

Boring Crew: H. Garrow, J. Wimmel/J. Gilman (GeoDesign)
Date Started: 7/31/12 Date Finished: 8/01/12
VTSPG MADS: N 562290.00 ft E 1812740.00 ft
Station: 11+07 Offset: 7' R
Ground Elevation: 1277 ft

Type: Casing Sampler
I.D.: 4 in 1.38 in
Hammer Wt: N.A. 140 lb.
Hammer Fall: N.A. 30 in.
Hammer/Rod Type: Auto/AWJ
Rig: CME 45C SKID CE = 1.53

Groundwater Observations
Date Depth (ft) Notes
07/31/12 2.0 Wet sample.
08/01/12 1.5 in casing (overnight)

Depth (ft)	Strata (I)	CLASSIFICATION OF MATERIALS (Description)	Pen. (Tip Dep. in) (ft)	CE (ft)	DR Rate (in/ft)	DR Rate (ft/min)	Blow Count (N10)	Moisture Content (%)	Gravel %	Sand %	Fines %
5	1	Asphalt (AASHTO M145 Classification: Visual Description (Burnmaster).) S1 (1'-3'): Loose, dark brown fine to coarse SAND, some (+) SILT, little (-) fine to coarse Gravel, moist to wet. (FILL) (AASHTO M145 Classification: A-1-b) (AASHTO M145 Classification: Visual Description (Burnmaster).) Rec. = 1.1 ft	3-4-4-4 (8)	19.6	37.8	40.9	21.3				
5	2	S2 (3'-5'): Loose, no recovery. (FILL) Rec. = 0.0 ft (AASHTO M145 Classification: Visual Description (Burnmaster).)	7-4-2-2 (7)	22.6	31.7	38.9	28.4				
10	3	S3 (5'-7'): Loose, dark brown SILT and fine to coarse SAND, some fine to coarse Gravel, trace Organic Fibers, wet. (LAKE SEDIMENT - POSSIBLE FILL) Rec. = 0.4 ft (AASHTO M145 Classification: A-2-4) (AASHTO M145 Classification: Visual Description (Burnmaster).)	1-1-1-1 (8)	28.7	45.6	36.0	18.4				
10	4	S4 (7'-9'): Loose, dark brown fine to coarse SAND, some fine Gravel, little SILT, trace (+) Organic Fibers, wet. (LAKE SEDIMENT - POSSIBLE FILL) Rec. = 0.7 ft (AASHTO M145 Classification: A-1-b) (AASHTO M145 Classification: Visual Description (Burnmaster).) Rec. = 0.7 ft	2-2-5-5 (10)	17.3	48.2	34.1	17.7				
15	5	S5 (9'-11'): Medium dense, dark brown fine to coarse SAND, little fine to coarse Gravel, little SILT, wet. (SILT SAND & GRAVEL) (AASHTO M145 Classification: A-1-b) (AASHTO M145 Classification: Visual Description (Burnmaster).)	5-8-6-5 (12)	14.6	42.3	44.2	13.5				
20	6	S6 (11'-13'): Medium dense, dark brown fine to coarse SAND, little SILT, little fine Gravel, wet. (SILT SAND & GRAVEL) Rec. = 1.1 ft (AASHTO M145 Classification: A-1-b) (AASHTO M145 Classification: Visual Description (Burnmaster).)	6-10-8-7 (15)	15.4	51.6	33.7	14.5				
20	7	S7 (13'-15'): Medium dense, dark brown fine to coarse SAND, some fine Gravel, little SILT, wet. (SILT SAND & GRAVEL) Rec. = 0.9 ft (AASHTO M145 Classification: A-1-a) (AASHTO M145 Classification: Visual Description (Burnmaster).)	5-6-8-9 (12)	10.8	57.8	32.0	10.4				
25	8	S8 (15'-17'): Medium dense, dark brown fine to coarse SAND, some fine Gravel, trace SILT, wet. (SILT SAND & GRAVEL) Rec. = 0.8 ft (AASHTO M145 Classification: A-1-a) (AASHTO M145 Classification: Visual Description (Burnmaster).)	16-10-10-10 (20)	10.8	41.9	32.0	26.1				
25	9	S9 (17'-19'): Medium dense, dark brown fine to coarse SAND, some fine Gravel, little SILT, wet. (SILT SAND & GRAVEL) Rec. = 0.9 ft (AASHTO M145 Classification: A-1-a) (AASHTO M145 Classification: Visual Description (Burnmaster).)	15/0/4 (100+)	5.4	70.8	16.0	13.2				
30	10	S10 (20'-22'): Medium dense, gray fine to medium SAND, some SILT, some fine to coarse Gravel, wet. (GLACIAL TILL WITH FREQUENT BOULDERS/COBBLES) Rec. = 1.0 ft (AASHTO M145 Classification: A-2-4) (AASHTO M145 Classification: Visual Description (Burnmaster).)	50/0/4 (100+)	7.7	63.9	15.3	18.8				
35	11	S11 (23'-25.4'): Refusal, gray fine to coarse GRAVEL (fractured cobble pieces), little fine to medium SAND, little SILT, wet. (GLACIAL TILL WITH FREQUENT BOULDERS/COBBLES) Rec. = 0.3 ft (AASHTO M145 Classification: A-1-a) (AASHTO M145 Classification: Visual Description (Burnmaster).)	21-22-22 (100+)	7.0	58.4	23.1	20.5				
40	12	S12 (30'-30.4'): Refusal, gray fine to coarse GRAVEL, little fine to coarse Sand, little (-) SILT, wet. (Pen = 0.4, Rec. = 0.4) C1) Very poor quality, fresh, moderately hard, gray LIMESTONE (boulder). (GLACIAL TILL WITH FREQUENT BOULDERS/COBBLES) Rec. = 0.4 ft (AASHTO M145 Classification: A-1-b) (AASHTO M145 Classification: Visual Description (Burnmaster).)	67 (100+)	8.6	44.7	22.8	32.4				
45	13	S12 (33'-33.7'): Refusal, gray fine to coarse SAND and fine to coarse GRAVEL, some SILT, wet. (GLACIAL TILL WITH FREQUENT BOULDERS/COBBLES) Rec. = 0.7 ft (AASHTO M145 Classification: A-1-b) (AASHTO M145 Classification: Visual Description (Burnmaster).)	48-50 (100+)	10.7	24.3	22.6	53.1				

