STATE OF VERMONT
AGENCY OF TRANSPORTATION
MATERIALS & RESEARCH SECTION
SUBSURFACE INFORMATION

# BORING LOG

Hartford, VT

I91 Bridge 43 N/S

Boring No.: B-201
Page No.: 1 of 2
Pin No.: s12a132
Checked By: ASP

Boring Crew: Drilex/Jason, MJR
Date Started: 3/31/14 Date Finished: 4/01/14
VTSPG NAD83: N 417499.15 ft E 1683209.44 ft
Station: 150+08.07 Offset: -28.75
Ground Elevation: 552.05 ft

| | Casing | Sampler |
|---|---|---|
| Type: | Auger/WB | SS |
| I.D.: | 4.5 in | 2 in |
| Hammer Wt: | 300 lb. | 140 lb. |
| Hammer Fall: | N.A. | 30 in. |
| Hammer/Rod Type: | | Auto |
| Rig: | CME 50 | CE = 1.33 |

Groundwater Observations

| Date | Depth (ft) | Notes |
|---|---|---|
| 04/01/14 | 0.0 | Due to water used during drilling |

| Depth (ft) | Strata (1) | CLASSIFICATION OF MATERIALS (Description) | Run (Dip deg.) | Core Rec. % (RQD %) | Drill Rate minutes/ft | Blows/6" (N Value) | Moisture Content % | Gravel % | Sand % | Fines % |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | | A-2-4, SaSiGr, Auger sample (FILL) | | | | | 19.1 | 19.6 | 54.2 | 26.2 |
| 2.5 | | | | | | | | | | |
| 5.0 | | A-2-4, SaSiGr, Rec. = 1.83 ft | | | | 8-17-19-20 (36) | 13.5 | 14.4 | 51.6 | 34.0 |
| 7.5 | | | | | | | | | | |
| 10.0 | | A-2-4, SaSiGr, Rec. = 1.5 ft | | | | 8-10-13-19 (23) | 14.4 | 19.7 | 48.8 | 31.5 |
| 12.5 | | | | | | | | | | |
| 15.0 | | A-2-4, GrSaSi, Rec. = 0.33 ft | | | | 17-30/2" (30+) | 12.1 | 35.3 | 33.9 | 30.8 |
| 17.5 | | | | | | | | | | |
| 20.0 | | A-4, SiSaGr, Rec. = 1.42 ft | | | | 10-24-32-46 (56) | 11.8 | 26.9 | 35.2 | 37.9 |
| 22.5 | | | | | | | | | | |

Notes:
1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
2. N Values have not been corrected for hammer energy. CE is the hammer energy correction factor. CE is an estimated value.
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.
4. Ground surface elevations indicated on the boring logs were estimated based on the grading plan provided by VAOT.

Terracon

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STATE OF VERMONT
AGENCY OF TRANSPORTATION
MATERIALS & RESEARCH SECTION
SUBSURFACE INFORMATION

# BORING LOG

Hartford, VT

I91 Bridge 43 N/S

Boring No.: B-201
Page No.: 2 of 2
Pin No.: s12a132
Checked By: ASP

Boring Crew: Drilex/Jason, MJR
Date Started: 3/31/14 Date Finished: 4/01/14
VTSPG NAD83: N 417499.15 ft E 1683209.44 ft
Station: 150+08.07 Offset: -28.75
Ground Elevation: 552.05 ft

| | Casing | Sampler |
|---|---|---|
| Type: | Auger/WB | SS |
| I.D.: | 4.5 in | 2 in |
| Hammer Wt: | 300 lb. | 140 lb. |
| Hammer Fall: | N.A. | 30 in. |
| Hammer/Rod Type: | | Auto |
| Rig: | CME 50 | CE = 1.33 |

Groundwater Observations

| Date | Depth (ft) | Notes |
|---|---|---|
| 04/01/14 | 0.0 | Due to water used during drilling |

| Depth (ft) | Strata (1) | CLASSIFICATION OF MATERIALS (Description) | Run (Dip deg.) | Core Rec. % (RQD %) | Drill Rate minutes/ft | Blows/6" (N Value) | Moisture Content % | Gravel % | Sand % | Fines % |
|---|---|---|---|---|---|---|---|---|---|---|
| 25.0 | | A-2-4, SaSiGr, Rec. = 1.33 ft | | | | 27-32-55/5" (55+) | 11.3 | 28.5 | 36.7 | 34.8 |
| 27.5 | | Split spoon refusal, Weathered bedrock | | | | | | | | |
| 30.0 | | 29.5 ft - 35.5 ft, Gray-green ANDESITE, hard, fresh 45° and 30° joint sets, smooth, open, moderately close. Upper 7 inches and lower 6 inches highly fractured and weathered | 1 | 28 (11) | 2<br>1<br>0.75<br>0.75<br>0.5 | | | | | |
| 32.5 | | | | | | | | | | |
| 35.0 | | 35.5 ft - 39.5 ft, Gray-green ANDESITE, hard,slight weathering in top 9 inches, 45° and 75° joint sets, very close. Bottom 31 inches, fresh weathering, 80° and 45° joint sets, moderately close, tight. Thinly foliated.<br><br>Open hole coring changed to spin 4-inch casing to 39 feet. | 3 | 67 (56) | 3<br>2.5<br>3.5<br>2.5 | | | | | |
| 37.5 | | | | | | | | | | |
| 40.0 | | 39.0 ft - 44.0 ft, Gray-green ANDESITE, very hard, slight to moderate weathering, 85°, 0°, 45° joint sets, very close to moderately close, quartz infilling. | 5 | 87 (70) | 2<br>2<br>2<br>2.75<br>2.5 | | | | | |
| 42.5 | | | | | | | | | | |
| 45.0 | | Hole stopped @ 44.0 ft | | | 3.5 | | | | | |
| 47.5 | | | | | | | | | | |

Notes:
1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
2. N Values have not been corrected for hammer energy. CE is the hammer energy correction factor. CE is an estimated value.
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.
4. Ground surface elevations indicated on the boring logs were estimated based on the grading plan provided by VAOT.

Terracon

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STATE OF VERMONT
AGENCY OF TRANSPORTATION
MATERIALS & RESEARCH SECTION
SUBSURFACE INFORMATION

# BORING LOG

**HARTFORD**
**IM 91-2(79)**
**I-91 BR-43**

Boring No.: **B-202**
Page No.: 1 of 1
Pin No.: 12A132
Checked By: BLS

Boring Crew: DAIGNEAULT, NIETO, HOOK
Date Started: 5/06/14 Date Finished: 5/07/14
VTSPG NAD83: N 417502.25 ft E 1683282.33 ft
Station: 150+23.81 Offset: 42.49
Ground Elevation: 551.6 ft

| | Casing | Sampler |
|---|---|---|
| Type: | WB | SS |
| I.D.: | 4 in | 1.5 in |
| Hammer Wt: | N.A. | 140 lb. |
| Hammer Fall: | N.A. | 30 in. |
| Hammer/Rod Type: | Auto/AWJ | |
| Rig: | CME 55 TRACK | $C_e$ = 1.46 |

