FREEMAN
COMPANIES
LAND DEVELOPMENT | ENGINEERING DESIGN | CONSTRUCTION SERVICES

Geotechnical Report
Meriden TOD Signal Upgrades
Meriden, Connecticut

December 18, 2019

Freeman Project No.: 2018-0108

Prepared for:
CDM Smith, Inc.
77 Hartland Street
Suite 201
East Hartford, Connecticut 06109

Prepared by:

Freeman Companies, LLC
36 John Street
Hartford, CT 06106

STATE OF CONNECTICUT
ALLISON M. McCAULIFFE
No. 23992
LICENSED PROFESSIONAL ENGINEER

12/18/19

Allison M. McCauliffe, P.E.
Senior Geotechnical Engineer/ Project Manager

TABLE OF CONTENTS

ATTACHMENTS

Table

1. Subsurface Data

Figures

1. Site Location Map
2. Exploration Location Plan 2A through 2F

Appendices

A. Test Boring Logs
B. Results of Laboratory Testing

1.0 INTRODUCTION

1.1 Summary

This report presents our evaluation of subsurface conditions for the Meriden TOD Signal Upgrades located in Meriden, Connecticut. The improvements include installation of new traffic signals at several intersections as detailed below.

Subsurface conditions generally consisted of variable density Fill overlying Organic Deposits, Glaciofluvial Deposits, Glaciolacustrine Deposits and Glacial Till. Weathered Bedrock was encountered in boring B-1 only. Currently, plans include replacing the existing signals with new signals and poles. It is anticipated that foundations will be drilled caisson type foundations.

1.2 Scope of Work

Freeman Companies, LLC performed the following tasks:

- Engaged a subsurface exploration contractor to conduct test borings at the site.
- Provided technical monitoring of the explorations.
- Arranged for a testing laboratory to conduct laboratory soil tests.
- Prepared this geotechnical report.

1.3 Authorization

The work was completed in accordance with the amendment to our agreement dated October 20, 2019.

2.0 SITE AND PROJECT DESCRIPTION

2.1 Site Description

The signal upgrades are located at various intersections throughout Meriden, Connecticut, as indicated on Figure 1, Location Map. The intersections include:

- West Main Street and Cook Avenue
- Hanover Street and Cook Avenue
- West Main Street and Butler Street
- West Main Street and South Grove Street
- West Main Street and Colony Street
- East Main Street and Pratt Street
- Crown Street and Perkins Street
- Church Street and Colony Street
- Colony Street and Hanover Street
- Hanover Street and South Grove Street
- Hanover Street and Butler Street

The existing signals in these areas are situated in the sidewalks, islands, or other areas off the roadways.

2.2 Project Description

The project will include replacement of the existing signals with new mast arm signals.

3.0 SUBSURFACE EXPLORATIONS

3.1 Recent Field Explorations

Eleven test borings (B-1 through B-11) were completed by New England Boring Contractors Inc., of Glastonbury, Connecticut from November 19 to 25, 2019 with a truck mounted drill rig using 3.25 inch diameter hollow-stem augers to depths ranging from 20 feet to 25 feet below existing ground surface. Borings were generally terminated at predetermined depths. Standard Penetration Tests (SPTs) were taken semi-continuously to 10 feet and then at maximum 5 foot intervals thereafter.

Exploration locations were determined by taping from existing site features and are considered approximate. A Freeman Companies geotechnical engineer observed the drilling and prepared the field boring logs with soil descriptions based on the visual observation of the samples. Test boring logs are included in Appendix A and locations are shown on Figures 2A through 2F, Subsurface Exploration Location Plan.

3.2 Laboratory Testing

Laboratory tests were performed to aid in classification and determination of engineering properties. Ten grain size distribution analyses and three Atterberg Limit tests were performed on soil samples recovered from the borings by Geotesting Express of Acton, Massachusetts. Laboratory testing results are included in Appendix B.

4.0 SUBSURFACE CONDITIONS

4.1 Subsurface Profile

The site subsurface conditions encountered in the explorations generally consist of Fill overlying Organic Deposits, Glaciofluvial Deposits, Glaciolacustrine Deposits, Glacial Till and Weathered Bedrock. Subsurface conditions are known only at the boring locations and may differ significantly between borings. The generalized subsurface conditions follow. See Table 1, attached, for boring specific data.

Thickness (feet)	Generalized Description
0.3 to 0.7	PAVEMENT/CONCRETE – At surface
2.7 to 11	FILL – Loose to medium dense, gray to brown to dark brown, coarse to fine SAND, some to trace coarse to fine to medium to fine gravel, some to trace silt
1.5 to 2	ORGANIC DEPOSIT – Loose dark gray to dark brown-black SILT, some fine sand, organic fibers
1.5 to Greater than 16.5	GLACIOFLUVIAL DEPOSITS – Medium dense to dense, brown, coarse to fine SAND, some to trace coarse to fine gravel, little to trace silt
16 to Greater than 19	GLACIOLACUSTRINE DEPOSITS – Loose to medium dense, brown SILT, varying to brown CLAY, trace fine sand, to Varved CLAY and SILT
Greater than 11.8 to 16	GLACIAL TILL - Medium dense to very dense, red-brown, fine SAND, some silt, little to trace medium to fine gravel
--	WEATHERED BEDROCK

4.2 Groundwater

Groundwater was encountered in the borings at approximately 4 feet to 14 feet below existing ground surface, corresponding to Elevation 112 feet to Elevation 126 feet. Groundwater level measurements were made during or immediately following drilling and may not represent static conditions. Groundwater levels will fluctuate with season, precipitation, nearby construction activities, and other conditions.

5.0 GEOTECHNICAL ENGINEERING RECOMMENDATIONS

5.1 Signal Pole Foundation Parameters

New mast arm signal poles will be installed at the intersections noted previously. At the time of this report, loading information was not available. For design purposes, signal pole foundations consisting of drilled three-foot-diameter shafts extending to a depth of 14 feet appear feasible. We will evaluate the response of the selected foundation system to vertical, horizontal, and moment loading, once that information is available. This is to confirm that calculated deflections are within tolerable limits.

5.2 Engineering Parameters

The following parameters are provided for each intersection to aid in mast arm foundation design:

- West Main Street and Cook Avenue

PARMETER	VALUE
Boring No.	B-1
Soil Type	Fill (c-f SAND, some m-f gravel, little silt), Glacial Till (c-f SAND, some silt, trace f gravel), Weathered Bedrock
Soil Density	125 pounds per cu. ft. (pcf)
Friction Angle	32 degrees - Fill 34 degrees – Glacial Till
Cohesion	0 pounds per sq. ft. (psf)
Groundwater	Not encountered

- Hanover Street and Cook Avenue

PARMETER	VALUE
Boring No.	B-2
Soil Type	Fill (c-f SAND, some m-f gravel, little to some silt), Organic Silt, Glaciofluvial Deposits (c-f SAND, little gravel, little silt), Glaciolacustrine Deposits (SILT, little fine sand)
Soil Density	120 pcf – Granular Deposits 115 pcf – Fine Deposit
Friction Angle	30 degrees – Fill 32 degrees – Glaciofluvial Deposit 32 degrees – Glaciolacustrine Deposit
Cohesion	0 psf
Groundwater	7 ft.

It is recommended that the 2 feet of organic soil be ignored and the depth of the pier be extended an additional two feet beyond typical design depth due to the poor engineering properties of the deposit.

- West Main Street and Butler Street

PARMETER	VALUE
Boring No.	B-3
Soil Type	Fill (c-f SAND, little m-f gravel, little silt), Glaciofluvial Deposits (c-f SAND, little m-f gravel, little silt), Glaciolacustrine Deposits (SILT, trace fine sand)
Soil Density	120 pcf – Granular Deposits 115 pcf – Fine Deposit
Friction Angle	32 degrees – Fill 32 degrees – Glaciolacustrine Deposit
Cohesion	0 psf
Groundwater	8 ft.

- West Main Street and South Grove Street

PARMETER	VALUE
Boring No.	B-4
Soil Type	Fill (c-f SAND, little to some m-f gravel, little silt), Glaciolacustrine Deposits (SILT, trace fine sand)
Soil Density	120 pcf – Granular Deposits 115 pcf – Fine Deposit
Friction Angle	30 degrees – Fill 30 degrees - Glaciolacustrine
Cohesion	0 psf
Groundwater	7 ft.

- West Main Street and Colony Street

PARMETER	VALUE
Boring No.	B-5
Soil Type	Fill (c-f SAND, little to some m-f gravel, little silt), Glaciolacustrine Deposits (SILT, little fine sand to fine SAND, some silt)
Soil Density	120 pcf – Granular Deposits 115 pcf – Fine Deposit
Friction Angle	32 degrees – Fill 32 degrees – Glaciolacustrine Deposits
Cohesion	0 psf
Groundwater	6 ft.

- East Main Street and Pratt Street

PARMETER	VALUE
Boring No.	B-6
Soil Type	Fill (c-f SAND, some c-f gravel, little to some silt), Organic Silt, Glaciofluvial Deposits (c-f SAND, little to some gravel, trace to little silt),
Soil Density	125 pcf – Granular Deposits
Friction Angle	32 degrees – Fill 34 degrees - Glaciofluvial Deposits
Cohesion	0 psf
Groundwater	12 ft.

It is recommended that the 2 feet of organic soil be ignored and the depth of the pier be extended an additional 2 feet beyond typical design depth due to the poor engineering properties of the deposit.

- Crown Street and Perkins Street

PARMETER	VALUE
Boring No.	B-7
Soil Type	Fill (c-f SAND, some c-f gravel, little to some silt), Glaciofluvial Deposits (c-f SAND, little to some gravel, little to trace silt), Glacial Till (c-f SAND, some silt, little gravel)
Soil Density	125 pcf – Granular Deposits
Friction Angle	32 degrees – Fill 32 degrees – Glaciofluvial Deposits 34 degrees – Glacial Till
Cohesion	0 psf
Groundwater	14 ft.

- Church Street and Colony Street

PARMETER	VALUE
Boring No.	B-8
Soil Type	Fill (c-f SAND, little c-f gravel, little silt), Glaciofluvial Deposits (c-f SAND, little silt), Glaciolacustrine Deposits (CLAY, trace fine sand)
Soil Density	120 pcf – Granular Deposits 105 pcf – Fine Deposit
Friction Angle	32 degrees – Fill 32 degrees – Glaciofluvial Deposits 0 degrees – Glaciolacustrine Deposits
Cohesion	1,500 psf - For Glaciolacustrine Deposit Only
Groundwater	9 ft.

- Colony Street and Hanover Street

PARMETER	VALUE
Boring No.	B-9
Soil Type	Fill (c-f SAND, some to little c-f gravel, some to little silt), Glaciofluvial Deposits (c-f SAND, some c-f gravel, little silt), Glaciolacustrine Deposits (CLAY, trace fine sand)
Soil Density	120 pcf – Granular Deposits 105 pcf – Fine Deposit
Friction Angle	32 degrees – Fill 32 degrees – Glaciofluvial Deposits 0 degrees – Glaciolacustrine Deposit
Cohesion	1,500 psf – For Glaciolacustrine Deposit Only
Groundwater	10 ft.

- Hanover Street and South Grove Street

PARMETER	VALUE
Boring No.	B-10
Soil Type	Fill (c-f SAND, little c-f gravel, little silt), Glaciofluvial Deposits (c-f SAND, some c-f gravel, little silt), Glaciolacustrine Deposits (Varved CLAY and SILT)
Soil Density	120 pcf – Granular Deposits 105 pcf – Fine Deposit
Friction Angle	32 degrees – Fill 32 degrees – Glaciofluvial Deposit 0 degrees – Glaciolacustrine Deposit
Cohesion	1,500 psf for Glaciolacustrine Deposit only
Groundwater	7 ft.

- Hanover Street and Butler Street

PARMETER	VALUE
Boring No.	B-11
Soil Type	Fill (c-f SAND, little c-f gravel, little silt), Glaciofluvial Deposits (c-f SAND, little m-f gravel, little silt), Glaciolacustrine Deposits (SILT, trace f sand)
Soil Density	120 pcf – Granular Deposits 115 pcf – Fine Deposit
Friction Angle	32 degrees – Fill 32 degrees – Glaciofluvial Deposit 32 degrees – Glaciolacustrine Deposit
Cohesion	0 psf
Groundwater	4 ft.

6.0 CONSTRUCTION CONSIDERATIONS

6.1 Excavation

Conventional heavy construction equipment should be suitable for excavation in existing soil materials. We anticipate that a drilling rig will be required for the signal foundation. Casing will likely be required for the drilling to maintain the hole. Difficult drilling through Glacial Till is anticipated in some locations. The drill rig should be capable of drilling through boulders and be able to maintain alignment. Excavations should conform to OSHA excavation regulations contained in 29 CFR Part 1926, latest edition, but should be confirmed at the time of excavation.

6.2 Dewatering

We anticipate that excavation dewatering can be accomplished by pumping from properly filtered sumps and be discharged according to federal, state, and local regulations. Surface water entering the construction area should be diverted away from excavations.

Drilled foundations will encounter groundwater. If methods are not water tight, then it should be assumed that concrete should be placed by tremie method from the bottom of the drill hole to displace groundwater.

7.0 FUTURE SERVICES AND LIMITATIONS

We recommend that Freeman Companies be engaged during construction to observe:

- Verify that soil conditions exposed in excavations are in general conformance with design assumptions
- Verify that the geotechnical aspects of construction are consistent with the project specifications

This report was prepared for the exclusive use of CDM Smith and the project design team. The recommendations provided herein are based on the project information provided at the time of this report and may require modification if there are any changes in the nature, design, or location or alignment of the roadway or structures.

The recommendations in this report are based in part on the data obtained from the subsurface explorations. The nature and extent of variations between explorations may not become evident until construction. If variations from the anticipated conditions are encountered, it may be necessary to revise the recommendations in this report.

Our professional services for this project have been performed in accordance with generally accepted engineering practices; no warranty, expressed or implied, is made.

