PURCHASING SECTION
13450 – 104 Avenue, Surrey, BC V3T 1V8
Tel: 604-590-7274
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ADDENDUM No. 2

REQUEST FOR QUOTATION No.:	**1220-040-2017-083**
TITLE:	**Material Screening and Filling Operation**
ADDENDUM ISSUE DATE:	**June 12, 2017**
DATE:	**PREFER TO RECEIVE SUBMISSION ON OR BEFORE June 23, 2017**

INFORMATION FOR CONTRACTOR

Contractors are advised that Addendum No. 2 to the RFQ is hereby issued by the City. This addendum shall form part of the Contract Documents and is to be read, interpreted and coordinated with all other parts. The following information is provided to answer question raised by Contractors for the above named project, to the extent referenced and shall become a part thereof. No consideration will be allowed for extras due to the Contractor or any sub-Contractor not being familiar with this addendum. This Addendum No. 2 contains (46) pages in total.

QUESTION AND ANSWER:

Q1. Will the Reference Documents referred to in Schedule D – Appendix 1 be provided as part of this tender?

A1. Schedule D – Appendix 1 lists four Reference Documents. Three out four documents were posted on June 09, 2017. The remaining fourth document entitled, AEE Report (Drawing Number Specification 4) is issued in Addendum No. 2.

- END OF ADDENDUM -

January 12, 2017 Project 1286

Surrey City Development Corporation
1870 - 13450 102 Avenue
Surrey, BC V3T 5X3

ATTENTION: Mr. Ross Yamaguchi
Senior Development Manager

REFERENCE: **Stokes Pit, Surrey, BC**
Supplemental Site Investigation Results
Geotechnical and Environmental

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1 INTRODUCTION

Active Earth Engineering Ltd. (Active Earth) previously completed a desktop study to compile existing geotechnical and environmental information regarding the large surplus soil stockpile located on the south end of the site, and environmental condition of the entire site. The results are presented in our November 24, 2016 letter report entitled "*Campbell Heights Phase 2, Stokes Pit, Surrey, BC, Soil Stockpile Assessment*."

A Supplemental Site Investigation (SSI) was completed in accordance with our recommendations provided in the November 24, 2016 report. This report presents the findings of the SSI.

2 SCOPE OF WORK

The following scope of work was completed:

1. A single monitoring well (AE16-MW1) was installed on the Site and near the west site boundary to assess potential impacts from a former diesel fuel spill on an adjacent property. The fuel spill occurred at the "Green Waste Recycling" Facility located near the corner of 192nd Street and 24th Avenue. A groundwater sample was collected from the monitoring well and analyzed for Potential Contaminants of Concern (PCOCs) associated with a diesel spill.
2. A single monitoring well (AE16-MW2) has been completed adjacent to the recycled asphalt stockpile. A groundwater sample was collected from this monitoring well and analyzed for PCOCs associated with asphalt. This monitoring well was also sampled for PCOCs associated with fill of unknown origin in order to assess groundwater quality in the aquifer beneath the large fill stockpile.

3. Three auger holes (AE16-BH1 through AE16-BH3) drilled within the stockpile to observe the soil types and to collect soil samples for laboratory analyses including grain size distribution, moisture content and Atterberg Limits testing.
4. Three Cone Penetration Tests (CPT) were completed adjacent to the three boreholes to assess the in-situ density of the soil within the stockpile. The primary objective was to assess the soil conditions near the base of the pile in order to evaluate if the material is suitable to remain in place during redevelopment of the site.
5. In addition, Active Earth reviewed the January 29, 2014 memorandum *Review of Dyke Fill Material at Stokes Pit, Surrey, BC* completed by Thurber Engineering Ltd.

3 SUMMARY OF ENVIRONMENTAL INVESTIGATION RESULTS

The laboratory analytical results for the soil and groundwater samples collected during the SSI are presented in the attached Tables 1 through 5, and discussed in the following.

3.1 Soil Analytical Results

A total of three soil samples were analyzed from AE16-MW1, to assess potential impacts from the former diesel spill on the adjacent property. The concentrations of all PCOCs analyzed were below the laboratory detection limit, indicating that no contamination is present at that location.

A total 13 samples were analyzed from the large fill stockpile, collected from AE16-MW2, AE16-BH1, AE16-BH2 and AE16-BH3. Some detectable concentrations of hydrocarbons are noted in 12 out of the 13 samples, however, the concentrations are relatively low and below the CSR standards for residential land use (RL). There was no contamination identified in any the soil samples, including hydrocarbons, metals and volatile organic compounds.

3.2 Groundwater Analytical Results

Groundwater samples were collected from monitoring wells AE16-MW1 and AE16-MW2, and analyzed for the appropriate PCOCs as described above.

The concentrations of all parameters analyzed for were below the applicable CSR standards. No groundwater contamination was identified associated with the former diesel spill, and no groundwater contamination was identified associated with the large fill stockpile.

Several dissolved metals concentrations are noted to be elevated beneath the stockpile (AE16-MW2) as compared to the sample from AE16-MW1 located outside of the stockpilepile footprint. In particular, the concentrations of cobalt and iron are noted to exceed the CSR irrigation water (IW) standards beneath the fill pile. The water chemistry AE16-MW2 overall has a higher hardness and is indicative of a longer subsurface residence time as compared to the water chemistry at AE16-MW1.

4 SUMMARY OF GEOTECHNICAL INVESTIGATION RESULTS

Drilling was completed by Van Mars Drilling and the CPT testing was carried out by Schwartz Geotechnical. Active Earth supervised all drilling and collected soil samples for laboratory analyses of geotechnical and chemical properties.

The locations of the boreholes, monitoring wells and CPT testing are shown on the attached Site Plan, Figure 1. Test hole logs and CPT results are attached.

4.1 Fill Soil Descriptions

The soil encountered in the four test holes (AE16-MW2, AE16-BH1, AE16-BH2 and AE16-BH3) within the large stockpile are similar to that observed in previous work undertaken by others. The soil stockpile includes a range of soil types, but the largest portion of soil is classified as a well-graded silty sand.

Small layers of sand with gravel and lower silt content were encountered at a few discrete locations, however, significant volumes of this type of material was not observed in this investigation, nor in previous investigations by others.

4.2 Moisture Content

A total of 20 soil samples collected from the fill stockpile were analyzed for moisture content during the recent Active Earth investigation, as summarized in the following table:

Summary of Moisture Content Results

Test Hole	Depth of Fill (m)	No. of Moisture Content Samples	Range of Moisture Contents (%)	No. of Samples Near Estimated Optimum Moisture (%)
MW2	9.2	4	12.1 – 21.5	3
BH1	11.8	6	16.4 – 51.0	1
BH2	8.2	5	9.2 – 135.5	1
BH3	6.7	5	16.5 – 28.4	0
Total		20		5

The moisture contents for the samples analyzed are shown on the test hole logs. It is noted that significant organic content was found in numerous samples as evidenced by the several moisture contents greater than 50%.

Previous investigations by others has included some moisture content analysis of soil samples collected from the large stockpile, and the results are similar to above.

4.3 Standard Proctor Moisture-Density

Thurber Engineering Ltd. (Thurber) collected one soil sample from the large soil stockpile. It is noted that this sample appears to be obtained from a surficial smaller stockpile of material placed

atop the large stockpile on the site. Sample #4 was analyzed for grain size and standard Proctor moisture-density relationship (ASTM D698) and obtained the following properties:

Summary of Thurber Laboratory Results for Sample #4

Parameter	% Passing No. 200	Moisture Content (%)		Maximum Dry Density (kg/m3)
		As Received	Optimum	
Silt Content	39.5			
Moisture Content (%)		16.4		
Calculated		16.4	15.5	1808
Oversize Corrected		16.4	13.3	1913

For suitable placement of structural fill, the soil should be within 2% of the estimated optimum moisture content. As shown above in Section 4.2, of the 20 moisture content samples only five were within 2% of the estimate optimum standard Proctor moisture content. The oversize corrected moisture content was used since it is likely that if the fill was used, the oversize materials would not be separated from the fill.

It is noted that the optimum moisture content will vary depending on the fines content; as the fines content increases, so does the optimum moisture. Thurber noted that Sample #4 was suitable for structural fill placement; however, suitable moisture control would be required.

4.4 Grain Size Distribution

During the recent Active Earth investigations, four soil samples from the large fill stockpile were analyzed for grain size distribution. Previously, one sample from the large stockpile was analyzed by Thurber in 2014, and four previous samples were analyzed by Trow Associates Inc.in 2007. The following table summarizes all available grain size distribution results.

Summary of Grain Size Distribution Analyses

Consultant	Year	Location	Depth (m)	Soil Description	% Gravel	% Sand	% Fines
Active Earth	2016	AE16-MW2	7.9	Silty SAND and GRAVEL	38.1	44.1	17.8
	2016	AE16-BH1	5.2	Silty SAND and GRAVEL	11.8	57.7	30.5
	2016	AE16-BH2	8.2	SAND, some gravel	13	60.1	26.9
	2016	AE16-BH3	5.2	SILT, some sand	14.7	54.6	30.7
Thurber	2014	Stockpile 4	-	Gravelly, SILT and SAND	20.8	39.7	39.5
Trow	2007	TP-6	0.7	SAND and GRAVEL, trace silt	43.5	54.9	1.6
	2007	AH-9	0.7	SAND, trace silt and gravel	0	95.4	4.6
	2007	AH-8	1.2	SAND and GRAVEL, trace silt	52.7	47	0.3
	2007	AH-8	5.2	Gravelly SAND, trace silt	12.7	87.1	0.2

4.5 Summary of SSI Geotechnical Results

The following presents a summary of the additional laboratory testing undertaken on the fill soils during the supplemental site investigation for geotechnical purposes:

Summary of SSI Geotechnical Results

Sample No.	Approx. Elevation (m)	Description	Moisture Content (%)	Plastic Limit (%)	Liquid Limit (%)	Potential Reusable Fill ?
AE16-BH1						
1		SILT, some Sand	27.8			
2		Silty SAND &	19.4			
4		Silty SAND	16.4			Yes
5		Organic SILT	51.0	32.6	33.5	
7		Low Plasticity CLAY	26.7	23.3	39.2	
AE16-MW2 – Ground Surface 47.5 masl						
1	46.6	Silty SAND	15.8			Yes
3	43.8	SILT & SAND	23.1			
4	43.2	Silty SAND	21.5			
6	41.1	Silty SAND	14.1			Yes
7	39.6	Silty SAND	12.1			Yes
AE16-BH2						
1		Silty SAND	9.3			Yes
3		Organic SILT	135.6			
4		CLAY	98.0			
5		SILT, trace Sand	18.3			
7		SILT & SAND	18.8	14.8	21.9	
AE16-BH3						
1		SAND	19.2			
2		Silty SAND	28.4			
3		Silty SAND	16.5			Yes
4		SILT, some Sand	27.1	22.3	26.0	
5		SILT	21.5			

5 CONCLUSIONS AND RECOMMENDATIONS

5.1 Potential Reusable Fill

The silty sand and gravel, and till-like fill with suitable moisture content of less than 16% may be used under access roads, parking areas and possibly under slabs. It is cautioned that any use of this fill must meet the structural requirements of each development and must be placed under strict moisture and compaction control supervision by the geotechnical engineer. Soil logs contain descriptions of organics, refuse and demolition debris which, along with high moisture contents, will make some of this material unsuitable as structural fill, requiring segregation during placement. Separation of the suitable material for re-use will be labour intensive.

It is noted that groundwater was identified during drilling at approximately 10m depth below the top of the stockpile, at approximately elevation 40 to 41 metres above sea level (masl). Accurate water level measurements were taken during sampling for chemical quality. The depth to groundwater beneath the large stockpile, measured in the monitoring well at AE16-MW2, was approximately 10.5m on December 15, 2016. When the elevation survey of the wells completed, these measurements can be converted into elevations, and will likely represent near high annual groundwater levels at the site. Piteau identified groundwater levels between 38.3 and 42.9 masl in nearby monitoring wells. The higher groundwater levels occurred at the north end of the site. The seasonal groundwater level fluctuation can be up to 4m based on Ministry of Environment Observation Wells. Any development should be completed above the high groundwater table with footings placed 0.5m above this level. As such, general final surface should at least 2.0m above the high groundwater table. Until accurate water level elevations can be calculated, we have assumed that the minimum grade elevation would be elevation 43.0 masl. Therefore, up to 3m of fill material could potentially remain below elevation 43.0 masl at the base of the existing soil stockpile to avoid excavation below the water table and provided the material is suitable for the proposed redevelopment.

Based on the three CPT results, the lower portion of the soil stockpile can be classified as medium dense and may remain in place under the following restrictions.

1. Additional site-specific testing should be undertaken when development plans are confirmed for each site, particularly if existing fills will remain;
2. Due to the variations in the fill materials, and potential presence of organics and debris, no fill is to remain under building footings, machine bases or where high floor loads are anticipated without further investigation to confirm their suitability;
3. At least 1.0 m of suitable structural granular fill (<8% passing No. 200 sieve) should be placed over any fill remaining in place beneath floor slabs, access roads and parking areas. This structural fill should be compacted to 95% Modified Proctor Maximum Dry Density (MPMDD – ASTM D1557)

The total volume of fill has been estimated using previous borehole logs completed by other consultants and current borehole information obtained in late 2016 by Active Earth, as well as the April 2016 topographic plan provided by SCDC. Cross-sections are attached showing the interpretation of the borehole data. The volume of potentially re-useable fill soil has been

determined by physical descriptions, moisture content and with some reference to the Thurber sample analyzed for proctor moisture/density relationship. Stratigraphic interpretation between the boreholes is not possible due to the randomness of the fill placement.

Fill soil that may remain under floors, access roads, municipal roads and parking areas has been determined using the above noted criteria as well as the CPT results that are not exhaustive. We have assumed that fill may remain to elevation 43.0 masl (at least 2m above the expected watertable at the south end of the site). It is cautioned that additional investigation of the remaining fill areas will be required for site-specific purposes. Note that based on current information, only fill in the southern portion of the pile has the potential to remain subject to further investigation as shown on Cross-sections A-A' and B-B'.

Fill that is present the west of the property line is assumed to remain in place and is not included in the volume calculation below.

5.2 Non-Reusable Fill

There is a large volume of fill that is not suitable for structural purposes, including beneath roadways, slabs, etc. To reduce costs, it is recommended that this material be placed on site where non-structural fill can be accommodated such as a berm. Alternately, a large stockpile could remain, however, the fill will not be appropriate for light industrial development that we understand is being contemplated for the site.

The following presents a cost estimate to remove and dispose of the non-structural soil to an off-site dump site located near Bradner Road and Huntington Road area in Abbotsford. There are no restrictions on the environmental quality of the soil for disposal purposes. The current investigations by Active Earth and the previous investigations by Trow have not identified any chemical quality concerns in the fill. If a suitable closer site or city owned lands can be identified, the unit costs will be lower than the estimate provided below.

Estimated off-site Disposal Costs

Item	No of loads per Hour	Round Trip (hours)	Volume (m^3)	Rate	Cost (m^3)
Loading *	6		12	$300	$4.17
Transportation*		1.5	12	$130	$16.00
Disposal Fee*			12	$90	$7.50
Total					**$27.92**

Due to the large volume of soil, contract tendering may result in competitive industry pricing possibly reducing the estimated costs noted above.

5.3 Fill Assessment Approach

We have used the following statistical approach in determining the volume of fills characterized as reusable.

Estimated Potential Volume of Reusable Fill

Location	Potential Structural Fill			Total Thickness of Fill in Boreholes (m)	% Potential Structural Fill in Borehole	% Potential Structural Fill of Total Fill Pile
	Depth Interval (m)		Thickness (m)			
	Top	Bottom				
MW2	0	1.8	1.8			
	5.3	9.2	3.9			
			5.7	9.2	62%	4.5%
BH1	3.6	6.1	2.5			
	8.2	9.2	1			
			3.5	11.8	30%	2.7%
BH2	0	3.6	3.6	8.2	44%	2.8%
BH3	3	4.8	1.8	7.7	23%	1.4%
AH10	5.6	8.2	2.6	8.2	32%	2.0%
AH14	0	2.2	2.2	6.6	33%	1.7%
AH15	0.8	3.4	2.6			
	4	8.8	4.8			
			7.4	8.8	84%	5.8%
AH17	0	1.8	1.8			
	2	5.8	3.8			
			5.6	5.8	97%	*2.2%*
AH18	0	3.4	3.4	6.1	56%	*1.3%*
AH19	0	3	3	4.7	64%	2.3%
AH20	0	2.1	2.1			
	7.6	12.6	5			
			7.1	12.6	56%	*2.8%*
AH21	0	0.6	0.6			
	5.2	9.3	4.1			
			4.7	9.3	51%	*1.8%*
AH22	6.9	11	4.1	11	37%	3.2%
AH23	2.2	4	1.8	9.8	18%	1.4%
AH25	0	1.2	1.2	8.2	15%	0.9%
Totals			**57.7**	**128**		**37%**
Estimated Total Volume of Fill Pile (m3)						**1,000,000**
Estimated Total Volume of Potential Reusable Fill (m3)						**370,000**
Estimated Total Volume of Potential Reusable Fill – 50% RECOVERABLE (m3)						**185,000**
Estimated volume of to Remain in Place (m3)						**100,000**
Estimated Total Volume of Non-Structural Fill to be moved (m3)						**715,000**

1) Italicized values have been reduced by 50% based on presence of debris.

All debris that is present should be removed from reusable fills prior to placement. As a conservative approach, we have assumed that 50% of the fill containing debris will not be reused, since this would be labour intensive.

The total volume of potential reusable fill in the stockpile is estimated to be approximately 370,000 m^3 which is based on a statistical interpolation of the information obtained from the boreholes listed in the table above. This is considered to be an upper-bound volume estimate, and it is expected that the volume material that can be reasonably recovered from the pile will be significantly less as a result of the sporadic occurrences in pockets throughout the pile. It is likely that the soils in the upper portion of the soil pile will be more readily recoverable that the sporadic pockets deeper in the pile. As such, we have provided a more conservative assumption that 50% of the potential reusable material present will be recoverable during site development. This approach considers that some of the re-usable soil will not be recovered due to mixing with surrounding un-useable soils during excavation. The method of excavation (bulk excavation, targeting re-useable soil pockets or stripping overburden in slices) will have some effect on the volume of recoverable soil as will weather and stockpiling and placement procedures for the recoverable soil.