Groundwater Observations

| Date | Depth (ft) | Notes |
|---|---|---|
| 05/07/14 | 5.1 | AM |
| | | |
| | | |

| Depth (ft) | Strata (1) | CLASSIFICATION OF MATERIALS (Description) | Run (Dip deg.) | Core Rec. % (RQD %) | Drill Rate minutes/ft | Blows/6" (N Value) | Moisture Content % | Gravel % | Sand % | Fines % |
|---|---|---|---|---|---|---|---|---|---|---|
| | | A-2-4, GrSiSa, brn, Moist, Rec. = 1.1 ft, Lab Note: Roots, grass, and Broken Rock were within sample. | | | | WH-2-4-11 (6) | 13.2 | 27.2 | 42.1 | 30.7 |
| | | Field Note:, Roller Coned ahead and cleaned out casing. | | | | | | | | |
| 5 | | A-2-4, SiGrSa, brn, MTW, Rec. = 1.0 ft, Lab Note: Broken Rock was within sample. | | | | 11-14-18-28 (32) | 13.2 | 33.0 | 37.5 | 29.5 |
| | | Field Note:, Roller Coned ahead and cleaned out casing. | | | | | | | | |
| 10 | | A-4, SaSi, gry, MTW, Rec. = 1.5 ft | | | | 19-31-39-R@1.0" (70) | 12.5 | 16.9 | 33.9 | 49.2 |
| | | Field Note:, Roller Coned ahead and cleaned out casing. | | | | | | | | |
| 15 | | A-4, GrSaSi, gry, MTW, Rec. = 1.0 ft, Lab Note: Broken Rock was within sample. | | | | 12-30-48-R@1.0" (78) | 11.5 | 25.0 | 28.2 | 46.8 |
| | | Field Note:, Roller Coned ahead and cleaned out casing. | | | | | | | | |
| 20 | | Visual Description:, Broken Rock with silty sand, gry, Moist, Rec. = 0.2 ft, Insufficient sample for testing. | | | | R@2.5" (R) | | | | |
| | | Field Note:, NXDC | | | | | | | | |
| 25 | | 25.0 ft - 30.0 ft, Dark-greenish-gray to medium-bluish-gray metamorphosed andesitic and basaltic Tuff, Moderately hard, Moderately weathered, Poor rock, NXMDC, Staining along fractures. RMR = 36 | 1 (85) | 36 (0) | 3 5 7 5 10 | Top of Bedrock @ 25.0 ft | | | | |
| 30 | | 30.0 ft - 35.0 ft, Dark-greenish-gray to medium-bluish-gray metamorphosed andesitic and basaltic Tuff, Moderately hard, Moderately weathered, Poor rock, NXMDC, Staining along fractures near end of run. RMR = 41 | 2 (85) | 100 (48) | 5 5 4 5 3 | | | | | |
| 35 | | Hole stopped @ 35.0 ft | | | | | | | | |
| 40 | | Remarks:<br>Hole collapsed at 7.0 ft. | | | | | | | | |
| 45 | | | | | | | | | | |

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

BORING LOG 2 HARTFORD IM 91-2(79).GPJ VERMONT AOT.GDT 5/30/14

STATE OF VERMONT
AGENCY OF TRANSPORTATION
MATERIALS & RESEARCH SECTION
SUBSURFACE INFORMATION

# BORING LOG

Hartford, VT

191 Bridge 43 N/S

Boring No.: B-203
Page No.: 1 of 2
Pin No.: s12a132
Checked By: ASP

Boring Crew: Drilex/Jason, MJR
Date Started: 4/02/14 Date Finished: 4/02/14
VTSPG NAD83: N 417612.48 ft E 1683219.83 ft
Station: 151+19.83 Offset: -40.28
Ground Elevation: 559.25 ft

| | Casing | Sampler |
|---|---|---|
| Type: | Auger/WB | SS |
| I.D.: | 4.5 in | 2 in |
| Hammer Wt: | 300 lb. | 140 lb. |
| Hammer Fall: | N.A. | 30 in. |
| Hammer/Rod Type: | | Auto |
| Rig: | CME 50 | CE = 1.33 |

Groundwater Observations

| Date | Depth (ft) | Notes |
|---|---|---|
| 04/02/14 | 0.0 | Due to water used during drilling |

| Depth (ft) | Strata (1) | CLASSIFICATION OF MATERIALS (Description) | Run (Dip deg.) | Core Rec. % (RQD %) | Drill Rate minutes/ft | Blows/6" (N Value) | Moisture Content % | Gravel % | Sand % | Fines % |
|---|---|---|---|---|---|---|---|---|---|---|
| 2.5 | | | | | | | | | | |
| 5.0 | | A-1-b, SaGrSi, Rec. = 1.17 ft, (FILL) | | | | 47-21-19-27 (40) | 8.0 | 37.0 | 39.8 | 23.2 |
| 7.5 | | | | | | | | | | |
| 10.0 | | No recovery, Rec. = 0.0 ft, (FILL) | | | | 18-32-32-32 (64) | | | | |
| 12.5 | | | | | | | | | | |
| 15.0 | | A-1-b, GrSaSi, Rec. = 0.33 ft | | | | 7-8-8-9 (16) | 10.3 | 58.3 | 29.6 | 12.1 |
| 17.5 | | | | | | | | | | |
| 20.0 | | A-4, SiSaGr, Rec. = 1.08 ft | | | | 10-19-24-36 (43) | 10.9 | 25.0 | 35.7 | 39.3 |
| 22.5 | | Weathered bedrock | | | | | | | | |
| | | 23.0 ft – 28.0 ft, Gray/brown ANDESITE, hard, very slight weathering, 0°, 45°, 80° joint sets, smooth, close, extensive quartz filling of joints/foliation. | 1 | 75 (67) | 3<br>3 | | | | | |

Notes:
1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
2. N Values have not been corrected for hammer energy. CE is the hammer energy correction factor. CE is an estimated value.
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.
4. Ground surface elevations indicated on the boring logs were estimated based on the grading plan provided by VAOT.

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STATE OF VERMONT
AGENCY OF TRANSPORTATION
MATERIALS & RESEARCH SECTION
SUBSURFACE INFORMATION

BORING LOG

Hartford, VT

191 Bridge 43 N/S

Boring No.: B-203
Page No.: 2 of 2
Pin No.: s12a132
Checked By: ASP

Boring Crew: Drilex/Jason, MJR
Date Started: 4/02/14 Date Finished: 4/02/14
VTSPG NAD83: N 417612.48 ft E 1683219.83 ft
Station: 151+19.83 Offset: -40.28
Ground Elevation: 559.25 ft

| | Casing | Sampler |
|---|---|---|
| Type: | Auger/WB | SS |
| I.D.: | 4.5 in | 2 in |
| Hammer Wt: | 300 lb. | 140 lb. |
| Hammer Fall: | N.A. | 30 in. |
| Hammer/Rod Type: | | Auto |
| Rig: | CME 50 | CE = 1.33 |

Groundwater Observations

| Date | Depth (ft) | Notes |
|---|---|---|
| 04/02/14 | 0.0 | Due to water used during drilling |

| Depth (ft) | Strata (1) | CLASSIFICATION OF MATERIALS (Description) | Run (Dip deg.) | Core Rec. % (RQD %) | Drill Rate minutes/ft | Blows/6" (N Value) | Moisture Content % | Gravel % | Sand % | Fines % |
|---|---|---|---|---|---|---|---|---|---|---|
| 27.5 | | | | | 3.5<br>2<br>3.5 | | | | | |
| 30.0 | | 28.0 ft – 33.0 ft, Gray/brown ANDESITE, hard, very slight weathering, 0°, 45°, 80° joint sets, smooth, close, extensive quartz filling of joints/foliation. | 2 | 90 (67) | 2<br>2<br>2.75<br>2.5<br>5 | | | | | |
| 32.5 | | Hole stopped @ 33.0 ft | | | | | | | | |
| 35.0 | | | | | | | | | | |
| 37.5 | | | | | | | | | | |
| 40.0 | | | | | | | | | | |
| 42.5 | | | | | | | | | | |
| 45.0 | | | | | | | | | | |
| 47.5 | | | | | | | | | | |

Notes:
1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
2. N Values have not been corrected for hammer energy. CE is the hammer energy correction factor. CE is an estimated value.
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.
4. Ground surface elevations indicated on the boring logs were estimated based on the grading plan provided by VAOT.

