#### STRUCTURE GEOTECHNICAL REPORT

Interstate 80 Bridge over Rowell Avenue & WCL RR Section 2013-008B & 2013-009B, Station 760+85.00 IDOT Job Number D-91-061-09 (PTB 152, Item 004) Existing SN 099-0066 (EB) & 099-0067 (WB) Proposed SN 099-0904 (EB) & 099-0905 (WB) Joliet, Will County, Illinois

#### Submitted to:

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**GSI Job No. 13125** 

May 6, 2015



Revised: May 6, 2015 March 18, 2015 November 24, 2014 July 3, 2014

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Attn: Mr. Dan Filice, P.E., S.E.

Bowman, Barrett and Associates, Inc.

Job No. 13125

Re:

Structure Geotechnical Report

Interstate 80 Bridge over Rowell Avenue & WCL RR Section 2013-008B & 2013-009B, Station 760+85.00 Proposed SN 099-0904 (EB) and 099-0905 (WB) Existing SN 099-0066 (EB) and 099-0067 (WB)

Joliet, Will County, Illinois

IDOT Job Number: D-91-061-09 (PTB 152, Item 004)

Dear Mr. Filice:

The following report presents the geotechnical analysis and recommendations for the reconstruction and widening of the existing bridge structures carrying Interstate 80 Bridge over Rowell Avenue & WCL RR. A total of nineteen (19) structural soil borings (BSB-33 through BSB-51) were completed. Copies of these boring logs, along with plan and profiles are included in this report.

If there are any questions regarding the information submitted herein, please do not hesitate to contact us.

Very truly yours,

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enc.

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## **SECTION 01: INTRODUCTION**

This report presents the results of the geotechnical investigation for the bridge replacement and widening of the Interstate 80 over Rowell Avenue & WCL RR Project, IDOT Job Number: D-91-061-09 (PTB 152, Item 004). The results of the nineteen (19) structure borings (BSB-33 through BSB-51) completed by Geo Services, along with plan and profile drawings, are included with this report.

Boring locations were selected by Geo Services, Inc. and were reviewed and approved by HBP Illinois Partners, JV (HBP), and the Illinois Department of Transportation (IDOT). Boring locations were marked in the field by Geo Services, Inc. (GSI) personnel after review of accessibility and utility locations. Estimated ground surface elevations at the as-drilled boring locations were taken from the topographic and cross-section drawings provided by HBP. The as-drilled locations for the borings are shown on the Boring Location Diagram found in Appendix C section of the report.

This report includes a description of subsurface conditions, location diagram, profiles and boring logs, as well as recommendations pertaining to the design and construction of the new bridge foundations, earth embankment, and general construction considerations for the site.

## **SECTION 02: PROJECT DESCRIPTION**

The existing bridges S.N. 099-0066 carrying I-80 Eastbound and S.N. 099-0067 carrying I-80 Westbound over Rowell Avenue and WCL Railroad was originally constructed in 1965 as FAI Route 80, Section 99-4-1VB. The eight-span EB structure is approximately 559' back to back of abutment, and consists of two continuous span units separated by a single span. Unit 1 consists of a three-span continuous wide flange beam and reinforced concrete deck and the single span unit is similar. Unit 2 consists of a four-span continuous plate girder and reinforced concrete deck. The nine-span WB structure is approximately 634' back to back of abutment, and consists of two continuous span units separated by a single span. Unit 1 consists of a four-span continuous wide flange beam and reinforced concrete deck and the single span unit is similar. Unit 2 consists of a four span continuous plate girder and reinforced concrete deck. The existing bridge decks are 36 feet out to out and consist of 6'-1/4" reinforced concrete composite slab with 2'-3/4" latex concrete overlay. The superstructures are supported on concrete stub abutments on piles and 2-column piers on spread footings and piles. The skew is 10°04'00" forward right Unit 1 and 34°05'00" forward left Unit 2. The decks were repaired in 1999 and 2011. The existing structure shall be removed.

There is an existing small pond between piers 1 and 2. The natural water level for this pond is estimated at 567.4 feet.

It is intended to remove and replace the bridge structure. The bridges are proposed to be widened at each side of the median lanes/shoulders to approximately  $\pm$  63 feet for the eastbound structure, and  $\pm$  63 feet for the westbound structure.

The new bridges (SN 099-0904 EB and SN 099-0905 WB) will be 5-span bridge structures and will have an overall width of approximately 126 feet, out to out with an approximate length of 593 feet, back-to-back abutments. The new bridges are proposed to be supported on stub-type abutments. A "wrap-around" MSE wall structure is also proposed at the East Abutment section of the bridge to support the widened sections of the bridge. The proposed substructure pile cap and foundation footing elevations were provided by HBP and are shown on the following Table 1.

Table 1 – Proposed Bridge Substructure Elevations

Substructure	Approximate Station based on I-80 centerline	Proposed bottom of pile cap/foundation elevation (feet)
West Abutment	Sta. 759+96	595.30 <sup>1</sup>
Pier 1	Sta. 761+15	See note 2
Pier 2	Sta. 762+31	See note 2
Pier 3 <sup>2</sup>	Sta. 763+39	See note 2
Pier 4 <sup>2</sup>	Sta. 764+59	See note 2
East Abutment	Sta. 765+76	613.40 <sup>1</sup>

Notes:

- 1. Piles assumed to be embedded 1.0-ft into the pile cap.
- 2. Drilled shafts will be used at the Piers as proposed. See table estimated end-bearing of drilled shaft elevations in Table 5 of this report

Based on the foundation loads provided by HBP, the total service loads at the top of foundation are shown on the following Table 2 - Preliminary Loads for the Substructures:.

Table 2 – Preliminary Loads for the Bridge Substructures

Location	Total Stren	gth I (kips)	Total Service (kips)		
Location	Eastbound	Westbound	Eastbound	Westbound	
West Abutment	2,032.12	2,127.11	1,444.76	1,516.19	
Pier 1	4,657.08	4,890.45	3,361.44	3,536.53	
Pier 2	3,696.26	4,351.90	2,648.16	3,113.86	
Pier 3	4,406.36	5,074.67	3,199.86	3,692.79	
Pier 4	5,131.51	5,280.04	3,732.83	3,844.08	
East Abutment	2,128.37	2,233.36	1,521.52	1,602.98	

### **SECTION 03: SUBSURFACE INVESTIGATION PROCEDURES**

The borings were performed during the months of November, 2013, and January to April, 2014 with a truck-mounted drilling rig. Borings performed near the abutments (BSB-33, BSB-34, BSB-50 and BSB-51), along Rowell Avenue (BSB-35 and BSB-36), and outside EJ&E RR below the bridge structure (BSB-46 thru BSB-49) were advanced by means of hollow stem augers and continued with rotary drilling techniques. The remainder of the borings (BSB-37 thru BSB-45) were performed from the top of the bridge deck down to ground surface along Interstate 80 (over Rowell Avenue & EJ&E RR) using steel casing thru the bridge deck to the ground surface and continued with rotary drilling techniques. Representative soil samples were obtained employing split spoon sampling procedures in accordance with AASHTO Method T-206. Bedrock cores were obtained in the bridge structure borings using an NX-size double tube core barrel with a diamond impregnated bit. Samples obtained in the field were returned to our laboratory for further examination and testing.

Split spoon sampling involves driving a 2.0-inch outside diameter split-barrel sampler into the soil with a 140-pound weight falling freely through a distance of 30 inches. Blow counts are recorded at 6" intervals and the blow counts are shown on the boring logs. The number of blows required to advance the sampler the last 12 inches is termed the Standard Penetration Resistance (N). The N value is an indication of the relative density of the soil.

## **SECTION 04: LAB TESTING PROGRAM**

The test procedures were performed in accordance with test procedures discussed in the IDOT Geotechnical Manual. All split-spoon samples obtained from the drilling operation were visually classified in the field. Cohesive samples were tested for unconfined compressive strength using an IDOT modified RIMAC test device and/or calibrated penetrometer in the field.

The soil testing program included performing water content, density and either unconfined compression and/or calibrated penetrometer tests on the cohesive samples recovered. Water content tests were performed on the non-cohesive samples recovered. These tests were performed upon representative portions of the samples obtained in the field. In addition, unconfined compressive testing was performed on rock cores obtained from the field and are indicated on the rock core logs.

The results of the above testing, along with a visual classification of the material based upon both the Illinois textural classification and the AASHTO Soil Classification System, are indicated on the boring logs.

## **SECTION 05: SUBSURFACE CONDITIONS**

Boring logs can be found in Appendix C. The stratification lines shown on the boring logs represent the approximate boundary between soil types, and the actual transition may be gradual.

Surface conditions at the boring locations taken along the roadway or shoulder areas of Interstate 80 consist of existing asphalt and/or concrete pavement to crushed stone to underlying dense to very dense sand, gravel and crushed stone fill materials (ranging from 1 to 3 feet deep) for borings performed at the existing abutments. Below the Interstate 80 bridge along Rowell Avenue and EJ&E RR where borings BSB-35, BSB-36, BSB-46 to BSB-49 were drilled, surface conditions vary from existing asphalt to underlying crushed stone, sand, cinders and stone fill to depths of approximately 1 to 3 feet. Beneath the surficial materials, interstratified layers of medium dense sand and gravel, stiff to hard stiff clay loam, organic loam fill and peat were encountered to varying depths of 10 to 55 feet below ground surface. Peat and/or organic loams were encountered at borings BSB-35 (EL. 562 to 569), BSB-41 (EL. 573 to 577), and BSB-44 (EL. 577 to 579).

The fill soils had moisture contents within the range of 2% to 23% with an average of 19%. Moisture contents of the cohesive soils are within the range of 15% to 24% with an average of 18%. The medium dense to very dense granular fill soils had moisture contents within the range of 5% to 18% with an average of 7%. Peat and organic soils had moisture contents within the range 27% to 87%.

Below the surface and fill materials, bedrock was encountered at varying elevations from 541 to 579. The rock cores obtained indicated Silurian System, Niagaran Dolomite. A summary of the bedrock information obtained during our exploration is tabulated in Table 3.

**Table 3 – Bedrock Information Summary** 

Boring (Run)	Station	Offset	RQD	Approximate Elevation of Qu Test (feet)	Unconfined Compressive Strength, Qu (tsf)
BSB-33 (Run 1)	Sta. 759+80	22.4' Left	94.5%	542.7	1,184
BSB-34 (Run 1)	Sta. 759+51	58.2' Right	95.0%	539.9	1,037
BSB-35 (Run 1)	Sta. 760+71	76.0' Left	85.0%	558.2	957
BSB-36 (Run 1)	Sta. 760+81	6.4' Right	69.0%	559.4	1,171
BSB-37 (Run 1)	Sta. 761+21	56.5' Left	31.0%	559.1	888
BSB-38 (Run 1)	Sta. 761+37	31.4' Right	67.0%	561.6	644
BSB-39 (Run 1)	Sta. 762+85	56.6' Left	49.0%	565.0	578
BSB-40 (Run 1)	Sta. 762+57	34.0' Left	36.0%	562.1	1,092
BSB-41 (Run 1)	Sta.762+84	31.3' Right	29.0%	562.7	832
BSB-42 (Run 1)	Sta. 762+03	53.3' Right	42.5%	523.9	710
BSB-43 (Run 1)	Sta. 764+04	56.7' Left	30.0%	564.1	940
BSB-44 (Run 1)	Sta. 763+56	37.7' Left	35.0%	564.9	1,119
BSB-45 (Run 1)	Sta. 731+16	53.1' Right	13.3%	568.0	593
BSB-45 (Run 2)	Sta. 763+16	53.1' Right	64.0%	521.7	946
BSB-46 (Run 1)	Sta. 765+12	66.7' Left	38.0%	567.5	1,172
BSB-47 (Run 1)	Sta. 764+65	7.2' Right	43.0%	567.1	1,566
BSB-48 (Run 1)	Sta. 765+02	20.2' Left	39.0%	566.6	1,450
BSB-49 (Run 1)	Sta. 764+48	62.0' Right	60.0%	570.4	564
BSB-50 (Run 1)	Sta. 766+69	55.4' Left	16.0%	570.2	906
BSB-51 (Run 1)	Sta. 765+96	26.4' Right	34.0%	574.7	900

### **SECTION 06: WATER TABLE CONDITIONS**

Groundwater was encountered before switching to rotary drilling techniques in 3 of the borings at elevations approximately 621 feet for the abutment borings (BSB-50), and elevations ranging from approximately 564 to 566 feet for the borings drilled below the bridge (BSB-35 and BSB-36). Due to the nature of rotary-wash drilling, it was not possible to obtain accurate water levels after drilling. Perched water levels may occur within granular layers above the rock. Fluctuations in the amount of water accumulated and in the hydrostatic water table can be anticipated depending on variations in precipitation and surface runoff.

### **SECTION 07: ANALYSIS**

#### **Mining Activity**

According to readily available ISGS sources, there are no documented coal mining operations in near vicinity to the project site and seismic activity is noted to be very low.

#### Site Seismic Parameters

For LFRD design, according to the AASHTO LRFD Bridge Design Specification 2012 (with 2013 Interims), the project site has a horizontal Response Spectral Acceleration of 0.040 at a period of 1.0 second and 5% critical dampening ( $S_1$ ). The site also has a horizontal Response Spectral Acceleration of 0.104 at a period of 0.2 seconds and 5% critical dampening ( $S_s$ ). The following table shows recommended seismic design data in accordance to the AASHTO LRFD Bridge Design Specification 2012 (with 2013 Interims).

Table 4 – Seismic Design Data

Seismic Performance Zone (SPZ)	1
Spectral Acceleration at 1 second (S <sub>D1</sub> )	0.068
Design Spectral Acceleration at 0.2 seconds (S <sub>Ds</sub> )	0.125
Soil Site Class	С

The project site is considered to be in a low seismic area and is considered a non-extreme event. Liquefiable layers are not expected to impact the design of the new bridge.

#### <u>Settlement</u>

Based on the TSL/cross-sections, the proposed bridge profile will be raised an estimated height of 1 to 2 feet from the top of the bridge abutment. In addition, the widened section of the bridge will be supported by an MSE wall with estimated maximum new fill heights of 20 feet at the eastbound I-80 and 23 feet at the westbound I-80. For this purpose, we estimate approximately 23 feet of maximum new fill is anticipated for the abutments over the stiff to hard clay to clay loam fill soils at the abutments. Settlement is calculated to be less than 0.4 inches at the abutments. For the piers founded on very dense granular soils, structural fill or shallow bedrock, settlement is estimated to be less than 0.4 inches. No settlement issues are expected for the bridge structure.