2018-0110
Willard Diloreto Parking Garage
CCSU
New Britain, Connecticut

Table 1
Subsurface Data

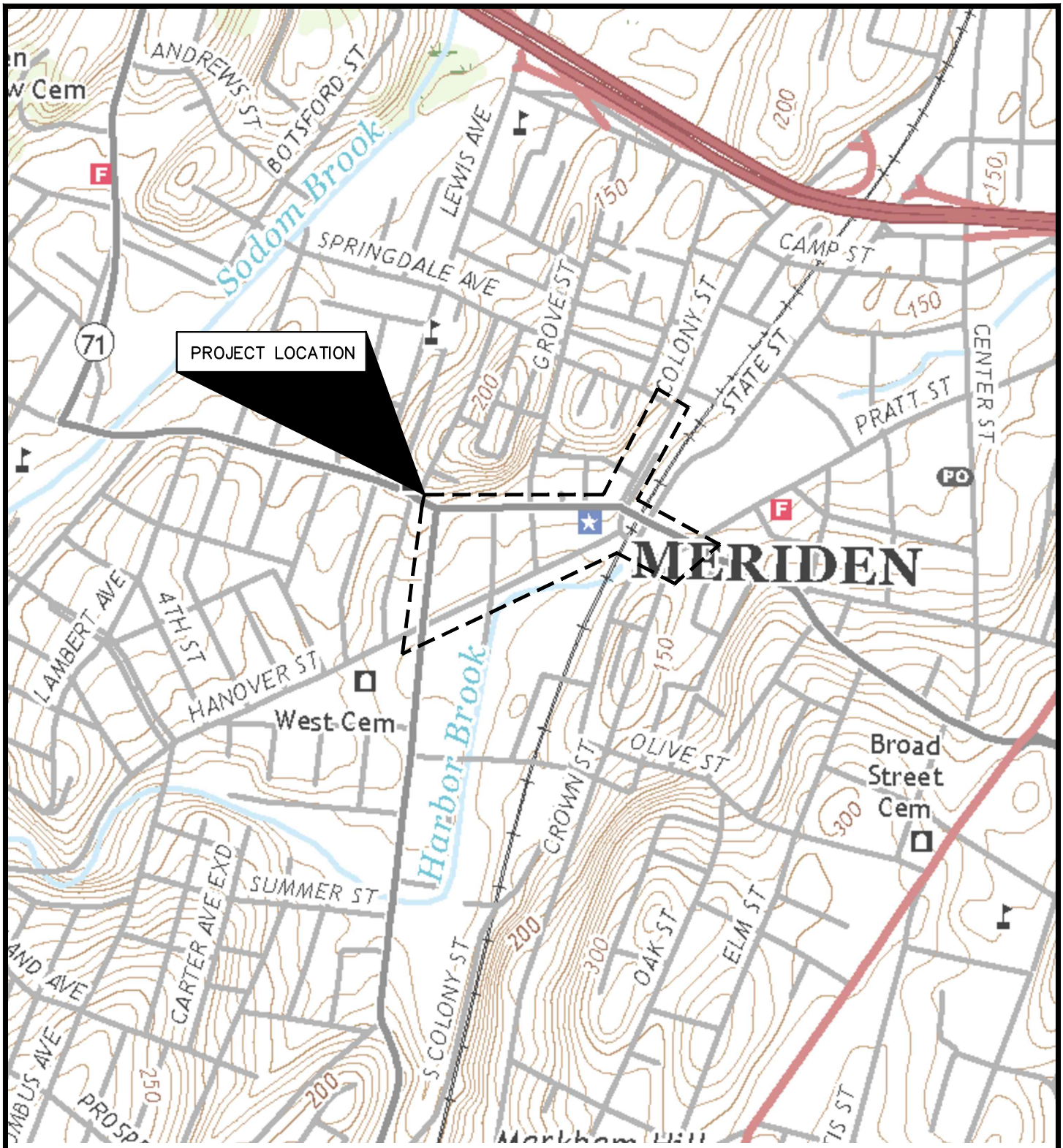
Boring No.	Ground Surface El.	Depth (ft.)	Thickness (ft.)						Groundwater		Bedrock	
			Pavement/Conrete	Fill	Organic Deposit	Glaciofluvial Deposit	Glaciolacustrine Deposite	Glacial Till	Depth (ft.)	Elevation	Depth (ft.)	Elevation
B-1	149	20.2	0.3	2.7	--	--	--	14.0	--	--	17	132
B-2	119.5	25	0.33	5.7	2.0	7.0	>10	--	7	112.5	--	--
B-3	136.75	25	0.3	6.2	--	1.5	>17	--	8	128.75	--	--
B-4	133.5	25	0.3	5.8	--	--	>18.5	--	7	126.5	--	--
B-5	130	25	0.3	5.7	--	--	>19	--	6	124	--	--
B-6	128.25	25	0.7	6.3	1.5	>16.5	--	--	12	116.25	--	--
B-7	130.5	20.3	--	3.5	--	5.0	--	>11.8	14	116.5	--	--
B-8	134.5	25	0.3	5.7	--	3.0	16.0	--	9	125.5	--	--
B-9	124.5	25	Brick Paver	11.0	--	5.5	>8.5	--	10	114.5	--	--
B-10	119	25	--	6.0	--	5.5	>13.5	--	7	112	--	--
B-11	119	25	0.3	4.2	--	5.5	>15	--	4	115	--	--

Notes:

1. Ground surface elevations are approximate and based upon grading plans provided by CDM Smith
2. Groundwater levels in borings were taken during drilling activities and may not represent stabilized conditions.
3. Bedrock elevations include weathered bedrock.
3. ">" - Greater Than "--" - Not Encountered

FREEMAN COMPANIES

FIGURES



USGS QUADRANGLE MAP
MERIDEN, CONNECTICUT
DATE 2018

FREEMAN COMPANIES
LAND DEVELOPMENT | ENGINEERING DESIGN | CONSTRUCTION SERVICES
36 JOHN STREET
HARTFORD, CT 06106
WWW.FREEMANCOS.COM
TEL:(860)251-9550
FAX:(860)986-7161
ELEVATE YOUR EXPECTATIONS

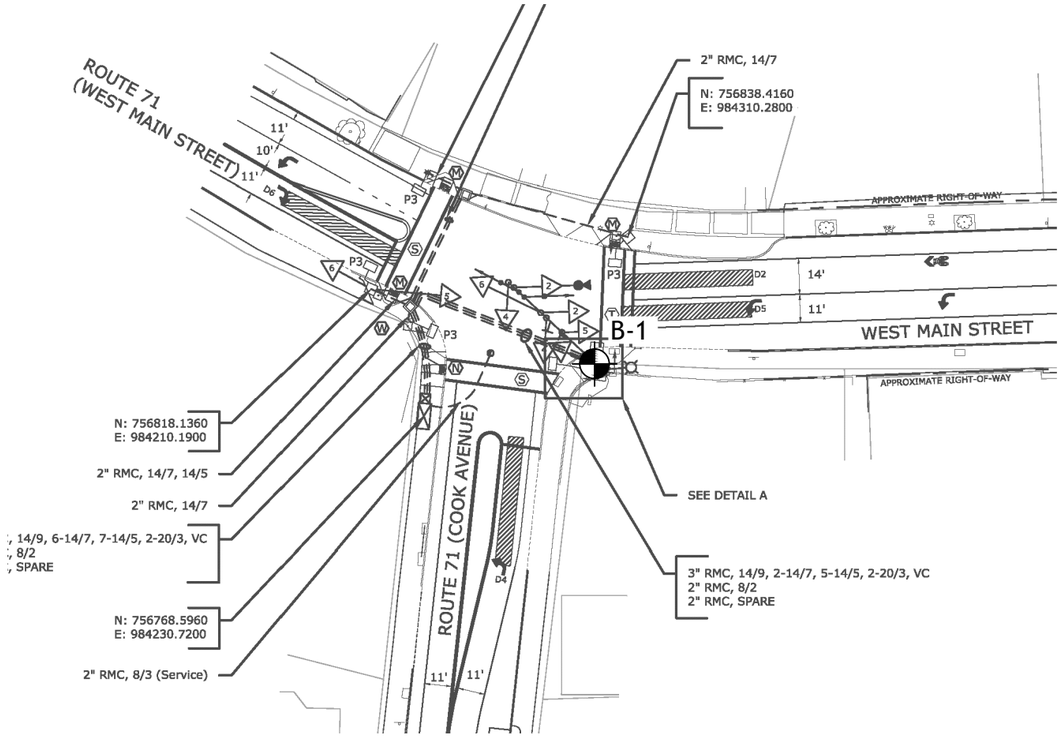
SITE LOCATION MAP

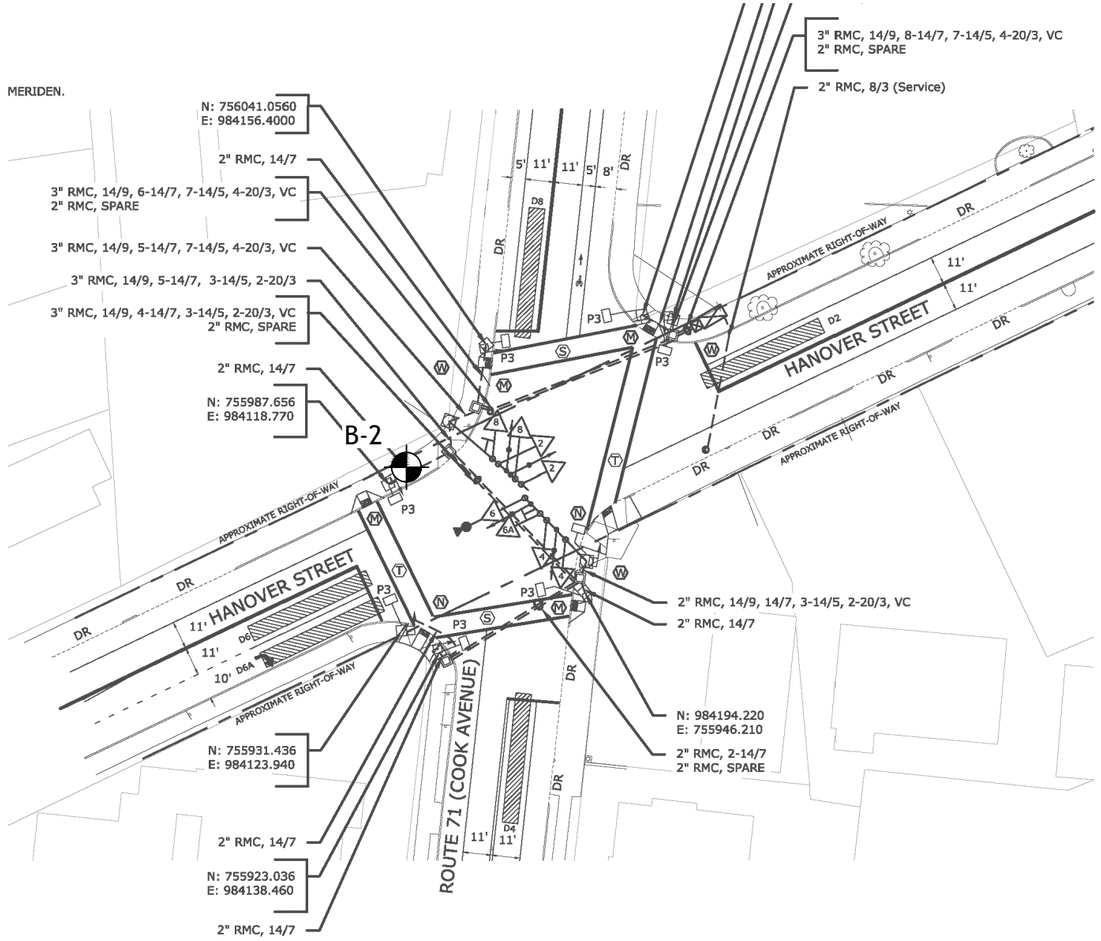
TOWN OR MERIDEN TOD SIGNAL UPGRADES
MERIDEN, CONNECTICUT

DRAFTED:	T.T.
CHECKED:	A.M.
APPROVED:	A.M.
SCALED:	1"=1000'
PROJECT NO.:	2018-0108
DATE:	12/03/2019

SHEET NO.

FIGURE 1





LEGEND:

B-1 TEST BORING

NOTES:

1. BASE PLAN PROVIDED CDM SMITH, INC.
2. EXPLORATION LOCATIONS WERE TAPED FROM EXISTING SITE FEATURES AND ARE APPROXIMATE
3. REFER TO THE TEXT AND APPENDICES FOR ADDITIONAL INFORMATION

GRAPHIC SCALE

60 30 0 60

SCALE IN FEET

SUBSURFACE EXPLORATION LOCATION PLAN

TOWN OF MERIDEN TOD TRAFFIC SIGNAL UPGRADES
MERIDEN, CONNECTICUT

FREEMAN COMPANIES
LAND DEVELOPMENT | ENGINEERING DESIGN | CONSTRUCTION SERVICES
FREEMAN COMPANIES, LLC
36 JOHN STREET
HARTFORD, CT 06106
WWW.FREEMANCOS.COM
TEL:(860)251-9550
TOLL FREE:(800)604-5141
FAX:(860)986-7161
ELEVATE YOUR EXPECTATIONS

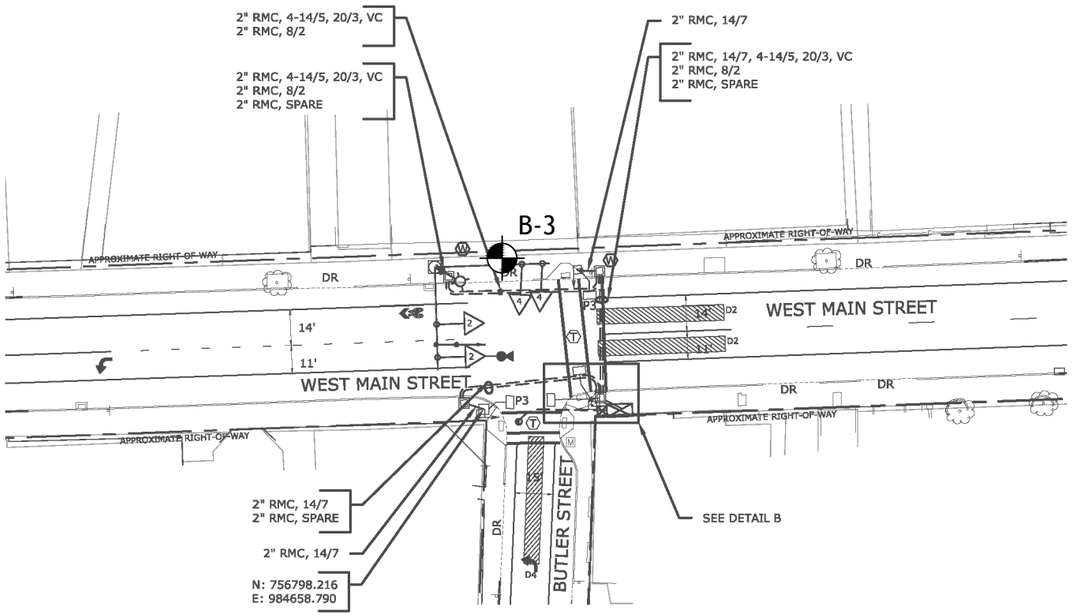
No.	Date	Description
–	–	–

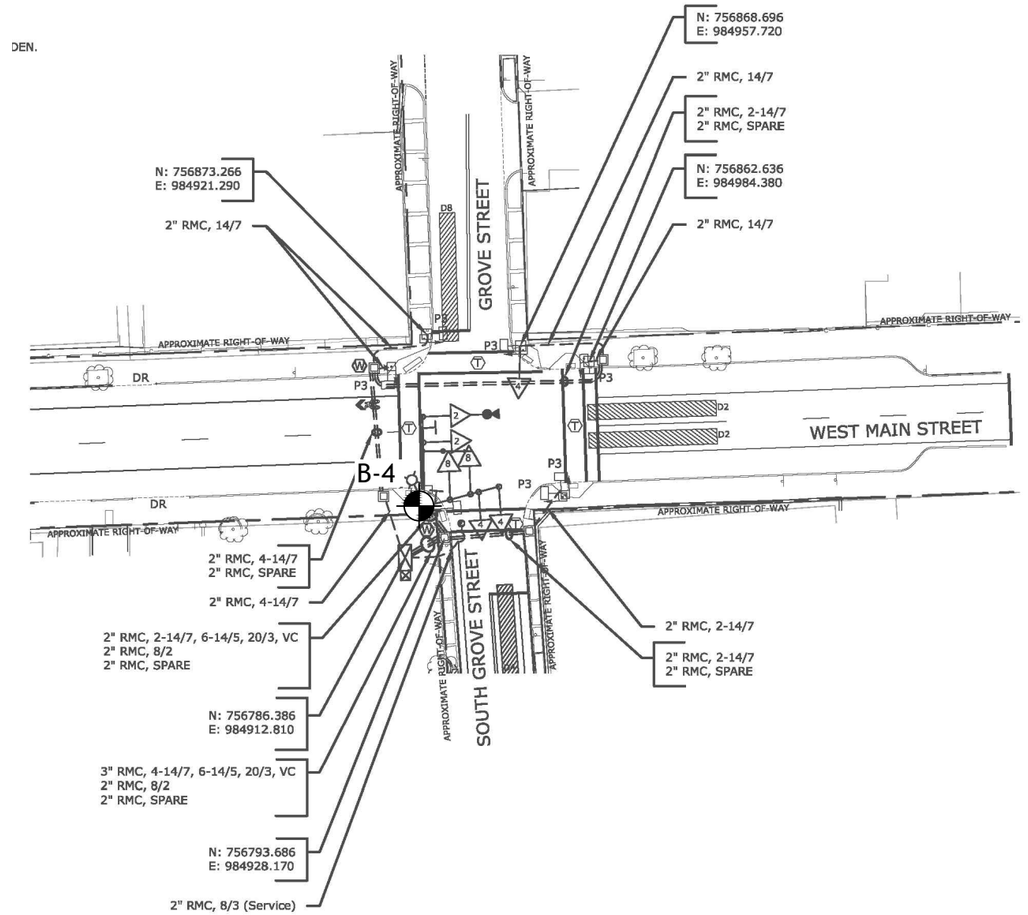
REVISIONS

DRAWN:	T.T.
CHECKED:	A.M.
APPROVED:	N.W.
SCALE:	1"=60'
PROJECT NO.:	2018–0108
DATE:	12/03/2019

SHEET NO.

