SUMMARY LOG

Drill Hole #: **TH23-SEG 2-74**

Ministry of Transportation and Infrastructure

Project: **Fraser Valley Highway 1 Corridor Improvement**

Location: Abbotsford, BC

Prepared by: 32079 Thurber Engineering Ltd.

Logged by: HG Reviewed by: ANR

Datum: UTM-Nad83 Alignment:

Northing/Easting: 5432822 , 547142 Station/Offset:

Elevation: 65.2 m *Coordinates taken with GPS*

Date(s) Drilled: 2023-01-13

Company: OnTrack

Driller: Andrew

Drill Make/Model: Diedrick D-120

Drilling Method: Solid Stem Auger

DEPTH (m)	DRILLING DETAILS	Pocket Penetrometer / Shear Strength (kPa) 100 200 300 400; Natural Vane (KPa) ⊕ Remold Vane (KPa); SPT "N" (BLOWS/300 mm) ▲; W_P% 20, W% 40 60, W_L% 80	SAMPLE TYPE	SAMPLE NO	RECOVERY (%)	SOIL SYMBOL	SOIL DESCRIPTION	CLASSIFICATION	COMMENTS TESTING Drillers Estimate {G % S % F %}	ELEVATION (m)
0							SM - SAND, silty, some to trace gravel, orange-brown; non-cohesive, moist to wet, loose.			65
							0.61m			
1		61.8		1			OH - ORGANIC CLAY, sandy to some sand, brown; cohesive.	OH		64
2							2.13m			63
							CL - SILTY CLAY, some to trace sand, trace organics, grey-brown; cohesive, moist, soft to firm.			
3		25.8		2			3.05m	CL		62
							CL - SILTY CLAY, some to trace sand, trace gravel; medium plasticity, brown-grey; cohesive, moist, very stiff.			
4		208		V1						61
		18.3		3				CL	Atterberg (Sa#3): PL:17% LL:28%	
									Atterberg (Sa#ST1): PL:17% LL:31%	
5		32.2		ST1				CL		60
							5.49m			
							CL - SILTY CLAY, some sand; medium plasticity, grey; cohesive., moist to wet, soft to firm.			
6		20.9		4				CL/ML	Atterberg (Sa#4): PL:18% LL:24%	59
7										58
		208		V2						
		20.4		5				CL	Atterberg (Sa#5): PL:17% LL:29%	
8										57
9							9.14m			56
							End of hole at 9.2 m depth. Hole open to 8.5 m depth. Water observed at 6.1 m depth upon completion of drilling.			
10										

Legend Sample Type: A-Auger; B-Becker; C-Core; G-Grab; V-Vane; L#-Lab Sample; S-Split Spoon; O-Odex (air rotary); W-Wash (mud return); T-Shelby Tube

Legend Installation: Sand; Grout; Cement; Bentonite; Drill Cuttings; Slotted; Slough; Piezometer

Final Depth of Hole: 9.1 m

Depth to Top of Rock:

MOTI-SOIL-REV3_EL. 1 DECIMAL PLACE 32079_FRASER VALLEY HWY 1 CORRIDOR.GPJ MOTI_DATATEMPLATE_REV3.GDT 23-5-19

SUMMARY LOG

Drill Hole #: **TH23-SEG 2-74**

Ministry of Transportation and Infrastructure

Project: **Fraser Valley Highway 1 Corridor Improvement**

Location: Abbotsford, BC

Prepared by: 32079
Thurber Engineering Ltd.

Logged by: HG Reviewed by: ANR

Datum: UTM-Nad83 Alignment:

Northing/Easting: 5432822 , 547142 Station/Offset:

Elevation: 65.2 m *Coordinates taken with GPS*

Date(s) Drilled: 2023-01-13

Company: OnTrack

Driller: Andrew

Drill Make/Model: Diedrick D-120

Drilling Method: Solid Stem Auger

DEPTH (m)	DRILLING DETAILS (SPT)	Pocket Penetrometer / Shear Strength (kPa) 100 200 300 400; Natural Vane (KPa) ⊕ Remold Vane (KPa); SPT "N" (BLOWS/300 mm); W_P% 20 — W% — 40 60 — W_L% 80	SAMPLE TYPE	SAMPLE NO	RECOVERY (%)	SOIL SYMBOL	SOIL DESCRIPTION	CLASSIFICATION	COMMENTS TESTING Drillers Estimate {G % S % F %}	ELEVATION (m)
10		208		V3						55
11										54
12										53
13										52
14										51
15										50
16										49
17										48
18										47
19										46
20										

Legend Sample Type: A-Auger; B-Becker; C-Core; G-Grab; V-Vane; L#-Lab Sample; S-Split Spoon; O-Odex (air rotary); W-Wash (mud return); T-Shelby Tube

Legend Installation: Sand; Grout; Cement; Bentonite; Drill Cuttings; Slotted; Slough; Piezometer

Final Depth of Hole: 9.1 m

Depth to Top of Rock:

MOTI-SOIL-REV3_EL. 1 DECIMAL PLACE 32079_FRASER VALLEY HWY 1 CORRIDOR.GPJ MOTI_DATATEMPLATE_REV3.GDT 23-5-19

SUMMARY LOG

Drill Hole #: **MRH22-SEG 2-01**

Ministry of Transportation and Infrastructure

Project: **Fraser Valley Highway 1 Corridor Improvement**

Location: Abbotsford, BC

Prepared by: 32079 Thurber Engineering Ltd.

Logged by: ANR Reviewed by: ANR

Datum: UTM-Nad83 Alignment:

Northing/Easting: 5432819 , 547153 Station/Offset:

Elevation: 65.3 m *Coordinates taken with GPS*

Date(s) Drilled: 2022-05-02

Company: Mud Bay

Driller:

Drill Make/Model: Fraste XL -03

Drilling Method: Mud Rotary

DEPTH (m)	DRILLING DETAILS (SPT)	Pocket Penetrometer / Shear Strength (kPa) 100 200 300 400; SPT "N" (BLOWS/300 mm); W_P% 20 — W% 40 60 — W_L% 80	SAMPLE TYPE	SAMPLE NO	RECOVERY (%)	SOIL SYMBOL	SOIL DESCRIPTION	CLASSIFICATION	COMMENTS TESTING Drillers Estimate {G % S % F %}	ELEVATION (m)
0							ML - SILT, some sand to sandy; low plasticity; fine to medium grained sand, brown-grey, partially oxidized; cohesive, moist to wet, very stiff.			65
1	7 10 12 14	22 ▲ 24.8 ●		1	25			ML		64
2										63
							2.74m			
3	5 7 10 11	17 ▲ 21.5 ●		2	100		ML - SILT, trace sand, trace gravel; low to medium plasticity; brown-grey, partially oxidized; cohesive, moist, stiff to very stiff.	ML/CL		62
4										61
	5 8 9 10	17 ▲ 21.2 ●		3	100			ML/CL		
5										60
							5.79m			
6	3 3 5 5	8 ▲ 20.3 ●		4	100		CL - SILTY CLAY, trace to some sand, trace gravel; fine to coarse grained sand; low to medium plasticity; sub-angular to sub-rounded, 13 mm max. size gravel, grey; cohesive, moist, firm to stiff.	ML/CL		59
7										58
	4 4 5 4	9 ▲ 23.1 ●		5	100			CL		
8										57
9	4 5 6 8	11 ▲			0					56
10										

MOTI-SOIL-REV3_EL. 1 DECIMAL PLACE 32079_FRASER VALLEY HWY 1 CORRIDOR.GPJ MOTI_DATATEMPLATE_REV3.GDT 23-5-19

Legend Sample Type: A-Auger; B-Becker; C-Core; G-Grab; V-Vane; L#-Lab Sample; S-Split Spoon; O-Odex (air rotary); W-Wash (mud return); T-Shelby Tube

Legend Installation: Sand; Grout; Cement; Bentonite; Drill Cuttings; Slotted; Slough; Piezometer

Final Depth of Hole: 30.8 m

Depth to Top of Rock:

SUMMARY LOG

Drill Hole #: **MRH22-SEG 2-01**

BRITISH COLUMBIA — Ministry of Transportation and Infrastructure

Project: **Fraser Valley Highway 1 Corridor Improvement**
Location: Abbotsford, BC

Prepared by: 32079
Thurber Engineering Ltd.

Logged by: ANR Reviewed by: ANR

Datum: UTM-Nad83 Alignment:
Northing/Easting: 5432819 , 547153 Station/Offset:
Elevation: 65.3 m *Coordinates taken with GPS*

Date(s) Drilled: 2022-05-02
Company: Mud Bay
Driller:
Drill Make/Model: Fraste XL -03
Drilling Method: Mud Rotary

DEPTH (m)	DRILLING DETAILS (SPT)	Pocket Penetrometer / Shear Strength (kPa) 100 200 300 400 / SPT "N" (BLOWS/300 mm) / W_P% 20 — W% 40 60 — W_L% 80	SAMPLE TYPE	SAMPLE NO	RECOVERY (%)	SOIL SYMBOL	SOIL DESCRIPTION	CLASSIFICATION	COMMENTS TESTING — Drillers Estimate {G % S % F %}	ELEVATION (m)
10	8 7 8 10	15			0		CL - SILTY CLAY, trace to some sand, trace gravel; fine to coarse grained sand; low to medium plasticity; sub-angular to sub-rounded, 13 mm max. size gravel, grey; cohesive, moist, firm to stiff. *(continued)*			55
11										54
12	3 4 7 9	11 20.2		6	100			CL		53
13										52
14	6 7 9 8	16 27.4		7	13			CL		51
15	5 6 7 9	13 19.5		8	100			CL		50
16	6 8 12 15	20 23.1		9	100			CL		49
17		17.5		10 11			16.76m ML - SILT, sandy; low plasticity; fine to medium grained sand, grey; cohesive, moist, very stiff.	ML CL/ML		48
18	7 9 13 18	22 17.8		12	100		17.98m CL - SILTY CLAY, trace sand, trace gravel; medium plasticity; fine to coarse grained sand; sub-angular to sub-rounded, 13 mm max. size, grey; cohesive, moist, very stiff.	CL		47
19										46
20										

Legend Sample Type: A-Auger, B-Becker, C-Core, G-Grab, V-Vane, L#-Lab Sample, S-Split Spoon, O-Odex (air rotary), W-Wash (mud return), T-Shelby Tube

Legend Installation: Sand, Grout, Cement, Bentonite, Drill Cuttings, Slotted, Slough, Piezometer

Final Depth of Hole: 30.8 m
Depth to Top of Rock:

MOTI-SOIL-REV3_EL. 1 DECIMAL PLACE 32079_FRASER VALLEY HWY 1 CORRIDOR.GPJ MOTI_DATATEMPLATE_REV3.GDT 23-5-19

SUMMARY LOG

Drill Hole #: **MRH22-SEG 2-01**

Ministry of Transportation and Infrastructure

Project: **Fraser Valley Highway 1 Corridor Improvement**

Location: Abbotsford, BC

Prepared by: 32079 Thurber Engineering Ltd.

Logged by: ANR Reviewed by: ANR

Datum: UTM-Nad83 Alignment:

Northing/Easting: 5432819 , 547153 Station/Offset:

Elevation: 65.3 m *Coordinates taken with GPS*

Date(s) Drilled: 2022-05-02

Company: Mud Bay

Driller:

Drill Make/Model: Fraste XL -03

Drilling Method: Mud Rotary

DEPTH (m)	DRILLING DETAILS SPT	Pocket Penetrometer / Shear Strength (kPa) 100 200 300 400; SPT "N" (BLOWS/300 mm); W_P% 20, W% 40 60, W_L% 80	SAMPLE TYPE	SAMPLE NO	RECOVERY (%)	SOIL SYMBOL	SOIL DESCRIPTION	CLASSIFICATION	COMMENTS TESTING Drillers Estimate {G % S % F %}	ELEVATION (m)
20										45
21	7 9 12 23	21 19.4 20.7		13 14	100		CL - SILTY CLAY, trace sand, trace gravel; medium plasticity; fine to coarse grained sand; sub-angular to sub-rounded, 13 mm max. size, grey; cohesive, moist, very stiff. *(continued)*	CL		44
22							21.56m ML - SILT, sandy to SILT and SAND; low plasticity; fine grained sand; interbedded, grey; cohesive, moist, stiff.	SM & CL/ML		43
23										42
24	18 17 17 20	34 8.6		15	50		23.47m ML - SILT, sandy; low to no plasticity; fine to medium grained sand, grey; cohesive, moist, hard to very stiff.	SW-SM		41
25										40
26										39
27	23 14 16 16	30 24.0		16	60			ML		38
28										37
29										36
30										

Legend Sample Type: A-Auger, B-Becker, C-Core, G-Grab, V-Vane, L#-Lab Sample, S-Split Spoon, O-Odex (air rotary), W-Wash (mud return), T-Shelby Tube

Legend Installation: Sand, Grout, Cement, Bentonite, Drill Cuttings, Slotted, Slough, Piezometer

Final Depth of Hole: 30.8 m

Depth to Top of Rock:

MOTI-SOIL-REV3_EL. 1 DECIMAL PLACE 32079_FRASER VALLEY HWY 1 CORRIDOR.GPJ MOTI_DATATEMPLATE_REV3.GDT 23-5-19

Ministry of Transportation and Infrastructure

SUMMARY LOG

Drill Hole #: **MRH22-SEG 2-01**

Project: **Fraser Valley Highway 1 Corridor Improvement**

Location: Abbotsford, BC

Prepared by: 32079 Thurber Engineering Ltd.