6 CLOSURE

The recommendations provided in this preliminary report have been prepared for specific application to this Site and have been developed in a manner consistent with that level of care normally exercised by qualified professionals in accordance with standard practices. The recommendations made reflect Active Earth's best judgement in light of the information currently available. Any use which the client or a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such parties. Active Earth accepts no responsibility for damages, if any, suffered the Site owner or third parties as a result of business decisions made or actions based on this report.

It is noted that Active Earth has relied on information provided by SCDC; we make no statement on the accuracy of this information. This report is intended to provide as accurate an assessment of the fill quality based on the information currently available. Additional investigations may result in changes to the conclusions.

We trust that this provides the information you currently require. If you have any questions or comments, please feel free to contact the undersigned.

Yours truly,

ACTIVE EARTH ENGINEERING LTD.

Matt Pye, P.Eng.
Senior Engineer

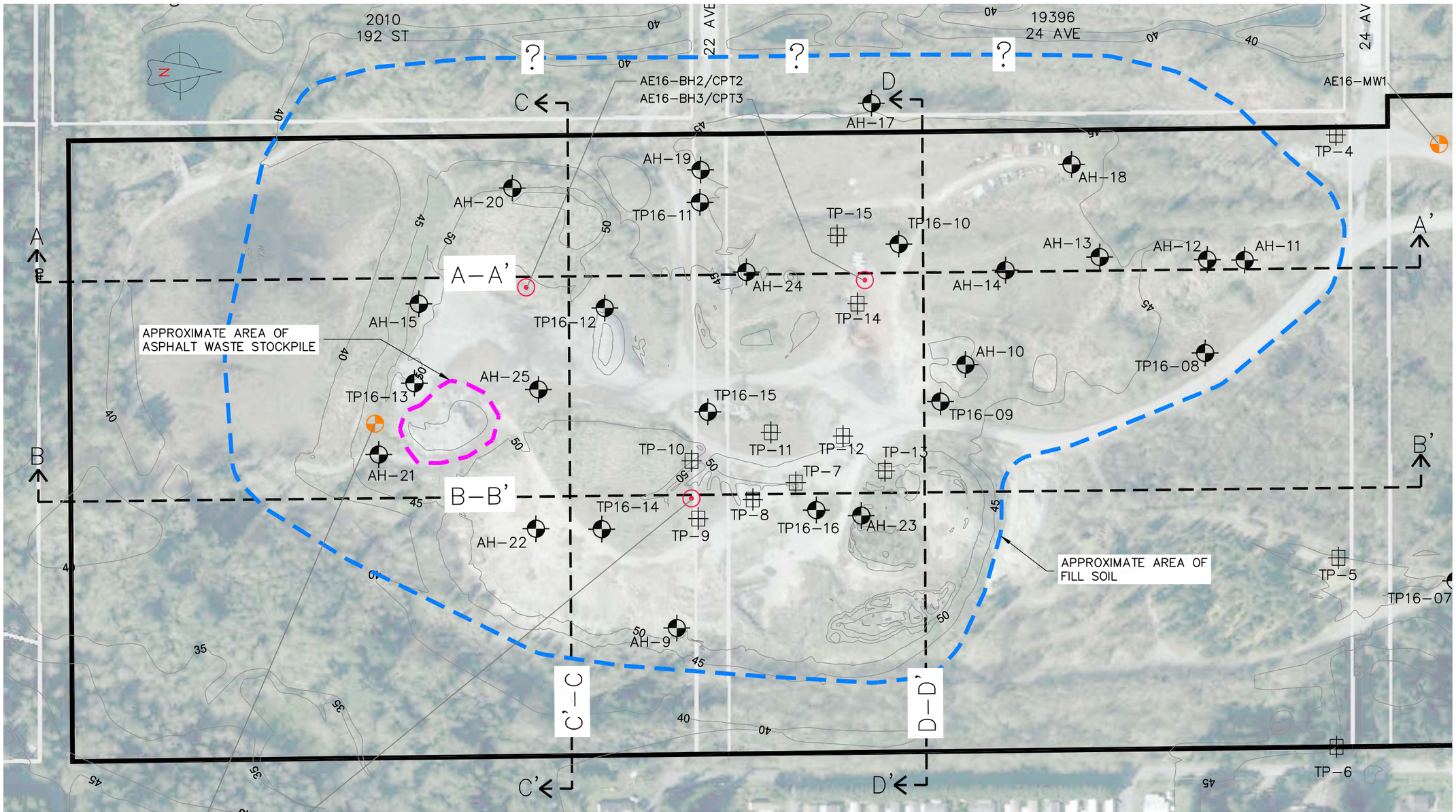
David Kneale, P.Geo.
Senior Hydrogeologist

Attachments: Figure 1 – Site Plan
Figure 2 – Cross Section A-A
Figure 3 – Cross Section B-B
Figure 4 – Cross Section C-C
Figure 5 – Cross Section D-D

Table 1 – Analytical Results for Hydrocarbons in Soil
Table 2 – Analytical Results for Metals in Soil
Table 3 – Analytical Results for Volatile Organic Compounds in Soil
Table 4 – Analytical Results for Hydrocarbons in Groundwater
Table 5 – Analytical Results for Metals in Groundwater

Borehole Logs
CPT Results
Valley Testing Geotechnical Lab Results

ATTACHMENTS



LEGEND

- APPROXIMATE AUGER HOLE LOCATION (BY OTHERS)
- APPROXIMATE HAND AUGER LOCATION (BY OTHERS)
- APPROXIMATE TEST PIT LOCATION (BY OTHERS)

INVESTIGATION LOCATIONS

- CPT AND BOREHOLE
- MONITORING WELL

REFERENCE: CITY OF SURREY – COSMOS MAPPING SYSTEM INCLUDING AERIAL PHOTOGRAPH DATED 2015

PATH:

Active Earth Engineering Ltd

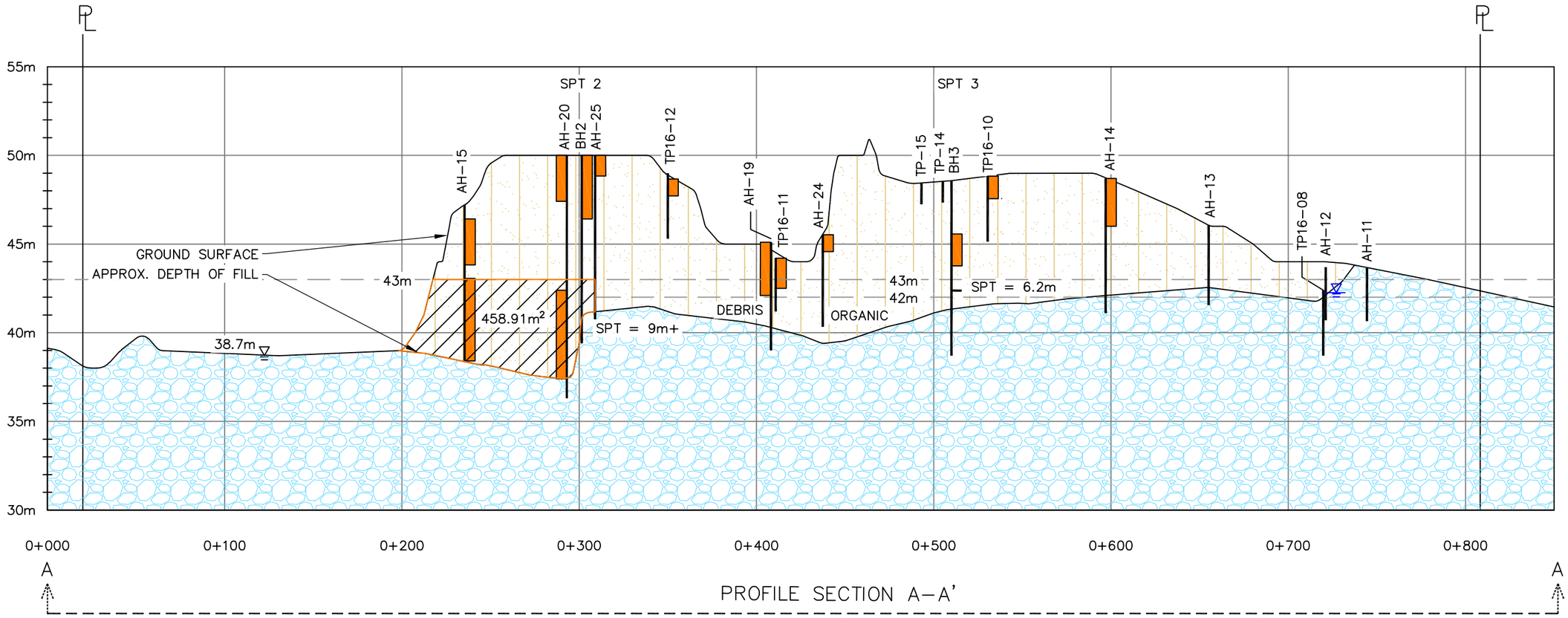
CLIENT NAME:	PROJECT LOCATION:
SURREY CITY DEVELOPMENT CORPORATION	SURREY, BC

SITE PLAN - SOUTH

19525 20th AVE / 19468 24th AVE / 19500 26th AVE & 2990 194th ST

DWN BY: EB	DWG NAME: 1286-A	DATE: 2016-12-21	
CHK'D: MP	PLOT:	CADFILE: 1286	FIGURE A

VERTICAL SCALE 1:250
(EXAGGERATION 10x)
ELEVATION (GEODETIC) (m)



LEGEND

- POSSIBLE FILL TO REMAIN IN PLACE WITH FURTHER INVESTIGATION
- NATIVE SOIL
- INFERRED POOR QUALITY FILL
- POTENTIAL REUSABLE FILL

HOR SCALE 1:2500 — 0 — 50 — 150m

VERT SCALE 1:250 — 0 — 5 — 15m

REFERENCE: CITY OF SURREY – COSMOS MAPPING SYSTEM

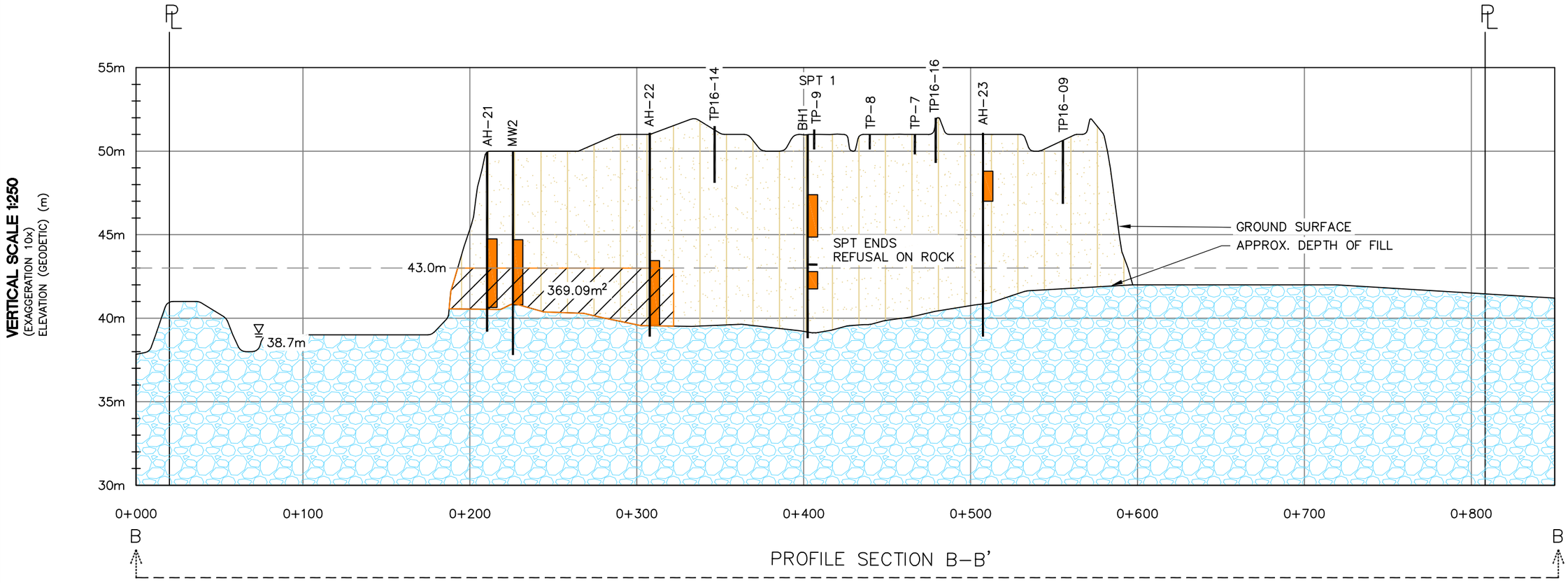
PATH:

Active Earth Engineering Ltd

CLIENT NAME: SURREY CITY DEVELOPMENT CORPORATION	PROJECT LOCATION: SURREY, BC

CROSS SECTION A-A
19525 20th AVE / 19468 24th AVE / 19500 26th AVE & 2990 194th ST

DWN BY: EB	DWG NAME: 1286–2	DATE: 2016–12–21	FIGURE 2
CHK'D: MP	PLOT:	CADFILE: 1286	



LEGEND

- POSSIBLE FILL TO REMAIN IN PLACE WITH FURTHER INVESTIGATION
- NATIVE SOIL
- INFERRED POOR QUALITY FILL
- POTENTIAL REUSABLE FILL

HOR SCALE 1:2500 (0, 50, 150m)

VERT SCALE 1:250 (0, 5, 15m)

REFERENCE: CITY OF SURREY – COSMOS MAPPING SYSTEM

PATH:

Active Earth Engineering Ltd

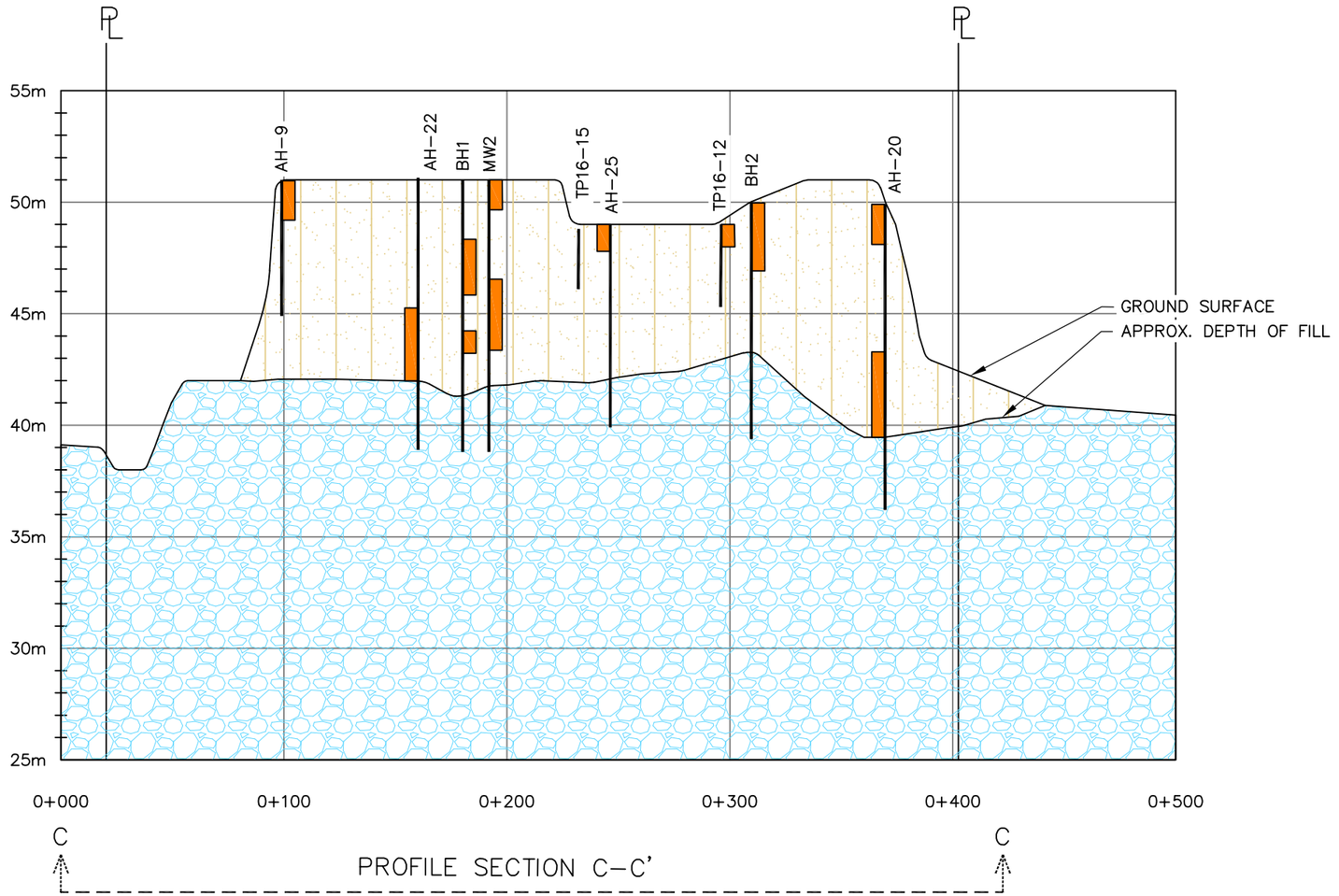
CLIENT NAME: SURREY CITY DEVELOPMENT CORPORATION	PROJECT LOCATION: SURREY, BC

CROSS SECTION B-B

19525 20th AVE / 19468 24th AVE / 19500 26th AVE & 2990 194th ST

DWN BY: EB	DWG NAME: 1286–3	DATE: 2016–12–21	FIGURE 3
CHK'D: MP	PLOT:	CADFILE: 1286	

VERTICAL SCALE 1:200
(EXAGGERATION 10x)
ELEVATION (GEODETIC) (m)