FIGURE 2A





LEGEND:

B-1 TEST BORING

NOTES:
1. BASE PLAN PROVIDED CDM SMITH, INC.
2. EXPLORATION LOCATIONS WERE TAPED FROM EXISTING SITE FEATURES AND ARE APPROXIMATE
3. REFER TO THE TEXT AND APPENDICES FOR ADDITIONAL INFORMATION

GRAPHIC SCALE
60 30 0 60
SCALE IN FEET

SUBSURFACE EXPLORATION LOCATION PLAN

TOWN OF MERIDEN TOD TRAFFIC SIGNAL UPGRADES
MERIDEN, CONNECTICUT

FREEMAN COMPANIES
LAND DEVELOPMENT | ENGINEERING DESIGN | CONSTRUCTION SERVICES
FREEMAN COMPANIES, LLC
36 JOHN STREET
HARTFORD, CT 06106
WWW.FREEMANCOS.COM
TEL:(860)251-9550
TOLL FREE:(800)604-5141
FAX:(860)986-7161
ELEVATE YOUR EXPECTATIONS

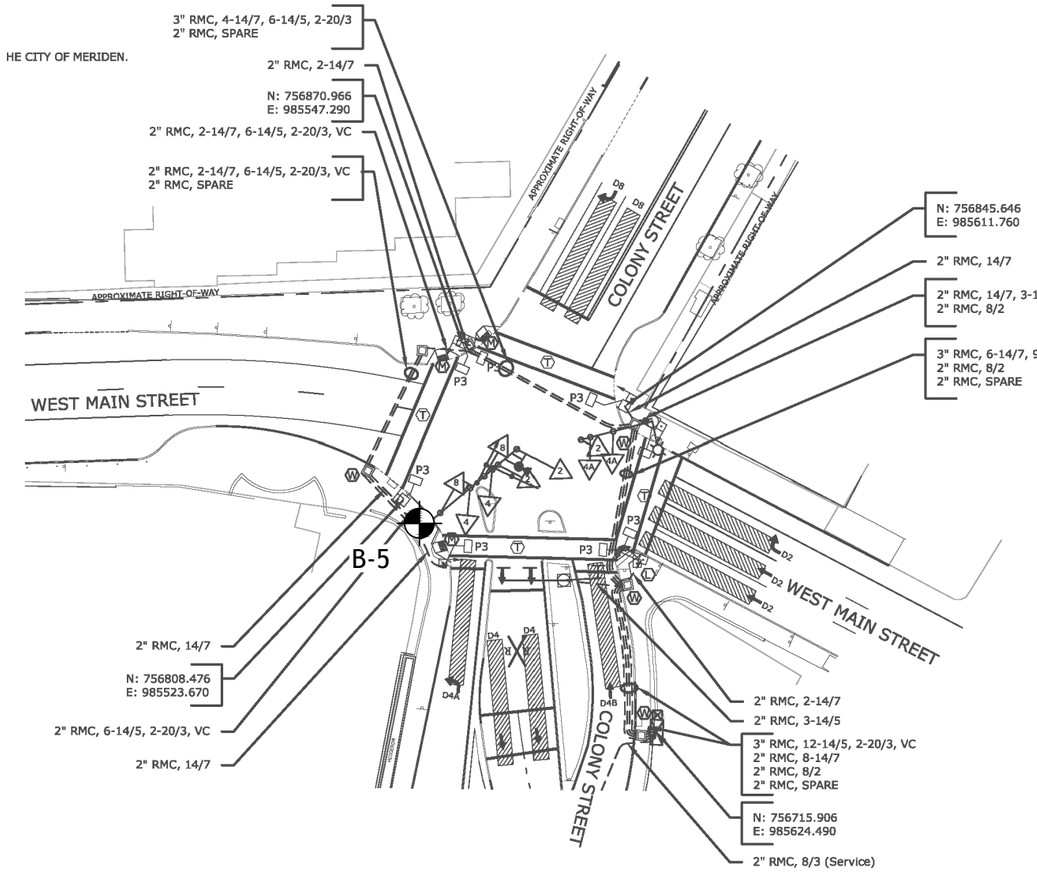
No.	Date	Description
–	–	–

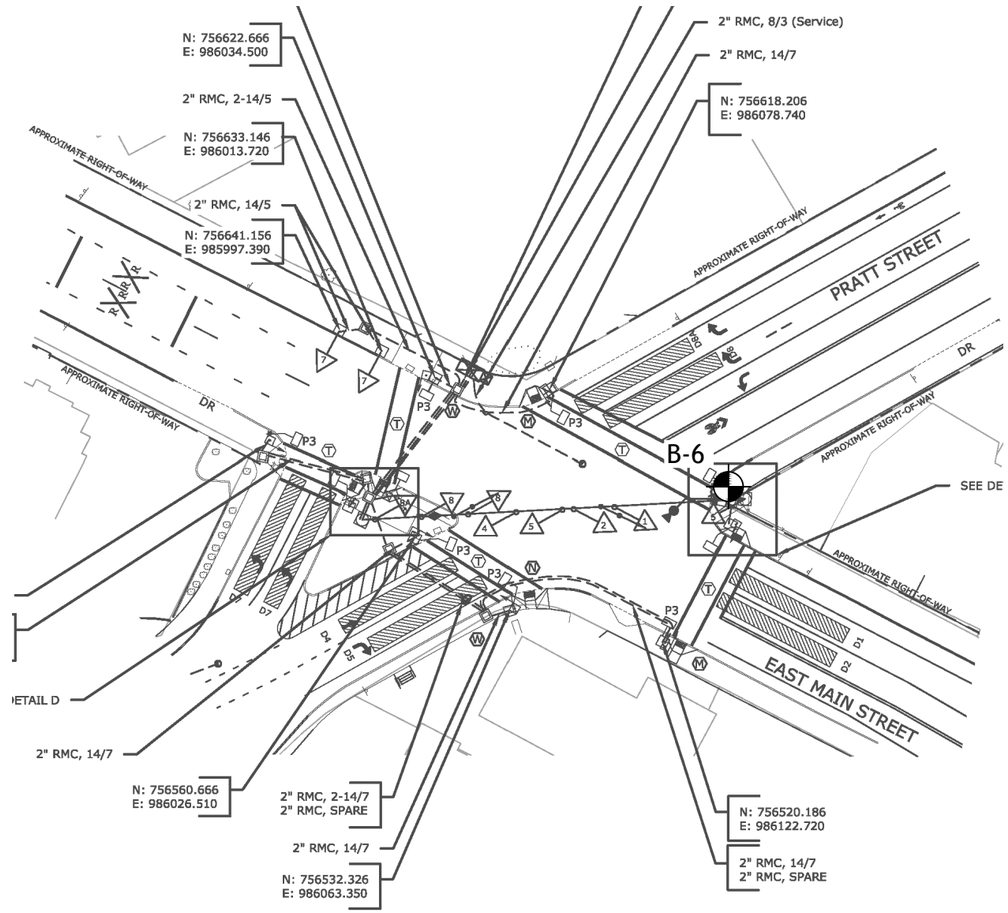
REVISIONS

DRAWN:	T.T.
CHECKED:	A.M.
APPROVED:	N.W.
SCALE:	1"=60'
PROJECT NO.:	2018–0108
DATE:	12/03/2019

SHEET NO.

FIGURE 2B





LEGEND:

B-1 TEST BORING

NOTES:
1. BASE PLAN PROVIDED CDM SMITH, INC.
2. EXPLORATION LOCATIONS WERE TAPED FROM EXISTING SITE FEATURES AND ARE APPROXIMATE
3. REFER TO THE TEXT AND APPENDICES FOR ADDITIONAL INFORMATION

GRAPHIC SCALE
60 30 0 60
SCALE IN FEET

SUBSURFACE EXPLORATION LOCATION PLAN

TOWN OF MERIDEN TOD TRAFFIC SIGNAL UPGRADES
MERIDEN, CONNECTICUT

FREEMAN COMPANIES
LAND DEVELOPMENT | ENGINEERING DESIGN | CONSTRUCTION SERVICES
FREEMAN COMPANIES, LLC
36 JOHN STREET
HARTFORD, CT 06106
WWW.FREEMANCOS.COM
TEL:(860)251-9550
TOLL FREE:(800)604-5141
FAX:(860)986-7161
ELEVATE YOUR EXPECTATIONS

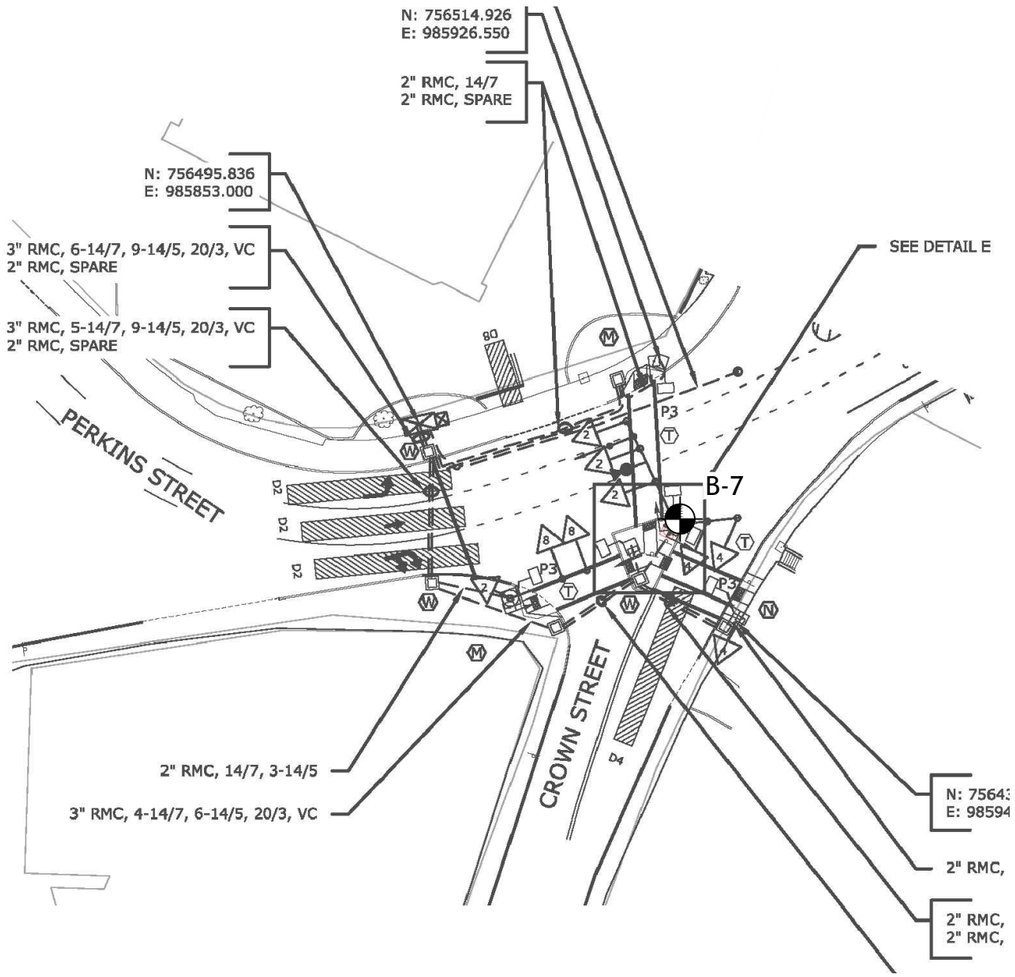
No.	Date	Description
–	–	–

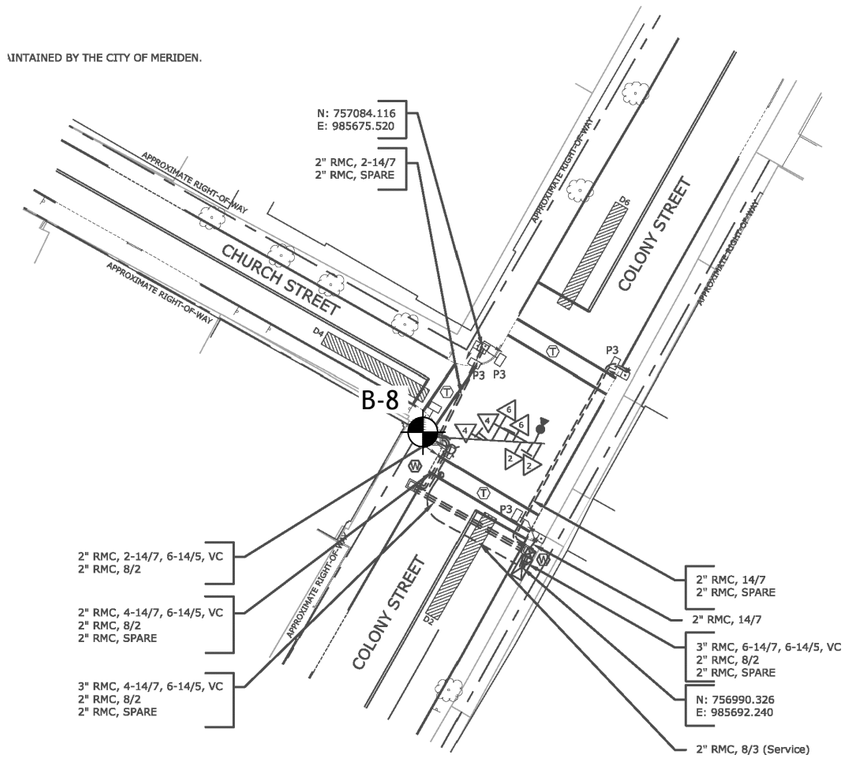
REVISIONS

DRAWN:	T.T.
CHECKED:	A.M.
APPROVED:	N.W.
SCALE:	1"=60'
PROJECT NO.:	2018–0108
DATE:	12/03/2019

SHEET NO.

FIGURE 2C





LEGEND:

B-1 TEST BORING

NOTES:
1. BASE PLAN PROVIDED CDM SMITH, INC.
2. EXPLORATION LOCATIONS WERE TAPED FROM EXISTING SITE FEATURES AND ARE APPROXIMATE
3. REFER TO THE TEXT AND APPENDICES FOR ADDITIONAL INFORMATION

GRAPHIC SCALE
60 30 0 60
SCALE IN FEET

SUBSURFACE EXPLORATION LOCATION PLAN

TOWN OF MERIDEN TOD TRAFFIC SIGNAL UPGRADES
MERIDEN, CONNECTICUT

FREEMAN COMPANIES
LAND DEVELOPMENT | ENGINEERING DESIGN | CONSTRUCTION SERVICES
FREEMAN COMPANIES, LLC
36 JOHN STREET
HARTFORD, CT 06106
WWW.FREEMANCOS.COM
TEL:(860)251-9550
TOLL FREE:(800)604-5141
FAX:(860)986-7161
ELEVATE YOUR EXPECTATIONS