Logged by: ANR Reviewed by: ANR

Datum: UTM-Nad83 Alignment:

Northing/Easting: 5432819 , 547153 Station/Offset:

Elevation: 65.3 m *Coordinates taken with GPS*

Date(s) Drilled: 2022-05-02

Company: Mud Bay

Driller:

Drill Make/Model: Fraste XL -03

Drilling Method: Mud Rotary

DEPTH (m)	DRILLING DETAILS	Pocket Penetrometer / Shear Strength (kPa) 100 200 300 400; SPT "N" (BLOWS/300 mm); W_P% 20 40 W% 60 W_L% 80	SAMPLE TYPE	SAMPLE NO	RECOVERY (%)	SOIL SYMBOL	SOIL DESCRIPTION	CLASSIFICATION	COMMENTS TESTING Drillers Estimate *{G % S % F %}*	ELEVATION (m)
30	S P T: 5 11 12 12	23 ▲● 27.0		17	100		ML - SILT, sandy; low to no plasticity; fine to medium grained sand, grey; cohesive, moist, hard to very stiff. *(continued)*	ML		35
31							30.78m End of Hole at 30.8 m depth, VWP 140394 installed at 16.3 m depth.			34
32										33
33										32
34										31
35										30
36										29
37										28
38										27
39										26
40										

Legend Sample Type: A-Auger; B-Becker; C-Core; G-Grab; V-Vane; L#-Lab Sample; S-Split Spoon; O-Odex (air rotary); W-Wash (mud return); T-Shelby Tube

Legend Installation: Sand; Grout; Cement; Bentonite; Drill Cuttings; Slotted; Slough; Piezometer

Final Depth of Hole: 30.8 m

Depth to Top of Rock:

MOTI-SOIL-REV3_EL. 1 DECIMAL PLACE 32079_FRASER VALLEY HWY 1 CORRIDOR.GPJ MOTI_DATATEMPLATE_REV3.GDT 23-5-19

SUMMARY LOG

Drill Hole #: **SCPT22-SEG 2-02**

Ministry of Transportation and Infrastructure

Project: **Fraser Valley Highway 1 Corridor Improvement**

Location: Abbotsford, BC

Prepared by: 32079 Thurber Engineering Ltd.

Logged by: SY Reviewed by: ANR

Datum: UTM-Nad83 Alignment:

Northing/Easting: 5432815 , 547143 Station/Offset:

Elevation: 65.1 m *Coordinates taken with GPS*

Date(s) Drilled: 2022-04-28

Company: OnTrack

Driller: Craig

Drill Make/Model: MPP Geoteck 60

Drilling Method: SCPT/Solid Stem Auger

DEPTH (m)	DRILLING DETAILS	Pocket Penetrometer / Shear Strength (kPa) 100 200 300 400; SPT "N" (BLOWS/300 mm); W_P% 20, W% 40 60, W_L% 80	SAMPLE TYPE	SAMPLE NO	RECOVERY (%)	SOIL SYMBOL	SOIL DESCRIPTION	CLASSIFICATION	COMMENTS TESTING (Drillers Estimate {G % S % F %})	ELEVATION (m)
0							CL - SILTY CLAY, trace organics, trace sand, trace gravel; medium plasticity; some roots; grey brown with trace oxidation; cohesive, moist, firm.			65
1		22.5		1				CL		64
							1.52m			
2		19.5		2			CL - SILTY CLAY, trace sand; low to medium plasticity; fine grained sand, brown; cohesive, moist, firm.	CL	Atterberg (Sa#2): PL:16% LL:26%	63
3							3.05m			62
							CL - SILTY CLAY, trace sand, trace gravel; medium plasticity; grey; cohesive, moist, firm to stiff.			
4		18.8		3				CL		61
5										60
6		17.9		4				CL	Atterberg (Sa#4): PL:15% LL:29%	59
7		19.4		5				CL		58
8										57
9		18.6		6				CL	Atterberg (Sa#6): PL:16% LL:28%	56
10		19.2								

Legend Sample Type: A-Auger, B-Becker, C-Core, G-Grab, V-Vane, L#-Lab Sample, S-Split Spoon, O-Odex (air rotary), W-Wash (mud return), T-Shelby Tube

Legend Installation: Sand, Grout, Cement, Bentonite, Drill Cuttings, Slotted, Slough, Piezometer

Final Depth of Hole: 15.2 m

Depth to Top of Rock:

MOTI-SOIL-REV3_EL. 1 DECIMAL PLACE 32079_FRASER VALLEY HWY 1 CORRIDOR.GPJ MOTI_DATATEMPLATE_REV3.GDT 5/18/23

SUMMARY LOG

Drill Hole #: **SCPT22-SEG 2-02**

Ministry of Transportation and Infrastructure

Project: **Fraser Valley Highway 1 Corridor Improvement**

Location: Abbotsford, BC

Prepared by: 32079
Thurber Engineering Ltd.

Logged by: SY Reviewed by: ANR

Datum: UTM-Nad83 Alignment:

Northing/Easting: 5432815 , 547143 Station/Offset:

Elevation: 65.1 m *Coordinates taken with GPS*

Date(s) Drilled: 2022-04-28
Company: OnTrack
Driller: Craig
Drill Make/Model: MPP Geoteck 60
Drilling Method: SCPT/Solid Stem Auger

DEPTH (m)	DRILLING DETAILS (SPT)	Pocket Penetrometer / Shear Strength (kPa) 100 200 300 400; SPT "N" (BLOWS/300 mm); W_P% 20 — W% 40 60 — W_L% 80	SAMPLE TYPE	SAMPLE NO	RECOVERY (%)	SOIL SYMBOL	SOIL DESCRIPTION	CLASSIFICATION	COMMENTS TESTING (Drillers Estimate {G % S % F %})	ELEVATION (m)
10				7			CL - SILTY CLAY, trace sand, trace gravel; medium plasticity; grey; cohesive, moist, firm to stiff. *(continued)*	CL		55
11										54
		19:1		8				CL	Atterberg (Sa#8): PL:16% LL:27%	
12										53
13										52
		19:0		9				CL	Atterberg (Sa#9): PL:16% LL:27%	
14										51
		18:9		10				CL		
15							15.24m			50
							End of hole at 15.2 m depth. Hole open to 14.3 m depth. Water observed at 14.2 m depth.			
16										49
17										48
18										47
19										46
20										

Legend Sample Type: A-Auger; B-Becker; C-Core; G-Grab; V-Vane; L#-Lab Sample; S-Split Spoon; O-Odex (air rotary); W-Wash (mud return); T-Shelby Tube

Legend Installation: Sand; Grout; Cement; Bentonite; Drill Cuttings; Slotted; Slough; Piezometer

Final Depth of Hole: 15.2 m
Depth to Top of Rock:

MOTI-SOIL-REV3_EL. 1 DECIMAL PLACE 32079_FRASER VALLEY HWY 1 CORRIDOR.GPJ MOTI_DATATEMPLATE_REV3.GDT 5/18/23

SUMMARY LOG

TETRA TECH

Drill Hole #: **PTH21-03**

Project: **TCFV Highway Widening - Segment 2**

Location: Abbotsford, BC - Highway 1

Date(s) Drilled: 06/11/2021

Company: Downrite Drilling

Driller: James

Drill Make/Model: Roto Sonic 160 AMS

Drilling Method: Sonic

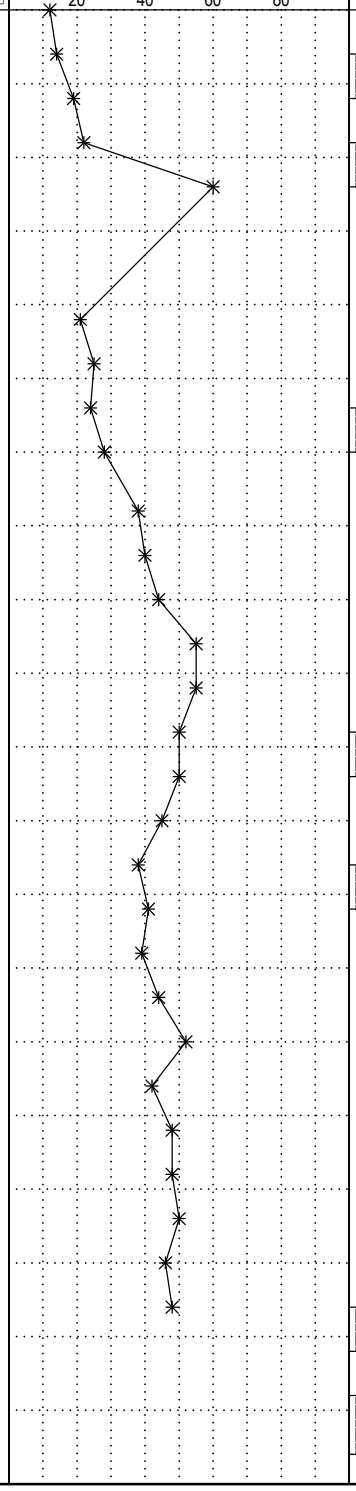
Prepared by: 704-ENG.VGEO04000-01 Shane Mulholland

Logged by: AL Reviewed by: TG

Datum: NAD83 Z10N Geodetic Alignment: L2000

Northing/Easting: 5432791.52 , 547175.54 Station/Offset: 2052+32.9

Elevation: 64.91 m *Coordinates Surveyed*



DEPTH (m)	SAMPLE NO	RECOVERY (%)	SOIL DESCRIPTION	CLASSIFICATION	COMMENTS TESTING	ELEVATION (m)
0	S1		TS - TOPSOIL. 0.05m	TS		64
1	S2		SP-SM - SAND, fine to medium sand, poorly graded, some gravel, occasional organics (rootlets), brown, homogeneous, (FILL), non-cohesive, dry to moist, compact.		- At 0.9 m depth sulfate, water-soluble < 0.050 - At 0.9 m depth chloride, water-soluble < 0.002	63
2				SP-SM		
3	S3				- At 2.7 m depth sulfate, water-soluble < 0.050 - At 2.7 m depth chloride, water-soluble < 0.002	62
4						61
5	S4		SM1 - SILTY SAND, fine sand, poorly graded, trace sub-rounded gravel up to 25 mm diameter, brown, heterogeneous, non-cohesive, moist, compact to dense. 4.6m	SM1	- Depth to water of 5.23 m recorded on 8/16/2021	60
6	S5					59
7						58
8			ML - SILT, low plastic, trace fine sand, grey, homogeneous, cohesive, w > PL, firm to stiff. 8.4m			57
9	S6					56
10	S7					55

Legend Sample Type: A-Auger; B-Becker; C-Core; G-Grab; V-Vane; L#-Lab Sample; S-Split Spoon; O-Odex (air rotary); W-Wash (mud return); T-Shelby Tube

Legend Installation: Sand; Grout; Cement; Bentonite; Drill Cuttings; Slotted; Slough; Piezometer

Final Depth of Hole: 18.3 m

Depth to Top of Rock: N/A

TETRA TECH

SUMMARY LOG

Drill Hole #: **PTH21-03**

Project: **TCFV Highway Widening - Segment 2**

Location: Abbotsford, BC - Highway 1

Prepared by: 704-ENG.VGEO04000-01 Shane Mulholland

Logged by: AL Reviewed by: TG

Datum: NAD83 Z10N Geodetic Alignment: L2000

Northing/Easting: 5432791.52 , 547175.54 Station/Offset: 2052+32.9

Elevation: 64.91 m *Coordinates Surveyed*

Date(s) Drilled: 06/11/2021

Company: Downrite Drilling

Driller: James

Drill Make/Model: Roto Sonic 160 AMS

Drilling Method: Sonic

DEPTH (m)	DRILLING DETAILS	⊕ Field Vane ⊢ Remold Field Vane (kPa) ⊗ Lab Vane Peak ⨯ Lab Vane - Remold (kPa) ■ UU Triaxial (kPa) ▲ SPT "N" (BLOWS/300 mm) ▲ △ LPT "N" (BLOWS/300 mm) △ Wp% ●W% ⊙ Organic% WL% 20 40 60 80	SAMPLE TYPE	SAMPLE NO	RECOVERY (%)	SOIL SYMBOL	SOIL DESCRIPTION	CLASSIFICATION	COMMENTS TESTING	SLOTTED PIEZOMETER	ELEVATION (m)
10							ML - SILT, low plastic, trace fine sand, grey, homogeneous, cohesive, w > PL, firm to stiff. *(continued)*				54
11				SH01	100						53
12								ML			52
13				S10							51
14											50
15				S11			15.2m				49
16							NO RECOVERY				48
17											47
18							18.3m				46
19							END TESTHOLE AT 18.3 m DEPTH (Target Depth). - Testhole location surveyed by Stantec. - Soil descriptions are based on visual classifications, field observations and testing, drill performance, and laboratory testing. Some variation through the interpreted soil layers is expected. - Upon completion, testhole was reinstated in accordance with the BC Groundwater Protection Regulation.				45
20											

