

**STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION**

M E M O R A N D U M

Subject: Project Number 106-126
Geotechnical Roadway
Report
Intersection Improvements at
Route 34 and Baldwin Road
Town of Orange
Date: April 25, 2016

to: Susan M. Libatique
Trans. Principal Engineer
Bureau of Engineering
and Construction

from: Leo L. Fontaine ^{for}
Trans. Principal Engineer
Bureau of Engineering
and Construction

1. Transmitted are the following:

- Roadway Geotechnical Report
- Structure Geotechnical Report
- Plans:
- Correspondence:

2. This transmittal is being made:

- In response to your request dated November 19, 2016
- Initiated by this office

3. Comments:

4. Please take the following action:

- Please review and forward to
- Please review for incorporation into the design of the project
- For your use and information

Attachment

Sara Ghatee/SG

cc: Sohrab Afrazi

Mary Baier

Sabastian A. Cannamela – Meredith Andrews

Michael McDonnell – Robert A. Pion

Geotechnical Roadway Report-Transmittal Format

Project Description: The purpose of this project is to address safety concerns at the intersection of Route 34 and Baldwin Road in Town of Orange. The existing intersection at Route 34 and Baldwin road is a three legged unsignalized intersection. The proposed safety improvements include minor widening of the Route 34 westbound approach and Baldwin road in order to provide right turn lanes; and providing a longer taper and additional storage length for vehicles turning left onto Route 34 eastbound by revising the existing raised median.

The information provided for our use in preparation of this report is Aerial Concept Plan, and the Environmental Review of the project.

Geotechnical Information and Site Conditions:

Surficial Geology: USGS mapping indicates that the surficial soil at the project location consist of predominantly glacial till overlying bedrock. Refer to Appendix 4 for USGS Mapping.

Bedrock Geology: USGS mapping shows that bedrock geology in the vicinity of the project is mapped as Schist. Refer to Appendix 4 for USGS Mapping.

Existing Plans: The original Route 34 construction plans (project number 36-43) show that the existing grade, at the time of construction, was elevated between 0 to 4 feet. The ground surface prior to construction of Route 34 is generally described as meadow and farmland.

Observations:

- Site evaluation, aerial photos and boring logs indicate that the existing elevation of Route 34 is about 10 feet higher than the natural grade. The natural grade in the vicinity of the project is around elevation 220±, near to elevation of the open field on north side of Route 34.

Subsurface Conditions:

All soil samples were visually classified in the field. Subsurface conditions generally consist of miscellaneous fill, bearing on glacial till.

Thickness(ft)	Description
0-12	Miscellaneous Fill – Medium dense to very dense sand gravel in varying percentages with little to trace silt.
0-2	Topsoil – Very loose sand and silt (Boring R-4)
3-10	Glacial Till – Dense to very dense sand, with lesser percentages of gravel and little to trace silt

Based upon moisture content of the soil samples ground water may be encountered approximately 12 to 15 feet below ground surface. This places the groundwater at approximate elevation 215. So the groundwater is not expected

to be encountered during roadway excavation.
Refer to Appendix 2 for Boring Location Plan and Appendix 3 for Finalized Boring Logs.

Subsurface Exploration and Testing Data:

- Boring logs and location plan attached.
- Pavement Core results and location plan attached.
- Bar Sounding/Pipe Probe/Test Pit logs attached.
- Laboratory test data attached.
- Rock core data sheet attached.

Recommendations:

Fill Slopes:

- Maximum fill slope rates: 2(h) to 1(v).
- Slope treatment for slope surface: use standard turf establishment for slopes 2(h) to 1(v) or flatter.
- A global stability analysis was performed for the proposed embankments. The proposed embankment is stable.
- Immediate settlement is expected to be less than ½ inch and post construction settlement will be negligible.

Earth Cut Slopes:

- Maximum cut slope rates: 2(h) to 1(v).
- Treatment for slope surface: use standard turf establishment.
- Earth excavation shrink value: 10%
- Rock excavation: neither rock excavation nor payment sized boulders are anticipated during roadway excavation.

