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Via Email

June 22, 2021
File No. 04.0191133.01

Mr. Dennis A. Vertiyev, P.E.
Green International Affiliates, Inc.
239 Littleton Road, Suite 3
Westford, MA 01886

RE: Geotechnical Data Report
New Roundabout at the Intersection of Route 67A with Silk Road, Rice Lane, and College Drive
Bennington STP 1000(23)
Bennington, Vermont

Dear Mr. Vertiyev:

This letter report presents the results of GZA GeoEnvironmental, Inc.'s (GZA's) recent subsurface investigations and associated laboratory testing completed for the proposed roundabout at the intersection of Route 67A with Silk Road, Rice Lane, and College Drive in Bennington, Vermont. This work has been conducted in accordance with our proposal dated February 5, 2021. The contents of this report are subject to the *Limitations* set forth in **Appendix A**.

GZA's understanding of the project is based on our ongoing discussions with GIA, our evaluation of potential environmental impacts summarized in our report entitled "Desktop Study for Hazardous Materials Assessment, New Roundabout at the Intersection of Route 67A with Silk Road, Rice Lane, and College Drive, Bennington STP 1000(23), Bennington, Vermont," dated September 15, 2020, and GIA's boring request plan dated January 14, 2021.

OBJECTIVES AND SCOPE OF SERVICES

The objectives of our work were to coordinate and conduct subsurface explorations and laboratory testing, and provide a summary and interpretation of subsurface conditions for use by GIA in the design and construction of the new roundabout and stormwater treatment systems. To meet these objectives, GZA completed the following Scope of Services:

- Conducted a site visit to observe surficial conditions, traffic, and boring access;
- Coordinated and observed a subsurface exploration program consisting of seven test borings to evaluate subsurface conditions, and conducted infiltration testing at two test boring locations;

- Coordinated a laboratory testing program to evaluate the engineering properties of the soil encountered in the test borings, including 13 soil gradation analyses on select samples of recovered soil; and
- Prepared this data report summarizing our findings and interpretations of subsurface conditions.

BACKGROUND AND EXISTING CONDITIONS

The proposed new roundabout will be located at the intersection of North Bennington Road (VT Route 67A), Silk Road, Rice Lane, and College Drive in Bennington, Vermont, as shown in **Figure 1, Locus Plan**. The project area covers approximately 1.33 acres based on the current conceptual design provided by GIA and includes paved state and local roadways, as well as forested and cleared undeveloped land. Properties adjoining the project area to the west and northwest contain undeveloped wooded and cleared areas, while properties to the south and east are improved with residential buildings and landscaping.

GZA completed a Hazardous Materials Assessment for the project in September 2020. Our assessment identified the Former Daniel Fagers Facility (FDFF) site (VT DEC #2005-3341) as a site of concern. The FDFF is located at 1092 North Bennington Road, southwest of the intersection of North Bennington Road (Route 67A) and Rice Lane and south of the intersection of North Bennington Road and College Drive. The property is listed as an active leaking underground storage tank (LUST) site. Soil and groundwater petroleum contamination were noted with ongoing groundwater monitoring.

As outlined in GZA's Hazardous Materials Assessment, a gasoline station was operated on the property from at least 1955 until 1986. Two 1,000-gallon underground storage tanks (USTs) containing gasoline were permanently closed and removed during 1986, and one 500-gallon fuel oil UST was permanently closed and removed in 2005. Currently groundwater at the site is monitored biannually. As such, GZA conducted field screening for volatile organic compounds (VOCs) on all soil samples collected our subsurface investigation, as described below.

SUBSURFACE EXPLORATIONS

GZA completed the requested subsurface exploration program consisting of seven test borings (designated B-1 through B-7) as summarized in **Table 1 – Summary of GZA Test Borings** and as shown on **Figure 2, Subsurface Exploration Location Plan**.

The test borings were drilled to depths of approximately 6 to 10 feet below ground surface (bgs) using a track-mounted drill rig. Standard Penetration Testing (SPT) and split-spoon sampling were performed continuously in the borings. Borings B-1 through B-5 were drilled by advancing the split-spoon sampler to the bottom of the boring without additional drill equipment. Borings B-6 and B-7 were drilled using 6-inch-diameter flush-jointed casing and drive-and-wash drilling techniques to conduct infiltration testing at these locations. The borings were backfilled with the drill cuttings and finished with asphalt cold patch where locations were drilled through existing pavement.

New England Boring Contractors (NEBC) of Derry, New Hampshire coordinated Dig Safe® utility clearance and provided drilling services. Traffic control was provided by Vermont Agency of Transportation Maintenance District 1 personnel. The test borings and infiltration testing were completed between May 24 and 25, 2021. GZA personnel observed the drilling and prepared the boring logs included in **Appendix B**. Soil samples were visually classified according to the Modified Burmister classification system, with the AASHTO classification indicated in parentheses. Soil samples were field screened for volatile organic compounds (VOCs) using a photoionization

detector (PID) using a 10.6eV lamp. VOC detections of 0.5 parts per million (ppm) or less were recorded at all boring locations and are considered to be indicative of background levels. Results of the field screening are presented on the test boring logs.

The approximate as-drilled boring and infiltration test locations were determined by GZA personnel using a handheld GPS unit. The estimated ground surface elevations were provided on the boring request sheet provided by GIA and should be considered approximate. Elevations referenced in this report are measured in feet and refer to the North American Vertical Datum of 1988 (NAVD88).

INFILRATION RATE TESTING

Two of the test borings (B-6 and B-7) were drilled to obtain subsurface soils and groundwater data for use in storm water management design, with infiltration testing conducted at these locations. The borings were drilled to the test depths indicated in the table below, as provided by GIA.

Infiltration rates were evaluated based on borehole infiltration tests conducted in the test borings in accordance with the protocol established in VTrans 2017 Vermont Stormwater Management Manual Section 4.3.3.2.5.

At each infiltration test location, a section of 6-inch-diameter steel casing was inserted into the drilled borehole to the approximate elevations indicated in the table below. The 6-inch casing was filled with 24 inches of water to pre-soak for 24 hours prior to conducting the infiltration testing. The pipe was filled with 24 inches of water and water levels were measured utilizing an electric water level meter for a total of 60 minutes or until the water drained from the pipe. The test was repeated at each location a total of four times. The final infiltration rate was estimated as the average rate for the four tests. The infiltration rate measured at each location is presented in the table below.

Boring ID	Approx. Ground Surface Elevation +/- (ft)	Test Depth (ft)	Approx. Elevation of Test (ft)	Average Infiltration Rate
B-6	569.3	9.6	559.7	10.25 in/hr [0.007 cm/s]
B-7	572.0	8.4	563.6	17.9 in/hr [0.013 cm/s]

1. Based on estimated ground surface elevations provided by GIA on the boring request plan.

LABORATORY TESTING

Thirteen soil gradation analyses and moisture content determinations were conducted on soil samples recovered from the subsurface explorations to confirm visual-manual field classifications and for use in engineering analyses. The laboratory gradation testing was performed by Thielsch Engineering at their Cranston, Rhode Island facility. Laboratory testing results are included in **Appendix C**.

GENERAL GEOLOGIC REVIEW

From a review of available literature, surficial geologic units identified in the area of project consist of moraine to the north and alluvium to the south, comprised of varying amounts of sand, silt, and gravel, underlain by bedrock.

According to the USGS 2011 Bedrock Geologic Map of Vermont, bedrock in the northwestern portion of the project area is mapped as interbedded orange, tan, and buff dolostone and blue gray to gray dolomitic limestone of the Bascom Formation. Bedrock in the southeastern portion of the project is mapped as red to brown sandstone, orange to gray and buff well-bedded dolostone, and red to brown weathered dolomitic quartzite of the Monkton Formation. A bedrock fault is mapped through the southeastern portion of the project area.

SUBSURFACE CONDITIONS

Five soil units were encountered in the test borings: Topsoil, Sand and Gravel, Sand and Silt, Sand, and Gravel. Approximately 4 to 6 inches of asphalt pavement was encountered in three of the test borings (B-2, B-3 and B-5). The approximate thicknesses and generalized descriptions of the subsurface units are presented in the following table, in descending order from existing ground surface. Detailed descriptions of the materials encountered at specific locations are provided in the boring log in **Appendix B**.

GENERALIZED SUBSURFACE CONDITIONS		
Subsurface Unit	**Approx. Thickness (ft)**	**Generalized Description**
Topsoil	0.2 to 0.3	Approximately 2 to 4 inches of topsoil was encountered at the ground surface in borings B-1, B-6, and B-7
Sand and Gravel	0.7 to >7.7	Loose to very dense, brown, fine to coarse SAND, some to little Gravel, little to trace Silt. Asphalt and brick observed in boring B-6. (A-1-a, A-1-b) Encountered in all borings.
Sand and Silt	>1.0 to >5.3	Medium dense, brown to olive brown, fine to coarse SAND, and to some Silt, some to trace Gravel TO medium dense, brown SILT and fine to medium Sand, little Gravel. (A-1-b, A-2-4, A-4) Encountered in borings B-1 and B4 through B-7.
Gravel	>4.0	Medium dense to very dense, brown, GRAVEL, and to some fine to coarse Sand, some to little Silt. (A-1-b) Encountered in boring B-7.

GROUNDWATER

Groundwater was not observed to a maximum depth of 10 feet bgs in the test borings. The groundwater observations were made at the times and under the conditions stated on the boring log. Fluctuations in groundwater levels will occur due to variations in season, precipitation, and other factors. Consequently, water levels during and after construction are likely to vary from those encountered in the borings at the time the observations were made.

INTERPRETATION OF SOIL ENGINEERING PROPERTIES

Based on the laboratory and in-situ testing results and our experience with similar deposits in the area, GZA has interpreted the soil properties for the Sand and Gravel, Sand and Silt, and Gravel strata as outlined in the following table.

ESTIMATED ENGINEERING PROPERTIES OF SOIL					
	Naturally Deposited Sand and Gravel	**Naturally Deposited Sand and Silt**	**Naturally Deposited Gravel**	**703.04 Granular Borrow**	**704.08 Granular Backfill for Structures**
Typical SPT N-value range encountered, uncorrected (Average N-value, uncorrected)	8 to 32 (16)	11 to 33 (19)	32 to 65 (49)	-	-
Internal Friction Angle, ϕ (degrees)	32	32	34	32	34
Total Unit Weight (lb/ft^3)	120	120	130	130	140

CLOSING

We appreciate the opportunity to work with you on this project. Should you have any questions regarding the data contained in this report or require additional information, please contact us.

Very truly yours,

GZA GEOENVIRONMENTAL, INC.

Jennifer R. Baron
Project Manager

Dave G. Lamothe, P.E.
Associate Principal

Jay L. Hodkinson, P.E.
Consultant/Reviewer

JRB/DGL/JLH:jrb
p:\04jobs\0191100s\04.0191133.00\04.0191133.01\report\final 04.0191133.01 bennington geotech data report 062221.docx

Attachments: Table 1 – Summary of GZA Test Borings
Figure 1 – Locus Plan
Figure 2 – Subsurface Exploration Location Plan
Appendix A – Limitations
Appendix B – Test Boring and Infiltration Testing Logs
Appendix C – Laboratory Test Results

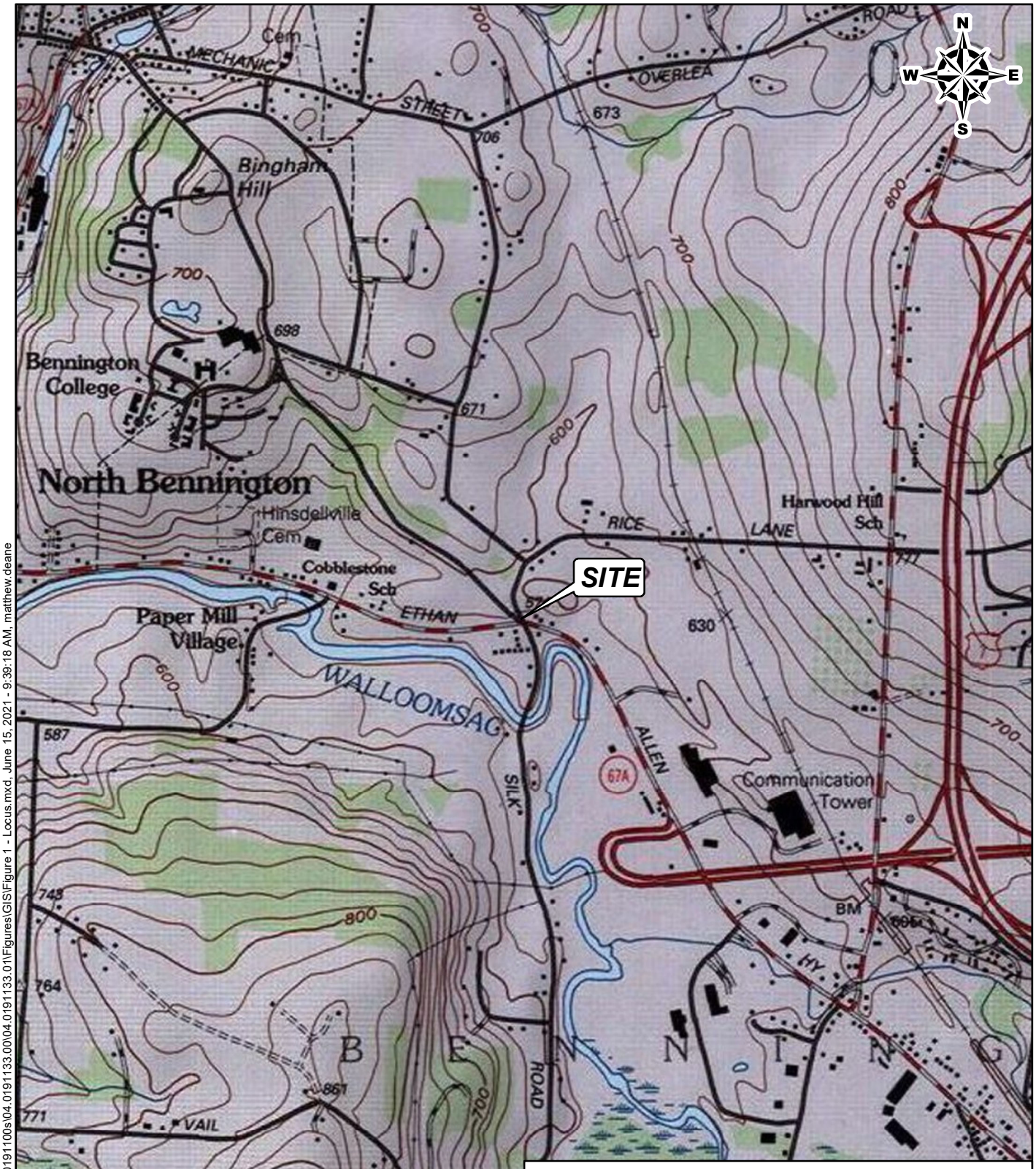
Table

TABLE 1
SUMMARY OF GZA TEST BORINGS
New Roundabout - Intersection of Route 67A, Silk Road, Rice Lane, College Drive
Bennington STP 1000(23)
Bennington, Vermont