Legend Sample Type: **A**-Auger, **B**-Becker, **C**-Core, **G**-Grab, **V**-Vane, **L#**-Lab Sample, **S**-Split Spoon, **O**-Odex (air rotary), **W**-Wash (mud return), **T**-Shelby Tube

Legend Installation: Sand, Grout, Cement, Bentonite, Drill Cuttings, Slotted, Slough, Piezometer

Final Depth of Hole: 18.3 m

Depth to Top of Rock: N/A

TETRA TECH

SUMMARY LOG

Drill Hole #: **PTH21-03**

Project: **TCFV Highway Widening - Segment 2**

Location: Abbotsford, BC - Highway 1

Prepared by: 704-ENG.VGEO04000-01 Shane Mulholland

Logged by: AL Reviewed by: TG

Datum: NAD83 Z10N Geodetic Alignment: L2000

Northing/Easting: 5432791.52 , 547175.54 Station/Offset: 2052+32.9

Elevation: 64.91 m *Coordinates Surveyed*

Date(s) Drilled: 06/11/2021

Company: Downrite Drilling

Driller: James

Drill Make/Model: Roto Sonic 160 AMS

Drilling Method: Sonic

DEPTH (m)	DRILLING DETAILS	⊕ Field Vane ┼ Remold Field Vane (kPa) ⊗ Lab Vane Peak ╳ Lab Vane - Remold (kPa) ■ UU Triaxial (kPa) ▲ SPT "N" (BLOWS/300 mm) ▲ △ LPT "N" (BLOWS/300 mm) △ Wp% ●W% ⊙ Organic% WL% 20 40 60 80	SAMPLE TYPE	SAMPLE NO	RECOVERY (%)	SOIL SYMBOL	SOIL DESCRIPTION	CLASSIFICATION	COMMENTS TESTING	SLOTTED PIEZOMETER	ELEVATION (m)
20							- A standpipe piezometer was installed at this location to a depth of 9.1 m with a 1.5 m slotted screen from 7.6 m to 9.1 m.				44
21											43
22											42
23											41
24											40
25											39
26											38
27											37
28											36
29											35
30											

Legend Sample Type: A-Auger, B-Becker, C-Core, G-Grab, V-Vane, L#-Lab Sample, S-Split Spoon, O-Odex (air rotary), W-Wash (mud return), T-Shelby Tube

Legend Installation: Sand, Grout, Cement, Bentonite, Drill Cuttings, Slotted, Slough, Piezometer

Final Depth of Hole: 18.3 m

Depth to Top of Rock: N/A

TETRA TECH

SUMMARY LOG

Drill Hole #: **PTH21-04**

Project: **TCFV Highway Widening - Segment 2**

Location: Abbotsford, BC - Highway 1

Date(s) Drilled: 06/15/2021 to 06/16/2021

Company: Downrite Drilling

Prepared by: 704-ENG.VGEO04000-01 Shane Mulholland

Logged by: AL Reviewed by: TG

Datum: NAD83 Z10N Geodetic Alignment: L2500

Northing/Easting: 5432782.81 , 547214.61 Station/Offset: 2552+70.5

Elevation: 65.31 m *Coordinates Surveyed*

Driller: Robert

Drill Make/Model: Fraste XL Max 170

Drilling Method: Sonic

DEPTH (m)	DRILLING DETAILS	⊕ Field Vane ⊕ Remold Field Vane (kPa) ⊗ Lab Vane Peak ⊗ Lab Vane - Remold (kPa) ■ UU Triaxial (kPa) ▲ SPT "N" (BLOWS/300 mm) ▲ △ LPT "N" (BLOWS/300 mm) △ Wp% ●W% ⊙ Organic% WL% 20 40 60 80	SAMPLE TYPE	SAMPLE NO	RECOVERY (%)	SOIL SYMBOL	SOIL DESCRIPTION	CLASSIFICATION	COMMENTS TESTING	ELEVATION (m)
0				S1			TS - TOPSOIL. 0.05m	TS		65
							SM1 - SILTY SAND, fine sand, poorly graded, trace gravel, brown, heterogeneous, (FILL), non-cohesive, moist.			
1				S2						64
								SM1		
2				S3						63
3							3.0m			
							ML - SILT, low plastic, trace fine sand, trace sub-angular to sub-rounded gravel up to 25 mm diameter, grey, homogeneous, cohesive, w ~ PL to w > PL, firm to stiff.			62
4				S4						61
				SH01	100					
5	5.2m ▼							ML		60
				S5						
6				SH02	100					59
7				S5a						
				S6			7.3m			58
							SM4 - SILTY SAND, fine sand, poorly graded, trace sub-angular gravel up to 25 mm diameter, brown to grey, heterogeneous, cohesive, wet.			
8								SM4		
										57
				S7			8.5m			
9							ML - SILT, low plastic, trace sand, trace gravel, grey, heterogeneous, w > PL, stiff.			
										56
10										

Legend

Sample Type: **A**-Auger, **B**-Becker, **C**-Core, **G**-Grab, **V**-Vane, **L#**-Lab Sample, **S**-Split Spoon, **O**-Odex (air rotary), **W**-Wash (mud return), **T**-Shelby Tube

Final Depth of Hole: 30.5 m

Depth to Top of Rock: N/A

TETRA TECH

SUMMARY LOG

Drill Hole #: **PTH21-04**

Project: **TCFV Highway Widening - Segment 2**

Location: Abbotsford, BC - Highway 1

Date(s) Drilled: 06/15/2021 to 06/16/2021

Company: Downrite Drilling

Prepared by: 704-ENG.VGEO04000-01 Shane Mulholland

Logged by: AL Reviewed by: TG

Datum: NAD83 Z10N Geodetic Alignment: L2500

Northing/Easting: 5432782.81 , 547214.61 Station/Offset: 2552+70.5

Elevation: 65.31 m *Coordinates Surveyed*

Driller: Robert

Drill Make/Model: Fraste XL Max 170

Drilling Method: Sonic

DEPTH (m)	DRILLING DETAILS	⊕ Field Vane ⊣ Remold Field Vane (kPa) ⊗ Lab Vane Peak ⨯ Lab Vane - Remold (kPa) ■ UU Triaxial (kPa) ▲ SPT "N" (BLOWS/300 mm) ▲ △ LPT "N" (BLOWS/300 mm) △ Wp% ●W% ⊙ Organic% WL% 20 40 60 80	SAMPLE TYPE	SAMPLE NO	RECOVERY (%)	SOIL SYMBOL	SOIL DESCRIPTION	CLASSIFICATION	COMMENTS TESTING	ELEVATION (m)
10							ML - SILT, low plastic, trace sand, trace gravel, grey, heterogeneous, w > PL, stiff. *(continued)*			55
11				S8				ML		54
				S9			- sand lense at 11.3 m depth. - becomes clayey from 11.6 m to 11. 9 m depth.			
12										53
13										
				S10			- sand, fine to medium, presence of wood chips at 13.3 m depth.			52
14							14.0m			
				S11			CL - SILTY CLAY, low to medium plastic, trace fine sand, trace sub-rounded gravel up to 10 mm diameter, grey, heterogeneous, cohesive, w > PL, firm to stiff.			51
15										
16										50
				S12			- becomes silt, trace sand from 16.2 m to 16.8 m depth.			49
17								CL		
				S13						48
18										
19										47
				S14						46
20							19.8m			

Legend Sample Type: **A**-Auger, **B**-Becker, **C**-Core, **G**-Grab, **V**-Vane, **L#**-Lab Sample, **S**-Split Spoon, **O**-Odex (air rotary), **W**-Wash (mud return), **T**-Shelby Tube

Final Depth of Hole: 30.5 m

Depth to Top of Rock: N/A

TETRA TECH

SUMMARY LOG

Drill Hole #: **PTH21-04**

Project: **TCFV Highway Widening - Segment 2**

Location: Abbotsford, BC - Highway 1

Date(s) Drilled: 06/15/2021 to 06/16/2021

Company: Downrite Drilling

Prepared by: 704-ENG.VGEO04000-01 Shane Mulholland

Logged by: AL Reviewed by: TG

Datum: NAD83 Z10N Geodetic Alignment: L2500

Northing/Easting: 5432782.81 , 547214.61 Station/Offset: 2552+70.5

Elevation: 65.31 m *Coordinates Surveyed*

Driller: Robert

Drill Make/Model: Fraste XL Max 170

Drilling Method: Sonic

DEPTH (m)	DRILLING DETAILS	⊕ Field Vane ⊕ Remold Field Vane (kPa) ⊗ Lab Vane Peak ⊗ Lab Vane - Remold (kPa) ■ UU Triaxial (kPa) ▲ SPT "N" (BLOWS/300 mm) ▲ △ LPT "N" (BLOWS/300 mm) △ Wp% ●W% ⊙ Organic% WL% 20 40 60 80	SAMPLE TYPE	SAMPLE NO	RECOVERY (%)	SOIL SYMBOL	SOIL DESCRIPTION	CLASSIFICATION	COMMENTS TESTING	ELEVATION (m)
20							ML - SILT, low plastic, trace fine sand, grey, homogeneous, cohesive, w > PL, firm to stiff. *(continued)*	ML		45
21							21.3m			
				S15			SM4 - SILTY SAND, fine to medium sand, trace sub-angular gravel up to 25 mm diameter, occasional cobbles, grey, heterogeneous, cohesive, wet, dense.			44
22				S16						43
23										
										42
24				S17				SM4		
25										41
				S18						40
26										
										39
27				S19						
							27.4m			38
28				S20			ML - SILT, low plastic, trace fine sand, grey, homogeneous, cohesive, w > PL, soft to firm.			
										37
29				S21				ML		
										36
30										

Legend Sample Type: **A**-Auger, **B**-Becker, **C**-Core, **G**-Grab, **V**-Vane, **L#**-Lab Sample, **S**-Split Spoon, **O**-Odex (air rotary), **W**-Wash (mud return), **T**-Shelby Tube

Final Depth of Hole: 30.5 m

Depth to Top of Rock: N/A

TETRA TECH

SUMMARY LOG

Drill Hole #: **PTH21-04**

Project: **TCFV Highway Widening - Segment 2**

Location: Abbotsford, BC - Highway 1

Date(s) Drilled: 06/15/2021 to 06/16/2021

Company: Downrite Drilling

Prepared by: 704-ENG.VGEO04000-01
Shane Mulholland

Logged by: AL Reviewed by: TG

Datum: NAD83 Z10N Geodetic Alignment: L2500

Northing/Easting: 5432782.81 , 547214.61 Station/Offset: 2552+70.5

Elevation: 65.31 m *Coordinates Surveyed*

Driller: Robert

Drill Make/Model: Fraste XL Max 170

Drilling Method: Sonic

DEPTH (m)	DRILLING DETAILS	⊕ Field Vane ⊕ Remold Field Vane (kPa) ⊗ Lab Vane Peak ⊗ Lab Vane - Remold (kPa) ■ UU Triaxial (kPa) ▲ SPT "N" (BLOWS/300 mm) ▲ △ LPT "N" (BLOWS/300 mm) △ Wp% ●W% ⊙ Organic% WL% 20 40 60 80	SAMPLE TYPE	SAMPLE NO	RECOVERY (%)	SOIL SYMBOL	SOIL DESCRIPTION	CLASSIFICATION	COMMENTS TESTING	ELEVATION (m)
30				S22						35
							30.5m END TESTHOLE AT 30.5 m DEPTH (Target Depth). - Testhole location surveyed by Stantec. - Soil descriptions are based on visual classifications, field observations and testing, drill performance, and laboratory testing. Some variation through the interpreted soil layers is expected. - Testhole backfilled with bentonite chips, sand, and asphalt patch.			
31										34
32										33
33										32
34										31
35										30
36										29
37										28
38										27
39										26
40										

