	<50
	EX3-SW-01	2	7/20/2017	<25	<50	<50
	EX3-SW-02	2	7/20/2017	<25	<50	<50
	EX3-SW-03	2	7/20/2017	<25	<50	<50
	EX3-SW-04	2	7/20/2017	<25	<50	<50
	EX3-SW-05	2	7/20/2017	<25	<50	<50
	EX3-SW-06	2	7/20/2017	**53**	**230**	**283**

TABLE 5 - POST-REMEDY SOIL ANALTYICAL DATA

Former Triumph Site
Sabey ETP II, Everett, WA

Area	Sample ID	Depth (feet)	Date Collected	NWTPH-DX Diesel Range	NWTPH-DX Oil Range	NWTPH-DX Diesel + Oil Range
				(mg/kg)	(mg/kg)	(mg/kg)
Excavation Area 4	EX4-FL-02	3	8/21/2017	<25	**910**	**910**
	EX4-FL-03	3	8/21/2017	<25	<50	<50
	EX4-SW-01	1.3	8/17/2017	<25	<50	<50
	EX4-SW-02	1.5	8/17/2017	<25	<50	<50
	EX4-SW-03	1.3	8/17/2017	<25	<50	<50
	EX4-SW-04	1.3	8/17/2017	<25	<50	<50
	EX4-SW-05	2.5	8/17/2017	**59**	**72**	**131**
	EX4-SW-06	1.8	8/21/2017	<25	<50	<50
	EX4-SW-07	1.8	8/21/2017	<25	<50	<50
	EX4-SW-08	2.1	8/21/2017	<25	**380**	**380**
	EX4-SW-09	1.8	8/21/2017	**290**	**210**	**500**
	EX4-SW-10	1.8	8/21/2017	**25**	<50	<50
Excavation Area 5	EX5-FL-01	2	8/16/2017	<25	<50	<50
	EX5-SW-01	1.3	8/16/2017	<25	<50	<50
	EX5-SW-02	1.3	8/16/2017	<25	**99**	**99**
	EX5-SW-03	1.3	8/16/2017	<25	<50	<50
	EX5-SW-04	2	8/17/2017	<25	**110**	**110**
Excavation Area 6	EX6-FL-01	2	8/16/2017	<25	<50	<50
	EX6-FL-02	2	8/17/2017	<25	**110**	**110**
	EX6-FL-03	2.2	8/18/2017	<25	<50	<50
	EX6-SW-02	1.2	8/16/2017	<25	**140**	**140**
	EX6-SW-04	1.2	8/16/2017	<25	**72**	**72**
	EX6-SW-05	1.8	8/17/2017	<25	<50	<50
	EX6-SW-06	1.5	8/17/2017	<25	<50	<50
	EX6-SW-08	1.3	8/17/2017	<25	<50	<50
	EX6-SW-09	1.3	8/17/2017	<25	<50	<50
	EX6-SW-10	1.4	8/18/2017	**96**	**62**	**158**
	EX6-SW11	1.2	8/18/2017	<25	<50	<50
	EX6-SW-12	1.4	8/18/2017	<25	<50	<50
	EX6-SW-13	1.4	8/18/2017	<25	<50	<50
	EX6-SW-14	1.4	8/18/2017	<25	<50	<50
	EX6-SW-15	2.3	8/22/2017	**4400**	**4000**	**8400**
Excavation Area 7	EX-7-FL-01	1.7	8/18/2017	<25	<50	<50
	EX-7-SW-02	1.2	8/18/2017	<25	<50	<50
	EX-7-SW-03	1.2	8/18/2017	<25	<50	<50
	EX-7-SW-04	1.2	8/18/2017	<25	<50	<50
Excavation Area 8	EX-8-FL-01	1.7	8/18/2017	<25	<50	<50
	EX-8-SW-01	1.2	8/18/2017	<25	<50	<50
	EX-8-SW-02	1.3	8/18/2017	<25	<50	<50
	EX-8-SW-03	1.2	8/18/2017	<25	<50	<50
	EX-8-SW-04	1.3	8/18/2017	**90**	**79**	**169**



Excavation No.	Approximate Area (sq. ft.)	Approximate Depth (ft)
1	732	5 - 10
2	432	5
3	147	5
4	577	3
5	71	2
6	297	2 - 2.17
7	35	1.5
8	64	1.5

EPH Sample Locations - Aug. 2019

Figure 3

Sample Locations and Excavation Areas
Former Triumph Structures
Everett, Washington

Environmental Resources Management
www.erm.com

J.E. 10/12/2017 04170883.03 G:\DWGS\0417088 Triumph\03\04170883-06.dwg

DOF - FIGURE 1 September 2019

ATTACHMENT A
DOF MEMORANDA
APRIL 4 AND JUNE 3, 2019

FORMER TRIUMPH STRUCTURES AEROSTRUCTURES
EVERETT, WASHINGTON

Dalton, Olmsted & Fuglevand, Inc.

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MEMORANDUM

TO: Roger Nye – Department of Ecology

FROM: Matt Dalton

DATE: April 4, 2019

SUBJECT: Ecology Opinion Letter Dated March 25, 2019
Triumph Structures Aerostructures
1415 75th Street SW, Everett, Washington
VCP No. NW3183

REF. NO: SAB-006-00

CC: Mikel Hansen – Sabey Corp.
Dave Cooper - DOF

The purpose of this memorandum is to provide our opinion whether a shallow continuous zone of ground water saturation exists beneath the referenced site. The referenced Ecology opinion letter (Item 2. on page 3) states the following:

> *"The presence (or not) of a shallow continuous zone of ground water saturation beneath the Site should be established, and if so, whether or not it has been impacted. This evaluation would be most appropriate in Remedial Excavation area #1, where the depth of excavation was greatest (10 feet), and also where water was encountered in an exploratory boring at a depth of 12.5 feet."*

It is our opinion that such a zone does not exist beneath the site and that sufficient data is available to make this determination. Our opinion is based on the following lines of evidence. Boring locations referenced below are shown on Figure 1.

- **ERM Observations**. Section 2.3.2 (page 6) of the ERM (2017) report that was submitted as Attachment A to DOF's "*Remedial Excavation and Cleanup*" Report (December 12, 2017) with Sabey's VCP application states the following:

  "Moist soil was encountered in two of the 15 soil borings advanced at the Subject Property during the 2017 subsurface investigation. The depth to moist soils encountered during the investigation was 3.5 feet bgs at SB-12 and approximately 11 feet bgs at SB-07 (Figure 3). The moist soils encountered at SB-12 and SB-07 are likely the result of perched water, as moist soil and groundwater were not encountered in other soil borings completed at similar shallow depths at the site".

  A review of the log of SB-12 noted a "*wet*" (not moist) zone at the top of a "*dark brown, fine SANDY SILT*" layer at approximately 3 to 3.5 feet. At seven feet a *dry*, "*brown fine*

SANDY SILT" was encountered. The boring/sampling depth was approximately 10.5 feet. SB-12 was located within Remedial Excavation area #1 which was excavated to a depth of 10 feet. DOF (Dave Cooper, Sr. Principal Geologist) observed no water flowing into the excavation during cleanup, so no shallow saturated ground water conditions existed at this location. The dry conditions are illustrated by the photographs shown on Figure 2.

At SB-7, ERM observed ground water at a depth of 5 feet. The log indicates a dry to moist, fine to medium SAND was present at a depth of 11 feet. No remedial excavation was required at this location, but the log indicates no groundwater saturation was present at 11 feet. It appears the shallower water at 5-5.5 feet was perched above several thin silt/clay layers. Water saturated conditons were not encountered in borings located north, east and south of SB-7 as discussed below.

- **Review of Other Boring Logs**. Attached Table 1 lists the boring depths and groundwater observations for the 35 borings drilled on the site. Eight (8) of these borings were drilled to depths greater than approximately 9 feet and 11 of these borings were drilled to depths of approximately 5 to 7 feet. The boring data are supplemented with observations made during the excavation of Areas 1, 2 and 3. Boring locations, excavation areas and the distribution of boring depths are illustrated on attached Figure 1. Attachment A presents the logs of selected borings discussed below. Pertinent observations are listed below.

    - Evidence of groundwater was only observed in boring SB-7. The log indicates that groundwater was present at a depth of approximately 5 to 5.5 feet based on the presence of "*wet*" soil. As noted above, the log indicates a dry to moist, fine to medium SAND was present at a depth of 11 feet. This upper zone is interpreted to be a localized perched saturated zone which is common in glacial till deposits which underlie the site. The localized nature of the zone is based on the following observations.

    - No evidence of groundwater was observed in boring SB-06 drilled to a depth of 9.3 feet and located approximately 40 feet southeast of SB-7. Soils were logged as "*dry*".

    - No evidence of groundwater was observed in boring P-7 drilled to a depth of 10 feet and located approximately 50 feet northeast of SB-7. Soils were logged as moist (not wet).

    - No evidence of groundwater was observed in the deepest boring (SB-1) drilled/sampled to a depth of 12.5 feet. SB-1 is located within the central portion of the site approximately 95 feet to the southeast of boring SB-7. While soil recovery was poor between depths of approximately 4.6 and 11.1 feet, soils between approximately 11.1 and 12.5 feet were logged as "*dry*".

    - No evidence of groundwater was observed in boring SB-15 drilled/sampled to a depth of approximately 12 feet. SB-15 is located along the west wall of the building approximately 85 feet north of SB-7. Soils were logged as "*dry*" and it was noted that groundwater was not encountered.

- No evidence of groundwater was observed in boring P-4 drilled to a depth of 10 feet and located approximately 190 feet south of SB-7. Soils were logged as moist (not wet).

- No evidence of groundwater was observed in boring SB-12 drilled to a depth of 10 feet or during the excavation of Remedial Area 1 to a depth of 10 feet.

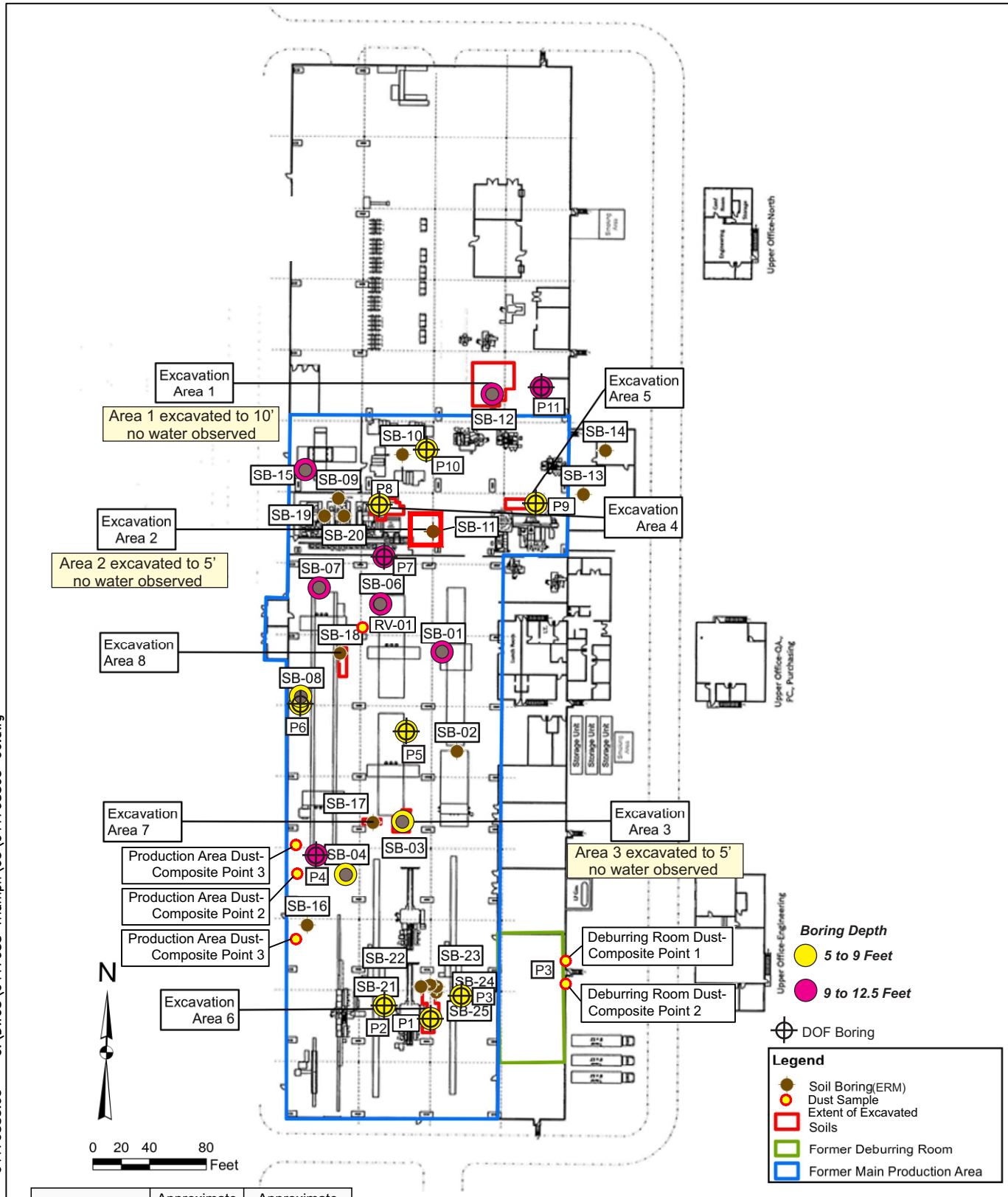
- **SUMMARY –** The shallow (approximately 5 feet below ground surface) perched saturated zone at SB-7 is clearly localized to the immediate area of the boring based on surrounding borings SB-01, SB-06, SB-15, P4 and P7. The surrounding borings are all of sufficient depth to have encountered the SB-7 saturated zone, if present. The discontinuous nature of the SB-7 zone is further supported by observations made during the excavation to a depth of 10 feet of Remedial Excavation Area 1, where no groundwater was encountered. Based on these data and observations, there is no shallow, continuous satrurated zone beneath the site.