Location	Boring Number	Approx. Ground Surface[4] Elev. +/-(ft.)	Approximate Location				Boring Depth (ft)	Groundwater[3]		Approx. Thickness of Deposit[5] (ft)				
			Northing	Easting	Station	Offset		Depth to (ft)	Elev. of (ft)	Asphalt	Topsoil	Sand and Gravel	Sand and Silt	Gravel
Silk Road	B-1	570.5	150973.71	1446160.70	33+36	7 RT	6.0	NE		NE	0.3	4.7	>1.0	NE
N Bennington Rd	B-2	574.2	151034.61	1446284.46	54+60	13 LT	6.0	NE		0.3	NE	>5.7	NE	NE
Rice Lane	B-3	582.5	151185.91	1446068.76	11+29	28 LT	8.0	NE		0.3	NE	>7.7	NE	NE
College Drive	B-4	576.0	151175.51	1446007.05	20+90	12 RT	6.0	NE		NE	NE	0.7	>5.3	NE
N Bennington Rd	B-5	575.0	151027.53	1445836.98	59+31	30 LT	6.0	NE		0.5	NE	1.1	>4.4	NE
SW of intersection (infiltration test)	B-6	569.3	150970.78	1446077.62	33+76	63 LT	10.0	NE		NE	0.2	5.8	>4.0	NE
SW of intersection (infiltration test)	B-7	572.0	151000.80	1445978.75	57+96	75 LT	10.0	NE		NE	0.3	3.7	2.0	>4.0

NOTES:
1. Refer to Appendix B for test boring logs.
2. "NE" indicates not encountered.
3. Groundwater measurements recorded in the table were obtained during the drilling process and should not be considered stabilized.
4. Ground surface elevations are approximate and were provided by Green International Affiliates. Elevations are measured in feet and reference the North American Vertical Datum of 1988.
5. The order that strata were encountered in the test borings may vary from the order shown on this table. Refer to the boring logs in Appendix B for detailed descriptions of the materials encountered at specific locations.

Figures



0 1,000 2,000 4,000

SCALE IN FEET

NO.	ISSUE / DESCRIPTION	BY	DATE
XX	XXXX	XX	XXX

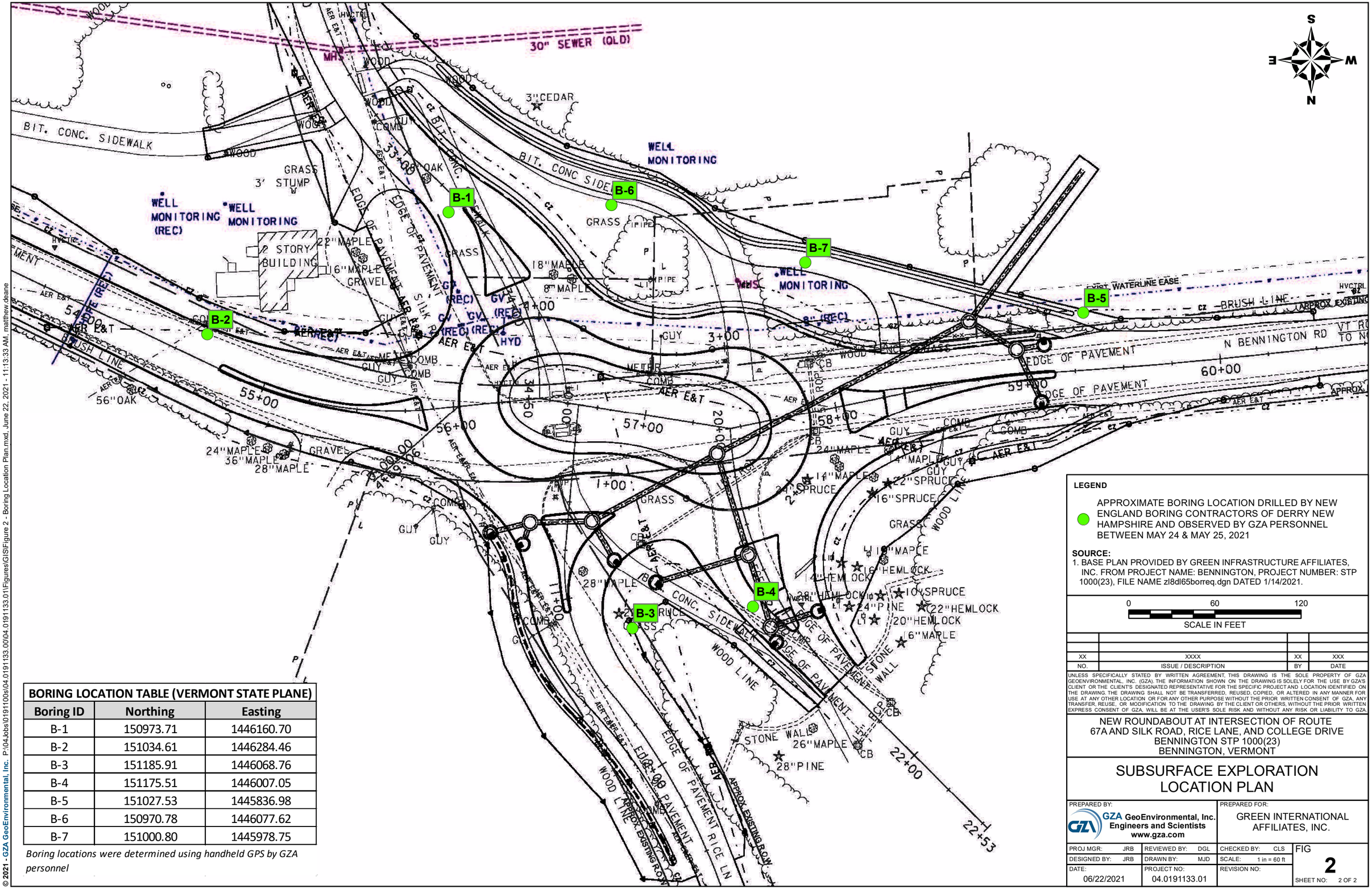
NEW ROUNDABOUT AT INTERSECTION OF ROUTE 67A AND SILK ROAD, RICE LANE, AND COLLEGE DRIVE
BENNINGTON STP 1000(23)
BENNINGTON, VERMONT

LOCUS PLAN

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR:
GREEN INTERNATIONAL AFFILIATES, INC.

PROJ MGR: JRB	REVIEWED BY: DGL	CHECKED BY: CLS	FIG 1
DESIGNED BY: MJD	DRAWN BY: MJD	SCALE: 1 in = 2,000 ft	
DATE: 06/15/2021	PROJECT NO: 04.0191133.01	REVISION NO:	SHEET NO: 1 OF 2



BORING LOCATION TABLE (VERMONT STATE PLANE)		
Boring ID	**Northing**	**Easting**
B-1	150973.71	1446160.70
B-2	151034.61	1446284.46
B-3	151185.91	1446068.76
B-4	151175.51	1446007.05
B-5	151027.53	1445836.98
B-6	150970.78	1446077.62
B-7	151000.80	1445978.75

Boring locations were determined using handheld GPS by GZA personnel

LEGEND

APPROXIMATE BORING LOCATION DRILLED BY NEW ENGLAND BORING CONTRACTORS OF DERRY NEW HAMPSHIRE AND OBSERVED BY GZA PERSONNEL BETWEEN MAY 24 & MAY 25, 2021

SOURCE:

1. BASE PLAN PROVIDED BY GREEN INFRASTRUCTURE AFFILIATES, INC. FROM PROJECT NAME: BENNINGTON, PROJECT NUMBER: STP 1000(23), FILE NAME zl8dl65borreq.dgn DATED 1/14/2021.

0 60 120

SCALE IN FEET

NO.	ISSUE / DESCRIPTION	BY	DATE
XX	XXXX	XX	XXX

NEW ROUNDABOUT AT INTERSECTION OF ROUTE 67A AND SILK ROAD, RICE LANE, AND COLLEGE DRIVE
BENNINGTON STP 1000(23)
BENNINGTON, VERMONT

SUBSURFACE EXPLORATION LOCATION PLAN

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR:
GREEN INTERNATIONAL AFFILIATES, INC.

PROJ MGR: JRB	REVIEWED BY: DGL	CHECKED BY: CLS	FIG 2
DESIGNED BY: JRB	DRAWN BY: MJD	SCALE: 1 in = 60 ft	
DATE: 06/22/2021	PROJECT NO: 04.0191133.01	REVISION NO:	SHEET NO: 2 OF 2

Appendix A – Limitations

GEOTECHNICAL LIMITATIONS

Use of Report

1. GZA GeoEnvironmental, Inc. (GZA) prepared this report on behalf of, and for the exclusive use of our Client for the stated purpose(s) and location(s) identified in the Proposal for Services and/or Report. Use of this report, in whole or in part, at other locations, or for other purposes, may lead to inappropriate conclusions; and we do not accept any responsibility for the consequences of such use(s). Further, reliance by any party not expressly identified in the agreement, for any use, without our prior written permission, shall be at that party's sole risk, and without any liability to GZA.

Standard of Care

2. GZA's findings and conclusions are based on the work conducted as part of the Scope of Services set forth in GZA's Proposal for Services and/or Report, and reflect our professional judgment. These findings and conclusions must be considered not as scientific or engineering certainties, but rather as our professional opinions concerning the limited data gathered during the course of our work. If conditions other than those described in this report are found at the subject location(s), or the design has been altered in any way, GZA shall be so notified and afforded the opportunity to revise the report, as appropriate, to reflect the unanticipated changed conditions.

3. GZA's services were performed using the degree of skill and care ordinarily exercised by qualified professionals performing the same type of services, at the same time, under similar conditions, at the same or a similar property. No warranty, expressed or implied, is made.

Subsurface Conditions

4. The generalized soil profile(s) provided in our Report are based on widely-spaced subsurface explorations and are intended only to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized, and were based on our assessment of subsurface conditions. The composition of strata, and the transitions between strata, may be more variable and more complex than indicated. For more specific information on soil conditions at a specific location refer to the exploration logs.

5. In preparing this report, GZA relied on certain information provided by the Client, state and local officials, and other parties referenced therein which were made available to GZA at the time of our evaluation. GZA did not attempt to independently verify the accuracy or completeness of all information reviewed or received during the course of this evaluation.

6. Water level readings have been made in test holes (as described in the Report) at the specified times and under the stated conditions. These data have been reviewed and interpretations have been made in this Report. Fluctuations in the level of the groundwater however occur due to temporal or spatial variations in areal recharge rates, soil heterogeneities, the presence of subsurface utilities, and/or natural or artificially induced perturbations. The water table encountered in the course of the work may differ from that indicated in the Report.

7. GZA's services did not include an assessment of the presence of oil or hazardous materials at the property. Consequently, we did not consider the potential impacts (if any) that contaminants in soil or groundwater may have on construction activities, or the use of structures on the property.

8. Recommendations for foundation drainage, waterproofing, and moisture control address the conventional geotechnical engineering aspects of seepage control. These recommendations may not preclude an environment that allows the infestation of mold or other biological pollutants.

Compliance with Codes and Regulations

9. We used reasonable care in identifying and interpreting applicable codes and regulations. These codes and regulations are subject to various, and possibly contradictory, interpretations. Compliance with codes and regulations by other parties is beyond our control.

Cost Estimates

10. Unless otherwise stated, our cost estimates are only for comparative and general planning purposes. These estimates may involve approximate quantity evaluations. Note that these quantity estimates are not intended to be sufficiently accurate to develop construction bids, or to predict the actual cost of work addressed in this Report. Further, since we have no control over either when the work will take place or the labor and material costs required to plan and execute the anticipated work, our cost estimates were made by relying on our experience, the experience of others, and other sources of readily available information. Actual costs may vary over time and could be significantly more, or less, than stated in the Report.

Additional Services

11. GZA recommends that we be retained to provide services during any future: site observations, design, implementation activities, construction and/or property development/redevelopment. This will allow us the opportunity to: i) observe conditions and compliance with our design concepts and opinions; ii) allow for changes in the event that conditions are other than anticipated; iii) provide modifications to our design; and iv) assess the consequences of changes in technologies and/or regulations.

