Illinois Department of Transportation

Abbreviated Structure Geotechnical Report

Original Report Date:	10-23-2014	Proposed SN:	046-2016	Route:	FAP 796 (IL 115)
Revised Date:	N/A	Existing SN:	046-0066	Section:	104 BR-1
Geotechnical Engineer:	Michael Short, IDOT District 3			County:	Kankakee
Structural Engineer:	Mike Okrent, Bloom Companies			Contract:	66B73

Indicate the proposed structure type, substructure types, and foundation locations (attach plan and elevation drawing): *The proposed structure is a double 9-feet by 5-feet precast box culvert with a 45° right forward skew. The end sections will be cast in place wingwalls.*

Discuss the existing boring data, existing plans foundation information, new subsurface exploration and need for any additional exploration to be provided with SGR Technical Memo (attach all data and subsurface profile plot): *The existing structure is a 28.3 ft. single span bridge with a 45° right forward skew supported by untreated timber piles. IDOT District 3 performed 1 soil boring in 2007 and 2 soil borings in 2013. The soil boring logs are attached.*

Provide the location and maximum height of any new soil fill or magnitude of footing bearing pressure. Estimate the amount and time of the expected settlement. Indicate if further testing, analysis, and/or ground improvement/treatment is necessary: *The profile of the proposed roadway is not expected to change, therefore there will not be any significant additional load applied to the soils. A site visit indicated no signs of settlement at the existing structure. No further settlement analysis is warranted.*

Identify any new cuts or fill slope angles and heights. Estimate the factor of safety against slope failure. Indicate if further testing, analysis or ground improvement/treatment is necessary. *The proposed side slopes are expected to be flatter than existing. Proposed slopes range from 1:3 to 1:4 with a maximum height of approximately 7 feet. A site visit indicated no signs of slope stability problems at the existing structure. No further slope stability analysis is warranted.*

Indicate at each substructure, the 100-year and 500-year total scour depths in the Hydraulics report, the non-granular scour depth reduction, the proposed ground surface, and the recommended foundation design scour elevations. *The design scour elevations at the upstream and downstream ends of culvert are 665.90 and 665.70 respectively. These elevations are based on a 3-ft deep cut-off wall below the invert elevation.*

Determining the seismic soil site class, the seismic performance zone, the 0.2 and 1.0 second design spectral accelerations and indicate if that the soils are liquefiable. *Not applicable to culverts.*

Confirm feasibility of the proposed foundation or wall type and provide design parameters. Attach a pile design table indicating feasible pile types, various nominal required bearings, factored resistances available and corresponding estimated lengths at locations where piles will be used. Provide factored bearing resistance and unit sliding resistance at various elevations and confirm no ground improvement/treatment is necessary where spread footings are proposed. Estimated top of rock elevations as well as preliminary skin friction and end bearing values shall be indicated when drilled shafts are proposed. *Various options are feasible for the wingwalls. If the length of the wingwall exceeds the maximum allowable length for horizontal cantilever wingwalls, the L-type wingwalls or a horizontal cantilever wingwall with gabion extensions are feasible. In addition, it may be possible to construct a horizontal catilever wingwalls that slightly exceed the 14-foot length limitation outlined in the Culvert Manual. For L-type wingwalls, the factored soil bearing capacity is 11,000 psf for a wall supported by a 15.5 feet by 4 feet footing and the soil bearing capacity is 16,000 psf for a wall supported by a 6.5 feet by 4 feet footing.*

The only aggregate needed under the precast concrete box culvert is the 6 inches required by Article 540.06 of the Standard Specifications.

Calculate the estimated water surface elevation and determine the need for cofferdam(s) and seal coat: *The structure can be constructed using conventional methods for water diversion.*

Assess the need for sheeting/soil retention versus using a temporary construction slope and provide recommendation for the most feasible option. *The new structure will be constructed using a detour. However, if stage construction is used, the pay item "Temporary Soil Retention System" should be used because soil strengths exceed 4.5 tsf.*

Illinois Department of Transportation
Division of Highways
Illinois Department of Transportation, District 3

SOIL BORING LOG

Date 12/19/07

ROUTE FAP 796 (IL 115) **DESCRIPTION** IL 115 over Reddick Creek, 0.9 miles North of Cabery **LOGGED BY** Larry Myers

SECTION (104-B)I **LOCATION** SW 1/4, **SEC.** 4, **TWP.** 29N, **RNG.** 9E, 3rd **PM**

COUNTY Kankakee **DRILLING METHOD** Hollow Stem Auger **HAMMER TYPE** CME Automatic

STRUCT. NO. 046-0066 (Exist.)
Station 986+00

BORING NO. #1: SE Wing
Station 986+40
Offset 12.00ft Lt.
Ground Surface Elev. 676.34 ft