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STATE OF VERMONT
AGENCY OF TRANSPORTATION
MATERIALS & RESEARCH SECTION
SUBSURFACE INFORMATION

# BORING LOG

**HARTFORD**
**IM 91-2(79)**
**I-91 BR-43**

Boring No.: **B-204**
Page No.: 1 of 1
Pin No.: 12A132
Checked By: BLS

Boring Crew: JUDKINS, HOOK
Date Started: 5/13/14 Date Finished: 5/15/14
VTSPG NAD83: N 417621.84 ft E 1683300.91 ft
Station: 151+46.59 Offset: 36.82
Ground Elevation: 556.94 ft

| | Casing | Sampler |
|---|---|---|
| Type: | WB | SS |
| I.D.: | 4 in | 1.5 in |
| Hammer Wt: | N.A. | 140 lb. |
| Hammer Fall: | N.A. | 30 in. |
| Hammer/Rod Type: | Auto/AWJ | |
| Rig: | CME 55 TRACK | $C_e$ = 1.46 |

Groundwater Observations

| Date | Depth (ft) | Notes |
|---|---|---|
| 05/14/14 | 4.9 | While drilling. |
| | | |
| | | |

| Depth (ft) | Strata (1) | CLASSIFICATION OF MATERIALS (Description) | Run (Dip deg.) | Core Rec. % (RQD %) | Drill Rate minutes/ft | Blows/6" (N Value) | Moisture Content % | Gravel % | Sand % | Fines % |
|---|---|---|---|---|---|---|---|---|---|---|
| | | A-1-a, SaGr with roots & grass, brn, Moist, Rec. = 0.6 ft, Lab Note: Broken Rock was within sample. | | | | | 4.6 | 53.4 | 33.0 | 13.6 |
| 5 | | Field Note:, Roller coned and cleaned out casing. | | | | | | | | |
| | | A-2-4, GrSa, brn, Moist, Rec. = 0.3 ft, Lab Note: Broken Rock was within sample. | | | | 12-20-16-17 (36) | 15.8 | 27.5 | 54.0 | 18.5 |
| | | Field Note:, Roller coned and cleaned out casing. | | | | | | | | |
| 10 | | A-4, SaGrSi, gry, Moist, Rec. = 0.8 ft, Lab Note: Broken Rock was within sample. | | | | 21-28-R@2.5" (R) | 10.5 | 30.0 | 26.4 | 43.6 |
| | | 11.8 ft - 14.0 ft, Dark-greenish-gray to medium-bluish-gray metamorphosed andesitic and basaltic Tuff, Moderately hard, Unweathered, Poor rock, NXDC, RMR = 36 | 1 (70) | 68 (0) | | Top of Bedrock @ 11.8 ft | | | | |
| 15 | | 14.0 ft - 19.0 ft, Dark-greenish-gray to medium-bluish-gray metamorphosed andesitic and basaltic Tuff, Moderately hard, Unweathered, Fair rock, NXMDC, RMR = 49 | 2 (70) | 88 (72) | 7<br>8<br>8<br>12<br>13 | | | | | |
| | | Hole stopped @ 19.0 ft | | | | | | | | |
| 20 | | Remarks:<br>Hole collapsed at 5.0 ft. | | | | | | | | |
| 25 | | | | | | | | | | |
| 30 | | | | | | | | | | |
| 35 | | | | | | | | | | |

Notes:
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2. N Values have not been corrected for hammer energy. $C_e$ is the hammer energy correction factor.
3. Water level readings have been made at times and under conditions stated. Fluctuations may occur due to other factors than those present at the time measurements were made.

BORING LOG 2 HARTFORD IM 91-2(79).GPJ VERMONT AOT.GDT 5/30/14

STATE OF VERMONT
AGENCY OF TRANSPORTATION
MATERIALS & RESEARCH SECTION
SUBSURFACE INFORMATION

# BORING LOG

Hartford, VT

I91 Bridge 43 N/S

Boring No.: B-206
Page No.: 1 of 2
Pin No.: s12a132
Checked By: ASP

Boring Crew: NTB/Mike Nadeau, MJR
Date Started: 3/25/14 Date Finished: 3/26/14
VTSPG NAD83: N 417516.45 ft E 1683358.85 ft
Station: 250+18.53 Offset: 37.94
Ground Elevation: 551.24 ft

| | Casing | Sampler |
|---|---|---|
| Type: | Auger/WB | SS |
| I.D.: | 4.5 in | 2 in |
| Hammer Wt: | 300 lb. | 140 lb. |
| Hammer Fall: | N.A. | 30 in. |
| Hammer/Rod Type: | | Auto |
| Rig: | CME 50 | CE = 1.33 |

Groundwater Observations

| Date | Depth (ft) | Notes |
|---|---|---|
| 03/26/14 | 11.4 | After casing removal |

| Depth (ft) | Strata (1) | CLASSIFICATION OF MATERIALS (Description) | Run (Dip deg.) | Core Rec. % (RQD %) | Drill Rate minutes/ft | Blows/6" (N Value) | Moisture Content % | Gravel % | Sand % | Fines % |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | | A-1-b, SaGrSi, Rec. = 1.17 ft, (FILL) | | | | 1-4-8-7 (12) | 15.6 | 32.0 | 48.7 | 19.3 |
| 2.5 | | | | | | | | | | |
| 5.0 | | A-2-4, SaGrSi, Rec. = 11.0 ft, (FILL) | | | | 8-8-6-8 (14) | 10.4 | 28.7 | 46.6 | 24.7 |
| 7.5 | | | | | | | | | | |
| 10.0 | | A-1-b, GrSaSi, Rec. = 0.5 ft | | | | 19-12-9-8 (21) | | 59.4 | 23.3 | 17.3 |
| 12.5 | | | | | | | | | | |
| 15.0 | | A-1-b, GrSaSi, Rec. = 10.8 ft | | | | 10-12-27-50/2" (39) | 11.6 | 39.8 | 39.6 | 20.6 |
| 17.5 | | | | | | | | | | |
| 20.0 | | | | | | | | | | |
| 22.5 | | | | | | | | | | |

Notes:
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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.
4. Ground surface elevations indicated on the boring logs were estimated based on the grading plan provided by VAOT.

Terracon

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STATE OF VERMONT
AGENCY OF TRANSPORTATION
MATERIALS & RESEARCH SECTION
SUBSURFACE INFORMATION

BORING LOG

Hartford, VT

I91 Bridge 43 N/S

Boring No.: B-206
Page No.: 2 of 2
Pin No.: s12a132
Checked By: ASP

Boring Crew: NTB/Mike Nadeau, MJR
Date Started: 3/25/14 Date Finished: 3/26/14
VTSPG NAD83: N 417516.45 ft E 1683358.85 ft
Station: 250+18.53 Offset: 37.94
Ground Elevation: 551.24 ft

| | Casing | Sampler |
|---|---|---|
| Type: | Auger/WB | SS |
| I.D.: | 4.5 in | 2 in |
| Hammer Wt: | 300 lb. | 140 lb. |
| Hammer Fall: | N.A. | 30 in. |
| Hammer/Rod Type: | | Auto |
| Rig: | CME 50 | CE = 1.33 |

Groundwater Observations

| Date | Depth (ft) | Notes |
|---|---|---|
| 03/26/14 | 11.4 | After casing removal |

| Depth (ft) | Strata (1) | CLASSIFICATION OF MATERIALS (Description) | Run (Dip deg.) | Core Rec. % (RQD %) | Drill Rate minutes/ft | Blows/6" (N Value) | Moisture Content % | Gravel % | Sand % | Fines % |
|---|---|---|---|---|---|---|---|---|---|---|
| 25.0 | | A-4, SiSaGr | | | | | 21.4 | 12.1 | 13.7 | 74.2 |
| | | Weathered bedrock | | | | | | | | |
| 27.5 | | 26.5 ft – 28.5 ft, Gray-green ANDESITE, fresh, very hard, 45°, 75°, 20° joint sets, rough, open, moderately close, foliated. | 1 | 83 (83) | 3.75<br>4 | | | | | |
| | | Hole stopped @ 28.5 ft | | | | | | | | |
| 30.0 | | | | | | | | | | |
| 32.5 | | | | | | | | | | |
| 35.0 | | | | | | | | | | |
| 37.5 | | | | | | | | | | |
| 40.0 | | | | | | | | | | |
| 42.5 | | | | | | | | | | |
| 45.0 | | | | | | | | | | |
| 47.5 | | | | | | | | | | |

Notes:
1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
2. N Values have not been corrected for hammer energy. CE is the hammer energy correction factor. CE is an estimated value.
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.
4. Ground surface elevations indicated on the boring logs were estimated based on the grading plan provided by VAOT.