Appendix B – Test Boring and Infiltration Testing Logs

STATE OF VERMONT
AGENCY OF TRANSPORTATION
CONSTRUCTION AND
MATERIALS BUREAU
CENTRAL LABORATORY

BORING LOG

Bennington STP 1000(23)
Bennington, VT

Boring No.: **B-1**
Page No.: 1 of 1
Pin No.: z18d165
Checked By: J. Baron

Boring Crew: M. Soucy (NEBC), A. Fournier (GZA)
Date Started: 5/24/21 Date Finished: 5/24/21
VTSPG NAD83: N 150973.71 ft E 1446160.70 ft
Station: 33+36 Offset: 7 RT
Ground Elevation: ~570.5

	Casing	Sampler
Type:		SS
I.D.:		2 in
Hammer Wt:	N.A.	140 lb.
Hammer Fall:	N.A.	30 in.
Hammer/Rod Type:		Auto
Rig: MOBILE B53 TRACK		C_E = 1.3

Groundwater Observations

Date	Depth (ft)	Notes
05/24/21		Not Encountered

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %
		Approximately 4 inches of topsoil, 0.0 ft - 0.3 ft					
		Visual Description, (Modified Burmister), S-1 (0.3-2.0'): Loose, brown, fine to coarse SAND and Gravel, little Silt (A-1-a). Moist (PID=0.2 ppm), Rec. = 1.2 ft	3-4-4-3 (8)				
2.5		Visual Description, (Modified Burmister), S-2 (2.0-4.0'): Loose, brown, fine to coarse SAND and Gravel, little Silt (A-1-a). Moist (PID=0.1 ppm), Rec. = 1.1 ft	5-5-5-8 (10)	9.0	52.4	34.1	13.5
		Visual Description, (Modified Burmister), S-3A (4.0-5.0'): Medium dense, brown, fine to coarse SAND, some Gravel, little Silt (A-1-a). Moist (PID=0.1 ppm), Rec. = 1.5 ft	5-6-5-4 (11)				
5.0		Visual Description, (Modified Burmister), S-3B (5.0-5.5'): Medium dense, brown, fine to coarse SAND and Silt (A-4). Moist (PID=0.1 ppm)					
		Visual Description, (Modified Burmister), S-3C (5.5-6.0'): Medium dense, brown, fine to coarse SAND, little Silt, little Gravel (A-1-b). Moist (PID=0.1 ppm)					
		Hole stopped @ 6.0 ft					

Remarks:
1. Soil samples were screened for volatile organic compounds (VOCs) using a Tiger Photoionization detector (PID) with a 10.6eV bulb, referenced to a isobuylene-in-air standard. Total VOCs detected are reported in parts per million (ppm). "ND" indicates no VOCs were detected above background levels.
2. Boring backfilled with cuttings.
3. Ground surface elevations are approximate and were provided by Green International Affliates. Elevations are measured in feet and reference the North American Vertical Datum of 1988.

7.5
10.0
12.5

Notes:
1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
2. N Values have not been corrected for hammer energy. 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.

STATE OF VERMONT
AGENCY OF TRANSPORTATION
CONSTRUCTION AND
MATERIALS BUREAU
CENTRAL LABORATORY

BORING LOG

Bennington STP 1000(23)
Bennington, VT

Boring No.: **B-2**
Page No.: 1 of 1
Pin No.: z18d165
Checked By: J. Baron

Boring Crew: M. Soucy (NEBC), A. Fournier (GZA)
Date Started: 5/24/21 Date Finished: 5/24/21
VTSPG NAD83: N 151034.61 ft E 1446284.46 ft
Station: 54+60 Offset: 13 LT
Ground Elevation: ~574.2

	Casing	Sampler
Type:		SS
I.D.:		2 in
Hammer Wt:	N.A.	140 lb.
Hammer Fall:	N.A.	30 in.
Hammer/Rod Type:		Auto
Rig: MOBILE B53 TRACK		C_E = 1.3

Groundwater Observations

Date	Depth (ft)	Notes
05/24/21		Not Encountered

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %
		Approximately 4 inches of pavement, 0.0 ft - 0.3 ft					
		Visual Description, (Modified Burmister), S-1A (0.3-1.9'): Very dense, light brown, fine to coarse SAND and Gravel, trace Silt (A-1-a). Dry (PID=0.0 ppm), Rec. = 2.0 ft	65-98-110-113 (208)	5.1	60.1	30.9	9.0
		Visual Description, (Modified Burmister), S-1B (1.9-2.0'): Very dense, brown, fine to medium SAND, trace Silt (A-1-b). Moist (PID=0.0 ppm)	12-8-7-8 (15)				
2.5		Visual Description, (Modified Burmister), S-2 (2.0-4.0'): Medium dense, brown, fine to coarse SAND, some Gravel, little Silt (A-1-b). Moist (PID=0.3 ppm), Rec. = 0.7 ft					
		Visual Description, (Modified Burmister), S-3 (4.0-6.0'): Medium dense, brown, fine to coarse SAND, some Gravel, little Silt (A-1-b). Moist (PID=0.4 ppm), Rec. = 1.7 ft	5-8-8-8 (16)	9.4	35.3	45.9	18.8
5.0		Hole stopped @ 6.0 ft					
7.5							
10.0							
12.5							

Remarks:
1. Soil samples were screened for volatile organic compounds (VOCs) using a Tiger Photoionization detector (PID) with a 10.6eV bulb, referenced to a isobuylene-in-air standard. Total VOCs detected are reported in parts per million (ppm). "ND" indicates no VOCs were detected above background levels.
2. Boring backfilled with cuttings and finished with asphalt cold patch.
3. Ground surface elevations are approximate and were provided by Green International Affliates. Elevations are measured in feet and reference the North American Vertical Datum of 1988.

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 04.0191133.01 VTRANS BENNINGTON STP 1000(23).GPJ VERMONT AOT.GDT 6/22/21

STATE OF VERMONT
AGENCY OF TRANSPORTATION
CONSTRUCTION AND
MATERIALS BUREAU
CENTRAL LABORATORY

BORING LOG

Bennington STP 1000(23)
Bennington, VT

Boring No.: **B-3**
Page No.: 1 of 1
Pin No.: z18d165
Checked By: J. Baron

Boring Crew: M. Soucy (NEBC), A. Fournier (GZA)
Date Started: 5/25/21 Date Finished: 5/25/21
VTSPG NAD83: N 151185.91 ft E 1446068.76 ft
Station: 11+29 Offset: 28 LT
Ground Elevation: ~582.5

	Casing	Sampler
Type:		SS
I.D.:		2 in
Hammer Wt:	N.A.	140 lb.
Hammer Fall:	N.A.	30 in.
Hammer/Rod Type:		Auto
Rig: MOBILE B53 TRACK		C_E = 1.3

Groundwater Observations

Date	Depth (ft)	Notes
05/25/21		Not Encountered

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %
		Approximately 4 inches of pavement, 0.0 ft - 0.3 ft					
		Visual Description, (Modified Burmister), S-1 (0.3-2.0'): Dense, brown, fine to coarse SAND, some Gravel, little Silt (A-1-b). Moist (PID=0.3 ppm), Rec. = 1.3 ft	37-17-15-12 (32)	4.8	43.6	37.2	19.2
2.5		Visual Description, (Modified Burmister), S-2 (2.0-4.0'): Medium dense, brown, fine to coarse SAND and Gravel, trace Silt (A-1-a). Moist (PID=0.3 ppm), Rec. = 1.3 ft	9-11-8-6 (19)	6.7	54.8	36.3	8.9
5.0		Visual Description, (Modified Burmister), S-3 (4.0-6.0'): Medium dense, brown, fine to coarse SAND, some Gravel, trace Silt (A-1-b). Moist (PID=0.1 ppm), Rec. = 0.5 ft	13-6-5-4 (11)				
7.5		No recovery due to rock in split spoon tip, Rec. = 0.0 ft, 6.0 ft - 8.0 ft	9-5-5-5 (10)				
		Hole stopped @ 8.0 ft					
10.0							
12.5							

Remarks:
1. Soil samples were screened for volatile organic compounds (VOCs) using a Tiger Photoionization detector (PID) with a 10.6eV bulb, referenced to a isobuylene-in-air standard. Total VOCs detected are reported in parts per million (ppm). "ND" indicates no VOCs were detected above background levels.
2. Boring backfilled with cuttings and finished with asphalt cold patch.
3. Ground surface elevations are approximate and were provided by Green International Affliates. Elevations are measured in feet and reference the North American Vertical Datum of 1988.

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 04.0191133.01 VTRANS BENNINGTON STP 1000(23).GPJ VERMONT AOT.GDT 6/22/21

STATE OF VERMONT
AGENCY OF TRANSPORTATION
CONSTRUCTION AND
MATERIALS BUREAU
CENTRAL LABORATORY

BORING LOG

Bennington STP 1000(23)
Bennington, VT

Boring No.: **B-4**
Page No.: 1 of 1
Pin No.: z18d165
Checked By: J. Baron

Boring Crew: M. Soucy (NEBC), A. Fournier (GZA)
Date Started: 5/25/21 Date Finished: 5/25/21
VTSPG NAD83: N 151175.51 ft E 1446007.05 ft
Station: 20+90 Offset: 12 RT
Ground Elevation: ~576.0

	Casing	Sampler
Type:		SS
I.D.:		2 in
Hammer Wt:	N.A.	140 lb.
Hammer Fall:	N.A.	30 in.
Hammer/Rod Type:		Auto
Rig:	MOBILE B53 TRACK RIG	C_E = 1.3

Groundwater Observations

Date	Depth (ft)	Notes
05/25/21		Not Encountered

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %
		Visual Description, (Modified Burmister), S-1A (0.0-0.7'): Medium dense, light brown, fine to medium SAND and Gravel, trace Silt (A-1-b). Dry (PID=0.3 ppm), Rec. = 1.2 ft	9-9-17-27 (26)				
		Visual Description, (Modified Burmister), S-1B (0.7-2.0'): Medium dense, brown, fine to coarse SAND, some Silt, some Gravel (A-2-4). Moist (PID=0.3 ppm)					
2.5		Visual Description, (Modified Burmister), S-2 (2.0-4.0'): Dense, brown, fine to coarse SAND, some Silt, some Gravel (A-2-4). Moist (PID=0.1 ppm), Rec. = 1.3 ft	10-17-16-15 (33)	13.2	34.2	35.6	30.2
		Visual Description, (Modified Burmister), S-3 (4.0-6.0'): Medium dense, brown, fine to coarse SAND, some Silt, some Gravel (A-2-4). Moist (PID=0.0 ppm), Rec. = 1.2 ft	17-14-10-10 (24)				
5.0		Hole stopped @ 6.0 ft					

Remarks:
1. Soil samples were screened for volatile organic compounds (VOCs) using a Tiger Photoionization detector (PID) with a 10.6eV bulb, referenced to a isobuylene-in-air standard. Total VOCs detected are reported in parts per million (ppm). "ND" indicates no VOCs were detected above background levels.
2. Boring backfilled with cuttings.
3. Ground surface elevations are approximate and were provided by Green International Affliates. Elevations are measured in feet and reference the North American Vertical Datum of 1988.

7.5
10.0
12.5

Notes:
1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
2. N Values have not been corrected for hammer energy. 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.

STATE OF VERMONT
AGENCY OF TRANSPORTATION
CONSTRUCTION AND
MATERIALS BUREAU
CENTRAL LABORATORY

BORING LOG

Bennington STP 1000(23)
Bennington, VT

Boring No.: **B-5**
Page No.: 1 of 1
Pin No.: z18d165
Checked By: J. Baron

Boring Crew: M. Soucy (NEBC), A. Fournier (GZA)
Date Started: 5/24/21 Date Finished: 5/24/21
VTSPG NAD83: N 151027.53 ft E 1445836.98 ft
Station: 59+31 Offset: 30 LT
Ground Elevation: ~575.0

	Casing	Sampler
Type:		SS
I.D.:		2 in
Hammer Wt:	N.A.	140 lb.
Hammer Fall:	N.A.	30 in.
Hammer/Rod Type:		Auto
Rig: MOBILE B53 TRACK		C_E = 1.3

Groundwater Observations

Date	Depth (ft)	Notes
05/24/21		Not Encountered

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %
		Approximately 6 inches of pavement, 0.0 ft - 0.5 ft					
		Visual Description, (Modified Burmister), S-1A (0.5-1.6'): Medium dense, dark brown, fine to coarse SAND, some Gravel, trace Silt (A-1-b). Moist (PID=0.3 ppm), Rec. = 1.4 ft	43-12-8-6 (20)	6.4	46.7	45.2	8.1
		Visual Description, (Modified Burmister), S-1B (1.6-2.0'): Medium dense, brown, SILT and fine to medium Sand, little Gravel (A-4). Moist (PID=0.3 ppm)					
2.5		Visual Description, (Modified Burmister), S-2 (2.0-4.0'): Medium dense, brown, SILT and fine to medium SAND, little Gravel (A-4). Moist (PID=0.1 ppm), Rec. = 1.3 ft	5-6-7-6 (13)	17.0	14.6	40.6	44.8
5.0		Visual Description, (Modified Burmister), S-3 (4.0-6.0'): Medium dense, brown, SILT and fine to medium Sand, little Gravel (A-4). Moist (PID=0.2 ppm), Rec. = 1.3 ft	6-7-7-7 (14)				
		Hole stopped @ 6.0 ft					
7.5							
10.0							
12.5							

Remarks:
1. Soil samples were screened for volatile organic compounds (VOCs) using a Tiger Photoionization detector (PID) with a 10.6eV bulb, referenced to a isobuylene-in-air standard. Total VOCs detected are reported in parts per million (ppm). "ND" indicates no VOCs were detected above background levels.
2. Boring backfilled with cuttings and finshed with asphalt cold patch.
3. Ground surface elevations are approximate and were provided by Green International Affliates. Elevations are measured in feet and reference the North American Vertical Datum of 1988.