Attachments
Table 1 – Boring Depths and Groundwater Observations
Figure 1 – Boring Locations
Figure 2 – Selected Views Remedial Excavation Area 1 – July 2017
Attachment A – Selected Boring Logs

TABLE 1 - Boring Depths and Groundwater Observations

Everett Technical Park II
Everett, Washington

Boring No.	Observed By:	Boring Depth (ft)	Comment
SB-1	ERM	12.5	GW not encountered - dry at 12.3 feet
SB-2	ERM	2	GW not encountered
SB-3	ERM	5	GW not encountered
SB-4	ERM	7	GW not encountered
SB-6	ERM	9.3	GW not encountered
SB-7	ERM	12	GW at 5-5.5 feet; dry at 11 feet
SB-8	ERM	5	GW not encountered
SB-9	ERM	3	GW not encountered
SB-10	ERM	2.7	GW not encountered
SB-11	ERM	3.5	GW not encountered
SB-12	ERM	10	GW not encountered
SB-13	ERM	2	GW not encountered
SB-14	ERM	1.5	GW not encountered
SB-15	ERM	12	GW not encountered
SB-16	ERM	3.5	GW not encountered
SB-17	ERM	1.5	GW not encountered
SB-18	ERM	1.5	GW not encountered
SB-19	ERM	1.3	GW not encountered
SB-20	ERM	1.5	GW not encountered
SB-21	ERM	1.9	GW not encountered
SB-22	ERM	2	GW not encountered
SB-23	ERM	2.5	GW not encountered
SB-24	ERM	1.9	GW not encountered
SB-25	ERM	2	GW not encountered
P-1	DOF	5	GW not encountered
P-2	DOF	5	GW not encountered
P-3	DOF	5	GW not encountered
P-4	DOF	10	GW not encountered
P-5	DOF	5	GW not encountered
P-6	DOF	5	GW not encountered
P-7	DOF	10	GW not encountered
P-8	DOF	5	GW not encountered
P-9	DOF	5	GW not encountered
P-10	DOF	5	GW not encountered
P-11	DOF	10	GW not encountered
Remedial Areas			
Area 1	ERM/DOF	10	GW not encountered
Area 2	ERM/DOF	5	GW not encountered
Area 3	ERM/DOF	5	GW not encountered
Area 4	ERM/DOF	3	GW not encountered
Area 5	ERM/DOF	2	GW not encountered
Area 6	ERM/DOF	2	GW not encountered
Area 7	ERM/DOF	1.5	GW not encountered
Area 8	ERM/DOF	1.5	GW not encountered



Excavation No.	Approximate Area (sq. ft.)	Approximate Depth (ft)
1	732	5 - 10
2	432	5
3	147	5
4	577	3
5	71	2
6	297	2 - 2.17
7	35	1.5
8	64	1.5

Ref: Boring Depths.cdr

Figure 3

Sample Locations and Excavation Areas
Former Triumph Structures
Everett, Washington

Environmental Resources Management
www.erm.com

ERM

J.E. 10/12/2017 04170883.03 G:\DWGS\0417088 Triumph\03\041708803–06.dwg

DOF - Boring Locations Figure 1 April 2019

Fig. 2a - Remedial Excavation Area 1 View to Northwest

Fig. 2b - Remedial Excavation Area 1 View to Southwest

Former
Everett, Washington

Selected Views Remedial Excavation Area 1 July 2017

SAB-006-01 **FIGURE 2** April 2019
Dalton, Olmsted & Fuglevand, Inc.

Ref: Rem Area 1 Photographs.cdr

ERM
1218 3rd Ave, Suite 1412
Seattle, WA 98101
Telephone: 425-462-8591

SB-01

CLIENT Triumph Group, Inc.
PROJECT NAME Everett Phase II ESA
PROJECT NUMBER 0409523
PROJECT LOCATION 1415 75th St. SW, Everett, WA
DATE STARTED 6/2/17 **COMPLETED** 6/5/17
GROUND ELEVATION _____ **HOLE SIZE** 2.25"
DRILLING CONTRACTOR Steadfast Services
GROUND WATER LEVELS:
DRILLING METHOD Hand Auger/Air Knife/Angle Direct Push
AT TIME OF DRILLING --- Not encountered
LOGGED BY R Holt **CHECKED BY** _____
AT END OF DRILLING ---
NOTES Drilled at ~22 deg from vertical, depths listed are actual depth bgs
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Environmental Data
0.0				Concrete slab	
				0.5	
		SP		Dark brown, fine to medium grained SAND, trace coarse sand, dry, no sheen, no odor	PID = 2.2
				1.4	
	AU SB - 01 - 1.5	SP		Brown, fine to medium grained SAND, trace coarse sand, dry, no sheen, no odor, trace fine gravel, subangular to subrounded	PID = 2.4 PID = 3
2.5					PID = 1.9
				Hand auger/air knife refusal at 2.3' bgs (2.5' apparent depth)	
		SP			PID = 1.8
					PID = 2
				4.6	
5.0				No recovery, sample stuck in liner, issues with till being dense and jamming up tooling in hole and sample in liner	
7.5					
				9.3	
				Minimal recovery, liner stuck in tooling, banged some soil out of the top of the tooling for PID reading	
10.0					PID = 0.1
				11.1	PID = 0.2
	SS SB - 01 - 12.5	SP		No recovery except material in toe of Geoprobe tooling; all other material stuck in tooling Grey, fine to medium grained SAND, some coarse sand, trace fine gravel, subangular to subrounded, dry, no sheen, no odor, very dense	PID = 0.1
				12.1	
		SP		12.3 Grey-brown, fine to medium grained SAND, trace coarse sand, trace fine to medium gravel, subangular to subrounded, dry, no sheen, no odor	PID = 0.2

Bottom of borehole at 12.3 feet.

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ERM
1218 3rd Ave, Suite 1412
Seattle, WA 98101
Telephone: 425-462-8591

SB-06

CLIENT Triumph Group, Inc.
PROJECT NAME Everett Phase II ESA
PROJECT NUMBER 0409523
PROJECT LOCATION 1415 75th St. SW, Everett, WA
DATE STARTED 6/2/17 **COMPLETED** 6/5/17
GROUND ELEVATION _____ **HOLE SIZE** 2.25"
DRILLING CONTRACTOR Steadfast Services
GROUND WATER LEVELS:
DRILLING METHOD Hand Auger/Air Knife/Angle Direct Push
AT TIME OF DRILLING — Not encountered
LOGGED BY R Holt **CHECKED BY** _____
AT END OF DRILLING —
NOTES Drilled at ~22 deg from vertical, depths listed are actual depth bgs
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Environmental Data
0.0					
				0.5 Concrete slab	
	AU SB-06-2.0	SP		Brown fine to medium grained SAND, no gravel, trace coarse sand, dry, no sheen, slight chemical odor	PID = 2.3
					PID = 3.4
					PID = 2.2
2.5					PID = 3.5
				2.8	PID = 1.3
		GP		3.0 Hardpan, Gravel and dense material, not able to hand auger/air knife through	PID = 0.2
	SS SB-06-4	SP		Brown, fine to medium grained SAND, trace gravel, subangular to subrounded, trace coarse sand, dry, no sheen, no odor, very dense	PID = 0.2
					PID = 0.1
5.0				5.1	
		SW		Brown, fine to coarse grained SAND, slightly dense to loose, dry, no sheen, no odor	PID = 0.2
				5.6	
		SP		Brown, fine to medium grained SAND, some fine gravel, subangular to subrounded, some coarse sand, dry, no sheen, no odor, very dense	PID = 0.2
					PID = 0.4
7.5					
	SS SB-06-9				PID = 0.2
					PID = 0.5
		SP		9.3 mottled at 9.75' (apparent depth, actual depth 9.3' bgs)	

Bottom of borehole at 9.3 feet.

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ERM
1218 3rd Ave, Suite 1412
Seattle, WA 98101
Telephone: 425-462-8591

SB-07

CLIENT Triumph Group, Inc.
PROJECT NAME Everett Phase II ESA
PROJECT NUMBER 0409523
PROJECT LOCATION 1415 75th St. SW, Everett, WA
DATE STARTED 6/2/17 **COMPLETED** 6/2/17
GROUND ELEVATION _____ **HOLE SIZE** 2.25"
DRILLING CONTRACTOR Steadfast Services
GROUND WATER LEVELS:
DRILLING METHOD Hand Auger/Air Knife/Direct Push
▽ **AT TIME OF DRILLING** 5.00 ft
LOGGED BY R Holt **CHECKED BY** _____
AT END OF DRILLING ---
NOTES _____
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Environmental Data
0.0				Concrete slab	
0.5		SP-SM		Grey-brown fine to coarse grained SAND, trace silt, soft to medium dense, wet (possibly from drilling), no sheen, no odor, trace fine to coarse gravel, subangular to subrounded	PID = 2.2
1.5				dry to moist and very dense	PID = 1.2
2.5					PID = 1.7
		SP-SM			PID = 2.3
5.0	SS SB - 07 - 4.5				PID = 2
5.0 ▽		SP-SM		Grey to brown, medium grained SAND, trace coarse sand, trace fine sand, wet, loose to medium dense	PID = 3.5
5.5				Brown, fine to medium grained SAND, very dense, moist to wet, trace coarse sand, trace fine to coarse gravel, subangular to subrounded, mottled though some silt and clay, very stiff	PID = 4
	SS SB - 07 - 6.5	SP-SM			PID = 4.5
7.5				No recovery, liner stuck in tooling	
10.0					
11.0	SS SB - 07 - 11	SP-SM		Brown, fine to medium grained SAND, very dense, dry to moist, trace coarse sand, trace fine to coarse gravel, subangular to subrounded, trace clay and silt, no mottling	PID = 1.9
12.0				Bottom of borehole at 12.0 feet.	

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ERM
1218 3rd Ave, Suite 1412
Seattle, WA 98101
Telephone: 425-462-8591

SB-12

CLIENT Triumph Group, Inc.
PROJECT NAME Everett Phase II ESA
PROJECT NUMBER 0409523
PROJECT LOCATION 1415 75th St. SW, Everett, WA
DATE STARTED 5/31/17 **COMPLETED** 5/31/17
GROUND ELEVATION _____ **HOLE SIZE** 2.25"
DRILLING CONTRACTOR Steadfast Services
GROUND WATER LEVELS:
DRILLING METHOD Direct Push
AT TIME OF DRILLING --- Not encountered
LOGGED BY M Crandell **CHECKED BY** _____
AT END OF DRILLING ---
NOTES _____
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Environmental Data
0.0				Concrete slab	
				0.5	
				Brown fine to medium grained SAND, trace silt and fine angular gravel, hydrocarbon odor	PID = 99
		SP			PID = 80.3
2.5					PID = 89.4
				3.0	
	AU SB - 12 - 3			Dark brown fine SANDY SILT, wet, hydrocarbon odor, trace fine angular gravel (likely sluff)	PID = 99.6
		ML			PID = 59.1
5.0				Refusal with hand auger at 5' bgs Begin using Geoprobe	PID = 2.3
		ML			
				7.0	
7.5				Brown, fine SANDY SILT, dry, very stiff, no odor, with fine subrounded gravel	PID = 0.3
		ML			
10.0	SS SB - 12- 10				PID = 0.2
				10.0	
				Bottom of borehole at 10.0 feet.	