Legend Sample Type: **A**-Auger, **B**-Becker, **C**-Core, **G**-Grab, **V**-Vane, **L#**-Lab Sample, **S**-Split Spoon, **O**-Odex (air rotary), **W**-Wash (mud return), **T**-Shelby Tube

Final Depth of Hole: 30.5 m
Depth to Top of Rock: N/A

MOTI-SOIL-REV3 ENG-VGEO04000-01 - TCFV SEGMENT 2 WIDENING 080321.GPJ MOTI_DATATEMPLATE_REV3.GDT 9/28/21

SUMMARY LOG

TETRA TECH

Project: **TCFV Highway Widening - Segment 2**

Location: Abbotsford, BC - Highway 1

Prepared by: 704-ENG.VGEO04000-01 Shane Mulholland

Logged by: SM Reviewed by: TG

Datum: NAD83 Z10N Geodetic Alignment: L2500

Northing/Easting: 5432554.19 , 547563.66 Station/Offset: 2556+88.2

Elevation: 66.26 m *Coordinates Surveyed*

Drill Hole #: **WTH21-27**

Date(s) Drilled: 05/13/2021

Company: Omega Environmental Drilling

Driller: Dan Gibson

Drill Make/Model: B54 Auger Rig

Drilling Method: Solid Stem Auger

⊕ Field Vane ┼ Remold Field Vane (kPa)
⊗ Lab Vane Peak ╳ Lab Vane - Remold (kPa)
■ UU Triaxial (kPa)
▲ SPT "N" (BLOWS/300 mm) ▲
△ LPT "N" (BLOWS/300 mm) △
Wp% ●W% ⊙ Organic% WL%
20 40 60 80

DEPTH (m)	DRILLING DETAILS	SPT	SAMPLE TYPE	SAMPLE NO	RECOVERY (%)	SOIL SYMBOL	SOIL DESCRIPTION	CLASSIFICATION	COMMENTS TESTING	SLOTTED PIEZOMETER	ELEVATION (m)
0							ASPH - ASPHALT. 0.15m	ASPH			66
				1			SW - SAND, fine to coarse sand, well graded, some fine to coarse sub-angular to rounded gravel up to 50 mm diameter, brown (dry), homogeneous, (FILL), non-cohesive, dry, compact. 0.46m	SW			
1				2			ML - SILT, low plastic, some sand to sandy fine sand, brown, homogeneous, cohesive, w<PL, stiff to very stiff. 1.07m	ML			65
		1 5 7 8		3	79		ML - SILT, low plastic, some fine to coarse sand, trace fine gravel up to 15 mm diameter, grey, homogeneous, cohesive, w<PL, stiff. - at 1.22 m depth, 300 mm pocket of organic SILT, decomposed organics (charcoal), dark brown 1.98m	ML	**Sieve** (Sa#4) G:0% S:30% F:70%		
2	12 ▲			4			ML - sandy SILT, fine to medium sand, orangey brown (dry), homogeneous, dry, compact. 2.59m	SP			64
	30 ●			5			SP - SAND, fine to medium sand, poorly graded (uniformly graded), orangey brown (dry), homogeneous, non-cohesive, dry, compact. 3.05m				
3		4 7 10 11			75		SW - SAND, fine to coarse sand, well graded, some gravel to gravelly fine to coarse angular to sub-rounded gravel up to 70 mm diameter, grey (dry), homogeneous, non-cohesive, dry, compact to dense.	SW			63
	17 ▲			6							
4											62
5											61
6				7			- at 5.79 m depth, clean, fine sand 6.1m				
							END TESTHOLE AT 6.1 m DEPTH (Target Depth). - Testhole location surveyed by Stantec. - Soil descriptions are based on visual classifications, field observations and testing, drill performance, and laboratory testing. Some variation through the interpreted soil layers is expected. - Upon completion, testhole was reinstated in accordance with the BC Groundwater Protection Regulation. - A standpipe piezometer was installed at this location to a depth of 6.1 m with a 1.5 m slotted screen from 4.6 m to 6.1 m.		- Depth to water recorded as dry on 8/17/2021		60
7											59
8											58
9											57
10											

Legend Sample Type: **A**-Auger, **B**-Becker, **C**-Core, **G**-Grab, **V**-Vane, **L#**-Lab Sample, **S**-Split Spoon, **O**-Odex (air rotary), **W**-Wash (mud return), **T**-Shelby Tube

Legend Installation: Sand, Grout, Cement, Bentonite, Drill Cuttings, Slotted, Slough, Piezometer

Final Depth of Hole: 6.1 m
Depth to Top of Rock: N/A

MOTI-SOIL-REV3 ENG-VGEO04000-01 - TCFV SEGMENT 2 WIDENING 080321.GPJ MOTI_DATATEMPLATE_REV3.GDT 9/28/21

SUMMARY LOG

TETRA TECH

Drill Hole #: **WTH21-28**

Project: **TCFV Highway Widening - Segment 2**

Location: Abbotsford, BC - Highway 1

Date(s) Drilled: 04/28/2021

Company: Omega Environmental Drilling

Prepared by: 704-ENG.VGEO04000-01
Shane Mulholland

Logged by: SM Reviewed by: TG

Datum: NAD83 Z10N Geodetic Alignment: L2000

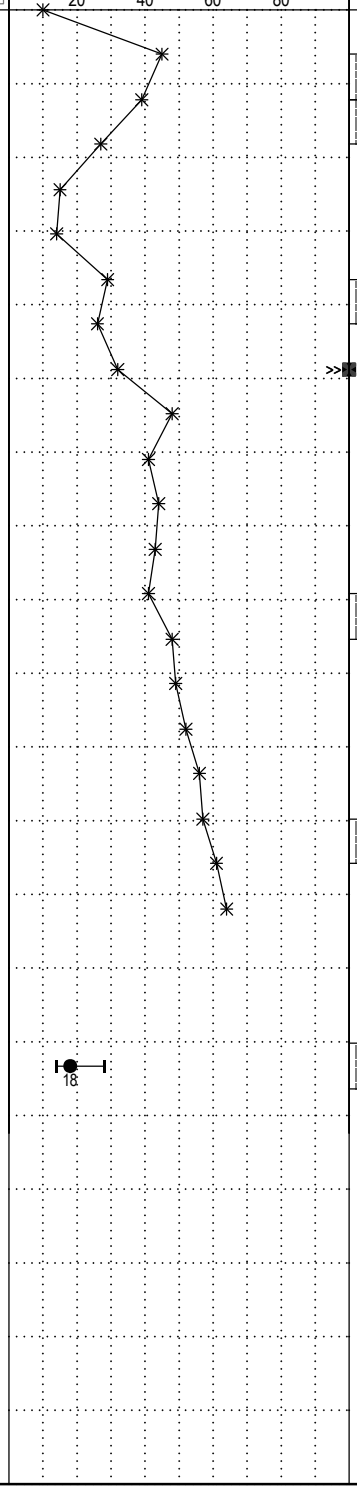
Northing/Easting: 5432473.31 , 547608.16 Station/Offset: 2057+69.8

Elevation: 66.96 m *Coordinates Surveyed*

Driller: Dan Gibson

Drill Make/Model: B54 Auger Rig

Drilling Method: Solid Stem Auger



DEPTH (m)	DRILLING DETAILS	SAMPLE TYPE	SAMPLE NO	RECOVERY (%)	SOIL SYMBOL	SOIL DESCRIPTION	CLASSIFICATION	COMMENTS TESTING	ELEVATION (m)
0						ASPH - ASPHALT. 0.13m	ASPH		
			1			SW - gravelly SAND, fine to coarse sand, fine to coarse angular to rounded gravel up to 50 mm diameter, trace cobbles up to 80 mm diameter, grey to brown, homogeneous, (FILL), non-cohesive, moist, compact.			
1			2			- wet below 0.61 m depth, absence of fine sand 1.37m	SW		66
2			3			CL - SILTY CLAY, low plastic, trace sand, trace gravel up to 10 mm diameter, grey, homogeneous, cohesive, w > PL, stiff to very stiff.		- At 2.44 m depth, pocket penetrometer maxed - At 2.44 m depth, medium torvane maxed (100 kPa)	65
3									64
4			4			- transition to CLAYEY SILT/ SILTY CLAY with increased clay content at 3.66 m depth	CL		63
5			5						62
6			6			- at 6.4 m depth, CLAY increases in plasticity with depth and difficult to remove from auger flights, w>PL		**Atterberg** (Sa#6): PL:14% LL:28%	61
7									60
8						7.62m END TESTHOLE AT 7.62 m DEPTH (Target Depth). - Testhole location surveyed by Stantec. - Soil descriptions are based on visual classifications, field observations and testing, drill performance, and laboratory testing. Some variation through the interpreted soil layers is expected. - Test backfilled to surface with drill cuttings, bentonite chips, sand, and asphalt patch.			59
9									58
10									

Legend Sample Type: **A**-Auger, **B**-Becker, **C**-Core, **G**-Grab, **V**-Vane, **L#**-Lab Sample, **S**-Split Spoon, **O**-Odex (air rotary), **W**-Wash (mud return), **T**-Shelby Tube

Final Depth of Hole: 7.6 m
Depth to Top of Rock: N/A

SUMMARY LOG

TETRA TECH

Drill Hole #: **WTH21-29**

Project: **TCFV Highway Widening - Segment 2**

Location: Abbotsford, BC - Highway 1

Date(s) Drilled: 05/13/2021

Company: Omega Environmental Drilling

Prepared by: 704-ENG.VGEO04000-01
Shane Mulholland

Logged by: SM Reviewed by: TG

Datum: NAD83 Z10N Geodetic Alignment: L2500

Northing/Easting: 5432435.18 , 547717.38 Station/Offset: 2558+82.6

Elevation: 66.61 m *Coordinates Surveyed*

Driller: Dan Gibson

Drill Make/Model: B54 Auger Rig

Drilling Method: Solid Stem Auger

⊕ Field Vane ┼ Remold Field Vane (kPa)
⊗ Lab Vane Peak ╳ Lab Vane - Remold (kPa)
■ UU Triaxial (kPa)
▲ SPT "N" (BLOWS/300 mm) ▲
△ LPT "N" (BLOWS/300 mm) △
Wp% ●W% ⊙ Organic% WL%
20 40 60 80

DEPTH (m)	DRILLING DETAILS	SAMPLE TYPE	SAMPLE NO	RECOVERY (%)	SOIL SYMBOL	SOIL DESCRIPTION	CLASSIFICATION	COMMENTS TESTING	ELEVATION (m)
0						ASPH - ASPHALT. 0.1m	ASPH		66
						SW - SAND, fine to coarse sand, well graded, some fine to coarse sub-angular to rounded gravel up to 70 mm diameter, trace cobbles up to 120 mm diameter, brown (dry), homogeneous, (FILL), non-cohesive, dry, compact to dense. 0.76m	SW		
1			1			CL - SILTY CLAY, low plastic, trace fine sand, trace gravel up to 15 mm diameter, grey, homogeneous, cohesive, w~PL, very stiff to hard.		**Atterberg** (Sa#1): PL:15% LL:27%	65
1.8m ▼						- w~PL below 1.83 m depth			
2			2						64
3							CL		
4			3			- thin beds of decayed organics, dark brown, mild organic odour below 3.66 m depth			63
5									62
6			4			6.1m			61
7						END TESTHOLE AT 6.10 m DEPTH (Target Depth). - Testhole location surveyed by Stantec. - Soil descriptions are based on visual classifications, field observations and testing, drill performance, and laboratory testing. Some variation through the interpreted soil layers is expected. - Testhole backfilled to surface with drill cuttings, bentonite chips, sand, and asphalt patch.			60
8									59
9									58
10									57

Legend
Sample Type:
A-Auger **B**-Becker **C**-Core **G**-Grab **V**-Vane
L#-Lab Sample **S**-Split Spoon **O**-Odex (air rotary) **W**-Wash (mud return) **T**-Shelby Tube

Final Depth of Hole: 6.1 m
Depth to Top of Rock: N/A

TETRA TECH

SUMMARY LOG

Project: **TCFV Highway Widening - Segment 2**

Location: Abbotsford, BC - Highway 1

Prepared by: 704-ENG.VGEO04000-01 Shane Mulholland

Logged by: SM Reviewed by: TG

Datum: NAD83 Z10N Geodetic Alignment: L2000

Northing/Easting: 5432341.56 , 547777.58 Station/Offset: 2059+84.4

Elevation: 66.35 m *Coordinates Surveyed*

Drill Hole #: **WTH21-30**

Date(s) Drilled: 04/29/2021

Company: Omega Environmental Drilling

Driller: Dan Gibson

Drill Make/Model: B54 Auger Rig

Drilling Method: Solid Stem Auger

⊕ Field Vane ┼ Remold Field Vane (kPa)
⊗ Lab Vane Peak ╳ Lab Vane - Remold (kPa)
■ UU Triaxial (kPa)
▲ SPT "N" (BLOWS/300 mm) ▲
△ LPT "N" (BLOWS/300 mm) △
Wp% ●W% ⊙ Organic% WL%
20 40 60 80