#### Slope Stability (for the retaining wall)

A "wrap-around" MSE retaining wall is proposed at the East Abutment as part of the new bridge structure. A maximum wall height of approximately 23 feet and a 2:1 horizontal to vertical geometry were used for slope stability calculations. Using the worst case scenario at boring BSB-50 with portion of the embankment as new fill, we calculate a Factor of Safety (FOS) of over 1.5 for undrained (short-term) and drained (long-term) condition, which satisfies the Factor of Safety requirement (FOS  $\geq$  1.5) per IDOT slope stability criteria. No slope stability issues were identified at the rest of the abutment areas.

## **SECTION 08: FOUNDATION RECOMMENDATIONS**

#### Foundation Recommendations

Based on the results of the borings, type of structure, and proposed loading, feasible foundations for support include a deep foundation system consisting of driven H-piles or drilled shafts at both abutments section of the bridges, and shallow spread footings or drilled shafts for the piers. Metal Shells are not recommended since the tip elevation will experience hard driving as reaches close to top of bedrock, which may cause damage the Metal Shell piles.

Shallow spread footings may be used for the piers where bedrock is approximately 10 feet or less below ground surface. For bedrock deeper than 10 feet below ground surface, the use of drilled shafts may be considered for the piers. However, axial/vertical and lateral loads will dictate the sizes and depths of the footing or drilled shafts required.

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We recommend that analysis for each foundation option presented below be considered before choosing a foundation system for the design.

#### H-Pile Recommendations at the Abutments

Based on the results of the borings and proposed foundation loadings, driven H-piles may be used for the support of the proposed abutments.

The selection of pile type should be determined by economic considerations if either pile types are feasible for the design of the bridge. Pile data for H-piles is included in Appendix E. Pile capacities and lengths were calculated to the piles' Maximum Nominal Required Bearing and Factored Resistance Available, based on a LRFD resistance factor of 0.55. We anticipate hard driving to occur at approximate elevation 558 feet at the West Abutment, and 578 feet at the East Abutment, and driving shoes are required to prevent damage to H-piles while driving into the dense sand, gravel and fractured rock.

For the new driven piles at the abutment areas, it is estimated settlement of ¼ inch or less excluding the elastic shortening of the pile due to loading.

Tables and graphs for estimated pile lengths for various pile sizes and pile capacities at each substructure unit are summarized in the Appendix E.

#### **Pile Foundations Considerations**

As per the IDOT Design Guide AGMU Memo 10.2, dated August 2011, the Washington State DOT (WSDOT) formula has replaced the FHWA Gates Formula as the standard method of construction verification. A modified IDOT static method was used to develop the SGR pile design tables. Nominal required bearing was calculated from LRFD skinfriction (with pile type correction factors) and end-bearing calculations. A value of 1.04 is used for Bias Factor Ratio ( $I_G$ ). A geotechnical resistance factor ( $\Phi_G$ ) of 0.55 was used in calculations for the factored resistance available (FRA). Pile lengths were picked with respect to the loadings and geometry of the proposed structures.

When Steel H-piles are used, the Steel H-piles shall be according to AASHTO M270 Grade 50.

The pile tables, provided in Appendix E, are estimates and test piles should be used for final pile length selections. We recommend that a minimum of one test pile be performed at each substructure unit. The piles should be driven until satisfactory driving resistance is developed in accordance with an appropriate pile driving formula. Some variation in pile lengths should be expected due to the variable depths to bedrock. The test piles shall be driven to 110 percent of the Nominal Required Bearing indicated in

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the pile data information. The pile size and capacity selected should be based on economic considerations and the loads imposed on the structures.

#### **Drilled Shafts Recommendations at the Abutments and Piers**

The foundations at the abutment sections of the proposed bridge may be constructed using end-bearing, drilled straight-shafts founded in very dense top of bedrock at approximate elevation ranges of 565 to 560 feet at the West Abutment and 575 to 578 feet at the East Abutment.

At the bridge piers where bedrock is deeper than 10 feet below ground surface, the foundations may be constructed using end-bearing, drilled straight-shafts rock-socketed to bedrock. A factored end-bearing unit resistance of 140 ksf is recommended for design for drilled shafts socketed 3 feet into sound bedrock. From the AASHTO LRFD Bridge Design Specifications Manual Table 10.4.6.4-1, the bedrock is considered fair to good quality. The Carter and Kulhawy equation was used to compute the bearing and an  $\Phi$ b=0.50 was used for the factor of safety. To the extent rock-socketing is provided, a factored friction value of 6.0 ksf/ft for side resistance can be used for rock-socketed shafts over the depth of the rock-socket to resist uplift loads. A minimum diameter of 24 inches for the rock-socket size is recommended.

An experienced, geotechnical engineer should be present during excavation to check that suitable sound rock has been reached. A permanent casing or removable forms may be used in lieu of a temporary cofferdam, and should be extended beneath the granular strata to top of bedrock elevation ranging at approximately 540 to 543 feet at the West Abutment, 575 to 578 feet at the East Abutment, and 560 to 575 feet at the Piers.

For the unit skin friction at the upper strata of the borings, the stiff to very stiff clay loam fill and medium dense to dense sand and gravel will have estimated factored resistances of 700 and 500 psf per foot, respectively. Note that the overburden side resistances in soil should be ignored due to temporary casing and drilling used for drilled shaft installation in rock (per Bridge Manual Section 3.10.2.1).

The following table is a summary of the approximate elevation of sound bedrock for foundation support.

**Table 5- Approximate Elevation of Sound Bedrock** 

Substructure	Boring(s)	Bottom of Estimated End-bearing Elevation (feet)	Top of Bedrock Elevation (feet) <sup>1</sup>
West Abutment WB <sup>2</sup>	BSB-33	543.0	544.6
West Abutment EB <sup>2</sup>	BSB-34	539.5	541.2
Pier 1 WB	BSB-35 and BSB-37	559.5	560.9 (BSB-35) & 563.7 (BSB-37)
Pier 1 EB	BSB-36 and BSB-38	561.5	563.5 (BSB-36) & 565.8 (BSB-38)
Pier 2 WB	BSB-39 and BSB-40	562.5	568.7 (BSB-39) & 567.9 (BSB-40)
Pier 2 EB	BSB-41 and BSB-42	562.5	569.2 (BSB-41) & 567.4 (BSB-42)
Pier 3 WB	BSB-43 and BSB-44	564.0	571.9 (BSB-43) & 568.9 (BSB-44)
Pier 3 EB	BSB-41 and BSB-45	564.0	569.2 (BSB-41) & 568.5 (BSB-45)
Pier 4 WB	BSB-46 and BSB-48	568.0	574.3 (BSB-46) & 572.1 (BSB-48)
Pier 4 EB	BSB-47 and BSB-49	570.0	571.8 (BSB-47) & 575.1 (BSB-49)
East Abutment WB <sup>3</sup>	BSB-50	570.0	574.9
East Abutment EB <sup>3</sup>	BSB-51	573.5	576.6

Note:

- 1. Verify in field.
- 2. Proposed Bottom of Pile Cap Elevation at West Abutment is approximately 595.3 feet.
- 3. Proposed Bottom of Pile Cap Elevation at East Abutment is approximately 613.4 feet.

Note that the bedrock had some vertical and horizontal fractures and the transition from the fractured and/or weathered rock to the sound bedrock may not be pronounced. It is strongly recommended that an experienced geotechnical engineer be onsite during the foundation excavation to check that suitable sound rock has been reached.

Based on the estimated bearing pressures and the magnitude of the loads expected, we estimate a maximum settlement of 0.40 inches or less for rock-socketed shafts foundations supported on bedrock as described above. Differential settlements would be dependent on the adjacent loads but is typically 1/2 to 2/3 of the total settlement. It should be noted that these settlement values are for compression of the bearing materials only and that elastic compression of the concrete shaft should be added to these values.

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For the drilled shaft caps, we recommend that shaft caps be situated at a minimum depth of 2.5 feet below final grade to provide frost protection with the exception that if pressure grouting of the bedrock is performed below the cap to "seal" the fractured bedrock from water infiltration, then minimum embedment to prevent frost heave may not need to be adhered to for design.

#### Shallow Spread Footing Recommendations at the Piers

Based on the information obtained from the borings and proposed high loads anticipated for the new bridge piers, shallow spread footing may be used for foundation support where bedrock depths about less than 10 feet below grade. Due to the variation of the bedrock elevation, piers may need to extend the foundations to bear on sound bedrock material. The spread footing foundations may be socketed into the sound bedrock at elevations tabulated in Table 5 – Approximate Elevation of Sound Bedrock, and can be designed for a factored bearing resistance of 140 ksf.

If materials with less than adequate bearing strength are noted at the foundation level during footing construction, the weaker material encountered at the base of the footings should be undercut to reach suitable rock, and the undercut area filled with lean concrete.

To provide adequate frost protection, we recommend that footing foundations be situated at a minimum depth of 4 feet below final grade with the exception that if pressure grouting of the bedrock is performed beneath the footing foundations to "seal" the fractured bedrock from water infiltration, then minimum embedment to prevent frost heave may not need to be adhered to for design.

#### Approach Slab Recommendations

The new approach slab will be supported on either new or existing embankment fill. Shallow footings for the "sleeper" below the slab should be designed for a maximum factored bearing resistance of 2.0 ksf situated on new embankment fill. The new fill should be compacted per IDOT specifications for earth embankment. Any organics or soft, yielding subgrade (if any) should be removed prior to new fill placement. A qualified geotechnical engineer should observe the subgrade prior to any base course is placed. Settlement of the approach slab is calculated on the order of less than 0.4 inches.

# **SECTION 09: LATERAL SOIL PROPERTIES**

The soil and bedrock parameters for lateral resistance shown in Tables 6 and 7 may be used for design of temporary retention system, as well as for the design of the drilled shafts.

Table 6 - Soil Parameters for Lateral Resistance

Material	Unit Weight (pcf)	Drained Friction Angle (°)	Undrained Cohesion (psf)	Lateral Modulus of Subgrade Reaction (pci)	Strain
Clay Loam Fill	125	30	2,000	750	0.006
Stiff Silty Clay	125	28	1,500	500	0.006
Medium Dense Loams, Sand, Cinders and Gravel	125	30	-	100	-
Dense Sand, Stone, Gravel and Crushed Concrete	125	32	-	150	0.004
Loose Peat <sup>2</sup>	80	10	-	10	0.020
Organic Silty Clay and Silty Loam <sup>3</sup>	100	20	1	30	0.020
Very Stiff Clay	125	32	2,500	800	0.005
Dense to Very Dense Loams, Sand, Gravel & Fractured Rock	132	34	-	250	-

Notes:

- 1. Values recommended for use in design from L-pile Software Manual.
- 2. Encountered at boring BSB-44 only.
- 3. Encountered at borings BSB-35 and BSB-41.

Table 7 – Bedrock Parameters for Lateral Resistance

Material	Unit Weight (pcf)	Young's Modulus (psi)	Uniaxial Compressive Strength (psi)	RQD (%)	Strain (k <sub>m</sub> )
Bedrock	150	2 x 10 <sup>6</sup>	See Lab Data on Rock Core Logs	13.3% to 95.0%	0.0001

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All soils which become softened or loosened at the base of foundation excavation areas or subgrade areas should be carefully recompacted or removed prior to placement of foundation concrete or fill material. No foundation concrete or structural fill should be placed in areas of ponded water or frozen soil.

During excavation for the proposed improvements, movement of adjacent soils into the excavation should be prevented. All excavations should be performed in accordance with the latest Occupational Safety and Health Administration (OSHA) requirements. Allowances should be made for any surcharge loads adjacent to the retaining structures.

# **SECTION 10: GENERAL CONSTRUCTION CONSIDERATIONS**

Traffic will be maintained utilizing staged construction. Lateral soil properties provided in Tables 6 and 7 may be used for temporary soil retention system design.

At the bridge abutments, upper soil stratigraphy mainly consist of stiff to very stiff clay loam fill material. The use of the IDOT Temporary Sheet Piling Design Charts at the West Abutment is feasible. However, due to the fill nature of the retention at the East Abutment, and high blow count loams, sands, gravels, stone, and shallow bedrock at the proposed Piers 1 thru 4 locations, IDOT Temporary Sheet Piling Design Charts are not feasible for stage construction, and the contractor will likely need to design and install a temporary soil retention system.

#### Cofferdam Recommendations for Spread Footing Foundations

Based on the temporary cofferdams criteria stated in Sections 2.3.6.4.2 and 3.13.3 of the IDOT Bridge Manual (2012) and GBSP No. 73 (Article 502.06b), the following cofferdam criteria are summarized as follows:

- Bottom elevation of footing excavation that is less than 6 below the water surface elevation will typically require Type 1 Cofferdam.
- Bottom elevation of footing excavation that is six feet or greater below the water surface elevation will typically require Type 2 Cofferdam.

For the spread footing foundations at the piers, excavation at near the proposed Pier 1 location (approximate elevation 559.5 feet), and proposed Pier 2 location (approximate elevation 562.5 feet) are to be below the estimated water surface elevation (approximate elevation 567.4 feet) of the existing pond. When a seal coat is required to provide a working platform for construction of the proposed Piers 1 and 2 locations, a Type 2 Cofferdam shall be used. A minimum factor of safety of buoyancy of 1.2 is required by IDOT. Pump and pit procedures are needed to keep the site "in the dry" during construction.

IDOT JOB NO: D-91-196-09 PROPOSED SN 099-0904 AND 099-0905 PTB 152, ITEM 004

As alternative to cofferdams at Piers 1 and 2, the contractor may also explore the use of sandbag temporary cofferdam system with dewatering wells where shallow bedrock is present to keep the site "in the dry" during construction.

#### Cofferdam Recommendations for Drilled Shaft Foundations

For the drilled shaft construction, excavation at near the proposed Pier 1 location (drilled shaft cap elevation estimated at 559.5 feet), are to be below the estimated water surface elevation (approximate elevation 567.4 feet) of the existing pond. A Type 2 Cofferdam may be necessary during construction of the proposed Pier 1 location.

For the proposed Pier 2, the use of permanent casing or other removable forms may be used to eliminate the need for a cofferdam.

Pump and pit procedures are needed at the piers to keep the site "in the dry" during construction. A seal coat will be needed for the cofferdam to provide a working platform for construction as well. A minimum factor of safety of buoyancy of 1.2 is required by IDOT.

### **SECTION 11: GENERAL QUALIFICATIONS**

The analysis and recommendations presented in this report are based upon the data obtained from the soil borings performed at the indicated locations and from any other information discussed in this report. This report does not reflect any variations that may occur between borings or across the site. In addition, the soil samples cannot be relied on to accurately reflect the strata variations that usually exist between sampling locations. The nature and extent of such variations may not become evident until construction. If variations appear evident, it will be necessary to reevaluate the recommendations of the report. In addition, it is recommended that Geo Services, Inc. be retained to perform construction observation and thereby provide a complete professional geotechnical engineering service through the observational method.