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ERM
1218 3rd Ave, Suite 1412
Seattle, WA 98101
Telephone: 425-462-8591

SB-15

CLIENT Triumph Group, Inc.
PROJECT NAME Everett Phase II ESA
PROJECT NUMBER 0409523
PROJECT LOCATION 1415 75th St. SW, Everett, WA
DATE STARTED 6/2/17 **COMPLETED** 6/5/17
GROUND ELEVATION _____ **HOLE SIZE** 2.25"
DRILLING CONTRACTOR Steadfast Services
GROUND WATER LEVELS:
DRILLING METHOD Hand Auger/Air Knife/Angle Direct Push
AT TIME OF DRILLING --- Not encountered
LOGGED BY R Holt **CHECKED BY** _____
AT END OF DRILLING ---
NOTES Drilled at ~22 deg from vertical, depths listed are actual depth bgs
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Environmental Data
0.0				Concrete slab	
				0.5	
	AU SB - 15 - 0.5	SP		Brown fine to medium grained SAND, trace coarse sand, trace fine gravel, subangular to subrounded, dry, no sheen, no odor	PID = 3.8
					PID = 3.5
					PID = 1.6
				2.3	
2.5				Hand auger refusal at 2.3' bgs (2.5' apparent depth)	PID = 1.4
				Brown fine to medium grained SAND, trace coarse sand, some fine to medium gravel, subangular to subrounded, dry, very dense, no odor, no sheen	
		SP			PID = 0.3
					PID = 0.4
5.0					
					PID = 0.3
				5.6	
	SS SB - 15 - 6.0	SP		5.8 mottled at 5.6' bgs (6' apparent depth)	
				slight chemical odor	PID = 0.4
		SP			PID = 0.3
					PID = 0.3
7.5				7.4	
				mottled at 7.4' bgs (8 ' apparent depth)	
				no sheen, no odor	PID = 0.3
		SP			
					PID = 0.6
				9.3	
		SP		9.5 mottled at 9.3' bgs (10' apparent depth)	
				no sheen, no odor	
10.0		SP		slight chemical odor	PID = 0.3
				10.2	
				no sheen, no odor	
		SP			PID = 0.5
	SS SB - 15 - 12.0			11.6	PID = 0.5
				Bottom of borehole at 11.6 feet.	

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DOF DALTON OLMSTED FUGLEVAND

LOG OF P-4

PROJECT: Triumph Structures Everett	COORDINATES: 227' south of north wall, 24' east of west wall	
LOCATION: Everett, WA	SURFACE ELEVATION: Indoor - Production area	
DRILLING CONTRACTOR: Cascade	DATE: 7/24/17	
DRILLING EQUIPMENT: Geoprobe 6600	TOTAL DEPTH OF BORING: 10.0'	
DRILLING METHOD: Direct-Push	LOGGED BY: D. Cooper	
SAMPLING METHOD: 2" dia. X 5' Macro w/acrylic liner	RESPONSIBLE PROF.: D. Cooper	REG. NO.: 1600
NOTES:		

DEPTH (feet)	SAMPLES: Lab Sample	SAMPLES: Sample Recovery	SAMPLES: Blows/Foot	SAMPLES: PID (ppm)	VISUAL SOIL DESCRIPTION Soil Group Name (USCS): color, moisture, density/consistency, grain size, other discriptors	WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS
1				0.0	7-inch concrete slab POORLY GRADED SAND (SP): dark gray (7.5YR-4/1), moist, 20% gravel, 80% sand	Thin Plastic Vapor Barrier
2						
3				0.0	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM): brown (7.5YR-5/3), moist, 20% gravel, 50% sand, 30% silt	
4						
5				0.0		
6						
7				0.0		
8						
9						
10				0.0		
11					Bottom of Boring 10.0 feet Backfilled with bentonite chip. Concrete patched slab	
12						
13						
14						
15						
16						
17						
18						
19						
20						

Note: The summary log is an interpretation based on samples, drill action, and interpolation. Variations between what is shown and actual conditions should be anticipated.

DOF DALTON OLMSTED FUGLEVAND

LOG OF P-7

PROJECT: Triumph Structures Everett	COORDINATES: 8' south of north wall, 75' east of west wall	
LOCATION: Everett, WA	SURFACE ELEVATION: Indoor - Production area	
DRILLING CONTRACTOR: Cascade	DATE: 7/24/17	
DRILLING EQUIPMENT: Geoprobe 6600	TOTAL DEPTH OF BORING: 10.0'	
DRILLING METHOD: Direct-Push	LOGGED BY: D. Cooper	
SAMPLING METHOD: 2" dia. X 5' Macro w/acrylic liner	RESPONSIBLE PROF.: D. Cooper	REG. NO.: 1600
NOTES:		

DEPTH (feet)	SAMPLES: Lab Sample	SAMPLES: Sample Recovery	SAMPLES: Blows/Foot	SAMPLES: PID (ppm)	VISUAL SOIL DESCRIPTION Soil Group Name (USCS): color, moisture, density/consistency, grain size, other discriptors	WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS
1				0.2	5-inch concrete slab	
2						
3				0.0	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM): brown (7.5YR-5/3), moist, 20% gravel, 50% sand, 30% silt	
4						
5				0.1		
6						
7				0.0		
8						
9						
10				0.0		
11					Bottom of Boring 10.0 feet Backfilled with bentonite chip. Concrete patched slab	
12						
13						
14						
15						
16						
17						
18						
19						
20						

Note: The summary log is an interpretation based on samples, drill action, and interpolation. Variations between what is shown and actual conditions should be anticipated.

DALTON
OLMSTED
FUGLEVAND

6034 N. Star Rd., Ferndale, Washington 98248
Telephone (cell) – (206) 498-6616

MEMORANDUM

TO: Roger Nye – Department of Ecology

FROM: Matt Dalton

DATE: June 3, 2019

SUBJECT: Results of Additional Subsurface Drilling
Triumph Structures Aerostructures
1415 75th Street SW, Everett, Washington
VCP No. NW3183

REF. NO: SAB-006-00

CC: Mikel Hansen – Sabey Corp.
Dave Cooper - DOF

This memorandum supplements our opinion memorandum dated April 3, 2019 concerning the presence of a *"shallow continuous zone of groundwater saturation"* beneath the Triumph site referenced in Ecology's opinion letter dated March 25, 2019. The April DOF memorandum states "*there is no shallow, continuous saturated zone beneath the site*" based on the available data. Our earlier opinion was based on site geology (surface deposits of glacial till) and explorations/remedial excavations completed to depths of up to 10 feet. Based on our discussions with Ecology concerning shallow groundwater, two additional borings were drilled to provide further support for our opinion.

Locations of Push-Probe Borings. Two push-probes were drilled at the locations shown on attached Figure 1. The locations were chosen because they are in the assumed down-gradient groundwater flow direction from the deepest remedial excavation area (Excavation Area 1). Note the property is situated at the top of a steep slope at an elevation of approximately 586 feet. The land surface drops to an elevation less than 450 feet. Based on topography, groundwater most likely flows in a northeasterly direction beneath the site. The probes are located east (GP-1) and northeast (GP-2) of the referenced excavation area.

Drilling Observations. The push-probes were logged by Dave Cooper, Principal Geologist and a Washington State licensed geologist with DOF. During drilling, observations were made for: 1) geology, 2) evidence of oily contamination (sheens, odors, and PID[i] measurements), and 3) water saturated conditions. The logs of the push-probes are presented as attached Figures 2 and 3. The push-probes were advanced to refusal in dense glacial till which occurred at depths of 19 and 24 feet below existing grade. Pertinent observations are summarized below.

[i] PID – Photoionization Detector.

- **Geology** – The probes encountered silty Sand with gravel consisting of Till fill, weathered Till and unweathered Till as follows:

    - 0-7.5 feet – Till fill
    - 7.5 to 12/14 feet – Weathered Till
    - 12/14 to 19/24 feet – (dense) unweathered Till

- **Evidence of Contamination** – No evidence of contamination of any kind was detected based on visual logging, odors, and PID measurements.

- **Evidence of Free Water** – No free water or water saturated interbeds were observed in the Till deposits. A thin (4 to 6 inches thick) wet zone was encountered at the contact between the Till fill and weathered Till. No free water was observed in the sample, such as water drippage during sample recovery. The zone was wetter in relation to the moist soils logged above and below this thin zone.

Based on the observations made during drilling and soil sample recovery, a continuous water table does not exist beneath the site to a depth of at least 24 feet. It is likely the regional water table lies below the Till at a depth greater than 50 feet based on area topography and geology. Furthermore, there is no evidence that the oily material has migrated downward below the depth of the Excavation Area 1.

Attachments
Figure 1 – Push-Probe Locations
Figure 2 – Log of GP-1
Figure 3 – Log of GP-2

Source: Google Earth

North

E=Approximate Ground Surface Elevation (feet) (From Google Earth)

Ref: Air Photo May 2017 Closeup A.cdr

1415 75th St. SW, Everett, WA	
Push-Probe Locations	**FIGURE 1**
SAB-006-00 *June 2019*	
Dalton, Olmsted & Fuglevand, Inc.	

DALTON OLMSTED FUGLEVAND

LOG OF GP-1

Sheet 1 of 1

PROJECT: SAB-006-00	COORDINATES: N343116.8 E1292380.5 (NAD83)	
LOCATION: ETP II	SURFACE ELEVATION: Approx. 586 (NAVD88)	
DRILLING CONTRACTOR: Cascade Drilling	DATE: 5/15/2019	
DRILLING EQUIPMENT: Geoprobe 7822DT	TOTAL DEPTH OF BORING: 24 ft.	
DRILLING METHOD: Direct Push	LOGGED BY: D. Cooper	
SAMPLING METHOD: 1.5" x 5' macro core with acrylic liner	RESPONSIBLE PROF.: D. Cooper	REG. NO.: 1600
NOTES:		

DEPTH (feet)	SAMPLES: Lab Sample	SAMPLES: Sample Recovery	SAMPLES: PID (ppm)	VISUAL SOIL DESCRIPTION Soil Group Name (USCS): color, moisture, density/consistency, grain size, other descriptors	WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS
0				0.5' Concrete Slab	concrete patch
1					
2			0.2	SILTY SAND WITH GRAVEL (SM) moist, mottled brown, 25% silt, 60% sand, 15% gravel Till Fill	Bentonite Chip
3					
4					
5				becomes wet, but no free water	
6			0.1		
7				wet, dark brown, trace wood	
8					
9					
10				SILTY SAND WITH GRAVEL (SM) moist, brown, 25% silt, 60% sand, 15% gravel Weathered Glacial Till No water-bearing interbeds	
11					
12			0.1		
13					
14				-Very Hard Drilling	
15					
16					
17			0.1	SILTY SAND WITH GRAVEL (SM) moist, brown to gray, 25% silt, 60% sand, 15% gravel uniform Unweathered Glacial Till No water-bearing interbeds	
18					
19					
20					
21					
22			0.1		
23					
24				Refusal at 24.0 feet	
25				Bottom of Boring 24 feet Backfilled with bentonite chips	

Note: The summary log is an interpretation based on samples, drill action, and interpolation. Variations between what is shown and actual conditions should be anticipated.