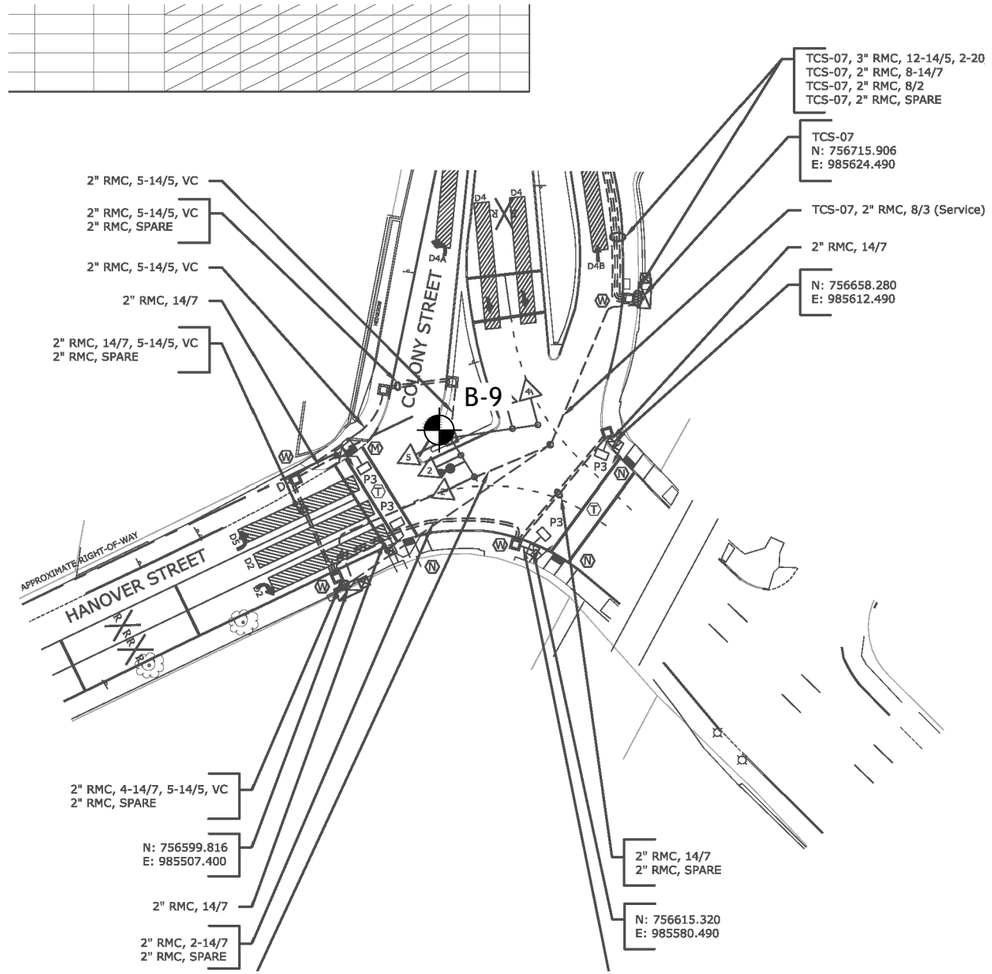
No.	Date	Description
–	–	–

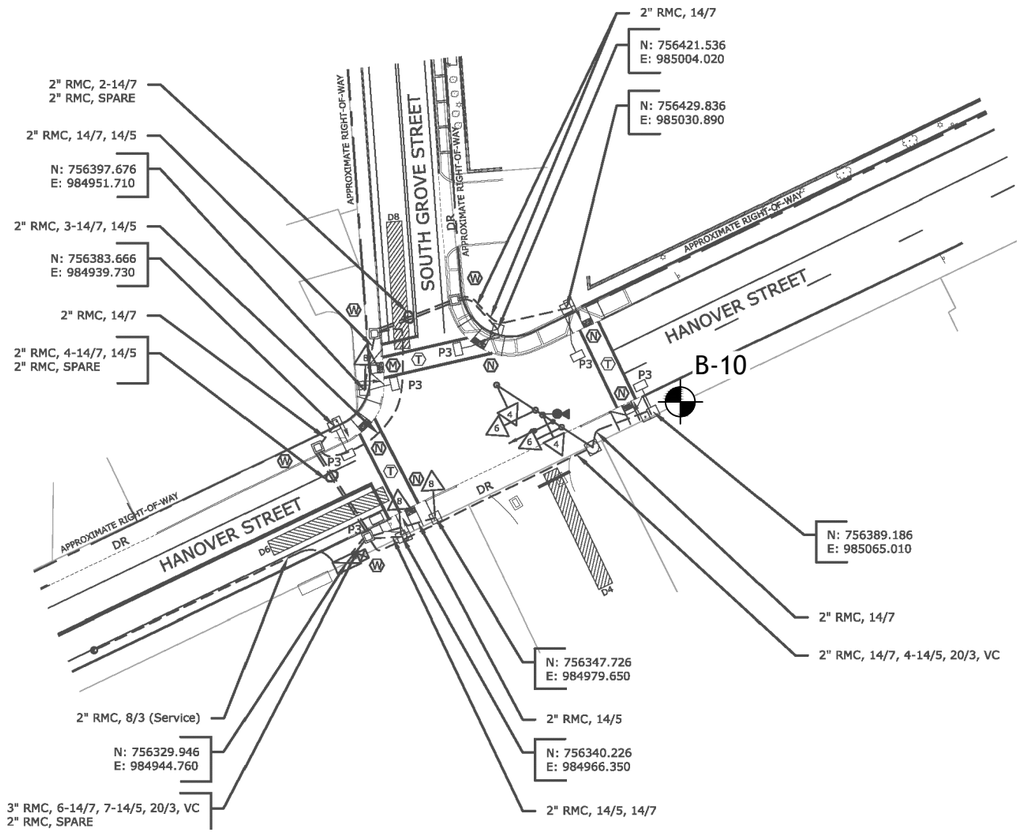
REVISIONS

DRAWN:	T.T.
CHECKED:	A.M.
APPROVED:	N.W.
SCALE:	1"=60'
PROJECT NO.:	2018–0108
DATE:	12/03/2019

SHEET NO.

FIGURE 2D





LEGEND:

B-1 TEST BORING

NOTES:

1. BASE PLAN PROVIDED CDM SMITH, INC.
2. EXPLORATION LOCATIONS WERE TAPED FROM EXISTING SITE FEATURES AND ARE APPROXIMATE
3. REFER TO THE TEXT AND APPENDICES FOR ADDITIONAL INFORMATION

GRAPHIC SCALE
60 30 0 60
SCALE IN FEET

SUBSURFACE EXPLORATION LOCATION PLAN

TOWN OF MERIDEN TOD TRAFFIC SIGNAL UPGRADES
MERIDEN, CONNECTICUT

FREEMAN COMPANIES
LAND DEVELOPMENT | ENGINEERING DESIGN | CONSTRUCTION SERVICES
FREEMAN COMPANIES, LLC
36 JOHN STREET
HARTFORD, CT 06106
WWW.FREEMANCOS.COM
TEL:(860)251-9550
TOLL FREE:(800)604-5141
FAX:(860)986-7161
ELEVATE YOUR EXPECTATIONS

No.	Date	Description
–	–	–

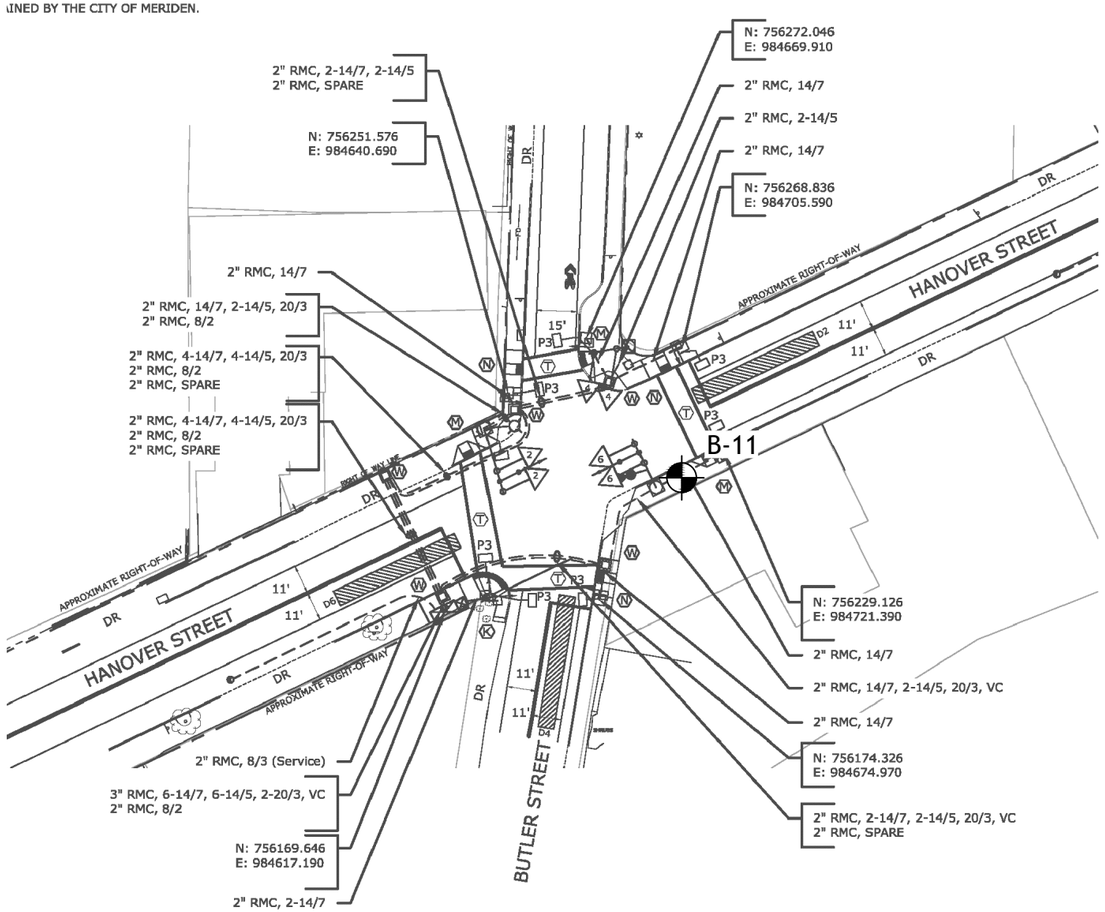
REVISIONS

DRAWN:	T.T.
CHECKED:	A.M.
APPROVED:	N.W.
SCALE:	1"=60'
PROJECT NO.:	2018–0108
DATE:	12/03/2019

SHEET NO.

FIGURE 2E

INED BY THE CITY OF MERIDEN.



LEGEND:

B-1 TEST BORING

NOTES:
1. BASE PLAN PROVIDED CDM SMITH, INC.
2. EXPLORATION LOCATIONS WERE TAPED FROM EXISTING SITE FEATURES AND ARE APPROXIMATE
3. REFER TO THE TEXT AND APPENDICES FOR ADDITIONAL INFORMATION

GRAPHIC SCALE
60 30 0 60
SCALE IN FEET

SUBSURFACE EXPLORATION LOCATION PLAN

TOWN OF MERIDEN TOD TRAFFIC SIGNAL UPGRADES
MERIDEN, CONNECTICUT

FREEMAN COMPANIES
LAND DEVELOPMENT | ENGINEERING DESIGN | CONSTRUCTION SERVICES
FREEMAN COMPANIES, LLC
36 JOHN STREET
HARTFORD, CT 06106
WWW.FREEMANCOS.COM
TEL:(860)251-9550
TOLL FREE:(800)604-5141
FAX:(860)986-7161
ELEVATE YOUR EXPECTATIONS

No.	Date	Description
–	–	–

REVISIONS

DRAWN:	T.T.
CHECKED:	A.M.
APPROVED:	N.W.
SCALE:	1"=60'
PROJECT NO.:	2018–0108
DATE:	12/03/2019

SHEET NO.

FIGURE 2F

APPENDIX A

TEST BORING LOGS

Driller: A. Mckerna	**Connecticut DOT Boring Report**		Hole No.: B-1
Inspector: T. Ta	Town: Meriden		Stat./Offset:
Engineer: Allison McCauliffe	Project No.: 2018-0108		Northing:
Start Date: 11-19-19	Route No.:		Easting:
Finish Date: 11-19-19	Bridge No.:		Surface Elevation: 149.0
Project Description: Town of Meriden TOD Signal Upgrades			
Casing Size/Type: 3.25" HSA	Sampler Type/Size: 1-3/8 inch ID		Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 Fall: 30in.		
Groundwater Observations: Not Encountered			

Depth (ft)	SAMPLES: Sample Type/No.	SAMPLES: Blows on Sampler per 6 inches	SAMPLES: Pen. (in.)	SAMPLES: Rec. (in.)	SAMPLES: RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0						Asphalt	Asphalt (3")	
	S-1	13 15 17 10	24	10		Fill	Gray c-f SAND, some m-f gravel, little silt, with brick	
							Gray c-f SAND, some m-f gravel, little silt	
	S-2	13 47 44 108	24	20		Glacial Till	Red brown c-f SAND, some silt	145
5	S-3	100/4"	4	4			Red brown f SAND, some silt, trace f gravel	
								140
10	S-4	100/5"	5	5			Red brown f SAND, some silt, trace f gravel	
								135
15	S-5	100/2"	2	2			Red brown f SAND, some silt, trace f gravel	
							Dramatically slower drilling rate, pieces of gravel observed in cuttings	
						Weathered Rock		130
20	S-6	100/2"	2	2			Weathered bedrock	
							END OF BORING 20.2ft	
								125
25								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 17ft Rock: 3.2ft No. of Soil Samples: 6 No. of Core Runs: ---	NOTES:	Sheet 1 of 1 SM-001-M REV. 1/02

Driller: A. Mckerna	**Connecticut DOT Boring Report**	Hole No.: B-2
Inspector: T. Ta	Town: Meriden	Stat./Offset:
Engineer: Allison McCauliffe	Project No.: 2018-0108	Northing:
Start Date: 11-19-19	Route No.:	Easting:
Finish Date: 11-19-19	Bridge No.:	Surface Elevation: 119.5
Project Description: Town of Meriden TOD Signal Upgrades		
Casing Size/Type: 3.25" HSA	Sampler Type/Size: 1-3/8 inch ID	Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 Fall: 30in.	
Groundwater Observations: @7.0 ATD		

Depth (ft)	SAMPLES: Sample Type/No.	SAMPLES: Blows on Sampler per 6 inches	SAMPLES: Pen. (in.)	SAMPLES: Rec. (in.)	SAMPLES: RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0						Concrete	Concrete (4")	
	S-1	9 10 11 12	24	10		Fill	Gray to brown c-f SAND, little m-f gravel, little silt, with red gravel	
	S-2	2 1 1 2	24	4			Gray to brown c-f SAND, some silt, little m-f gravel	115
5							Gray brown c-f SAND, little silt, trace m-f gravel	
	S-3	2 4 3 2	24	18		Organic Silt	Dark gray SILT, some f sand, with organic fibers	
	S-4	8 8 11 10	24	16			Dark gray SILT, little f sand, with organic fibers	
						Glaciofluvial	Red brown c-f SAND, little m-f gravel, little silt, intermixed with gray c-f sand	110
10	S-5	8 10 15 17	24	22			Brown c-f SAND, little silt	
								105
15						Lacustrine		
	S-6	9 9 14 17	24	14			Brown SILT, little f sand	
								100
20	S-7	8 11 15 16	24	20			Brown SILT, little f sand	
	S-8	9 10 14 14	24	22			Brown SILT	95
25							END OF BORING 25ft	

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in	NOTES:	Sheet
Earth: 25ft Rock: ft		1 of 1
No. of Soil Samples: 8 No. of Core Runs: ---		SM-001-M REV. 1/02

Driller: A. Mckerna	**Connecticut DOT Boring Report**		Hole No.: B-3
Inspector: T. Ta	Town: Meriden		Stat./Offset:
Engineer: Allison McCauliffe	Project No.: 2018-0108		Northing:
Start Date: 11-22-19	Route No.:		Easting:
Finish Date: 11-22-19	Bridge No.:		Surface Elevation: 136.75
Project Description: Town of Meriden TOD Signal Upgrades			
Casing Size/Type: 3.25" HSA	Sampler Type/Size: 1-3/8 inch ID		Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 Fall: 30in.		
Groundwater Observations: @8.0 ATD			

Depth (ft)	SAMPLES: Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0						Concrete	Concrete (4")	
	S-1	11 21 19 4	24	12		Base	Gray c-f SAND, some c-f gravel, trace silt, Gravel Base (8")	
						Fill	Brown c-f SAND, little c-f gravel, little silt, with brick	135
	S-2	16 21 22 39	24	10			Brown c-f SAND, little c-f gravel, little silt, with concrete and bricks	
5								
	S-3	9 6 8 11	24	18			Brown c-f SAND, little c-f gravel, little silt	
						Glaciofluvial	Brown c-f SAND, little m-f gravel, little silt	130
	S-4	14 16 15 16	24	18			Brown c-f SAND, little m-f gravel, little silt	
						Lacustrine	Brown SILT, trace f-sand	
10								
	S-5	10 12 9 13	24	16			Brown SILT, trace f-sand	
								125
15								
	S-6	4 4 5 9	24	20			Brown SILT, trace f-sand	
								120
20								
	S-7	6 9 10 11	24	22			Brown SILT, trace f-sand	
								115
	S-8	6 8 9 13	24	22			Brown SILT, trace f-sand	
25								
							END OF BORING 25ft	110

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 25ft Rock: ft	NOTES:	Sheet 1 of 1
No. of Soil Samples: 8 No. of Core Runs: ---		SM-001-M REV. 1/02

Driller: A. Mckerna	**Connecticut DOT Boring Report**		Hole No.: B-4
Inspector: T. Ta	Town: Meriden		Stat./Offset:
Engineer: Allison McCauliffe	Project No.: 2018-0108		Northing:
Start Date: 11-19-19	Route No.:		Easting:
Finish Date: 11-19-19	Bridge No.:		Surface Elevation: 133.5
Project Description: Town of Meriden TOD Signal Upgrades			
Casing Size/Type: 3.25" HSA	Sampler Type/Size: 1-3/8 inch ID		Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 Fall: 30in.		
Groundwater Observations: @7.0 ATD			

Depth (ft)	SAMPLES: Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0						Asphalt	Asphalt (3")	
	S-1	10 5 2 2	24	8		Fill	Gray c-f SAND, some m-f gravel, little silt	
	S-2	2 2 2 2	24	8			Gray c-f SAND, some m-f gravel, little silt	130
5	S-3	4 4 4 6	24	4			Gray to brown c-f SAND, some m-f gravel, little silt	
	S-4	7 8 6 9	24	16		Lacustrine	Brown f SAND, and silt Brown f SAND, and silt, 3" layer of c-f sand with dark brown lenses	125
10	S-5	6 5 3 5	24	22			Brown SILT, trace f-sand	
								120
15	S-6	4 2 2 5	24	22			Brown SILT, trace f-sand	
								115
20	S-7	5 9 10 9	24	22			Brown SILT, trace f-sand	
	S-8	9 11 13 14	24	22			Brown SILT, trace f-sand, trace f-gravel towards upper portion of sample	110
25							END OF BORING 25ft	