This report has been prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted geotechnical engineering practices. No other warranties, either expressed or implied, are intended or made. In the event that any changes in the nature, design or location of the project as outlined in this report are planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and the conclusions of this report modified or verified in writing by the geotechnical engineer. Also note that Geo Services, Inc. is not responsible for any claims, damages, or liability associated with any other party's interpretation of this report's subsurface data or reuse of the report's subsurface data or engineering analyses without the express written authorization of Geo Services, Inc.

# APPENDIX A GENERAL NOTES

#### **GENERAL NOTES**

#### **CLASSIFICATION**

American Association of State Highway & Transportation Officials (AASHTO) System used for soil classification.

Cohesionle	ess Soils
------------	-----------

Relative	No. of Blows	<u>TERMINOLOGY</u>
<u>Density</u>	per foot N	
		<b>Streaks</b> are considered to be paper thick.
Very Loose	0 to 4	Lenses are considered to be less than 2
Loose	4 to 10	inches thick. Layers are considered to
Medium Dense	10 to 30	be less than 6 inches thick. Stratum are
Dense	30 to 50	considered to be greater than 6 inches thick.
Very Dense	Over 50	·

#### **Cohesive Soils**

Hard

Consistency	Unconfined Compressive Strength - qu (tsf)
Very Soft Soft	Less than 0.25 0.25 - 0.5
Medium Stiff	0.5 - 1.0
Stiff	1.0 - 2.0
Very Stiff	2.0 - 4.0

Over 4.0

#### DRILLING AND SAMPLING SYMBOLS

SS:	Split Spoon 1-3/8" I.D., 2" O.D.	HS:	Housel Sampler
ST:	Shelby Tube 2" O.D., except where noted	WS:	Wash Sample
AS:	Auger Sample	FT:	Fish Tail
DB:	Diamond Bit - NX: BX: AX	RB:	Rock Bit
CB:	Carboloy Bit - NX: BX: AX	WO:	Wash Out
OS:	Osterberg Sampler		

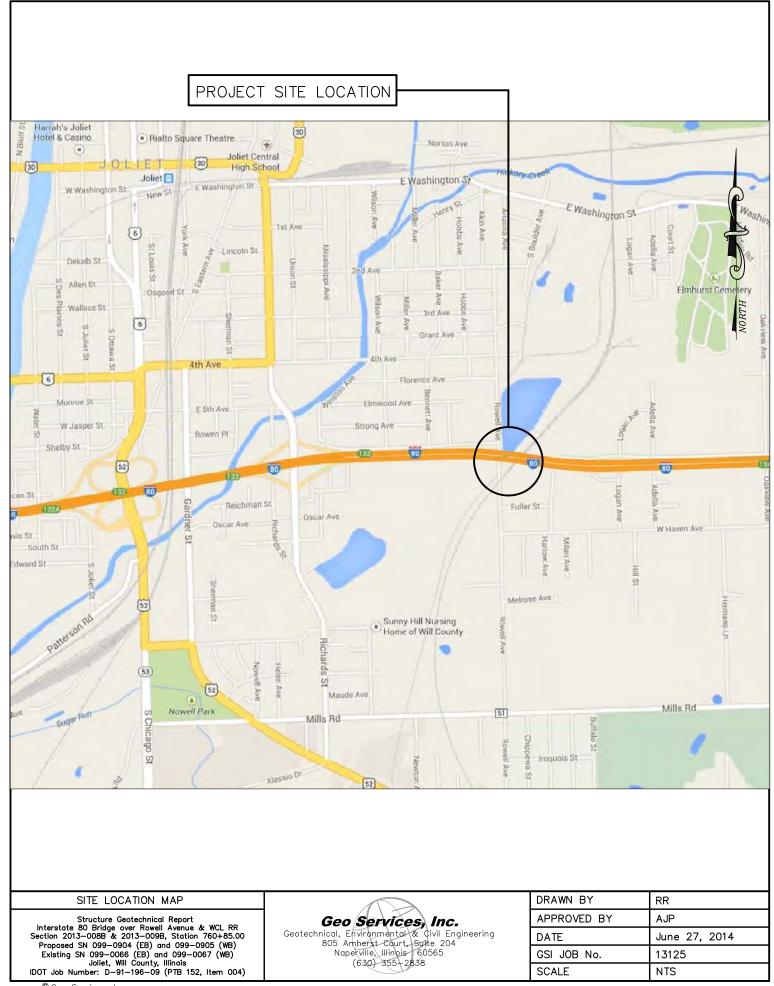
Standard "N" Penetration: Blows per foot of a 140 lb. hammer falling 30" on a 2" O.D. Split Spoon

#### WATER LEVEL MEASUREMENT SYMBOLS

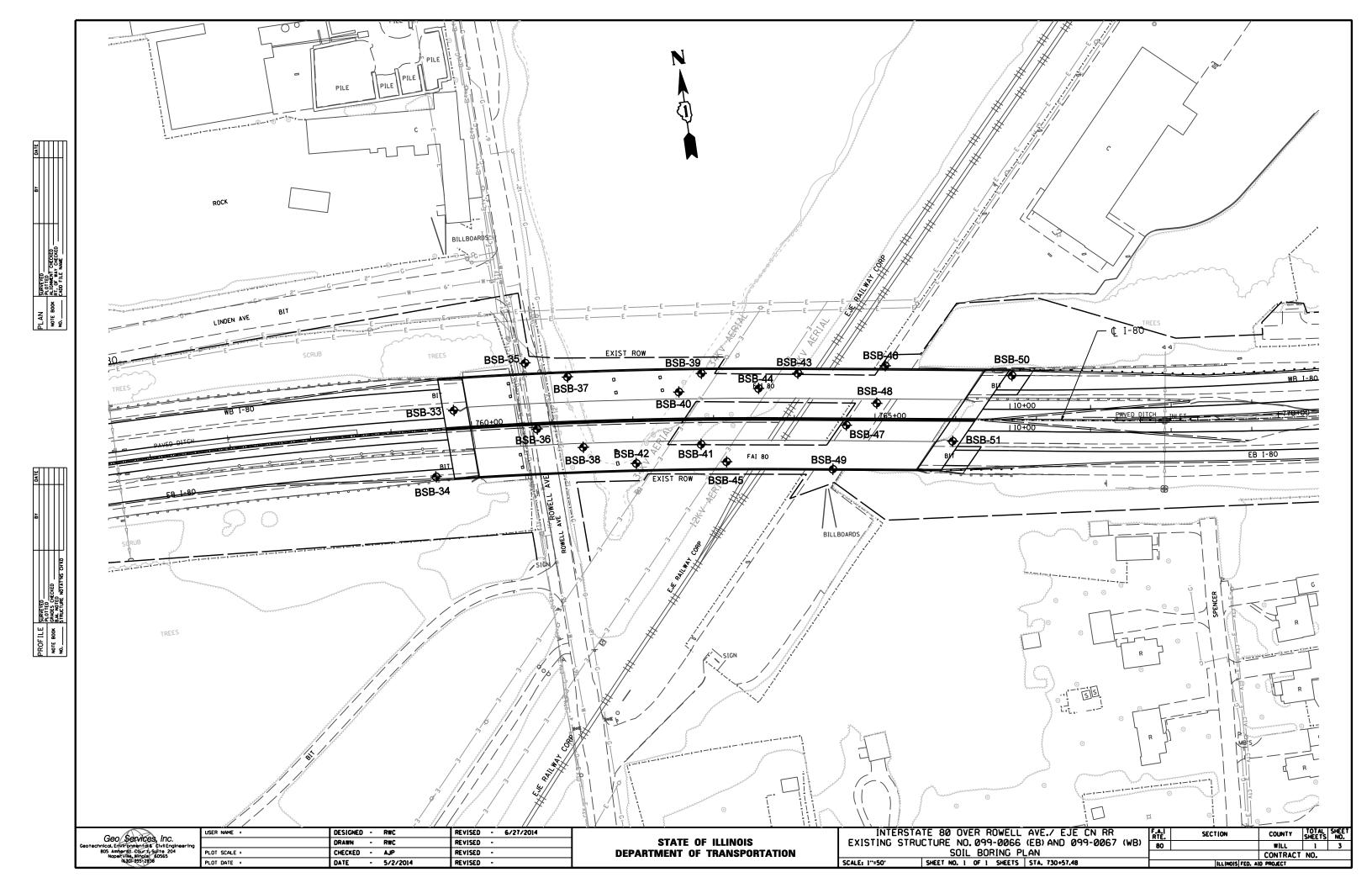
VVL:	Water	WD:	While Drilling
WCI:	Wet Cave In	BCR:	Before Casing Removal
DCI:	Dry Cave In	ACR:	After Casing Removal
WS:	While sampling	AB:	After Boring

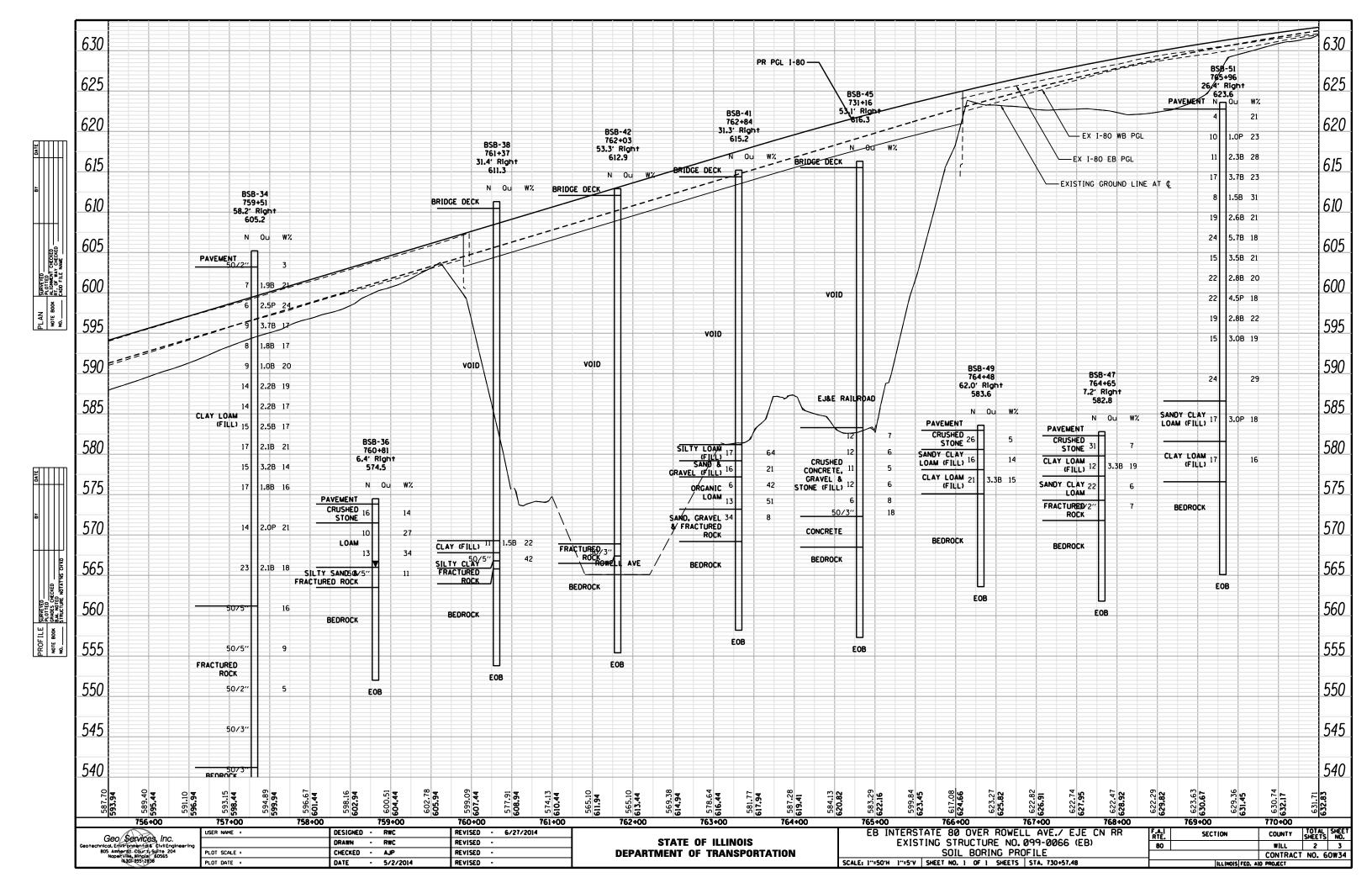
Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days observation, and additional evidence on ground water elevations must be sought.