FIGURE 2

DALTON OLMSTED FUGLEVAND

LOG OF GP-2

PROJECT: SAB-006-00	COORDINATES: N343143.5 E1292380.5 (NAD83)	
LOCATION: ETP II	SURFACE ELEVATION: Approx. 586 (NAVD88)	
DRILLING CONTRACTOR: Cascade Drilling	DATE: 5/15/2019	
DRILLING EQUIPMENT: Geoprobe 7822DT	TOTAL DEPTH OF BORING: 19 ft.	
DRILLING METHOD: Direct Push	LOGGED BY: D. Cooper	
SAMPLING METHOD: 1.5" x 5' macro core with acrylic liner	RESPONSIBLE PROF.: D. Cooper	REG. NO.: 1600
NOTES:		

DEPTH (feet)	SAMPLES: Lab Sample	SAMPLES: Sample Recovery	SAMPLES: PID (ppm)	VISUAL SOIL DESCRIPTION Soil Group Name (USCS): color, moisture, density/consistency, grain size, other descriptors	WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS
1				0.5' Concrete Slab	concrete patch
2			0.1	SILTY SAND WITH GRAVEL (SM) moist, mottled brown, 25% silt, 60% sand, 15% gravel Till Fill	Bentonite Chip
3					
4					
5				dark brown, trace organics	
6			0.2		
7				becomes wet, but no free water	
8				SILTY SAND WITH GRAVEL (SM) moist, brown, 25% silt, 60% sand, 15% gravel Weathered Glacial Till No water-bearing interbeds	
9					
10					
11					
12			0.1	-Very Hard Drilling	
13					
14				SILTY SAND WITH GRAVEL (SM) moist, brown to gray, 25% silt, 60% sand, 15% gravel uniform Unweathered Glacial Till No water-bearing interbeds	
15					
16					
17			0.1		
18					
19				Refusal at 19.0 feet Bottom of Boring 19 feet Backfilled with bentonite chips	
20					
21					
22					
23					
24					
25					

Note: The summary log is an interpretation based on samples, drill action, and interpolation. Variations between what is shown and actual conditions should be anticipated.

FIGURE 3

ATTACHMENT B
LABORATORY DATA SHEETS
EPH ANALYSES – AUGUST 2019

FORMER TRIUMPH STRUCTURES AEROSTRUCTURES
EVERETT, WASHINGTON

Dalton, Olmsted & Fuglevand, Inc.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

10 September 2019

Dave Cooper
Dalton, Olmsted & Fuglevand, Inc
1420 - 156th Ave., NE STE C1
Bellevue, WA 98007

RE: Sabey ETP II

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)	Associated SDG ID(s)
19H0389	N/A

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

Amanda Volgardsen, Project Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

ACCREDITED IN ACCORDANCE WITH nelac
Cert# 100006

PJLA Testing
Accreditation # 66169

4611 S. 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 19H0389	Turn-around Requested: NORMAL	Page: 1 of 1	
ARI Client Company: DOF	Phone:	Date: 8/26/19	Ice Present? Yes
Client Contact: MATT DALTON / DAVE COOPER		No. of Coolers: 1	Cooler Temps: 0.9
Client Project Name: SAFETY ETP II			
Client Project #:	Samplers: D Cooper		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: PAHs - SIM	Analysis Requested: EPH	Notes/Comments
AREA 6_SW-15(12)	8/23/19	1000	SOIL	2	X	X	
AREA 2_SW-06(12)	8/23/19	1100	↓	↓	X	X	

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: DA Cooper	Printed Name: Kenny Dang	Printed Name:	Printed Name:
	Company: DOF	Company: ARI	Company:	Company:
	Date & Time: 8/26/19 0920	Date & Time: 8/26/19 0920	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Dalton, Olmsted & Fuglevand, Inc	Project: Sabey ETP II	
1420 - 156th Ave., NE STE C1	Project Number: [none]	**Reported:**
Bellevue WA, 98007	Project Manager: Dave Cooper	10-Sep-2019 15:54

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
AREA6_SW-15(R)	19H0389-01	Solid	23-Aug-2019 10:00	26-Aug-2019 09:20
AREA2_SW-06(R)	19H0389-02	Solid	23-Aug-2019 11:00	26-Aug-2019 09:20

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

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Dalton, Olmsted & Fuglevand, Inc	Project: Sabey ETP II	
1420 - 156th Ave., NE STE C1	Project Number: [none]	**Reported:**
Bellevue WA, 98007	Project Manager: Dave Cooper	10-Sep-2019 15:54

Case Narrative

Sample receipt

Samples as listed on the preceding page were received August 26, 2019 under ARI work order 19H0389. For details regarding sample receipt, please refer to the Cooler Receipt Form.

Polynuclear Aromatic Hydrocarbons (PAH) - EPA Method SW8270D-SIM

The samples were extracted and analyzed within the recommended holding times.

The samples were reanalyzed due to saturated chromatography as well internal standards within area limits, but with high bias. Both sets of data reported.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank was clean at the reporting limits.

The LCS percent recoveries were within control limits.

Extractable Organic Hydrocarbons - WA-Ecology

The samples were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements, with the exception of SHI0106-CCV4/CCV7 which are outside of control limits high for the Aliphatic range C21-C34 and SHI0106-CCV5/CCV6 which are outside of control limits high for the Aromatic Range C21-C34. This may be due to possible carry over caused by matrix interference. The samples were reanalyzed for verification, with the CCV's within limits. Both analyses were reported to attain reporting limits and passing QC. No further corrective action was taken.

The Aliphatic surrogate 1-Chloro-octadecane was not reported due to chromatographic interference on the initial analyses. The surrogate was flagged with "NRS" qualifiers. The samples were reanalyzed with surrogate recoveries within control limits. All other surrogate percent recoveries were within control limits. No further corrective action was taken.

The method blanks were clean at the reporting limits.

The LCS percent recoveries were within control limits.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: DOF

Project Name: Sabey ETP

COC No(s): _____ (NA)

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Assigned ARI Job No: 19H0389

Tracking No: _____ (NA)

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of the cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)

Time 0920 0.9

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: D00S206

Cooler Accepted by: KD Date: 8/26/19 Time: 0920

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	(NO)
What kind of packing material was used?	Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: _____		
Was sufficient ice used (if appropriate)?	NA	(YES)	NO
How were bottles sealed in plastic bags?	Individually	Grouped	(Not)
Did all bottles arrive in good condition (unbroken)?		(YES)	NO
Were all bottle labels complete and legible?		(YES)	NO
Did the number of containers listed on COC match with the number of containers received?		(YES)	NO
Did all bottle labels and tags agree with custody papers?		(YES)	NO
Were all bottles used correct for the requested analyses?		(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)	(NA)	YES	NO
Were all VOC vials free of air bubbles?	(NA)	YES	NO
Was sufficient amount of sample sent in each bottle?		(YES)	NO
Date VOC Trip Blank was made at ARI	(NA)		

Were the sample(s) split by ARI? (NA) YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: JBm Date: 08/26/19 Time: 1124 Labels checked by: JBm

*** Notify Project Manager of discrepancies or concerns ***

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: Date:

Dalton, Olmsted & Fuglevand, Inc	Project: Sabey ETP II	
1420 - 156th Ave., NE STE C1	Project Number: [none]	**Reported:**
Bellevue WA, 98007	Project Manager: Dave Cooper	10-Sep-2019 15:54

AREA6_SW-15(R)

19H0389-01 (Solid)

Semivolatile Organic Compounds - SIM

Method: EPA 8270D-SIM — Sampled: 08/23/2019 10:00
Instrument: NT8 — Analyzed: 05-Sep-2019 18:45

Sample Preparation:	Preparation Method: EPA 3546 (Microwave)		
	Preparation Batch: BHI0018	Sample Size: 10.01 g (wet)	Dry Weight:9.47 g
	Prepared: 03-Sep-2019	Final Volume: 0.5 mL	% Solids: 94.64
Sample Cleanup:	Cleanup Method: Silica Gel		
	Cleanup Batch: CHI0025	Initial Volume: 0.5 mL	
	Cleaned: 05-Sep-2019	Final Volume: 0.5 mL	
Sample Cleanup:	Cleanup Method: GPC		
	Cleanup Batch: CHI0024	Initial Volume: 0.5 mL	
	Cleaned: 04-Sep-2019	Final Volume: 0.5 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	3	4.04	15.8	ND	ug/kg	U
2-Methylnaphthalene	91-57-6	3	3.50	15.8	**8.95**	ug/kg	J, D
1-Methylnaphthalene	90-12-0	3	1.27	15.8	**11.4**	ug/kg	J, D
Acenaphthylene	208-96-8	3	3.43	15.8	ND	ug/kg	U
Acenaphthene	83-32-9	3	1.81	15.8	ND	ug/kg	U
Dibenzofuran	132-64-9	3	4.37	15.8	ND	ug/kg	U
Fluorene	86-73-7	3	2.00	15.8	ND	ug/kg	U
Phenanthrene	85-01-8	3	2.27	15.8	ND	ug/kg	U
Anthracene	120-12-7	3	2.76	15.8	ND	ug/kg	U
Fluoranthene	206-44-0	3	1.49	15.8	ND	ug/kg	U
Pyrene	129-00-0	3	1.98	15.8	ND	ug/kg	U
Benzo(a)anthracene	56-55-3	3	2.61	15.8	ND	ug/kg	U
Chrysene	218-01-9	3	3.33	15.8	ND	ug/kg	U
Benzo(b)fluoranthene	205-99-2	3	4.34	15.8	ND	ug/kg	U
Benzo(k)fluoranthene	207-08-9	3	2.41	15.8	ND	ug/kg	U
Benzo(j)fluoranthene	205-82-3	3	2.15	15.8	ND	ug/kg	U
Benzofluoranthenes, Total		3	9.53	31.7	ND	ug/kg	U
Benzo(a)pyrene	50-32-8	3	1.94	15.8	ND	ug/kg	U
Indeno(1,2,3-cd)pyrene	193-39-5	3	3.33	15.8	ND	ug/kg	U
Dibenzo(a,h)anthracene	53-70-3	3	2.82	15.8	ND	ug/kg	U
Benzo(g,h,i)perylene	191-24-2	3	3.37	15.8	**28.8**	ug/kg	D
Surrogate: 2-Methylnaphthalene-d10				*32-120 %*	*83.9*	*%*	
Surrogate: Dibenzo[a,h]anthracene-d14				*21-133 %*	*101*	*%*	
Surrogate: Fluoranthene-d10				*36-134 %*	*65.0*	*%*	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Dalton, Olmsted & Fuglevand, Inc	Project: Sabey ETP II	
1420 - 156th Ave., NE STE C1	Project Number: [none]	**Reported:**
Bellevue WA, 98007	Project Manager: Dave Cooper	10-Sep-2019 15:54

AREA6_SW-15(R)

19H0389-01 (Solid)

Washington Department of Ecology Methods

Method: WA EPH — Sampled: 08/23/2019 10:00
Instrument: FID8 — Analyzed: 07-Sep-2019 14:19

Sample Preparation:	Preparation Method: EPA 3546 (Microwave)		
	Preparation Batch: BHH0812	Sample Size: 10.03 g (wet)	Dry Weight:9.49 g
	Prepared: 30-Aug-2019	Final Volume: 1 mL	% Solids: 94.64
Sample Cleanup:	Cleanup Method: Silica Gel		
	Cleanup Batch: CHI0006	Initial Volume: 1 mL	
	Cleaned: 03-Sep-2019	Final Volume: 1 mL	

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
C8-C10 Aliphatics		1	2110	ND	ug/kg	U
C10-C12 Aliphatics		1	2110	ND	ug/kg	U
C12-C16 Aliphatics		1	2110	**189000**	ug/kg	
C16-C21 Aliphatics		1	2110	**1980000**	ug/kg	
C21-C34 Aliphatics		1	2110	**10400000**	ug/kg	
Surrogate: 1-Chloro-octadecane			*30-160 %*		*NRS*	NRS

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
C8-C10 Aromatics		1	2110	ND	ug/kg	U
C10-C12 Aromatics		1	2110	ND	ug/kg	U
C12-C16 Aromatics		1	2110	**4690**	ug/kg	
C16-C21 Aromatics		1	2110	**128000**	ug/kg	
C21-C34 Aromatics		1	2110	**754000**	ug/kg	
Surrogate: o-Terphenyl			*30-160 %*	*52.2*	*%*	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Dalton, Olmsted & Fuglevand, Inc	Project: Sabey ETP II	
1420 - 156th Ave., NE STE C1	Project Number: [none]	**Reported:**
Bellevue WA, 98007	Project Manager: Dave Cooper	10-Sep-2019 15:54

AREA6_SW-15(R)

19H0389-01RE1 (Solid)