Terracon

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STATE OF VERMONT
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MATERIALS & RESEARCH SECTION
SUBSURFACE INFORMATION

# BORING LOG

Hartford, VT

I91 Bridge 43 N/S

Boring No.: B-206A
Page No.: 1 of 2
Pin No.: s12a132
Checked By: ASP

Boring Crew: Drilex/Jason, MJR
Date Started: 3/31/14 Date Finished: 3/31/14
VTSPG NAD83: N 417516.45 ft E 1683355.85 ft
Station: 250+18.53 Offset: 34.94
Ground Elevation: 551.24 ft

| | Casing | Sampler |
|---|---|---|
| Type: | Auger/WB | SS |
| I.D.: | 4.5 in | 2 in |
| Hammer Wt: | 300 lb. | 140 lb. |
| Hammer Fall: | N.A. | 30 in. |
| Hammer/Rod Type: | | Auto |
| Rig: | CME 50 | CE = 1.33 |

Groundwater Observations

| Date | Depth (ft) | Notes |
|---|---|---|
| 03/26/14 | 11.4 | See B-206 |

| Depth (ft) | Strata (1) | CLASSIFICATION OF MATERIALS (Description) | Run (Dip deg.) | Core Rec. % (ROD %) | Drill Rate minutes/ft | Blows/6" (N Value) | Moisture Content % | Gravel % | Sand % | Fines % |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Augered to 22.5', 3 feet west of B-206, and began rock core at 22.5 feet. | | | | | | | | |
| 22.5 | | 22.5 ft – 27.5 ft, Gray-green ANDESITE, very hard, with phenocrysts, no foliation/bedding, 45° and 25° joint sets, smooth, fresh, moderately close. | 1 | 46 (17) | | | | | | |

Notes:
1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
2. N Values have not been corrected for hammer energy. CE is the hammer energy correction factor. CE is an estimated value.
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.
4. Ground surface elevations indicated on the boring logs were estimated based on the grading plan provided by VAOT.

Terracon

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MATERIALS & RESEARCH SECTION
SUBSURFACE INFORMATION

BORING LOG

Hartford, VT

I91 Bridge 43 N/S

Boring No.: B-206A
Page No.: 2 of 2
Pin No.: s12a132
Checked By: ASP

Boring Crew: Drilex/Jason, MJR
Date Started: 3/31/14 Date Finished: 3/31/14
VTSPG NAD83: N 417516.45 ft E 1683355.85 ft
Station: 250+18.53 Offset: 34.94
Ground Elevation: 551.24 ft

| | Casing | Sampler |
|---|---|---|
| Type: | Auger/WB | SS |
| I.D.: | 4.5 in | 2 in |
| Hammer Wt: | 300 lb. | 140 lb. |
| Hammer Fall: | N.A. | 30 in. |
| Hammer/Rod Type: | | Auto |
| Rig: | CME 50 | CE = 1.33 |

Groundwater Observations

| Date | Depth (ft) | Notes |
|---|---|---|
| 03/26/14 | 11.4 | See B-206 |

| Depth (ft) | Strata (1) | CLASSIFICATION OF MATERIALS (Description) | Run (Dip deg.) | Core Rec. % (ROD %) | Drill Rate minutes/ft | Blows/6" (N Value) | Moisture Content % | Gravel % | Sand % | Fines % |
|---|---|---|---|---|---|---|---|---|---|---|
| 27.5 | | 27.5 ft – 29.5 ft, Similar as above. | 2 | 25 (0) | | | | | | |
| 30.0 | | 29.5 ft – 32.5 ft, Similar as above. Lots of stops and starts due to poor circulation return/stoppages. | 3 | 77 (64) | 2.25<br>2.5<br>1.5 | | | | | |
| 32.5 | | Hole stopped @ 32.5 ft | | | | | | | | |

Notes:
1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
2. N Values have not been corrected for hammer energy. CE is the hammer energy correction factor. CE is an estimated value.
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.
4. Ground surface elevations indicated on the boring logs were estimated based on the grading plan provided by VAOT.

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STATE OF VERMONT
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MATERIALS & RESEARCH SECTION
SUBSURFACE INFORMATION

# BORING LOG

Hartford, VT

I91 Bridge 43 N/S

Boring No.: B-208
Page No.: 1 of 1
Pin No.: s12a132
Checked By: ASP

Boring Crew: Drilex/Jason, MJR
Date Started: 4/02/14 Date Finished: 4/03/14
VTSPG NAD83: N 417615.23 ft E 1683383.96 ft
Station: 251+21.16 Offset: 41.48
Ground Elevation: 546.61 ft

| | Casing | Sampler |
|---|---|---|
| Type: | Auger/WB | SS |
| I.D.: | 4.5 in | 2 in |
| Hammer Wt: | 300 lb. | 140 lb. |
| Hammer Fall: | N.A. | 30 in. |
| Hammer/Rod Type: | | Auto |
| Rig: | CME 50 | CE = 1.33 |

Groundwater Observations

| Date | Depth (ft) | Notes |
|---|---|---|
| 04/03/14 | 0.0 | Due to water used during drilling |

| Depth (ft) | Strata (1) | CLASSIFICATION OF MATERIALS (Description) | Run (Dip deg.) | Core Rec. % (RQD %) | Drill Rate minutes/ft | Blows/6" (N Value) | Moisture Content % | Gravel % | Sand % | Fines % |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Spin 4" casing to 12", start coring at 14" | | | | | | | | |
| 2.5 | | 1.0 ft – 5.0 ft, Gray-green ANDESITE, hard, fresh, joints moderately close, rough, some smooth surfaces; foliation near vertical . | 1 | 91 (89) | 2.75<br>2.5<br>2.5<br>2 | | | | | |
| 5.0 | | 5.0 ft – 9.0 ft, Similar as above, very slight weathering, near vertical foliation, joint set at 45°, hard, close, smooth. | 2 | 93 (85) | 2.5<br>2.75<br>2.5<br>2.75 | | | | | |
| 7.5 | | 9.0 ft – 10.0 ft, Similar as above, 45° joint set. | 3 | 100 (68) | 3 | | | | | |
| 10.0 | | 10.0 ft – 15.0 ft, Similar as above, severe vertical fracturing in upper 2 feet, moderately weathered, open to closed, vertical foliation with quartz filling. | 4 | 100 (65) | 2.3<br>3<br>3<br>3.3<br>5.2 | | | | | |
| 12.5 | | | | | | | | | | |
| 15.0 | | 15.0 ft – 20.0 ft, Similar as above, hard, 45° joint set, open to closed, moderate to fresh weathering, vertical to near vertical foliation with quartz filling. | 5 | 100 (66) | 2.7<br>2.7<br>2.2<br>2.3<br>2.6 | | | | | |
| 17.5 | | | | | | | | | | |
| 20.0 | | Hole stopped @ 20.0 ft | | | | | | | | |
| 22.5 | | | | | | | | | | |

Notes:
1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
2. N Values have not been corrected for hammer energy. CE is the hammer energy correction factor. CE is an estimated value.
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.
4. Ground surface elevations indicated on the boring logs were estimated based on the grading plan provided by VAOT.

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SUBSURFACE INFORMATION

# BORING LOG

**HARTFORD**
**IM 91-2(79)**
**I-91 BR-43**

Boring No.: **B-209**
Page No.: 1 of 1
Pin No.: 12A132
Checked By: BLS

Boring Crew: DAIGNEAULT, NIETO, JUDKINS
Date Started: 5/07/14 Date Finished: 5/08/14
VTSPG NAD83: N 417447.61 ft E 1683272.04 ft
Station: 149+67.32 Offset: 41.40
Ground Elevation: 573.65 ft

| | Casing | Sampler |
|---|---|---|
| Type: | WB | SS |
| I.D.: | 4 in | 1.5 in |
| Hammer Wt: | N.A. | 140 lb. |
| Hammer Fall: | N.A. | 30 in. |
| Hammer/Rod Type: | Auto/AWJ | |
| Rig: | CME 55 TRACK | $C_E$ = 1.46 |