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 25ft Rock: ft	NOTES:	Sheet 1 of 1
No. of Soil Samples: 8 No. of Core Runs: ---		SM-001-M REV. 1/02

Driller: A. Mckerna	**Connecticut DOT Boring Report**		Hole No.: B-5
Inspector: T. Ta	Town: Meriden		Stat./Offset:
Engineer: Allison McCauliffe	Project No.: 2018-0108		Northing:
Start Date: 11-20-19	Route No.:		Easting:
Finish Date: 11-20-19	Bridge No.:		Surface Elevation: 130.0
Project Description: Town of Meriden TOD Signal Upgrades			
Casing Size/Type: 3.25" HSA	Sampler Type/Size: 1-3/8 inch ID		Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 Fall: 30in.		
Groundwater Observations: @6 ATD			

Depth (ft)	SAMPLES: Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0						Asphalt	Asphalt (3")	130
						Base	Gravel Base (6")	
						Fill	Auger kept walking lifting up the pavement patch, had to break asphalt and drill down.	
	S-1	5 4 6 6	24	8			Brown c-f SAND, some m-f gravel, little silt	
	S-2	6 8 6 7	24	1			Brown c-f SAND, some m-f gravel, little silt, gravel lodged at tip	
5								125
	S-3	8 8 8 8	24	16		Lacustrine	Brown c-f SAND, little m-f gravel, little silt Brown c-f SAND, little silt	
	S-4	6 8 8 8	24	20			Brown f SAND, some silt	
10								120
	S-5	3 2 2 3	24	22			Brown f SAND, and silt	
15								115
	S-6	4 6 8 8	24	22			Brown SILT	
20								110
	S-7	6 6 6 8	24	22			Brown SILT	
	S-8	6 8 8 8	24	22			Brown SILT	
25								105
							END OF BORING 25ft	

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 25ft Rock: ft No. of Soil Samples: 8 No. of Core Runs: ---	NOTES:	Sheet 1 of 1 SM-001-M REV. 1/02

Driller: M. St. John	**Connecticut DOT Boring Report**	Hole No.: B-6
Inspector: T. Ta	Town: Meriden	Stat./Offset:
Engineer: Allison McCauliffe	Project No.: 2018-0108	Northing:
Start Date: 11-25-19	Route No.:	Easting:
Finish Date: 11-25-19	Bridge No.:	Surface Elevation: 128.25
Project Description: Town of Meriden TOD Signal Upgrades		
Casing Size/Type: 3.25" HSA	Sampler Type/Size: 1-3/8 inch ID	Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 Fall: 30in.	
Groundwater Observations: @12.0 ATD		

Depth (ft)	SAMPLES: Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0						Concrete	Concrete (8")	
						Base	Gray c-f SAND, some c-f gravel, little silt, (gravel base 8")	
	S-1	4 5 13 10	24	10		Fill	Brown c-f SAND, little c-f gravel, little silt	
								125
	S-2	6 7 7 14	24				Brown c-f SAND, little c-f gravel, little silt	
5							Brown c-f SAND, some silt	
	S-3	3 27 33 16	24	14			Brown c-f SAND, some c-f gravel, little silt	
	S-4	3 2 3 17	24	14		Organics	Dark brown black SILT, with organic fibers	
								120
						Glaciofluvial	Brown c-f SAND, little m-f gravel, little silt	
10	S-5	15 18 12 14	24	8			Brown c-f SAND, some c-f gravel, some silt	
								115
15								
	S-6	21 25 33 27	24	4			Brown c-f SAND, little f gravel, little silt	
								110
20								
	S-7	14 15 30 28	24	24			Brown c-f SAND, little f gravel, trace silt	
								105
	S-8	23 24 28 27	24	24			Brown c-f SAND, little f gravel, trace silt	
25							END OF BORING 25ft	

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 25ft Rock: ft	NOTES:	Sheet 1 of 1
No. of Soil Samples: 8 No. of Core Runs: ---		SM-001-M REV. 1/02

Driller: M. St. John	**Connecticut DOT Boring Report**	Hole No.: B-7
Inspector: T. Ta	Town: Meriden	Stat./Offset:
Engineer: Allison McCauliffe	Project No.: 2018-0108	Northing:
Start Date: 11-25-19	Route No.:	Easting:
Finish Date: 11-25-19	Bridge No.:	Surface Elevation: 130.5
Project Description: Town of Meriden TOD Signal Upgrades		
Casing Size/Type: 3.25" HSA	Sampler Type/Size: 1-3/8 inch ID	Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 Fall: 30in.	
Groundwater Observations: @14.0 ATD		

Depth (ft)	SAMPLES: Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0	S-1	3 3 10 12	24	14		Topsoil	Topsoil (3")	130
						Fill	Brown c-f SAND, little f gravel, little silt	
	S-2	10 6 6 7	24	18			Brown c-f SAND, little c-f gravel, little silt, with asphalt	
							Brown c-f SAND, little c-f gravel, little silt	
						Glaciofluvial	Brown c-f SAND, little f gravel, trace silt	
5	S-3	7 8 12 16	24	20			Red brown c-f SAND, little f gravel, trace silt	125
	S-4	14 14 14 30	24	16			Red brown c-f SAND, some silt, little m-f gravel	
						Glacial Till		
10	S-5	10 10 17 18	24	18			Red brown c-f SAND, some silt, little m-f gravel	120
15	S-6	22 31 36 32	24	12			Red brown c-f SAND, some silt, trace m-f gravel	115
20	S-7	100/3"	3	2			Red brown c-f SAND, some silt, little m-f gravel	110
							END OF BORING 20.3ft	
25								105

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 20.3ft Rock: ft	NOTES:	Sheet 1 of 1
No. of Soil Samples: 7 No. of Core Runs: ---		SM-001-M REV. 1/02

Driller: A. Mckerna	**Connecticut DOT Boring Report**		Hole No.: B-8
Inspector: T. Ta	Town: Meriden		Stat./Offset:
Engineer: Allison McCauliffe	Project No.: 2018-0108		Northing:
Start Date: 11-20-19	Route No.:		Easting:
Finish Date: 11-20-19	Bridge No.:		Surface Elevation: 134.5
Project Description: Town of Meriden TOD Signal Upgrades			
Casing Size/Type: 3.25" HSA	Sampler Type/Size: 1-3/8 inch ID		Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 Fall: 30in.		
Groundwater Observations: @9.0 ATD			

Depth (ft)	SAMPLES: Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0	S-1	15 14 7 5	24	10		Concrete / Base / Fill	Concrete (4") Gravel Base (6") Brown to black c-f SAND, little c-f gravel, little silt, with coal and brick	
	S-2	5 7 6 4	24	10			Dark brown c-f SAND, little silt, with brick	
5	S-3	18 13 9 9	24	16		Glaciofluvial	Brown c-f SAND, little m-f gravel, little silt	130
	S-4	13 11 9 8	24	16			Brown c-f SAND, little silt Brown f SAND, some silt, 1" pockets of sand trace silt (wet at tip of spoon)	
10	S-5	6 7 6 8	24	16		Lacustrine	Brown CLAY, trace f-sand	125
15	S-6	6 8 7 12	24	18			Brown CLAY, trace f-sand	120
20	S-7	14 14 19 15	24	18			Brown CLAY, trace f-sand	115
	S-8	14 14 14 13	24	20			Brown CLAY, trace f-sand	110
25							END OF BORING 25ft	

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 25ft Rock: ft	NOTES:	Sheet 1 of 1
No. of Soil Samples: 8 No. of Core Runs: ---		SM-001-M REV. 1/02

Driller: A. Mckerna	**Connecticut DOT Boring Report**	Hole No.: B-9
Inspector: T. Ta	Town: Meriden	Stat./Offset:
Engineer: Allison McCauliffe	Project No.: 2018-0108	Northing:
Start Date: 11-20-19	Route No.:	Easting:
Finish Date: 11-20-19	Bridge No.:	Surface Elevation: 124.5
Project Description: Town of Meriden TOD Signal Upgrades		
Casing Size/Type: 3.25" HSA	Sampler Type/Size: 1-3/8 inch ID	Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 Fall: 30in.	
Groundwater Observations: @10.0 ATD		

Depth (ft)	SAMPLES: Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0	S-1	5 8 8 7	24	8		Fill	(Removed brick pavers) Brown to gray c-f SAND, some m-f gravel, little silt	
	S-2	8 10 15 26	24	12			Brown to gray c-f SAND, some c-f gravel, little silt, with brick	
5	S-3	21 8 5 3	24	16			Brown to dark brown c-f SAND, little c-f gravel, little silt, with brick	120
	S-4	10 8 5 5	24	14			Brown c-f SAND, little c-f gravel, some silt Dark brown f SAND, and silt, with decomposed wood	
10	S-5	4 2 6 5	24	18		Glaciofluvial	Brown to dark brown c-f SAND, some silt, little m-f gravel, with organic fibers and decomposed wood Brown c-f SAND, some m-f gravel, little silt	115
15	S-6	8 21 19 31	24	18		Lacustrine	Brown c-f SAND, some c-f gravel, little silt Brown f SAND, some silt	110
20	S-7	8 10 13 10	24	22			Brown CLAY, trace f-sand	105
	S-8	7 18 13 15	24	22			Brown CLAY, trace f-sand	
25							END OF BORING 25ft	100

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 25ft Rock: ft	NOTES:	Sheet 1 of 1
No. of Soil Samples: 8 No. of Core Runs: ---		SM-001-M REV. 1/02

Driller: A. Mckerna	**Connecticut DOT Boring Report**		Hole No.: B-10
Inspector: T. Ta	Town: Meriden		Stat./Offset:
Engineer: Allison McCauliffe	Project No.: 2018-0108		Northing:
Start Date: 11-21-19	Route No.:		Easting:
Finish Date: 11-21-19	Bridge No.:		Surface Elevation: 119.0
Project Description: Town of Meriden TOD Signal Upgrades			
Casing Size/Type: 3.25" HSA	Sampler Type/Size: 1-3/8 inch ID		Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 Fall: 30in.		
Groundwater Observations: @7.0 ATD			

Depth (ft)	SAMPLES: Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0						Topsoil	Topsoil (3")	
						Fill	Hand dug to 4ft to clear utilities. Augered to 5ft to make hole straight.	
							Brown to dark brown c-f SAND, little c-f gravel, little silt, (observed from hand dug cuttings)	115
5	S-1	3 8 18 20	24	18			Brown c-f SAND, little c-f gravel, little silt	
						Glaciofluvial	Brown c-f SAND, little silt	
	S-2	24 28 25 18	24	18			Brown c-f SAND, some c-f gravel, little silt	
								110
10	S-3	6 2 9 17	24	10			Brown c-f SAND, little silt	
						Lacustrine	Brown SILT, little f sand	
								105
15	S-4	6 8 9 11	24	16			Brown CLAY varved with silt	
								100
20	S-5	4 8 11 13	24	22			Brown CLAY varved with silt	
	S-6	7 6 11 12	24	22			Brown CLAY varved with silt	95
25							END OF BORING 25ft	

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 25ft Rock: ft No. of Soil Samples: 6 No. of Core Runs: ---	NOTES:	Sheet 1 of 1 SM-001-M REV. 1/02

Driller: A. Mckerna	**Connecticut DOT Boring Report**		Hole No.: B-11
Inspector: T. Ta	Town: Meriden		Stat./Offset:
Engineer: Allison McCauliffe	Project No.: 2018-0108		Northing:
Start Date: 11-22-19	Route No.:		Easting:
Finish Date: 11-22-19	Bridge No.:		Surface Elevation: 119.0
Project Description: Town of Meriden TOD Signal Upgrades			
Casing Size/Type: 3.25" HSA	Sampler Type/Size: 1-3/8 inch ID		Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 Fall: 30in.		
Groundwater Observations: @4.0 ATD			

Depth (ft)	SAMPLES: Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0						Concrete	Concrete (4")	
	S-1	14 14 10 7	24	10		Base	Gray c-f SAND, little c-f gravel, little silt, Gravel Base (8")	
						Fill	Brown to black c-f SAND, little c-f gravel, little silt, with cinder	
	S-2	7 6 5 5	24	12			Brown c-f SAND, little c-f gravel, little silt	
							Brown f SAND, some silt, (very moist)	115
5						Glaciofluvial		
	S-3	3 4 7 8	24	18			Brown f SAND and SILT	
							Brown c-f SAND and SILT, little m-f gravel	
	S-4	6 4 5 9	24	10			Brown to dark brown c-f SAND, little m-f gravel, little silt, organic fibers at 8.5ft	
								110
10						Lacustrine		
	S-5	15 17 15 18	24	20			Brown SILT, trace f sand	
								105
15								
	S-6	3 8 8 14	24	20			Brown SILT, trace f sand, 2" pockets of c-f sand	
								100
20								
	S-7	3 15 6 7	24	20			Brown SILT, trace f sand	
	S-8	5 7 7 8	24	22			Brown SILT, trace f sand	95
25							END OF BORING 25ft	

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 25ft Rock: ft No. of Soil Samples: 8 No. of Core Runs: ---	NOTES:	Sheet 1 of 1 SM-001-M REV. 1/02

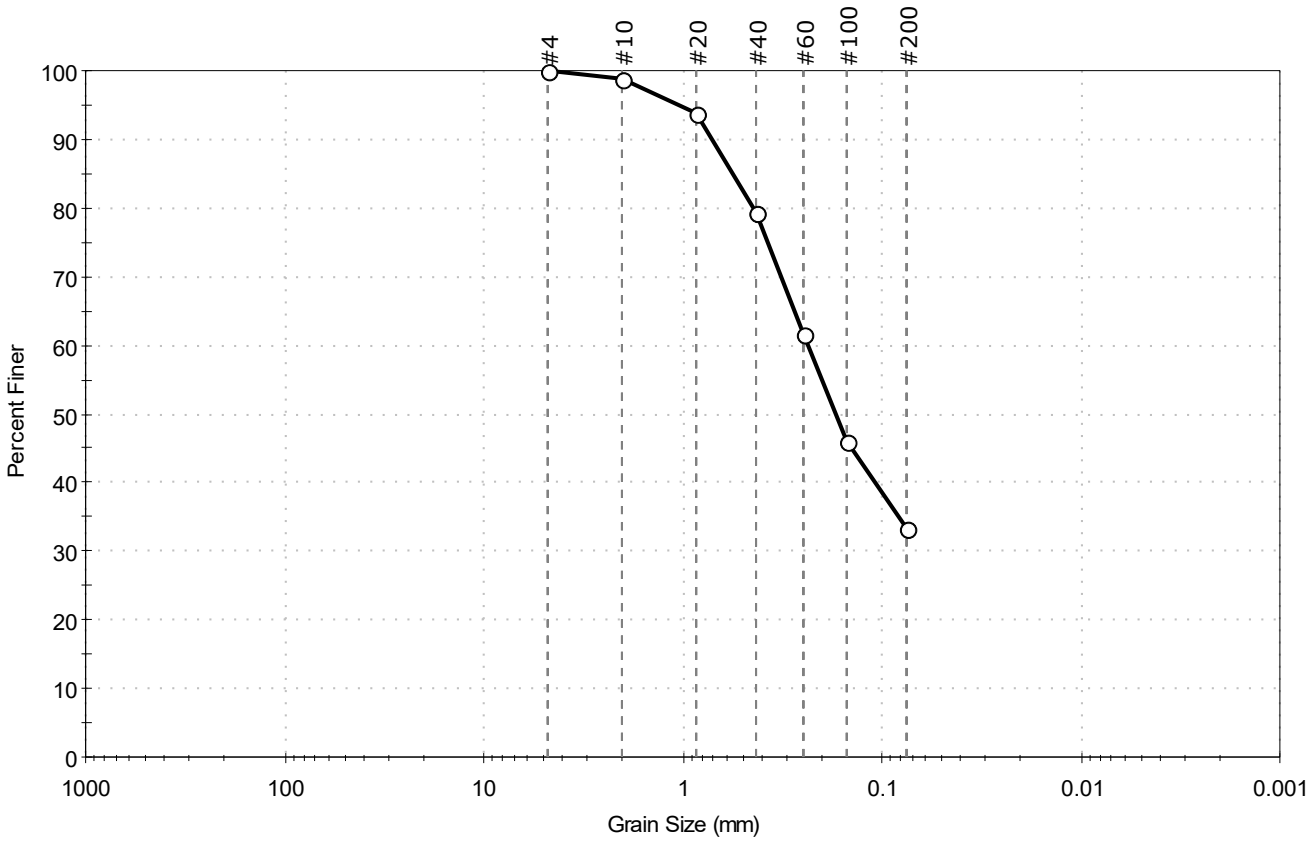
APPENDIX B

RESULTS OF LABORATORY TESTING

GeoTesting EXPRESS

Client:	Freeman Companies, LLC				
Project:	City of Meriden TOD Signal Upgrades				
Location:	Meriden, CT			Project No:	GTX-311005
Boring ID:	B-1	Sample Type:	bag	Tested By:	ckg
Sample ID:	S2	Test Date:	12/05/19	Checked By:	bfs
Depth :	2.5-4.5	Test Id:	532851		
Test Comment:	---				
Visual Description:	Moist, reddish brown silty sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
--	0.0	66.7	33.3

