

BORING NO. B-39

PROJECT: Hennepin County CSAH 112	CLIENT: Hennepin County
LOCATION: Long Lake, MN	ARCHITECT - ENGINEER: SRF Consulting Group, Inc.

DEPTH IN FEET	SAMPLE		SOIL DESCRIPTION	N-VALUE IN BLOWS/FT.	% REC.	LABORATORY TESTS			
	NO.	TYPE				W (%)	DC (pcf)	P20D (%)	Gp (tsf)
1			12 inches Bituminous						
2	192	SS	6 inches Fine to Medium Sand with Silt, brown, medium dense, moist (Roadway Basecourse) (SP-SM)	14	33				
3			Sandy Silty Clay, brown, stiff (Fill) (SC)	13	56				1.8
4	193	SS							
5	194	SS							
6			Silty Sand, brown, medium dense, moist (SM)	16	50				
7									
8	195	SS	Silty Clay with a trace sand, brown-gray, stiff to very stiff (CL)	17	89				2.8
9									
10	196	SS							
11									
12			Silty Clay with a trace sand, brown-gray, stiff to very stiff (CL)	14	89				2.3
13									
14									
15	197	SS							

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ the transition may be gradual.

WATER LEVEL OBSERVATIONS			BORING STARTED 6-19-12	
WL	Dry, WD		BORING COMPLETED 6-19-12	
WL	Dry, AD		RIG CME 75 HT	FOREMAN br
CAVE IN DEPTH	4ft		DRAWN nl	JOB# 95423

BLUE EARTH HENNEPIN COUNTY CSAH 112.GPJ UNITWT.GDT 8/6/12

BORING NO. B-40

PROJECT: Hennepin County CSAH 112	CLIENT: Hennepin County
LOCATION: Long Lake, MN	ARCHITECT - ENGINEER: SRF Consulting Group, Inc.

DEPTH IN FEET	SAMPLE		SOIL DESCRIPTION	N-VALUE IN BLOWS/FT.	% REC.	LABORATORY TESTS			
	NO.	TYPE				W (%)	DC (pcf)	P20D (%)	Gp (tsf)
1	198	SS	Silty Clayey Sand, brown, loose, moist (Fill) (SC)	6	67	19		40.1	
2									
3	199	SS	Silty Clay with trace sand, brown, medium stiff (CL)	3	72	17			1.5
4									
5	200	SS		14	67				1.5
6									
7			Sandy Silty Clay, brown, medium stiff (SC)						
8	201	SS		21	67				0.5
9									
10	202	SS		8	39				
11			Medium to Coarse Sand, brown, medium dense, moist (SW)						
12									
13									
14									
15	203	SS	Fine Sand with Silt, brown, medium dense, wet (SM)	12	72				
Soil boring drilled with Hollow Stem Auger Boring Termination Depth = 15.5ft Borehole backfilled with soil upon completion									

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ the transition may be gradual.

WATER LEVEL OBSERVATIONS			BORING STARTED 6-19-12	
WL	Dry, WD		BORING COMPLETED 6-19-12	
WL	Dry, AD		RIG CME 75 HT	FOREMAN br
CAVE IN DEPTH	4ft		DRAWN nl	JOB# 95423

BLUE EARTH HENNEPIN COUNTY CSAH 112.GPJ UNITWT.GDT 8/6/12

GALE-TEC ENGINEERING, INC.

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www.gale-tec.com

Mr. Mike Turner, P.E.
SRF Consulting Group, Inc.
One Carlson Parkway North
Plymouth MN 55447

August 7, 2012

GTE Project No. 95423

RE: Geotechnical Engineering for Preliminary Design of CSAH 112
in Long Lake and Orono, MN

Dear Mr. Turner:

We have completed our subsurface exploration and geotechnical review associated with the preliminary design of the above referenced project.

If you have any questions concerning this report, please do not hesitate to contact us.

Respectfully,

GALE-TEC ENGINEERING, INC.



Stephan M. Gale, P.E.
Principal Engineer

Nathan M. Lichty, EIT
Project Engineer

I hereby certify that this plan, specification, calculation, or report was prepared by me or under my direct supervision and that I am a Registered Professional Engineer under Minnesota Statute, Sections 326.02 to 326.15.



Stephan M. Gale

Date: 8/7/2012 Reg. No. 13854

GEOTECHNICAL ENGINEERING REPORT FOR PRELIMINARY DESIGN OF CSAH 112 IN LONG LAKE AND ORONO, MN

1.0 INTRODUCTION

CSAH 112, between CSAH 6 and TH 12, in western Hennepin County is scheduled for reconstruction. The reconstruction is approximately 6 miles in length and exists through both rural and urban areas including the cities of Long Lake and Orono. The roadway has been split into four (4) segments for organizational and design purposes. The segments are generally split between the highway's rural and urban sections and are given below:

- Segment 1 – CSAH 6 at West End of Project to Old Crystal Bay Road
(Rural Section)
- Segment 2 – Old Crystal Bay Road to Brown Road (Urban Section)
- Segment 3 – Brown Road to Cemetery Road (Urban Section)
- Segment 4 – Cemetery Road to TH 12 (Rural Section)

For this preliminary roadway design, soil borings were drilled at approximately 500 ft intervals along the roadway alignment. A total of 40 soil borings were either drilled through the existing pavement or adjacent to the existing roadway through the roadway embankment. The borings were distributed along the four (4) highway segments.