Groundwater Observations

| Date | Depth (ft) | Notes |
|---|---|---|
| 05/08/14 | 26.7 | AM |
| | | |
| | | |

| Depth (ft) | Strata (1) | CLASSIFICATION OF MATERIALS (Description) | Run (Dip deg.) | Core Rec. % (RQD %) | Drill Rate minutes/ft | Blows/6" (N Value) | Moisture Content % | Gravel % | Sand % | Fines % |
|---|---|---|---|---|---|---|---|---|---|---|
| | | A-1-b, GrSa, brn, Moist, Rec. = 1.1 ft | | | | 1-2-4-6 (6) | 5.1 | 43.1 | 47.9 | 9.0 |
| | | Field Note:, Roller Coned ahead and cleaned out casing. | | | | | | | | |
| 5 | | A-1-b, GrSa, brn, Moist, Rec. = 0.7 ft, Lab Note: Broken Rock was within sample. | | | | 8-6-7-9 (13) | 11.1 | 42.1 | 44.1 | 13.8 |
| | | Field Note:, Roller Coned ahead and cleaned out casing. | | | | | | | | |
| 10 | | Visual Description:, GrSa with some Broken Rock, brn, Moist, Rec. = 0.3 ft, Rock stuck in sampler. Insufficient sample for testing. | | | | 8-12-16-19 (28) | 7.9 | | | |
| 15 | | A-2-4, Sa, Lt/brn, Moist, Rec. = 1.5 ft | | | | 13-14-17-15 (31) | 11.9 | 2.2 | 80.7 | 17.1 |
| | | Field Note:, Roller Coned ahead and cleaned out casing. | | | | | | | | |
| 20 | | A-2-4, GrSiSa, brn, Moist, Rec. = 1.3 ft, Lab Note: Broken Rock was within sample. | | | | 13-13-15-16 (28) | 13.2 | 24.1 | 47.8 | 28.1 |
| | | Field Note:, Roller Coned ahead and cleaned out casing. | | | | | | | | |
| 25 | | A-2-4, SiSa, brn, Moist, Rec. = 1.3 ft, Lab Note: Broken Rock was within sample. | | | | 8-9-15-14 (24) | 13.6 | 19.2 | 51.1 | 29.7 |
| | | Field Note:, Roller Coned ahead and cleaned out casing. | | | | | | | | |
| 30 | | A-2-4, SiGrSa, brn, Moist, Rec. = 0.9 ft, Lab Note: Broken Rock was within sample. | | | | 24-22-22-14 (44) | 12.4 | 37.1 | 39.5 | 23.4 |
| 35 | | 35.0 ft - 40.0 ft, Dark-greenish-gray to medium-bluish-gray metamorphosed andesitic and basaltic Tuff, Moderately hard, Unweathered, Poor rock, NXMDC, Near vertical fracture from 36.25' to 39.2'. RMR = 36 | 1 (85) | 84 (18) | 6 7 6 5 6 | Top of Bedrock @ 35.0 ft | | | | |
| 40 | | Hole stopped @ 40.0 ft | | | | | | | | |
| 45 | | Remarks: Hole collapsed at 27.1 ft. | | | | | | | | |

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

BORING LOG 2 HARTFORD IM 91-2(79).GPJ VERMONT AOT.GDT 5/30/14

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AGENCY OF TRANSPORTATION
MATERIALS & RESEARCH SECTION
SUBSURFACE INFORMATION

# BORING LOG

**HARTFORD**
**IM 91-2(79)**
**I-91 BR-43**

Boring No.: **B-210**
Page No.: 1 of 1
Pin No.: 12A132
Checked By: BLS

Boring Crew: DAIGNEAULT, NIETO, JUDKINS
Date Started: 5/08/14 Date Finished: 5/12/14
VTSPG NAD83: N 417672.63 ft E 1683317.78 ft
Station: 152+00.73 Offset: 41.39
Ground Elevation: 572.42 ft

| | Casing | Sampler |
|---|---|---|
| Type: | WB | SS |
| I.D.: | 4 in | 1.5 in |
| Hammer Wt: | N.A. | 140 lb. |
| Hammer Fall: | N.A. | 30 in. |
| Hammer/Rod Type: | Auto/AWJ | |
| Rig: | CME 55 TRACK | $C_E$ = 1.46 |

Groundwater Observations

| Date | Depth (ft) | Notes |
|---|---|---|
| 05/09/14 | 19.7 | AM |
| 05/12/14 | 19.3 | While drilling. |

| Depth (ft) | Strata (1) | CLASSIFICATION OF MATERIALS (Description) | Run (Dip deg.) | Core Rec. % (RQD %) | Drill Rate minutes/ft | Blows/6" (N Value) | Moisture Content % | Gravel % | Sand % | Fines % |
|---|---|---|---|---|---|---|---|---|---|---|
| | | A-1-b, SaGr, brn, Moist, Rec. = 1.1 ft, Lab Note: Wood & Roots were within sample. | | | | 3-2-4-4 (6) | 5.3 | 47.9 | 44.4 | 7.7 |
| | | Field Note:, NXDC, Cobbles | | | | | | | | |
| 5 | | Field Note:, No Recovery | | | | R@0.0" (R) | | | | |
| | | Field Note:, NXDC, Boulder | | | | | | | | |
| 10 | | A-2-4, GrSiSa, gry, Moist, Rec. = 0.9 ft | | | | 5-4-3-4 (7) | 14.5 | 22.3 | 44.5 | 33.2 |
| | | Field Note:, NXDC | | | | | | | | |
| 15 | | A-2-4, SiSa, gry, Moist, Rec. = 1.2 ft | | | | 10-13-11-15 (24) | 12.7 | 17.8 | 48.1 | 34.1 |
| | | Field Note:, Roller Coned ahead and cleaned out casing. | | | | | | | | |
| 20 | | A-2-4, GrSiSa, gry, Moist, Rec. = 1.1 ft | | | | 10-9-10-10 (19) | 12.1 | 21.8 | 51.5 | 26.7 |
| | | Field Note:, Roller Coned ahead and cleaned out casing. | | | | | | | | |
| 25 | | A-4, SaGrSi, gry, Moist, Rec. = 0.5 ft, Lab Note: Broken Rock was within sample. | | | | R@6.0" (R) | 10.3 | 32.0 | 29.4 | 38.6 |
| | | Field Note:, Roller Coned ahead and cleaned out casing. | | | | | | | | |
| 30 | | Field Note:, No Recovery | | | | R@0.0" (R) | | | | |
| | | Field Note:, Mostly Broken Rock with a small layer of Weathered Rock | | | | | | | | |
| | | 32.6 ft - 36.6 ft, Dark-greenish-gray to medium-bluish-gray metamorphosed andesitic and basaltic Tuff, Moderately hard to soft, Unweathered, Poor rock, NXMDC, RMR = 41 | 1 (75) | 100 (28) | 2<br>3<br>7<br>13 | Top of Bedrock @ 32.6 ft | | | | |
| 35 | | 36.6 ft - 41.6 ft, Dark-greenish-gray to medium-bluish-gray metamorphosed andesitic and basaltic Tuff, Moderately hard to soft, Unweathered, Poor rock, NXMDC, RMR = 36 | 2 (75) | 42 (0) | 3<br>26<br>16<br>9<br>3 | | | | | |
| 40 | | Hole stopped @ 41.6 ft | | | | | | | | |
| 45 | | Remarks:<br>Hole collapsed at 7.7 ft. | | | | | | | | |

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

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# BORING LOG

**HARTFORD**
**IM 91-2(79)**
**I-91 BR-43**

Boring No.: **B-211**
Page No.: 1 of 1
Pin No.: 12A132
Checked By: BLS

Boring Crew: DAIGNEAULT, NIETO, HOOK
Date Started: 5/05/14 Date Finished: 5/05/14
VTSPG NAD83: N 417452.80 ft E 1683180.69 ft
Station: 149+58.45 Offset: -49.66
Ground Elevation: 567.04 ft

| | Casing | Sampler |
|---|---|---|
| Type: | WB | SS |
| I.D.: | 4 in | 1.5 in |
| Hammer Wt: | N.A. | 140 lb. |
| Hammer Fall: | N.A. | 30 in. |
| Hammer/Rod Type: | Auto/AWJ | |
| Rig: CME 55 TRACK | $C_e$ = 1.46 | |