Notes: 1. Specifications lines represent approximate boundary between material types. Variations may be greater.
2. Values have not been corrected for hammer energy. CE is the hammer energy correction factor.
3. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring Crew: H. Garrow, J. Wimmel/J. Gilman (GeoDesign)
Date Started: 7/31/12 Date Finished: 8/01/12
VTSPG MADS: N 562290.00 ft E 1812740.00 ft
Station: 11+07 Offset: 7' R
Ground Elevation: 1277 ft

Type: Casing Sampler
I.D.: 4 in 1.38 in
Hammer Wt: N.A. 140 lb.
Hammer Fall: N.A. 30 in.
Hammer/Rod Type: Auto/AWJ
Rig: CME 45C SKID CE = 1.53

Groundwater Observations
Date Depth (ft) Notes
07/31/12 2.0 Wet sample.
08/01/12 1.5 in casing (overnight)

Depth (ft)	Strata (I)	CLASSIFICATION OF MATERIALS (Description)	Pen. (Tip Dep. in) (ft)	CE (ft)	DR Rate (in/ft)	DR Rate (ft/min)	Blow Count (N10)	Moisture Content (%)	Gravel %	Sand %	Fines %
55	14	Description (Burnmaster). S13 (40'-40.5'): Refusal, gray SILT, some (-) fine to medium Sand, trace fine to coarse Gravel, wet. (GLACIAL TILL WITH FREQUENT BOULDERS/COBBLES) Rec. = 0.5 ft (AASHTO M145 Classification: A-2-4) (AASHTO M145 Classification: Visual Description (Burnmaster).)	50 (100+)	11.6	18.4	19.5	62.1				
60	15	S14 (43'-46'): Refusal, gray SILT, some fine to medium Sand, trace (+) fine Gravel, wet. (GLACIAL TILL) Rec. = 1.0 ft (AASHTO M145 Classification: A-4) (AASHTO M145 Classification: Visual Description (Burnmaster).)	18-25-35 (57)	23.2	7.2	92.8					
60	16	S15 (50'-50.5'): Refusal, gray SILT, little fine Sand, trace fine Gravel, wet. (GLACIAL TILL) Rec. = 0.5 ft (AASHTO M145 Classification: A-4) (AASHTO M145 Classification: Visual Description (Burnmaster).)	17-23-28-35 (48)	23.5	27.4	72.6					
65	17	S16 (53'-57'): Very dense, gray SILT, little fine Sand, wet. (GLACIAL TILL) Rec. = 1.6 ft (AASHTO M145 Classification: A-4) (AASHTO M145 Classification: Visual Description (Burnmaster).)	3-14-24 (38)	24.0	38.2	60.8					
70	18	S17 (60'-62'): Very dense, SILT and fine to medium SAND, wet. (GLACIAL TILL) Rec. = 1.6 ft (AASHTO M145 Classification: A-4) (AASHTO M145 Classification: Visual Description (Burnmaster).)									
70	19	S18 (70'-72'): Dense, SILT and fine to medium SAND, wet. (GLACIAL TILL) Rec. = 1.8 ft (AASHTO M145 Classification: A-4) (AASHTO M145 Classification: Visual Description (Burnmaster).)									
75	20	S19 (80'-82'): Very dense, SILT and fine to medium SAND, wet. (GLACIAL TILL) Rec. = 1.7 ft (AASHTO M145 Classification: A-4) (AASHTO M145 Classification: Visual Description (Burnmaster).)	20-31-40-44 (71)	22.8	41.2	58.8					
90	21	S20 (90'-91.4'): Refusal, gray SILT, little fine to coarse Sand, trace fine to coarse Gravel, wet (top 3" washed angular gravel). (GLACIAL TILL) Rec. = 1.4 ft (AASHTO M145 Classification: A-4) (AASHTO M145 Classification: Visual Description (Burnmaster).)	22-30-30/0/4 (100+)	20.4	12.3	78.8					