Construction Considerations:

- Reuse (or non-reuse) of excavated material requirements: the non-organic excavated material should be suitable for re-use as subgrade.
- Subgrade stabilization requirements: no yielding or over-excavation of the subgrade soil is anticipated. Subgrade soil, prepared in accordance with the Standard Specification Form 816, shall provide a firm stable base for the placement of the pavement structure.

Appendix Information:

1. Project Location Plan
2. Boring Location Plan
3. Final Edited Boring Logs
4. USGS Bedrock and Surficial Mapping

Appendices Table of Contents

Appendix 1	Project Location Plan
Appendix 2	Boring Location Plan
Appendix 3	Final Edited Boring Logs
Appendix 4	USGS Bedrock and Surficial Mapping

Appendix 1

Project Location Plan

PROJECT LOCATION PLAN

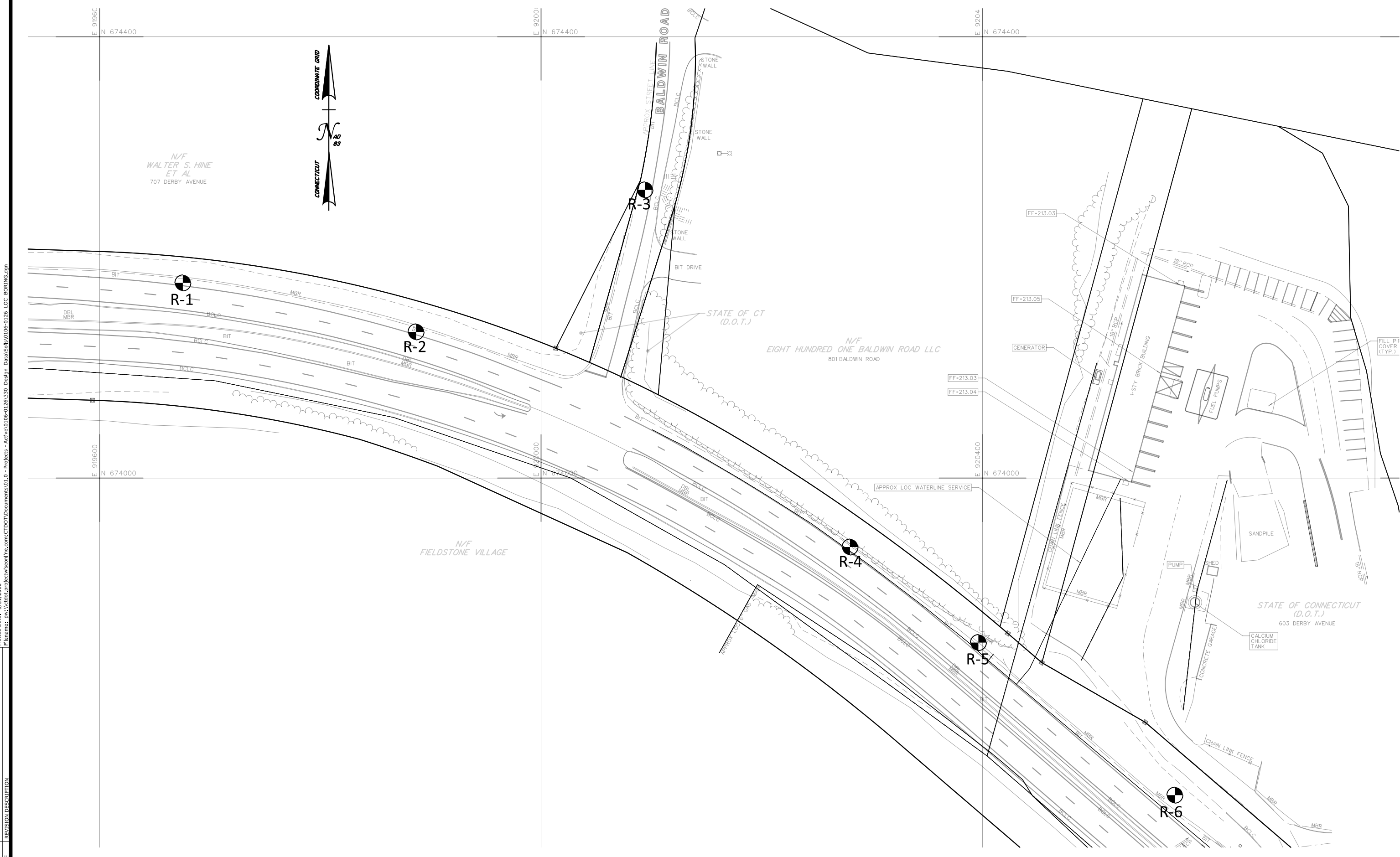


PROJECT NUMBER: 106-126
ROUTE NUMBER: 34

INTERSECTION IMPROVEMENTS AT ROUTE 34
AND BALDWIN ROAD IN TOWN OF ORANGE

Appendix 2

Boring Location Plan



N/F
WALTER S. HINE
ET AL
707 DERBY AVENUE

N/F
EIGHT HUNDRED ONE BALDWIN ROAD LLC
801 BALDWIN ROAD

N/F
FIELDSTONE VILLAGE

STATE OF CONNECTICUT
(D.O.T.)
603 DERBY AVENUE

**PRELIMINARY
DESIGN REVIEW**

SCALE AS NOTED

SIGNATURE/
BLOCK:

OFFICE OF ENGINEERING
2800 BERLIN TURNPIKE
NEWINGTON, CT 06111

APPROVED BY: _____



INTERSECTION IMPROVEMENTS
AT ROUTE 34 AND BALDWIN ROAD
TOWN OF ORANGE

PROJECT NO. 106-126
DRAWING TITLE:

**BORING LOCATION PLAN &
GENERALIZED SOIL PROFILE**

DRAWING NO. _____
SHEET NO. _____