Groundwater Observations

| Date | Depth (ft) | Notes |
|---|---|---|
| 05/05/14 | 8.1 | While drilling. |
| | | |
| | | |

| Depth (ft) | Strata (1) | CLASSIFICATION OF MATERIALS (Description) | Run (Dip deg.) | Core Rec. % (RQD %) | Drill Rate minutes/ft | Blows/6" (N Value) | Moisture Content % | Gravel % | Sand % | Fines % |
|---|---|---|---|---|---|---|---|---|---|---|
| | | A-2-4, SiSa, brn, Moist, Rec. = 0.7 ft, Lab Note: Grass & Roots were within sample. | | | | 1-1-1-1 (2) | 18.0 | 15.5 | 53.9 | 30.6 |
| 5 | | A-2-4, SiSa, brn, Moist, Rec. = 1.0 ft, Lab Note: Roots were within sample. Roller Coned, Cleaned out casing. | | | | 1-1-6-10 (7) | 20.1 | 7.8 | 70.4 | 21.8 |
| 10 | | A-2-4, SiSa, brn, Moist, Rec. = 1.1 ft, Lab Note: Broken Rock was within sample. | | | | 10-9-9-14 (18) | 14.5 | 15.4 | 58.8 | 25.8 |
| | | Field Note:, Roller Coned ahead and cleaned out casing. | | | | | | | | |
| 15 | | A-4, SiSa, brn, Moist, Rec. = 0.7 ft, Lab Note: Broken Rock was within sample. | | | | 5-12-R@6.0" (R) | 13.8 | 18.1 | 41.1 | 40.8 |
| | | SaGr, blu-grn, Dry, Rec. = 0.2 ft, 16.3 ft - 16.5 ft, Lab Note: Mostly Broken Rock with sandy silt. | | | | | 3.8 | 52.2 | 32.2 | 15.6 |
| | | Field Note:, Roller Coned ahead and cleaned out casing. | | | | | | | | |
| 20 | | A-4, GrSaSi, gry, MTW, Rec. = 0.9 ft, Lab Note: Broken Rock was within sample. | | | | 25-42-R@3.5" (R) | 11.3 | 25.3 | 26.8 | 47.9 |
| | | Field Note:, Roller Coned ahead and cleaned out casing. | | | | | | | | |
| 25 | | A-4, GrSaSi, gry, MTW, Rec. = 1.2 ft, Lab Note: Broken Rock was within sample. | | | | 17-36-31-R@3.5" (67) | 12.9 | 20.5 | 35.2 | 44.3 |
| | | Field Note:, Roller Coned ahead and cleaned out casing. | | | | | | | | |
| 30 | | A-4, SaSi, gry, Moist, Rec. = 1.3 ft, Lab Note: Broken Rock was within sample. | | | | 26-44-R@3.5" (R) | 11.5 | 18.3 | 32.5 | 49.2 |
| | | Field Note:, Roller Coned ahead and cleaned out casing. | | | | | | | | |
| 35 | | A-4, SaSi, gry, Moist, Rec. = 0.8 ft, Lab Note: Broken Rock was within sample. | | | | 30-R@6.0" (R) | 12.4 | 16.1 | 36.9 | 47.0 |
| | | Field Note:, Roller Coned, Weathered Rock | | | | | | | | |
| 40 | | 40.0 ft - 45.0 ft, Dark-greenish-gray to medium-bluish-gray metamorphosed andesitic and basaltic Tuff, Moderately hard, Unweathered, Poor rock, NXMDC, Vertical fractures in upper core run. RMR = 36 | 1 (85) | 90 (7) | 6<br>7<br>7<br>13<br>15 | Top of Bedrock @ 40.0 ft | | | | |
| 45 | | Hole stopped @ 45.0 ft | | | | | | | | |

Remarks:
Hole collapsed at 38.2 ft.

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

BORING LOG 2 HARTFORD IM 91-2(79).GPJ VERMONT AOT.GDT 5/30/14

STATE OF VERMONT
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# BORING LOG

**HARTFORD**
**IM 91-2(79)**
**I-91 BR-43**

Boring No.: **B-212**
Page No.: 1 of 1
Pin No.: 12A132
Checked By: BLS

Boring Crew: DAIGNEAULT, NIETO, HOOK
Date Started: 4/30/14 Date Finished: 5/02/14
VTSPG NAD83: N 417630.22 ft E 1683206.05 ft
Station: 151+33.92 Offset: -57.55
Ground Elevation: 564.13 ft

| | Casing | Sampler |
|---|---|---|
| Type: | WB | SS |
| I.D.: | 4 in | 1.5 in |
| Hammer Wt: | N.A. | 140 lb. |
| Hammer Fall: | N.A. | 30 in. |
| Hammer/Rod Type: | Auto/AWJ | |
| Rig: | CME 55 TRACK | $C_E$ = 1.46 |

Groundwater Observations

| Date | Depth (ft) | Notes |
|---|---|---|
| 05/02/14 | 12.7 | AM |
| 05/02/14 | 1.6 | Casing removed. |

| Depth (ft) | Strata (1) | CLASSIFICATION OF MATERIALS (Description) | Run (Dip deg.) | Core Rec. % (RQD %) | Drill Rate minutes/ft | Blows/6" (N Value) | Moisture Content % | Gravel % | Sand % | Fines % |
|---|---|---|---|---|---|---|---|---|---|---|
| | | A-4, SiSa, brn, Moist, Rec. = 1.1 ft, Lab Note: Grass & Roots were within sample. | | | | 1-2-3-4 (5) | 16.1 | 12.1 | 49.3 | 38.6 |
| | | A-4, SiSa, brn, Moist, Rec. = 1.4 ft | | | | | 10.8 | 13.9 | 48.6 | 37.5 |
| 5 | | A-4, SiSa, brn, Moist, Rec. = 1.3 ft | | | | 8-10-16-19 (26) | 9.8 | 15.6 | 43.1 | 41.3 |
| | | A-2-4, SiSa, brn, Moist, Rec. = 1.7 ft | | | | 15-20-15-17 (35) | 8.6 | 16.3 | 53.7 | 30.0 |
| | | A-2-4, SiGrSa, gry, Moist, Rec. = 1.2 ft, NXDC, Cleaned out casing. | | | | 11-14-45-17 (59) | 11.0 | 26.0 | 49.2 | 24.8 |
| 10 | | A-2-4, SiGrSa, gry, Moist, Rec. = 1.2 ft, NXDC, Cleaned out casing. Lab Note: Broken Rock was within sample. | | | | 13-11-13-14 (24) | 11.5 | 24.0 | 55.7 | 20.3 |
| | | A-2-4, SiGrSa, gry, Moist, Rec. = 0.8 ft, Lab Note: Broken Rock was within sample. | | | | 23-16-11-16 (27) | 11.7 | 32.2 | 47.2 | 20.6 |
| 15 | | A-1-b, SaGr, gry, Moist, Rec. = 1.1 ft, NXDC, Cleaned out casing. Lab Note: Broken Rock was within sample. | | | | 20-16-15-16 (31) | 10.9 | 43.0 | 39.5 | 17.5 |
| | | A-2-4, GrSa, gry, Moist, Rec. = 1.2 ft, Lab Note: Broken Rock was within sample. | | | | 13-13-14-15 (27) | 11.8 | 29.0 | 53.1 | 17.9 |
| | | A-1-b, SaGr, gry, Moist, Rec. = 1.1 ft, Lab Note: Broken Rock was within sample. | | | | 22-26-28-22 (54) | 10.6 | 51.4 | 32.0 | 16.6 |
| 20 | | A-4, SiSa, gry, Moist, Rec. = 1.5 ft, Lab Note: Broken Rock was within sample. | | | | 12-12-16-13 (28) | 15.6 | 17.0 | 45.9 | 37.1 |
| | | A-2-4, SaGrSi, gry, Moist, Rec. = 1.0 ft, Lab Note: Broken Rock was within sample. | | | | 18-39-33-R@1.0" (72) | 10.3 | 33.9 | 31.0 | 35.1 |
| 25 | | A-4, SaSi, gry, Moist, Rec. = 0.3 ft<br>Field Note:, Cobbles | | | | R@3.5" (R) | 11.7 | 8.7 | 44.0 | 47.3 |
| | | Field Note:, Weathered Rock<br>27.4 ft - 32.4 ft, Dark-greenish-gray to medium-bluish-gray metamorphosed andesitic and basaltic Tuff, Moderately hard, Unweathered, Poor rock, NXMDC, Near vertical fracture from 29.4' to 32.4'. RMR = 36 | 1 (85) | 86 (10) | 2<br>3<br>4<br>3<br>4 | Top of Bedrock @ 27.4 ft | | | | |
| 30 | | Hole stopped @ 32.4 ft | | | | | | | | |
| 35 | | Remarks:<br>Hole collapsed at 16.3 ft. | | | | | | | | |