LEGEND

- NATIVE SOIL
- INFERRED POOR QUALITY FILL
- POTENTIAL REUSABLE FILL

HOR SCALE 1:2500 (0, 50, 150m)

VERT SCALE 1:250 (0, 5, 15m)

REFERENCE: CITY OF SURREY – COSMOS MAPPING SYSTEM

PATH:

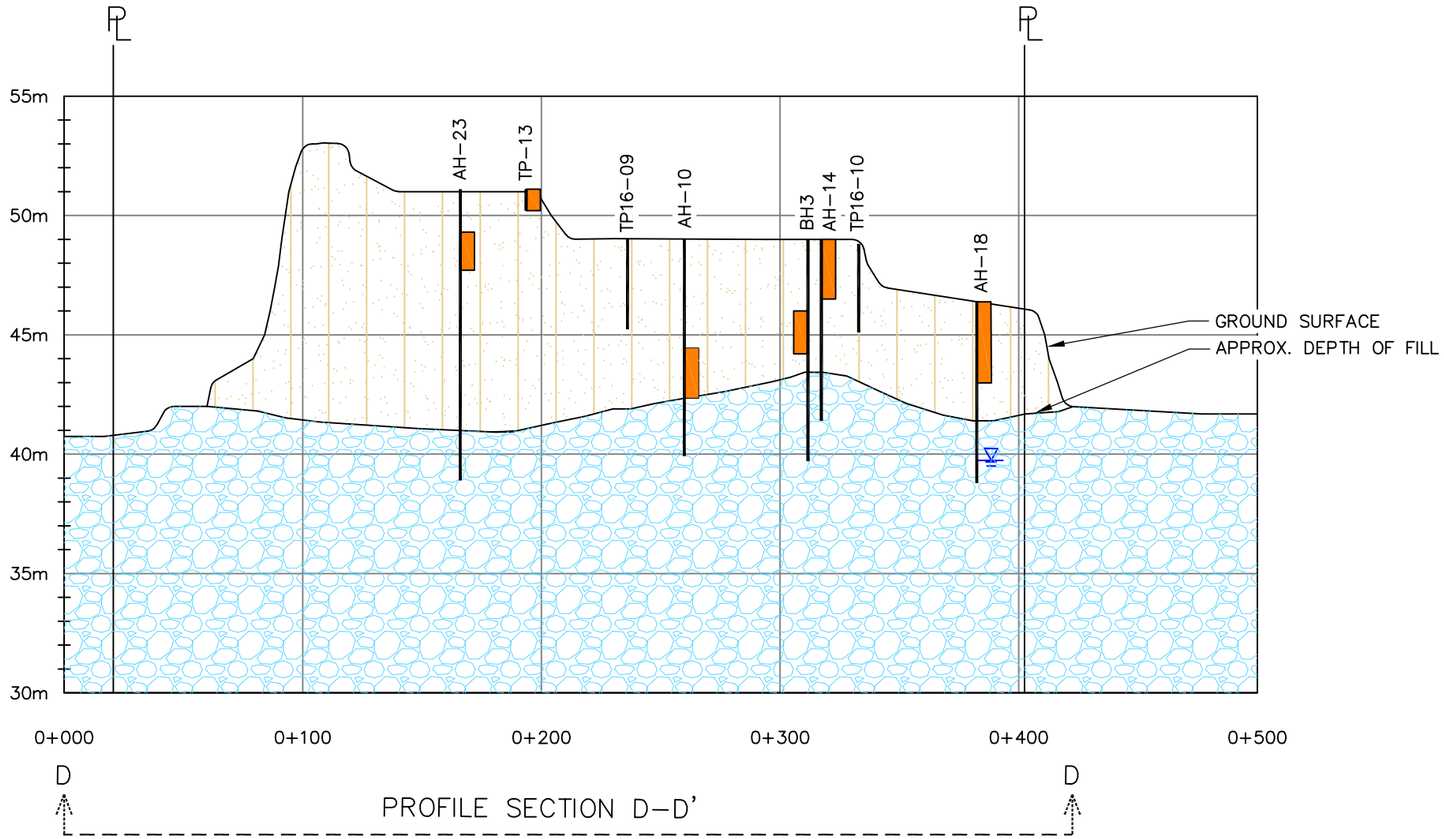
Active Earth Engineering Ltd

CLIENT NAME:	PROJECT LOCATION:
SURREY CITY DEVELOPMENT CORPORATION	SURREY, BC

CROSS SECTION C-C
19525 20th AVE / 19468 24th AVE / 19500 26th AVE & 2990 194th ST

DWN BY: EB	DWG NAME: 1286–4	DATE: 2016–12–21	FIGURE 4
CHK'D: MP	PLOT:	CADFILE: 1286	

VERTICAL SCALE 1:200
(EXAGGERATION 10x)
ELEVATION (GEODETIC) (m)



LEGEND

- NATIVE SOIL
- INFERRED POOR QUALITY FILL
- POTENTIAL REUSABLE FILL

HOR SCALE 1:2500 (0, 50, 150m)

VERT SCALE 1:250 (0, 5, 15m)

REFERENCE: CITY OF SURREY – COSMOS MAPPING SYSTEM

PATH:

Active Earth Engineering Ltd

CLIENT NAME:	PROJECT LOCATION:
SURREY CITY DEVELOPMENT CORPORATION	SURREY, BC

CROSS SECTION D-D
19525 20th AVE / 19468 24th AVE / 19500 26th AVE & 2990 194th ST

DWN BY: EB	DWG NAME: 1286-5	DATE: 2016-12-21	FIGURE 5
CHK'D: MP	PLOT:	CADFILE: 1286	

Analytical Table Footnotes: Analytical Results for Soil

All concentrations in ug/g, except pH.

All terms defined within the body of Active Earth's report.

"<" Result is less than the laboratory detection limit indicated.

"-" Parameter not analyzed or no standard or guideline applies.

* RPDs are not normally calculated where one or more concentrations are less than five times MDL.

(1) BC Contaminated Sites Regulation (CSR BC Reg. 375/96 includes amendments up to BC Reg. 4/2014) Generic Numerical Soil Standards (Schedules 4 and 10) and Matrix Numerical Soil Standards (Schedule 5), considering the site specific factors of toxicity to soil invertebrates and plants, intake of contaminated soil, groundwater flow to surface water used by Marine Aquatic Life, for Commercial (CL) Land Use. Standards for Residential Land Use (RL) have been included for information purposes.

(2) BC Contaminated Sites Regulation (CSR BC Reg. 375/96 includes amendments up to BC Reg. 4/2014) Standards Triggering Contaminated Soil Relocation Agreements (Schedule 7) for Soil Relocation to Non-Agricultural Lands (Column II). If soils exceed these standards, an authorization is required to dispose of these soils (e.g. disposal to a permitted landfill or via a Soil Relocation Agreement).

(3) The standards referenced are for light extractable petroleum hydrocarbons (LEPH) and heavy extractable petroleum hydrocarbons (HEPH), which are corrected for polyaromatic hydrocarbons (PAHs). EPH (c 10 - c 19) and EPH (c19 - c32) are uncorrected for PAH.

Associated Lab Files: 16V169396

BOLD, BLUE SHADING	Concentration > CSR RL Standard (Not Applicable to the Site).
BOLD, RED SHADING	Concentration > CSR CL Standard.
BOLD, GREY SHADING	Concentration >CSR SRA Standard.

Table 1: Analytical Results for Hydrocarbons in Soil

Sample Location				**AE16-MW1**			**AE16-BH1**			**AE16-MW2**			
Sample ID				AE16-MW1-2	AE16-MW1-3	AE16-MW1-4	AE16-BH1-2	AE16-BH1-4	AE16-BH1-5	AE16-MW2-1	AE16-MW2-2	AE16-MW2-3	AE16-MW2-4
Depth (m)				0.61	2.1	3.6	2.1	5.2	7	0.9	2.4	3.0	4.0
Vapour Reading (ppm)				70	15	45	60	20	20	0	0	25	60
Fill/Native				Native	Native	Native	Fill	Fill	Fill	Fill	Fill	Fill	Fill
Date Sampled				02-Dec-16	02-Dec-16	02-Dec-16	02-Dec-16	02-Dec-16	02-Dec-16	02-Dec-16	02-Dec-16	02-Dec-16	02-Dec-16
	CSR Standards [1]												
	RL [1]	**CL [1]**	**SRA[2]**										
Extractable Petroleum Hydrocarbons (ug/g)													
EPH10-19	**1000[3]**	**2000[3]**	**1000[3]**	<20	-	<20	<20	<20	20	<20	<20	-	68
EPH19-32	**1000[3]**	**5000[3]**	**1000[3]**	<20	-	<20	39	44	132	45	96	-	420
LEPH	**1000**	**2000**	**1000**	<20	-	<20	<20	<20	20	<20	<20	-	68
HEPH	**1000**	**5000**	**1000**	<20	-	<20	38	44	132	45	94	-	420
Volatile Petroleum Hydrocarbons (ug/g)													
VHs6-10	-	-	-	-	<10	-	-	-	-	-	-	<10	-
VPHs	**200**	**200**	**200**	-	<10	-	-	-	-	-	-	<10	-
Polycyclic Aromatic Hydrocarbons (ug/g)													
Acenaphthene	**-**	**-**	**-**	<0.01	-	<0.01	<0.01	0.01	<0.01	<0.01	0.03	-	<0.01
Acenaphthylene	**-**	**-**	**-**	<0.01	-	<0.01	0.01	0.04	<0.01	<0.01	0.07	-	<0.01
Anthracene	**-**	**-**	**-**	<0.02	-	<0.02	0.02	0.06	<0.02	<0.02	0.09	-	<0.02
Benz(a)anthracene	**1**	**10**	**1**	<0.02	-	<0.02	0.12	0.12	<0.02	<0.02	0.38	-	0.05
Benzo(a)pyrene	**1**	**10**	**1**	<0.05	-	<0.05	0.15	0.08	<0.05	<0.05	0.36	-	0.05
Benzo(b)fluoranthene	**1**	**10**	**1**	<0.02	-	<0.02	0.11	0.06	<0.02	<0.02	0.33	-	0.05
Benzo(g,h,i)perylene	**-**	**-**	**1**	<0.05	-	<0.05	0.1	0.05	<0.05	<0.05	0.27	-	0.06
Benzo(k)fluoranthene	**1**	**10**	**-**	<0.02	-	<0.02	0.07	0.04	<0.02	<0.02	0.17	-	0.02
Chrysene	**-**	**-**	**-**	<0.05	-	<0.05	0.14	0.14	<0.05	<0.05	0.35	-	0.07
Dibenz(a,h)anthracene	**1**	**10**	**1**	<0.02	-	<0.02	0.03	<0.02	<0.02	<0.02	0.09	-	<0.02
Fluoranthene	**-**	**-**	**-**	<0.05	-	<0.05	0.12	0.24	<0.05	<0.05	0.6	-	0.12
Fluorene	**-**	**-**	**-**	<0.02	-	<0.02	<0.02	0.06	<0.02	<0.02	0.04	-	0.02
Indeno(1,2,3-c,d)pyrene	**1**	**10**	**1**	<0.02	-	<0.02	0.09	0.04	<0.02	<0.02	0.26	-	0.04
Naphthalene	**5**	**50**	**5**	<0.01	-	<0.01	<0.01	0.04	<0.01	<0.01	<0.01	-	0.01
Phenanthrene	**5**	**50**	**5**	<0.02	-	<0.02	0.04	0.32	<0.02	<0.02	0.26	-	0.11
Pyrene	**10**	**100**	**10**	<0.02	-	<0.02	0.19	0.24	0.03	0.03	0.47	-	0.12
Non-Halogenated Volatiles (ug/g)													
Benzene	**2.5**	**2.5**	**0.04**	-	<0.02	-	-	-	-	-	-	<0.02	-
Toluene	**1.5**	**25**	**1.5**	-	<0.05	-	-	-	-	-	-	<0.05	-
Ethylbenzene	**1**	**20**	**1**	-	<0.05	-	-	-	-	-	-	<0.05	-
Total Xylenes	**5**	**50**	**5**	-	<0.2	-	-	-	-	-	-	<0.2	-
Styrene	**5**	**50**	**5**	-	<0.05	-	-	-	-	-	-	<0.05	-
MTBE	**320**	**700**	**-**	-	<0.1	-	-	-	-	-	-	<0.1	-

Notes:

BOLD, BLUE SHADING	Concentration greater than CSR Residential Land Use (RL) Standard (Not Applicable to the Site).
BOLD, RED SHADING	Concentration greater than CSR Commercial Land Use (CL) Standard.
BOLD, GREY SHADING	Concentration greater than CSR Soil Relocation Agreement (SRA) Standard.

Table 1: Analytical Results for Hydrocarbons in Soil

Sample Location				**AE16-BH2**			**AE16-BH3**		
Sample ID				AE16-BH2-3	AE16-BH2-5	AE16-BH2-7	AE16-BH3-1	AE16-BH3-2	AE16-BH3-5
Depth (m)				3.6	5.5	8.2	0.9	2.1	6.7
Vapour Reading (ppm)				65	310	40	380	230	0
Fill/Native				Fill	Fill	Fill	Fill	Fill	Fill
Date Sampled				02-Dec-16	02-Dec-16	02-Dec-16	02-Dec-16	02-Dec-16	02-Dec-16
	CSR Standards [1]								
	RL [1]	**CL [1]**	**SRA[2]**						
Extractable Petroleum Hydrocarbons (ug/g)									
EPH10-19	**1000[3]**	**2000[3]**	**1000[3]**	70	<20	<20	<20	<20	<20
EPH19-32	**1000[3]**	**5000[3]**	**1000[3]**	668	29	44	96	125	133
LEPH	**1000**	**2000**	**1000**	70	<20	<20	<20	<20	<20
HEPH	**1000**	**5000**	**1000**	667	29	44	95	123	132
Volatile Petroleum Hydrocarbons (ug/g)									
VHs6-10	-	-	-	-	-	-	-	-	-
VPHs	**200**	**200**	**200**	-	-	-	-	-	-
Polycyclic Aromatic Hydrocarbons (ug/g)									
Acenaphthene	**-**	**-**	**-**	<0.03	<0.01	<0.01	0.01	0.03	0.02
Acenaphthylene	**-**	**-**	**-**	<0.03	<0.01	0.04	0.06	0.1	0.05
Anthracene	**-**	**-**	**-**	<0.06	<0.02	0.05	0.07	0.15	0.07
Benz(a)anthracene	**1**	**10**	**1**	0.12	<0.02	0.14	0.17	0.35	0.16
Benzo(a)pyrene	**1**	**10**	**1**	<0.2	<0.05	0.11	0.14	0.3	0.13
Benzo(b)fluoranthene	**1**	**10**	**1**	0.11	<0.02	0.07	0.1	0.23	0.1
Benzo(g,h,i)perylene	**-**	**-**	**1**	<0.2	<0.05	0.07	0.09	0.2	0.09
Benzo(k)fluoranthene	**1**	**10**	**-**	0.06	<0.02	0.05	0.06	0.13	0.06
Chrysene	**-**	**-**	**-**	<0.2	<0.05	0.17	0.19	0.36	0.18
Dibenz(a,h)anthracene	**1**	**10**	**1**	<0.06	<0.02	0.02	0.04	0.08	0.03
Fluoranthene	**-**	**-**	**-**	0.2	<0.05	0.22	0.24	0.57	0.25
Fluorene	**-**	**-**	**-**	<0.06	<0.02	0.03	0.02	0.05	0.07
Indeno(1,2,3-c,d)pyrene	**1**	**10**	**1**	0.06	<0.02	0.06	0.09	0.19	0.08
Naphthalene	**5**	**50**	**5**	<0.03	<0.01	0.01	<0.01	0.03	0.11
Phenanthrene	**5**	**50**	**5**	0.16	<0.02	0.22	0.2	0.44	0.31
Pyrene	**10**	**100**	**10**	0.24	<0.02	0.25	0.28	0.56	0.28
Non-Halogenated Volatiles (ug/g)									
Benzene	**2.5**	**2.5**	**0.04**	-	-	-	-	-	-
Toluene	**1.5**	**25**	**1.5**	-	-	-	-	-	-
Ethylbenzene	**1**	**20**	**1**	-	-	-	-	-	-
Total Xylenes	**5**	**50**	**5**	-	-	-	-	-	-
Styrene	**5**	**50**	**5**	-	-	-	-	-	-
MTBE	**320**	**700**	**-**	-	-	-	-	-	-

Notes:

BOLD, BLUE SHADING	Concentration greater than CSR Residential Land Use (RL) Standard (Not Applicable to the Site).
BOLD, RED SHADING	Concentration greater than CSR Commercial Land Use (CL) Standard.
BOLD, GREY SHADING	Concentration greater than CSR Soil Relocation Agreement (SRA) Standard.