REV.	DATE	REVISION DESCRIPTION

DESIGNER/DRAWN: _____
 CHECKED BY: _____
 Plotted Date: 3/31/2016
 Filename: p:\ctdot\project\wsonline.com\CTDOT\Documents\106-126\330_Design_Data\Soil\106-0126_LOC_BORING.dgn

Appendix 3

Finalized Boring Logs

Driller: Jason Dorou	Connecticut DOT Boring Report		Hole No.: R-1
Inspector: Glenn L. Arzt	Town: Orange	Stat./Offset:	
Engineer: Sara Ghatee	Project No.: 0106-0126	Northing: 674176.9	
Start Date: 1-6-16	Route No.: 34	Easting: 919675.4	
Finish Date: 1-6-16	Bridge No.: NA	Surface Elevation: 226.8	

Project Description: Intersection Improvements at Route 34 and Baldwin Road

Casing Size/Type: 4in HSA	Sampler Type/Size: 2in SS	Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 Fall: 30in.	

Groundwater Observations:

Depth (ft)	SAMPLES					Generalized Strata Description	Material Description and Notes	Elevation (ft)	
	Sample Type/No.	Blows on Sampler per 6 inches							Pen. (in.)
0							PAVEMENT STRUCTURE MISC. FILL	225	
5	S-1	7	2	19	7	24	16	Gray - C/F GRAVEL, AND F/C SAND, trace Silt	220
10	S-2	5	4	11	27	24	15	Brown - C/F SAND AND F/C GRAVEL, trace Silt	215
15	S-3	19	26	16	17	24	0	GLACIAL TILL No Recovery	210
20								END OF BORING 17ft	205
25									200
30									195
35									190
40									185
45									180
50									180

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: 0ft	NOTES: Pavement structure consists of 8 inches of bituminous concrete pavement with no discernable subbase.	Sheet 1 of 1
No. of Soil Samples: 3 No. of Core Runs: 0		SM-001-M REV. 1/02