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

BORING LOG 2 HARTFORD IM 91-2(79).GPJ VERMONT AOT.GDT 5/30/14

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# BORING LOG

**HARTFORD**
**IM 91-2(79)**
**I-91 BR-43**

Boring No.: **B-214**
Page No.: 1 of 1
Pin No.: 12A132
Checked By: BLS

Boring Crew: JUDKINS, HOOK
Date Started: 5/12/14 Date Finished: 5/13/14
VTSPG NAD83: N 417666.95 ft E 1683415.96 ft
Station: 251+81.01 Offset: 60.34
Ground Elevation: 560.87 ft

| | Casing | Sampler |
|---|---|---|
| Type: | WB | SS |
| I.D.: | 4 in | 1.5 in |
| Hammer Wt: | N.A. | 140 lb. |
| Hammer Fall: | N.A. | 30 in. |
| Hammer/Rod Type: | | Auto/AWJ |
| Rig: | CME 55 TRACK | $C_e$ = 1.46 |

Groundwater Observations

| Date | Depth (ft) | Notes |
|---|---|---|
| | | No water to depth. |
| | | |
| | | |

| Depth (ft) | Strata (1) | CLASSIFICATION OF MATERIALS (Description) | Run (Dip deg.) | Core Rec. % (RQD %) | Drill Rate minutes/ft | Blows/6" (N Value) | Moisture Content % | Gravel % | Sand % | Fines % |
|---|---|---|---|---|---|---|---|---|---|---|
| | | A-2-4, SiGrSa, brn, Moist, Rec. = 0.7 ft, Lab Note: Wood, roots, grass were within sample. | | | | 1-4-10-9 (14) | 24.2 | 24.8 | 53.9 | 21.3 |
| | | Field Note:, Cobbles & Boulders | | | | | | | | |
| 5 | | Field Note:, No Recovery | | | | R@1.0" (R) | | | | |
| | | Field Note:, Lost water return at 6.0 feet | | | | | | | | |
| | | Field Note:, NXDC, Cleaned out casing | | | | | | | | |
| 10 | | Lab Note, Mostly Broken Rock with sandy silt, grn, Moist, Rec. = 0.5 ft | | | | 26-24-17-13 (41) | 7.5 | 65.7 | 20.7 | 13.6 |
| | | Field Note:, NXDC, Cobbles | | | | | | | | |
| 15 | | 15.0 ft - 16.0 ft, Dark-greenish-gray to medium-bluish-gray metamorphosed andesitic and basaltic Tuff, with plagioclase phenocrysts. Moderately hard, Unweathered, Poor rock, NXDC, RMR = 39 | 1 (?) | 70 (0) | 3 | Top of Bedrock @ 15.0 ft | | | | |
| | | | 2 (?) | 98 (58) | 5 4 4 5 5 | | | | | |
| 20 | | 16.0 ft - 21.0 ft, Dark-greenish-gray to medium-bluish-gray metamorphosed andesitic and basaltic Tuff, with plagioclase phenocrysts. Moderately hard, Unweathered, Fair rock, NXMDC, RMR = 49 | | | | | | | | |
| | | Hole stopped @ 21.0 ft | | | | | | | | |
| 25 | | Remarks:<br>Hole collapsed at 10.3 ft. | | | | | | | | |
| 30 | | | | | | | | | | |
| 35 | | | | | | | | | | |
| 40 | | | | | | | | | | |
| 45 | | | | | | | | | | |

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

BORING LOG 2 HARTFORD IM 91-2(79).GPJ VERMONT AOT.GDT 5/30/14

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MATERIALS & RESEARCH SECTION
SUBSURFACE INFORMATION

# BORING LOG

Hartford, VT

191 Bridge 43 N/S

Boring No.: B-215
Page No.: 1 of 1
Pin No.: s12a132
Checked By: ASP

Boring Crew: Drilex/Jason, MJR
Date Started: 4/03/14 Date Finished: 4/03/14
VTSPG NAD83: N 417493.25 ft E 1683150.25 ft
Station: 149+92.68 Offset: -86.12
Ground Elevation: 552.71 ft

| | Casing | Sampler |
|---|---|---|
| Type: | Auger/WB | SS |
| I.D.: | 4.5 in | 2 in |
| Hammer Wt: | 300 lb. | 140 lb. |
| Hammer Fall: | N.A. | 30 in. |
| Hammer/Rod Type: | | Auto |
| Rig: | CME 50 | CE = 1.33 |

Groundwater Observations

| Date | Depth (ft) | Notes |
|---|---|---|
| 04/03/14 | 0.0 | Due to water used during drilling |

| Depth (ft) | Strata (1) | CLASSIFICATION OF MATERIALS (Description) | Run (Dip deg.) | Core Rec. % (RQD %) | Drill Rate minutes/ft | Blows/6" (N Value) | Moisture Content % | Gravel % | Sand % | Fines % |
|---|---|---|---|---|---|---|---|---|---|---|
| | | A-1-b, SaGrSi, Rec. = 1.0 ft, (FILL) | | | | 4-3-2-2 (5) | 20.4 | 31.6 | 46.0 | 22.4 |
| 2.5 | | A-2-4, SaSiGr, (FILL) | | | | 5-7-10-10 (17) | 13.5 | 22.8 | 45.6 | 31.6 |
| 5.0 | | A-4, SiSaGr, Rec. = 1.17 ft | | | | 12-27-39-25/1" (66) | 11.2 | 20.2 | 33.9 | 45.9 |
| 7.5 | | A-4, SiSaGr, Rec. = 15.0 ft | | | | 19-27-42-30/2" (69) | 11.4 | 12.5 | 37.4 | 50.1 |
| 10.0 | | Weathered bedrock | | | | | | | | |
| 12.5 | | 12.0 ft – 17.0 ft, Grey-green ANDESITE, hard, 5° to 70° and 45° joint sets, smooth, fresh. Bottom 8" 45° fractures, mod. weathered, open-clay-silt filled at very bottom of last 45° joint. Foliation nearly vertical, mod. close, tight. | 1 | 100 (85) | 1.3<br>2.3<br>2.5<br>3<br>1.6 | | | | | |
| 15.0 | | | | | | | | | | |
| 17.5 | | Hole stopped @ 17.0 ft | | | | | | | | |
| 20.0 | | | | | | | | | | |
| 22.5 | | | | | | | | | | |

Notes:
1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
2. N Values have not been corrected for hammer energy. CE is the hammer energy correction factor. CE is an estimated value.
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.
4. Ground surface elevations indicated on the boring logs were estimated based on the grading plan provided by VAOT.