Semivolatile Organic Compounds - SIM

Method: EPA 8270D-SIM — Sampled: 08/23/2019 10:00
Instrument: NT8 — Analyzed: 05-Sep-2019 17:41

Sample Preparation:	Preparation Method: EPA 3546 (Microwave)		
	Preparation Batch: BHI0018	Sample Size: 10.01 g (wet)	Dry Weight:9.47 g
	Prepared: 03-Sep-2019	Final Volume: 0.5 mL	% Solids: 94.64
Sample Cleanup:	Cleanup Method: Silica Gel		
	Cleanup Batch: CHI0025	Initial Volume: 0.5 mL	
	Cleaned: 05-Sep-2019	Final Volume: 0.5 mL	
Sample Cleanup:	Cleanup Method: GPC		
	Cleanup Batch: CHI0024	Initial Volume: 0.5 mL	
	Cleaned: 04-Sep-2019	Final Volume: 0.5 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	10	13.5	52.8	ND	ug/kg	U
2-Methylnaphthalene	91-57-6	10	11.7	52.8	ND	ug/kg	U
1-Methylnaphthalene	90-12-0	10	4.23	52.8	**9.83**	ug/kg	J, D
Acenaphthylene	208-96-8	10	11.4	52.8	ND	ug/kg	U
Acenaphthene	83-32-9	10	6.03	52.8	ND	ug/kg	U
Dibenzofuran	132-64-9	10	14.6	52.8	ND	ug/kg	U
Fluorene	86-73-7	10	6.66	52.8	ND	ug/kg	U
Phenanthrene	85-01-8	10	7.58	52.8	ND	ug/kg	U
Anthracene	120-12-7	10	9.19	52.8	ND	ug/kg	U
Fluoranthene	206-44-0	10	4.96	52.8	ND	ug/kg	U
Pyrene	129-00-0	10	6.61	52.8	ND	ug/kg	U
Benzo(a)anthracene	56-55-3	10	8.70	52.8	ND	ug/kg	U
Chrysene	218-01-9	10	11.1	52.8	ND	ug/kg	U
Benzo(b)fluoranthene	205-99-2	10	14.5	52.8	ND	ug/kg	U
Benzo(k)fluoranthene	207-08-9	10	8.02	52.8	ND	ug/kg	U
Benzo(j)fluoranthene	205-82-3	10	7.18	52.8	ND	ug/kg	U
Benzofluoranthenes, Total		10	31.8	106	ND	ug/kg	U
Benzo(a)pyrene	50-32-8	10	6.48	52.8	ND	ug/kg	U
Indeno(1,2,3-cd)pyrene	193-39-5	10	11.1	52.8	ND	ug/kg	U
Dibenzo(a,h)anthracene	53-70-3	10	9.41	52.8	ND	ug/kg	U
Benzo(g,h,i)perylene	191-24-2	10	11.2	52.8	**31.7**	ug/kg	J, D
Surrogate: 2-Methylnaphthalene-d10				*32-120 %*	*87.9*	*%*	
Surrogate: Dibenzo[a,h]anthracene-d14				*21-133 %*	*76.5*	*%*	
Surrogate: Fluoranthene-d10				*36-134 %*	*79.8*	*%*	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Dalton, Olmsted & Fuglevand, Inc	Project: Sabey ETP II	
1420 - 156th Ave., NE STE C1	Project Number: [none]	**Reported:**
Bellevue WA, 98007	Project Manager: Dave Cooper	10-Sep-2019 15:54

AREA6_SW-15(R)

19H0389-01RE1 (Solid)

Washington Department of Ecology Methods

Method: WA EPH — Sampled: 08/23/2019 10:00
Instrument: FID8 — Analyzed: 09-Sep-2019 15:49

Sample Preparation:	Preparation Method: EPA 3546 (Microwave)		
	Preparation Batch: BHH0812	Sample Size: 10.03 g (wet)	Dry Weight:9.49 g
	Prepared: 30-Aug-2019	Final Volume: 1 mL	% Solids: 94.64
Sample Cleanup:	Cleanup Method: Silica Gel		
	Cleanup Batch: CHI0006	Initial Volume: 1 mL	
	Cleaned: 03-Sep-2019	Final Volume: 1 mL	

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
C8-C10 Aliphatics		5	10500	ND	ug/kg	U
C10-C12 Aliphatics		5	10500	ND	ug/kg	U
C12-C16 Aliphatics		5	10500	**196000**	ug/kg	D
C16-C21 Aliphatics		5	10500	**2060000**	ug/kg	D
C21-C34 Aliphatics		5	10500	**11900000**	ug/kg	D
Surrogate: 1-Chloro-octadecane			*30-160 %*	*49.0*	*%*	

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
C8-C10 Aromatics		5	10500	ND	ug/kg	U
C10-C12 Aromatics		5	10500	ND	ug/kg	U
C12-C16 Aromatics		5	10500	ND	ug/kg	U
C16-C21 Aromatics		5	10500	**134000**	ug/kg	D
C21-C34 Aromatics		5	10500	**753000**	ug/kg	D
Surrogate: o-Terphenyl			*30-160 %*	*59.0*	*%*	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Dalton, Olmsted & Fuglevand, Inc	Project: Sabey ETP II	
1420 - 156th Ave., NE STE C1	Project Number: [none]	**Reported:**
Bellevue WA, 98007	Project Manager: Dave Cooper	10-Sep-2019 15:54

AREA2_SW-06(R)

19H0389-02 (Solid)

Semivolatile Organic Compounds - SIM

Method: EPA 8270D-SIM — Sampled: 08/23/2019 11:00
Instrument: NT8 — Analyzed: 05-Sep-2019 19:11

Sample Preparation:	Preparation Method: EPA 3546 (Microwave)		
	Preparation Batch: BHI0018	Sample Size: 10.01 g (wet)	Dry Weight:9.63 g
	Prepared: 03-Sep-2019	Final Volume: 0.5 mL	% Solids: 96.22
Sample Cleanup:	Cleanup Method: Silica Gel		
	Cleanup Batch: CHI0025	Initial Volume: 0.5 mL	
	Cleaned: 05-Sep-2019	Final Volume: 0.5 mL	
Sample Cleanup:	Cleanup Method: GPC		
	Cleanup Batch: CHI0024	Initial Volume: 0.5 mL	
	Cleaned: 04-Sep-2019	Final Volume: 0.5 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	3	3.97	15.6	ND	ug/kg	U
2-Methylnaphthalene	91-57-6	3	3.44	15.6	ND	ug/kg	U
1-Methylnaphthalene	90-12-0	3	1.25	15.6	**4.21**	ug/kg	J, D
Acenaphthylene	208-96-8	3	3.38	15.6	ND	ug/kg	U
Acenaphthene	83-32-9	3	1.78	15.6	ND	ug/kg	U
Dibenzofuran	132-64-9	3	4.30	15.6	ND	ug/kg	U
Fluorene	86-73-7	3	1.97	15.6	ND	ug/kg	U
Phenanthrene	85-01-8	3	2.24	15.6	ND	ug/kg	U
Anthracene	120-12-7	3	2.71	15.6	ND	ug/kg	U
Fluoranthene	206-44-0	3	1.46	15.6	ND	ug/kg	U
Pyrene	129-00-0	3	1.95	15.6	ND	ug/kg	U
Benzo(a)anthracene	56-55-3	3	2.57	15.6	ND	ug/kg	U
Chrysene	218-01-9	3	3.28	15.6	ND	ug/kg	U
Benzo(b)fluoranthene	205-99-2	3	4.27	15.6	ND	ug/kg	U
Benzo(k)fluoranthene	207-08-9	3	2.37	15.6	ND	ug/kg	U
Benzo(j)fluoranthene	205-82-3	3	2.12	15.6	ND	ug/kg	U
Benzofluoranthenes, Total		3	9.37	31.1	ND	ug/kg	U
Benzo(a)pyrene	50-32-8	3	1.91	15.6	ND	ug/kg	U
Indeno(1,2,3-cd)pyrene	193-39-5	3	3.27	15.6	ND	ug/kg	U
Dibenzo(a,h)anthracene	53-70-3	3	2.78	15.6	ND	ug/kg	U
Benzo(g,h,i)perylene	191-24-2	3	3.32	15.6	ND	ug/kg	U
Surrogate: 2-Methylnaphthalene-d10				*32-120 %*	*72.7*	*%*	
Surrogate: Dibenzo[a,h]anthracene-d14				*21-133 %*	*81.9*	*%*	
Surrogate: Fluoranthene-d10				*36-134 %*	*54.6*	*%*	

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Dalton, Olmsted & Fuglevand, Inc	Project: Sabey ETP II	
1420 - 156th Ave., NE STE C1	Project Number: [none]	**Reported:**
Bellevue WA, 98007	Project Manager: Dave Cooper	10-Sep-2019 15:54

AREA2_SW-06(R)

19H0389-02 (Solid)

Washington Department of Ecology Methods

Method: WA EPH — Sampled: 08/23/2019 11:00
Instrument: FID8 — Analyzed: 07-Sep-2019 15:01

Sample Preparation:	Preparation Method: EPA 3546 (Microwave)		
	Preparation Batch: BHH0812	Sample Size: 10.03 g (wet)	Dry Weight:9.65 g
	Prepared: 30-Aug-2019	Final Volume: 1 mL	% Solids: 96.22
Sample Cleanup:	Cleanup Method: Silica Gel		
	Cleanup Batch: CHI0006	Initial Volume: 1 mL	
	Cleaned: 03-Sep-2019	Final Volume: 1 mL	

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
C8-C10 Aliphatics		1	2070	ND	ug/kg	U
C10-C12 Aliphatics		1	2070	ND	ug/kg	U
C12-C16 Aliphatics		1	2070	**118000**	ug/kg	
C16-C21 Aliphatics		1	2070	**1450000**	ug/kg	
C21-C34 Aliphatics		1	2070	**6290000**	ug/kg	
Surrogate: 1-Chloro-octadecane			*30-160 %*		*NRS*	NRS

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
C8-C10 Aromatics		1	2070	ND	ug/kg	U
C10-C12 Aromatics		1	2070	ND	ug/kg	U
C12-C16 Aromatics		1	2070	**3920**	ug/kg	
C16-C21 Aromatics		1	2070	**114000**	ug/kg	
C21-C34 Aromatics		1	2070	**497000**	ug/kg	
Surrogate: o-Terphenyl			*30-160 %*	*52.1*	*%*	

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Dalton, Olmsted & Fuglevand, Inc	Project: Sabey ETP II	
1420 - 156th Ave., NE STE C1	Project Number: [none]	**Reported:**
Bellevue WA, 98007	Project Manager: Dave Cooper	10-Sep-2019 15:54

AREA2_SW-06(R)

19H0389-02RE1 (Solid)

Semivolatile Organic Compounds - SIM

Method: EPA 8270D-SIM — Sampled: 08/23/2019 11:00
Instrument: NT8 — Analyzed: 05-Sep-2019 18:07