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	99		
#20	0.85	94		
#40	0.42	79		
#60	0.25	62		
#100	0.15	46		
#200	0.075	33		

Coefficients

D_{85} = 0.5568 mm D_{30} = N/A
D_{60} = 0.2359 mm D_{15} = N/A
D_{50} = 0.1701 mm D_{10} = N/A
C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO Silty Gravel and Sand (A-2-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ---

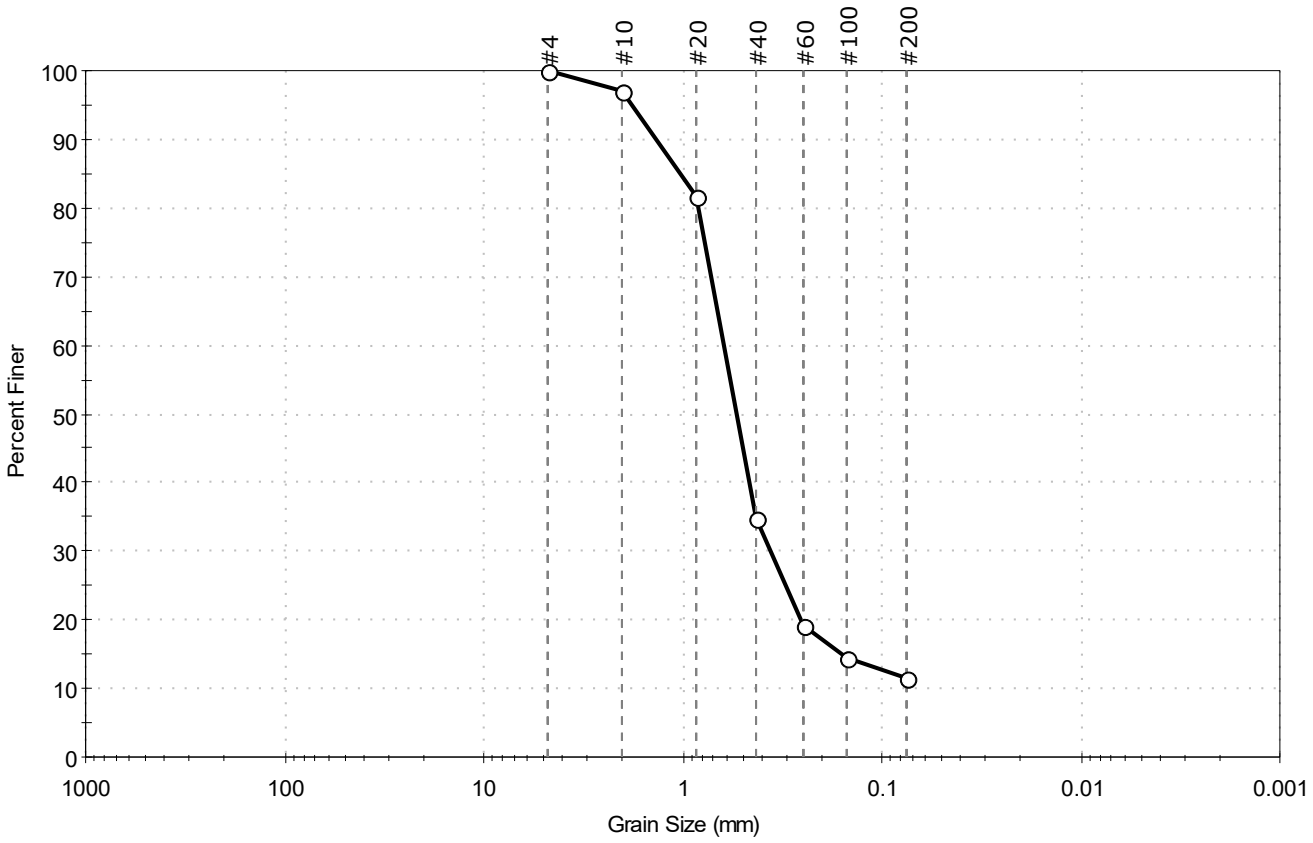
Sand/Gravel Hardness : ---

printed 12/13/2019 10:12:30 AM

GeoTesting EXPRESS

Client:	Freeman Companies, LLC				
Project:	City of Meriden TOD Signal Upgrades				
Location:	Meriden, CT			Project No:	GTX-311005
Boring ID:	B-2	Sample Type:	bag	Tested By:	ckg
Sample ID:	S5	Test Date:	12/05/19	Checked By:	bfs
Depth :	10-12	Test Id:	532860		
Test Comment:	---				
Visual Description:	Moist, reddish brown sand with silt				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.0	88.4	11.6

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	97		
#20	0.85	82		
#40	0.42	35		
#60	0.25	19		
#100	0.15	15		
#200	0.075	12		

Coefficients

D_{85} = 1.0193 mm	D_{30} = 0.3620 mm
D_{60} = 0.6169 mm	D_{15} = 0.1583 mm
D_{50} = 0.5324 mm	D_{10} = N/A
C_u = N/A	C_c = N/A

Classification

ASTM N/A

AASHTO Stone Fragments, Gravel and Sand (A-1-b (0))

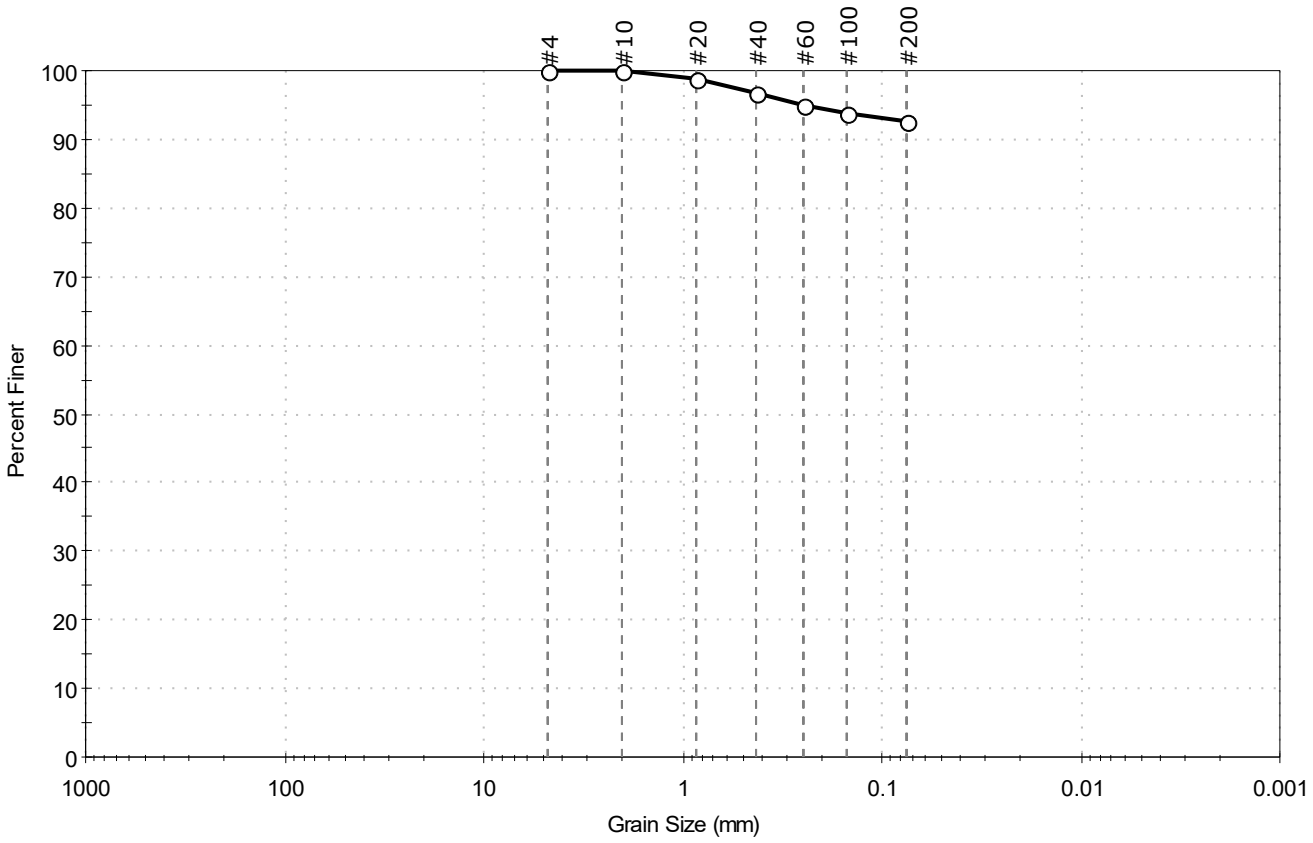
Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

Client:	Freeman Companies, LLC				
Project:	City of Meriden TOD Signal Upgrades				
Location:	Meriden, CT			Project No:	GTX-311005
Boring ID:	B-3	Sample Type:	bag	Tested By:	ckg
Sample ID:	S5	Test Date:	12/05/19	Checked By:	bfs
Depth :	10-12	Test Id:	532852		
Test Comment:	---				
Visual Description:	Moist, reddish brown clay				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
--	0.0	7.4	92.6

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	99		
#40	0.42	97		
#60	0.25	95		
#100	0.15	94		
#200	0.075	93		

Coefficients

D_{85} = N/A	D_{30} = N/A
D_{60} = N/A	D_{15} = N/A
D_{50} = N/A	D_{10} = N/A
C_u = N/A	C_c = N/A

Classification

ASTM N/A

AASHTO Silty Soils (A-4 (0))

Sample/Test Description

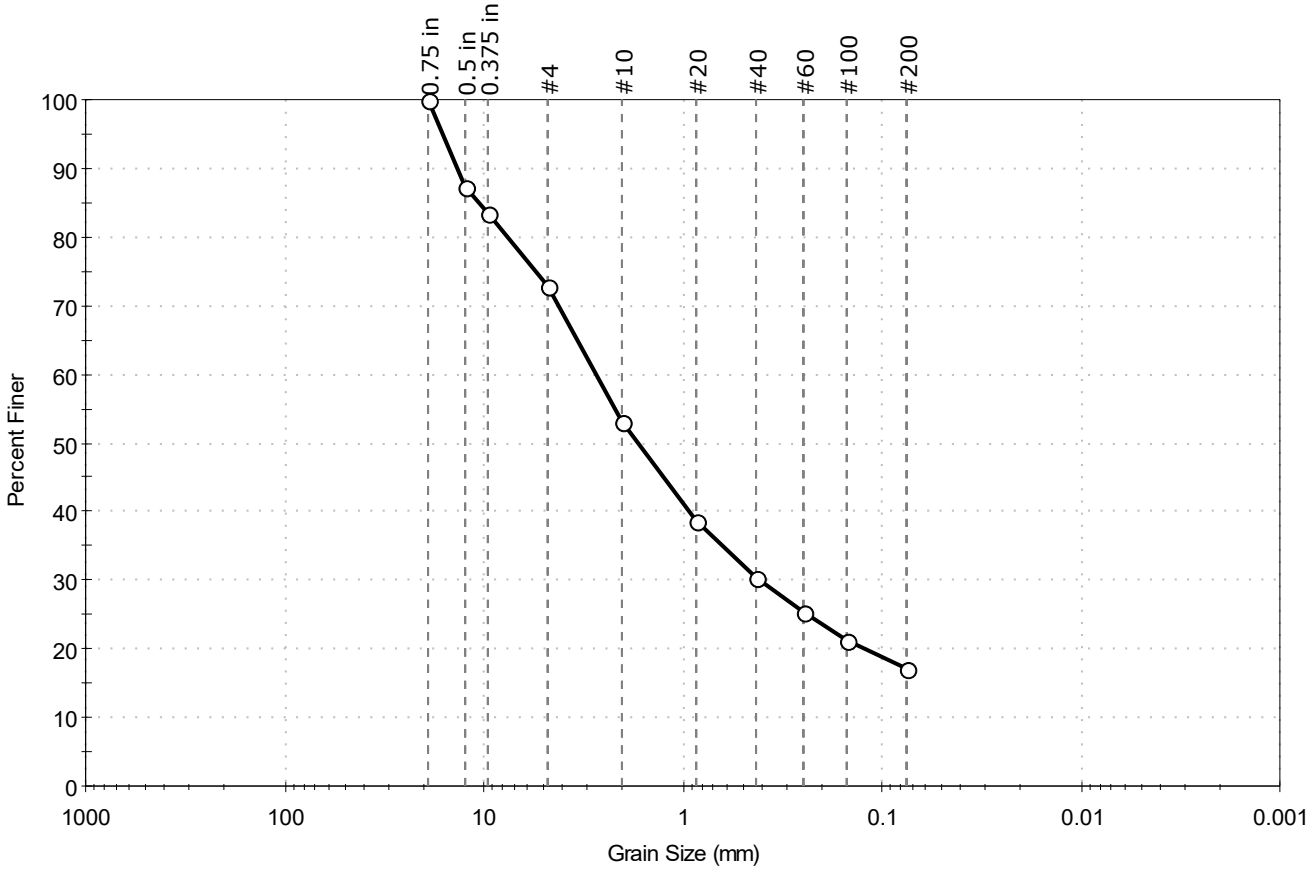
Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

printed 12/13/2019 10:12:32 AM

Client:	Freeman Companies, LLC				
Project:	City of Meriden TOD Signal Upgrades				
Location:	Meriden, CT			Project No:	GTX-311005
Boring ID:	B-4	Sample Type:	bag	Tested By:	ckg
Sample ID:	S2	Test Date:	12/05/19	Checked By:	bfs
Depth :	2.5-4.5	Test Id:	532859		
Test Comment:	---				
Visual Description:	Moist, olive brown silty sand with gravel				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	27.0	55.9	17.1

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.75 in	19.00	100		
0.5 in	12.50	87		
0.375 in	9.50	83		
#4	4.75	73		
#10	2.00	53		
#20	0.85	39		
#40	0.42	30		
#60	0.25	25		
#100	0.15	21		
#200	0.075	17		

Coefficients

D_{85} = 10.6201 mm D_{30} = 0.4119 mm

D_{60} = 2.7071 mm D_{15} = N/A

D_{50} = 1.6715 mm D_{10} = N/A

C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO Stone Fragments, Gravel and Sand (A-1-b (0))