Surface Water Elev. 669.32 ft
Stream Bed Elev. ft

Groundwater Elev.:
First Encounter 669.3 ft ▼
Upon Completion Dry ft
After Hrs. ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Augered Bituminous Pavement and Black Silty Clay Loam Topsoil Fill			
673.84			
Very Stiff Black Silty Clay Loam Topsoil Fill with Organics	3		
	4 4	3.0 P	30.2
-5			
	2		
	2 3	2.5 P	23.9
Water encountered at 7' 669.34 ▼			
Soft Brown and Gray Silt, Silty Clay and Silty Loam - Layered	1		
	1 1	0.5 P	27.4
666.84			
Very Stiff Brown Silty Clay Loam Till -10			
	3		
	3 4	2.4 B	20.0
663.84			
Very Stiff Gray Silty Clay Loam Till	4		
	6 10	3.6 S	15.1
-15			
	4		
	9 11	3.8 S	14.2
	5		
	7 7	3.6 S	15.5
-20			

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Very Stiff Gray Silty Clay Loam Till *(continued)*	4		
	5 7	3.6 S	16.6
	4		
	5 7	3.6 S	17.0
-25			
	5		
	5 7	3.7 S	18.0
	5		
	6 7	3.7 S	19.2
-30			
	4		
	6 7	3.6 B	19.1
-35			
	3		
	5 7	3.5 B	20.5
639.84			
End of Boring			
-40			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, from 137 (Rev. 8-99)

Illinois Department of Transportation
Division of Highways
IDOT

SOIL BORING LOG

Date 1/9/13

ROUTE FAP 796 (IL 115) **DESCRIPTION** IL 115 over Reddick Creek, 0.9 miles North of Cabery **LOGGED BY** Larry Myers

SECTION (104-B)I **LOCATION** SE 1/4, **SEC.** 5, **TWP.** 29N, **RNG.** 9E,
Latitude 41.012644, **Longitude** -88.209175

COUNTY Kankakee **DRILLING METHOD** Hollow Stem Auger **HAMMER TYPE** CME Automatic

STRUCT. NO. 046-0066 (Exist.)
Station 986+00

BORING NO. 1 (N.W. Quad.)
Station 985+72
Offset 13.0 ft Rt.
Ground Surface Elev. 676.84 ft

Surface Water Elev. 669.89 ft
Stream Bed Elev. 669.71 ft

Groundwater Elev.:
First Encounter Dry ft
Upon Completion Dry ft
After ____ **Hrs.** ____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Augered HMA, Black Silty Clay Loam Fill			
674.34			
Very Stiff Black Silty Clay Loam Fill	3		
	3 5	3.5 P	24
671.84	-5		
Very Stiff Brown & Gray Silty Clay Loess	3		
	3 4	3.0 P	23
669.34			
Very Stiff Brown Silty Clay Loam Till	2		
	3 3	3.0 P	22
	-10		
	3		
	3 3	3.0 P	22
664.84			
Hard Gray & Brown Silty Clay Loam Till	5		
	6 7	5.1 S	18
	-15		
	3		
	4 5	4.4 S	15
	3		
	4 5	4.4 S	17
657.34			
	-20		

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Hard Gray Silty Clay Loam Till - very uniform *(continued)*	3		
	4 5	4.4 S	16
	4		
	4 6	4.5 S	16
	-25		
	4		
	5 6	4.5 S	17
	5		
	6 6	4.5 S	17
	-30		
	6		
	6 7	4.5 S	18
	-35		
	5		
	6 7	4.5 S	17
640.34			
End of Boring			
	-40		

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
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BBS, form 137 (Rev. 8-99)

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SOIL BORING LOG

Date 1/9/13

ROUTE FAP 796 (IL 115) **DESCRIPTION** IL 115 over Reddick Creek, 0.9 miles North of Cabery **LOGGED BY** Larry Myers

SECTION (104-B)I **LOCATION** SE 1/4, **SEC.** 5, **TWP.** 29N, **RNG.** 9E,
Latitude 41.012418, **Longitude** -88.209176

COUNTY Kankakee **DRILLING METHOD** Hollow Stem Auger **HAMMER TYPE** CME Automatic

STRUCT. NO. 046-0066 (Exist.)
Station 986+00

BORING NO. 2 (S.W. Quad.)
Station 986+57
Offset 12.0 ft Rt.
Ground Surface Elev. 676.81 ft

Surface Water Elev. 669.89 ft
Stream Bed Elev. 669.71 ft

Groundwater Elev.:
First Encounter Dry ft
Upon Completion Dry ft
After ____ **Hrs.** ____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Augered HMA, White Shoulder Gravel, Black Silty Clay Loam Fill			
674.31			
Very Stiff Black Silty Clay Loam Fill	3		
	4 4	3.0 P	23
671.81 -5			
Very Stiff Brown & Gray Silty Clay Loess	3		
	2 3	3.0 P	21
669.31			
Very Stiff Brown Silty Clay Loam Till	3		
	2 3	3.1 S	21
-10			
	2		
	2 4	3.9 S	20
664.81			
Hard Brown & Gray Silty Clay Loam Till	6		
	9 12	5.2 S	17
661.81 -15			
Hard Gray Silty Clay Loam Till - very uniform	4		
	6 6	4.6 S	15
	4		
	5 6	4.6 S	15
-20			

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Hard Gray Silty Clay Loam Till - very uniform *(continued)*	4		
	5 5	4.5 S	16
	4		
	5 6	4.5 S	17
-25			
	4		
	5 5	4.5 S	17
	4		
	5 7	4.5 S	14
-30			
	4		
	5 6	4.5 S	15
-35			
	4		
	5 5	4.5 S	14
640.31			
End of Boring			
-40			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

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