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.

STATE OF VERMONT
AGENCY OF TRANSPORTATION
CONSTRUCTION AND
MATERIALS BUREAU
CENTRAL LABORATORY

BORING LOG

Bennington STP 1000(23)
Bennington, VT

Boring No.: **B-6**
Page No.: 1 of 1
Pin No.: z18d165
Checked By: J. Baron

Boring Crew: M. Soucy (NEBC), A. Fournier (GZA)
Date Started: 5/24/21 Date Finished: 5/24/21
VTSPG NAD83: N 150970.78 ft E 1446077.62 ft
Station: 33+76 Offset: 63 LT
Ground Elevation: ~569.3

	Casing	Sampler
Type:	WASH BORE	SS
I.D.:	6 in	2 in
Hammer Wt:	140 lb.	140 lb.
Hammer Fall:	30 in.	30 in.
Hammer/Rod Type:	Auto	
Rig: MOBILE B53 TRACK	C_E = 1.3	

Groundwater Observations

Date	Depth (ft)	Notes
05/24/21		Not Encountered

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %
		Visual Description, Approximately 2 inches of topsoil					
		Visual Description, (Modified Burmister), S-1 (0.2-2.0'): Medium dense, brown, fine to coarse SAND, little Gravel, little Silt (A-1-b). Dry (PID=0.1 ppm), Rec. = 1.7 ft	7-9-9-9 (18)				
2.5		Visual Description, (Modified Burmister), S-2 (2.0-4.0'): Medium dense, brown, fine to coarse SAND, some Gravel, little Silt, with asphalt pieces (A-1-a). Dry (PID=0.3 ppm), Rec. = 1.7 ft	5-11-9-20 (20)	9.1	53.4	32.7	13.9
5.0		Visual Description, (Modified Burmister), S-3 (4.0-6.0'): Medium dense, brown, BRICK, some fine to coarse Sand, little Gravel, little Silt (A-1-b). Dry (PID=0.5 ppm), Rec. = 0.7 ft	17-4-7-10 (11)				
7.5		Visual Description, (Modified Burmister), S-4 (6.0-8.0'): Medium dense, olive brown, fine to coarse SAND and Silt, trace Gravel (A-4). Moist (PID=0.2 ppm), Rec. = 1.7 ft	14-9-7-9 (16)				
		Visual Description, (Modified Burmister), S-5 (8.0-10.0'): Medium dense, olive brown, fine to coarse SAND and Silt, trace Gravel (A-4). Moist (PID=0.2 ppm), Rec. = 1.3 ft	10-8-12-16 (20)	12.1	15.0	41.5	43.5
10.0		Hole stopped @ 10.0 ft					
12.5							

Remarks:
1. 6-inch casing installed to 10 feet bgs for infiltration test.
2. Soil samples were screened for volatile organic compounds (VOCs) using a Tiger Photoionization detector (PID) with a 10.6eV bulb, referenced to a isobuylene-in-air standard. Total VOCs detected are reported in parts per million (ppm). "ND" indicates no VOCs were detected above background levels.
3. Boring backfilled with cuttings.
4. Ground surface elevations are approximate and were provided by Green International Affliates. Elevations are measured in feet and reference the North American Vertical Datum of 1988.

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 04.0191133.01 VTRANS BENNINGTON STP 1000(23).GPJ VERMONT AOT.GDT 6/22/21

STATE OF VERMONT
AGENCY OF TRANSPORTATION
CONSTRUCTION AND
MATERIALS BUREAU
CENTRAL LABORATORY

BORING LOG

Bennington STP 1000(23)
Bennington, VT

Boring No.: **B-7**
Page No.: 1 of 1
Pin No.: z18d165
Checked By: J. Baron

Boring Crew: M. Soucy (NEBC), A. Fournier (GZA)
Date Started: 5/24/21 Date Finished: 5/24/21
VTSPG NAD83: N 151000.80 ft E 1445978.75 ft
Station: 57+96 Offset: 75 LT
Ground Elevation: ~572.0

	Casing	Sampler
Type:	WASH BORE	SS
I.D.:	6 in	2 in
Hammer Wt:	140 lb.	140 lb.
Hammer Fall:	30 in.	30 in.
Hammer/Rod Type:	Auto	
Rig: MOBILE B53 TRACK	C_E = 1.3	

Groundwater Observations

Date	Depth (ft)	Notes
05/24/21		Not Encountered

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %
		Approximately 4 inches of topsoil, 0.0 ft - 0.3 ft					
		Visual Description, (Modified Burmister), S-1 (0.3-2.0'): Loose, brown, fine to coarse SAND, some Gravel, little Silt, little roots (A-1-a). Dry (PID=0.2 ppm), Rec. = 1.2 ft	2-5-5-6 (10)				
2.5		Visual Description, No Recovery, Rec. = 0.0 ft	7-10-11-11 (21)				
5.0		Visual Description, (Modified Burmister), S-3 (4.0-6.0'): Medium dense, brown, fine to coarse SAND, some Silt, little Gravel (A-2-4). Dry (PID=0.4 ppm), Rec. = 1.0 ft	8-6-7-8 (13)	9.5	27.4	43.0	29.6
7.5		Visual Description, (Modified Burmister), S-4 (6.0-8.0'): Dense, light brown, GRAVEL, some fine to coarse Sand, little Silt (A-1-b). Dry (PID=0.4 ppm), Rec. = 1.5 ft	12-13-19-16 (32)	3.2	59.4	24.5	16.1
		Visual Description, (Modified Burmister), S-5 (8.0-10.0'): Very dense, brown, GRAVEL and fine to coarse Sand, some Silt (A-1-b). Dry (PID=0.3 ppm), Rec. = 1.3 ft	19-45-20-18 (65)	6.6	47.5	28.4	24.1
10.0		Hole stopped @ 10.0 ft					
12.5							

Remarks:
1. 6-inch casing installed to 10 feet bgs for infiltration test.
2. Soil samples were screened for volatile organic compounds (VOCs) using a Tiger Photoionization detector (PID) with a 10.6eV bulb, referenced to a isobuylene-in-air standard. Total VOCs detected are reported in parts per million (ppm). "ND" indicates no VOCs were detected above background levels.
3. Boring backfilled with cuttings.
4. Ground surface elevations are approximate and were provided by Green International Affliates. Elevations are measured in feet and reference the North American Vertical Datum of 1988.

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.

BOREHOLE INFILTRATION LOG

GZA GeoEnvironmental, Inc.
5 Commerce Park Rd,
Suite 201
Bedford, NH 03110

Client:	Green International Affiliates, Inc.	EXPLORATION NO.	B-6
Project:	Bennington STP 1000 (23)	SHEET	1 of 1
City, State:	Bennington , VT	GZA PROJECT NO.	04.0191133.01

LOGGED BY:	A. Fournier	BORING COORDINATES	N 150970.78	E 1446077.62	
DRILLING CO:	NEBC	GROUND SURFACE EL.(FT)	569.3	DATUM (S)	
FOREMAN:	D.Soucy	BORING DEPTH (FT)	10.0	DATE START/FINISH	5/25/21

Test Number 1

Time Interval:	1.0 Hour		Approximate Elev. of casing bottom:		559.7	Initial G.W. Reading from G.S. :		Not encountered
Interval #	Start Time	End Time	Casing above G.S. (ft)	G.W. level @ start (ft)	G.W. level @ end (ft)	Total time (min)	G.W. Change (ft)	Accumulated G.W. Change (ft)
1	7:57	8:01	1.15	6.76	6.98	0:04	0.22	0.22
2	8:01	8:27	1.15	6.98	7.26	0:26	0.28	0.50
3	8:27	8:37	1.15	7.26	7.38	0:10	0.12	0.62
4	8:37	8:44	1.15	7.38	7.44	0:07	0.06	0.68
5	8:44	8:57	1.15	7.44	7.56	0:13	0.12	0.80

Test Number 2

Time Interval:	1.0 Hour		Approximate Elev. of casing bottom:		559.7	Initial G.W. Reading from G.S. :		Not encountered
Interval #	Start Time	End Time	Casing above G.S. (ft)	G.W. level @ start (ft)	G.W. level @ end (ft)	Total time (min)	G.W. Change (ft)	Accumulated G.W. Change (ft)
1	8:59	9:09	1.15	6.7	6.97	0:10	0.27	0.27
2	9:09	9:18	1.15	6.97	7.08	0:09	0.11	0.38
3	9:18	9:32	1.15	7.08	7.23	0:14	0.15	0.53
4	9:32	9:45	1.15	7.23	7.38	0:13	0.15	0.68
5	9:45	9:59	1.15	7.38	7.52	0:14	0.14	0.82

Test Number 3

Time Interval:	1.0 Hour		Approximate Elev. of casing bottom:		559.7	Initial G.W. Reading from G.S. :		Not encountered
Interval #	Start Time	End Time	Casing above G.S. (ft)	G.W. level @ start (ft)	G.W. level @ end (ft)	Total time (min)	G.W. Change (ft)	Accumulated G.W. Change (ft)
1	10:01	10:21	1.15	6.6	7.11	0:20	0.51	0.51
2	10:21	10:46	1.15	7.11	7.38	0:25	0.27	0.78
3	10:46	11:01	1.15	7.38	7.52	0:15	0.14	0.92

Test Number 4

Time Interval:			Approximate Elev. of casing bottom:		559.7	Initial G.W. Reading from G.S. :		Not encountered
Interval #	Start Time	End Time	Casing above G.S. (ft)	G.W. level @ start (ft)	G.W. level @ end (ft)	Total time (min)	G.W. Change (ft)	Accumulated G.W. Change (ft)
1	11:03	11:19	1.15	6.51	6.78	0:16	0.27	0.27
2	11:19	11:42	1.15	6.78	7.12	0:23	0.34	0.61
3	11:42	12:03	1.15	7.12	7.39	0:21	0.27	0.88

Test Protocol Notes (VTrans 2017 Vermont Stormwater Management Manual, Section 4.3.3.2):
a) Install a solid 6 inch diameter by 30 inch long casing to a depth of 24 inches below the proposed bottom of the practice.
b) Remove any smeared soil surfaces and provide a natural soil interface into which water can percolate.
c) Remove all loose material from inside the casing.
d) Fill the casing with water to a depth of 24 inches and allow to pre-soak for 24 hours.
e) After pre-soaking in accordance with d), refill the casing with 24 inches of water and record the drop in water level from the top of the casing at the end of one hour.

Test # 1 Last Interval #: [5] Total Level Change (1): [0.80 ft] Total Time (2): [60 minutes] k = (1) / (2) = [9.6](in/hr)

Test # 2 Last Interval #: [5] Total Level Change (1): [0.82 ft] Total Time (2): [60 minutes] k = (1) / (2) = [9.8](in/hr)

Test # 3 Last Interval #: [3] Total Level Change (1): [0.92 ft] Total Time (2): [60 minutes] k = (1) / (2) = [11.0](in/hr)

Test # 4 Last Interval #: [3] Total Level Change (1): [0.88 ft] Total Time (2): [60 minutes] k = (1) / (2) = [10.6](in/hr)

Average k
10.25 in/hr

BOREHOLE INFILTRATION LOG

GZA GeoEnvironmental, Inc.
5 Commerce Park Rd,
Suite 201
Bedford, NH 03110

Client:	Green International Affiliates, Inc.	EXPLORATION NO.	B-7
Project:	Bennington STP 1000 (23)	SHEET	1 of 1
City, State:	Bennington , VT	GZA PROJECT NO.	04.0191133.01

LOGGED BY:	A. Fournier	BORING COORDINATES	N 151000.80	E 1445978.78	
DRILLING CO:	NEBC	GROUND SURFACE EL.(FT)	572.0	DATUM (S)	
FOREMAN:	D.Soucy	BORING DEPTH (FT)	10	DATE START/FINISH	5/25/21

Test Number 1

Time Interval:	1.0 Hour		Approximate Elev. of casing bottom:		563.6	Initial G.W. Reading from G.S. :		Not encountered
Interval #	Start Time	End Time	Casing above G.S. (ft)	G.W. level @ start (ft)	G.W. level @ end (ft)	Total time (min)	G.W. Change (ft)	Accumilated G.W. Change (ft)
1	8:00	8:03	1.02	6.46	6.48	0:03	0.02	0.02
2	8:03	8:25	1.02	6.48	7.11	0:22	0.63	0.65
3	8:25	8:45	1.02	7.11	7.60	0:20	0.49	1.14
4	8:45	8:55	1.02	7.60	7.78	0:10	0.18	1.32
5	8:55	9:00	1.02	7.78	7.90	0:05	0.12	1.44

Test Number 2

Time Interval:	1.0 Hour		Approximate Elev. of casing bottom:		563.6	Initial G.W. Reading from G.S. :		Not encountered
Interval #	Start Time	End Time	Casing above G.S. (ft)	G.W. level @ start (ft)	G.W. level @ end (ft)	Total time (min)	G.W. Change (ft)	Accumilated G.W. Change (ft)
1	9:02	9:08	1.02	6.36	6.60	0:06	0.24	0.24
2	9:08	9:19	1.02	6.60	6.94	0:11	0.34	0.58
3	9:19	9:31	1.02	6.94	7.25	0:12	0.31	0.89
4	9:31	9:46	1.02	7.25	7.60	0:15	0.35	1.24
5	9:46	10:02	1.02	7.60	7.94	0:16	0.34	1.58

Test Number 3

Time Interval:	1.0 Hour		Approximate Elev. of casing bottom:		563.6	Initial G.W. Reading from G.S. :		Not encountered
Interval #	Start Time	End Time	Casing above G.S. (ft)	G.W. level @ start (ft)	G.W. level @ end (ft)	Total time (min)	G.W. Change (ft)	Accumilated G.W. Change (ft)
1	10:04	10:20	1.02	6.45	6.93	0:16	0.48	0.48
2	10:20	10:47	1.02	6.93	7.61	0:27	0.68	1.16
3	10:47	11:04	1.02	7.61	7.91	0:17	0.3	1.46

Test Number 4

Time Interval:			Approximate Elev. of casing bottom:		563.6	Initial G.W. Reading from G.S. :		Not encountered
Interval #	Start Time	End Time	Casing above G.S. (ft)	G.W. level @ start (ft)	G.W. level @ end (ft)	Total time (min)	G.W. Change (ft)	Accumilated G.W. Change (ft)
1	11:06	11:26	1.02	6.70	7.20	0:20	0.5	0.5
2	11:26	11:41	1.02	7.20	7.67	0:15	0.47	0.97
3	11:41	12:06	1.02	7.67	8.17	0:25	0.5	1.47

Test Protocol Notes (VTrans 2017 Vermont Stormwater Management Manual, Section 4.3.3.2):

a) Install a solid 6 inch diameter by 30 inch long casing to a depth of 24 inches below the proposed bottom of the practice.

b) Remove any smeared soil surfaces and provide a natural soil interface into which water can percolate.

c) Remove all loose material from inside the casing.

d) Fill the casing with water to a depth of 24 inches and allow to pre-soak for 24 hours.

e) After pre-soaking in accordance with d), refill the casing with 24 inches of water and record the drop in water level from the top of the casing at the end of one hour.