Table 2 - Analytical Results for Total Metals in Soil

			Sample Location	**AE16-BH1**			**AE16-BH2**			**AE16-BH3**		
			Sample ID	AE16-BH1-2	AE16-BH1-4	AE16-BH1-5	AE16-BH2-3	AE16-BH2-5	AE16-BH2-7	AE16-BH3-1	AE16-BH3-2	AE16-BH3-5
			Depth (m)	2.1	5.2	7	2.3	5.5	8.2	90	2.1	6.7
			Fill/Native	Fill	Fill	Fill	Fill	Native	Native	Fill	Native	Native
			Date Sampled	02-Dec-16	02-Dec-16	02-Dec-16	02-Dec-16	02-Dec-16	02-Dec-16	02-Dec-16	02-Dec-16	02-Dec-16
	CSR Standards [1]											
	RL[1]	**CL**[1]	**SRA**[2]									
Physical Tests												
pH	**-**	**-**	**-**	6.65	7.16	6.21	6.1	6.4	6.38	6.53	6.66	6.46
Total Metals (µg/g)												
Antimony (Sb)	**20**	**40**	**20**	0.4	0.7	0.4	0.4	0.3	0.3	0.4	0.3	0.4
Arsenic (As)	**25**	**25**	**15**	5.6	6	5.1	4.6	5.7	5.3	4.3	4.8	4.9
Barium (Ba)	**1000**	**1,500**	**400**	105	96	86.3	97.6	84.9	95.1	68.9	70.4	74.8
Beryllium (Be)	**4**	**8**	**4**	0.3	0.3	0.3	0.2	0.3	0.3	0.2	0.2	0.2
Cadmium (Cd) pH < 7.0	**2**	**2**	**1.5**	0.08		0.14	0.21	0.09	0.09	0.13	0.13	0.13
pH 7.0 -< 7.5	**3.5**	**3.5**			0.11							
pH 7.5 -< 8.0	**35**	**35**										
pH >= 8.0	**35**	**100**										
Chromium (Total)	**60**	**60**	**60**	38	38	28	15	34	36	26	26	41
Chromium (VI)	**60**	**60**	**60**	-	-	-	-	-	-	-	-	-
Cobalt (Co)	**50**	**300**	**50**	11.4	11	8.6	4.7	9.8	10	7.3	7.5	8.8
Copper (Cu) pH < 5.0	**90**	**90**	**90**									
pH 5.0 -< 5.5	**100**	**100**										
pH 5.5 -< 6.0	**150**	**200**										
pH > = 6.0	**150**	**250**		32.6	33.5	18.5	17.2	27.1	27.3	26.6	27.1	31.3
Lead (Pb) pH < 5.5	**150**	**150**	**100**									
pH 5.5 -< 6.0	**250**	**250**										
pH 6.0 -< 6.5	**400**	**700**				12.7	17.8	21.2	12.1			55.2
pH >= 6.5	**400**	**700**		12.3	16.3					16.3	12.2	
Mercury (Hg)	**15**	**40**	**15**	0.04	0.05	0.07	0.11	0.04	0.03	0.04	0.03	0.03
Molybdenum (Mo)	**10**	**40**	**10**	0.5	0.6	0.7	2.8	0.7	0.7	1.1	0.9	1.1
Nickel (Ni)	**100**	**500**	**100**	32.3	30.6	21.9	15.1	27.7	30.9	21.5	20.7	27.4
Selenium (Se)	**3**	**10**	**3**	0.4	0.3	0.7	0.7	0.2	0.7	0.3	0.3	0.4
Silver (Ag)	**20**	**40**	**20**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Thallium (Tl)	**-**	**-**	**-**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Tin (Sn)	**50**	**300**	**50**	0.7	0.6	0.7	0.4	0.4	0.5	0.5	0.5	0.4
				0.5	0.5	0.4	0.3	0.5	0.5	0.5	0.5	0.7
Vanadium (V)	**200**	**-**	**200**	69	65	58	33	63	62	50	50	54
Zinc (Zn) pH < 6.5	**150**	**150**	**150**		78	80	38	61	58			61
pH 6.5 -< 7.0	**300**	**300**		63						61	57	
pH > = 7.0	**450**	**600**										

Notes:

* Concentration less than Regional Background of 90 ug/g

BOLD, BLUE SHADING	Concentration greater than CSR Residential Land Use (RL) Standard (Not Applicable to the Site).
BOLD, RED SHADING	Concentration greater than CSR Commercial Land Use (CL) Standard.
BOLD, GREY SHADING	Concentration greater than CSR Soil Relocation Agreement (SRA) Standard.

Table 3 - Analytical Results for Volatile Organic Compounds In Soil

Sample Location				**AE16-MW1**	**AE16-MW2**
Sample ID				**AE16-MW1-3**	**AE16-MW2-3**
Depth (m)				2.1	3
Vapour Reading (ppm)				15	25
Fill/Native				Native	Native
Date Sampled				02-Dec-16	02-Dec-16
	CSR Standards [1]				
	RL [1]	**CL [1]**	**SRA [2]**		
Halogenated Volatiles (µg/g)					
Acetone	14000	54000	-	<0.5	<0.5
Bromomethane	3.9	13	-	<0.05	<0.05
Bromodichloromethane	8.2	18	-	<0.05	<0.05
Bromoform	620	2200	-	<0.05	<0.05
Carbon Tetrachloride	5	50	5	<0.05	<0.05
Chlorobenzene	1	10	1	<0.05	<0.05
Dibromochloromethane	11	26	-	<0.05	<0.05
Chloroethane	30	65	-	<0.05	<0.05
Chloroform	5	50	5	<0.05	<0.05
Chloromethane	47	160	-	<0.05	<0.05
1,2-Dichlorobenzene	1	10	1	<0.05	<0.05
1,3-Dichlorobenzene	1	10	1	<0.05	<0.05
1,4-Dichlorobenzene	1	10	1	<0.05	<0.05
1,1-Dichloroethane	5	50	5	<0.05	<0.05
1,2-Dichloroethane	5	50	5	<0.05	<0.05
1,1-Dichloroethylene	5	50	5	<0.05	<0.05
cis-1,2-Dichloroethylene	-	-	-	<0.05	<0.05
trans-1,2-Dichloroethylene	-	-	-	<0.05	<0.05
1,2-Dichloroethylene[3]	5	50	5	<0.05	<0.05
Dichloromethane	5	50	5	<0.05	<0.05
1,2-Dichloropropane	5	50	5	<0.05	<0.05
cis-1,3-Dichloropropylene	5	50	5	<0.05	<0.05
trans-1,3-Dichloropropylene	5	50	5	<0.05	<0.05
1,1,1,2-Tetrachloroethane	32	73	-	<0.05	<0.05
1,1,2,2-Tetrachloroethane	4.1	9.3	5	<0.05	<0.05
Tetrachloroethylene	5	5	5	<0.05	<0.05
1,1,1-Trichloroethane	5	50	5	<0.05	<0.05
1,1,2-Trichloroethane	5	50	5	<0.05	<0.05
Trichloroethylene	0.65	0.65	0.015	<0.01	<0.01
Trichlorofluoromethane	390	2000	-	<0.05	<0.05
Vinyl Chloride	0.79	7.5	-	<0.05	<0.05

Notes:

BOLD, BLUE SHADING	Concentration greater than CSR Residential Land Use (RL) Standard (Not Applicable to the Site).
BOLD, RED SHADING	Concentration greater than CSR Commercial Land Use (CL) Standard.
BOLD, GREY SHADING	Concentration greater than CSR Soil Relocation Agreement (SRA) Standard.

Analytical Table Footnotes: Analytical Results for Groundwater

All concentrations in µg/L, except pH, or if noted.

All terms defined within the body of Active Earth's report.

"<" means less than the laboratory detection limit indicated.

"-" means not analyzed or no standard or guideline applies.

* means RPD not calculated. RPDs are not normally calculated where one or more concentrations are less than five times MDL.

(1) BC Contaminated Sites Regulation (CSR BC Reg. 375/96 includes amendents up to BC Reg. 4/2014) groundwater standards (Schedule 6) and generic soil and drinking water standards (Schedule 10). Applicable standards include those for protection of Freshwater Aquatic Water (AW), protection of groundwater used for Drinking Water (DW), and those apply irrespective of groundwater use.

(2) Standard applies to all sites irrespective of water use.

(3) Laboratory Minimum Detection Limit exceeds the applicable CSR DW standard

(4) CSR Stage 8 Amendments (effective January 24, 2013) indicate that standards for dissolved Iron and Manganese only apply at sites with specified uses listed in Schedule 2 of the CSR.

BOLD, BLUE SHADING	Concentration greater thanthe CSR Drinking Water Standard (DW)
BOLD, RED SHADING	Concentration greater than CSR Freshwater Aquatic Life (FAW) Standard
BOLD, GREEN SHADING	Concentration greater than CSR Irrigation (IW) or Livestock Water use (LW) Standard

Table 4: Analytical Results for Hydrocarbons in Groundwater

Sample Location	CSR Standards[1]			AE16-MW1	AE16-MW2
Screened Interval (m)	Freshwater Aquatic Life (FAW)	Drinking Water (DW)	Irrigation Water (IW)		
Date Sampled				15-Dec-16	15-Dec-16
Hydrocarbons (µg/L)					
VHw_{6-10}	**15000**[2]	**15000**[2]	**15000**[2]	<100	<100
VPHw	**1500**	**1500**	**-**	<100	<100
$EPHw_{10-19}$	**5000**[2]	**5000**[2]	**5000**[2]	<250	<250
$EPHw_{19-32}$	**-**	**-**	**-**	<250	<250
$LEPH_W$	**500**	**-**	**-**	<250	<250
$HEPH_W$	**-**	**-**	**-**	<250	<250
Monoaromatic Hydrocarbons (µg/L)					
Benzene	**4000**	**5**	**-**	<0.5	<0.5
Toluene	**390**	**24**	**-**	<0.5	<0.5
Ethylbenzene	**2000**	**2.4**	**-**	<0.5	<0.5
Xylenes	**-**	**300**	**-**	<0.75	<0.75
Styrene	**720**	**-**	**-**	<0.5	<0.5
Methyl t-butyl ether (MTBE)	**34,000**	**15**	**-**	<0.5	<0.5
Polycyclic Aromatic Hydrocarbons (µg/L)					
Acenaphthene	**60**	**-**	**-**	<0.050	<0.050
Acenaphthylene	**-**	**-**	**-**	<0.050	<0.050
Acridine	**0.5**	**-**	**-**	<0.050	<0.050
Anthracene	**1**	**-**	**-**	<0.050	<0.050
Benzo(a)anthracene	**1**	**-**	**-**	<0.050	<0.050
Benzo(a)pyrene	**0.1**	**0.01**	**-**	<0.0050	<0.0050
Benzo(b)fluoranthene	**-**	**-**	**-**	<0.050	<0.050
Benzo(g,h,i)perylene	**-**	**-**	**-**	<0.050	<0.050
Benzo(k)fluoranthene	**-**	**-**	**-**	<0.050	<0.050
Chrysene	**1**	**-**	**-**	<0.050	<0.050
Dibenz(a,h)anthracene	**-**	**-**	**-**	<0.0050	<0.0050
Fluoranthene	**2**	**-**	**-**	<0.050	<0.050
Fluorene	**120**	**-**	**-**	<0.050	<0.050
Indeno(1,2,3-cd)pyrene	**-**	**-**	**-**	<0.050	<0.050
Naphthalene	**10**	**-**	**-**	<0.050	<0.050
Phenanthrene	**3**	**-**	**-**	<0.050	<0.050
Pyrene	**0.2**	**-**	**-**	<0.050	<0.050
Quinoline	**34**	**-**	**-**	<0.050	<0.050

BOLD, BLUE SHADING	Concentration greater thanthe CSR Drinking Water Standard (DW)
BOLD, RED SHADING	Concentration greater than CSR Freshwater Aquatic Life (FAW) Standard
BOLD, GREEN SHADING	Concentration greater than CSR Irrigation (IW)

Table 5: Analytical Results for Dissolved Metals in Groundwater

Sample Location	CSR Standards [1]			AE16-MW1	AE16-MW2
Screened Interval (m)					
Date Sampled	Freshwater Aquatic Life (FAW)	Drinking Water (DW)	Irrigation Water (IW)	15-Dec-16	15-Dec-16
Physical Tests					
Hardness (as CaCO3)-mg/L -	-	-	-	28.4	500
Dissolved Metals (µg/L)					
Aluminum (Al)-Dissolved	-	9500	5000	<10	<10
Antimony (Sb)-Dissolved	200	6	-	<0.50	<0.50
Arsenic (As)-Dissolved	50	10	100	<1.0	135
Barium (Ba)-Dissolved	10000	1000	-	<20	149
Beryllium (Be)-Dissolved	53	-	100	<5.0	<5.0
Boron (B)-Dissolved	50000	5000	500-6000	<100	110
Cadmium (Cd)-Dissolved H <= 30	0.1	5	5	<0.050	<0.050
H = 30 -< 90	0.3				
H = 90 -< 150	0.5				
H = 150 -< 210	0.6				
Calcium (Ca)-Dissolved	-	-	-	7010	141000
Chromium (Cr)-Dissolved	10 [2]	50	8, 5	<0.50	1.13
Cobalt (Co)-Dissolved	40	-	50	<0.50	81.8
Copper (Cu)-Dissolved H = < 50	20	1000	200	<1.0	<1.0
H = 50 - < 75	30				
H = 75 -< 100	40				
H = 100 -< 125	50				
H = 125 -< 150	60				
H = 150 -< 175	70				
H = 175 -< 200	80				
H = > 200	90				
Iron (Fe)-Dissolved [4]	-	-	5000	<30	111000
Lead (Pb)-Dissolved H = < 50	40	10	200	<1.0	<1.0
H = 50 -< 100	50				
H = 100 -< 200	60				
H = 200 -< 300	110				
H = > 300	160				
Lithium (Li)-Dissolved	-	-	2500	<50	<50
Magnesium (Mg)-Dissolved	-	100000	-	2640	36000
Manganese (Mn)-Dissolved [4]	-	-	200	25	20800
Mercury (Hg)-Dissolved	1	-	1	<0.20	<0.20
Molybdenum (Mo)-Dissolved	10000	250	10-30	<1.0	4.1
Nickel (Ni)-Dissolved H = < 60	250	-	200	<5.0	7.8
H = 60 -< 120	650				
H = 120 -< 180	1100				
H = > 180	1500				
Potassium (K) - Dissolved	-	-	-	<2000	7600
Selenium (Se)-Dissolved	10	10	20, 50	<1.0	<1.0
Silver (Ag)-Dissolved H = < 100	0.5	-	-	<0.050	<0.050
H = > 100	15	-	-		
Sodium (Na)-Dissolved	-	200000	-	4500	100000
Thallium (Tl)-Dissolved	3	-	-	<0.20	<0.20
Titanium (Ti)-Dissolved	1000	-	-	<50	<50
Uranium (U)-Dissolved	3000	20	10	<0.20	<0.20
Vanadium (V)-Dissolved	-	-	100	<30	<30
Zinc (Zn)-Dissolved H = < 90	75	5000	1000 - 5000	<5.0	6.9
H = 90 -< 100	150				
H = 100 -< 200	900				
H = 200 -< 300	1650				
H = 300 -< 400	2400				

BOLD, BLUE SHADING	Concentration greater thanthe CSR Drinking Water Standard (DW)
BOLD, RED SHADING	Concentration greater than CSR Freshwater Aquatic Life (FAW) Standard
BOLD, GREEN SHADING	Concentration greater than CSR Irrigation (IW)

AE16-MW1

(Page 1 of 1)

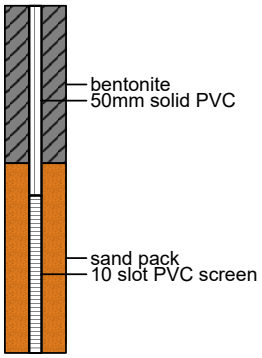
Campbell Heights Phase 2
Stokes Pit, Surrey, BC

Project 1286

Date Started	: December 2, 2016	Company Rep.	: JB
Date Completed	: December 2, 2016	Lab Analysis	: *indicates sent for analysis
Hole Diameter	: 152mm	Drilled By	: VanMars Drilling
Drilling Method	: Solid Stem Auger	Logged By	: JB
Sampling Method	: Grab		

Depth in Meters	Surf. Elev.	USCS	GRAPHIC	DESCRIPTION	Lab Analysis	Sample No.	Soil Vapours ppm	Moisture Content %
0		GM		SILT with SAND, fine to coarse grained and GRAVEL, brown, moderate density, moist, no odour/staining		1-1	10	-
		GW		SAND, medium to coarse grained with GRAVEL, grey, loose, moist, no odour/staining (NATIVE)				
1		SW		SAND, fine grained, grey, loose, moist, no odour/staining (NATIVE)		1-2	70	-
		GW		SAND, coarse grained with GRAVEL, grey, loose, moist, no odour/staining (NATIVE)		1-3	15	-
2								
		GW		SAND, fine to coarse grained with GRAVEL, grey, moderate density, wet at 2.13m, no odour/staining (NATIVE)				
3								
						1-4	45	-
4				End of Hole				
5								
6								
7								
8								
9								
10								
11								
12								
13								

Monitoring Well
AE16-MW1



AE16-MW2

(Page 1 of 1)

Active Earth Engineering Ltd

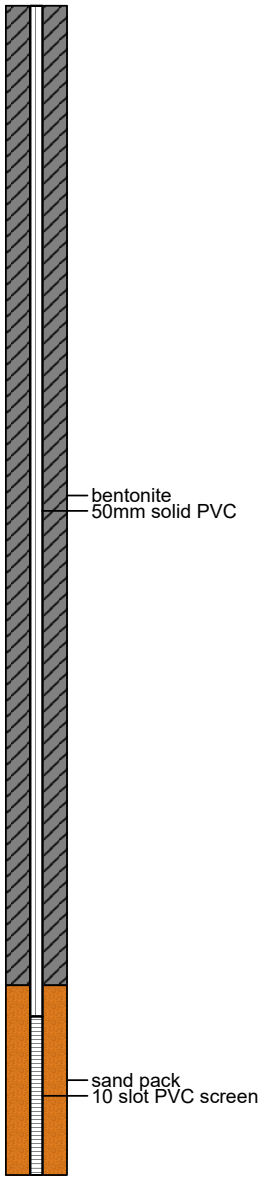
Campbell Heights Phase 2
Stokes Pit, Surrey, BC

Project 1286

Date Started	: December 2, 2016	Company Rep.	: JB
Date Completed	: December 2, 2016	Lab Analysis	: *indicates sent for analysis
Hole Diameter	: 152mm	Drilled By	: VanMars Drilling
Drilling Method	: Solid Stem Auger	Logged By	: JB
Sampling Method	: Grab		

Depth in Meters	Surf. Elev.	USCS	GRAPHIC	DESCRIPTION	Lab Analysis	Sample No.	Soil Vapours ppm	Moisture Content %
0–1		GM		SILT, SAND, fine to coarse grained and GRAVEL, brown, moderate density, moist, no odour/staining		2-1	0	15.8
2		ML		SILT with ORGANICS, trace gravel, brown, moderate density, organic odour, no staining		2-2	0	-
		GM		SILT, SAND, fine to coarse grained and GRAVEL, grey, loose, moist, no odour/staining				
3		SM		SILT and SAND, some gravel, trace organics, brown, loose, no odour/staining		2-3	25	23.1
4–5		GM		SILTY SAND and GRAVEL, grey, moderate density, moist, hydrocarbon odour, no staining from 3.65m to 4.26m		2-4	60	21.5
5–6		GW		SAND, coarse grained and GRAVEL, grey, loose, moist, no odour/staining		2-5	20	-
6–7		GM		SILTY SAND, fine to coarse grained and GRAVEL, dark grey and brown, loose to moderate density, slight hydrocarbon odour, no staining		2-6	15	14.1
7–8		GM		SILTY SAND, fine to coarse grained and GRAVEL, grey, moderate density, no odour/staining		2-7	110	12.1
9		SW		SAND, coarse grained, trace gravel, grey, moderate density, no odour/staining (NATIVE)				
10				wet at 10.05m		2-8	190	-
11–12								
13				End of Hole				