DEPTH (m)	DRILLING DETAILS	SPT	SAMPLE TYPE	SAMPLE NO	RECOVERY (%)	SOIL SYMBOL	SOIL DESCRIPTION	CLASSIFICATION	COMMENTS TESTING	SLOTTED PIEZOMETER	ELEVATION (m)
0							ASPH - ASPHALT. 0.1m	ASPH			66
				1			SW - gravelly SAND, fine to coarse sand, fine to coarse sub-angular to rounded gravel up to 50 mm diameter, trace cobbles up to 100 mm diameter, brown (dry), homogeneous, (FILL), non-cohesive, dry, compact. 0.61m	SW			
1				2							65
	1.5m ▼	4 11 13 20		3	88		CL - sandy SILTY CLAY, low plastic, fine to medium sand, poorly graded, trace fine to coarse rounded gravel up to 15 mm diameter, grey, homogeneous, cohesive, w > PL, stiff to very stiff. - water observed trickling in from testhole sidewall (North side)				
2		24 ▲									64
				4			- moist / w~PL below 2.44 m depth - thin (4 cm) layer of wet SAND and SILT layer; thin (4-12 cm) layers for fine to coarse sand, wet, occaionally throughout unit (eg. at 2.44 m, 3.96 m, 4.88 m, 7.01 m, 8.23 m depths)				
3		3 6 10 11		5	113				**Atterberg** (Sa#5): PL:15% LL:28% **Sieve** (Sa#5) G:3% S:31% F:66% - Depth to water of 3.72 m recorded on 8/16/2021		63
		16 ● 16									
4											62
		4 5 7 10		6	113						
5		12 ▲									61
				7			- clayey, moderate to high plasticity below 5.49 m depth, trace sand, w > PL				
6											60
		2 4 5 7		8	104						
7		9 ▲									59
8		3 5 6 6		9	108						58
		11 ▲									
9											57
		3 4 4 7		10	108				**Atterberg** (Sa#10): PL:14% LL:28%		
		8 ▲ ● 19									
10							END TESTHOLE AT 9.75 m DEPTH 9.75m				

Legend Sample Type: A-Auger, B-Becker, C-Core, G-Grab, V-Vane, L#-Lab Sample, S-Split Spoon, O-Odex (air rotary), W-Wash (mud return), T-Shelby Tube

Legend Installation: Sand, Grout, Cement, Bentonite, Drill Cuttings, Slotted, Slough, Piezometer

Final Depth of Hole: 9.8 m
Depth to Top of Rock: N/A

MOTI-SOIL-REV3 ENG-VGEO04000-01 - TCFV SEGMENT 2 WIDENING 080321.GPJ MOTI_DATATEMPLATE_REV3.GDT 9/28/21

TETRA TECH

SUMMARY LOG

Drill Hole #: **WTH21-30**

Project: **TCFV Highway Widening - Segment 2**

Location: Abbotsford, BC - Highway 1

Date(s) Drilled: 04/29/2021

Company: Omega Environmental Drilling

Prepared by: 704-ENG.VGEO04000-01
Shane Mulholland

Logged by: SM Reviewed by: TG

Datum: NAD83 Z10N Geodetic Alignment: L2000

Northing/Easting: 5432341.56 , 547777.58 Station/Offset: 2059+84.4

Elevation: 66.35 m *Coordinates Surveyed*

Driller: Dan Gibson

Drill Make/Model: B54 Auger Rig

Drilling Method: Solid Stem Auger

DEPTH (m)	DRILLING DETAILS	⊕ Field Vane ┼ Remold Field Vane (kPa) ⊗ Lab Vane Peak ╳ Lab Vane - Remold (kPa) ■ UU Triaxial (kPa) ▲ SPT "N" (BLOWS/300 mm) ▲ △ LPT "N" (BLOWS/300 mm) △ Wp% ●W% ⊙ Organic% WL% 20 40 60 80	SAMPLE TYPE	SAMPLE NO	RECOVERY (%)	SOIL SYMBOL	SOIL DESCRIPTION	CLASSIFICATION	COMMENTS TESTING	SLOTTED PIEZOMETER	ELEVATION (m)
10							(Target Depth). - Testhole location surveyed by Stantec. - Soil descriptions are based on visual classifications, field observations and testing, drill performance, and laboratory testing. Some variation through the interpreted soil layers is expected. - Upon completion, testhole was reinstated in accordance with the BC Groundwater Protection Regulation. - A standpipe piezometer was installed at this location to a depth of 5.5 m with a 3 m slotted screen from 2.5 m to 5.5 m.				56
11											55
12											54
13											53
14											52
15											51
16											50
17											49
18											48
19											47
20											

Legend Sample Type: **A**-Auger, **B**-Becker, **C**-Core, **G**-Grab, **V**-Vane, **L#**-Lab Sample, **S**-Split Spoon, **O**-Odex (air rotary), **W**-Wash (mud return), **T**-Shelby Tube

Legend Installation: Sand, Grout, Cement, Bentonite, Drill Cuttings, Slotted, Slough, Piezometer

Final Depth of Hole: 9.8 m
Depth to Top of Rock: N/A

SUMMARY LOG

TETRA TECH

Drill Hole #: **WTH21-32**

Project: **TCFV Highway Widening - Segment 2**

Location: Abbotsford, BC - Highway 1

Date(s) Drilled: 04/29/2021

Company: Omega Environmental Drilling

Prepared by: 704-ENG.VGEO04000-01
Shane Mulholland

Logged by: SM Reviewed by: TG

Datum: NAD83 Z10N Geodetic Alignment: L2000

Northing/Easting: 5432211.9 , 547944.96 Station/Offset: 2061+96.1

Elevation: 65.27 m *Coordinates Surveyed*

Driller: Dan Gibson

Drill Make/Model: B54 Auger Rig

Drilling Method: Solid Stem Auger

⊕ Field Vane ┼ Remold Field Vane (kPa)
⊗ Lab Vane Peak ╳ Lab Vane - Remold (kPa)
■ UU Triaxial (kPa)
▲ SPT "N" (BLOWS/300 mm) ▲
△ LPT "N" (BLOWS/300 mm) △
Wp% ●W% ⊙ Organic% WL%
20 40 60 80

DEPTH (m)	DRILLING DETAILS	SPT	SAMPLE TYPE	SAMPLE NO	RECOVERY (%)	SOIL SYMBOL	SOIL DESCRIPTION	CLASSIFICATION	COMMENTS TESTING	SLOTTED PIEZOMETER	ELEVATION (m)
0							ASPH - ASPHALT. 0.1m	ASPH			65
				1			SW - gravelly SAND, fine to coarse sand, well graded, fine to coarse sub-angular to rounded gravel up to 50 mm diameter, trace cobbles up to 130 mm diameter, brown (dry), homogeneous, (FILL), non-cohesive, dry, compact.	SW			
1							- trace organics (wood fragments) at 1.22 m 1.37m				64
		3 8 9 9			0		ML - SILT, low plastic, trace to some fine to medium sand, some sub-angular gravel up to 20 mm diameter, mottled grey to brown, homogeneous, cohesive, w<PL, stiff to very stiff.	ML			
2				2			2.74m				63
		7 19 10 5			8		SM4 - SILTY SAND, fine to coarse sand, gap graded, some fine to coarse angular to sub-rounded gravel up to 60 mm diameter, trace cobbles up to 110 mm diameter, brown with pockets of grey silt, heterogeneous, pockets of fine to medium SAND	SM4	**Sieve** (Sa#3) G:9% S:50% F:41%		
3	3.7m			3			- challenging drilling 3.96 m - 4.57 m, drill appeared to be scraping against cobbles				62
							4.88m				61
4				4			ML - SILT, low to medium plasticity, trace to some fine to medium sand, some sub-angular to rounded gravel up to 15 mm diameter, grey, homogeneous, cohesive, w<PL to w~ PL, stiff.	ML	- Depth to water of 4.84 m recorded on 8/16/2021		60
5							6.1m				59
6							END TESTHOLE AT 6.10 m DEPTH (Target Depth). - Testhole location surveyed by Stantec. - Soil descriptions are based on visual classifications, field observations and testing, drill performance, and laboratory testing. Some variation through the interpreted soil layers is expected. - Upon completion, testhole was reinstated in accordance with the BC Groundwater Protection Regulation. - A standpipe piezometer was installed at this location to a depth of 4.9 m with a 1.5 m slotted screen from 3.4 m to 4.9 m.				58
7											57
8											56
9											
10											

Legend Sample Type: **A**-Auger, **B**-Becker, **C**-Core, **G**-Grab, **V**-Vane, **L#**-Lab Sample, **S**-Split Spoon, **O**-Odex (air rotary), **W**-Wash (mud return), **T**-Shelby Tube

Legend Installation: Sand, Grout, Cement, Bentonite, Drill Cuttings, Slotted, Slough, Piezometer

Final Depth of Hole: 6.1 m
Depth to Top of Rock: N/A

TETRA TECH

SUMMARY LOG

Drill Hole #: **WTP21-09**

Project: **TCFV Highway Widening - Segment 2**

Location: Abbotsford, BC - Highway 1

Date(s) Drilled: 06/08/2021

Company: Vanport Enterprises Ltd.

Prepared by: 704-ENG.VGEO04000-01 Shane Mulholland

Logged by: KB Reviewed by: TG

Datum: NAD83 Z10N Geodetic Alignment: L2500

Northing/Easting: 5432172.13 , 548044.06 Station/Offset: 2563+02.1

Elevation: 63.67 m *Coordinates Surveyed*

Driller: JV

Drill Make/Model: Case CX160

Drilling Method: Excavator

DEPTH (m)	DRILLING DETAILS	⊕ Field Vane ⊣ Remold Field Vane (kPa) ⊗ Lab Vane Peak ⨯ Lab Vane - Remold (kPa) ■ UU Triaxial (kPa) ▲ SPT "N" (BLOWS/300 mm) ▲ △ LPT "N" (BLOWS/300 mm) △ Wp% ●W% ⊙ Organic% WL% 20 40 60 80	SAMPLE TYPE	SAMPLE NO	RECOVERY (%)	SOIL SYMBOL	SOIL DESCRIPTION		CLASSIFICATION	COMMENTS TESTING	ELEVATION (m)
0				1			TS - TOPSOIL	0.2m	TS		63
							SW - gravelly SAND, fine to coarse sand, well graded, fine to coarse sub-rounded gravel, brown (dry), heterogenous, trace to some cobbles up to 80 mm diameter, non-cohesive, dry, compact.	0.3m	SW		
1				2					SM		62
				3			SM - SILTY SAND, fine sand, poorly graded, trace to some coarse sub-rounded gravel, grey, heterogenous, non-cohesive, dry to moist, compact to dense.	1.0m	OL		
2							OL - ORGANIC SILT, low plastic, organics (wood debris up to 20 cm long), trace fine sand, trace coarse sub-rounded gravel, brown, heterogenous, trace cobbles up to 200 mm diameter, cohesive, w ~ PL, firm to stiff.	2.0m			61
				4							
3							SW - gravelly SAND, fine to coarse sand, well graded, fine to coarse sub-rounded to rounded gravel, grey to brown, heterogenous, trace to some cobbles up to 200 mm diameter, non-cohesive, moist to wet, compact.		SW		60
4											
				5							59
5								5.0m			
							END TESTPIT AT 5.0 m DEPTH (Target Depth). - Testpit location surveyed by Stantec. - Soil descriptions are based on visual classifications, field observations and testing, drill performance, and laboratory testing. Some variation through the interpreted soil layers is expected. - Testpit backfilled to surface with soil cuttings.				58
6											57
7											
											56
8											
											55
9											
											54
10											

Legend Sample Type: **A**-Auger, **B**-Becker, **C**-Core, **G**-Grab, **V**-Vane, **L#**-Lab Sample, **S**-Split Spoon, **O**-Odex (air rotary), **W**-Wash (mud return), **T**-Shelby Tube

Final Depth of Hole: 5.0 m

Depth to Top of Rock: N/A

MOTI-SOIL-REV3 ENG-VGEO04000-01 - TCFV SEGMENT 2 WIDENING 080321.GPJ MOTI_DATATEMPLATE_REV3.GDT 9/28/21

SUMMARY LOG

TETRA TECH

Drill Hole #: **WTP21-10**

Project: **TCFV Highway Widening - Segment 2**

Location: Abbotsford, BC - Highway 1

Date(s) Drilled: 06/08/2021

Company: Vanport Enterprises Ltd.