Test # 1 Last Interval #: [5] Total Level Change (1): [1.44 ft] Total Time (2): [60 minutes] k = (1) / (2) = [17.3](in/hr)

Test # 2 Last Interval #: [5] Total Level Change (1): [1.58 ft] Total Time (2): [60 minutes] k = (1) / (2) = [19.0](in/hr)

Test # 3 Last Interval #: [3] Total Level Change (1): [1.46 ft] Total Time (2): [60 minutes] k = (1) / (2) = [17.5](in/hr)

Test # 4 Last Interval #: [3] Total Level Change (1): [1.47 ft] Total Time (2): [60 minutes] k = (1) / (2) = [17.6](in/hr)

Average k
17.9 in/hr

Appendix C – Laboratory Test Results

THIELSCH ENGINEERING
195 Frances Avenue
Cranston RI, 02910
Phone: (401)-467-6454
Fax: (401)-467-2398
thielsch.com
Let's Build a Solid Foundation

Client Information:
GZA GeoEnvironmental, Inc
Bedford, NH
PM: J. Baron / A. Fournier
Assigned By: A. Fournier
Collected By: A. Fournier

Project Information:
New Roundabout in Bennington, VT
Bennington, VT
GZA Project Number: 04.0191133.01
Summary Page: 1 of 1
Report Date: 06.11.21

LABORATORY TESTING DATA SHEET, Report No.: 7421-F-126

Boring No.	Sample No.	Depth (Ft)	Laboratory No.	Identification Tests								Proctor / CBR / Permeability Tests								Laboratory Log and Soil Description
				As Received Water Content %	LL %	PL %	Gravel %	Sand %	Fines %	Org. %	G_s	Dry unit wt. pcf	Test Water Content %	γ_d MAX (pcf) W_{opt} (%)	γ_d MAX (pcf) W_{opt} (%) (Corr.)	Target Test Setup as % of Proctor	CBR @ 0.1"	CBR @ 0.2"	Permeability cm/sec	
				D2216	D4318		D6913			D2974	D854			D1557						
B-1	S-2	2-4	21-S-2143	9.0			37.2	49.3	13.5											Brown f-c SAND and GRAVEL, little Silt
B-2	S-1	0-2	21-S-2144	5.1			43.2	47.8	9.0											Very Light Brown f-c SAND and GRAVEL, trace Silt
B-2	S-3	4-6	21-S-2145	9.4			24.1	57.1	18.8											Brown f-c SAND, some Gravel, little Silt
B-3	S-1	0-2	21-S-2146	4.8			26.1	54.7	19.2											Brown f-c SAND, some Gravel, little Silt
B-3	S-2	2-4	21-S-2147	6.7			42.1	49.0	8.9											Brown f-c SAND and GRAVEL, trace Silt
B-4	S-2	2-4	21-S-2148	13.2			22.3	47.5	30.2											Brown f-c SAND, some Silt, some Gravel
B-5	S-1	0-2	21-S-2149	6.4			30.9	61.0	8.1											Dark Brown f-c SAND, some Gravel, trace Silt
B-5	S-2	2-4	21-S-2150	17.0			10.6	44.6	44.8											Brown SILT and f-m SAND, little Gravel
B-6	S-2	2-4	21-S-2151	9.1			34.2	51.9	13.9											Brown f-c SAND, some Gravel, little Silt
B-6	S-5	8-10	21-S-2152	12.1			5.3	51.2	43.5											Brown f-c SAND and SILT, trace Gravel
B-7	S-3	4-6	21-S-2153	9.5			14.1	56.3	29.6											Brown f-c SAND, some Silt, little Gravel
B-7	S-4	6-8	21-S-2154	3.2			51.6	32.3	16.1											Light Brown GRAVEL, some f-c SAND, little Silt

Date Received: *06.04.21*

Reviewed By:

Date Reviewed: *06.14.21*

THIELSCH ENGINEERING

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Let's Build a Solid Foundation

Client Information:
GZA GeoEnvironmental, Inc
Bedford, NH
PM: J. Baron / A. Fournier
Assigned By: A. Fournier
Collected By: A. Fournier

Project Information:
New Roundabout in Bennington, VT
Bennington, VT
GZA Project Number: 04.0191133.01
Summary Page: 1 of 1
Report Date: 06.11.21

LABORATORY TESTING DATA SHEET, Report No.: 7421-F-126

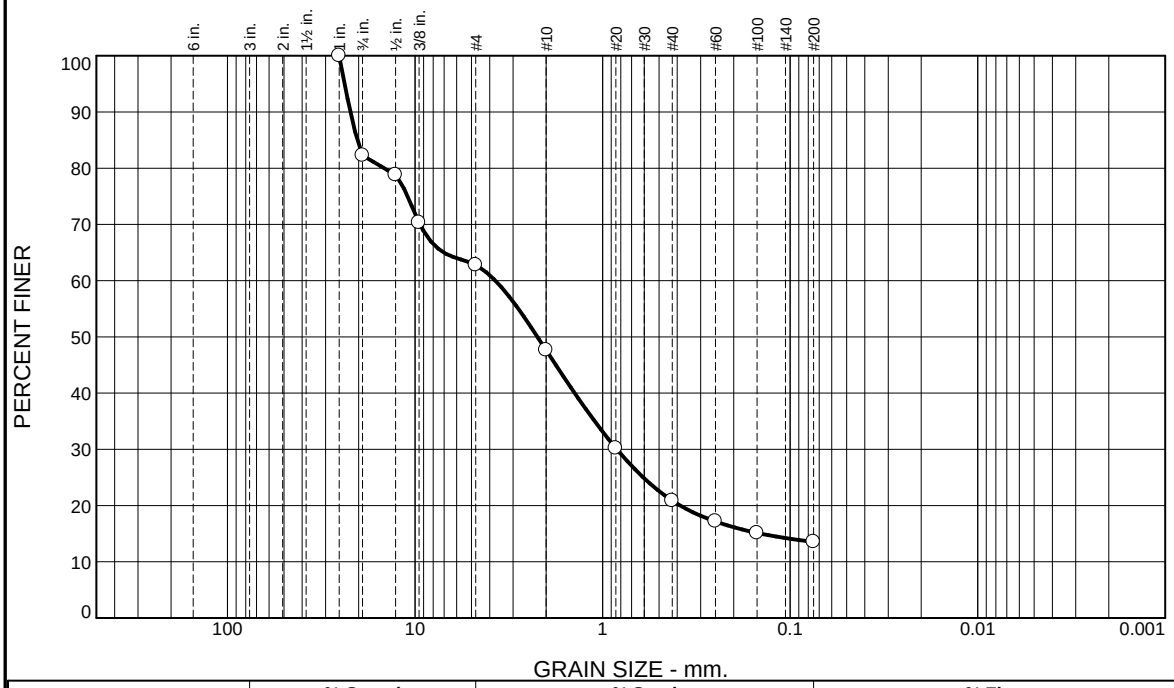
Boring No.	Sample No.	Depth (Ft)	Laboratory No.	Identification Tests								Proctor / CBR / Permeability Tests								Laboratory Log and Soil Description
				As Received Water Content %	LL %	PL %	Gravel %	Sand %	Fines %	Org. %	G_s	Dry unit wt. pcf	Test Water Content %	γ_d MAX (pcf) W_{opt} (%)	γ_d MAX (pcf) W_{opt} (%) (Corr.)	Target Test Setup as % of Proctor	CBR @ 0.1"	CBR @ 0.2"	Permeability cm/sec	
				D2216	D4318		D6913			D2974	D854			D1557						
B-7	S-5	8-10	21-S-2155	6.6			38.5	37.4	24.1											Brown GRAVEL and f-c SAND, some Silt

Date Received: *06.04.21*

Reviewed By:

Date Reviewed: *06.14.21*

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	17.7	19.5	15.2	26.7	7.4	13.5	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
0.75"	82.3		
0.5"	78.8		
0.375"	70.3		
#4	62.8		
#10	47.6		
#20	30.2		
#40	20.9		
#60	17.2		
#100	15.1		
#200	13.5		

* (no specification provided)

Material Description

Brown f-c SAND and GRAVEL, little Silt

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-1-a

Coefficients

D_{90}= 22.1140 D_{85}= 20.3092 D_{60}= 3.7299
D_{50}= 2.2256 D_{30}= 0.8398 D_{15}= 0.1438
D_{10}= C_u= C_c=

Remarks

Date Received: 06.04.21 **Date Tested:** 06.08.21

Tested By: JM / MS

Checked By: Steven Accetta

Title: Laboratory Coordinator

Source of Sample: Boring **Depth:** 2-4' **Date Sampled:**
Sample Number: B-1 / S-2

Thielsch Engineering Inc.

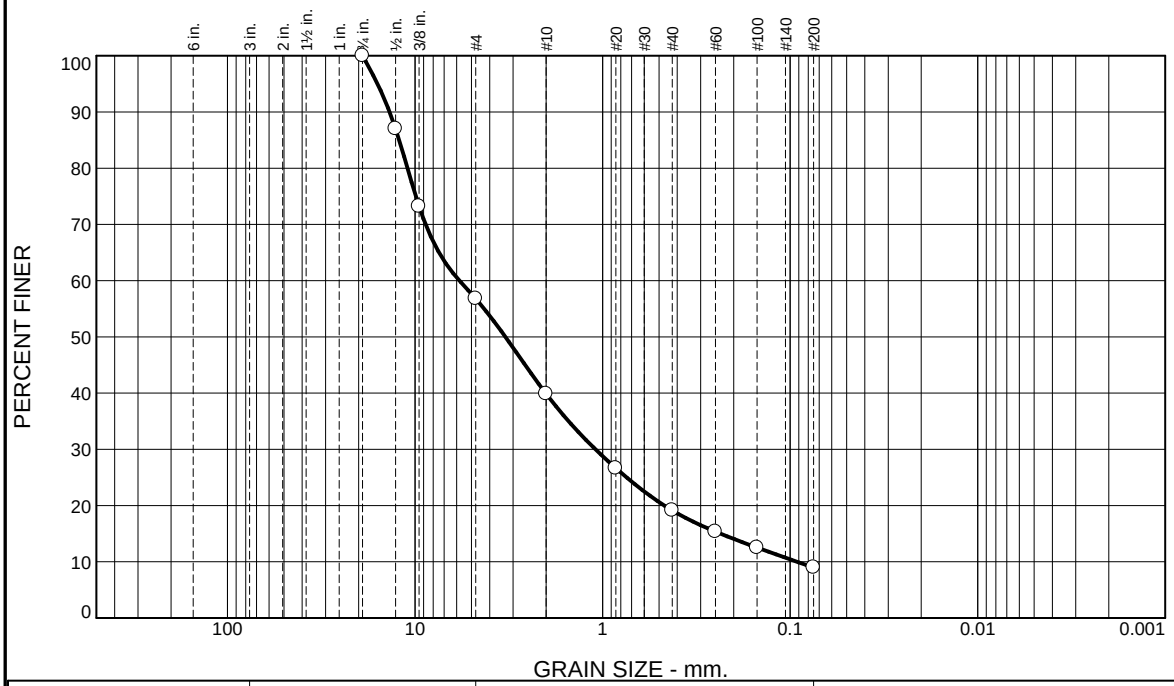
Cranston, RI

Client: GZA GeoEnvironmental, Inc

Project: New Roundabout in Bennington
Bennington, VT

Project No: 04.0191133.01 **Figure** 21-S-2143

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	43.2	16.9	20.8	10.1	9.0	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
0.75"	100.0		
0.5"	87.0		
0.375"	73.2		
#4	56.8		
#10	39.9		
#20	26.7		
#40	19.1		
#60	15.4		
#100	12.5		
#200	9.0		

* (no specification provided)

Material Description

Very Light Brown f-c SAND and GRAVEL, trace Silt

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SW-SM **AASHTO (M 145)=** A-1-a

Coefficients

D_{90}= 13.6638 D_{85}= 12.1535 D_{60}= 5.8013
D_{50}= 3.3001 D_{30}= 1.0916 D_{15}= 0.2350
D_{10}= 0.0918 C_u= 63.17 C_c= 2.24

Remarks

Date Received: 06.04.21 **Date Tested:** 06.10.21

Tested By: JM / MS

Checked By: Steven Accetta

Title: Laboratory Coordinator

Source of Sample: Boring **Depth:** 0-2' **Date Sampled:**
Sample Number: B-2 / S-1

Thielsch Engineering Inc.