Monitoring Well
AE16-MW2



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AE16-BH1

(Page 1 of 1)

Active Earth Engineering Ltd

Campbell Heights Phase 2
Stokes Pit, Surrey, BC

Project 1286

Date Started	: December 2, 2016	Company Rep.	: JB
Date Completed	: December 2, 2016	Lab Analysis	: *indicates sent for analysis
Hole Diameter	: 152mm	Drilled By	: VanMars Drilling
Drilling Method	: Solid Stem Auger	Logged By	: JB
Sampling Method	: Grab		

Depth in Meters	Surf. Elev.	USCS	GRAPHIC	DESCRIPTION	Lab Analysis	Sample No.	Soil Vapours ppm	Moisture Content %
0		ML		SILT, some sand, trace gravel, tan, very dense, moist, no odour/staining		1-1	0	27.8
1		SM		SILTY SAND, some gravel, brown, moderate density, wet, no odour/staining				
2		GM		SILTY, SAND and GRAVEL, grey with greenish staining, moderate density, moist, no odour		1-2	60	19.4
3		SW		SAND, fine to coarse grained with ORGANICS, black, loose, damp, no odour/staining		1-3	0	-
4		GM		SILTY SAND and GRAVEL, trace organics, grey, moderate density, moist, no odour/staining				
5				black odourless staining from 4.87m to 5.18m		1-4	20	16.4
6		ML		SILT with ORGANICS (wood chips), brown, moderate density, moist to wet, organic odour, no staining				
7						1-5	20	51.0
8		GW		SAND and GRAVEL, well graded, grey, loose, moist		1-6	0	-
9		ML		SILT, some sand, trace gravel, grey, moderate density, wet, no odour/staining				
10				wet at 9.75m				
11		CL		CLAY, low plasticity		1-7	15	26.7
12		SW		SAND, coarse grained, grey, loose, wet, no odour/staining (NATIVE)				
				End of Hole				
13								

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Active Earth Engineering Ltd

AE16-BH2

Campbell Heights Phase 2
Stokes Pit, Surrey, BC

Project 1286

Date Started	: December 2, 2016	Company Rep.	: JB
Date Completed	: December 2, 2016	Lab Analysis	: *indicates sent for analysis
Hole Diameter	: 152mm	Drilled By	: VanMars Drilling
Drilling Method	: Solid Stem Auger	Logged By	: JB
Sampling Method	: Grab		

Depth in Meters	Surf. Elev.	USCS	GRAPHIC	DESCRIPTION	Lab Analysis	Sample No.	Soil Vapours ppm	Moisture Content %
0		SM		SILTY SAND, some gravel, trace organics, brown, moderate density, no odour/staining		2-1	10	9.3
1								
2								
3						2-2	10	-
						2-3	65	135.6
4		ML		SILT with ORGANICS, dark brown, loose, wet at 3.65m, organic odour, no staining		2-4	15	98.0
		CL		CLAY, blueish-grey, moderate density, moist, no odour/staining from 4.26m to 4.57m				
5						2-5	310	18.3
6								
7		ML		SILT and SAND, trace gravel, blueish-grey, moderate density, no odour/staining		2-6	40	-
8						2-7	40	18.8
		GW		SAND, coarse grained with GRAVEL, grey, moderate density, no odour/staining (NATIVE)				
9						2-8	30	-
10								
11				End of Hole				
12								
13								

Active Earth Engineering Ltd

AE16-BH3

Campbell Heights Phase 2
Stokes Pit, Surrey, BC

Project 1286

Date Started	: December 2, 2016	Company Rep.	: JB
Date Completed	: December 2, 2016	Lab Analysis	: *indicates sent for analysis
Hole Diameter	: 152mm	Drilled By	: VanMars Drilling
Drilling Method	: Solid Stem Auger	Logged By	: JB
Sampling Method	: Grab		

Depth in Meters	Surf. Elev.	USCS	GRAPHIC	DESCRIPTION	Lab Analysis	Sample No.	Soil Vapours ppm	Moisture Content %
0		SW		SAND, fine to coarse grained, some gravel, dark brown, moist, no odour/staining		3-1	380	19.2
1		GW		SAND and GRAVEL, grey, loose, moist, no odour/staining				
2		SM		SILTY SAND, some gravel, brown, no odour/staining		3-2	230	28.4
3								
4						3-3	0	16.5
5		ML		SILT, some sand, trace organics, brown and grey, moderate density		3-4	30	27.1
6		ML		SILT with ORGANICS, dark brown, loose, wet at 5.79m, organic odour				
7		SW		SAND, fine to coarse grained, trace gravel, grey, loose, wet, no odour/staining (NATIVE)		3-5 3-6	0 0	21.5 -
8				iron staining from 8.22m to 9.14m				
9				End of Hole				
10								
11								
12								
13								

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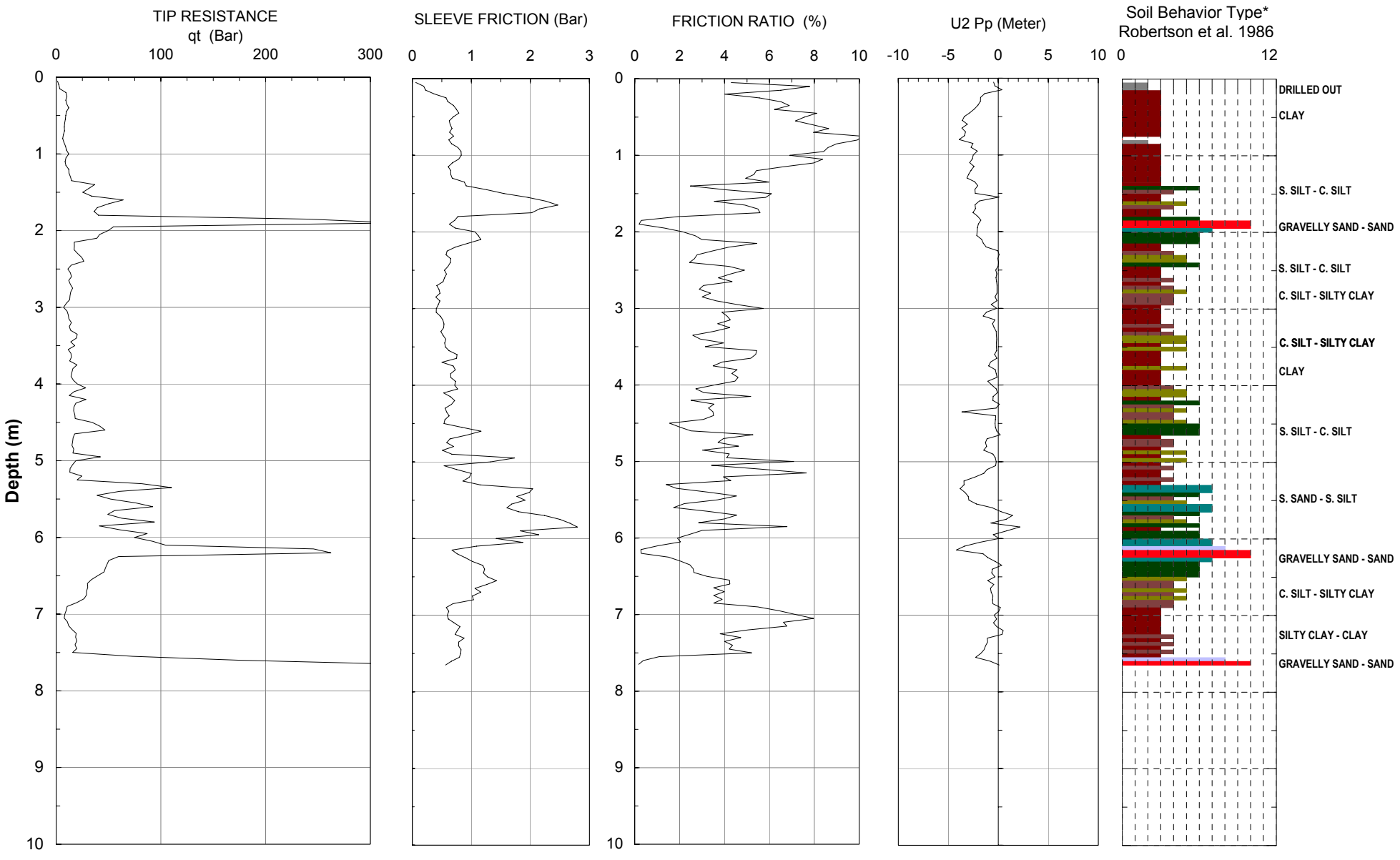
Active Earth Engineering Ltd

Operator: Schwartz Soil Technical
Sounding: CPT16 - 01
Cone ID: DPG0236

Date: December 3, 2016
Site: SCDC Campbell Heights Phase 2
Active Earth project no: 1286

Schwartz SOIL TECH



Maximum Depth = 7.65 meters

Depth Increment = 0.05 meters

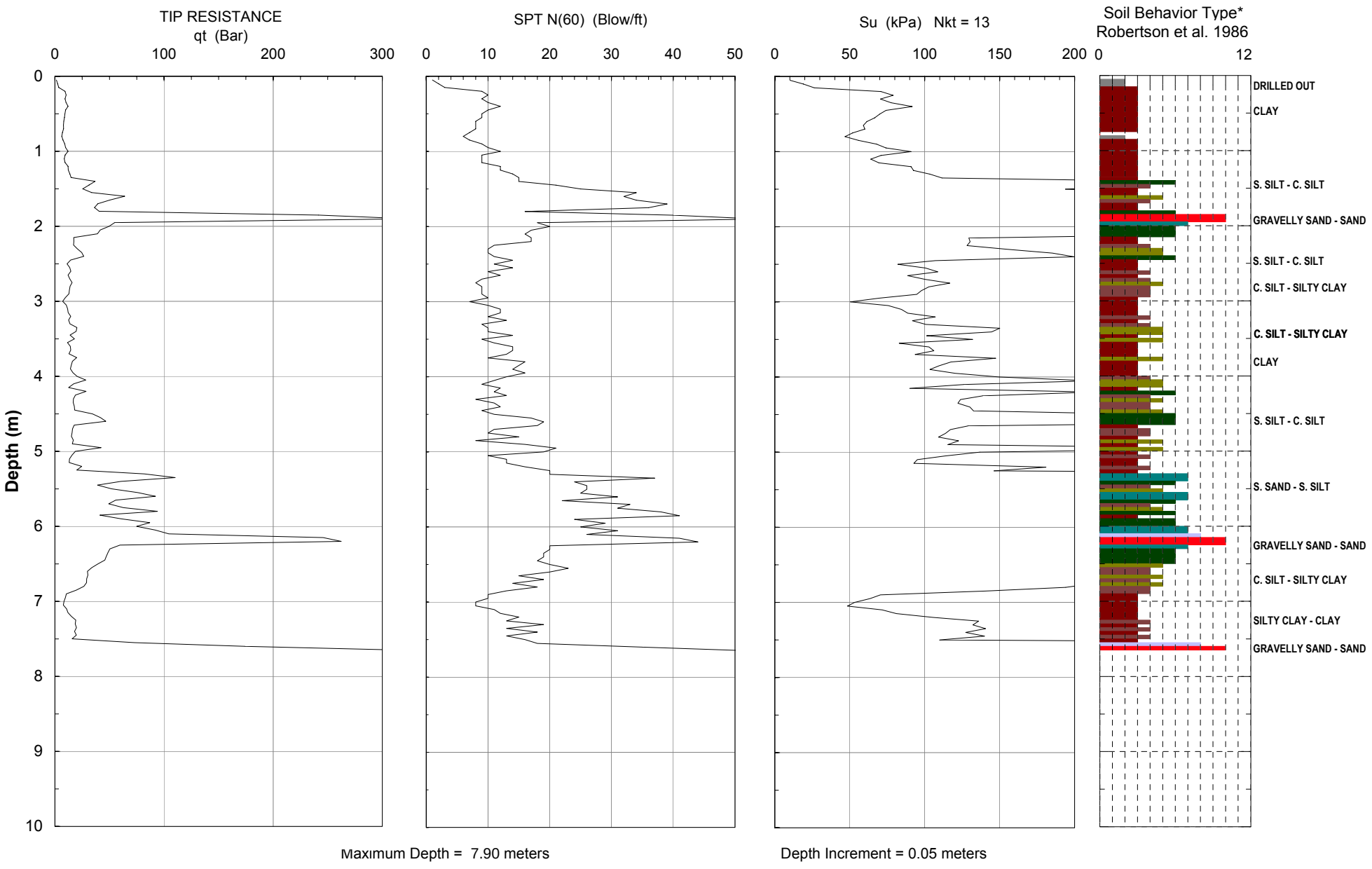
1 sensitive fine grained
2 organic material
3 clay
4 silty clay to clay
5 clayey silt to silty clay
6 sandy silt to clayey silt
7 silty sand to sandy silt
8 sand to silty sand
9 sand
10 gravelly sand to sand
11 very stiff fine grained (*)
12 sand to clayey sand (*)

Active Earth Engineering Ltd

Operator: Schwartz Soil Technical
Sounding: CPT16 - 01
Cone ID: DPG0236

Date: December 3, 2016
Site: SCDC Campbell Heights Phase 2
Active Earth project no: 1286

Schwartz SOIL TECH



Maximum Depth = 7.90 meters

Depth Increment = 0.05 meters

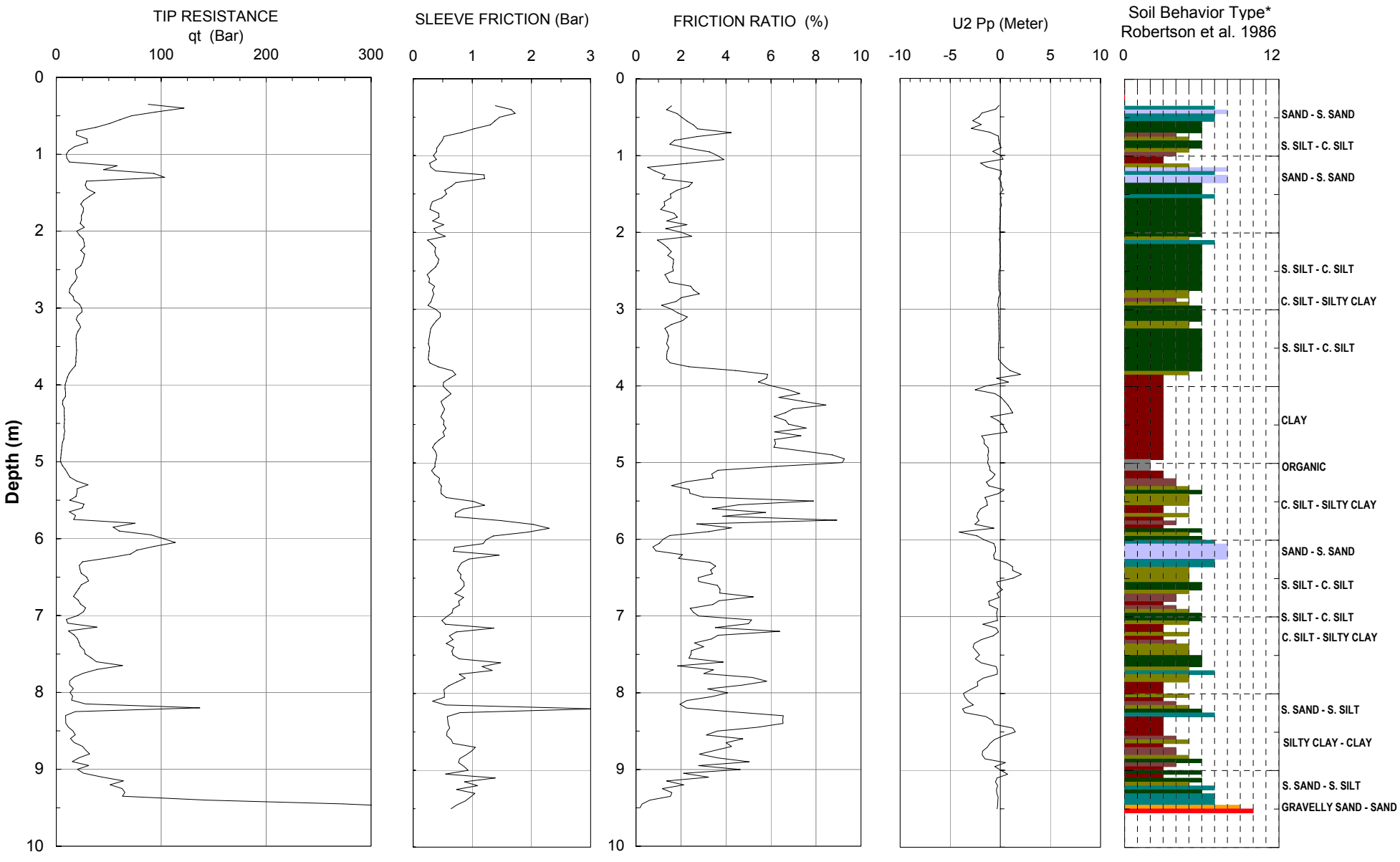
1 sensitive fine grained
2 organic material
3 clay
4 silty clay to clay
5 clayey silt to silty clay
6 sandy silt to clayey silt
7 silty sand to sandy silt
8 sand to silty sand
9 sand
10 gravelly sand to sand
11 very stiff fine grained (*)
12 sand to clayey sand (*)

Active Earth Engineering Ltd

Operator: Schwartz Soil Technical
Sounding: CPT16 - 02
Cone ID: DPG0236

Date: December 3, 2016
Site: SCDC Campbell Heights Phase 2
Active Earth project no: 1286