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MATERIALS & RESEARCH SECTION
SUBSURFACE INFORMATION

# BORING LOG

Hartford, VT

I91 Bridge 43 N/S

Boring No.: B-216
Page No.: 1 of 1
Pin No.: s12a132
Checked By: ASP

Boring Crew: Drilex/Jason, MJR
Date Started: 4/03/14 Date Finished: 4/03/14
VTSPG NAD83: N 417592.86 ft E 1683174.45 ft
Station: 150+91.87 Offset: 80.60
Ground Elevation: 549.35 ft

| | Casing | Sampler |
|---|---|---|
| Type: | Auger/WB | SS |
| I.D.: | 4.5 in | 2 in |
| Hammer Wt: | 300 lb. | 140 lb. |
| Hammer Fall: | N.A. | 30 in. |
| Hammer/Rod Type: | | Auto |
| Rig: | CME 50 | CE = 1.33 |

Groundwater Observations

| Date | Depth (ft) | Notes |
|---|---|---|
| 04/03/14 | 0.0 | Due to water used during drilling |

| Depth (ft) | Strata (1) | CLASSIFICATION OF MATERIALS (Description) | Run (Dip deg.) | Core Rec. % (RQD %) | Drill Rate minutes/ft | Blows/6" (N Value) | Moisture Content % | Gravel % | Sand % | Fines % |
|---|---|---|---|---|---|---|---|---|---|---|
| 5.0 | | A-4, SaSiGr, Rec. = 0.83 ft | | | | 9-11-14-14 (25) | 12.3 | 25.0 | 39.1 | 35.9 |
| 7.5 | | Weathered bedrock | | | | | | | | |
| 10.0 | | | | | | | | | | |
| 12.5 | | 11.0 ft – 16.0 ft, Gray-green ANDESITE, hard, 0° and 80° joint sets, slightly weathered, smooth, moderately close, slighty open joints in 9" piece near bottom, smooth; thin foliation. | 1 | 90 (85) | 2.5<br>2.3<br>2.5<br>2.3<br>2.8 | | | | | |
| 15.0 | | Hole stopped @ 16.0 ft | | | | | | | | |
| 17.5 | | | | | | | | | | |
| 20.0 | | | | | | | | | | |
| 22.5 | | | | | | | | | | |

Notes:
1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
2. N Values have not been corrected for hammer energy. CE is the hammer energy correction factor. CE is an estimated value.
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.
4. Ground surface elevations indicated on the boring logs were estimated based on the grading plan provided by VAOT.

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# BORING LOG

Hartford, VT

191 Bridge 43 N/S

Boring No.: B-217
Page No.: 1 of 2
Pin No.: s12a132
Checked By: ASP

Boring Crew: NTB/Mike Nadeau, MJR
Date Started: 3/25/14 Date Finished: 3/25/14
VTSPG NAD83: N 417515.93 ft E 1683416.13 ft
Station: 250+29.29 Offset: 94.25
Ground Elevation: 555.78 ft

| | Casing | Sampler |
|---|---|---|
| Type: | Auger/WB | SS |
| I.D.: | 4.5 in | 2 in |
| Hammer Wt: | 300 lb. | 140 lb. |
| Hammer Fall: | N.A. | 30 in. |
| Hammer/Rod Type: | | Auto |
| Rig: | CME 50 | CE = 1.33 |

Groundwater Observations

| Date | Depth (ft) | Notes |
|---|---|---|
| 03/25/14 | 10.2 | After drilling |

| Depth (ft) | Strata (1) | CLASSIFICATION OF MATERIALS (Description) | Run (Dip deg.) | Core Rec. % (RQD %) | Blows/6" (N Value) | Moisture Content % | Gravel % | Sand % | Fines % |
|---|---|---|---|---|---|---|---|---|---|
| 0.0 | | A-2-4, SaSiGr, Rec. = 1.17 ft, (FILL) | | | 3-7-7-7 (14) | 16.8 | 23.4 | 47.4 | 29.2 |
| 2.5 | | | | | | | | | |
| 5.0 | | A-2-4, SaSiGr, Rec. = 1.83 ft, (FILL) | | | 9-17-17-12 (34) | 14.6 | 17.8 | 51.3 | 30.9 |
| | | A-1-b, GrSaSi, (FILL) | | | | 7.4 | 48.0 | 29.5 | 22.5 |
| 7.5 | | | | | | | | | |
| 10.0 | | A-2-4, SaSiGr, Rec. = 1.92 ft | | | 15-14-16-8 (30) | 10.8 | 26.8 | 41.6 | 31.6 |
| 12.5 | | | | | | | | | |
| 15.0 | | A-2-4, GrSaSi, Rec. = 1.08 ft | | | 9-15-18-19 (33) | 10.7 | 37.0 | 34.5 | 28.5 |
| 17.5 | | | | | | | | | |
| 20.0 | | | | | | | | | |
| 22.5 | | | | | | | | | |

Notes:
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BORING LOG

Hartford, VT

191 Bridge 43 N/S

Boring No.: B-217
Page No.: 2 of 2
Pin No.: s12a132
Checked By: ASP

Boring Crew: NTB/Mike Nadeau, MJR
Date Started: 3/25/14 Date Finished: 3/25/14
VTSPG NAD83: N 417515.93 ft E 1683416.13 ft
Station: 250+29.29 Offset: 94.25
Ground Elevation: 555.78 ft

| | Casing | Sampler |
|---|---|---|
| Type: | Auger/WB | SS |
| I.D.: | 4.5 in | 2 in |
| Hammer Wt: | 300 lb. | 140 lb. |
| Hammer Fall: | N.A. | 30 in. |
| Hammer/Rod Type: | | Auto |
| Rig: | CME 50 | CE = 1.33 |

Groundwater Observations

| Date | Depth (ft) | Notes |
|---|---|---|
| 03/25/14 | 10.2 | After drilling |

| Depth (ft) | Strata (1) | CLASSIFICATION OF MATERIALS (Description) | Run (Dip deg.) | Core Rec. % (RQD %) | Blows/6" (N Value) | Moisture Content % | Gravel % | Sand % | Fines % |
|---|---|---|---|---|---|---|---|---|---|
| | | Rec. = 0.17 ft, 25.0 ft – 27.0 ft | | | 9-11-12-14 (23) | | | | |
| 27.5 | | Weathered bedrock | | | | | | | |
| 30.0 | | 30.0 ft – 33.0 ft, Gray-green ANDESITE, hard, 70° and 45° joint sets, closely spaced, slight to severe weathering, with quartz boudins. | 1 | 58 (12.5) | | | | | |
| 32.5 | | 33.0 ft – 34.5 ft, Green-gray ANDESITE, hard, 45° to 0°, 90° joint sets, closely spaced, rough to smooth, moderately weathered. | 2 | 66 (44) | | | | | |
| 35.0 | | 34.5 ft – 36.0 ft, Similar as above, vertical fracture in last 8" piece, very slight weathering. | 3 | 100 (69) | | | | | |
| | | Hole stopped @ 36.0 ft | | | | | | | |
| 37.5 | | | | | | | | | |
| 40.0 | | | | | | | | | |
| 42.5 | | | | | | | | | |
| 45.0 | | | | | | | | | |
| 47.5 | | | | | | | | | |

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# BORING LOG

Hartford, VT

191 Bridge 43 N/S

Boring No.: B-218
Page No.: 1 of 1
Pin No.: s12a132
Checked By: ASP

Boring Crew: Drilex/Jason, MJR
Date Started: 4/03/14 Date Finished: 4/03/14
VTSPG NAD83: N 417651.73 ft E 1683448.99 ft
Station: 251+74.37 Offset: 96.21
Ground Elevation: 547.65 ft

| | Casing | Sampler |
|---|---|---|
| Type: | Auger/WB | SS |
| I.D.: | 4.5 in | 2 in |
| Hammer Wt: | 300 lb. | 140 lb. |
| Hammer Fall: | N.A. | 30 in. |
| Hammer/Rod Type: | | Auto |
| Rig: | CME 50 | CE = 1.33 |

Groundwater Observations

| Date | Depth (ft) | Notes |
|---|---|---|
| 04/02/14 | 0.0 | Due to water used during drilling |

| Depth (ft) | Strata (1) | CLASSIFICATION OF MATERIALS (Description) | Run (Dip deg.) | Core Rec. % (RQD %) | Drill Rate minutes/ft | Blows/6" (N Value) | Moisture Content % | Gravel % | Sand % | Fines % |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Spin 4" casing to 12", start coring at 12" | | | | | | | | |
| 2.5 | | 1.0 ft – 5.0 ft, Gray-green ANDESITE, hard, 75° and 10° joint sets, fresh weathering, moderately close. Minor 75° foliation with quartz filling, thin, rough, slightly open to tight. | 1 | 92 (92) | 2.3<br>2.2<br>2<br>2.75 | | | | | |
| 5.0 | | 5.0 ft – 6.0 ft, Similar as above. | 2 | 100 (50) | 2 | | | | | |
| | | Hole stopped @ 6.0 ft | | | | | | | | |
| 7.5 | | | | | | | | | | |
| 10.0 | | | | | | | | | | |
| 12.5 | | | | | | | | | | |
| 15.0 | | | | | | | | | | |
| 17.5 | | | | | | | | | | |
| 20.0 | | | | | | | | | | |
| 22.5 | | | | | | | | | | |

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