Driller: Jason Dorou	Connecticut DOT Boring Report		Hole No.: R-2
Inspector: Glenn L. Arzt	Town: Orange	Stat./Offset:	
Engineer: Sara Ghatee	Project No.: 0106-0126	Northing: 674132.5	
Start Date: 1-6-16	Route No.: 34	Easting: 919886.7	
Finish Date: 1-6-16	Bridge No.: NA	Surface Elevation: 229.5	

Project Description: Intersection Improvements at Route 34 and Baldwin Road

Casing Size/Type: 4in HSA	Sampler Type/Size: 2in SS	Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 Fall: 30in.	

Groundwater Observations:

Depth (ft)	SAMPLES					Generalized Strata Description	Material Description and Notes	Elevation (ft)	
	Sample Type/No.	Blows on Sampler per 6 inches							Pen. (in.)
0							PAVEMENT STRUCTURE MISC. FILL		
5	S-1	8	13	18	22	24	14	Brown - F/C SAND, AND C/F GRAVEL, trace Silt	225
10	S-2	13	25	35	52	24	16	Gray - F/C SAND, AND C/F GRAVEL, trace Silt	220
15	S-3	30				0	0	GLACIAL TILL	215
20								No Recovery	210
25								END OF BORING 15ft	205
30									200
35									195
40									190
45									185
50									180

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: 15ft Rock: 0ft	NOTES: Pavement structure consists of 12 inches of bituminous concrete pavement with no discernable subbase. Encountered split spoon refusal at 15 feet	Sheet 1 of 1
No. of Soil Samples: 3	No. of Core Runs: 0	SM-001-M REV. 1/02

Driller: Jason Dorou	Connecticut DOT Boring Report		Hole No.: R-3
Inspector: Glenn L. Arzt	Town: Orange	Stat./Offset:	
Engineer: Sara Ghatee	Project No.: 0106-0126	Northing: 674261.2	
Start Date: 1-7-16	Route No.: 34	Easting: 920094.1	
Finish Date: 1-7-16	Bridge No.: NA	Surface Elevation: 219.4	

Project Description: Intersection Improvements at Route 34 and Baldwin Road

Casing Size/Type: 4in HSA	Sampler Type/Size: 2in SS	Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 Fall: 30in.	

Groundwater Observations:

Depth (ft)	SAMPLES					Generalized Strata Description	Material Description and Notes	Elevation (ft)
	Sample Type/No.	Blows on Sampler per 6 inches			Pen. (in.)			
0						PAVEMENT STRUCTURE		
5	S-1	23	35	68	15	14	Light Brown - F/C SAND, some f/c Gravel, trace Silt	215
10							END OF BORING 7ft	210
15								205
20								200
25								195
30								190
35								185
40								180
45								175
50								170

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: 7ft Rock: 0ft	NOTES: Pavement structure consists of 12 inches of bituminous concrete pavement with no discernable subbase. Encountered auger refusal at 7 feet.	Sheet 1 of 1
No. of Soil Samples: 1	No. of Core Runs: 0	SM-001-M REV. 1/02

Driller: Jason Dorou	Connecticut DOT Boring Report		Hole No.: R-4
Inspector: Glenn L. Arzt	Town: Orange	Stat./Offset:	
Engineer: Sara Ghatee	Project No.: 0106-0126	Northing: 673937.5	
Start Date: 1-6-16	Route No.: 34	Easting: 920279.9	
Finish Date: 1-6-16	Bridge No.: NA	Surface Elevation: 230.5	

Project Description: Intersection Improvements at Route 34 and Baldwin Road

Casing Size/Type: 4in HSA	Sampler Type/Size: 2in SS	Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 Fall: 30in.	