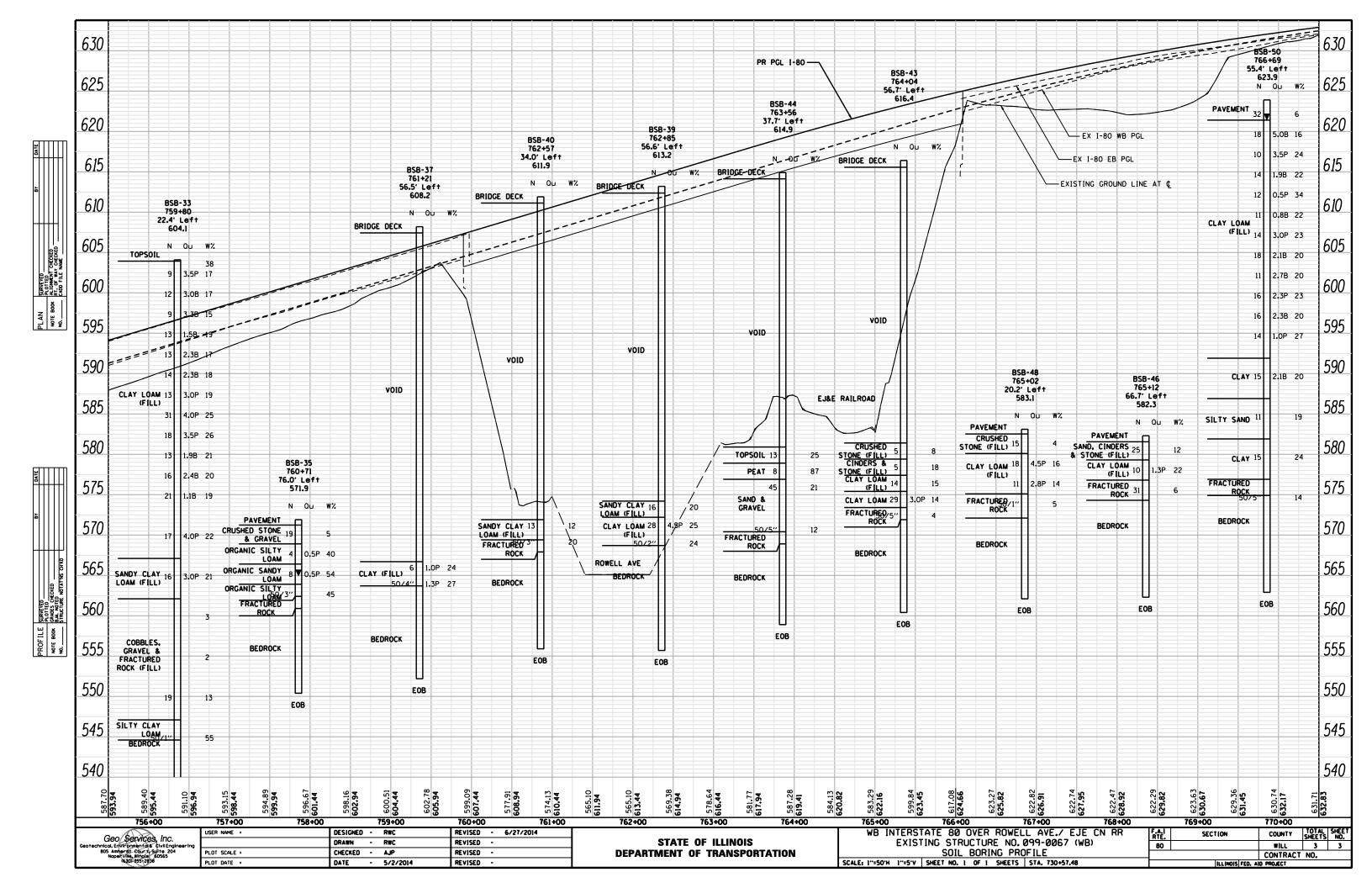
# APPENDIX B SITE LOCATION MAP



# APPENDIX C SOIL BORING LOCATION PLAN & PROFILE







# APPENDIX D BORING & ROCK CORE LOGS



Z:PROJECTS\2013\13125 HNTB, I-80 PHASE II (NEAR TERM)\13125 BORING LOGS\13125 LOG.GPJ 4/2\15

**GSI Job No.** 13125

# **SOIL BORING LOG**

Page  $\underline{1}$  of  $\underline{2}$ 

**Date** 3/13/14

ROUTE	F.A.I RT	E. 80	DE	SCRI	PTION			I-80 Phase II (Near T	erm)	LC	OGGE	D BY		IB
SECTION	2013-008	BB & 2013-00	09B	L	OCAT	ION _	SE 1/4	, <b>SEC.</b> 15, <b>TWP.</b> T35N	, <b>RNG.</b> R10E,	3 <sup>rd</sup> PM				
COUNTY	Will	DRII	LLING	MET	THOD		Hollow	Stem Auger/Rotary	HAMMER	TYPE .	(	OME A	utoma	tic
STRUCT. NO. Station BORING NO.	BS	SB-33	_ _	D E P T H	B L O W S	U C S	M O I S T	Surface Water Elev. Stream Bed Elev. Groundwater Elev.:	n/a_	_ ft	D E P T H	B L O W S	n c %	M O I S T
Station Offset	75 22.4	9+80 10ft Left	_	"		Qu	'	First Encounter Upon Completion	Dry to 10.0' n/a				Qu	-
Ground Surf	ace Elev.	604.11		(ft)	(/6")	(tsf)	(%)	After Hrs.		ft	(ft)	(/6")	(tsf)	(%)
2.0" TOPSOIL CLAY LOAM-	-black	to bord	03.94	_			38	CLAY LOAM-brown-s (Fill) (continued)	stiff to hard		_			
(Fill)	orowri-Suii	lo riai u			4			(1 m) (continued)				6		
					4	3.5	17					7	3.5	26
					5	Р						11	Р	
					4		4=					4	1.0	0.1
				<u> </u>	5 7	3.0 B	17				 -25	5 8	1.9 B	21
											<u>-25</u>			
					3							4		
				_	6	3.3	15				_	6	2.4	20
					3	В						10	В	
				_	3						_	5		
					6 7	1.5 B	19					8 13	1.1 B	19
				<u>-10</u>	/	В					-30	13	В	
					4 5	2.3	17				_			
					8	B	''							
				_	3						_	4		
					7	2.3	18					7	4.0	22
				<u>-15</u>	7	В					- <u>35</u>	10	Р	
				-										
					4	0.0	40							
					5 8	3.0 P	19	SANDY CLAY LOAM	l-brown-verv	567.11				
					_			stiff (Fill)	- · · · · · · · · · · · · · · ·					
					4						_	5		
					23	4.0	25					7	3.0	21
				-20		Р					-40	9	Р	



**GSI Job No.** 13125

# **SOIL BORING LOG**

Page  $\underline{2}$  of  $\underline{2}$ 

Date \_\_3/13/14

	ROUTE	F. <i>P</i>	A.I RTE. 80	DES	SCRI	PTION			I-80 Phase II (Near	Term)	LO	GGE	D BY		JB
	SECTION	201	3-008B & 201	13-009B	_ L	OCAT	ION _	SE 1/4	, <b>SEC</b> . 15, <b>TWP</b> . T35N	N, <b>RNG.</b> R10E, 3	3 <sup>rd</sup> PM				
	COUNTY		Will	DRILLING	MET	THOD		Hollow	Stem Auger/Rotary	HAMMER 1	TYPE _	(	OME A	utoma	tic
			BSB-33		D E P T	B L O W	U C S	M O I S	Surface Water Elev. Stream Bed Elev. Groundwater Elev.:	n/a n/a	_ ft _ ft	D E P T	B L O W	U C S	M O I S
	Station		759+80		Н	S	Qu	T	First Encounter			Н	S	Qu	T
			22.40ft Left lev. 604.		(ft)	(/6")	(tsf)	(%)	Upon Completion After Hrs.	n/a	_ ft	(ft)	(/6")	(tsf)	(%)
	stiff (Fill) (	continued)		562.11					Drillers Observation: Bedrock (continued) Borehole continued coring.		543.61				
	COBBLES FRACTUR dense (Fill	RED ROC	EL, CK-medium								-				
					-45			3			-	- <u>65</u>			
/15											-	_			
LOG.GPJ 4/2											-				
LOGS\13125_					-50			2			-	-70 -			
N13125 BORING											-				
I (NEAR TERM)						13		13			-	_			
, I-80 PHASE II					- <u>55</u>	13					-	- <u>75</u>			
Z:/PROJECTS\2013\13125 HNTB, I-80 PHASE II (NEAR TERM)\13125 BORING LOGS\13125_LOG.GPJ 4/2/15	SILTY CL. loose (A-6		l-brown-very	547.11							-				
Z:\PROJECT				544.61	-60	2 2 50/1"		30			-	-80			



# **ROCK CORE LOG**

**GSI Job No.** \_\_\_\_13125\_\_\_

Page <u>1</u> of <u>1</u>

Date \_\_3/13/14\_\_

ROUTE	F.A.I RTE	. 80	DESCRIPTION _		I-80 Pha	se II (Nea	r Term)			_ LO	GGED	BY	JB
SECTION	2013-008E	3 & 2013-009	B LOCATION	N SE 1	/4, <b>SEC.</b> 15,	<b>TWP</b> . T3	5N, <b>RNG</b>	. R10	E, 3 <sup>rd</sup>	PM			
COUNTY _	Will	CORIN	NG METHODF	Rotary W	ash					R	_	CORE	s
	O		CORING BARR	REL TYPE	& SIZE	NX Do Swivel		D	С	E C	R Q	T	T R E
Station _			Core Diamete		2 544.61	in ft		E P	O R	V E	D	M E	N G
BORING NO Station	D. BSE 759	3-33 9+80	Top of Rock Begin Core E		543.61			T H	E	R Y		_	T H
Offset	22.40 Irface Elev.	0ft Left 604.11	ft					(ft)	(#)	(%)	(%)	(min/ft)	(tsf)
SILURIAN S	SYSTEM, NIAC	SARAN SERI	IES DOLOMITE				543.61		1	100	95	7	,
Light gray to	gray with hori	zontal beddin	ng. Varved from -6. -65.8', -67.6', -67.	2.0' to -6 8', -68.5'	2.5'. Horizoı , -68.9', -69.	ntal 5' & -69.8			·				1184.0
								-65					
								_					
End Of Bori	ng @ -70 5' B	oring backfille	ed with cuttings.				533.61						
Liid Oi Boii	11g @ 70.0. D	oring backling	od with odtings.										
								-73					
								_					
								80					

Color pictures of the cores

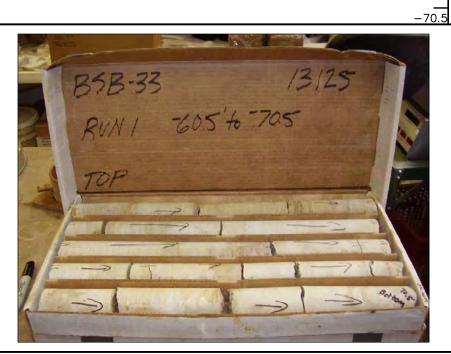
Yes

Cores will be stored for examination until 5 yrs after const.

# ROCK CORE LOG

PAGE <u>1</u> of <u>1</u> DATE <u>3/13/2014</u> LOGGED BY MD

Geo Services, Inc.	ROCK CORE LOG	ATE _	<u>3/13</u>	<u>/201</u>	4		
Geotechnical, Environmental & Civil Engineering 805 Amherst Court, Suite 204 Naperville, Illinois 60565		.OGGED	BY	MD			
(630) 355+2838		SI JOE	3 No.	<u>13</u>	3125_		
ROUTE	DESCRIPTION <u>I-80 Reconstruction (Near Term Phase</u>	2)					
SECTION	LOCATION SEC 15, T35N, R10E, SW 1/4, 3rd PM						
COUNTY Will	CORING METHOD <u>Rotary Wash</u>						
STRUCT. NO Station		ft E P T	C O R E	R E C O	R Q Q	C O R E T	S T R E
BORING NO. <u>BSB-33</u> Station 759+80 Offset 22.4' Left	Top of Rock Elev. 544.6  Begin Core Elev. 543.6	-   H -	R U N	V E R	D	M E	N G T
Ground Surface Elev. 604.11		(ft)		(%)	(%)	(min /ft)	H (tsf)
	DOLOMITE  edding. Varved from -62.0' to -62.5'. Horizontal -63.5', -65.8', -67.6', -67.8', -68.5', -68.9',			100.0	94.5	n/a	1184 <b>6</b>





Z.PROJECTS\2013\13125 HNTB, I-80 PHASE II (NEAR TERM)\13125 BORING LOGS\13125\_LOG.GPJ 4/2/15

**GSI Job No.** 13125

# **SOIL BORING LOG**

Page  $\underline{1}$  of  $\underline{2}$ 

**Date** 3/20/14

ROUTE	F.A.I RTE. 80	DE	SCRI	PTION			I-80 Phase II (Near T	erm)	L(	OGGE	D BY	J	IB
SECTION _	2013-008B & 20	13-009B	ι	OCAT	ION _	SE 1/4	, <b>SEC.</b> 15, <b>TWP.</b> T35N	, <b>RNG.</b> R10E, 3	B <sup>rd</sup> PM				
COUNTY _	Will	DRILLING	ME1	THOD		Hollow	Stem Auger/Rotary	HAMMER 1	YPE	(	CME A	utoma	tic
Station BORING NO.	BSB-34 759+51 58.20ft Righ		D E P T H	B L O W S	U C S Qu	M O I S T		n/a  Dry to 10.0'	_ ft _ ft	D E P T H	B L O W S	U C S Qu	M O I S T
Ground Surf	ace Elev. 605	.22 <b>ft</b>	(ft)	(/6")	(tsf)	(%)	Upon Completion After Hrs.		ft	(ft)	(/6")	(tsf)	(%)
STONE, 6.0"	T, 4.0" CRUSHED CRUSHED 0" CRUSHED	603.22		50/2"		3	CLAY to CLAY LOAN gray-stiff to very stiff ( (continued)				3	2.5	17
CLAY to CLA gray-stiff to ve	Y LOAM-brown & ery stiff (Fill)	000:22	_								9	В	
				2	1.9	21				_	5 7	2.1	21
			5	4	В					- <u>25</u>	10	В	
				2	2.5	24					6 7	3.2	14
				3	Р						8	В	
				3	3.7	17					4	1.8	16
			<u>-10</u>	4	В					-30	11	В	
				3 4 4	1.8 B	17							
				3							6		
			<u>-15</u>	4 5	1.0 B	20					6 8	2.0 P	21
				6 7 7	2.2 B	19							
				3 5 9	2.2 B	17					7 9 14	2.1 B	18



Z.PROJECTS\2013\13125 HNTB, I-80 PHASE II (NEAR TERM)\13125 BORING LOGS\13125\_LOG.GPJ 4/2\15

**GSI Job No.** 13125

# **SOIL BORING LOG**

Page  $\underline{2}$  of  $\underline{2}$ 

**Date** 3/20/14

ROUTE	F.A.I RTE. 80	DE	SCRI	PTION			I-80 Phase II (Near 1	Гerm)	L0	OGGE	D BY		<u>IB</u>
SECTION	2013-008B & 201	3-009B	ι	OCAT	ION _	SE 1/4	, SEC. 15, TWP. T35N	I, <b>RNG.</b> R10E,	3 <sup>rd</sup> PM				
COUNTY	Will	DRILLING	MET	THOD		Hollow	Stem Auger/Rotary	HAMMER	TYPE	(	OME A	utoma	tic
Station BORING NO. Station	BSB-34 759+51		D E P T H	B L O W S	U C S	M O I S T		n/a  Dry to 10.0'	_ ft _ ft	D E P T H	B L O W S	U C s Qu	M O I S T
	58.20ft Right ace Elev. 605.2		(ft)	(/6")	(tsf)	(%)	Upon Completion After Hrs.	n/a	_ ft _ ft	(ft)	(/6")	(tsf)	(%)
CLAY to CLA' gray-stiff to ve (continued)	Y LOAM-brown & ry stiff (Fill)						FRACTURED ROCK dense (continued)						
FRACTURED	ROCK-gray-very	561.22		18 50/5"		16	Drillers Observation:	Apparent	541.22		6 50/3"		
dense				25 50/5"		9	Borehole continued vicoring.	with rock	540.22	65			
				50/2"		5							



# **ROCK CORE LOG**

**GSI Job No.** \_\_\_\_13125\_\_\_

Page  $\underline{1}$  of  $\underline{1}$ 

Date \_\_3/20/14\_

ROUTE	F.A.I RTE. 80	DESC	RIPTION		I-80 Pha	se II (Near	Term)			_ LO	GGED	BY	JB
SECTION _	2013-008B & 201	13-009B	LOCATION	SE 1/4,	<b>SEC.</b> 15,	<b>TWP</b> . T35	N, <b>RNG</b> .	. R10I	E, 3 <sup>rd</sup>	PM			
COUNTY	Will	CORING ME	THOD Rot	arv Was	h					R		CORE	s
_						NX Dou	ıble			E C	R	т	T R
STRUCT. NO	O		RING BARREL	. TYPE &	SIZE _	Swivel-1		D	С	0	Q	;	E
Station _		c	ore Diameter		2	in		Е	0	٧		M	N
BORING NO	DBSB-34	_	op of Rock Ele	ev	541.22	ft		P	R	E	D	E	G
Station _			egin Core Elev		540.22	ft		T H	Ε	R Y	•		T H
Offset	58.20ft Right										(0/)		
Ground Su	irface Elev. 605.	22ft						(ft)	(#)	(%)	(%)	(min/ft)	(tsf)
SILURIAN S	SYSTEM, NIAGARAN ith horizontal bedding	N SERIES DO	DLOMITE rontal fractures	s through	nout		540.22	_	1	100	95		1037.0
Light gray W	iii nonzonai bedain	g. 001110 110112	orital fractaret	anougi	iout.								
								-					
								_					
								- <del>7</del> 0					
								<u>-70</u>					
								_					
								-					
							530.22	-75					
End Of Bori	ng @ -75.0'. Boring b	packfilled with	cuttings.										
								-					
								-					
								<u>-80</u>					
								-					
								-					
								-85					

Color pictures of the cores

Cores will be stored for examination until

5 yrs after const.