Notes: 1. Specifications lines represent approximate boundary between material types. Variations may be greater.
2. Values have not been corrected for hammer energy. CE is the hammer energy correction factor.
3. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring Crew: H. Garrow, J. Wimmel/J. Gilman (GeoDesign)
Date Started: 7/31/12 Date Finished: 8/01/12
VTSPG MADS: N 562290.00 ft E 1812740.00 ft
Station: 11+07 Offset: 7' R
Ground Elevation: 1277 ft

Type: Casing Sampler
I.D.: 4 in 1.38 in
Hammer Wt: N.A. 140 lb.
Hammer Fall: N.A. 30 in.
Hammer/Rod Type: Auto/AWJ
Rig: CME 45C SKID CE = 1.53

Groundwater Observations
Date Depth (ft) Notes
07/31/12 2.0 Wet sample.
08/01/12 1.5 in casing (overnight)

Depth (ft)	Strata (I)	CLASSIFICATION OF MATERIALS (Description)	Pen. (Tip Dep. in) (ft)	CE (ft)	DR Rate (in/ft)	DR Rate (ft/min)	Blow Count (N10)	Moisture Content (%)	Gravel %	Sand %	Fines %
105	22	Hole stopped @ 100.0 ft No refusal to 100' deep.									
110	23	Remarks: 1) Start sampling at 1' deep. Advanced casing through 5" of asphalt. 2) Driller notes occasional roller bit chatter through inferred coarse gravel and/or small cobbles at 13' deep. 3) Inter boulder at 24.5' deep based on roller bit resistance. 4) Spill occurred during 22.4' deep interval 10 blows with no movement. 5) Inter glacial fill with frequent nested boulders and cobbles (estimated under 12" thick) from 24.5' to 35' deep based grinding and chatter during casing advance. Recoveries from the clean out barrel used to clear the casing and spill spoon samples from this interval were almost entirely composed of broken pieces of Limestone with silt and sand. Attempted core run from 30' to 35' and recovered 1.8' worth of Limestone and Quartz boulder/cobble pieces. 6) Driller used hammer to pound sampler through approximately 8' of slough to reach sample interval for S12 at 35' (8 blows), 12' of slough for sample S13 at 40' deep (10 blows) and through 4' of slough at 45' deep (11 blows). Asked driller to clean hole with the roller bit instead of cleanout barrel going forward in attempt to break up more of the coarse gravel slough in the borehole. Driller stated he couldn't because it would cover large the drill rods. 7) Inter glacial fill between 35' and 45' deep to contain frequent boulders and cobbles (estimated under 12" diameter) but not as frequent as noted between 24.5' and 35'. 8) Boulders and cobbles not encountered while advancing borehole below 45' deep. 9) Driller noted decrease in resistance to casing advance of approximately 54' deep. 10) Exploration terminated after roller bit advance to 100' deep with no refusal (casing was at 90' deep). 11) Lab testing gradations reported are per AASHTO M145. 12) Northings, Eastings, Ground Surface Elevation, and Stationing shown are approximations based on visual estimates of the borehole location made in the field by GeoDesign personnel on July 31, 2012 and MicroStation files downloaded from TY Lin's FTP site by GeoDesign personnel on August 22, 2012. Location and elevation approximations for the borehole should be considered accurate only to the degree implied by the method of borehole location used.									

Notes: 1. Specifications lines represent approximate boundary between material types. Variations may be greater.
2. Values have not been corrected for hammer energy. CE is the hammer energy correction factor.
3. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.