The purpose for this preliminary investigation is to 1) evaluate existing pavement and subgrade soil conditions, 2) evaluate groundwater conditions, 3) provide R-value recommendations, 4) provide soil correction recommendations for widened roadway sections or new sections, and 5) provide a preliminary evaluation of grade separation structures along the roadway alignment.

This report was prepared in substantial accordance with our revised proposal dated February 9, 2012 and our SRF Professional Services Subconsultant Agreement dated May 3, 2012.

2.0 REVIEW OF DATA PROVIDED TO US

We were provided a series of plans from recently completed MnDOT and Hennepin County road and bridge construction projects in the vicinity of CSAH 112. The majority of these plans are associated with the construction of the “new” T.H. 12 roadway and interchanges. A list of construction documents that have relevance to the potential reconstruction of CSAH 112 are given below.

2.1 Historical Construction Documents

Plans for Bridge 27136 (State Project No. 2713-27136) – This project includes the construction of the bridge, foundation system and abutments associated with the Luce Line State Trail over CSAH 112. The construction plans are dated February, 2007. The foundation system consists of driven piles. Two (2) foundation borings, one (1) at each

abutment, were drilled to determine soil conditions. The results of the borings indicate that the soils near the ground surface generally consist of sandy and silty clays. These borings indicate that at the time of the borings, the groundwater table was at an elevation of 948ft at one boring and 957ft at the other boring.

Plans for Bridge 27274 (State Project No. 2713-27274) – This project includes the construction of the bridge, foundation system and abutments associated with the Willow Drive overpass over T.H. 12 and the BNSF railroad line. The plans are dated February, 2003. The foundation system consists of driven piles. Three (3) foundation borings, one (1) at each abutment and at the center bridge pier were drilled to determine soil conditions. The results of the borings indicate that the soils near the ground surface generally consist of soft to stiff silty clay and clay till.

Plans for Bridge 27275 (State Project No. 2713-27275) – This project includes the construction of the bridge, foundation system and abutments associated with the Old Crystal Bay Road overpass over T.H. 12 and the BNSF railroad line. The plans are dated February, 2003. The foundation system consists of driven piles. Five (5) foundation borings, two (2) at each abutment and one (1) at the center bridge pier were drilled to determine soil conditions. The results of the borings indicate that the soils near the ground surface generally consist of soft to stiff silty clay and clay till to a depth of about 30 ft. Layers of medium dense fine sand were also encountered. At the time of these borings, the groundwater table was estimated to be about at an elevation of 980ft.

Plans for Bridge 27277 (State Project No. 2713-27277) – This project includes the construction of the bridge, foundation system and abutments associated with the CSAH 6 overpass over the BNSF railroad line. The plans are dated August, 2005. The foundation system consists of driven piles. Two (2) foundation borings, one (1) at each abutment was drilled to determine soil conditions. The results of the borings indicate that the soils generally consist of soft to stiff silty clay and clay till down to a depth of about 70 ft below the ground surface.

Plans for Mill and Overlay of T.H. 12 (State Project No. 2713-101) – This project includes a bituminous mill and overlay of then TH 12, currently CSAH 112, from 3700ft west of Old Crystal Bay Road to Wayzata Boulevard. The plan sheets are dated July, 2009. For this project the upper 2 inches of bituminous was milled and replaced. Additional guardrail was also added at sections along Long Lake and along some retention ponds in the western portions of the City of Long Lake.

Plans for Construction of “New” TH 12 near Long Lake and Orono (State Project 2713-83) – This project includes the construction of the “new” TH 12 just south of CSAH 112 through the Cities of Long Lake and Orono. Included in this plan set is the grading, retaining wall construction and bridge construction for both the CSAH 6-TH 12 and the Wayzata Blvd.-TH 12 interchanges. The roadway sections for the interchanges appear to have been designed using an R-value of 45. Although there were several pavement sections, the typical pavement section for TH 12 in this area and the interchanges generally consists of 9 inches of bituminous over 3 inches of Class 5 aggregate base.

Plans for Construction of “New” TH 12 near Long Lake and Orono (State Project 2713-83 & 2713-75) – This project includes the construction of the “new” TH 12 just south of CSAH 112 through the Cities of Long Lake and Orono. Included in this plan set is the grading, roadway construction, retaining wall construction and bridge construction for both the CSAH 6-TH 12 and the Wayzata Blvd.-TH 12 interchanges. The plans were dated April, 2007. The roadway sections for the interchanges appear to have been designed using an R-value of 25. Although there were several pavement sections, the typical pavement section for TH 12 in this area and the interchanges generally consists of 9 inches of bituminous over 3 inches of Class 5 aggregate base.

3.0 2012 SUBSURFACE EXPLORATION

The subsurface exploration along the existing roadway was performed from June 11 to June 21, 2012. Boring locations were selected by SRF Consulting Group Inc. (SRF) and Gale-Tec Engineering, Inc. (GTE) and staked in the field by GTE. Prior to drilling, Gopher State One Call was contacted to check for underground utilities. A total of 40 soil borings (B-1 to B-40) were performed, with 20 soil borings drilled through the existing pavement and 20 soil borings drilled through the existing the roadway embankment adjacent to the pavement with a truck-mounted CME 75 drill rig. Locations and elevations were obtained by HTPO, Inc. and are included in Table No. 1.