Sample Preparation:	Preparation Method: EPA 3546 (Microwave)		
	Preparation Batch: BHI0018	Sample Size: 10.01 g (wet)	Dry Weight:9.63 g
	Prepared: 03-Sep-2019	Final Volume: 0.5 mL	% Solids: 96.22
Sample Cleanup:	Cleanup Method: Silica Gel		
	Cleanup Batch: CHI0025	Initial Volume: 0.5 mL	
	Cleaned: 05-Sep-2019	Final Volume: 0.5 mL	
Sample Cleanup:	Cleanup Method: GPC		
	Cleanup Batch: CHI0024	Initial Volume: 0.5 mL	
	Cleaned: 04-Sep-2019	Final Volume: 0.5 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	10	13.2	51.9	ND	ug/kg	U
2-Methylnaphthalene	91-57-6	10	11.5	51.9	ND	ug/kg	U
1-Methylnaphthalene	90-12-0	10	4.16	51.9	ND	ug/kg	U
Acenaphthylene	208-96-8	10	11.3	51.9	ND	ug/kg	U
Acenaphthene	83-32-9	10	5.93	51.9	ND	ug/kg	U
Dibenzofuran	132-64-9	10	14.3	51.9	ND	ug/kg	U
Fluorene	86-73-7	10	6.55	51.9	ND	ug/kg	U
Phenanthrene	85-01-8	10	7.45	51.9	ND	ug/kg	U
Anthracene	120-12-7	10	9.04	51.9	ND	ug/kg	U
Fluoranthene	206-44-0	10	4.88	51.9	ND	ug/kg	U
Pyrene	129-00-0	10	6.50	51.9	ND	ug/kg	U
Benzo(a)anthracene	56-55-3	10	8.56	51.9	ND	ug/kg	U
Chrysene	218-01-9	10	10.9	51.9	ND	ug/kg	U
Benzo(b)fluoranthene	205-99-2	10	14.2	51.9	ND	ug/kg	U
Benzo(k)fluoranthene	207-08-9	10	7.89	51.9	ND	ug/kg	U
Benzo(j)fluoranthene	205-82-3	10	7.06	51.9	ND	ug/kg	U
Benzofluoranthenes, Total		10	31.2	104	ND	ug/kg	U
Benzo(a)pyrene	50-32-8	10	6.37	51.9	ND	ug/kg	U
Indeno(1,2,3-cd)pyrene	193-39-5	10	10.9	51.9	ND	ug/kg	U
Dibenzo(a,h)anthracene	53-70-3	10	9.25	51.9	ND	ug/kg	U
Benzo(g,h,i)perylene	191-24-2	10	11.1	51.9	ND	ug/kg	U
Surrogate: 2-Methylnaphthalene-d10				*32-120 %*	*73.3*	*%*	
Surrogate: Dibenzo[a,h]anthracene-d14				*21-133 %*	*80.4*	*%*	
Surrogate: Fluoranthene-d10				*36-134 %*	*101*	*%*	

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Dalton, Olmsted & Fuglevand, Inc	Project: Sabey ETP II	
1420 - 156th Ave., NE STE C1	Project Number: [none]	**Reported:**
Bellevue WA, 98007	Project Manager: Dave Cooper	10-Sep-2019 15:54

AREA2_SW-06(R)

19H0389-02RE1 (Solid)

Washington Department of Ecology Methods

Method: WA EPH — Sampled: 08/23/2019 11:00
Instrument: FID8 — Analyzed: 09-Sep-2019 16:33

Sample Preparation:	Preparation Method: EPA 3546 (Microwave)		
	Preparation Batch: BHH0812	Sample Size: 10.03 g (wet)	Dry Weight:9.65 g
	Prepared: 30-Aug-2019	Final Volume: 1 mL	% Solids: 96.22
Sample Cleanup:	Cleanup Method: Silica Gel		
	Cleanup Batch: CHI0006	Initial Volume: 1 mL	
	Cleaned: 03-Sep-2019	Final Volume: 1 mL	

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
C8-C10 Aliphatics		5	10400	ND	ug/kg	U
C10-C12 Aliphatics		5	10400	ND	ug/kg	U
C12-C16 Aliphatics		5	10400	**124000**	ug/kg	D
C16-C21 Aliphatics		5	10400	**1510000**	ug/kg	D
C21-C34 Aliphatics		5	10400	**6530000**	ug/kg	D
Surrogate: 1-Chloro-octadecane			*30-160 %*	*34.3*	*%*	

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
C8-C10 Aromatics		5	10400	ND	ug/kg	U
C10-C12 Aromatics		5	10400	ND	ug/kg	U
C12-C16 Aromatics		5	10400	ND	ug/kg	U
C16-C21 Aromatics		5	10400	**110000**	ug/kg	D
C21-C34 Aromatics		5	10400	**472000**	ug/kg	D
Surrogate: o-Terphenyl			*30-160 %*	*54.3*	*%*	

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Dalton, Olmsted & Fuglevand, Inc	Project: Sabey ETP II	
1420 - 156th Ave., NE STE C1	Project Number: [none]	**Reported:**
Bellevue WA, 98007	Project Manager: Dave Cooper	10-Sep-2019 15:54

Semivolatile Organic Compounds - SIM - Quality Control

Batch BHI0018 - EPA 3546 (Microwave)

Instrument: NT8

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHI0018-BLK1)				Prepared: 03-Sep-2019 Analyzed: 05-Sep-2019 16:43							
Naphthalene	ND	1.28	5.00	ug/kg							U
2-Methylnaphthalene	ND	1.10	5.00	ug/kg							U
1-Methylnaphthalene	ND	0.40	5.00	ug/kg							U
Acenaphthylene	ND	1.08	5.00	ug/kg							U
Acenaphthene	ND	0.57	5.00	ug/kg							U
Dibenzofuran	ND	1.38	5.00	ug/kg							U
Fluorene	ND	0.63	5.00	ug/kg							U
Phenanthrene	ND	0.72	5.00	ug/kg							U
Anthracene	ND	0.87	5.00	ug/kg							U
Fluoranthene	ND	0.47	5.00	ug/kg							U
Pyrene	ND	0.63	5.00	ug/kg							U
Benzo(a)anthracene	ND	0.82	5.00	ug/kg							U
Chrysene	ND	1.05	5.00	ug/kg							U
Benzo(b)fluoranthene	ND	1.37	5.00	ug/kg							U
Benzo(k)fluoranthene	ND	0.76	5.00	ug/kg							U
Benzo(j)fluoranthene	ND	0.68	5.00	ug/kg							U
Benzofluoranthenes, Total	ND	3.01	10.0	ug/kg							U
Benzo(a)pyrene	ND	0.61	5.00	ug/kg							U
Indeno(1,2,3-cd)pyrene	ND	1.05	5.00	ug/kg							U
Dibenzo(a,h)anthracene	ND	0.89	5.00	ug/kg							U
Benzo(g,h,i)perylene	ND	1.07	5.00	ug/kg							U
Surrogate: 2-Methylnaphthalene-d10	85.2			ug/kg	*150*		*56.8*	*32-120*			
Surrogate: Dibenzo[a,h]anthracene-d14	117			ug/kg	*150*		*77.9*	*21-133*			
Surrogate: Fluoranthene-d10	127			ug/kg	*150*		*84.7*	*36-134*			

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Dalton, Olmsted & Fuglevand, Inc	Project: Sabey ETP II	
1420 - 156th Ave., NE STE C1	Project Number: [none]	**Reported:**
Bellevue WA, 98007	Project Manager: Dave Cooper	10-Sep-2019 15:54

Semivolatile Organic Compounds - SIM - Quality Control

Batch BHI0018 - EPA 3546 (Microwave)

Instrument: NT8

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BHI0018-BS1)					Prepared: 03-Sep-2019 Analyzed: 05-Sep-2019 17:09						
Naphthalene	142	1.28	5.00	ug/kg	300		47.2	36-120			
2-Methylnaphthalene	143	1.10	5.00	ug/kg	300		47.7	35-120			
1-Methylnaphthalene	146	0.40	5.00	ug/kg	300		48.7	39-120			
Acenaphthylene	156	1.08	5.00	ug/kg	300		52.2	35-120			
Acenaphthene	152	0.57	5.00	ug/kg	300		50.8	39-120			
Dibenzofuran	152	1.38	5.00	ug/kg	300		50.7	38-120			
Fluorene	169	0.63	5.00	ug/kg	300		56.5	41-120			
Phenanthrene	193	0.72	5.00	ug/kg	300		64.3	46-120			
Anthracene	206	0.87	5.00	ug/kg	300		68.6	36-120			
Fluoranthene	229	0.47	5.00	ug/kg	300		76.2	46-120			
Pyrene	244	0.63	5.00	ug/kg	300		81.4	49-120			
Benzo(a)anthracene	228	0.82	5.00	ug/kg	300		75.9	42-120			
Chrysene	242	1.05	5.00	ug/kg	300		80.7	48-120			
Benzo(b)fluoranthene	273	1.37	5.00	ug/kg	300		91.0	35-127			
Benzo(k)fluoranthene	260	0.76	5.00	ug/kg	300		86.8	37-129			
Benzo(j)fluoranthene	256	0.68	5.00	ug/kg	300		85.3	40-120			
Benzofluoranthenes, Total	792	3.01	10.0	ug/kg	900		88.0	46-120			
Benzo(a)pyrene	218	0.61	5.00	ug/kg	300		72.6	36-120			
Indeno(1,2,3-cd)pyrene	218	1.05	5.00	ug/kg	300		72.6	40-120			
Dibenzo(a,h)anthracene	211	0.89	5.00	ug/kg	300		70.3	38-120			
Benzo(g,h,i)perylene	226	1.07	5.00	ug/kg	300		75.3	38-120			
Surrogate: 2-Methylnaphthalene-d10	126			ug/kg	*150*		*83.9*	*32-120*			
Surrogate: Dibenzo[a,h]anthracene-d14	193			ug/kg	*150*		*128*	*21-133*			
Surrogate: Fluoranthene-d10	201			ug/kg	*150*		*134*	*36-134*			

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Dalton, Olmsted & Fuglevand, Inc	Project: Sabey ETP II	
1420 - 156th Ave., NE STE C1	Project Number: [none]	**Reported:**
Bellevue WA, 98007	Project Manager: Dave Cooper	10-Sep-2019 15:54

Washington Department of Ecology Methods - Quality Control

Batch BHH0812 - EPA 3546 (Microwave)

Instrument: FID8

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHH0812-BLK1)				Prepared: 30-Aug-2019 Analyzed: 09-Sep-2019 15:06						
C8-C10 Aliphatics	ND	2000	ug/kg							U
C10-C12 Aliphatics	ND	2000	ug/kg							U
C12-C16 Aliphatics	ND	2000	ug/kg							U
C16-C21 Aliphatics	ND	2000	ug/kg							U
C21-C34 Aliphatics	ND	2000	ug/kg							U
Surrogate: 1-Chloro-octadecane	7770		ug/kg	*15000*		*51.8*	*30-160*			

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Dalton, Olmsted & Fuglevand, Inc	Project: Sabey ETP II	
1420 - 156th Ave., NE STE C1	Project Number: [none]	**Reported:**
Bellevue WA, 98007	Project Manager: Dave Cooper	10-Sep-2019 15:54

Washington Department of Ecology Methods - Quality Control

Batch BHH0812 - EPA 3546 (Microwave)

Instrument: FID8

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHH0812-BLK2)				Prepared: 30-Aug-2019 Analyzed: 07-Sep-2019 11:28						
C8-C10 Aromatics	ND	2000	ug/kg							U
C10-C12 Aromatics	ND	2000	ug/kg							U
C12-C16 Aromatics	ND	2000	ug/kg							U
C16-C21 Aromatics	ND	2000	ug/kg							U
C21-C34 Aromatics	ND	2000	ug/kg							U
Surrogate: o-Terphenyl	8160		ug/kg	*15000*		*54.4*	*30-160*			

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Dalton, Olmsted & Fuglevand, Inc	Project: Sabey ETP II	
1420 - 156th Ave., NE STE C1	Project Number: [none]	**Reported:**
Bellevue WA, 98007	Project Manager: Dave Cooper	10-Sep-2019 15:54

Washington Department of Ecology Methods - Quality Control

Batch BHH0812 - EPA 3546 (Microwave)

Instrument: FID8

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BHH0812-BS1)				Prepared: 30-Aug-2019 Analyzed: 09-Sep-2019 15:28						
C8-C10 Aliphatics	5860	2000	ug/kg	15000		39.1	30-160			
C10-C12 Aliphatics	6950	2000	ug/kg	15000		46.3	30-160			
C12-C16 Aliphatics	8200	2000	ug/kg	15000		54.7	30-160			
C16-C21 Aliphatics	10300	2000	ug/kg	15000		68.3	30-160			
C21-C34 Aliphatics	11100	2000	ug/kg	15000		73.9	30-160			
Surrogate: 1-Chloro-octadecane	8890		ug/kg	*15000*		*59.3*	*30-160*			

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Dalton, Olmsted & Fuglevand, Inc	Project: Sabey ETP II	
1420 - 156th Ave., NE STE C1	Project Number: [none]	**Reported:**
Bellevue WA, 98007	Project Manager: Dave Cooper	10-Sep-2019 15:54

Washington Department of Ecology Methods - Quality Control

Batch BHH0812 - EPA 3546 (Microwave)

Instrument: FID8

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BHH0812-BS2)				Prepared: 30-Aug-2019 Analyzed: 07-Sep-2019 11:49						
C10-C12 Aromatics	5620	2000	ug/kg	15000		37.5	30-160			
C12-C16 Aromatics	7320	2000	ug/kg	15000		48.8	30-160			
C16-C21 Aromatics	19400	2000	ug/kg	30000		64.6	30-160			
C21-C34 Aromatics	7580	2000	ug/kg	15000		50.5	30-160			
Surrogate: o-Terphenyl	9560		ug/kg	*15000*		*63.7*	*30-160*			