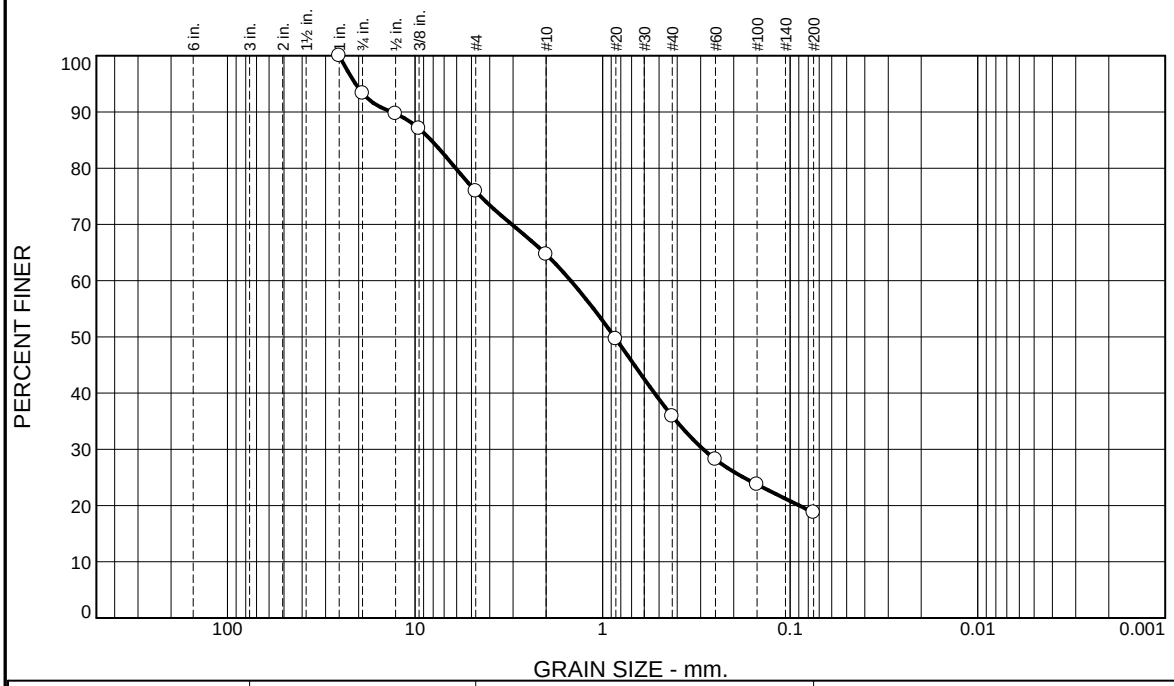
Cranston, RI

Client: GZA GeoEnvironmental, Inc

Project: New Roundabout in Bennington
Bennington, VT

Project No: 04.0191133.01 **Figure** 21-S-2144

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	6.7	17.4	11.2	28.8	17.1	18.8	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
0.75"	93.3		
0.5"	89.7		
0.375"	87.1		
#4	75.9		
#10	64.7		
#20	49.6		
#40	35.9		
#60	28.2		
#100	23.7		
#200	18.8		

* (no specification provided)

Material Description

Brown f-c SAND, some Gravel, little Silt

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-1-b

Coefficients

D_{90}= 13.3349 D_{85}= 8.2014 D_{60}= 1.4778
D_{50}= 0.8650 D_{30}= 0.2903 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 06.04.21 **Date Tested:** 06.10.21

Tested By: JM / MS

Checked By: Steven Accetta

Title: Laboratory Coordinator

Source of Sample: Boring **Depth:** 4-6' **Date Sampled:**
Sample Number: B-2 / S-3

Thielsch Engineering Inc.

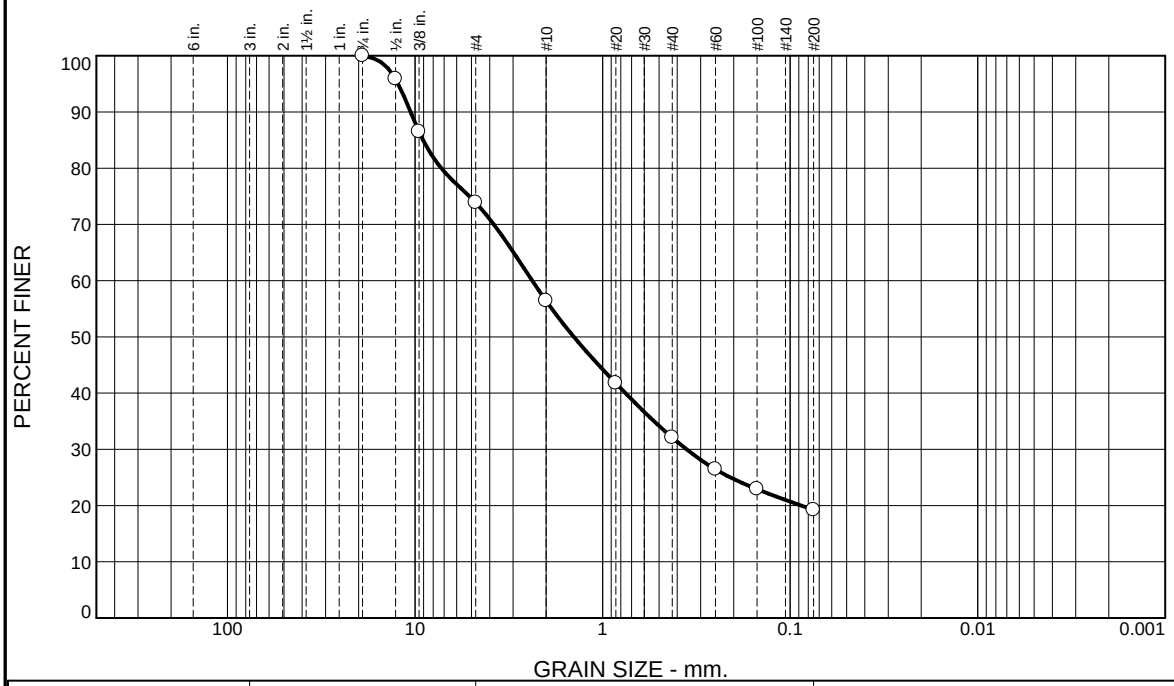
Cranston, RI

Client: GZA GeoEnvironmental, Inc

Project: New Roundabout in Bennington
Bennington, VT

Project No: 04.0191133.01 **Figure** 21-S-2145

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	26.1	17.5	24.3	12.9	19.2	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
0.75"	100.0		
0.5"	95.9		
0.375"	86.5		
#4	73.9		
#10	56.4		
#20	41.8		
#40	32.1		
#60	26.4		
#100	22.9		
#200	19.2		

* (no specification provided)

Material Description

Brown f-c SAND, some Gravel, little Silt

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-1-b

Coefficients

D_{90}= 10.5682 D_{85}= 9.0641 D_{60}= 2.3718
D_{50}= 1.4226 D_{30}= 0.3567 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 06.04.21 **Date Tested:** 06.10.21

Tested By: JM / MS

Checked By: Steven Accetta

Title: Laboratory Coordinator

Source of Sample: Boring **Depth:** 0-2' **Date Sampled:**
Sample Number: B-3 / S-1

Thielsch Engineering Inc.

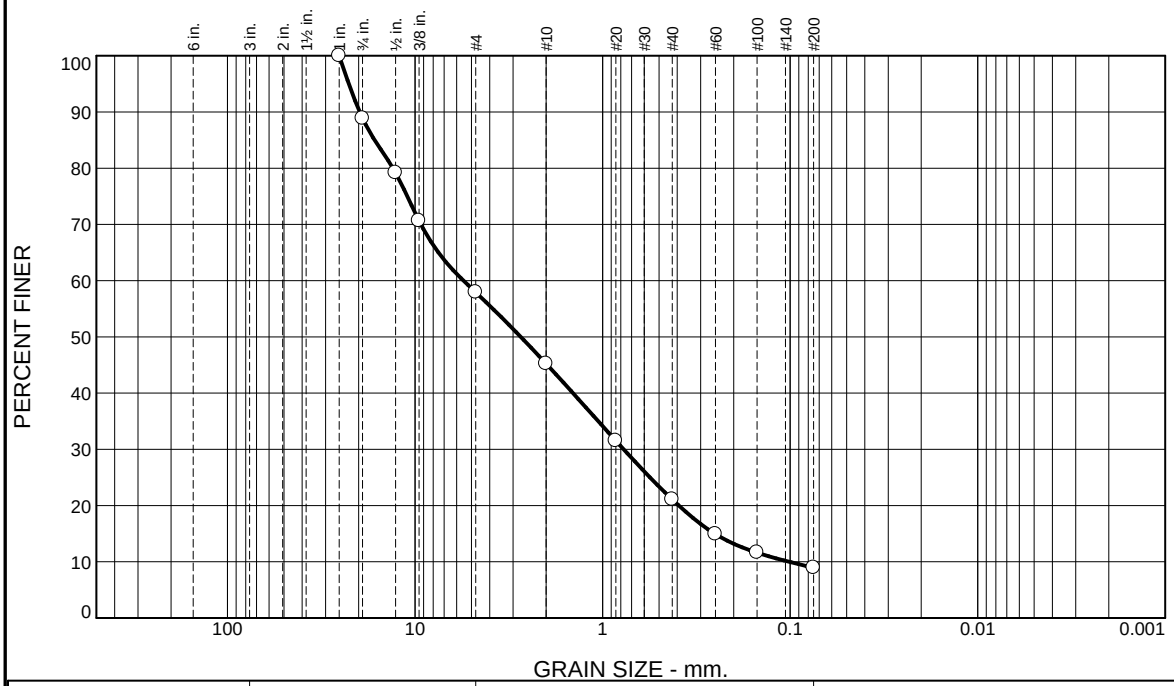
Cranston, RI

Client: GZA GeoEnvironmental, Inc

Project: New Roundabout in Bennington
Bennington, VT

Project No: 04.0191133.01 **Figure** 21-S-2146

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	11.1	31.0	12.7	24.1	12.2	8.9	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
0.75"	88.9		
0.5"	79.2		
0.375"	70.6		
#4	57.9		
#10	45.2		
#20	31.5		
#40	21.1		
#60	14.9		
#100	11.6		
#200	8.9		

* (no specification provided)

Material Description

Brown f-c SAND and GRAVEL, trace Silt

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SW-SM **AASHTO (M 145)=** A-1-a

Coefficients

D_{90}= 19.7288 D_{85}= 16.4326 D_{60}= 5.5204
D_{50}= 2.7311 D_{30}= 0.7722 D_{15}= 0.2526
D_{10}= 0.1012 C_u= 54.56 C_c= 1.07

Remarks

Date Received: 06.04.21 **Date Tested:** 06.10.21

Tested By: JM / MS

Checked By: Steven Accetta

Title: Laboratory Coordinator

Source of Sample: Boring **Depth:** 2-4' **Date Sampled:**
Sample Number: B-3 / S-2

Thielsch Engineering Inc.

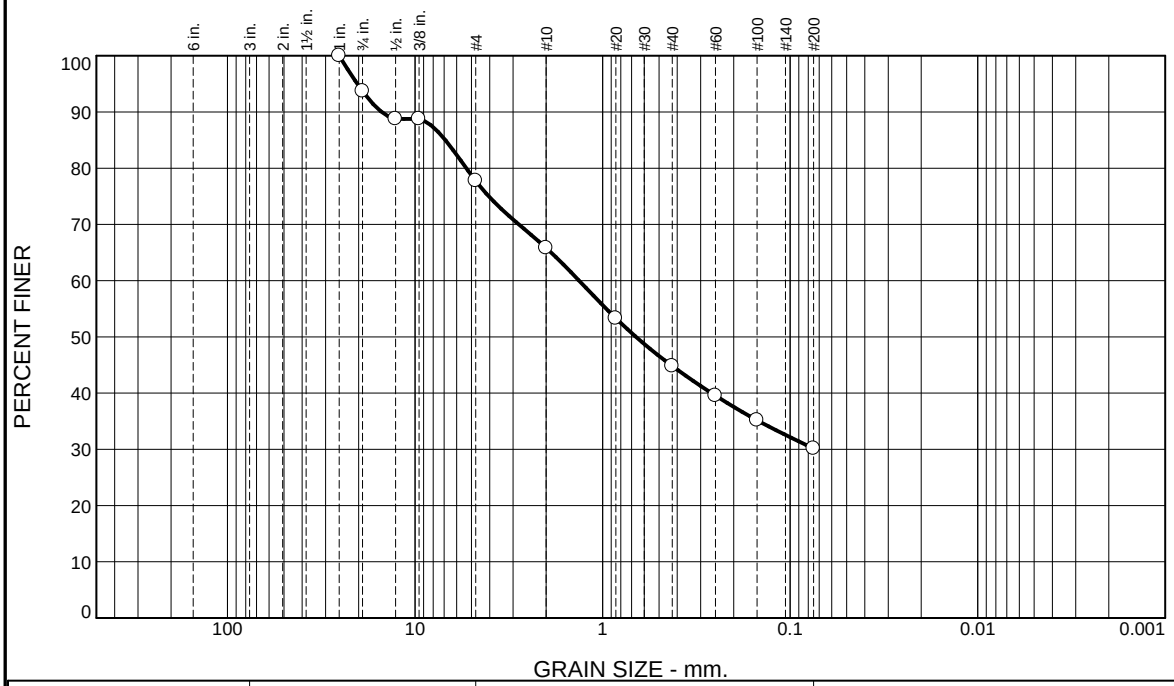
Cranston, RI

Client: GZA GeoEnvironmental, Inc

Project: New Roundabout in Bennington
Bennington, VT

Project No: 04.0191133.01 **Figure** 21-S-2147

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	6.3	16.0	11.9	21.0	14.6	30.2	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
0.75"	93.7		
0.5"	88.8		
0.375"	88.8		
#4	77.7		
#10	65.8		
#20	53.3		
#40	44.8		
#60	39.6		
#100	35.2		
#200	30.2		

* (no specification provided)

Material Description

Brown f-c SAND, some Silt, some Gravel

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-2-4(0)

Coefficients

D_{90}= 15.0765 D_{85}= 6.8859 D_{60}= 1.3337
D_{50}= 0.6637 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Sample visually classified as non-plastic.