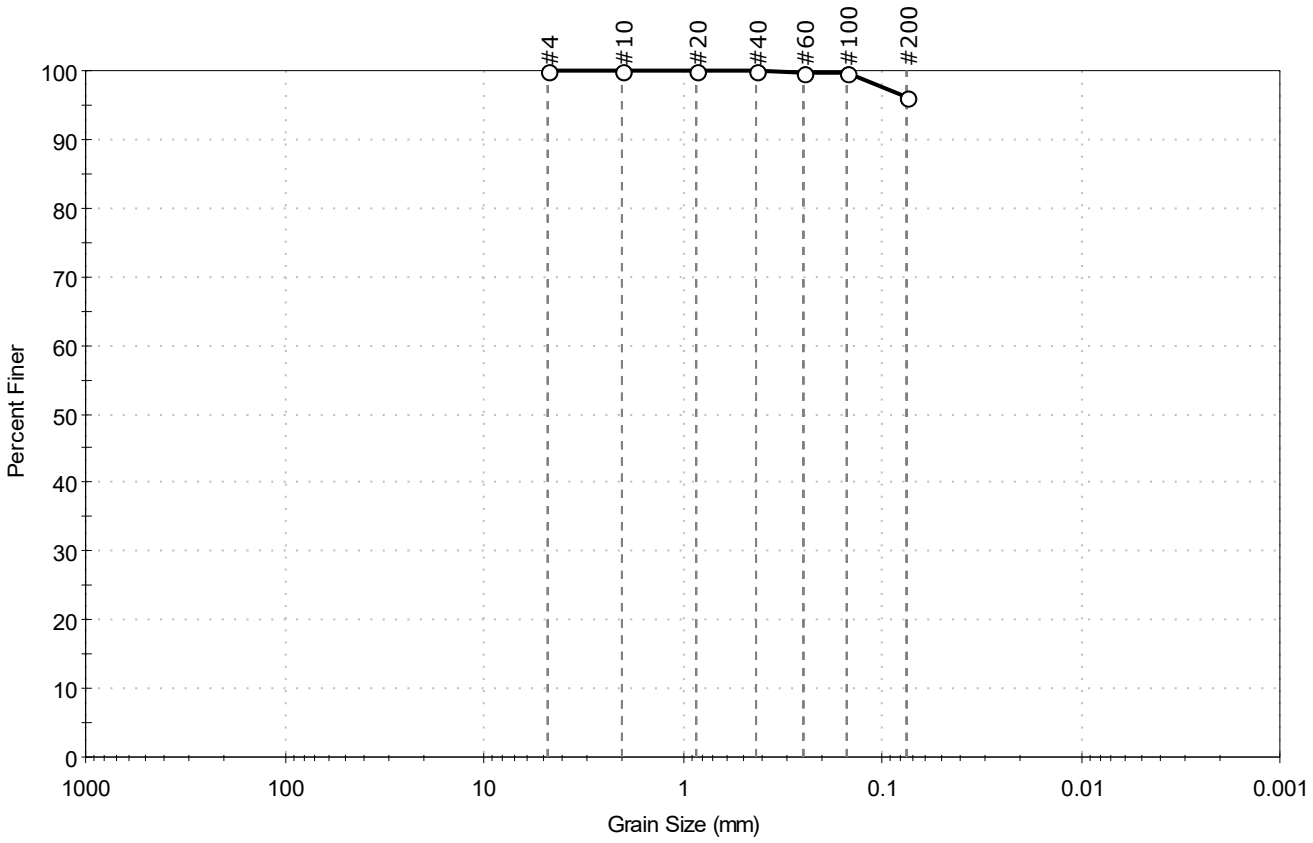
Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

Client:	Freeman Companies, LLC				
Project:	City of Meriden TOD Signal Upgrades				
Location:	Meriden, CT			Project No:	GTX-311005
Boring ID:	B-4	Sample Type:	bag	Tested By:	ckg
Sample ID:	S5	Test Date:	12/05/19	Checked By:	bfs
Depth :	10-12	Test Id:	532853		
Test Comment:	---				
Visual Description:	Moist, reddish brown clay				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
--	0.0	3.7	96.3

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	100		
#40	0.42	100		
#60	0.25	100		
#100	0.15	100		
#200	0.075	96		

Coefficients

D_{85} = N/A D_{30} = N/A

D_{60} = N/A D_{15} = N/A

D_{50} = N/A D_{10} = N/A

C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO Silty Soils (A-4 (0))

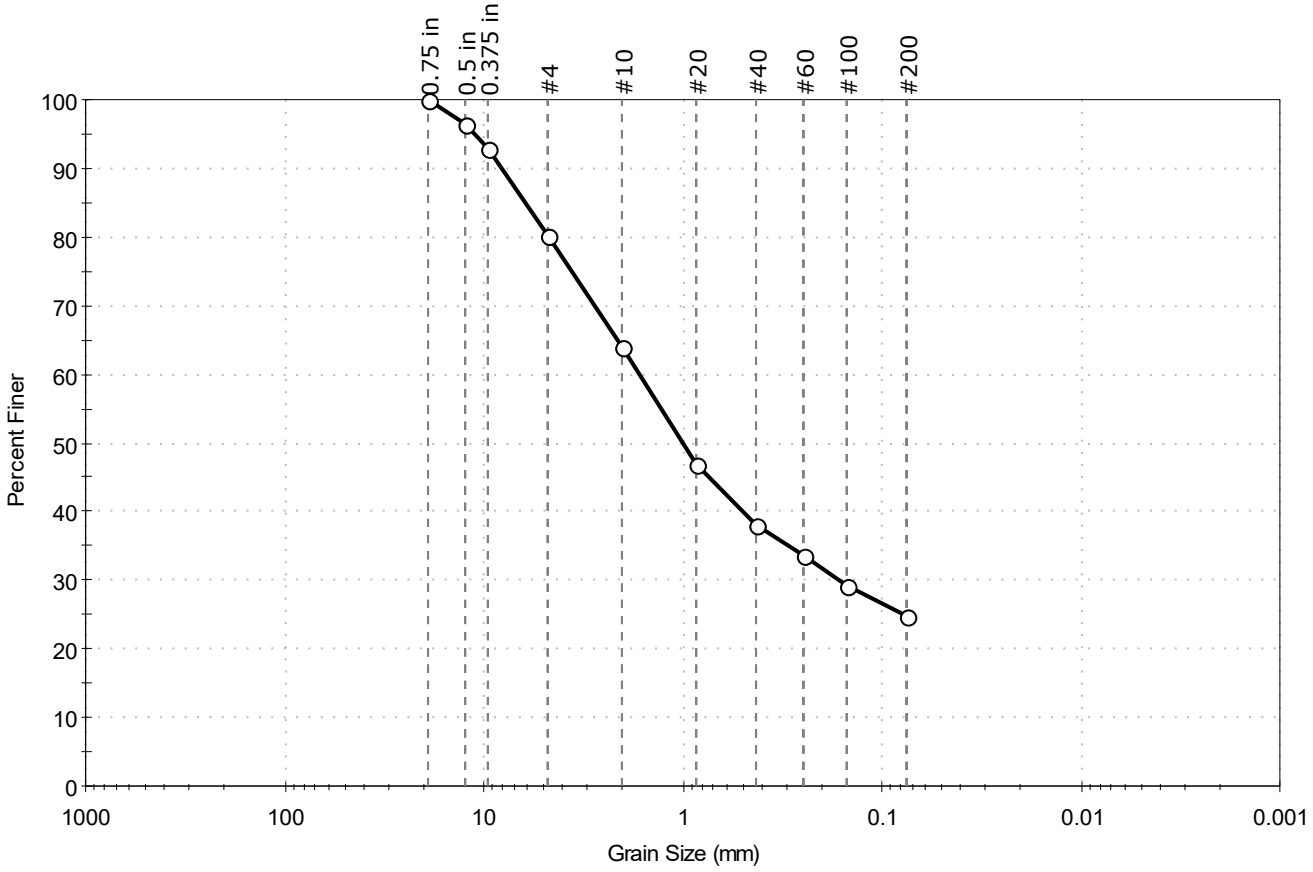
Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

Client:	Freeman Companies, LLC				
Project:	City of Meriden TOD Signal Upgrades				
Location:	Meriden, CT			Project No:	GTX-311005
Boring ID:	B-6	Sample Type:	bag	Tested By:	ckg
Sample ID:	S5	Test Date:	12/05/19	Checked By:	bfs
Depth :	10-12	Test Id:	532854		
Test Comment:	---				
Visual Description:	Moist, reddish brown silty sand with gravel				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
--	19.8	55.5	24.7

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.75 in	19.00	100		
0.5 in	12.50	96		
0.375 in	9.50	93		
#4	4.75	80		
#10	2.00	64		
#20	0.85	47		
#40	0.42	38		
#60	0.25	34		
#100	0.15	29		
#200	0.075	25		

Coefficients

D_{85} = 6.1847 mm
D_{30} = 0.1638 mm
D_{60} = 1.6364 mm
D_{15} = N/A
D_{50} = 0.9901 mm
D_{10} = N/A
C_u = N/A
C_c = N/A

Classification

ASTM N/A

AASHTO Stone Fragments, Gravel and Sand (A-1-b (0))

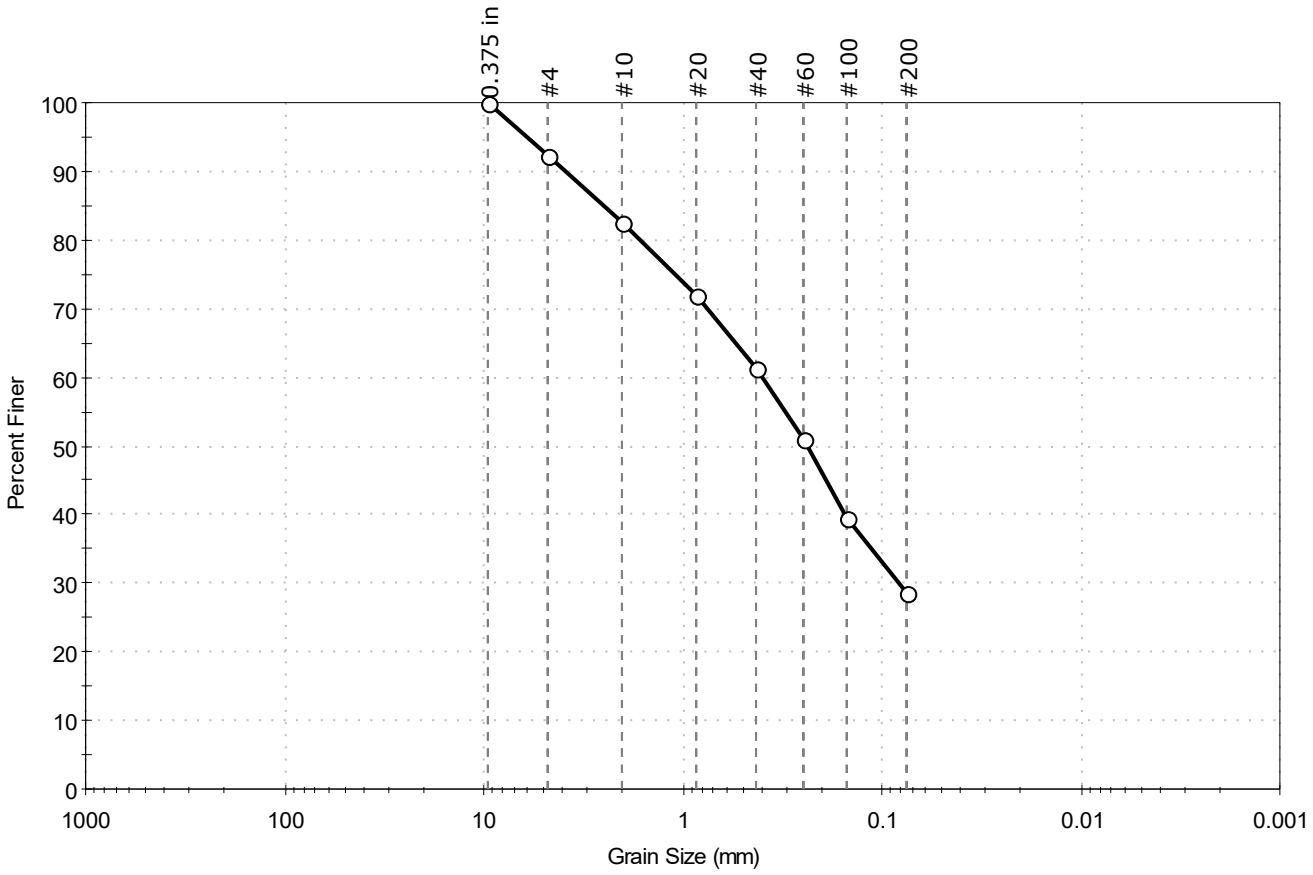
Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

Client:	Freeman Companies, LLC				
Project:	City of Meriden TOD Signal Upgrades				
Location:	Meriden, CT			Project No:	GTX-311005
Boring ID:	B-7	Sample Type:	bag	Tested By:	ckg
Sample ID:	S6	Test Date:	12/05/19	Checked By:	bfs
Depth :	15-17	Test Id:	532855		
Test Comment:	---				
Visual Description:	Moist, reddish brown silty sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	7.8	63.7	28.5

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	92		
#10	2.00	82		
#20	0.85	72		
#40	0.42	61		
#60	0.25	51		
#100	0.15	40		
#200	0.075	28		

Coefficients

D_{85} = 2.5016 mm D_{30} = 0.0825 mm

D_{60} = 0.3949 mm D_{15} = N/A

D_{50} = 0.2389 mm D_{10} = N/A

C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO Silty Gravel and Sand (A-2-4 (0))

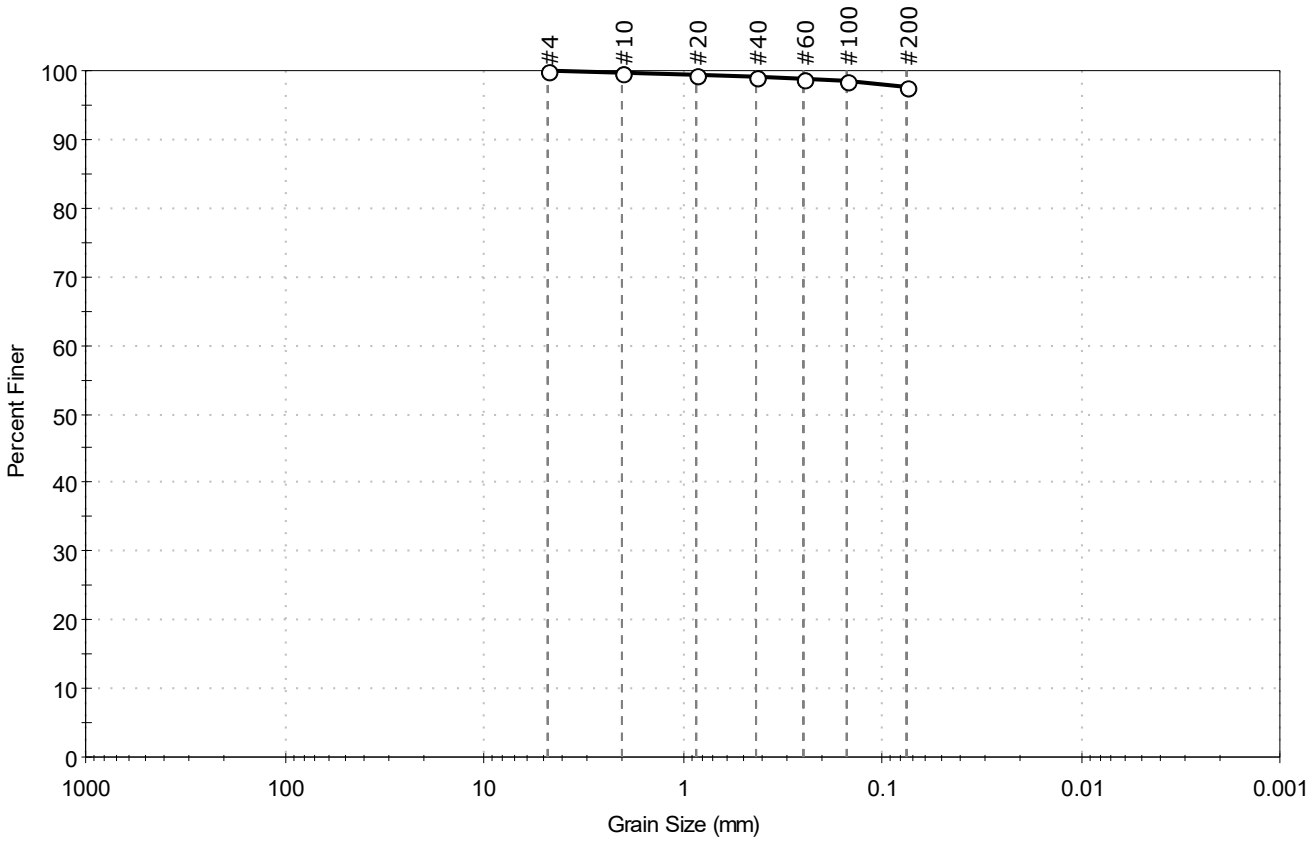
Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

Client:	Freeman Companies, LLC				
Project:	City of Meriden TOD Signal Upgrades				
Location:	Meriden, CT			Project No:	GTX-311005
Boring ID:	B-8	Sample Type:	bag	Tested By:	ckg
Sample ID:	S6	Test Date:	12/05/19	Checked By:	bfs
Depth :	15-17	Test Id:	532856		
Test Comment:	---				
Visual Description:	Moist, reddish brown clay				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.0	2.3	97.7

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	99		
#40	0.42	99		
#60	0.25	99		
#100	0.15	99		
#200	0.075	98		