Schwartz SOIL TECH



Maximum Depth = 9.55 meters

Depth Increment = 0.05 meters

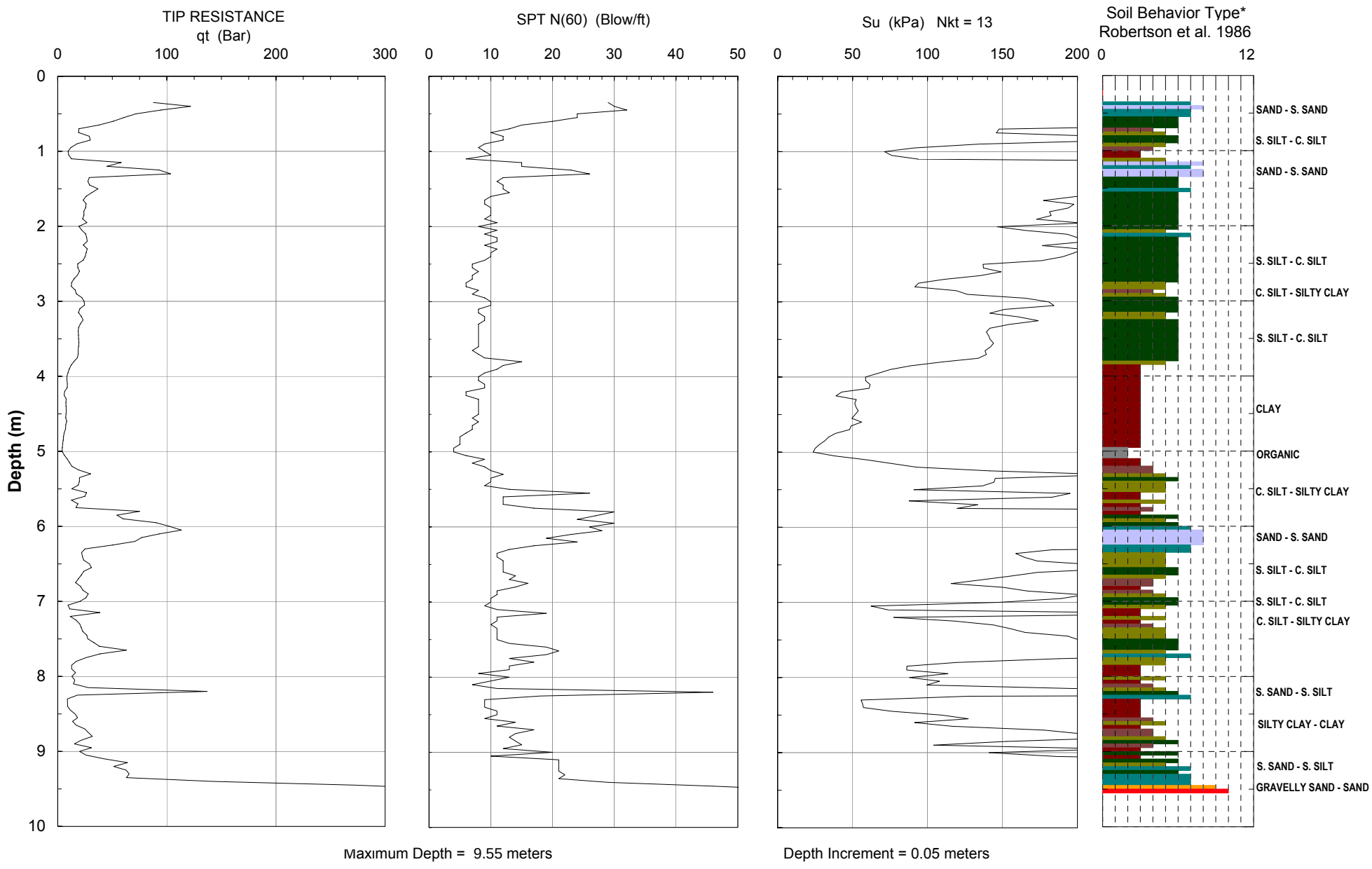
1 sensitive fine grained
2 organic material
3 clay
4 silty clay to clay
5 clayey silt to silty clay
6 sandy silt to clayey silt
7 silty sand to sandy silt
8 sand to silty sand
9 sand
10 gravelly sand to sand
11 very stiff fine grained (*)
12 sand to clayey sand (*)

Active Earth Engineering Ltd

Operator: Schwartz Soil Technical
Sounding: CPT16 - 02
Cone ID: DPG0236

Date: December 3, 2016
Site: SCDC Campbell Heights Phase 2
Active Earth project no: 1286

Schwartz SOIL TECH



Maximum Depth = 9.55 meters

Depth Increment = 0.05 meters

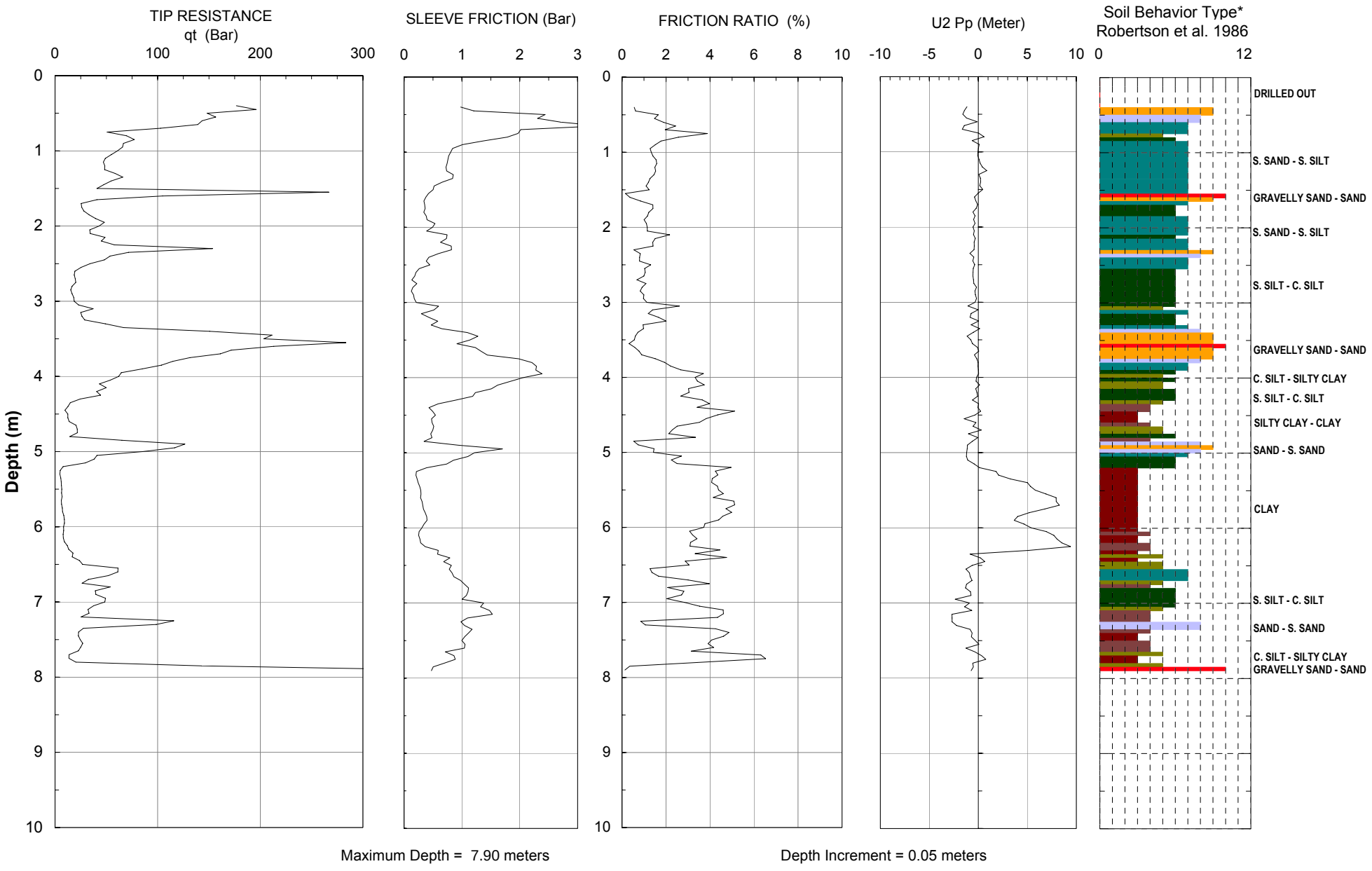
1 sensitive fine grained
2 organic material
3 clay
4 silty clay to clay
5 clayey silt to silty clay
6 sandy silt to clayey silt
7 silty sand to sandy silt
8 sand to silty sand
9 sand
10 gravelly sand to sand
11 very stiff fine grained (*)
12 sand to clayey sand (*)

Active Earth Engineering Ltd

Operator: Schwartz Soil Technical
Sounding: CPT16 - 03
Cone ID: DPG0236

Date: December 3, 2016
Site: SCDC Campbell Heights Phase 2
Active Earth project no: 1286

Schwartz SOIL TECH



Maximum Depth = 7.90 meters

Depth Increment = 0.05 meters

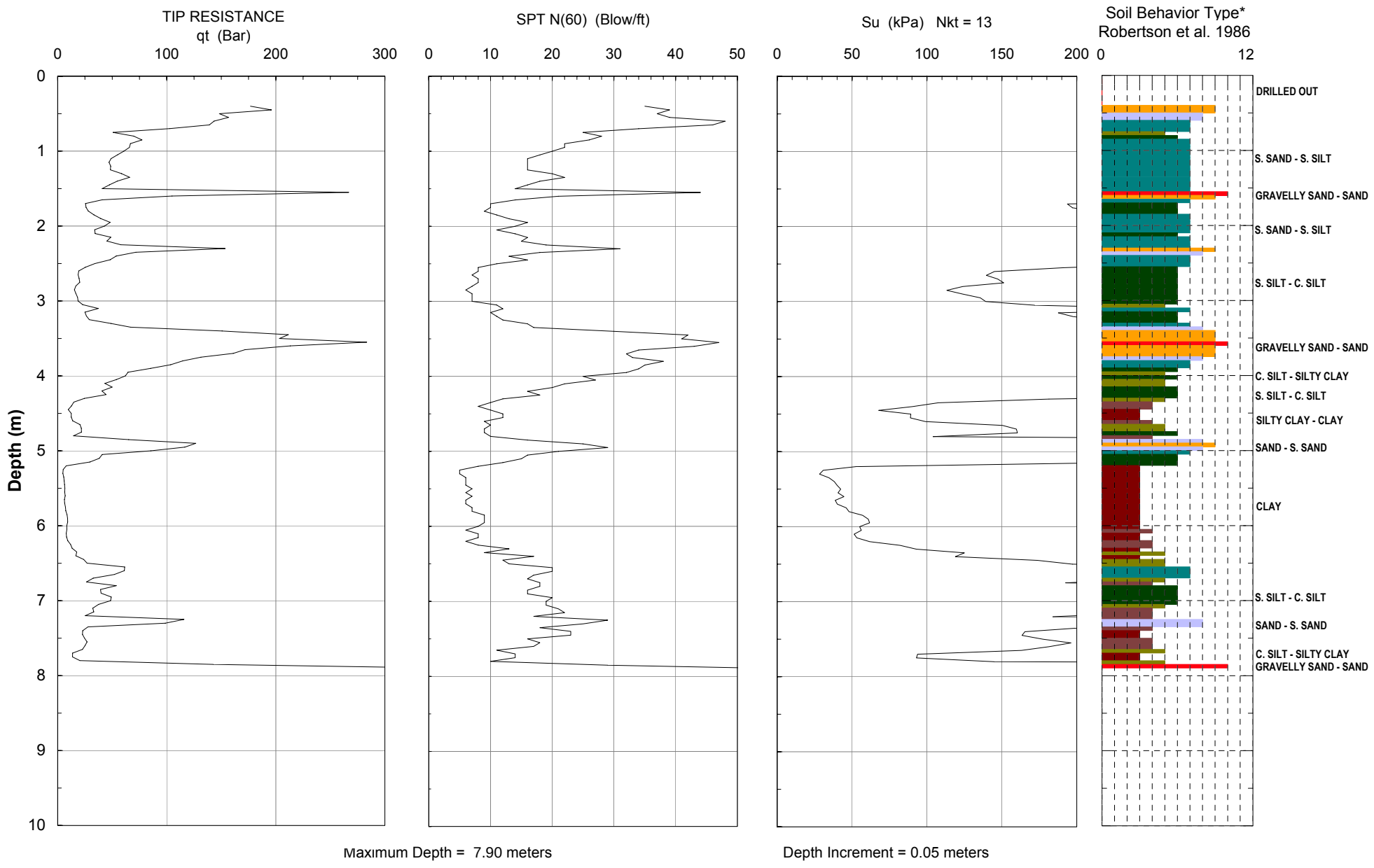
1 sensitive fine grained
2 organic material
3 clay
4 silty clay to clay
5 clayey silt to silty clay
6 sandy silt to clayey silt
7 silty sand to sandy silt
8 sand to silty sand
9 sand
10 gravelly sand to sand
11 very stiff fine grained (*)
12 sand to clayey sand (*)

Active Earth Engineering Ltd

Operator: Schwartz Soil Technical
Sounding: CPT16 - 03
Cone ID: DPG0236

Date: December 3, 2016
Site: SCDC Campbell Heights Phase 2
Active Earth project no: 1286

Schwartz SOIL TECH



Maximum Depth = 7.90 meters

Depth Increment = 0.05 meters

1 sensitive fine grained
2 organic material
3 clay
4 silty clay to clay
5 clayey silt to silty clay
6 sandy silt to clayey silt
7 silty sand to sandy silt
8 sand to silty sand
9 sand
10 gravelly sand to sand
11 very stiff fine grained (*)
12 sand to clayey sand (*)

VALLEY TESTING AND ENGINEERING
18 - 3275 McCallum Rd, Abbotsford, BC V2S 7W8

MOISTURE CONTENT

CLIENT: ACTIVE EARTH ENGINEERING	**TEST NO.** 1	**PROJECT NO:**	V-8309
PROJECT:	**DATE SAMPLED:** 5-Dec-16	**SAMPLED BY:**	CLIENT
PROJECT CONTACT: MATT PYE	**DATE TESTED:** 6-Dec-16	**TESTED BY:**	VG

Bore Hole No.	*AE16-MW2-1	AE16-MW2-3	AE16-MW2-4	AE16-MW2-6	AE16-MW2-7
Depth (ft)	3	12	14	21	26
Tare No.	F	G	H	I	J
Wt Wet Sample + Tare	401.23	391.3	406.36	396.03	398.94
Wt Dry Sample + Tare	348.71	320.81	337.4	349.03	357.66
Wt Water	52.52	70.49	68.96	47.00	41.28
Wt Tare	16.0	16.0	16.0	16.0	15.9
Wt Dry Sample	332.7	304.8	321.5	333.1	341.7
Moisture Content (%)	**15.8**	**23.1**	**21.5**	**14.1**	**12.1**

Bore Hole No.	AE16-BH1-1	AE16-BH1-2	AE16-BH1-4	AE16-BH1-5	AE16-BH1-7
Depth	3	7	17	23	33
Tare No.	A	B	Q	R	S
Wt Wet Sample + Tare	401.03	404.22	392.16	384.97	395.26
Wt Dry Sample + Tare	317.24	341.19	339.26	260.29	315.39
Wt Water	83.79	63.03	52.9	124.68	79.87
Wt Tare	16.0	15.9	15.9	16.0	16.0
Wt Dry Sample	301.2	325.3	323.4	244.3	299.4
Moisture Content (%)	**27.8**	**19.4**	**16.4**	**51.0**	**26.7**

Bore Hole No.	AE16-BH2-1	AE16-BH2-3	AE16-BH2-4	AE16-BH2-5	AE16-BH2-7
Depth	3	14	13	18	27
Tare No.	C	D	E	T	U
Wt Wet Sample + Tare	409.11	351.2	339.39	384.52	395.67
Wt Dry Sample + Tare	375.77	158.18	179.35	327.45	335.47
Wt Water	33.34	193.02	160.04	57.07	60.2
Wt Tare	15.9	15.8	16.0	15.9	15.9
Wt Dry Sample	359.9	142.4	163.4	311.5	319.6
Moisture Content (%)	**9.3**	**135.6**	**98.0**	**18.3**	**18.8**

Bore Hole No.	AE16-BH3-1	AE16-BH3-2	AE16-BH3-3	AE16-BH3-4	AE16-BH3-5
Depth	3	7	13	17	22
Tare No.	K	L	M	N	O
Wt Wet Sample + Tare	404.21	405.8	401.61	403.11	408.48
Wt Dry Sample + Tare	341.76	319.6	347	320.65	339.12
Wt Water	62.45	86.2	54.61	82.46	69.36
Wt Tare	16.0	15.8	16.0	15.9	15.9
Wt Dry Sample	325.8	303.8	331.0	304.8	323.2
Moisture Content (%)	**19.2**	**28.4**	**16.5**	**27.1**	**21.5**

VALLEY TESTING AND ENGINEERING
18 - 3275 McCALLUM RD, ABBOTSFORD, BC V2S 7W8
Tel.: (604) 855-9733 Fax.: (604) 855-7378

ASTM D 4318
Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils

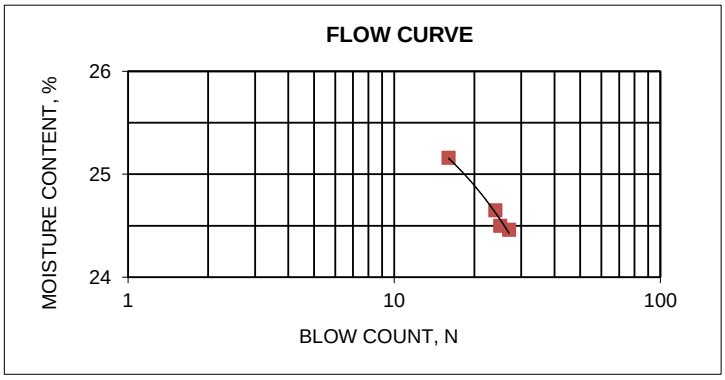
CLIENT	**ACTIVE EARTH ENGINEERING LTD**	OUR JOB NO:	V8309
	4510 SADDLEHORN CRESCENT	YOUR JOB NO:	
	LANGLEY, BC	REPORT DATE:	14-Dec-16
	V2Z IJ6	TESTED BY	JR