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Dalton, Olmsted & Fuglevand, Inc	Project: Sabey ETP II	
1420 - 156th Ave., NE STE C1	Project Number: [none]	**Reported:**
Bellevue WA, 98007	Project Manager: Dave Cooper	10-Sep-2019 15:54

Certified Analyses included in this Report

Analyte	Certifications
EPA 8270D-SIM in Solid	
Naphthalene	ADEC,DoD-ELAP,NELAP,WADOE
2-Methylnaphthalene	ADEC,DoD-ELAP,NELAP
1-Methylnaphthalene	ADEC,DoD-ELAP,NELAP,WADOE
Biphenyl	ADEC,DoD-ELAP,NELAP
2,6-Dimethylnaphthalene	ADEC,WADOE
Acenaphthylene	ADEC,DoD-ELAP,NELAP,WADOE
Acenaphthene	ADEC,DoD-ELAP,NELAP,WADOE
Dibenzofuran	ADEC,DoD-ELAP,NELAP
Fluorene	ADEC,DoD-ELAP,NELAP,WADOE
Phenanthrene	ADEC,DoD-ELAP,NELAP,WADOE
Anthracene	ADEC,DoD-ELAP,NELAP,WADOE
Carbazole	ADEC,DoD-ELAP,NELAP
1-Methylphenanthrene	ADEC
Fluoranthene	ADEC,DoD-ELAP,NELAP,WADOE
Pyrene	ADEC,DoD-ELAP,NELAP,WADOE
Benzo(a)anthracene	ADEC,DoD-ELAP,NELAP,WADOE
Chrysene	ADEC,DoD-ELAP,NELAP,WADOE
Benzo(b)fluoranthene	ADEC,DoD-ELAP,NELAP,WADOE
Benzo(k)fluoranthene	ADEC,DoD-ELAP,NELAP,WADOE
Benzo(j)fluoranthene	ADEC,DoD-ELAP,NELAP,WADOE
Benzo(e)pyrene	ADEC,NELAP
Benzo(a)pyrene	ADEC,DoD-ELAP,NELAP,WADOE
Perylene	ADEC,NELAP
Indeno(1,2,3-cd)pyrene	ADEC,DoD-ELAP,NELAP,WADOE
Dibenzo(a,h)anthracene	ADEC,DoD-ELAP
Benzo(g,h,i)perylene	ADEC,DoD-ELAP,NELAP,WADOE
WA EPH in Solid	
C8-C10 Aliphatics	WADOE,DoD-ELAP,NELAP
C10-C12 Aliphatics	WADOE,DoD-ELAP,NELAP
C12-C16 Aliphatics	WADOE,DoD-ELAP,NELAP
C16-C21 Aliphatics	WADOE,DoD-ELAP,NELAP
C21-C34 Aliphatics	WADOE,DoD-ELAP,NELAP
C8-C10 Aromatics	DoD-ELAP,NELAP,WADOE
C10-C12 Aromatics	DoD-ELAP,NELAP,WADOE

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Dalton, Olmsted & Fuglevand, Inc	Project: Sabey ETP II	
1420 - 156th Ave., NE STE C1	Project Number: [none]	**Reported:**
Bellevue WA, 98007	Project Manager: Dave Cooper	10-Sep-2019 15:54

C12-C16 Aromatics	DoD-ELAP,NELAP,WADOE
C16-C21 Aromatics	DoD-ELAP,NELAP,WADOE
C21-C34 Aromatics	DoD-ELAP,NELAP,WADOE

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	17-015	01/31/2021
CALAP	California Department of Public Health CAELAP	2748	06/30/2019
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	01/01/2021
NELAP	ORELAP - Oregon Laboratory Accreditation Program	WA100006-012	05/12/2020
WADOE	WA Dept of Ecology	C558	06/30/2019
WA-DW	Ecology - Drinking Water	C558	06/30/2019

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Dalton, Olmsted & Fuglevand, Inc	Project: Sabey ETP II	
1420 - 156th Ave., NE STE C1	Project Number: [none]	**Reported:**
Bellevue WA, 98007	Project Manager: Dave Cooper	10-Sep-2019 15:54

Notes and Definitions

U	This analyte is not detected above the reporting limit (RL) or if noted, not detected above the limit of detection (LOD).
NRS	This surrogate not reported due to chromatographic interference
J	Estimated concentration value detected below the reporting limit.
D	The reported value is from a dilution
*	Flagged value is not within established control limits.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
[2C]	Indicates this result was quantified on the second column on a dual column analysis.

ATTACHMENT C
EPH WORKSHEETS
SAMPLES AREA 2-SW06(R) AND AREA 6-SW15(R)

FORMER TRIUMPH STRUCTURES AEROSTRUCTURES
EVERETT, WASHINGTON

Dalton, Olmsted & Fuglevand, Inc.

A2. 1B Worksheet for Calculating Soil Cleanup Levels for Protection of Human Health: (Soil Direct Contact Pathway)

Method B: Unrestricted Land Use (WAC 173-340-740)

Date: 9/19/2019
Site Name: Everett Tech Park II
Sample Name: Area 2-SW06('R)

Soil

Chemical of Concern or EC group	Current Condition				Adjusted Condition			
	Measured Soil Conc @dry basis	HQ	RISK	Pass or Fail?	Soil Conc being tested	HQ	RISK	Pass or Fail?
	mg/kg	unitless	unitless		mg/kg	unitless	unitless	
Petroleum EC Fraction								
AL_EC >5-6	0				0.00E+00			
AL_EC >6-8	0				0.00E+00			
AL_EC >8-10	0				0.00E+00			
AL_EC >10-12	0				0.00E+00			
AL_EC >12-16	118	7.08E-02			2.72E+02	1.63E-01		
AL_EC >16-21	1450	1.31E-02			3.34E+03	3.01E-02		
AL_EC >21-34	6290	5.66E-02			1.45E+04	1.30E-01		
AR_EC >8-10	0				0.00E+00			
AR_EC >10-12	0				0.00E+00			
AR_EC >12-16	3.92	1.41E-03			9.03E+00	3.25E-03		
AR_EC >16-21	114	6.84E-02			2.63E+02	1.58E-01		
AR_EC >21-34	497	2.24E-01			1.15E+03	5.15E-01		
Benzene	0		0.00E+00		0.00E+00		0.00E+00	
Toluene	0				0.00E+00			
Ethylbenzene	0				0.00E+00			
Total Xylenes	0				0.00E+00			
Naphthalene	0				0.00E+00	0.00E+00		
1-Methyl Naphthalene	0				0.00E+00	0.00E+00		
2-Methyl Naphthalene	0				0.00E+00	0.00E+00		
n-Hexane	0				0.00E+00	0.00E+00		
MTBE	0				0.00E+00			
Ethylene Dibromide (EDB)	0		0.00E+00		0.00E+00	0.00E+00	0.00E+00	
1,2 Dichloroethane (EDC)	0		0.00E+00		0.00E+00	0.00E+00	0.00E+00	
Benzo(a)anthracene	0		0.00E+00	*For*	0.00E+00		0.00E+00	*For*
Benzo(b)fluoranthene	0		0.00E+00	*all*	0.00E+00		0.00E+00	*all*
Benzo(k)fluoranthene	0		0.00E+00	*cPAHs*	0.00E+00		0.00E+00	*cPAHs*
Benzo(a)pyrene	0		0.00E+00		0.00E+00		0.00E+00	
Chrysene	0		0.00E+00		0.00E+00		0.00E+00	
Dibenz(a,h)anthracene	0		0.00E+00	Σ Risk=	0.00E+00		0.00E+00	Σ Risk=
Indeno(1,2,3-cd)pyrene	0		0.00E+00	0.00E+00	0.00E+00		0.00E+00	0.00E+00
Sum	**8472.92**	4.34E-01	0.00E+00		1.95E+04	1.00E+00	0.00E+00	

TEST CURRENT CONDITION

Measured TPH Soil Conc, mg/kg= 8472.920
HI= 4.339E-01
RISK= 0.000E+00

Pass or Fail? Pass

Check Residual Saturation (WAC340-747(10))

CALCULATE PROTECTIVE CONDITION

This tool allows the user to calculate protective TPH soil concentration based on various soil quality criteria. The Workbook uses the same composition ratio as for the measured data.

Calculate Protective TPH Soil Conc

Selected Criterion: @HI=1
Most Stringent? YES

Protctive TPH Soil Conc, mg/kg = 19526.40
HI = 1.00E+00
RISK = 0.00E+00

TEST ADJUSTED CONDITION

This tool allows the user to test whether a particular TPH soil concentration is protective of human health. The Workbook uses the same composition ratio as for the measured data.

Test Adjusted TPH Soil Conc

Tested TPH Soil Conc, mg/kg =
HI =
RISK =

Pass or Fail?

A2. 1B Worksheet for Calculating Soil Cleanup Levels for Protection of Human Health: (Soil Direct Contact Pathway)

Method B: Unrestricted Land Use (WAC 173-340-740)

Soil

Date: 9/19/2019
Site Name: Everett Tech Park II
Sample Name: Area 6-SW15('R)

Chemical of Concern or EC group	Current Condition				Adjusted Condition			
	Measured Soil Conc @dry basis	HQ	RISK	Pass or Fail?	Soil Conc being tested	HQ	RISK	Pass or Fail?
	mg/kg	unitless	unitless		mg/kg	unitless	unitless	
Petroleum EC Fraction								
AL_EC >5-6	0				0.00E+00			
AL_EC >6-8	0				0.00E+00			
AL_EC >8-10	0				0.00E+00			
AL_EC >10-12	0				0.00E+00			
AL_EC >12-16	189	1.13E-01			2.94E+02	1.76E-01		
AL_EC >16-21	1980	1.78E-02			3.08E+03	2.77E-02		
AL_EC >21-34	10400	9.36E-02			1.62E+04	1.46E-01		
AR_EC >8-10	0				0.00E+00			
AR_EC >10-12	0				0.00E+00			
AR_EC >12-16	4.69	1.69E-03			7.30E+00	2.63E-03		
AR_EC >16-21	128	7.68E-02			1.99E+02	1.20E-01		
AR_EC >21-34	754	3.39E-01			1.17E+03	5.28E-01		
Benzene	0		0.00E+00		0.00E+00		0.00E+00	
Toluene	0				0.00E+00			
Ethylbenzene	0				0.00E+00			
Total Xylenes	0				0.00E+00			
Naphthalene	0				0.00E+00	0.00E+00		
1-Methyl Naphthalene	0.0114	2.93E-06			1.77E-02	4.56E-06		
2-Methyl Naphthalene	0.00895	2.87E-05			1.39E-02	4.47E-05		
n-Hexane	0				0.00E+00	0.00E+00		
MTBE	0				0.00E+00			
Ethylene Dibromide (EDB)	0		0.00E+00		0.00E+00	0.00E+00	0.00E+00	
1,2 Dichloroethane (EDC)	0		0.00E+00		0.00E+00	0.00E+00	0.00E+00	
Benzo(a)anthracene	0		0.00E+00	*For*	0.00E+00		0.00E+00	*For*
Benzo(b)fluoranthene	0		0.00E+00	*all*	0.00E+00		0.00E+00	*all*
Benzo(k)fluoranthene	0		0.00E+00	*cPAHs*	0.00E+00		0.00E+00	*cPAHs*
Benzo(a)pyrene	0		0.00E+00		0.00E+00		0.00E+00	
Chrysene	0		0.00E+00		0.00E+00		0.00E+00	
Dibenz(a,h)anthracene	0		0.00E+00	Σ Risk=	0.00E+00		0.00E+00	Σ Risk=
Indeno(1,2,3-cd)pyrene	0		0.00E+00	0.00E+00	0.00E+00		0.00E+00	0.00E+00
Sum	**13455.71035**	6.43E-01	0.00E+00		2.09E+04	1.00E+00	0.00E+00	

TEST CURRENT CONDITION

Measured TPH Soil Conc, mg/kg= 13455.710
HI= 6.426E-01
RISK= 0.000E+00
Pass or Fail? Pass
Check Residual Saturation (WAC340-747(10))

CALCULATE PROTECTIVE CONDITION

This tool allows the user to calculate protective TPH soil concentration based on various soil quality criteria. The Workbook uses the same composition ratio as for the measured data.