Date Received: 06.04.21 **Date Tested:** 06.09.21

Tested By: JM / MS

Checked By: Steven Accetta

Title: Laboratory Coordinator

Source of Sample: Boring **Depth:** 2-4' **Date Sampled:**
Sample Number: B-4 / S-2

Thielsch Engineering Inc.

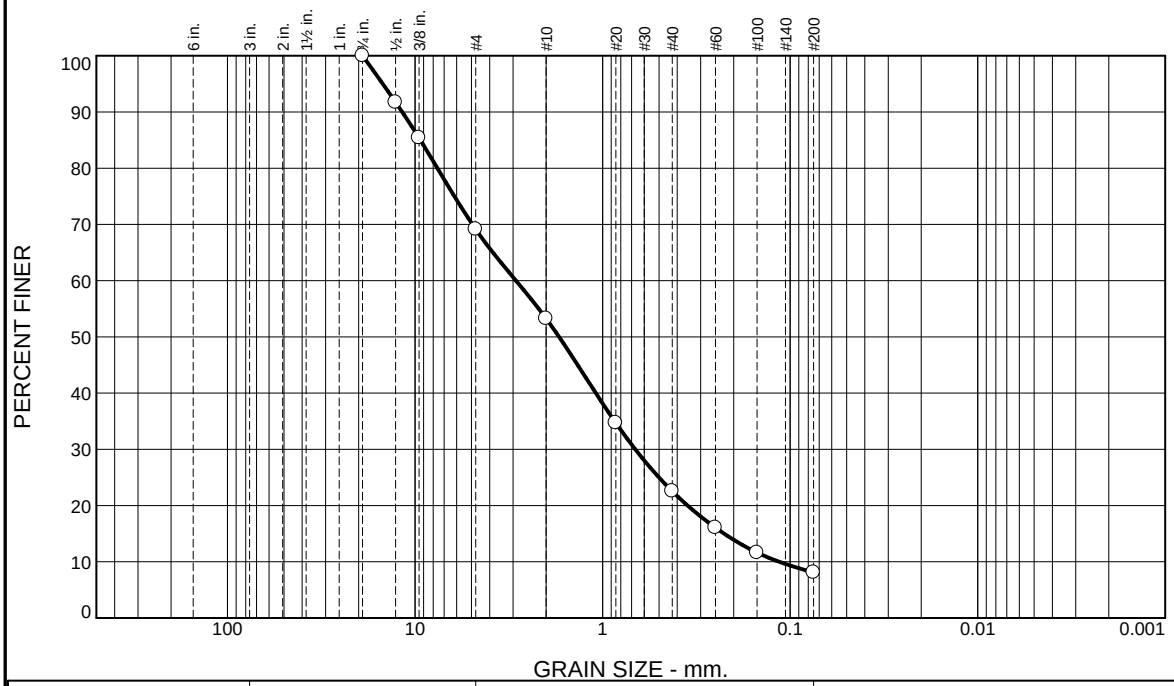
Cranston, RI

Client: GZA GeoEnvironmental, Inc

Project: New Roundabout in Bennington
Bennington, VT

Project No: 04.0191133.01 **Figure** 21-S-2148

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	30.9	15.8	30.8	14.4	8.1	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
0.75"	100.0		
0.5"	91.7		
0.375"	85.4		
#4	69.1		
#10	53.3		
#20	34.7		
#40	22.5		
#60	16.1		
#100	11.6		
#200	8.1		

* (no specification provided)

Material Description

Dark Brown f-c SAND, some Gravel, trace Silt

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SW-SM **AASHTO (M 145)=** A-1-b

Coefficients

D_{90}= 11.7141 D_{85}= 9.3688 D_{60}= 2.8980
D_{50}= 1.7056 D_{30}= 0.6696 D_{15}= 0.2247
D_{10}= 0.1143 C_u= 25.35 C_c= 1.35

Remarks

Date Received: 06.04.21 **Date Tested:** 06.09.21

Tested By: JM / MS

Checked By: Steven Accetta

Title: Laboratory Coordinator

Source of Sample: Boring **Depth:** 0-2' **Date Sampled:**
Sample Number: B-5 / S-1

Thielsch Engineering Inc.

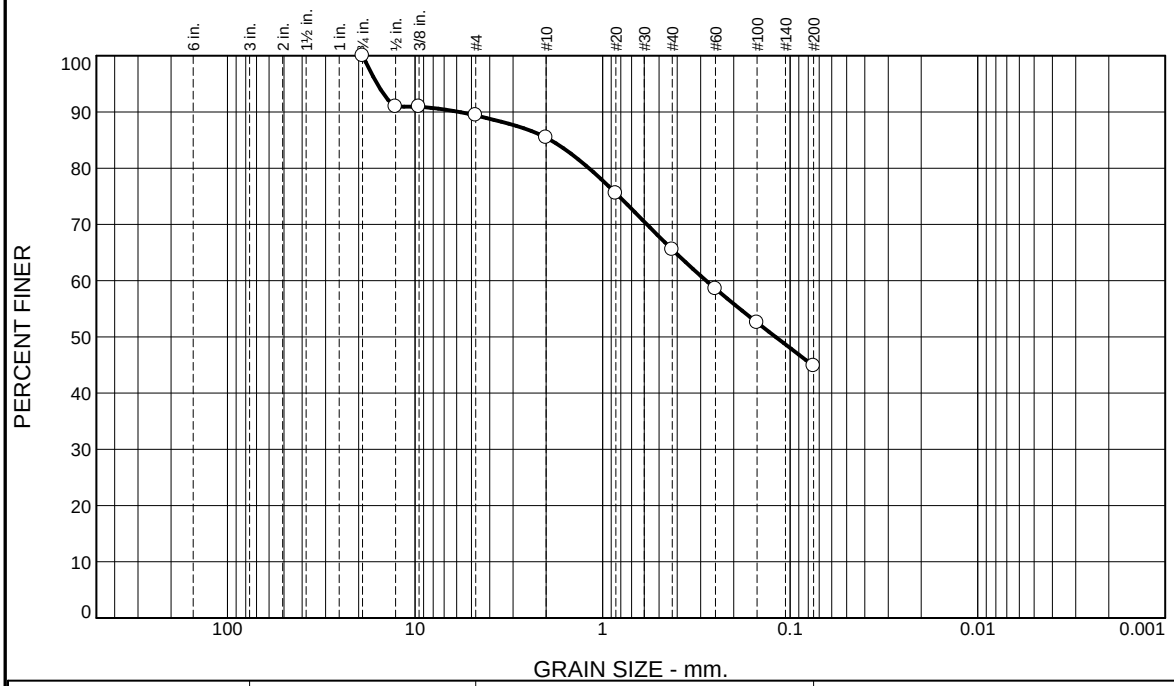
Cranston, RI

Client: GZA GeoEnvironmental, Inc

Project: New Roundabout in Bennington
Bennington, VT

Project No: 04.0191133.01 **Figure** 21-S-2149

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	10.6	4.0	19.9	20.7	44.8	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
0.75"	100.0		
0.5"	90.9		
0.375"	90.9		
#4	89.4		
#10	85.4		
#20	75.6		
#40	65.5		
#60	58.6		
#100	52.5		
#200	44.8		

* (no specification provided)

Material Description

Brown SILT and f-m SAND, Gravel

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 5.7897 D_{85}= 1.8942 D_{60}= 0.2803
D_{50}= 0.1196 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Sample visually classified as non-plastic.

Date Received: 06.04.21 **Date Tested:** 06.10.21

Tested By: JM / MS

Checked By: Steven Accetta

Title: Laboratory Coordinator

Source of Sample: Boring **Depth:** 2-4' **Date Sampled:**
Sample Number: B-5 / S-2

Thielsch Engineering Inc.

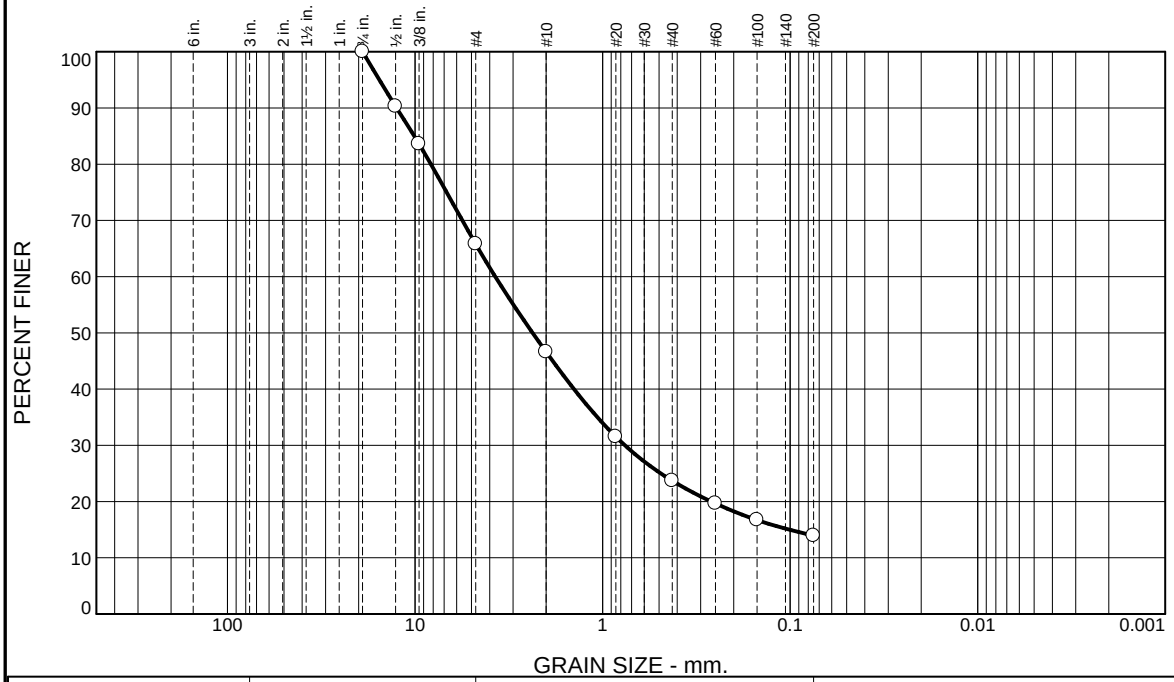
Cranston, RI

Client: GZA GeoEnvironmental, Inc

Project: New Roundabout in Bennington
Bennington, VT

Project No: 04.0191133.01 **Figure** 21-S-2150

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	34.2	19.2	22.9	9.8	13.9	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
0.75"	100.0		
0.5"	90.3		
0.375"	83.6		
#4	65.8		
#10	46.6		
#20	31.5		
#40	23.7		
#60	19.7		
#100	16.7		
#200	13.9		

* (no specification provided)

Material Description

Brown f-c SAND, some Gravel, little Silt

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-1-a

Coefficients

D_{90}= 12.5460 D_{85}= 10.1014 D_{60}= 3.7327
D_{50}= 2.3619 D_{30}= 0.7610 D_{15}= 0.1006
D_{10}= C_u= C_c=

Remarks

Date Received: 06.04.21 **Date Tested:** 06.09.21

Tested By: JM / MS

Checked By: Steven Accetta

Title: Laboratory Coordinator

Source of Sample: Boring **Depth:** 2-4' **Date Sampled:**
Sample Number: B-6 / S-2

Thielsch Engineering Inc.