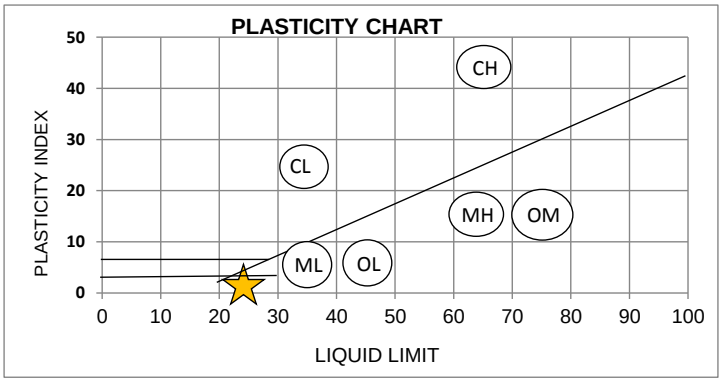
ATTENTION **DAVID KNEALE, P.GEO**
PROJECT: **ATTERBERG & MOISTURE TEST**

SAMPLE DESCRIPTION

SAMPLE I.D.: **AE16-MW2-7**	SAMPLE RECEIVED: 5-Dec-16
SAMPLE LOC	
SAMPLE TYPE:	

POINTS	1	2	3		
NUMBER OF BLOWS, N	27	24	16	**25**	
% MOISTURE CONTENT, W_N	24.0	24.2	24.7	**24.0**	
CORRECTION FACTOR, K at	25.0	1.000			
CALCULATED LIQUID LIMIT = K (W_N) =		24.0			





RESULT SUMMARY

PLASTIC LIMIT	AS IS MOISTURE	LIQUID LIMIT	PLASTICITY INDEX	SOIL CLASSIFICATION
17.4	**12.1%**	**24.0**	**6.6**	**Low Plasticity SILT** (ASTM D-4318)

Per: ***Jaime Rivero***
Laboratory Supervisor

Reviewed By: ***Jim Hernandez, AScT***
Laboratory Manager

VALLEY TESTING AND ENGINEERING
18 - 3275 McCALLUM RD, ABBOTSFORD, BC V2S 7W8
Tel.: (604) 855-9733 Fax.: (604) 855-7378

ASTM D 4318
Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils

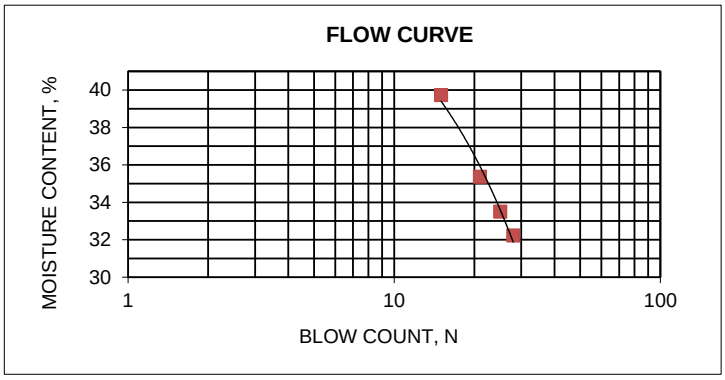
CLIENT	**ACTIVE EARTH ENGINEERING LTD**	OUR JOB NO:	V8309
	4510 SADDLEHORN CRESCENT	YOUR JOB NO:	
	LANGLEY, BC	REPORT DATE:	14-Dec-16
	V2Z IJ6	TESTED BY	JR

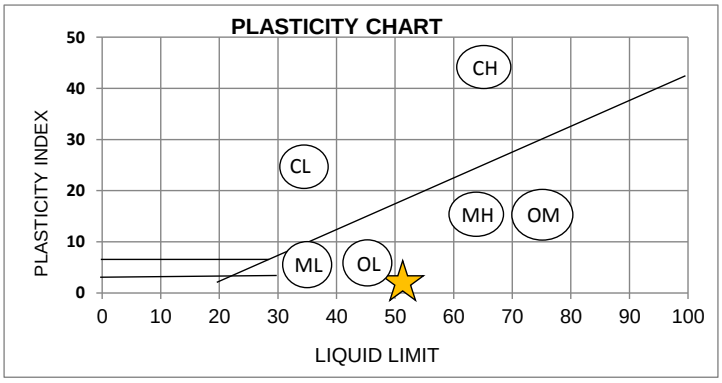
ATTENTION **DAVID KNEALE, P.GEO**
PROJECT: **ATTERBERG & MOISTURE TEST**

SAMPLE DESCRIPTION

SAMPLE I.D.: **AE16-BH1-5**	SAMPLE RECEIVED: 5-Dec-16
SAMPLE LOC	
SAMPLE TYPE:	

POINTS	1	2	3		
NUMBER OF BLOWS, N	28	21	15	**25**	
% MOISTURE CONTENT, W_N	32.2	35.4	39.7	**33.5**	
CORRECTION FACTOR, K at	25.0	1.000			
CALCULATED LIQUID LIMIT = K (W_N) =		33.5			





RESULT SUMMARY

PLASTIC LIMIT	AS IS MOISTURE	LIQUID LIMIT	PLASTICITY INDEX	SOIL CLASSIFICATION
32.6	**51.0%**	**33.5**	**0.9**	**Low Plasticity Organic** (ASTM D-4318)

Per: ***Jaime Rivero***
Laboratory Supervisor

Reviewed By: ***Jim Hernandez, AScT***
Laboratory Manager

VALLEY TESTING AND ENGINEERING
18 - 3275 McCALLUM RD, ABBOTSFORD, BC V2S 7W8
Tel.: (604) 855-9733 Fax.: (604) 855-7378

ASTM D 4318
Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils

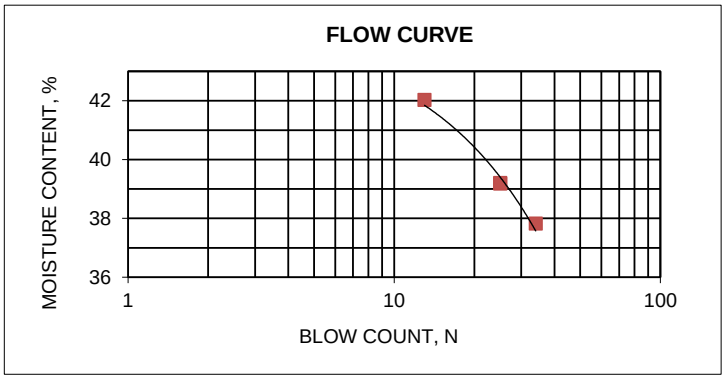
CLIENT	**ACTIVE EARTH ENGINEERING LTD**	OUR JOB NO:	V8309
	4510 SADDLEHORN CRESCENT	YOUR JOB NO:	
	LANGLEY, BC	REPORT DATE:	14-Dec-16
	V2Z IJ6	TESTED BY	JR

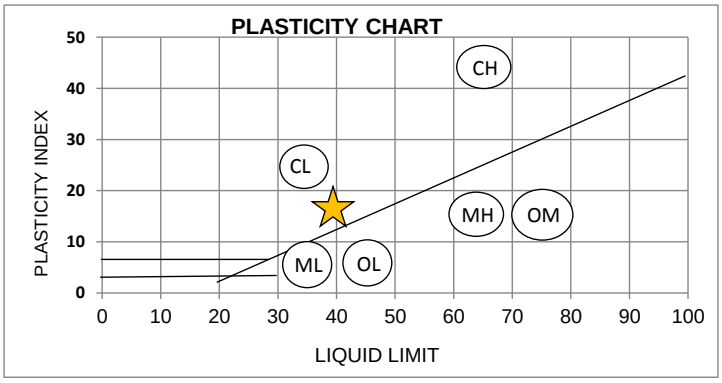
ATTENTION **DAVID KNEALE, P.GEO**
PROJECT: **ATTERBERG & MOISTURE TEST**

SAMPLE DESCRIPTION

SAMPLE I.D.: **AE16-BH1-7**	SAMPLE RECEIVED: 5-Dec-16
SAMPLE LOC	
SAMPLE TYPE:	

POINTS	1	2	3		
NUMBER OF BLOWS, N	34	25	13	**25**	
% MOISTURE CONTENT, W_N	37.8	39.2	42.0	**39.2**	
CORRECTION FACTOR, K at	25.0	1.000			
CALCULATED LIQUID LIMIT = K (W_N) =		39.2			





RESULT SUMMARY

PLASTIC LIMIT	AS IS MOISTURE	LIQUID LIMIT	PLASTICITY INDEX	SOIL CLASSIFICATION
23.3	**26.7%**	**39.2**	**15.9**	**Low Plasticity CLAY** (ASTM D-4318)

Per: ***Jaime Rivero***
Laboratory Supervisor

Reviewed By: ***Jim Hernandez, AScT***
Laboratory Manager

VALLEY TESTING AND ENGINEERING
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Tel.: (604) 855-9733 Fax.: (604) 855-7378

ASTM D 4318
Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils

CLIENT **ACTIVE EARTH ENGINEERING LTD**
4510 SADDLEHORN CRESCENT
LANGLEY, BC
V2Z IJ6

OUR JOB NO: V8309
YOUR JOB NO:
REPORT DATE: 14-Dec-16
TESTED BY JR

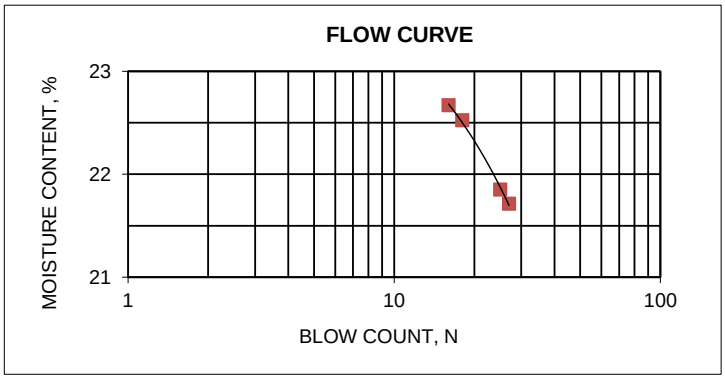
ATTENTION **DAVID KNEALE, P.GEO**
PROJECT: **ATTERBERG & MOISTURE TEST**

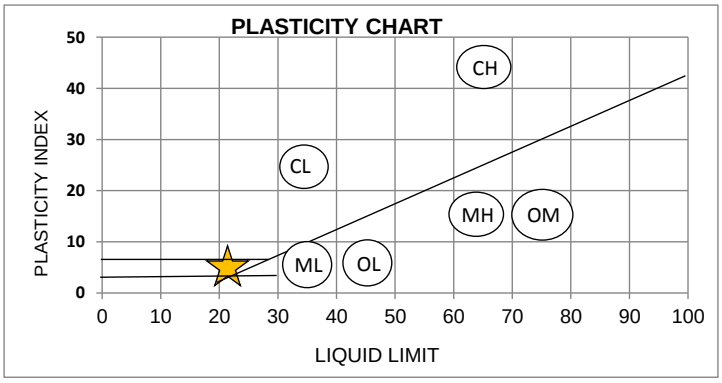
SAMPLE DESCRIPTION

SAMPLE I.D.: **AE16-BH2-7**
SAMPLE LOC
SAMPLE TYPE:

SAMPLE RECEIVED: 5-Dec-16

POINTS	1	2	3		
NUMBER OF BLOWS, N	27	18	16	**25**	
% MOISTURE CONTENT, W_N	21.7	22.5	22.7	**21.9**	
CORRECTION FACTOR, K at	25.0	1.000			
CALCULATED LIQUID LIMIT = K (W_N) =		21.9			





RESULT SUMMARY

PLASTIC LIMIT	AS IS MOISTURE	LIQUID LIMIT	PLASTICITY INDEX	SOIL CLASSIFICATION
14.8	**18.8%**	**21.9**	**7.1**	**Low Plasticity CLAY/SILT** (ASTM D-4318)

Per: ***Jaime Rivero***
Laboratory Supervisor

Reviewed By: ***Jim Hernandez, AScT***
Laboratory Manager

VALLEY TESTING AND ENGINEERING
18 - 3275 McCALLUM RD, ABBOTSFORD, BC V2S 7W8
Tel.: (604) 855-9733 Fax.: (604) 855-7378

ASTM D 4318
Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils

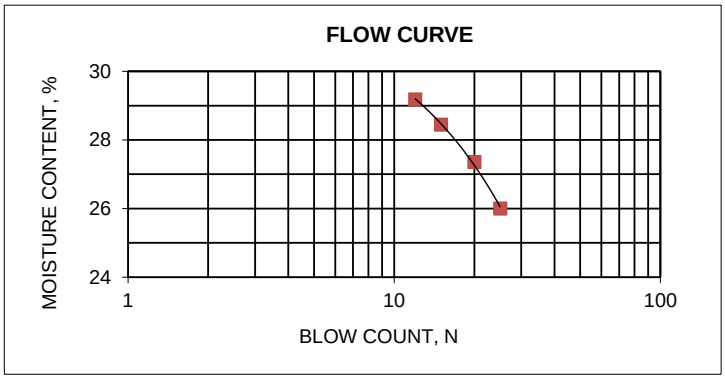
CLIENT	**ACTIVE EARTH ENGINEERING LTD**	OUR JOB NO:	V8309
	4510 SADDLEHORN CRESCENT	YOUR JOB NO:	
	LANGLEY, BC	REPORT DATE:	14-Dec-16
	V2Z IJ6	TESTED BY	JR

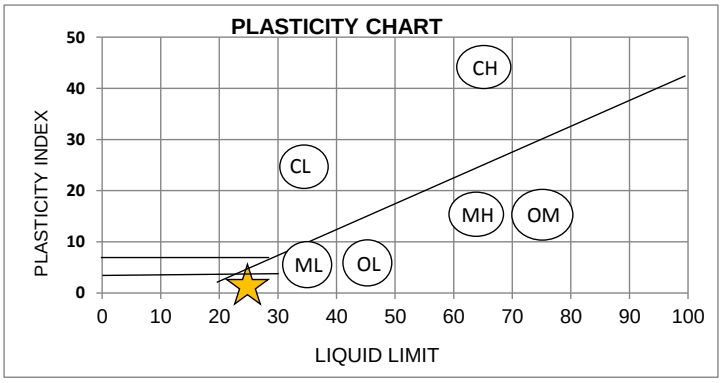
ATTENTION **DAVID KNEALE, P.GEO**
PROJECT: **ATTERBERG & MOISTURE TEST**

SAMPLE DESCRIPTION

SAMPLE I.D.: **AE16-BH3-4**	SAMPLE RECEIVED: 5-Dec-16
SAMPLE LOC	
SAMPLE TYPE:	

POINTS	1	2	3		
NUMBER OF BLOWS, N	20	15	12	**25**	
% MOISTURE CONTENT, W_N	27.4	28.4	29.2	**26.0**	
CORRECTION FACTOR, K at	25.0	1.000			
CALCULATED LIQUID LIMIT = K (W_N) =		26.0			





RESULT SUMMARY

PLASTIC LIMIT	AS IS MOISTURE	LIQUID LIMIT	PLASTICITY INDEX	SOIL CLASSIFICATION
22.3	**27.1%**	**26.0**	**3.7**	**Low Plasticity SILT** (ASTM D-4318)

Per: ***Jaime Rivero***
Laboratory Supervisor

Reviewed By: ***Jim Hernandez, AScT***
Laboratory Manager

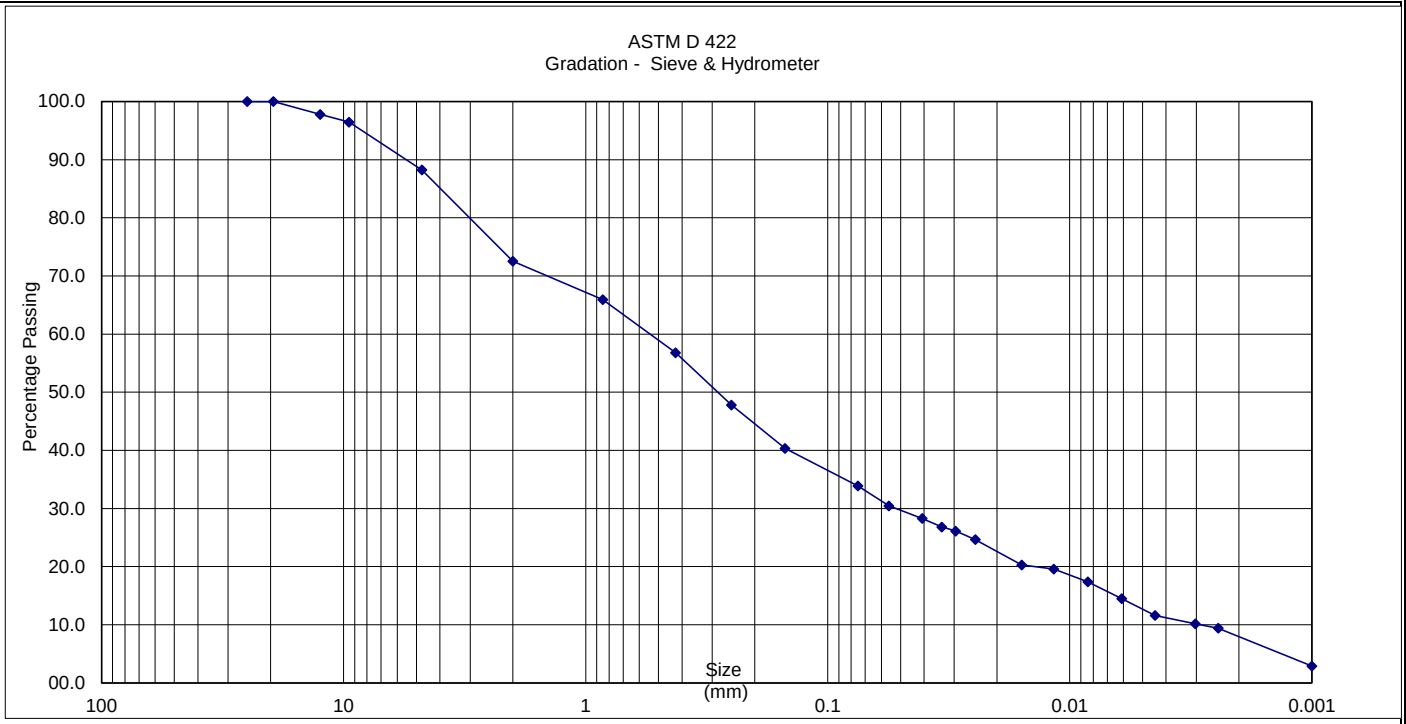
VALLEY TESTING AND ENGINEERING
18 - 3275 McCALLUM RD, ABBOTSFORD, BC V2S 7W8
Tel.: (604) 855-9733 Fax.: (604) 855-7378