Prepared by: 704-ENG.VGEO04000-01
Shane Mulholland

Logged by: KB Reviewed by: TG

Datum: NAD83 Z10N Geodetic Alignment: L2000

Northing/Easting: 5432096.58 , 548105.72 Station/Offset: 2063+93.7

Elevation: 63.68 m *Coordinates Surveyed*

Driller: JV

Drill Make/Model: Case CX160

Drilling Method: Excavator

DEPTH (m)	DRILLING DETAILS	⊕ Field Vane ⊣ Remold Field Vane (kPa) ⊗ Lab Vane Peak ⨯ Lab Vane - Remold (kPa) ■ UU Triaxial (kPa) ▲ SPT "N" (BLOWS/300 mm) ▲ △ LPT "N" (BLOWS/300 mm) △ Wp% ●W% ⊙ Organic% WL% 20 40 60 80	SAMPLE TYPE	SAMPLE NO	RECOVERY (%)	SOIL SYMBOL	SOIL DESCRIPTION	CLASSIFICATION	COMMENTS TESTING	ELEVATION (m)
0							TS - TOPSOIL 0.2m	TS		63
1				1			SM - SILTY SAND, fine sand, poorly graded, trace to some coarse sub-rounded gravel, trace organics (rootlets), brown (dry), heterogenous, trace cobbles up to 150 mm diameter, non-cohesive, dry, compact.	SM		62
2				2			1.7m SW - gravelly SAND, fine to coarse sand, well graded, fine to coarse sub-rounded to rounded gravel, grey to brown, heterogenous, trace to some cobbles up to 200 mm diameter, non-cohesive, dry to moist, compact.	SW		61
3										60
4				3			4.5m SM - SILTY SAND, fine sand, poorly graded, grey, homogenous, non-cohesive, moist, dense.	SM		59
5							5.0m END TESTPIT AT 5.0 m DEPTH (Target Depth). - Testpit location surveyed by Stantec. - Soil descriptions are based on visual classifications, field observations and testing, drill performance, and laboratory testing. Some variation through the interpreted soil layers is expected. - Testpit backfilled to surface with soil cuttings.			58
6										57
7										56
8										55
9										54
10										

Legend Sample Type: **A**-Auger, **B**-Becker, **C**-Core, **G**-Grab, **V**-Vane, **L#**-Lab Sample, **S**-Split Spoon, **O**-Odex (air rotary), **W**-Wash (mud return), **T**-Shelby Tube

Final Depth of Hole: 5.0 m
Depth to Top of Rock: N/A

Ministry of Transportation and Infrastructure

SUMMARY LOG

Drill Hole #: **TH22-SEG 2-47**

Project: **Fraser Valley Highway 1 Corridor Improvement**
Location: Abbotsford, BC

Prepared by: 32079
Thurber Engineering Ltd.

Logged by: RJT Reviewed by: ANR

Datum: UTM-Nad83 Alignment:
Northing/Easting: 5432093 , 548158 Station/Offset:
Elevation: 64.2 m *Coordinates taken with GPS*

Date(s) Drilled: 2022-05-31
Company: OnTrack
Driller: Brandon
Drill Make/Model: Diedrick D-120
Drilling Method: DCPT/Solid Stem Auger

DEPTH (m)	DRILLING DETAILS	Pocket Penetrometer / Shear Strength (kPa) 100 200 300 400; SPT "N" (BLOWS/300 mm); W_P% 20, W% 40 60, W_L% 80	SAMPLE TYPE	SAMPLE NO	RECOVERY (%)	SOIL SYMBOL	SOIL DESCRIPTION	CLASSIFICATION	COMMENTS TESTING Drillers Estimate *{G % S % F %}*	ELEVATION (m)
0		3.9		1			SP - SAND and GRAVEL, trace silt; fine to coarse grained; 76 mm max. size gravel; non-cohesive, grey, moist.	SW/GW		64
1		10.3		2				SP/GP		63
							1.52m			
2		8.3		3			SP - SAND and GRAVEL, trace silt; medium to fine grained sand; sub-angular to sub-rounded, 64 mm max. size gravel, brown; non-cohesive, moist, dense to very dense.	SP-SM		62
3		5.7		4				SP/GP		61
4		5.5		5				SP/GP		60
							4.42m			
5		19.5		6			CL - SILTY CLAY, trace to some sand; low to medium plasticity; fine to coarse grained sand, grey; cohesive, wet to moist, hard.	ML/CL		59
6		14.9		7				CL		58
							6.1m			
7							End of hole at 6.1 m depth. Hole open to 3.1 m depth. No groundwater observed upon completion of drilling.			57
8										56
9										55
10										

Legend Sample Type: A-Auger, B-Becker, C-Core, G-Grab, V-Vane, L#-Lab Sample, S-Split Spoon, O-Odex (air rotary), W-Wash (mud return), T-Shelby Tube

Legend Installation: Sand, Grout, Cement, Bentonite, Drill Cuttings, Slotted, Slough, Piezometer

Final Depth of Hole: 6.1 m
Depth to Top of Rock:

MOTI-SOIL-REV3_EL. 1 DECIMAL PLACE 32079_FRASER VALLEY HWY 1 CORRIDOR.GPJ MOTI_DATATEMPLATE_REV3.GDT 23-5-19

SUMMARY LOG

TETRA TECH

Drill Hole #: **WTH21-37**

Project: **TCFV Highway Widening - Segment 2**

Location: Abbotsford, BC - Highway 1

Prepared by: 704-ENG.VGEO04000-01 Shane Mulholland

Logged by: SM Reviewed by: TG

Datum: NAD83 Z10N Geodetic Alignment: L2000

Northing/Easting: 5431684.93 , 549002.19 Station/Offset: 2074+09.9

Elevation: 66.45 m *Coordinates Surveyed*

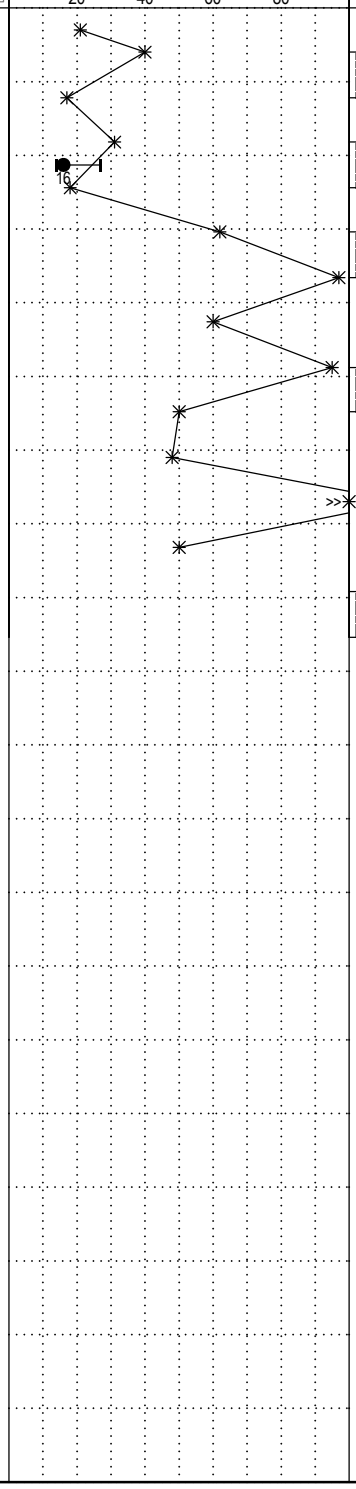
Date(s) Drilled: 05/03/2021

Company: Omega Environmental Drilling

Driller: Dan Gibson

Drill Make/Model: B54 Auger Rig

Drilling Method: Solid Stem Auger



DEPTH (m)	SAMPLE TYPE	SAMPLE NO	RECOVERY (%)	SOIL SYMBOL	SOIL DESCRIPTION	CLASSIFICATION	COMMENTS TESTING	ELEVATION (m)
0					ASPH - ASPHALT. 0.1m	ASPH		
		1			SW - gravelly SAND, fine to coarse sand, fine to coarse sub-angular to rounded gravel up to 60 mm diameter, brown (dry), homogeneous, (FILL), non-cohesive, dry to moist, compact to dense. 0.61m	SW		66
1		2			CL - SILTY CLAY, low plastic, trace to some fine to coarse sand, trace sub-rounded to rounded gravel up to 10 mm diameter, mottled grey to brown, homogeneous, cohesive, w~PL, stiff to very stiff. - some organics (wood fibres, partially decomposed) below 1.37 m depth 1.52m	CL	**Atterberg** (Sa#2): PL:14% LL:27%	65
2		3						
		4			SP - gravelly SAND, fine to medium sand, poorly graded (gap graded, skips coarse sand), angular to rounded gravel up to 70 mm diameter, trace silt, trace to some cobbles up to 90 mm diameter, homogeneous, non-cohesive, dry, dense to very dense.	SP	DCPT1 refused at depth of 2.84 m	64
3								63
							DCPT2 refused at depth of 3.73 m	
4		5			- at 4.24 m depth drill grinding on something impassible (large cobble/boulder) 4.27m			62
5					END TESTHOLE AT 4.27 m DEPTH (Auger Refusal). - Testhole location surveyed by Stantec. - Soil descriptions are based on visual classifications, field observations and testing, drill performance, and laboratory testing. Some variation through the interpreted soil layers is expected. - Testhole backfilled to surface with drill cuttings, bentonite chips, sand, and asphalt patch.			61
6								60
7								59
8								58
9								57
10								

Legend Sample Type: **A**-Auger, **B**-Becker, **C**-Core, **G**-Grab, **V**-Vane, **L#**-Lab Sample, **S**-Split Spoon, **O**-Odex (air rotary), **W**-Wash (mud return), **T**-Shelby Tube

Final Depth of Hole: 4.3 m

Depth to Top of Rock: N/A

SUMMARY LOG

TETRA TECH

Drill Hole #: **WTP21-14**

Project: **TCFV Highway Widening - Segment 2**

Location: Abbotsford, BC - Highway 1

Date(s) Drilled: 06/03/2021

Company: Vanport Enterprises Ltd.

Prepared by: 704-ENG.VGEO04000-01 Shane Mulholland

Logged by: KB Reviewed by: TG

Datum: NAD83 Z10N Geodetic Alignment: L2500

Northing/Easting: 5431706.85 , 549095.97 Station/Offset: 2574+91.6

Elevation: 67.42 m *Coordinates Surveyed*

Driller: JV

Drill Make/Model: Case CX160

Drilling Method: Excavator

DEPTH (m)	DRILLING DETAILS	⊕ Field Vane ⊣ Remold Field Vane (kPa) ⊗ Lab Vane Peak ⨯ Lab Vane - Remold (kPa) ■ UU Triaxial (kPa) ▲ SPT "N" (BLOWS/300 mm) ▲ △ LPT "N" (BLOWS/300 mm) △ Wp% ●W% ⊙ Organic% WL% (20 40 60 80)	SAMPLE TYPE	SAMPLE NO	RECOVERY (%)	SOIL SYMBOL	SOIL DESCRIPTION	CLASSIFICATION	COMMENTS TESTING	ELEVATION (m)
0							TS - TOPSOIL 0.2m	TS		
							ML - SILT, low plastic, trace to some fine sand, trace to some organics (roots, rootlets), brown (dry), heterogenous, cohesive, w < PL, firm to stiff.	ML		67
1				1			1.1m			
							SW - gravelly SAND, fine to coarse sand, well graded, fine to coarse sub-rounded to rounded gravel, trace silt, grey to brown, heterogenous, some cobbles up to 200 mm diameter, non-cohesive, moist to wet, dense.			66
2				2						
								SW		65
3										
	3.7m ▼									64
4				3			- At 3.7 m depth, water was entering the test pit from 3.7 m depth to 4.1 m depth. Material at these depths were not wet while logging. 4.2m			63
				4			SW - SAND, medium to coarse sand, well graded, some fine to coarse sub-rounded to rounded gravel, grey to brown, homogenous, non-cohesive, moist to wet, loose to compact. 5.0m	SW		
5							END TESTPIT AT 5.0 m DEPTH (Target Depth). - Testpit location surveyed by Stantec. - Soil descriptions are based on visual classifications, field observations and testing, drill performance, and laboratory testing. Some variation through the interpreted soil layers is expected. - Testpit backfilled to surface with soil cuttings.			62
6										61
7										60
8										59
9										58
10										

Legend Sample Type: **A**-Auger, **B**-Becker, **C**-Core, **G**-Grab, **V**-Vane, **L#**-Lab Sample, **S**-Split Spoon, **O**-Odex (air rotary), **W**-Wash (mud return), **T**-Shelby Tube

Final Depth of Hole: 5.0 m

Depth to Top of Rock: N/A

MOTI-SOIL-REV3 ENG-VGEO04000-01 - TCFV SEGMENT 2 WIDENING 080321.GPJ MOTI_DATATEMPLATE_REV3.GDT 9/28/21

TETRA TECH

SUMMARY LOG

Drill Hole #: **WTP21-15**

Project: **TCFV Highway Widening - Segment 2**

Location: Abbotsford, BC - Highway 1

Date(s) Drilled: 06/03/2021

Company: Vanport Enterprises Ltd.