# ROCK CORE LOG

PAGE 1	of <u>1</u>	
DATE <u>3/21</u>	/2014	
LOGGED BY	JK	
CSL IOD No	17105	

Geo Services, Inc.

Geotechnical, Environmental & Givil Engineering

805 Amherst Court, Suite 204

Naperville, Illinois 60565

(630) 355-2838

ROUTE	DESCRIPTION <u>I-80 Reconstruction (Near Term Phase 2</u>	)					
SECTION	LOCATION SEC 15, T35N, R10E, SE 1/4, 3rd PM						
COUNTY Will	CORING METHOD Rotary Wash			_			
Station	Top of Rock Elev. $\underline{541.2}$ Begin Core Elev. $\underline{540.2}$	D E P T H	СОКП КОХ	к ноо>ык≻ %	R · Q · D · %	C O R E T - M E (min /ft)	
SILURIAN SYSTEM, NIAGARAN SERIES RUN 1 (-65.0' to -75.0') Light gray with horizontal bedding. S	Some horizontal fractures throughout.		1	100.0	95.0	n/a	1037 <b>©</b>





Z:PROJECTS\2013\13125 HNTB, I-80 PHASE II (NEAR TERM)\13125 BORING LOGS\13125 LOG.GPJ 4/2\15

**GSI Job No.** 13125

# **SOIL BORING LOG**

Page <u>1</u> of <u>1</u>

**Date** 11/5/13

ROUTE	F.A.I RTE. 80	DES	SCRI	PTION	-		I-80 Phase II (Near Te	erm) LO	GGED BY TZ
SECTION	2013-008B & 2013-	-009B	_ L	OCAT	ION _	SW 1/	4, <b>SEC.</b> 14, <b>TWP.</b> T35N,	RNG. R10E, 3 <sup>rd</sup> PM	
COUNTY	Will DF	RILLING	MET	THOD		Hollow	Stem Auger/Rotary	_ HAMMER TYPE _	CME Automatic
STRUCT. NO. Station			D E P	B L O	U C S	M O I	Surface Water Elev. Stream Bed Elev.		
Station	BSB-35 760+71 76.00ft Left ace Elev. 571.92	  ft	H (ft)	W S (/6")	Qu (tsf)	S T (%)		564.9 ft <u>▼</u> ft ft	
8.0" ASPHAL				, ,	, ,	, ,	1113.	··	
CRUSHED S <sup>-</sup> GRAVEL-brov	FONE & vn-medium dense	571.25	. — ——	8 9 10		5			
ORGANIC SIL loose (A-7)	TY LOAM-black-very	568.92	_	2					
				2 2	0.5 P	40			
ORGANIC SA brown-mediun	NDY LOAM-dark n stiff (A-8)	566.42	<u> </u>	2 5 3	0.5 P	54			
ORGANIC SIL LOAM-gray-m	.TY edium dense (A-7)	563.92		3		45			
Drillers Observ Rock	ation: Fractured	562.42	<u>-10</u>	20 50/3"		45			
Bedrock	/ation: Apparent	560.92 560.42							
coring.	inued with rock								



# **ROCK CORE LOG**

**GSI Job No.** \_\_\_\_13125\_\_\_

Page  $\underline{1}$  of  $\underline{1}$ 

**Date** \_\_11/5/13\_

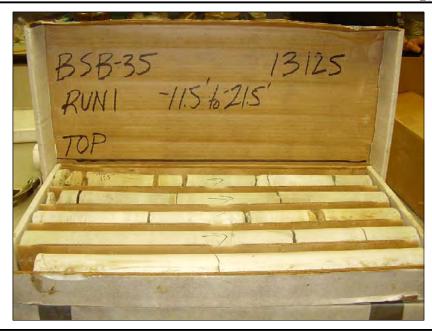
ROUTE	F.A.I RTE. 80	DES	CRIPTION	-	-80 Phas	e II (Near	Term)			LOC	GED	BY	TZ
SECTION	2013-008B & 2	2013-009B	LOCATION	SW 1/4,	<b>SEC.</b> 14,	<b>TWP.</b> T35	N, <b>RNG</b>	. R10E	E, 3 <sup>rd</sup>	PM			
COUNTY _	Will	_ CORING M	ETHOD Rota	ary Wash						R		CORE	S
STRUCT. N	O	C	ORING BARREL	TYPE & S	SIZE	NX Dou Swivel-1		_	_	E C	R	Ţ	T R
Station _			Core Diameter		2	in			C O	0 V	Q	I M	E N
BORING NO	<b>D</b> . BSB-35		Top of Rock Ele		60.92	ft			R	E	D	E	G
Station _	760+71		Begin Core Elev	. <u>5</u>	60.42	_ ft		T H	E	R Y	•		T H
Offset		eft 71.92 <b>ft</b>							(#)	(%)	(%)	(min/ft)	(tsf)
	SYSTEM, NIAGAR		OLOMITE				560.42			100	85	,	
	vith horizontal bedd			rt nodules	. Some h	orizontal	-		•				
mactures tri	rougriout.						-						
													957.0
							-						937.0
							-	-15					
								$\exists$					
							_						
							-						
								$\dashv$					
							-						
							-						
								-20					
							-						
							550.42						
End Of Bor	ing @ -21.5'. Boring	g backfilled wit	th cuttings.				550.42						
							-						
							_						
							-	-25					
							_						
								-					
							=						
							_						
								$\dashv$					
							-						
							_	-30					
								$\dashv$					

Color pictures of the cores

Cores will be stored for examination until 5 yrs after const.

PAGE	1	of _	1
DATE	11/5/:	2013	
LOGGE	D BY _	JK	
GSL JO	DB No	13125	

Geo Services, Inc.  Geotechnical, Environmental & Givil Engineering	ROCK CORE LOG	DATE _	<u>11/5</u>	<u>/2013</u>	3		
Geotechnical, Environmental & Civil Engineering 805 Amherst Court Suite 204 Naperville, Illinois 60565		LOGGE	D BY	JK			
(630) 355+2838		GSI JO	В По	13	125		
ROUTE	DESCRIPTION <u>I-80 Reconstruction (Near Term Phase</u>	2)					
SECTION	LOCATION SEC 14, T35N, R10E, SW 1/4, 3rd PM						
COUNTY Will	CORING METHOD <u>Rotary Wash</u>		Ι .	T 5			
Station	Top of Rock Elev. 560.9  Begin Core Elev. 560.4	_ft	CORE RUN (#)	RECOVERY (%)	R · Q · D · %	C O R T - M E (mft)	STRENGTH (tsf)
SILURIAN SYSTEM, NIAGARAN SERIES RUN 1 (-11.5' to -21.5') Light gray with horizontal bedding. F fractures throughout.	DOLOMITE Tine grained with few chert nodules. Some horizontal		1	100.0	85.0	n/a	957 <b>⊚</b> −13.7'





# **SOIL BORING LOG**

Page <u>1</u> of <u>1</u>

Date \_\_11/5/13\_

SECTION         2013-008B & 2013-009B         LOCATION         SW 1/4, SEC. 14, TWP. T35N, RNG. R10E, 3 <sup>rd</sup> PM           COUNTY         Will         DRILLING METHOD         Hollow Stem Auger/Rotary         HAMMER TYPE         CME Automati           STRUCT. NO. Station         BSB-36         T W S I W	Z
STRUCT. NO	
Station       BORING NO.       BSB-36       T       W       S       Groundwater Elev.:       Groundwater Elev.:       First Encounter       566.0       ft       ¶         Station       6.40ft Right       (ft)       (/6")       (tsf)       (%)       Groundwater Elev.:       First Encounter       566.0       ft       ¶         Ground Surface Elev.       574.52       ft       (ft)       (/6")       (tsf)       (%)       After       Hrs.       ft	ic
Ground Surface Elev.         574.52         ft         (ft)         (/6")         (tsf)         (%)         After         Hrs.         ft           8.0" ASPHALT         573.85         CRUSHED STONE         Training	
8.0" ASPHALT 573.85  CRUSHED STONE	
CRUSHED STONE	
CRUSHED STONE 9	
7 14	
LOAM-dark brown & gray-medium dense (A-4)	
5 27	
2	
3 34	
10	
Fee 00 -	
9 SILTY SAND & FRACTURED 15 15 15 15 15 15 15 15 15 15 15 15 15	
ROCK-brown-very dense	
<u>-10</u> 50/5"	
© 563.52 Drillers Observation: Apparent	
Bedrock Bedrock	
<u> </u>	
Soring Borehole continued with rock	
4	
SILTY SAND & FRACTURED   15   17   11   11   15   15   17   11   11	



**GSI Job No.** \_\_\_\_13125\_\_\_

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**Date** \_\_\_11/5/13\_\_

ROUIE	F.A.IRIE. 80	DE	SCRIPTION		1-80 Phas	se II (Near	r Lerm)			_ LO	GGED	BY	IZ
SECTION	2013-008B & 2	2013-009B	LOCATION	SW 1/4	, <b>SEC.</b> 14,	<b>TWP.</b> T3	5N, <b>RNG</b>	<b>3</b> . R10	DE, 3 <sup>r</sup>	d PM			
COUNTY	Will	CORING	METHOD Ro	otary Wash	n					R		CORE	s
		_		,		NX Do	uble			E	R	_	T
STRUCT. NO.			CORING BARRE	L TYPE &	SIZE _	Swivel-	10 ft	D	С	C O	· Q	T	R E
Station			Core Diameter		2	in		E	o	V		М	N
BORING NO.	BSB-36	3	Top of Rock E	lev	563.52	ft		P	R	E	D	E	G
Station			Begin Core Ele		562.02	ft		T H	Ε	R Y	•		T H
Offset	6.40ft Rig								<b>/4</b> 5		(0/)	(main ( <b>f</b> 4)	
		74.52 ft						(ft)	(#)	(%)		(min/ft)	(tsf)
	STEM, NIAGAR		S DOLOMITE ained with few ch			horizontal	562.02		1	100	69		
fractures throu	ighout.	illig. i lile gid	airied with lew Ch	ert riodule		ionzontai		_					
								-15					
													1171.0
								_					
								-20					
								_					
End Of Boring	g @ -22.5'. Boring	g backfilled v	with cuttings.				552.02						
								_					
								$\overline{}$					
								-25					
								_					
								-30					
								$\dashv$					
								-					

PAGE \_1 \_\_\_\_ of \_1

DATE \_11/5/2013

LOGGED BY \_JK

GSI JOB No. \_13125

Geo Services, Inc.

Geotechnical, Environmental & Givil Engineering

805 Amberst Court, Suite 204

Naperville, Ulinois 60565

(630) 355-2838

	00		, 110.		120		
ROUTE	DESCRIPTION <u>I-80 Reconstruction (Near Term Phase 2</u>	)					
SECTION	LOCATION SEC 14, T35N, R10E, SW 1/4, 3rd PM						
COUNTY Will	CORING METHOD Rotary Wash						
Station  BORING NO	Top of Rock Elev. $\underline{563.5}$ Begin Core Elev. $\underline{562.0}$	P T H	CORE RDZ	RECOVERY		CORTIME (min	S T R E N G T H
Ground Surface Elev574.52		(ft)		(%)	(%)		
SILURIAN SYSTEM, NIAGARAN SERIES RUN 1 (-12.5' to -22.5') Light gray with horizontal bedding. F fractures throughout.	Tine grained with few chert nodules. Some horizontal			100.0	69.0	nya	-15.1 <sup>2</sup>





Z:PROJECTS\2013\13125 HNTB, I-80 PHASE II (NEAR TERM)\13125 BORING LOGS\13125 LOG.GPJ 4/2\15

**GSI Job No.** 13125

## **SOIL BORING LOG**

Page <u>1</u> of <u>2</u>

**Date** 1/13/14

ROUTE	F.A.I RTE. 80	DE	SCRI	PTION			I-80 Phase II (Near Te	rm) L	oggi	ED BY	F	<u>₹</u> P
SECTION _	2013-008B & 2013-00	09B	[	OCAT	ION _	SW 1/	4, <b>SEC.</b> 14, <b>TWP.</b> T35N,	RNG. R10E, 3 <sup>rd</sup> PM	<u> </u>			
COUNTY	Will DRI	LLING	MET	THOD			Mud Rotary	_ HAMMER TYPE	(	CME A	utoma	tic
Station BORING NO. Station Offset	BSB-37 761+21 56.50ft Left ace Elev. 608.16	_ _ _	D E P T H	B L O W S	U C S Qu (tsf)	M O I S T	Surface Water Elev. Stream Bed Elev.  Groundwater Elev.: First Encounter Upon Completion After Hrs.		D E P T H	B L O W S	U C S Qu (tsf)	M O I S T (%)
	RETE BRIDGE DECK	<b></b> 607.39		, ,	, ,	, ,	VOID (continued)	<u> </u>		, ,	, ,	. ,
VOID		007.39										