Coefficients

D_{85} = N/A D_{30} = N/A

D_{60} = N/A D_{15} = N/A

D_{50} = N/A D_{10} = N/A

C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO Silty Soils (A-4 (0))

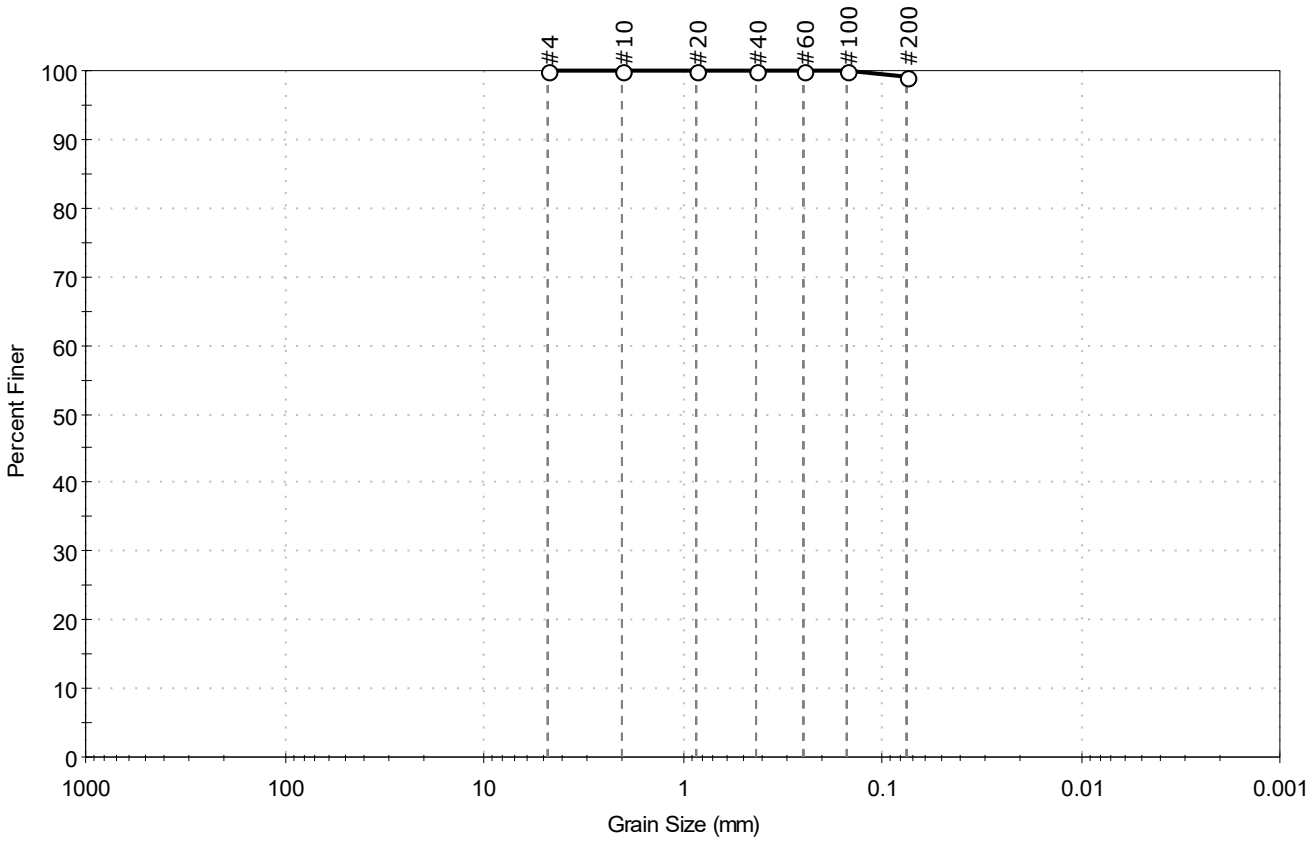
Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

Client:	Freeman Companies, LLC				
Project:	City of Meriden TOD Signal Upgrades				
Location:	Meriden, CT			Project No:	GTX-311005
Boring ID:	B-9	Sample Type:	bag	Tested By:	ckg
Sample ID:	S8	Test Date:	12/05/19	Checked By:	bfs
Depth :	23-25	Test Id:	532857		
Test Comment:	---				
Visual Description:	Moist, reddish brown clay				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
--	0.0	0.9	99.1

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	100		
#40	0.42	100		
#60	0.25	100		
#100	0.15	100		
#200	0.075	99		

Coefficients

D_{85} = N/A	D_{30} = N/A
D_{60} = N/A	D_{15} = N/A
D_{50} = N/A	D_{10} = N/A
C_u = N/A	C_c = N/A

Classification

ASTM N/A

AASHTO Silty Soils (A-4 (0))

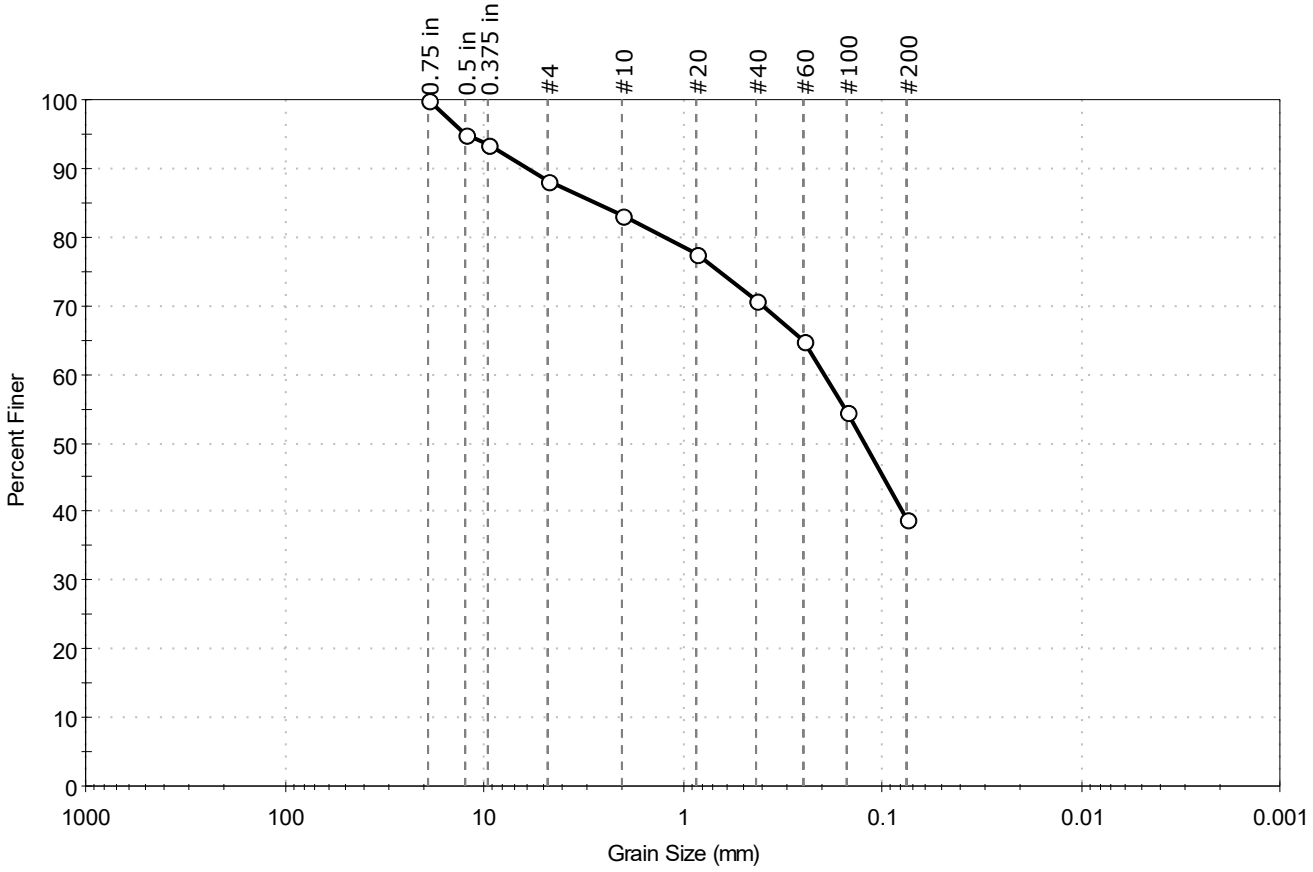
Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

Client:	Freeman Companies, LLC				
Project:	City of Meriden TOD Signal Upgrades				
Location:	Meriden, CT			Project No:	GTX-311005
Boring ID:	B-11	Sample Type:	bag	Tested By:	ckg
Sample ID:	S3	Test Date:	12/05/19	Checked By:	bfs
Depth :	5-7	Test Id:	532858		
Test Comment:	---				
Visual Description:	Moist, reddish brown silty sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
--	11.7	49.5	38.8

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.75 in	19.00	100		
0.5 in	12.50	95		
0.375 in	9.50	94		
#4	4.75	88		
#10	2.00	83		
#20	0.85	77		
#40	0.42	71		
#60	0.25	65		
#100	0.15	55		
#200	0.075	39		

Coefficients

D_{85} = 2.7450 mm D_{30} = N/A

D_{60} = 0.1957 mm D_{15} = N/A

D_{50} = 0.1224 mm D_{10} = N/A

C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO Silty Soils (A-4 (0))

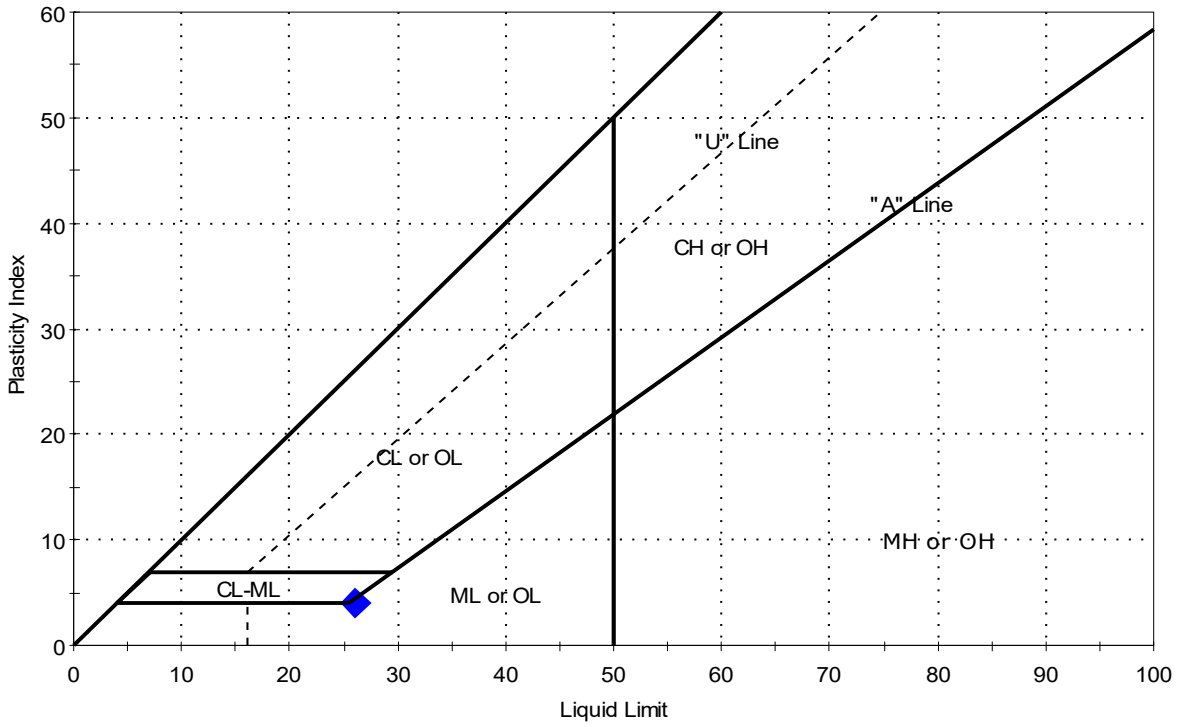
Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

Client:	Freeman Companies, LLC				
Project:	City of Meriden TOD Signal Upgrades				
Location:	Meriden, CT			Project No:	GTX-311005
Boring ID:	B-2	Sample Type:	bag	Tested By:	cam
Sample ID:	S7	Test Date:	12/12/19	Checked By:	bfs
Depth :	20-22	Test Id:	532842		
Test Comment:	---				
Visual Description:	Moist, reddish brown silt				
Sample Comment:	---				

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	S7	B-2	20-22	28	26	22	4	1.6	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: LOW

Client:	Freeman Companies, LLC				
Project:	City of Meriden TOD Signal Upgrades				
Location:	Meriden, CT			Project No:	GTX-311005
Boring ID:	B-5	Sample Type:	bag	Tested By:	cam
Sample ID:	S6	Test Date:	12/12/19	Checked By:	bfs
Depth :	15-17	Test Id:	532843		
Test Comment:	---				
Visual Description:	Moist, reddish brown silt				
Sample Comment:	---				

Atterberg Limits - ASTM D4318

Sample Determined to be non-plastic

Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	S6	B-5	15-17	25	n/a	n/a	n/a	n/a	

Dry Strength: MEDIUM

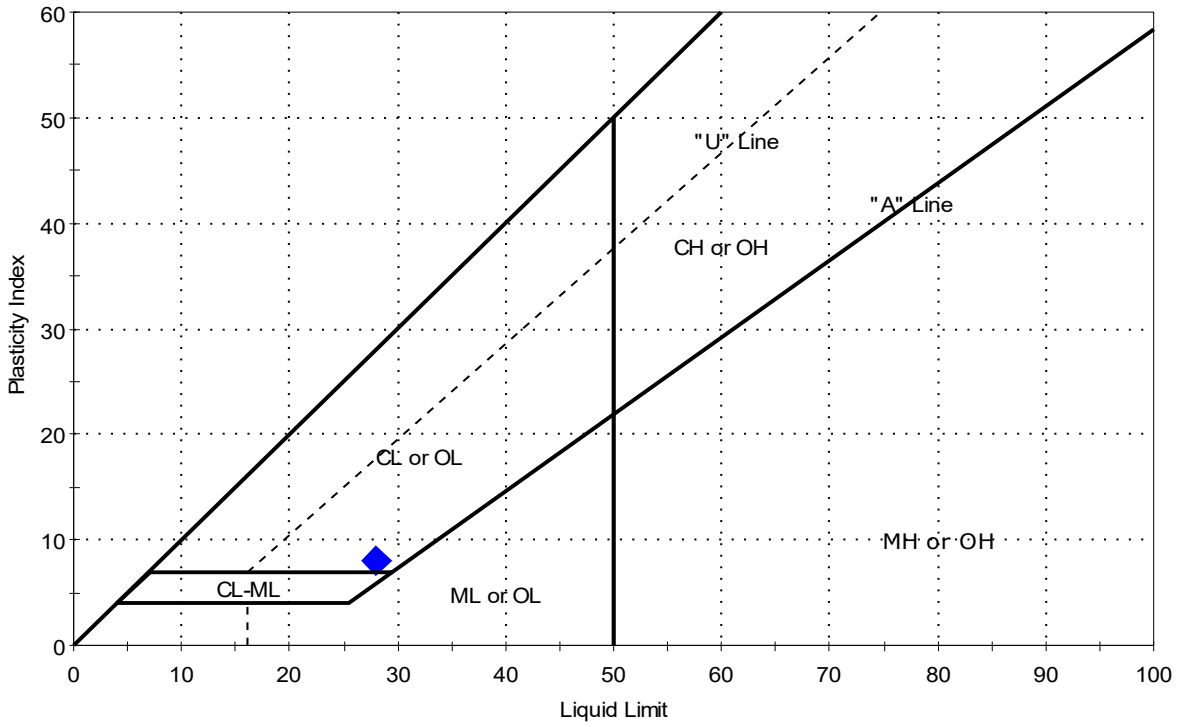
Dilatancy: RAPID

Toughness: n/a

The sample was determined to be Non-Plastic

Client:	Freeman Companies, LLC				
Project:	City of Meriden TOD Signal Upgrades				
Location:	Meriden, CT			Project No:	GTX-311005
Boring ID:	B-10	Sample Type:	bag	Tested By:	cam
Sample ID:	S5	Test Date:	12/12/19	Checked By:	bfs
Depth :	20-22	Test Id:	532844		
Test Comment:	---				
Visual Description:	Wet, reddish brown clay				
Sample Comment:	---				

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	S5	B-10	20-22	33	28	20	8	1.6	

Sample Prepared using the WET method

Dry Strength: HIGH

Dilatancy: SLOW

Toughness: LOW