Groundwater Observations:

Depth (ft)	SAMPLES					Generalized Strata Description	Material Description and Notes	Elevation (ft)	
	Sample Type/No.	Blows on Sampler per 6 inches							Pen. (in.)
0							PAVEMENT STRUCTURE MISC. FILL	230	
5	S-1	1	1	1	3	24	15	TOPSOIL Brown - Topsoil	225
10	S-2	19	23	25	48	24	16	GLACIAL TILL Brown - F/C SAND, AND C/F GRAVEL, trace Silt	220
15	S-3	10	18	63		18	15	Light Brown - F/C SAND, little c/f Gravel, trace Silt	215
20								END OF BORING 16.5ft	210
25									205
30									200
35									195
40									190
45									185
50									

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: 16.5ft Rock: 0ft	NOTES: Pavement structure consists of 12 inches of bituminous concrete pavement with no discernable subbase.	Sheet 1 of 1
No. of Soil Samples: 3 No. of Core Runs: 0		SM-001-M REV. 1/02

Driller: Jason Dorou	Connecticut DOT Boring Report		Hole No.: R-5
Inspector: Glenn L. Arzt	Town: Orange	Stat./Offset:	
Engineer: Sara Ghatee	Project No.: 0106-0126	Northing: 673850.9	
Start Date: 1-6-16	Route No.: 34	Easting: 920396.2	
Finish Date: 1-6-16	Bridge No.: NA	Surface Elevation: 227.4	

Project Description: Intersection Improvements at Route 34 and Baldwin Road

Casing Size/Type: 4in HSA	Sampler Type/Size: 2in SS	Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 Fall: 30in.	

Groundwater Observations:

Depth (ft)	SAMPLES					Generalized Strata Description	Material Description and Notes	Elevation (ft)	
	Sample Type/No.	Blows on Sampler per 6 inches							Pen. (in.)
0							PAVEMENT STRUCTURE MISC. FILL	225	
5	S-1	7	13	12	16	24	3	Brown - F/C SAND, AND C/F GRAVEL, trace Silt	220
10	S-2	25	23	23	21	24	13	White - F SAND, AND C/F GRAVEL, trace Silt	215
15	S-3	7	10	40		14	12	Brown - C/F SAND, little c/f Gravel, trace Silt	210
20								END OF BORING 16.2ft	205
25									200
30									195
35									190
40									185
45									180
50									

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: 16.2ft Rock: 0ft	NOTES: Pavement structure consists of 12 inches of bituminous concrete pavement with no discernable subbase.	Sheet 1 of 1
No. of Soil Samples: 3 No. of Core Runs: 0		SM-001-M REV. 1/02

Driller: Jason Dorou	Connecticut DOT Boring Report		Hole No.: R-6
Inspector: Glenn L. Arzt	Town: Orange	Stat./Offset:	
Engineer: Sara Ghatee	Project No.: 0106-0126	Northing: 673712.6	
Start Date: 1-7-16	Route No.: 34	Easting: 920574.2	
Finish Date: 1-7-16	Bridge No.: NA	Surface Elevation: 218.7	

Project Description: Intersection Improvements at Route 34 and Baldwin Road

Casing Size/Type: 4in HSA	Sampler Type/Size: 2in SS	Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 Fall: 30in.	

Groundwater Observations:

Depth (ft)	SAMPLES					Generalized Strata Description	Material Description and Notes	Elevation (ft)
	Sample Type/No.	Blows on Sampler per 6 inches						
0							TOPSOIL	
							MISC. FILL	
5	S-1	8	10	12	14	24	18	
								Brown - F/C SAND, little f/c Gravel, trace Silt
10	S-2	11	12	11	15	24	16	
								Tan - F/C SAND, trace Silt, trace f/c Gravel
15	S-3	30	40			6	6	
								GLACIAL TILL
								Brown - F/C SAND, some c/f Gravel, trace Silt
								END OF BORING 15.5ft
20								
25								
30								
35								
40								
45								
50								