Z.PROJECTS\2013\13125 HNTB, I-80 PHASE II (NEAR TERM)\13125 BORING LOGS\13125\_LOG.GPJ 4/2/15

**GSI Job No.** 13125

## **SOIL BORING LOG**

Page  $\underline{2}$  of  $\underline{2}$ 

Date \_\_\_1/13/14\_\_

ROUTEF.A.I RTE. 80			SCRII	PTION			I-80 Phase II (Near Term) LOGGED BY RP				
SECTION	2013-008B & 2013	3-009B	_ L	OCATI	ON _	SW 1/4	4, <b>SEC.</b> 14, <b>TWP</b> . T35N	, <b>RNG.</b> R10E, 3 <sup>rd</sup> <b>PM</b>			
COUNTY	Will D	RILLING	MET	HOD			Mud Rotary	_ HAMMER TYPE	CME Automatic		
Station BORING NO. Station Offset	BSB-37 761+21 56.50ft Left		D E P T H (ft)	B L O W S	U C S Qu (tsf)	M O I S T (%)	Upon Completion	n/a <b>ft</b> n/a <b>ft</b> n/a <b>ft</b>			
VOID (continue	ace Elev608.10 ed)	6 ft	(11)	(10)	(131)	(70)	After Hrs.	π			
CLAY-brown-s		566.66 563.66		5 3 3 4 5	1.0 P	24					
Drillers Observ Bedrock	ation: Apparent	303.00	- <u>45</u>	50/4"	Р						
Borehole conti	inued with rock	562.16	-50								



**GSI Job No.** \_\_\_\_13125\_\_\_

Page <u>1</u> of <u>1</u>

Date \_\_1/13/14\_

ROUTE	F.A.I RTE. 80	DESCRIPTION	I-80 Phase	II (Near Term)		_ LOG	GED	BY	RP
SECTION	2013-008B & 2013-00	09B LOCATION SW 1	/4, <b>SEC.</b> 14, <b>T</b>	TWP. T35N, RNG	i. R10E, 3	rd PM			
COUNTY	Will COR	RING METHOD Rotary Wa	ash			R	_	CORE	S
				NX Double		E	R	Т	T R
STRUCT. NO.		CORING BARREL TYPE	& SIZE	Swivel-10 ft	D C	o	Q	i	E
Station		Core Diameter	2	in	E O	V		М	N
BODING NO	BSB-37	Top of Rock Elev.	563.66	ft	PR	E	D	E	G
	761+21	Begin Core Elev.	562.16	ft	T   E	R			T
Offset					н	Y			Н
Ground Surfa		 _ ft			(ft) (#)	(%)	(%)	(min/ft)	(tsf)
SILURIAN SY	STEM, NIAGARAN SE gray with horizontal bedo		merous horizo	562.16 ntal	1	99	31		888.0
End Of Boring	@ -56.0'. Boring backf	illed with cuttings.		552.10					
	, ,	<b>J</b>							
					_				
					-60				
					-				
					-65				
					<u>-65</u>				
					$\dashv$				
1					1				

The "Strength" column represents the uniaxial compressive strength of the core sample (ASTM D-2938)

PAGE <u>1</u> of <u>1</u> DATE <u>1/14/2014</u> LOGGED BY JK GSI JOB No. <u>13125</u>

Geo Services, Inc.
Geotechnical, Environmental & Civil Engineering
805 Amherst Court, Suite 204
Naperville, Illinois 60565
(630) 355+2838
, ,

ROUTE	DESCRIPTION <u>I-80 Reconstruction (Near Term Phase 2)</u>	)					
SECTION	LOCATION SEC 14, T35N, R10E, SW 1/4, 3rd PM						
COUNTY Will	CORING METHOD Rotary Wash			_			
Station	Top of Rock Elev. $\underline{563.7}$ Begin Core Elev. $\underline{562.2}$	D E P T H	CORE RUN (#)	ж тисо>шх	R · Q · D · 8	‡, + 3 + 3: 1 M M − 1 M O O	S F R E Z G F H (tsf)
SILURIAN SYSTEM, NIAGARAN SERIES RUN 1 (-46.0' to -56.0') Light gray to gray with horizontal be fractures throughout.	DOLOMITE edding. Highly fractured with numerous horizontal		1	· · ·	31.0		





## **SOIL BORING LOG**

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**Date** 3/26/14

F	ROUTE	F.A.I F	RTE. 80	DE	SCRI	PTION			I-80 Phase II (Near Te	erm)	LOGGI	ED BY		JB
S	SECTION _	2013-0	08B & 2013	-009B	[	OCAT	ION _	SW 1/	4, <b>SEC.</b> 14, <b>TWP.</b> T35N	, <b>RNG.</b> R10E, 3 <sup>rd</sup>	PM			
C	COUNTY _	Will	D	RILLING	MET	HOD			Mud Rotary	_ HAMMER TYP	PE	CME A	utoma	itic
E	Station SORING NO. Station		BSB-38 761+37 .40ft Right		D E P T H	B L O W S	U C S	M O I S T	Surface Water Elev. Stream Bed Elev.  Groundwater Elev.: First Encounter	n/a <b>ft</b>	T H	B L O W S	U C S Qu	M O I S T
	<b>Ground Sur</b>	rface Elev.	611.31	<u>1</u> ft	(ft)	(/6")	(tsf)	(%)	Upon Completion After Hrs.	ft	(ft)	(/6")	(tsf)	(%)
1	0.0" CONC	RETE BR	IDGE DECK	( 610.48	_				VOID (continued)		_			
V	OID/													
2/15														
GPJ 4/														
3/13125					 -10									
3008					_						_			
BORING														
13125														
TERM)														
NEAR														
ASE II (					<u>-15</u>									
-80 PH					_						_			
HNTB,														
\13125														
5\2013														
Z:PROJECTS'2013(13125 HNTB, 1-80 PHASE II (NEAR TERM)(13125 BORING LOGS(13125_LOG.GPJ 4/2/15														
Z:\PR					-20						-40			



## **SOIL BORING LOG**

Page  $\underline{2}$  of  $\underline{2}$ 

**Date** 3/26/14

	ROUTE	F.A.I RTE. 80	DES	SCRI	PTION			I-80 Phase II (Near Te	erm) L	OGGED BY _	JB
	SECTION _	2013-008B & 2013	-009B	_ L	OCAT	ION _	SW 1/	4, <b>SEC.</b> 14, <b>TWP.</b> T35N,	, <b>RNG.</b> R10E, 3 <sup>rd</sup> <b>PM</b>		
	COUNTY _	Will D	RILLING	MET	HOD	-		Mud Rotary	_ HAMMER TYPE	CME Auto	matic
	<b>0</b> 4 41	D		D E P	B L O	U C S	M O I	Surface Water Elev. Stream Bed Elev.	n/a <b>ft</b> n/a <b>ft</b>		
	Station Offset	BSB-38 761+37 31.40ft Right rface Elev. 611.31		T H (ft)	W S	Qu (tsf)	S T (%)	Groundwater Elev.: First Encounter Upon Completion After Hrs.	n/a <b>ft</b> n/a <b>ft</b>		
	VOID (contin		•				, ,	71101 1113.			
	CLAY-brown	n-stiff (Fill)	569.31 567.81	_	8 6 5	1.5 B	22				
	SILTY CLAY	/-dark brown			10						
	weathered re	ervation-Fractured & ock ervation-Apparent	566.81 565.81	- <u>45</u>	50/5"		42				
	Bedrock										
Z:\PROJECTS\2013\13125 HNTB, 1-80 PHASE II (NEAR TERM)\13125 BORING LOGS\13125_LOG.GPJ 4/2/15		er loss @ -47.0' ntinued with rock	563.81	-50							



**GSI Job No.** \_\_\_\_13125\_\_\_

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Date \_\_3/26/14\_

ROUTE	F.A.I RTE. 80	_ DESCRIPTION	I-80 Pha	se II (Near Term)		LO	GGED	BY	JB
SECTION	2013-008B & 2013-0	009B LOCATION SW	/ 1/4, <b>SEC.</b> 14	, <b>TWP.</b> T35N, <b>RN</b> 0	<b>G.</b> R10E,	3 <sup>rd</sup> <b>PM</b>			
COUNTY	Will CO	PRING METHOD Rotary \	Wash			R		CORE	s
				NX Double		E	R	т	T R
STRUCT. N	O	CORING BARREL TYI	PE & SIZE _	Swivel-10 ft	D C	0	Q	1	E
Station _		Core Diameter	2		E O	V E	D	M E	N G
BORING NO	D. <u>BSB-38</u>	Top of Rock Elev.  Begin Core Elev.	565.81 563.81		TE	R	.		T
Station _ Offset		Begin Core Elev.		''	н	Y			Н
	urface Elev. 611.31	ft			(ft) (#)	(%)	(%)	(min/ft)	(tsf)
	SYSTEM, NIAGARAN SI	ERIES DOLOMITE ining. Horizontal bedding wit	h numaraua h	563.81	1	100	67		
fractures the	roughout.	iriirig. Horizoritai beddirig wit	n numerous n	ionzoniai	_				
					-50				644.0
					-				
					-55				
					_				
Fr.d Of David		Cilled with a string of		553.81					
End Of Bori	ing @ -57.5'. Boring back	Killed with cuttings.							
					<u>-60</u>				
					$\dashv$				
					$\rightarrow$				
					-65				
					$\dashv$				

Color pictures of the cores

5 yrs after const.

PAGE	1	of	1
DATE	3/26/	2014	
LOGGE	D BY	JK	
GSI JO	DR No	1.31.25	5

Geo Services, Inc.	ROCK CORE LOG	DATE _	3/26	/201	4		
Geotechnical, Environmental & Civil Engineering 805 Amherst Court, Suite 204 Naperville, Illinois 60565	l	OGGED	BY	JK			
(630) 355+2838		GSI JOE	3 No.	<u>13</u>	125		
ROUTE	DESCRIPTION <u>I-80 Reconstruction (Near Term Phase</u>	2)					
SECTION	LOCATION SEC 14, T35N, R10E, SW 1/4, 3rd PM						
COUNTY Will	CORING METHOD <u>Rotary Wash</u>						
STRUCT. NO  Station  BORING NO  Station  761+37  Offset  Ground Surface Elev  611.31	CORING BARREL TYPE & SIZE NX Double Swivel—10  Core Diameter 2.0 in  Top of Rock Elev. 565.8  Begin Core Elev. 563.8	ft E P T H	CORE RUN #)	RECOVERY (%)	R . Q . D . (%)	C O R E - M E (min /ft)	
SILURIAN SYSTEM, NIAGARAN SERIES RUN 1 (-47.5' to -57.5') Light gray to gray with some rust s fractures throughout.	DOLOMITE staining. Horizontal bedding with numerous horizontal				67.0		





## **SOIL BORING LOG**

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**Date** 1/5/14

	ROUTE	F.A.I F	RTE. 80	DES	SCRII	PTION			I-80 Phase II (Near Te	erm)	LOG	GED B	<b>/</b> F	RP
	SECTION	2013-0	08B & 2013	3-009B	_ L	OCAT	ION _	SW 1/-	4, <b>SEC.</b> 14, <b>TWP.</b> T35N	, <b>RNG</b> . R10E,	3 <sup>rd</sup> PM			
	COUNTY _	Will	c	RILLING	MET	HOD			Mud Rotary	_ HAMMER T	YPE _	CME	Automa	atic
	BORING NO	<b>).</b>	BSB-39		DEPTH	B L O W S	U C S	M O I S T	Surface Water Elev. Stream Bed Elev. Groundwater Elev.:	n/a	ft	L O W	U C S	M O I S T
	Offset	56	6.60ft Left		/£4\				Upon Completion	n/a n/a	ft			
Γ	Ground Su 10.0" CONC	Irface Elev.			(ft)	(/6")	(tsf)	(%)	After Hrs. VOID (continued)		ft (1	t) (/6"	(tsf)	(%)
Z:\PROJECTS\2013\13125 HNTB, I-80 PHASE II (NEAR TERM)\13125 BORING LOGS\13125_LOG.GPJ 4/2/15	VOID			612.35								335		
ROJEC									SANDY CLAY LOAM-	-dark brown	574.18	7		
Z:\P					-20				& black-medium dens	e (FIII)	-	40 8		20



Z.PROJECTS\2013\13125 HNTB, I-80 PHASE II (NEAR TERM)\13125 BORING LOGS\13125\_LOG.GPJ 4/2\15

**GSI Job No.** 13125

## **SOIL BORING LOG**

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**Date** 1/5/14

ROUTE	F.A.I RTE. 80	DE	SCRI	PTION			I-80 Phase II (Near Te	erm) L	OGGED BY RP
SECTION _	2013-008B & 2013-	-009B	_ L	OCAT	ION _	SW 1/-	4, <b>SEC.</b> 14, <b>TWP</b> . T35N	, <b>RNG.</b> R10E, 3 <sup>rd</sup> <b>PM</b>	I
COUNTY _	Will D	RILLING	MET	HOD			Mud Rotary	_ HAMMER TYPE	CME Automatic
Station BORING NO. Station Offset	BSB-39 762+85 56.60ft Left		D E P T H	B L O W S	U C S Qu	M O I S T	Surface Water Elev. Stream Bed Elev. Groundwater Elev.: First Encounter Upon Completion	n/a ft ft ft	
	face Elev. 613.18 Y LOAM-dark brown	<u>ft</u>	(ft)	<b>(/6'')</b>	(tsf)	(%)	After Hrs.	ft	
& black-media (continued)	um dense (Fill) dark brown-medium	572.18		7 13 15	4.5 P	25			
Drillers Obser	vation: Apparent	568.68	-45	50/2"		24			
Bedrock  Borehole concoring.	tinued with rock	565.68							



**GSI Job No.** \_\_\_\_13125\_\_\_

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**Date** 1/5/14

SECTION         2013-008B & 2013-009B         LOCATION         SW 1/4, SEC. 14, TWP. T35N, RNG. R10E, 3 <sup>rd</sup> PM           COUNTY         Will         CORING METHOD         Rotary Wash         NX Double         REC. 14, TWP. T35N, RNG. R10E, 3 <sup>rd</sup> PM           STRUCT. NO.         CORING BARREL TYPE & SIZE         NX Double         D         C		
COUNTY Will CORING METHOD Rotary Wash  STRUCT. NO. CORING BARREL TYPE & SIZE  NX Double Swivel-10 ft D C O		
STRUCT. NO CORING BARREL TYPE & SIZE NX Double Swivel-10 ft D C O		
STRUCT. NO CORING BARREL TYPE & SIZE NX Double Swivel-10 ft D C O	CORE	
STRUCT. NO CORING BARREL TYPE & SIZE Swivel-10 ft D C O	R	T
	.   Ţ	R
Station   F   O   V	Q I . M	E N
Core Diameter 2 In P R F	D E	G
BORING NO. BSB-39 TOP OF ROCK Elev. T F R	.   -	T
Station 762+85 Begin Core Elev 1   H   V		н
Offset 56.60ft Left Ground Surface Elev 613.18 ft	(%) (min/f	t) (tsf)
	49	-, (,
SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE 565.68 1 1 100 Light gray to gray with horizontal bedding. Weathered with numerous horizontal fractures	49	
throughout. 1/4" clay parting @ -56.7'.		578.0
<u> </u>		
-50		
_ <u>-55</u>		
End Of Boring @ -57.5'. Boring backfilled with cuttings.		
-60		
· · · · · · · · · · · · · · · · · · ·		
	<b>I</b>	
		I

PAGE	1	of _	1
DATE	1/15/	2014	
LOGGE	D BY _	JK	
GSI JC	B No	13125	

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Geo Services, Inc.  Geotechnical, Environmental & Givil Engineering	ROCK CORE LOG	DATE <u>1/15/20</u>
805 Amherst Court, Suite 204 Naperville, Illinois 60565		LOGGED BY <u>Jk</u>
(630) 355+2838		GSI JOB No
ROUTE	DESCRIPTION <u>I-80 Reconstruction (Near Term Phase</u>	e 2)
SECTION	LOCATION SEC 14, T35N, R10E, SW 1/4, 3rd PM	
COUNTY WIII	CORING METHOD Rotary Wash	

STRUCT. NO. \_ \_\_\_ CORING BARREL TYPE & SIZE NX Double Swivel-10 ft Ε C O R E Q 2.0 in R Station \_\_\_ Core Diameter Τ ΕT Top of Rock Elev. \_568.7 BORING NO. <u>BSB</u>-39 ٧ Η Begin Core Elev. <u>565.7</u> Ε Station <u>762+85</u> М U R Ε Offset 56.6' Left (min

Н 613.18 Ground Surface Elev. (ft) /ft) (tsf) n/a 578 @ -48.2 1 100.0 49.0 SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE RUN 1 (-47.5' to -57.5') Light gray to gray with horizontal bedding. Weathered with numerous horizontal fractures throughout. 1/4" clay parting @ -56.7'.