Calculate Protective TPH Soil Conc

Selected Criterion: @HI=1
Most Stringent? YES
Protctive TPH Soil Conc, mg/kg = 20938.18
HI = 1.00E+00
RISK = 0.00E+00

TEST ADJUSTED CONDITION

This tool allows the user to test whether a particular TPH soil concentration is protective of human health. The Workbook uses the same composition ratio as for the measured data.

Test Adjusted TPH Soil Conc

Tested TPH Soil Conc, mg/kg =
HI =
RISK =
Pass or Fail?

A2. 2 Worksheet for Calculating Soil Cleanup Level for the Protection of Ground Water Quality (Leaching Pathway)

Washington State Department of Ecology, Toxics Cleanup Program Cleanup Levels for Protection of Ground Water

WAC 173-340-740 and 747

Groundwater

Date: 9/19/2019

Site Name: Everett Tech Park II

Sample Name: Area 2-SW06('R)

Chemical of Concern or EC Group	Measured Soil Conc @dry basis	GW Cleanup Level	Adjusted Condition				
			Soil Conc being tested	Predicted Conc @Well	HQ @ Well	RISK @ Well	Pass or Fail?
	mg/kg	ug/L	mg/kg	ug/L	unitless	unitless	
Petroleum EC Fraction							
AL_EC >5-6	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >6-8	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >8-10	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >10-12	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >12-16	118		9.78E+02	9.20E-04	1.92E-06		
AL_EC >16-21	1450		1.20E+04	1.43E-05	4.47E-10		
AL_EC >21-34	6290		5.21E+04	4.84E-10	1.51E-14		
AR_EC >8-10	0		0.00E+00	0.00E+00	0.00E+00		
AR_EC >10-12	0		0.00E+00	0.00E+00	0.00E+00		
AR_EC >12-16	3.92		3.25E+01	3.11E-01	3.88E-04		
AR_EC >16-21	114		9.45E+02	6.28E-01	1.31E-03		
AR_EC >21-34	497		4.12E+03	2.80E-02	4.38E-05		
Benzene	0	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Toluene	0	1000	0.00E+00	0.00E+00	0.00E+00		
Ethylbenzene	0	700	0.00E+00	0.00E+00	0.00E+00		
Total Xylenes	0	1000	0.00E+00	0.00E+00	0.00E+00		
Naphthalene	0	160	0.00E+00	0.00E+00	0.00E+00		
1-Methyl Naphthalene	0		0.00E+00	0.00E+00	0.00E+00		
2-Methyl Naphthalene	0		0.00E+00	0.00E+00	0.00E+00		
n-Hexane	0		0.00E+00	0.00E+00	0.00E+00		
MTBE	0	20	0.00E+00	0.00E+00	0.00E+00		
Ethylene Dibromide (EDB)	0	0.01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1,2 Dichloroethane (EDC)	0	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Benzo(a)anthracene	0	for	0.00E+00	0.00E+00		0.00E+00	for
Benzo(b)fluoranthene	0	all	0.00E+00	0.00E+00		0.00E+00	all
Benzo(k)fluoranthene	0	cPAHs	0.00E+00	0.00E+00		0.00E+00	cPAHs
Benzo(a)pyrene	0	Risk=	0.00E+00	0.00E+00		0.00E+00	
Chrysene	0	1E-05	0.00E+00	0.00E+00		0.00E+00	
Dibenz(a,h)anthracene	0		0.00E+00	0.00E+00		0.00E+00	Σ Risk=
Indeno(1,2,3-cd)pyrene	0		0.00E+00	0.00E+00		0.00E+00	0.00E+00
Sum	8472.92		7.02E+04	9.67E-01	1.74E-03	0.00E+00	Pass

Site-Specific Hydrogeological Properties previously entered:

Item	Symbol	Value	Units
Total soil porosity:	n	0.43	unitless
Volumetric water content:	Θ_w	0.3	unitless
Volumetric air content:	Θ_a	0.13	unitless
Soil bulk density measured:	ρ_b	1.5	kg/L
Fraction Organic Carbon:	f_{oc}	0.001	unitless
Dilution Factor:	DF	20	unitless

Target Ground Water TPH conc adjusted previously if any:

Target Ground Water TPH Conc, ug/L ⇒ 500

CALCULATE PROTECTIVE CONDITION OR TEST ADJUSTED CONDITION — Calculate or Test

@ HI=1

Pass or Fail? YES

Tested TPH Soil Conc, mg/kg = **100% NAPL**

Predicted TPH GW Conc, ug/L = 9.67E-01

RISK @ Well = 0.00E+00

HI @Well = 1.74E-03

DEDAILED MODEL RESULTS

Type of model used for computation:	4-Phase Model
Computation completed?	Yes!
Initial Weighted Average MW of NAPL, g/mol:	347.5
Equilibrated Weighted Average MW of NAPL, g/mol:	347.6
Initial Weighted Average Density of NAPL, kg/L:	0.810
Volumetric NAPL Content, Θ_{NAPL} :	1.3E-01
NAPL Saturation (%), Θ_{NAPL}/n :	30.23%
100% NAPL, mg/kg	70211.0

Mass Distribution Pattern @ 4-phase in soil pore system:

Total Mass distributed in Water Phase: 0.00% in Solid: 0.00%

Total Mass distributed in Air Phase: 0.00% in NAPL: 100.00%

Please Check Soil Residual Saturation TPH Levels: Refer to Table 747-5!

A2. 2 Worksheet for Calculating Soil Cleanup Level for the Protection of Ground Water Quality (Leaching Pathway)

~~Calculating Soil Cleanup Level for the Protection of Ground Water Quality (Leaching Pathway)~~ Ground Water

WAC 173-340-740 and 747

Groundwater

Date: 9/19/2019

Site Name: Everett Tech Park II

Sample Name: Area 6-SW15('R)

Chemical of Concern or EC Group	Measured Soil Conc @dry basis	GW Cleanup Level	Adjusted Condition				
			Soil Conc being tested	Predicted Conc @Well	HQ @ Well	RISK @ Well	Pass or Fail?
	mg/kg	ug/L	mg/kg	ug/L	unitless	unitless	
Petroleum EC Fraction							
AL_EC >5-6	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >6-8	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >8-10	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >10-12	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >12-16	189		9.84E+02	9.42E-04	1.96E-06		
AL_EC >16-21	1980		1.03E+04	1.25E-05	3.91E-10		
AL_EC >21-34	10400		5.42E+04	5.12E-10	1.60E-14		
AR_EC >8-10	0		0.00E+00	0.00E+00	0.00E+00		
AR_EC >10-12	0		0.00E+00	0.00E+00	0.00E+00		
AR_EC >12-16	4.69		2.44E+01	2.38E-01	2.97E-04		
AR_EC >16-21	128		6.67E+02	4.51E-01	9.39E-04		
AR_EC >21-34	754		3.93E+03	2.72E-02	4.25E-05		
Benzene	0	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Toluene	0	1000	0.00E+00	0.00E+00	0.00E+00		
Ethylbenzene	0	700	0.00E+00	0.00E+00	0.00E+00		
Total Xylenes	0	1000	0.00E+00	0.00E+00	0.00E+00		
Naphthalene	0	160	0.00E+00	0.00E+00	0.00E+00		
1-Methyl Naphthalene	0.0114		5.94E-02	2.62E-03	6.55E-06		
2-Methyl Naphthalene	0.00895		4.66E-02	2.03E-03	6.33E-05		
n-Hexane	0		0.00E+00	0.00E+00	0.00E+00		
MTBE	0	20	0.00E+00	0.00E+00	0.00E+00		
Ethylene Dibromide (EDB)	0	0.01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1,2 Dichloroethane (EDC)	0	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Benzo(a)anthracene	0	for	0.00E+00	0.00E+00		0.00E+00	for
Benzo(b)fluoranthene	0	all	0.00E+00	0.00E+00		0.00E+00	all
Benzo(k)fluoranthene	0	cPAHs	0.00E+00	0.00E+00		0.00E+00	cPAHs
Benzo(a)pyrene	0	Risk=	0.00E+00	0.00E+00		0.00E+00	
Chrysene	0	1E-05	0.00E+00	0.00E+00		0.00E+00	
Dibenz(a,h)anthracene	0		0.00E+00	0.00E+00		0.00E+00	Σ Risk=
Indeno(1,2,3-cd)pyrene	0		0.00E+00	0.00E+00		0.00E+00	0.00E+00
Sum	13455.71035		7.01E+04	7.21E-01	1.35E-03	0.00E+00	Pass

Site-Specific Hydrogeological Properties previously entered:

Item	Symbol	Value	Units
Total soil porosity:	n	0.43	unitless
Volumetric water content:	Θ_w	0.3	unitless
Volumetric air content:	Θ_a	0.13	unitless
Soil bulk density measured:	ρ_b	1.5	kg/L
Fraction Organic Carbon:	f_{oc}	0.001	unitless
Dilution Factor:	DF	20	unitless

Target Ground Water TPH conc adjusted previously if any:

Target Ground Water TPH Conc, ug/L ⇒	500

CALCULATE PROTECTIVE CONDITION OR TEST ADJUSTED CONDITION

Calculate or Test

@ HI=1

Pass or Fail? YES

Tested TPH Soil Conc, mg/kg = **100% NAPL**

Predicted TPH GW Conc, ug/L = 7.21E-01

RISK @ Well = 0.00E+00

HI @Well = 1.35E-03

DEDAILED MODEL RESULTS

Type of model used for computation:	4-Phase Model
Computation completed?	Yes!
Initial Weighted Average MW of NAPL, g/mol:	352.9
Equilibrated Weighted Average MW of NAPL, g/mol:	353.0
Initial Weighted Average Density of NAPL, kg/L:	0.808
Volumetric NAPL Content, Θ_{NAPL} :	1.3E-01
NAPL Saturation (%), Θ_{NAPL}/n:	30.23%
100% NAPL, mg/kg	70067.0

Mass Distribution Pattern @ 4-phase in soil pore system:

Total Mass distributed in Water Phase: 0.00% in Solid: 0.00%

Total Mass distributed in Air Phase: 0.00% in NAPL: 100.00%

Please Check Soil Residual Saturation TPH Levels: Refer to Table 747-5!

ATTACHMENT D
MTCAStat DATA OUTPUT
(UCL95% Calculation)

FORMER TRIUMPH STRUCTURES AEROSTRUCTURES
EVERETT, WASHINGTON

Everett Technical Park II
UCL95% TPH D+O (Detects Only)

	A	B
1	DATA	ID
2	37000	ETPII
3	19000	TPH D+O
4	8400	mg/kg
5	2600	
6	2066	Detects
7	1900	Only
8	1800	
9	1700	9/21/2019
10	1700	
11	1500	
12	1000	
13	930	
14	910	
15	710	
16	710	
17	500	
18	490	
19	470	
20	380	
21	340	
22	330	
23	312	
24	283	
25	280	
26	170	
27	169	
28	158	
29	140	
30	140	
31	131	
32	120	
33	110	
34	110	
35	110	
36	110	
37	110	
38	110	
39	99	
40	98	
41	84	
42	84	
43	81.8	
44	78	
45	72	
46	69	
47	68	
48	65	
49	59	
50	57	
51	50	
52	50	
53	41	
54	21.5	
55	5.5	
56		
57		
58		
59		
60		
61		
62		
63		
64		
65		
66		
67		
68		
69		
70		

MTCAStat 97 Site Module

Number of samples		Uncensored values	
Uncensored	54	Mean	1631.144
Censored		Lognormal mean	1035.951
Detection limit or PQL		Std. devn.	5643.724
Method detection limit		Median	149
TOTAL	54	Min.	5.5
ENTER DATA		Max	37000

Distribution Decision

Probability plot method		W test	D'Agostino's test
Lognormal distribution?		Normal distribution?	
r-squared is:	0.932	r-squared is:	0.272

Recommendations:

Use lognormal distribution.

Upper Confidence Limit (UCL)

UCL (Land's method) is 2090.28633559136

Paste values

Sort data

Calculate UCL

Lognormal

Normal

Neither

Clear messages

Clear all

Histogram

5 10 20

Create report

Sample size

Finished

Exit MTCA*Stat*