Prepared by: 704-ENG.VGEO04000-01 Shane Mulholland

Logged by: KB Reviewed by: TG

Datum: NAD83 Z10N Geodetic Alignment: L2000

Northing/Easting: 5431683.79 , 549182.73 Station/Offset: 2075+90.1

Elevation: 68.09 m *Coordinates Surveyed*

Driller: JV

Drill Make/Model: Case CX160

Drilling Method: Excavator

⊕ Field Vane ┼ Remold Field Vane (kPa)
⊗ Lab Vane Peak ╳ Lab Vane - Remold (kPa)
■ UU Triaxial (kPa)
▲ SPT "N" (BLOWS/300 mm) ▲
△ LPT "N" (BLOWS/300 mm) △
Wp% ●W% ⊙ Organic% WL%
20 40 60 80

DEPTH (m)	DRILLING DETAILS	SAMPLE TYPE	SAMPLE NO	RECOVERY (%)	SOIL SYMBOL	SOIL DESCRIPTION	CLASSIFICATION	COMMENTS TESTING	ELEVATION (m)
0						TS - TOPSOIL	TS		68
						0.2m			
1			1			ML - SILT, low plastic, some fine sand, some organics (rootlets, charcoal, wood debris), brown (dry), heterogenous, trace cobbles up to 100 mm diameter, trace anthropogenic materials (glass fragments up to 5 cm long), (FILL), cohesive, w < PL, stiff.	ML		67
						- At 1.5 m depth, wood debris up to 20 cm long from 1.5 m to 1.6 m depth.			
2			2			1.6m SW - SAND, fine to medium sand, well graded, trace fine to coarse sub-rounded gravel, trace organics (rootlets, charcoal), grey to brown, heterogenous, non-cohesive, dry to moist, compact.	SW		66
						2.8m SP - gravelly SAND, fine sand, gap graded, coarse sub-rounded to rounded gravel, trace silt, grey to brown, heterogenous, some cobbles and boulders up to 300 mm diameter, non-cohesive, moist, dense.	SP		65
3						3.8m			
4	3.8m ▼		3			SW - gravelly SAND, medium to coarse sand, well graded, fine to coarse sub-rounded to rounded gravel, grey to brown, homogeneous, some cobbles and boulders up to 300 mm diameter, non-cohesive, moist to wet, dense.	SW		64
5						- At 3.8 m depth, water was entering the test pit from 3.8 m to 4.3 m depth. Material at these depths were not wet while logging.			63
						5.0m END TESTPIT AT 5.0 m DEPTH (Target Depth).			
6						- Testpit location surveyed by Stantec.			62
						- Soil descriptions are based on visual classifications, field observations and testing, drill performance, and laboratory testing. Some variation through the interpreted soil layers is expected.			
7						- Testpit backfilled to surface with soil cuttings.			61
8									60
9									59
10									

Legend Sample Type:
A-Auger, B-Becker, C-Core, G-Grab, V-Vane
L#-Lab Sample, S-Split Spoon, O-Odex (air rotary), W-Wash (mud return), T-Shelby Tube

Final Depth of Hole: 5.0 m
Depth to Top of Rock: N/A

SUMMARY LOG

TETRA TECH

Drill Hole #: **WTP21-18**

Project: **TCFV Highway Widening - Segment 2**

Location: Abbotsford, BC - Highway 1

Date(s) Drilled: 06/04/2021

Company: Vanport Enterprises Ltd.

Prepared by: 704-ENG.VGEO04000-01 Shane Mulholland

Logged by: KB Reviewed by: TG

Datum: NAD83 Z10N Geodetic Alignment: L2000

Northing/Easting: 5431650.43 , 549583.53 Station/Offset: 2079+92.2

Elevation: 68.24 m *Coordinates Surveyed*

Driller: JV

Drill Make/Model: Case CX160

Drilling Method: Excavator

⊕ Field Vane ⊣ Remold Field Vane (kPa)
⊗ Lab Vane Peak ⨯ Lab Vane - Remold (kPa)
■ UU Triaxial (kPa)
▲ SPT "N" (BLOWS/300 mm) ▲
△ LPT "N" (BLOWS/300 mm) △
Wp% ●W% ⊙ Organic% WL%
20 40 60 80

DEPTH (m)	DRILLING DETAILS	SAMPLE TYPE	SAMPLE NO	RECOVERY (%)	SOIL SYMBOL	SOIL DESCRIPTION	CLASSIFICATION	COMMENTS TESTING	ELEVATION (m)
0						TS - TOPSOIL 0.2m	TS		68
			1			SW - SAND, medium to coarse sand, well graded, brown (dry), homogeneous, (FILL), non-cohesive, dry, compact. 0.5m	SW		
			2			SM - SILTY SAND, fine sand, poorly graded, trace fine to coarse sub-rounded gravel, trace organics (rootlets), grey to brown, heterogenous, non-cohesive, dry to moist, compact to dense. 1.0m	SM		
1									67
2						SP - gravelly SAND, fine sand, gap graded, coarse sub-rounded to rounded gravel, trace silt, grey to brown, heterogeneous, some cobbles and boulders up to 350 mm diameter, non-cohesive, moist, compact to dense.	SP		66
			3						
3									65
4						SW - gravelly SAND, medium to coarse sand, well graded, fine to coarse sub-rounded to rounded gravel, grey to brown, homogeneous, some cobbles up to 200 mm diameter, non-cohesive, moist to wet, compact. 4.0m	SW		64
			4						
5	▼ 5.0m					- becomes wet at 5.0 m depth 5.1m			63
						END TESTPIT AT 5.1 m DEPTH (Target Depth). - Testpit location surveyed by Stantec. - Soil descriptions are based on visual classifications, field observations and testing, drill performance, and laboratory testing. Some variation through the interpreted soil layers is expected. - Testpit backfilled to surface with soil cuttings.			
6									62
7									61
8									60
9									59
10									

Legend Sample Type: A-Auger, B-Becker, C-Core, G-Grab, V-Vane, L#-Lab Sample, S-Split Spoon, O-Odex (air rotary), W-Wash (mud return), T-Shelby Tube

Final Depth of Hole: 5.1 m
Depth to Top of Rock: N/A

TETRA TECH

SUMMARY LOG

Drill Hole #: **WTP21-19**

Project: **TCFV Highway Widening - Segment 2**

Location: Abbotsford, BC - Highway 1

Date(s) Drilled: 06/04/2021

Company: Vanport Enterprises Ltd.

Prepared by: 704-ENG.VGEO04000-01 Shane Mulholland

Logged by: KB Reviewed by: TG

Datum: NAD83 Z10N Geodetic Alignment: L2500

Northing/Easting: 5431659.95 , 549682.99 Station/Offset: 2580+80.5

Elevation: 68.39 m *Coordinates Surveyed*

Driller: JV

Drill Make/Model: Case CX160

Drilling Method: Excavator

DEPTH (m)	DRILLING DETAILS	⊕ Field Vane ⊣ Remold Field Vane (kPa) ⊗ Lab Vane Peak ⨯ Lab Vane - Remold (kPa) ■ UU Triaxial (kPa) ▲ SPT "N" (BLOWS/300 mm) ▲ △ LPT "N" (BLOWS/300 mm) △ Wp% ●W% ⊙ Organic% WL% (20 40 60 80)	SAMPLE TYPE	SAMPLE NO	RECOVERY (%)	SOIL SYMBOL	SOIL DESCRIPTION	CLASSIFICATION	COMMENTS TESTING	ELEVATION (m)
0				1			TS - TOPSOIL	TS		68
							0.2m SP - gravelly SAND, fine sand, gap graded, coarse sub-rounded to rounded gravel, trace silt, grey to brown (dry), homogeneous, some cobbles up to 200 mm diameter, non-cohesive, dry, compact to dense.	SP		
1				2			0.8m SP-SM - SILTY SAND, fine sand, poorly graded, grey to brown, homogenous, non-cohesive, dry to moist, compact to dense.	SP-SM		67
							1.2m SP - gravelly SAND, fine sand, gap graded, coarse sub-rounded to rounded gravel, trace silt, grey to brown, heterogeneous, some cobbles and boulders up to 700 mm diameter, non-cohesive, moist, dense.			
2										66
3				3				SP		65
4										64
				4			4.8m SW - gravelly SAND, medium to coarse sand, well graded, fine to coarse sub-rounded to rounded gravel, grey to brown, homogeneous, some cobbles up to 150 mm diameter, non-cohesive, moist to wet, compact.	SW		
5							5.0m END TESTPIT AT 5.0 m DEPTH (Target Depth). - Testpit location surveyed by Stantec. - Soil descriptions are based on visual classifications, field observations and testing, drill performance, and laboratory testing. Some variation through the interpreted soil layers is expected. - Testpit backfilled to surface with soil cuttings.			63
6										62
7										
8										61
9										60
										59
10										

Legend Sample Type: **A**-Auger, **B**-Becker, **C**-Core, **G**-Grab, **V**-Vane, **L#**-Lab Sample, **S**-Split Spoon, **O**-Odex (air rotary), **W**-Wash (mud return), **T**-Shelby Tube

Final Depth of Hole: 5.0 m

Depth to Top of Rock: N/A

MOTI-SOIL-REV3 ENG-VGEO04000-01 - TCFV SEGMENT 2 WIDENING 080321.GPJ MOTI_DATATEMPLATE_REV3.GDT 9/28/21

SUMMARY LOG

TETRA TECH

Drill Hole #: **WTP21-20**

Project: **TCFV Highway Widening - Segment 2**

Location: Abbotsford, BC - Highway 1

Date(s) Drilled: 06/04/2021

Company: Vanport Enterprises Ltd.

Prepared by: 704-ENG.VGEO04000-01 Shane Mulholland

Logged by: KB Reviewed by: TG

Datum: NAD83 Z10N Geodetic Alignment: L2000

Northing/Easting: 5431636.39 , 549784.91 Station/Offset: 2081+94.1

Elevation: 66.51 m *Coordinates Surveyed*

Driller: JV

Drill Make/Model: Case CX160

Drilling Method: Excavator

⊕ Field Vane ⊣ Remold Field Vane (kPa)
⊗ Lab Vane Peak ✕ Lab Vane - Remold (kPa)
■ UU Triaxial (kPa)
▲ SPT "N" (BLOWS/300 mm) ▲
△ LPT "N" (BLOWS/300 mm) △
Wp% ●W% ⊙ Organic% WL%
20 40 60 80

DEPTH (m)	DRILLING DETAILS	SAMPLE TYPE	SAMPLE NO	RECOVERY (%)	SOIL SYMBOL	SOIL DESCRIPTION	CLASSIFICATION	COMMENTS TESTING	ELEVATION (m)
0						TS - TOPSOIL 0.2m	TS		
			1			SP-SM - SAND, fine sand, poorly graded, trace fine to coarse sub-rounded gravel, brown (dry), heterogenous, trace cobbles up to 100 mm diameter, non-cohesive, dry, compact to dense. 0.8m	SP-SM		66
1			2			SW - gravelly SAND, medium to coarse sand, well graded, fine to coarse sub-rounded to rounded gravel, grey to brown, homogeneous, some cobbles up to 200 mm diameter, non-cohesive, dry to moist, loose to compact. - At 0.8 m depth, sloughing from 0.8 m to 3.6 m depth	SW		65
2									64
3			3			3.6m GW - sandy GRAVEL, fine to coarse sub-rounded to rounded gravel, well graded, medium to coarse sand, grey to brown, heterogeneous, trace to some cobbles and boulders up to 300 mm diameter, non-cohesive, moist, compact. 4.1m	GW		63
4			4			SW - gravelly SAND, medium to coarse sand, well graded, fine to coarse sub-rounded to rounded gravel, grey to brown, homogeneous, some cobbles up to 200 mm diameter, non-cohesive, moist to wet, compact. 5.0m	SW		62
5						END TESTPIT AT 5.0 m DEPTH (Target Depth). - Testpit location surveyed by Stantec. - Soil descriptions are based on visual classifications, field observations and testing, drill performance, and laboratory testing. Some variation through the interpreted soil layers is expected. - Testpit backfilled to surface with soil cuttings.			61
6									60
7									59
8									58
9									57
10									

Legend
Sample Type:
A-Auger **B**-Becker **C**-Core **G**-Grab **V**-Vane
L#-Lab Sample **S**-Split Spoon **O**-Odex (air rotary) **W**-Wash (mud return) **T**-Shelby Tube

Final Depth of Hole: 5.0 m
Depth to Top of Rock: N/A

TETRA TECH

SUMMARY LOG

Drill Hole #: **WTP21-21**

Project: **TCFV Highway Widening - Segment 2**

Location: Abbotsford, BC - Highway 1

Date(s) Drilled: 06/04/2021

Company: Vanport Enterprises Ltd.