Z.PROJECTS\2013\13125 HNTB, I-80 PHASE II (NEAR TERM)\13125 BORING LOGS\13125\_LOG.GPJ 4/2/15

**GSI Job No.** 13125

## **SOIL BORING LOG**

Page  $\underline{1}$  of  $\underline{2}$ 

**Date** 3/14/14

ROUTE	F.A.I RTE. 80	DES	CRII	PTION			I-80 Phase II (Near Te	erm) L	.oggi	ED BY	N	IW
SECTION	2013-008B & 2013	-009B	_ L	OCATI	ON _	SW 1/4	4, <b>SEC.</b> 14, <b>TWP</b> . T35N	, <b>RNG</b> . R10E, 3 <sup>rd</sup> <b>PM</b>	<u>i</u>			
COUNTY	Will D	RILLING	MET	HOD			Mud Rotary	_ HAMMER TYPE	CME A		utoma	tic
Station BORING NO. Station Offset	BSB-40 762+57 34.00ft Left		D E P T H	B L O W S (/6")	U C S Qu	M O I S T	Upon Completion	n/a ft n/a ft n/a ft	D E P T H	B L O W S	G G	M O I S T
	ace Elev. 611.93 TE BRIDGE DECK		(ft)	(10)	(tsf)	(%)	After Hrs. VOID (continued)	π	(11)	(/6 )	(tsf)	(%)
		611.14						571.93				



Z.PROJECTS\2013\13125 HNTB, I-80 PHASE II (NEAR TERM)\13125 BORING LOGS\13125\_LOG.GPJ 4/2\15

**GSI Job No.** 13125

## **SOIL BORING LOG**

Page  $\underline{2}$  of  $\underline{2}$ 

**Date** 3/14/14

ROUTE F.A	I RTE. 80	DES	SCRII	PTION			I-80 Phase II (Near Te	erm)	LOGGED BY	NW
SECTION2013	3-008B & 2013-00	)9B	_ L	OCATI	ON _	SW 1/4	4, <b>SEC.</b> 14, <b>TWP.</b> T35N	, <b>RNG.</b> R10E, 3 <sup>rd</sup> I	PM	
COUNTY	Will DRIL	LING	MET	HOD			Mud Rotary	_ HAMMER TYPE	CME Au	tomatic
STRUCT. NO Station BORING NO Station	BSB-40		DEPTH	B L O W S	U C s Qu	M O I S T	Surface Water Elev. Stream Bed Elev. Groundwater Elev.: First Encounter			
Offset Ground Surface Ele	34.00ft Left	_ _ ft	(ft)	(/6")	(tsf)	(%)	Upon Completion After Hrs.	n/a ft		
SANDY CLAY LOAI GRAVEL & STONE brown-medium dens dense (Fill)	M with -dark se to very	<u>-</u>		2 8 5	(101)	12	Aiter nrs.	π		
Drillers Observation: Weathered Rock	Fractured	69.43		50/3"		20				
Drillers Observation: Bedrock  Borehole continued coring.	Apparent 5	65.93	-45 -50 -55 -55 -60							



**GSI Job No.** \_\_\_\_13125

Page <u>1</u> of <u>1</u>

Date 3/14/14

F.A.I RTE. 80 DESCRIPTION I-80 Phase II (Near Term) LOGGED BY NW SECTION 2013-008B & 2013-009B LOCATION SW 1/4, SEC. 14, TWP. T35N, RNG. R10E, 3<sup>rd</sup> PM R **CORE** S Will CORING METHOD Rotary Wash Ε R Т NX Double С Т R STRUCT. NO. **CORING BARREL TYPE & SIZE** Swivel-10 ft D С 0 Q Ε Т Station Ε 0 ٧ Ν **Core Diameter** Ρ Ε R D Ε G 567.93 BORING NO. BSB-40 Top of Rock Elev. \_ Т Т R Ε 565.93 Begin Core Elev. Station \_\_\_\_\_ 762+57 Υ Н Н Offset 34.00ft Left (ft) (%) (min/ft) (#) (%) (tsf) Ground Surface Elev. 611.93 ft SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE 565.93 1 95 36 Light gray with horizontal bedding. Weathered & cherty with rust staining to -50.0'. Numerous horizontal fractures throughout with some intersecting vertical fractures. 1092.0 End Of Boring @ -56.0'. Boring backfilled with cuttings. -65

Color pictures of the cores Yes

Cores will be stored for examination until 5 yrs after const.

PAGE <u>1</u>	of <u>1</u>
DATE <u>3/14/</u>	<sup>′</sup> 2014
LOGGED BY	JK
GSL JOB No	13125

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Geo Services, Inc. Geotechnical, Environmental & Givil Engineering	ROCK CORE LOG	DA	TE <u>3</u>	/14/	<u> 2014</u>	<u> </u>		
805 Amherst Court, Suite 204		LOC	GGED	BY.	JK			
Naperville, Illinois 60565 (630) 355+2838		GSI	JOB	No.	<u>13</u>	<u>125</u>		
ROUTE	DESCRIPTION <u>I-80 Reconstruction (Near Term Pl</u>	hase 2)						
SECTION	LOCATION SEC 14, T35N, R10E, SW 1/4, 3rd PM	<u> </u>						
COUNTY Will	CORING METHOD <u>Rotary Wash</u>							
STRUCT. NO Station	CORING BARREL TYPE & SIZE <u>NX Double Swivel</u> Core Diameter <u>2.0 in</u>	<u>l-10</u> ft	D E P	C O R	R E C C	R · Q	CORT	S T R

Top of Rock Elev.  $\underline{567.9}$ BORING NO. BSB-40 Н Begin Core Elev. <u>565.9</u> Station \_ 762+57 U Offset <u>34.0' Left</u>

Н (min Ground Surface Elev. 611.93 (ft) /ft) (tsf) 95.0 36.0 n/a 1092 SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE RUN 1 (-46.0' to -56.0') Light gray with horizontal bedding. Weathered & cherty with rust staining to -50.0'. Numerous horizontal fractures throughout with some intersecting vertical fractures.





**GSI Job No.** <u>13125</u>

#### **SOIL BORING LOG**

Page <u>1</u> of <u>2</u>

**Date** 3/25/14

ROUTE F.A.I RTE. 80 DESCRIPTION I-80 Phase II (Near Term) LOGGED BY NW SECTION 2013-008B & 2013-009B LOCATION SW 1/4, SEC. 14, TWP. T35N, RNG. R10E, 3<sup>rd</sup> PM Will DRILLING METHOD Mud Rotary HAMMER TYPE CME Automatic В М STRUCT. NO. Surface Water Elev. n/a **ft** L С 0 Ε L С 0 Station Stream Bed Elev. n/a **ft** Ρ S S 0 ı Ρ 0 ı Т W S Т W S BORING NO. BSB-41 Groundwater Elev.: S Т Т 
 Station
 762+84

 Offset
 31.30ft Right
 Qu Н S Qu First Encounter n/a ft **Upon Completion** <u>n/a</u> ft (ft) (/6") (%) (ft) (/6") (%) (tsf) (tsf) Ground Surface Elev. 615.22 After \_\_\_\_ Hrs. 10.0" CONCRETE BRIDGE DECK VOID (continued) 614.39 VOID E:\PROJECTS\2013\13125 HNTB, 1-80 PHASE II (NEAR TERM)\13125 BORING LOGS\13125 LOG.GPJ 4/2/15 SILTY LOAM with 10 Sand-gray-medium dense (Fill) 64 9 10 7 579.22 SAND & GRAVEL-brown & gray-medium dense (Fill) 21 6 8 8 577.22 ORGANIC LOAM-dark brown to 6 black-medium dense (A-7) 42 6 3



Z:PROJECTS\2013\13125 HNTB, I-80 PHASE II (NEAR TERM)\13125 BORING LOGS\13125 LOG.GPJ 4/2\15

**GSI Job No.** 13125

## **SOIL BORING LOG**

Page  $\underline{2}$  of  $\underline{2}$ 

**Date** 3/25/14

ROUTE	F.A.I RTE. 80	DE	ESCRIPTION I-80 Phase II (Near T			I-80 Phase II (Near Te	Term) LOGGED BY NW				
SECTION _	2013-008B & 2013-	-009B	_ L	OCAT	ION _	SW 1/	4, <b>SEC.</b> 14, <b>TWP</b> . T35N,	, <b>RNG.</b> R10E, 3 <sup>rd</sup> <b>PM</b>			
COUNTY _	Will DI	RILLING	MET	HOD			Mud Rotary	_ HAMMER TYPE _	CME Automatic		
Station BORING NO. Station Offset	BSB-41 762+84 31.30ft Right face Elev. 615.22		D E P T H	B L O W S (6")	U C S Qu (tsf)	M O I S T	Upon Completion	n/a ft n/a ft  n/a ft  n/a ft  n/a ft ft ft			
ORGANIC Le black-mediur (continued)	OAM-dark brown to n dense (A-7)	573.22		3 3 4 9	(tol)	51	Atter nrs.				
SAND, GRA ROCK-browi	VEL & FRACTURED n-dense			8 10 15 19		8					
bedrock 100.0% water	er loss @ -46.5' ntinued with rock	569.22									



**GSI Job No.** \_\_\_\_13125

Page  $\underline{1}$  of  $\underline{1}$ 

**Date** 3/25/14

ROUTE	F.A.I RTE. 80	<u> </u>	ESCRIPTION		I-80 Phas	se II (Neaı	r Term)			_ LO	GGED	BY	NW
SECTION _	2013-008B &	2013-009B	LOCATION	SW 1/	4, <b>SEC.</b> 14,	, <b>TWP.</b> T3	5N, <b>RNG</b>	i. R10	DE, 3	d PM			
COUNTY _	Will	CORING	METHOD R	otary Wa	sh					R		CORE	S
OTPLICT NO			CODINO DADDE	T/DE	9 OIZE	NX Do				E	R	т	T R
Station	). 		CORING BARRE	LIYPE	& SIZE _	Swivel-	10 π	D	С	0	Q	I	Ε
			Core Diameter		2			E	O R	V E	D	M E	N G
BORING NO.			Top of Rock E		569.22 568.22	ft ft		P T	E	R			T
Station Offset			Begin Core Ele	ev	300.22	11.		н	_	Y	-		H
		15.22 <b>ft</b>						(ft)	(#)	(%)	(%)	(min/ft)	(tsf)
	YSTEM, NIAGAF						568.22	` '	1	98	29	, ,	
Light gray to	gray with horizon orizontal fractures	ital bedding.	Weathered with	rust stair	ning to -52.0	0'.	500.22			90	29		832.0
E. LOCD.	0 57 0 0	I I Cli I	20				558.22						
End Of Borin	ıg @ -57.0'. Borin	ng backfilled	with cuttings.					-					
								<u>-60</u>					
								_					
								-					
								_					
								_					
								-					
								-65					
								_					

Color pictures of the cores Yes

Cores will be stored for examination until 5 yrs after const.