CLIENT: **ACTIVE EARTH ENGINEERING LTD**
4510 SADDLEHORN CRESCENT
LANGLEY, BC
V2Z IJ6
ATTENTION: DAVID KNEALE, P.GEO
PROJECT: GRAIN SIZE DISTRIBUTION

FILE NO: V8309
DATE:
DATE SAMPLED: 5-Dec-16
DATE TESTED: 14-Dec-16
SAMPLE ID **AE16-BH1-4**

GRADATION: SIEVE & HYDROMETER

SIEVE	SIZE(mm)	%PASS	
3"	75	100.0	GRAVEL
1"	25	100.0	
3/4	19.5	100.0	
1/2	12.5	97.8	
3/8	9.5	96.4	
#4	4.75	88.2	
#10	2	72.5	SAND
#20	0.85	65.9	
#40	0.425	56.8	
#60	0.25	47.8	
#100	0.15	40.3	
#200	0.0750	33.9	
	0.0559	30.5	SILT
	0.0407	28.3	
	0.0338	26.8	
	0.0296	26.1	
	0.0245	24.7	
	0.0158	20.3	
	0.0116	19.6	
	0.0084	17.4	
	0.0061	14.5	
	0.0044	11.6	
	0.0030	10.2	CLAY
	0.0024	09.4	
	0.0010	02.9	Colloids



SPECIFIC GRAVITY: FRACTION PASSING #10 = 2.65 g/cm3 (assumed)
AS IS MOISTURE CONTENT = 16.4%

Materials	Cobbles	Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt	Clay and Colloids	Totals
Composition,%	0.0	11.8	15.7	15.7	26.3	20.3	10.2	100.0

Tested By
Jaime Rivero
Lab Supervisor

Reviewed By:
Jim Hernandez
Lab Manager

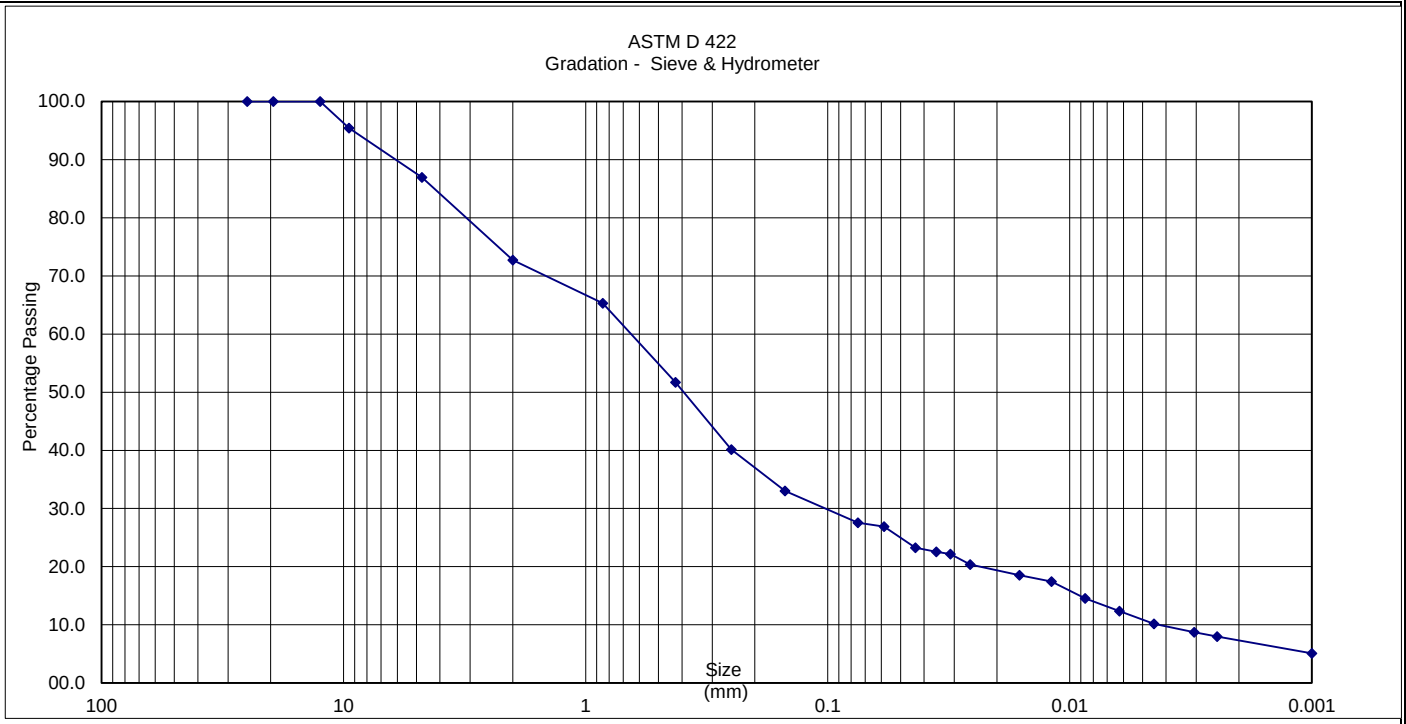
VALLEY TESTING AND ENGINEERING
18 - 3275 McCALLUM RD, ABBOTSFORD, BC V2S 7W8
Tel.: (604) 855-9733 Fax.: (604) 855-7378

FILE NO: V8309
DATE:
DATE SAMPLED: 5-Dec-16
DATE TESTED: 14-Dec-16
SAMPLE ID **AE16-BH2-7**

CLIENT: **ACTIVE EARTH ENGINEERING LTD**
4510 SADDLEHORN CRESCENT
LANGLEY, BC
V2Z IJ6
ATTENTION: DAVID KNEALE, P.GEO
PROJECT: GRAIN SIZE DISTRIBUTION

GRADATION: SIEVE & HYDROMETER

SIEVE	SIZE(mm)	%PASS	
3"	75	100.0	GRAVEL
1"	25	100.0	
3/4	19.5	100.0	
1/2	12.5	100.0	
3/8	9.5	95.4	
#4	4.75	87.0	
#10	2	72.7	SAND
#20	0.85	65.3	
#40	0.425	51.7	
#60	0.25	40.1	
#100	0.15	33.0	
#200	0.0750	27.6	
	0.0586	26.9	SILT
	0.0434	23.3	
	0.0356	22.5	
	0.0311	22.2	
	0.0258	20.4	
	0.0162	18.5	
	0.0119	17.4	
	0.0086	14.5	
	0.0062	12.4	
	0.0045	10.2	
	0.0031	08.7	CLAY
	0.0025	08.0	
	0.0010	05.1	Colloids



SPECIFIC GRAVITY: FRACTION PASSING #10 = 2.65 g/cm3 (assumed)
AS IS MOISTURE CONTENT = 18.8%

Materials	Cobbles	Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt	Clay and Colloids	Totals
Composition,%	**0.0**	**13.0**	**14.3**	**21.0**	**24.8**	**18.2**	**8.7**	**100.0**

Tested By
Jaime Rivero
Lab Supervisor

Reviewed By:
Jim Hernandez
Lab Manager

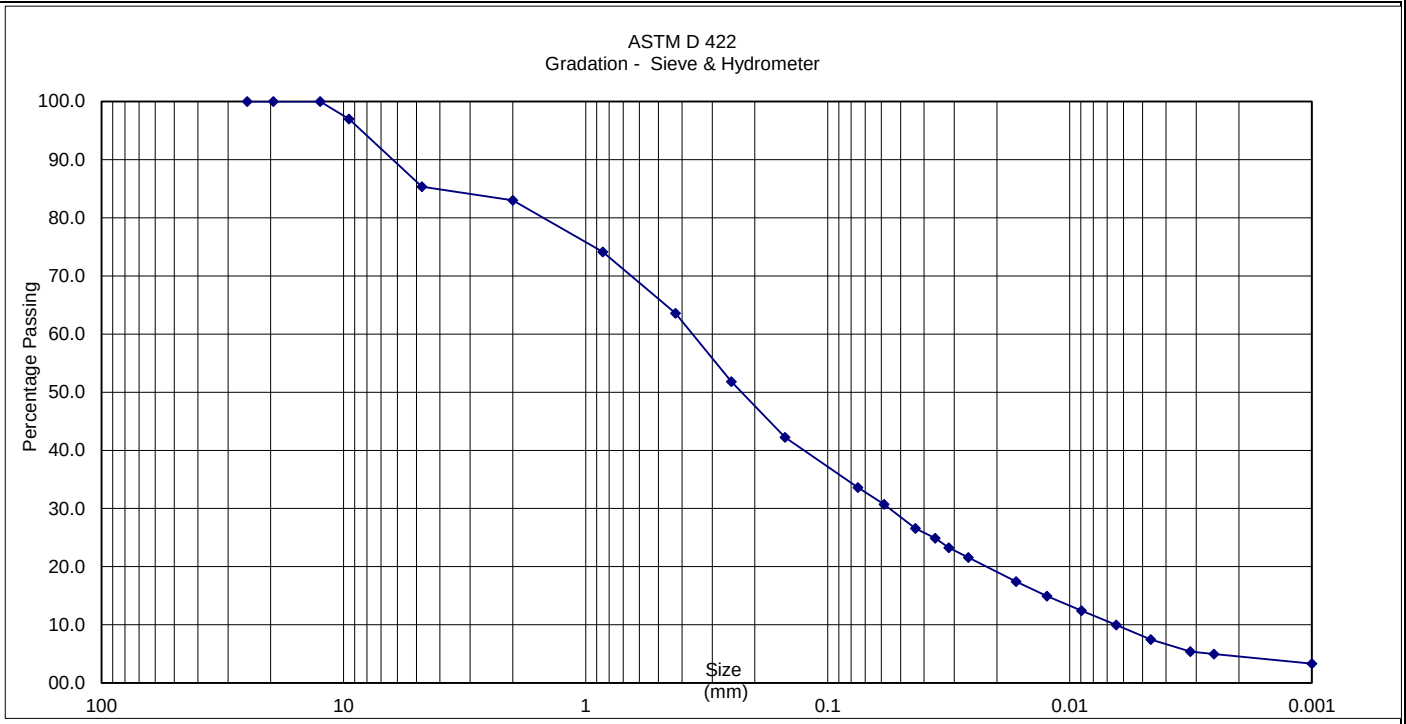
VALLEY TESTING AND ENGINEERING
18 - 3275 McCALLUM RD, ABBOTSFORD, BC V2S 7W8
Tel.: (604) 855-9733 Fax.: (604) 855-7378

CLIENT: **ACTIVE EARTH ENGINEERING LTD**
4510 SADDLEHORN CRESCENT
LANGLEY, BC
V2Z IJ6
ATTENTION: DAVID KNEALE, P.GEO
PROJECT: GRAIN SIZE DISTRIBUTION

FILE NO: V8309
DATE:
DATE SAMPLED: 5-Dec-16
DATE TESTED: 14-Dec-16
SAMPLE ID **AE16-BH3-4**

GRADATION: SIEVE & HYDROMETER

SIEVE	SIZE(mm)	%PASS	
3"	75	100.0	GRAVEL
1"	25	100.0	
3/4	19.5	100.0	
1/2	12.5	100.0	
3/8	9.5	97.0	
#4	4.75	85.3	
#10	2	83.0	SAND
#20	0.85	74.1	
#40	0.425	63.6	
#60	0.25	51.8	
#100	0.15	42.3	
#200	0.0750	33.6	
	0.0586	30.7	SILT
	0.0434	26.6	
	0.0359	24.9	
	0.0316	23.2	
	0.0263	21.6	
	0.0166	17.4	
	0.0124	14.9	
	0.0090	12.5	
	0.0064	10.0	
	0.0046	07.5	
	0.0032	05.4	CLAY
	0.0025	05.0	
	0.0010	03.3	Colloids



SPECIFIC GRAVITY: FRACTION PASSING #10 = 2.65 g/cm3 (assumed)
AS IS MOISTURE CONTENT = 27.1%

Materials	Cobbles	Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt	Clay and Colloids	Totals
Composition,%	**0.0**	**14.7**	**2.3**	**19.4**	**32.9**	**25.3**	**5.4**	**100.0**

Tested By
Jaime Rivero
Lab Supervisor

Reviewed By:
Jim Hernandez
Lab Manager

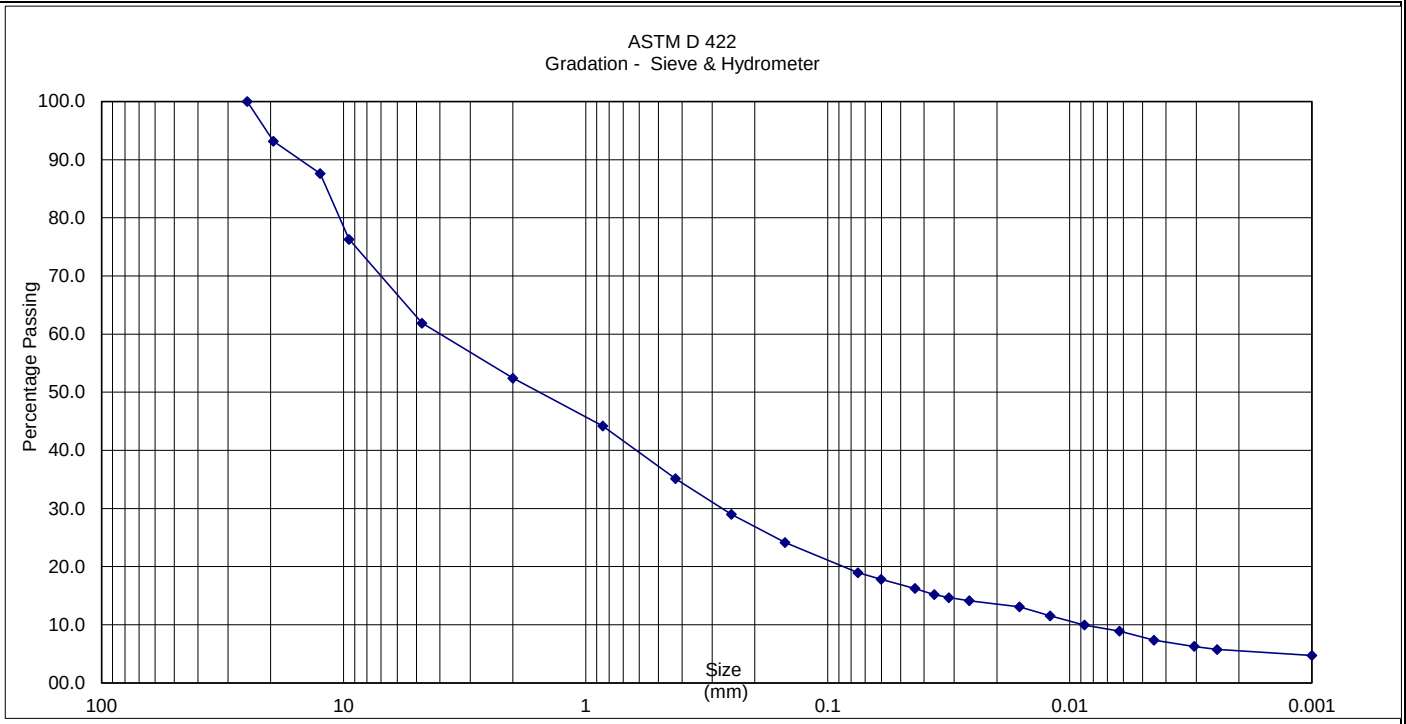
VALLEY TESTING AND ENGINEERING
18 - 3275 McCALLUM RD, ABBOTSFORD, BC V2S 7W8
Tel.: (604) 855-9733 Fax.: (604) 855-7378

CLIENT: **ACTIVE EARTH ENGINEERING LTD**
4510 SADDLEHORN CRESCENT
LANGLEY, BC
V2Z IJ6
ATTENTION: DAVID KNEALE, P.GEO
PROJECT: GRAIN SIZE DISTRIBUTION

FILE NO: V8309
DATE:
DATE SAMPLED: 5-Dec-16
DATE TESTED: 14-Dec-16
SAMPLE ID **AE16-MW2-7**

GRADATION: SIEVE & HYDROMETER

SIEVE	SIZE(mm)	%PASS	
3"	75	100.0	GRAVEL
1"	25	100.0	
3/4	19.5	93.2	
1/2	12.5	87.6	
3/8	9.5	76.3	
#4	4.75	61.9	
#10	2	52.4	SAND
#20	0.85	44.2	
#40	0.425	35.1	
#60	0.25	29.0	
#100	0.15	24.2	
#200	0.0750	19.0	
	0.0601	17.8	SILT
	0.0436	16.3	
	0.0363	15.2	
	0.0316	14.7	
	0.0260	14.2	
	0.0162	13.1	
	0.0121	11.5	
	0.0087	10.0	
	0.0062	08.9	
	0.0045	07.3	
	0.0031	06.3	CLAY
	0.0025	05.8	
	0.0010	04.7	Colloids



SPECIFIC GRAVITY: FRACTION PASSING #10 = 2.65 g/cm3 (assumed)
AS IS MOISTURE CONTENT = 12.1%

Materials	Cobbles	Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt	Clay and Colloids	Totals
Composition,%	0.0	38.1	9.5	17.3	17.3	11.5	6.3	100.0

Tested By
Jaime Rivero
Lab Supervisor

Reviewed By:
Jim Hernandez
Lab Manager