Prepared by: 704-ENG.VGEO04000-01 Shane Mulholland

Logged by: KB Reviewed by: TG

Datum: NAD83 Z10N Geodetic Alignment: L2500

Northing/Easting: 5431646.75 , 549881.61 Station/Offset: 2582+79.5

Elevation: 66.31 m *Coordinates Surveyed*

Driller: JV

Drill Make/Model: Case CX160

Drilling Method: Excavator

DEPTH (m)	DRILLING DETAILS	⊕ Field Vane ⊣ Remold Field Vane (kPa) ⊗ Lab Vane Peak ⨯ Lab Vane - Remold (kPa) ■ UU Triaxial (kPa) ▲ SPT "N" (BLOWS/300 mm) ▲ △ LPT "N" (BLOWS/300 mm) △ Wp% ●W% ⊙ Organic% WL% 20 40 60 80	SAMPLE TYPE	SAMPLE NO	RECOVERY (%)	SOIL SYMBOL	SOIL DESCRIPTION	CLASSIFICATION	COMMENTS TESTING	ELEVATION (m)
0							TS - TOPSOIL	TS		66
				1			0.2m SP - SAND, fine sand, poorly graded, trace fine to coarse sub-rounded gravel, trace to some organics (rootlets, charcoal), brown (dry), heterogenous, trace cobbles up to 100 mm diameter, non-cohesive, dry, compact to dense.	SP		
1				2			0.7m SW - gravelly SAND, medium to coarse sand, well graded, fine to coarse sub-rounded to rounded gravel, grey to brown, homogeneous, some cobbles and boulders up to 300 mm diameter, non-cohesive, moist, loose to compact.	SW		65
2										64
3				3			3.2m ML - SILT, medium plastic, some clay, grey, homogenous, cohesive, w ~ PL, stiff.	ML		63
4							3.8m GW-GM - sandy GRAVEL, fine to coarse sub-rounded to rounded gravel, well graded, medium to coarse sand, grey to brown, heterogeneous, trace to some cobbles and boulders up to 300 mm diameter, non-cohesive, moist, compact.	GW-GM		62
5				4			5.0m END TESTPIT AT 5.0 m DEPTH (Target Depth). - Testpit location surveyed by Stantec. - Soil descriptions are based on visual classifications, field observations and testing, drill performance, and laboratory testing. Some variation through the interpreted soil layers is expected. - Testpit backfilled to surface with soil cuttings.			61
6										60
7										59
8										58
9										57
10										

Legend Sample Type: A-Auger, B-Becker, C-Core, G-Grab, V-Vane, L#-Lab Sample, S-Split Spoon, O-Odex (air rotary), W-Wash (mud return), T-Shelby Tube

Final Depth of Hole: 5.0 m

Depth to Top of Rock: N/A

TETRA TECH

SUMMARY LOG

Drill Hole #: **WTH21-39**

Project: **TCFV Highway Widening - Segment 2**

Location: Abbotsford, BC - Highway 1

Date(s) Drilled: 05/04/2021

Company: Omega Environmental Drilling

Prepared by: 704-ENG.VGEO04000-01
Shane Mulholland

Logged by: SM Reviewed by: TG

Datum: NAD83 Z10N Geodetic Alignment: L2000

Northing/Easting: 5431611.67 , 549978.79 Station/Offset: 2083+89.3

Elevation: 64.74 m *Coordinates Surveyed*

Driller: Dan Gibson

Drill Make/Model: B54 Auger Rig

Drilling Method: Solid Stem Auger

⊕ Field Vane ┼ Remold Field Vane (kPa)
⊗ Lab Vane Peak ╳ Lab Vane - Remold (kPa)
■ UU Triaxial (kPa)
▲ SPT "N" (BLOWS/300 mm) ▲
△ LPT "N" (BLOWS/300 mm) △
Wp% ●W% ⊙ Organic% WL%
20 40 60 80

DEPTH (m)	DRILLING DETAILS SPT	SAMPLE TYPE	SAMPLE NO	RECOVERY (%)	SOIL SYMBOL	SOIL DESCRIPTION	CLASSIFICATION	COMMENTS TESTING	ELEVATION (m)
0	11, 15, 16, 16 (31)					ASPH - ASPHALT. 0.08m	ASPH		
						SW - gravelly SAND, fine to coarse sand, fine to coarse sub-angular to rounded gravel up to 50 mm diameter, brown (dry), homogeneous, (FILL), non-cohesive, dry, compact. 0.61m	SW		64
1	9, 14, 8, 9 (22)		1, 2	83		SP-SM - SILTY SAND, fine to medium sand, poorly graded, trace fine gravel up to 20 mm diameter, light brown (dry), heterogeneous, non-cohesive, dry, compact.	SP-SM		63
2			3			- damp to moist below 1.22 m depth 1.83m			
						SW - gravelly SAND, fine to coarse sand, well graded, sub-angular to rounded gravel up to 75 mm, some cobbles up to 75 mm diameter, brown, homogeneous, contact with gravelly SAND inferred due to spin up on auger, non-cohesive, dry to moist, compact to dense.	SW		62
3						- difficulty drilling below 2.44 m depth (hole sloughing more and more during cleanout due to cobbles)			
			4			3.81m			61
4						END TESTHOLE AT 3.81 m DEPTH (Auger Refusal).			
						- Testhole location surveyed by Stantec.			
						- Soil descriptions are based on visual classifications, field observations and testing, drill performance, and laboratory testing. Some variation through the interpreted soil layers is expected.			60
5						- Testhole backfilled to surface with drill cuttings, bentonite chips, sand, and asphalt patch.			
6									59
7									58
8									57
9									56
10									55

Legend Sample Type:
A-Auger, **B**-Becker, **C**-Core, **G**-Grab, **V**-Vane
L#-Lab Sample, **S**-Split Spoon, **O**-Odex (air rotary), **W**-Wash (mud return), **T**-Shelby Tube

Final Depth of Hole: 3.8 m
Depth to Top of Rock: N/A

MOTI-SOIL-REV3 ENG-VGEO04000-01 - TCFV SEGMENT 2 WIDENING 080321.GPJ MOTI_DATATEMPLATE_REV3.GDT 9/28/21

TETRA TECH

SUMMARY LOG

Drill Hole #: **WTH21-40**

Project: **TCFV Highway Widening - Segment 2**

Location: Abbotsford, BC - Highway 1

Date(s) Drilled: 05/10/2021

Company: Omega Environmental Drilling

Prepared by: 704-ENG.VGEO04000-01
Shane Mulholland

Logged by: SM Reviewed by: TG

Datum: NAD83 Z10N Geodetic Alignment: L2500

Northing/Easting: 5431641.16 , 550081.88 Station/Offset: 2584+79.7

Elevation: 64.7 m *Coordinates Surveyed*

Driller: Dan Gibson

Drill Make/Model: B54 Auger Rig

Drilling Method: Solid Stem Auger

DEPTH (m)	DRILLING DETAILS	⊕ Field Vane ┼ Remold Field Vane (kPa) ⊗ Lab Vane Peak ╳ Lab Vane - Remold (kPa) ■ UU Triaxial (kPa) ▲ SPT "N" (BLOWS/300 mm) ▲ △ LPT "N" (BLOWS/300 mm) △ Wp% ●W% ⊙ Organic% WL% 20 40 60 80	SAMPLE TYPE	SAMPLE NO	RECOVERY (%)	SOIL SYMBOL	SOIL DESCRIPTION	CLASSIFICATION	COMMENTS TESTING	ELEVATION (m)
0							ASPH - ASPHALT. 0.18m	ASPH		64
							SW - SAND, fine to coarse sand, some fine to coarse sub-angular to rounded gravel up to 60 mm diameter, brown (dry), homogeneous, (FILL), non-cohesive, dry, compact to dense. 0.61m	SW		
1				1			SP - SAND, fine to medium sand, poorly graded, trace to some fine to coarse angular to rounded gravel up to 70 mm diameter, trace cobbles up to 180 mm diameter, light brown (dry), homogeneous, non-cohesive, dry, dense to very dense.			63
2				2				SP		62
3							3.51m			61
4							END TESTHOLE AT 3.51 m DEPTH (Effective Refusal). - Testhole location surveyed by Stantec. - Soil descriptions are based on visual classifications, field observations and testing, drill performance, and laboratory testing. Some variation through the interpreted soil layers is expected. - Testhole backfilled to surface with bentonite chips, sand, and asphalt patch.			60
5										59
6										58
7										57
8										56
9										55
10										

Legend Sample Type: **A**-Auger, **B**-Becker, **C**-Core, **G**-Grab, **V**-Vane, **L#**-Lab Sample, **S**-Split Spoon, **O**-Odex (air rotary), **W**-Wash (mud return), **T**-Shelby Tube

Final Depth of Hole: 3.5 m
Depth to Top of Rock: N/A

SUMMARY LOG

TETRA TECH

Project: **TCFV Highway Widening - Segment 2**

Location: Abbotsford, BC - Highway 1

Prepared by: 704-ENG.VGEO04000-01 Shane Mulholland

Logged by: SM Reviewed by: TG

Datum: NAD83 Z10N Geodetic Alignment: L2000

Northing/Easting: 5431601.51 , 550127.74 Station/Offset: 2085+38.6

Elevation: 63.79 m *Coordinates Surveyed*

Drill Hole #: **WTH21-41**

Date(s) Drilled: 05/04/2021

Company: Omega Environmental Drilling

Driller: Dan Gibson

Drill Make/Model: B54 Auger Rig

Drilling Method: Solid Stem Auger

DEPTH (m)	DRILLING DETAILS	SPT	Field Vane + Remold Field Vane (kPa); Lab Vane Peak × Lab Vane - Remold (kPa); UU Triaxial (kPa); SPT "N" (BLOWS/300 mm); LPT "N" (BLOWS/300 mm); Wp% ●W% ⊙ Organic% WL% (20 40 60 80)	SAMPLE TYPE	SAMPLE NO	RECOVERY (%)	SOIL SYMBOL	SOIL DESCRIPTION	CLASSIFICATION	COMMENTS TESTING	SLOTTED PIEZOMETER	ELEVATION (m)
0		10 9 11 16	20			67		ASPH - ASPHALT. 0.1m	ASPH			63
					1			SW - gravelly SAND, fine to coarse sand, fine to coarse sub-angular to rounded gravel up to 75 mm diameter, some cobbles up to 100 mm diameter, brown (dry), homogeneous, (FILL), non-cohesive, dry, compact. 0.61m	SW			
1								SP - SAND, primarily fine grained to medium sand, poorly graded, trace fine to coarse sub-rounded to rounded gravel up to 60 mm diameter, trace silt, light brown, homogeneous, rapid dilatancy, non-cohesive, moist, compact. - damp to moist below 1.37 m depth - difficulty drilling below 2.13 m depth				
2		2 9 10 13	19		2	67			SP			62
					3			2.74m		- Depth to water recorded as dry on 8/16/2021		
3		10 26 28 32	54		4	75		SW - gravelly SAND, fine to medium sand, well graded, primarily fine sub-angular to rounded gravel, trace to some cobbles (inferred by drilling difficulty), brown, homogeneous, some gravel greater than 20 mm diameter up to 50 mm diameter, non-cohesive, dry to moist, dense to very dense.				61
					5			- moist below 4.27 m depth	SW			60
4										- Poor recovery below 4.27 m depth. Hole continued to slough in to 3.66 m depth		
5								4.88m END TESTHOLE AT 4.88 m DEPTH (Auger Refusal). - Testhole location surveyed by Stantec. - Soil descriptions are based on visual classifications, field observations and testing, drill performance, and laboratory testing. Some variation through the interpreted soil layers is expected. - Upon completion, testhole was reinstated in accordance with the BC Groundwater Protection Regulation. - A standpipe piezometer was installed at this location to a depth of 2.5 m with a 1 m slotted screen from 1.5 m to 2.5 m.				59
6												58
7												57
8												56
9												55
10												54

Legend Sample Type: A-Auger, B-Becker, C-Core, G-Grab, V-Vane, L#-Lab Sample, S-Split Spoon, O-Odex (air rotary), W-Wash (mud return), T-Shelby Tube

Legend Installation: Sand, Grout, Cement, Bentonite, Drill Cuttings, Slotted, Slough, Piezometer

Final Depth of Hole: 4.9 m

Depth to Top of Rock: N/A

MOTI-SOIL-REV3 ENG-VGEO04000-01 - TCFV SEGMENT 2 WIDENING 080321.GPJ MOTI_DATATEMPLATE_REV3.GDT 9/28/21