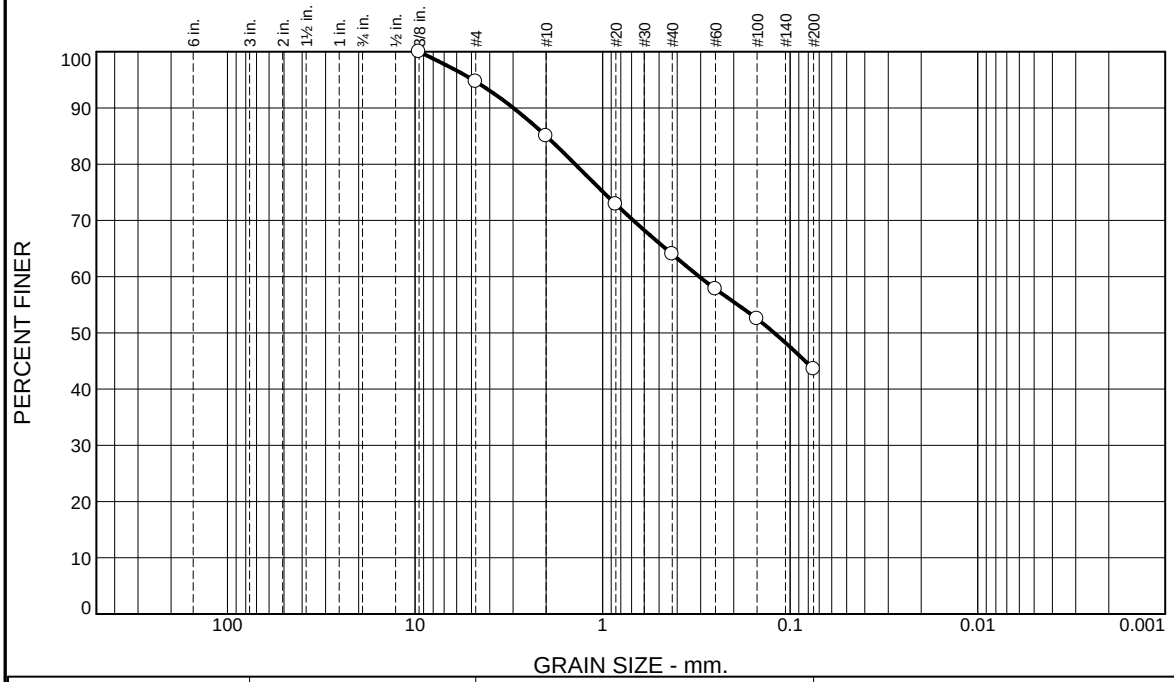
Cranston, RI

Client: GZA GeoEnvironmental, Inc

Project: New Roundabout in Bennington
Bennington, VT

Project No: 04.0191133.01 **Figure** 21-S-2151

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	5.3	9.7	21.0	20.5	43.5	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
0.375"	100.0		
#4	94.7		
#10	85.0		
#20	72.9		
#40	64.0		
#60	57.8		
#100	52.5		
#200	43.5		

* (no specification provided)

Material Description

Brown f-c SAND and SILT, trace Gravel

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 2.9897 D_{85}= 1.9980 D_{60}= 0.3046
D_{50}= 0.1215 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Sample visually classified as non-plastic.

Date Received: 06.04.21 **Date Tested:** 06.09.21

Tested By: JM / MS

Checked By: Steven Accetta

Title: Laboratory Coordinator

Source of Sample: Boring **Depth:** 8-10' **Date Sampled:**
Sample Number: B-6 / S-5

Thielsch Engineering Inc.

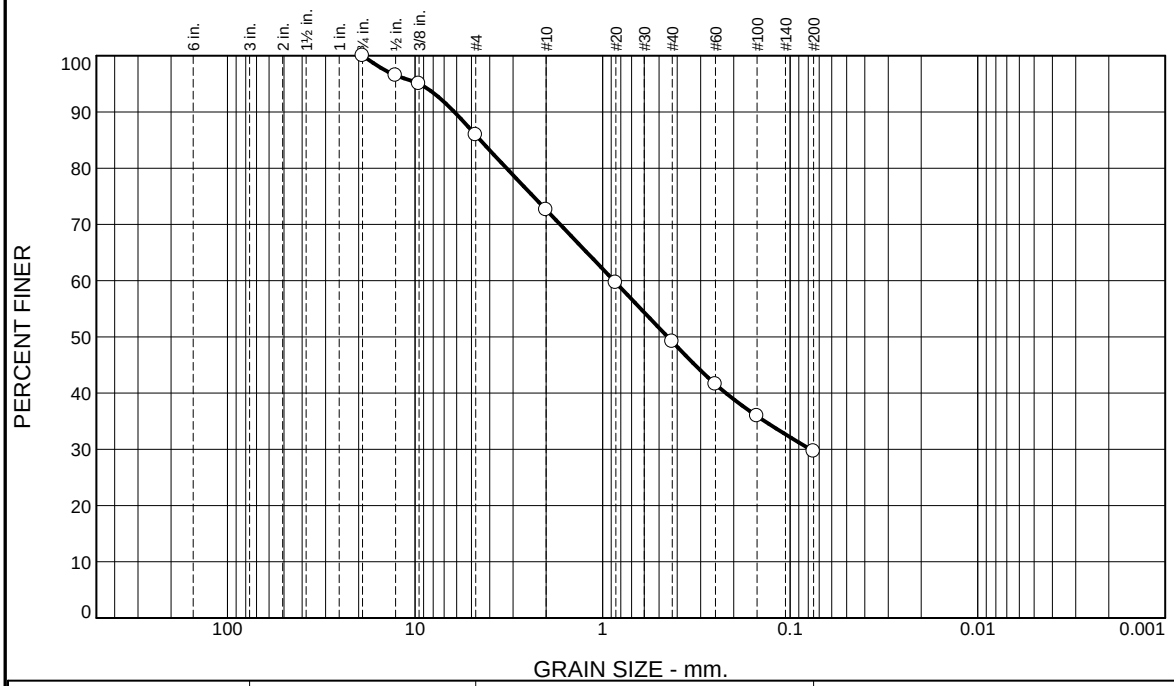
Cranston, RI

Client: GZA GeoEnvironmental, Inc

Project: New Roundabout in Bennington
Bennington, VT

Project No: 04.0191133.01 **Figure** 21-S-2152

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	14.1	13.3	23.5	19.5	29.6	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
0.75"	100.0		
0.5"	96.5		
0.375"	95.0		
#4	85.9		
#10	72.6		
#20	59.6		
#40	49.1		
#60	41.6		
#100	35.9		
#200	29.6		

* (no specification provided)

Material Description

Brown f-c SAND, some Silt, little Gravel

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-2-4(0)

Coefficients

D_{90}= 6.1686 D_{85}= 4.4854 D_{60}= 0.8707
D_{50}= 0.4497 D_{30}= 0.0781 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 06.04.21 **Date Tested:** 06.09.21

Tested By: JM / MS

Checked By: Steven Accetta

Title: Laboratory Coordinator

Source of Sample: Boring **Depth:** 4-6' **Date Sampled:**
Sample Number: B-7 / S-3

Thielsch Engineering Inc.

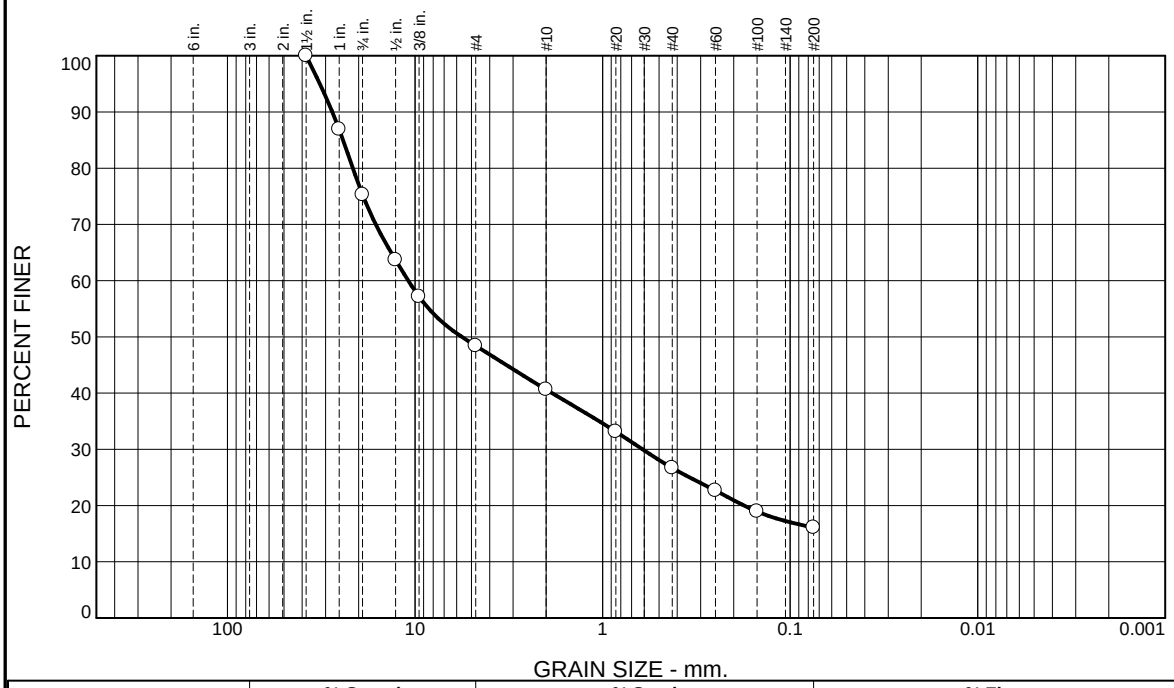
Cranston, RI

Client: GZA GeoEnvironmental, Inc

Project: New Roundabout in Bennington
Bennington, VT

Project No: 04.0191133.01 **Figure** 21-S-2153

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	24.7	26.9	7.8	13.9	10.6	16.1	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1-1/2"	100.0		
1"	86.9		
3/4"	75.3		
1/2"	63.7		
3/8"	57.2		
#4	48.4		
#10	40.6		
#20	33.1		
#40	26.7		
#60	22.7		
#100	18.9		
#200	16.1		

* (no specification provided)

Material Description

Light Brown GRAVEL, some f-c SAND, little Silt

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= GM **AASHTO (M 145)=** A-1-b

Coefficients

D_{90}= 27.6011 D_{85}= 24.1972 D_{60}= 10.8777
D_{50}= 5.6300 D_{30}= 0.6121 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 06.04.21 **Date Tested:** 06.09.21

Tested By: JM / MS

Checked By: Steven Accetta

Title: Laboratory Coordinator

Source of Sample: Boring **Depth:** 6-8' **Date Sampled:**
Sample Number: B-7 / S-4

Thielsch Engineering Inc.

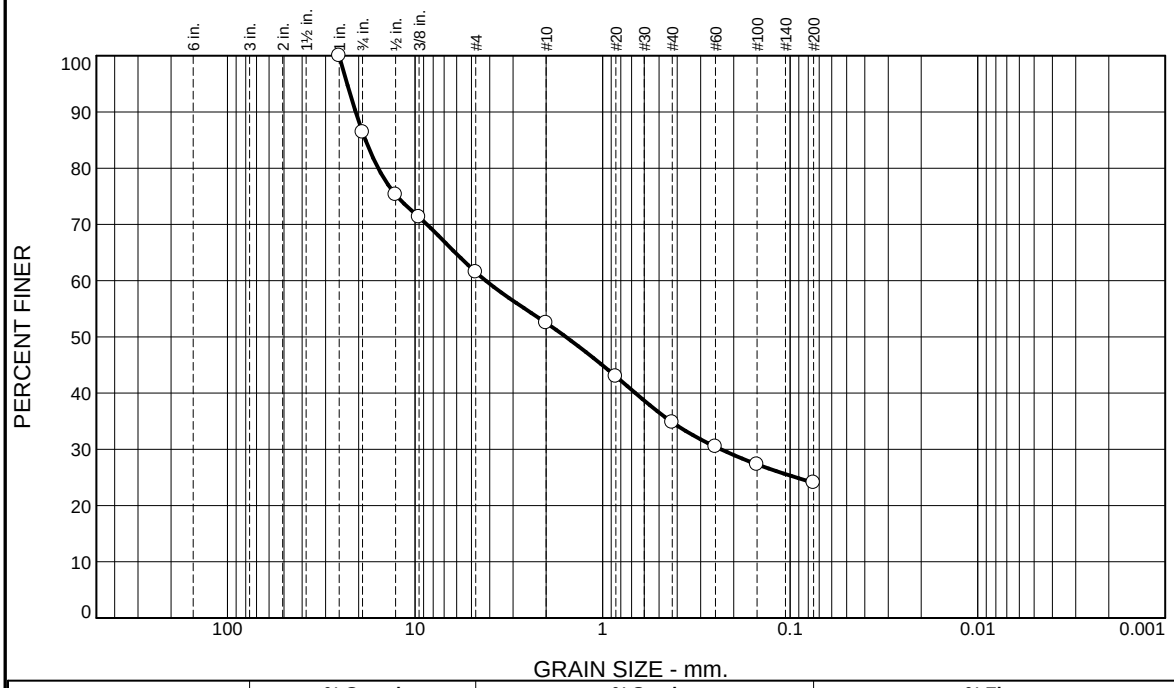
Cranston, RI

Client: GZA GeoEnvironmental, Inc

Project: New Roundabout in Bennington
Bennington, VT

Project No: 04.0191133.01 **Figure** 21-S-2154

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	13.6	24.9	9.0	17.7	10.7	24.1	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
0.75"	86.4		
0.5"	75.3		
0.375"	71.3		
#4	61.5		
#10	52.5		
#20	43.0		
#40	34.8		
#60	30.5		
#100	27.3		
#200	24.1		

* (no specification provided)

Material Description

Brown GRAVEL and f-c SAND, some Silt

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= GM **AASHTO (M 145)=** A-1-b

Coefficients

D_{90}= 20.7170 D_{85}= 18.3752 D_{60}= 4.1968
D_{50}= 1.5686 D_{30}= 0.2338 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 06.04.21 **Date Tested:** 06.09.21

Tested By: JM / MS

Checked By: Steven Accetta

Title: Laboratory Coordinator

Source of Sample: Boring **Depth:** 8-10' **Date Sampled:**
Sample Number: B-7 / S-5

Thielsch Engineering Inc.

Cranston, RI

Client: GZA GeoEnvironmental, Inc

Project: New Roundabout in Bennington
Bennington, VT

Project No: 04.0191133.01 **Figure** 21-S-2155