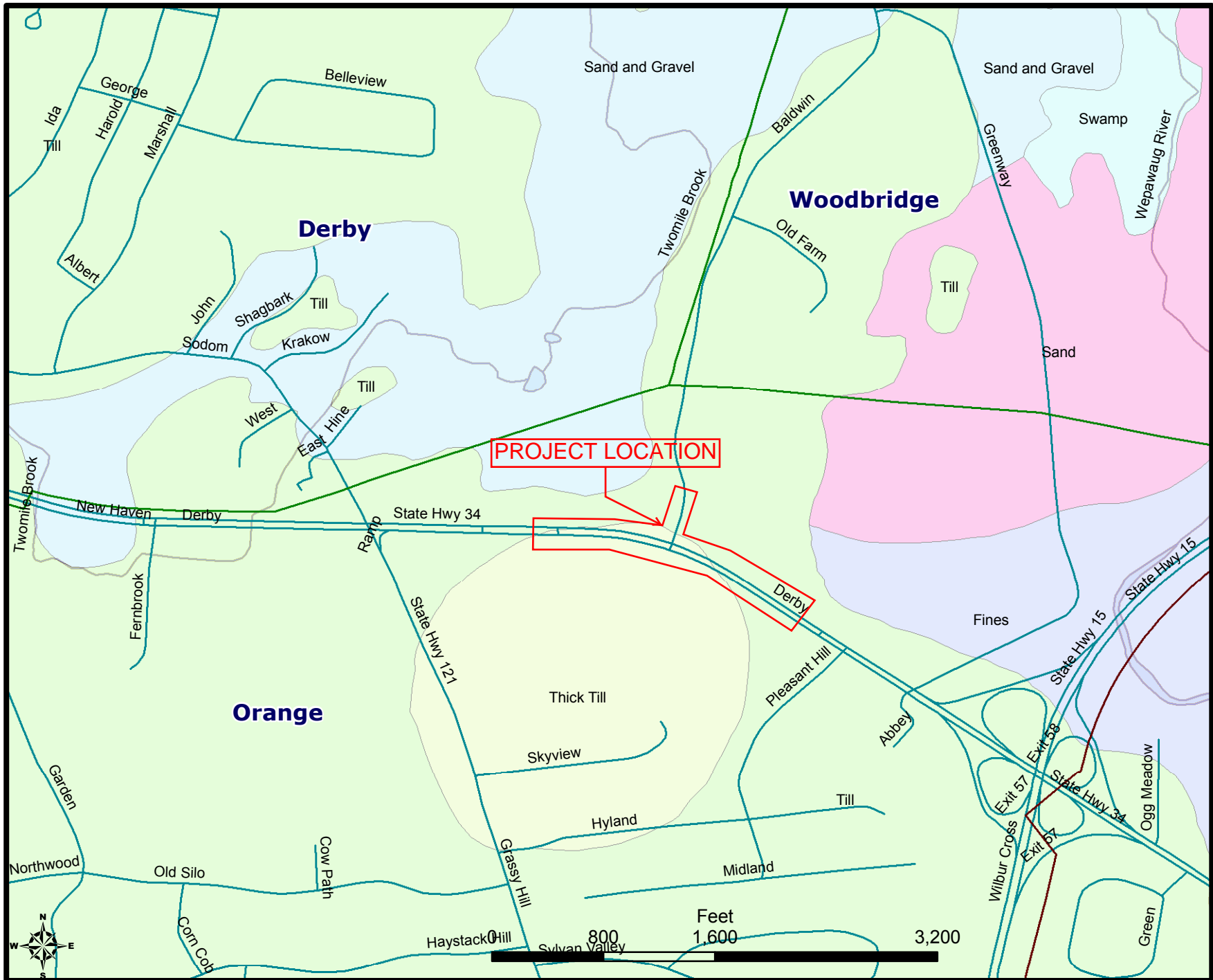
Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test
Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 15.5ft Rock: 0ft	NOTES:	Sheet 1 of 1
No. of Soil Samples: 3 No. of Core Runs: 0		SM-001-M REV. 1/02

Appendix 4

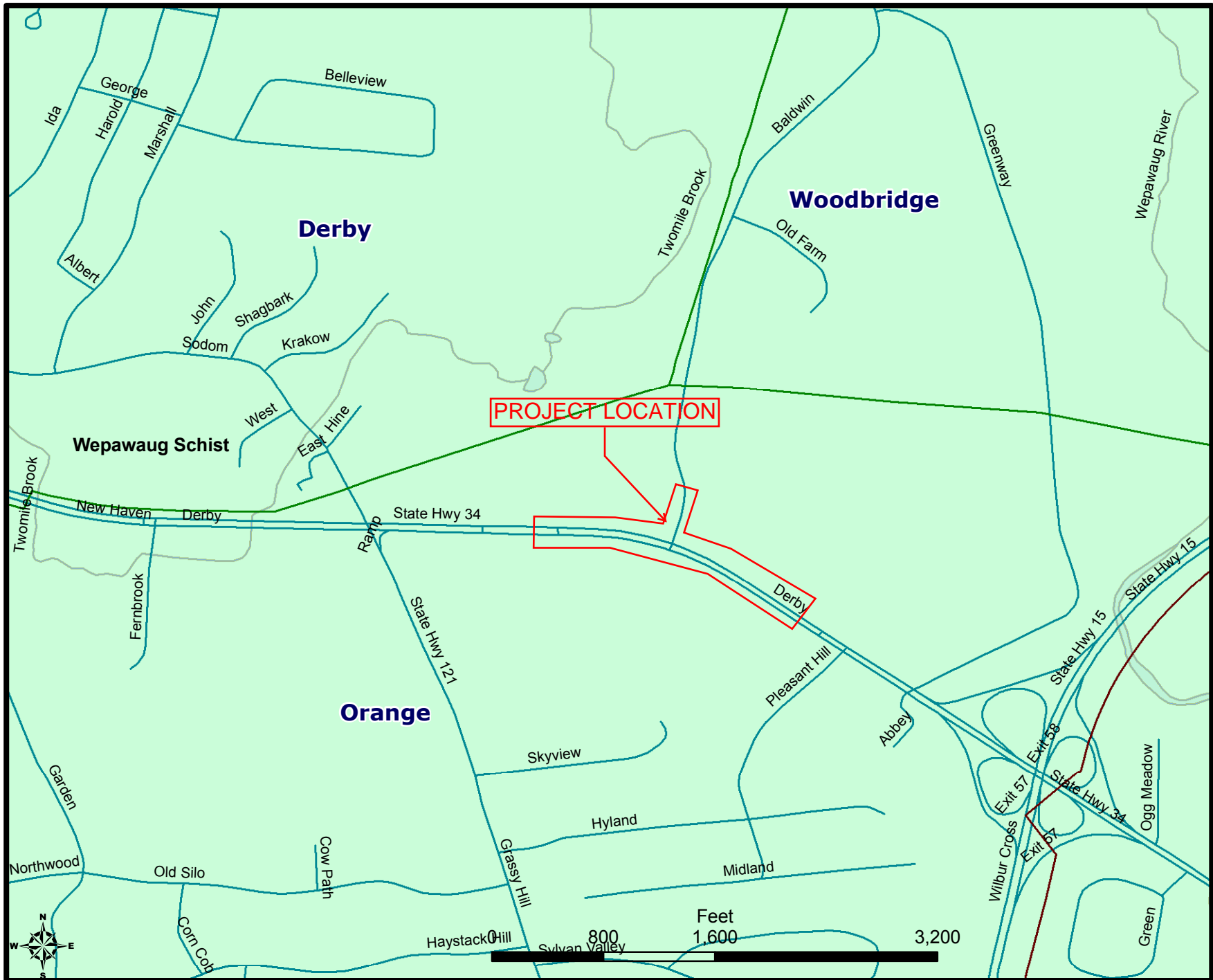
USGS Bedrock and Surficial Mapping

Surficial Soil Geology



Project No 106-126
Intersection Improvements at Route 34 and Baldwin Road

Bedrock Geology



Project No 106-126
Intersection Improvements at Route 34 and Baldwin Road