The "Strength" column represents the uniaxial compressive strength of the core sample (ASTM D-2938)

PAGE <u>1</u> of <u>1</u> DATE <u>3/25/2014</u> LOGGED BY JK

Geo Services, Inc. Geotechnical, Environmental & Civil Engineering	ROCK CORE LOG	G DAT	E <u>3/25</u>	/201	4		
Geotechnical, Environmental & Givil Engineering 805 Amherst Court, Suite 204 Naperville, Hinois 60565		LOG	GED BY	_JK			
(630) 355+2838		GSI	JOB No	. <u>13</u>	125		
ROUTE	DESCRIPTION <u>I-80 Reconstruction (N</u>	lear Term Phase 2)					
SECTION	LOCATION SEC 14, T35N, R10E, SW	1/4, 3rd PM					
COUNTY Will	CORING METHOD Rotary Wash						
STRUCT. NO Station	Core Diameter <u>2.0 in</u>		D C E O P R T E	R E C O	R Q	C O R ET	S T R E
BORING NO. <u>BSB-41</u> Station <u>762+84</u> Offset <u>31.3' Right</u>	Top of Rock Elev. <u>569.2</u> Begin Core Elev. <u>568.2</u>		HRUN	V E R Y	D	I M E	N G T :
Ground Surface Elev. 615.22			(ft) (#)	(%)	(%)	(min /ft)	(tsf)
SILURIAN SYSTEM, NIAGARAN SERIES RUN 1 (-47.0' to -57.0') Light gray to gray with horizontal be Numerous horizontal fractures through	dding. Weathered with rust staining	- <u>-</u> 5	52.0	36.0	29.0		-52.5





# **SOIL BORING LOG**

Page  $\underline{1}$  of  $\underline{2}$ 

Date 3/31/14

	ROUTE	F.A.I RTE. 80	DES	CRIPT	ION		I-80 Phase II (Near T	erm) L	LOGGED BY NW				
	SECTION _	2013-008B & 2	013-009B	_ LOC	CATION	SW 1	/4, <b>SEC.</b> 14, <b>TWP.</b> T35N	I, <b>RNG.</b> R10E, 3 <sup>rd</sup> <b>PM</b>					
	COUNTY _	Will	DRILLING	METHO	DD		Mud Rotary	HAMMER TYPE		CME A	utoma	itic	
		DBSB-42		E P	B U L C O S	M O I S	Surface Water Elev. Stream Bed Elev. Groundwater Elev.:	n/a ft ft	D E P T	B L O W	U C S	M O I S	
	Station	762+03 53.30ft Ric		H :	S Qu	1		n/a_ ft	Н	S	Qu	Т	
_	Ground Su	rface Elev. 61	2.91 <b>ft</b>	(ft) (/	6") (ts1	(%)	After Hrs.		(ft)	(/6")	(tsf)	(%)	
		RETE BRIDGE D	ECK 612.08				VOID (continued)		_	-			
	VOID												
			_							1			
			-										
				-					_	1			
			_	-5									
			-	<u>-5</u>					<u>-25</u>	1			
			-										
4/2/15			_										
GPJ			-										
5_LOG			_							1			
3/1312			_	-10					-30	1			
3 LOG									_	-			
ORING			-						_				
3125 B			-							1			
RM)/1			-										
AR TE				-					_	1			
N =			-						-35	1			
PHASI			-	<u>-15</u>					<u>-35</u>	1			
B, I-80			-							1			
5 HNT			_							1			
Z:\PROJECTS\2013\13125 HNTB, I-80 PHASE II (NEAR TERM)\13125 BORING LOGS\13125_LOG.GPJ 4/2/15			_							-			
\$\201;			_										
OJECT			-							1			
Z:\PR(				-20					-40	1			



## **SOIL BORING LOG**

Page  $\underline{2}$  of  $\underline{2}$ 

Date \_\_3/31/14

	ROUTE	F.A.I R	TE. 80	_ DES	SCRII	PTION	-		I-80 Phase II (Near Te	erm)	LOGGED BY _	NW
	SECTION _	2013-00	8B & 2013-	009B	_ L	OCAT	ION _	SW 1/-	4, <b>SEC.</b> 14, <b>TWP.</b> T35N,	, <b>RNG.</b> R10E, 3 <sup>rd</sup> <b>PI</b>	М	
	COUNTY _	Will	DR	RILLING	MET	HOD			Mud Rotary	_ HAMMER TYPE	CME Auto	omatic
	STRUCT. NO Station			_	D E P	B L O	UCS	M O I	Surface Water Elev. Stream Bed Elev.	n/a ft n/a ft		
	BORING NO. Station Offset Ground Sur	53.3	62+03 30ft Right	  ft	T H (ft)	W S (/6")	Qu (tsf)	S T (%)	Groundwater Elev.: First Encounter Upon Completion After Hrs.	n/a ft n/a ft ft		
	VOID (contin	D ROCK		568.91 567.41	-45	2 4 25 50/3"		15				
Z:PROJECTS\2013\13125 HNTB, I-80 PHASE II (NEAR TERM)\13125 BORING LOGS\13125_LOG.GPJ 4/2/15	Borehole concoring.	itinued with	rock	565.41	-50							



**GSI Job No.** \_\_\_\_13125\_\_\_

Page  $\underline{1}$  of  $\underline{1}$ 

Date \_\_3/31/14\_\_

ROUTE	F.A.I RTE. 80	DESCRII	PTION		I-80 Pha	se II (Nea	ar Term)			_ LO	GGED	BY	NW
SECTION _	2013-008B & 2013	3-009B <b>L</b>	OCATION	SW 1/4	, <b>SEC.</b> 14	, <b>TWP.</b> T	35N, <b>RNC</b>	<b>3.</b> R10	DE, 3	d PM			
COUNTY	Will	CORING METH	OD Rot	ary Was	sh					R		CORE	S
	_			•		NX Do				E C	R	т	T R
STRUCT. NO	O		NG BARREL	TYPE 8	R SIZE _	Swivel	l-10 ft	D	С	0	Q	ı	E
Station _		Cor	e Diameter		2	in		E	0	V	·	M	N
BORING NO			of Rock Ele		567.41 565.41			P T	R E	E R	D .	E	G T
Station Offset			in Core Elev	<b>/</b>	303.41	_ "		н		Υ			Н
	rface Elev. 612.9							(ft)	(#)	(%)	(%)	(min/ft)	(tsf)
	SYSTEM, NIAGARAN						565.41		1	94	43		710.0
Light gray to	gray & fine grained worizontal fractures thro	vith horizontal b Dughout.	edding. Soi	me light	rust stainir	ng with		_					
		- ag											
								-50					
								_					
								_					
								-55					
								_					
							555.41						
End Of Borir	ng @ -57.5'. Boring ba	ackfilled with co	uttings.										
								-60					
								_					
								-65					
								_					

Color pictures of the cores

5 yrs after const.

Cores will be stored for examination until

PAGE \_1 \_\_\_ of \_1

DATE \_3/31/2014

LOGGED BY \_JK

GSI JOB No. \_13125

Geo Services, Inc. Geotechnical, Environmental & Givil Engineering 805 Amherst Court, Suite 204 Naperville, Ulinois 60565 (630) 355-2838
DOLLTE

ROUTE	DESCRIPTION <u>I-80 Reconstruction (Near Term Phase 2)</u>	)					
SECTION	LOCATION SEC 14, T35N, R10E, SW 1/4, 3rd PM						
COUNTY Will	CORING METHOD Rotary Wash				_		
Station	CORING BARREL TYPE & SIZE NX Double Swivel—10 ft Core Diameter 2.0 in Top of Rock Elev. 567.4 Begin Core Elev. 565.4	D E P T H	CORE RUN (#)	RECOVERY (%)	R · Q · D · %	S S S S S S S S S S S S S S S S S S S	SHREZGHT (tsf)
SILURIAN SYSTEM, NIAGARAN SERIES RUN 1 (-47.5' to -57.5') Light gray to gray & fine grained wi numerous horizontal fractures throug	th horizontal bedding. Some light rust staining with ghout.	-52.5	1	<b>'</b>	42.5		





# **SOIL BORING LOG**

Page  $\underline{1}$  of  $\underline{2}$ 

**Date** 4/17/14

	ROUTE	F.A.I RTE. 80	DESCRI	PTION			I-80 Phase II (Near Te	LOGGED BY			JB	
	SECTION	2013-008B & 20	13-009B I	LOCAT	ION _	SE 1/4	, <b>SEC.</b> 15, <b>TWP.</b> T35N,	RNG. R10E, 3	B <sup>rd</sup> PM			
	COUNTY	Will	DRILLING MET	THOD			Mud Rotary	_ HAMMER 1	YPE	CME A	utoma	itic
	BORING NO.	BSB-43	Р Т		U C % Qu	M O I S T	Surface Water Elev. Stream Bed Elev. Groundwater Elev.:	n/a	ft E P T	1	U C S	M O I S T
	Offset	764+04 56.70ft Left					First Encounter Upon Completion	n/a	ft			
ı		ace Elev616.		(/6")	(tsf)	(%)	After Hrs.		ft (ft)	(/6")	(tsf)	(%)
Z:PROJECTS/2013/13125 HNTB, 1-80 PHASE II (NEAR TERM)/13125 BORING LOGS/13125_LOG.GPJ 4/2/15	VOID	ETE BRIDGE DE					VOID (continued)					
-80 Ph			_	1			CRUSHED STONE-k	oose (FIII)	_	3		8
5 HNTB, I									579.44	3 2		
3/1312				-			CINDERS & STONE- (Fill)	black-loose		3		18
JECTS/2013				-			CLAY LOAM with Sto	ne-brown &	577.44	2 2 3		10
Z:\PRC			-20	1			gray-medium dense (I		 -40	2		15



Z.PROJECTS\2013\13125 HNTB, I-80 PHASE II (NEAR TERM)\13125 BORING LOGS\13125\_LOG.GPJ 4/2\15

**GSI Job No.** 13125

## **SOIL BORING LOG**

Page  $\underline{2}$  of  $\underline{2}$ 

**Date** 4/17/14

ROUTE	F.A.I RTE. 80	DES	SCRI	PTION			I-80 Phase II (Near Te	erm) LC	OGGED BY JB
SECTION	2013-008B & 2013-	-009B	_ L	OCAT	ION _	SE 1/4	, <b>SEC.</b> 15, <b>TWP</b> . T35N,	RNG. R10E, 3 <sup>rd</sup> PM	
COUNTY	Will D	RILLING	MET	HOD			Mud Rotary	_ HAMMER TYPE	CME Automatic
Station BORING NO Station	764+04		D E P T H	B L O W S	U C S	M O I S T	Surface Water Elev. Stream Bed Elev. Groundwater Elev.: First Encounter	n/aft n/aft	
Offset Ground Surfac	56.70ft Left e Elev. 616.44	ft	(ft)	(/6")	(tsf)	(%)		n/a ft ft	
	th Stone-brown & ense (Fill)	575.44		5 9 7 18 18	3.0 P	14			
FRACTURED F	OCK .	573.44		11					
TIACTOREDI	KOOK	571.94		4 39 50/5"		4			
Drillers Observation bedrock  Borehole continuoring.		570.44	45						



**GSI Job No.** \_\_\_\_13125\_\_\_

Page  $\underline{1}$  of  $\underline{1}$ 

Date <u>4/17/14</u>

ROUTE	F.A.I RTE. 80	DESCRIPTION	I-80 Phas	e II (Near Term)		LO	GGED	BY	JB
SECTION	2013-008B & 2013-00	9B LOCATION SE 1/	4, <b>SEC.</b> 15, 1	TWP. T35N, RNG	. R10E, 3	PM PM			
COUNTY	Will <b>COR</b>	ING METHOD Rotary Wa	ash			R		CORE	S
				NX Double		E	R	_	Ţ
		CORING BARREL TYPE	& SIZE	Swivel-10 ft	D C	C	Q.	T	R E
Station		Core Diameter	2	in	E O	V	-	M	N
BORING NO.	BSB-43	Top of Rock Elev.	571.94	ft	PR	E	D	E	G
Station	764+04	Begin Core Elev	570.44	_ ft	T   E   H	R			T H
Offset	56.70ft Left				(ft) (#)	(%)	(%)	(min/ft)	(tsf)
Ground Surfa		_ ft		570.44				(111111111)	(tSI)
Light gray to g numerous che		avy bedding. Highly fractured merous horizontal fractures th	& weathered	570.44 d with		99	30		940.0
End Of Boring	@ -56.0'. Boring backfi	lled with cuttings.		000.44	_				
					$\dashv$				
					-60				
					-				
					-65				

Color pictures of the cores

Cores will be stored for examination until 5 yrs after const.

PAG	E <u>1</u>	of <u>1</u>	
DAT	E <u>4/17/</u>	2014	
LOG	GED BY	JK	
CSI	IOR No	13125	

Geo Services, Inc. Geotechnical, Environmental & Givil Engineering
805 Amherst Court, Suite 204
Naperville, Illinois 60565
(630) 355+2838

					120		
ROUTE	DESCRIPTION <u>I-80 Reconstruction (Near Term Phase 2)</u>	)					
SECTION	LOCATION SEC 14, T35N, R10E, SW 1/4, 3rd PM						
COUNTY Will	CORING METHOD Rotary Wash	D	С	Ь	R	С	S
STRUCT. NO Station  BORING NO Station	CORING BARREL TYPE & SIZE NX Double Swivel—10 ft Core Diameter 2.0 in Top of Rock Elev. 571.9 Begin Core Elev. 570.4		OORE RU	RECOVE	K . Q . D .	O R E T M	T R E Z G
Offset <u>56.7' Left</u>			N	R Y		E (min	T H
Ground Surface Elev. 616.44		(ft)	(#)	(%)	(%)	`/ft)	(tsf)
	DOLOMITE  o wavy bedding. Highly fractured & weathered with Numerous horizontal fractures throughout.		1	99.0	30.0	n/a	940 <b>9</b>





SOIL BORING LOG Page 1 of 2

**GSI Job No.** 13125

**Date** \_\_3/13/14\_\_

	ROUTE	F.A.I RTE	. 80	DES	CRII	PTION			I-80 Phase II (Near Te	Term) LOGGED BY NW						
,	SECTION	2013-008B	8 & 2013-00	9B	_ L	OCAT	ION _	SW 1/	4, <b>SEC.</b> 14, <b>TWP.</b> T35N	, <b>RNG.</b> R10E, 3	B <sup>rd</sup> PM					
	COUNTY	Will	DRIL	LING	MET	HOD	Mud Rotary			_ HAMMER T	YPE	CME A	utoma	itic		
	STRUCT. NO. Station			- -	D E P	B L O	U C S	M O I	Surface Water Elev. Stream Bed Elev.		ft E	B L O	U C S	M O I		
	BORING NO. Station Offset	BSE 763	3-44 +56	- -	H	W S	Qu	S T	Groundwater Elev.: First Encounter Upon Completion	n/a	ft H		Qu	S T		
	Ground Surfa	ace Elev.	614.94	- ft	(ft)	(/6")	(tsf)	(%)	After Hrs.			(/6")	(tsf)	(%)		
	9.5" CONCRE		DECK						VOID (continued)							
,	VOID		6	<u>14.15                                   </u>								1				
	VOID										_	_				
				-								-				
					-						_	+				
				-												
				_												
					 -5						_	-				
				-	<u>-5</u>						2	5				
					_						-	1				
				_												
2				-								4				
4/2/1					_						-	-				
GPJ				-								1				
LOG					_						_	1				
125				_												
3S/13				-	-10						3	0				
3 100					_						_	+				
RINC				-								1				
Z:PROJECTS/2013/13125 HNTB, I-80 PHASE II (NEAR TERM))13125 BORING LOGS/13125_LOG.GPJ 4/2/15				_							_					
)/131					_						_	-				
ERM				-								+				
EAR					$\dashv$						_ 580.94	1				
Z Z				-					TOPSOIL-black		_	7				
IASE				_	- <u>15</u>						3			25		
90 PF					$\dashv$							_ 7 _ 6				
E, L				-					PEAT-black-loose		578.94	3				
NH S											_	4		87		
1312				-								4				
2013\				-					SAND & CDAVEL bro		576.94	4				
CTS\					$\dashv$				SAND & GRAVEL-bro dense	Jvvi i-v <del>e</del> i y	-	5		21		
SOJE				-	-							_ 8 _ 17				
Z:\PF					-20						-4					



# **SOIL BORING LOG**

Page <u>2</u> of <u>2</u>

**Date** 3/13/14

	ROUTE	F.A.I RTE. 80	DESCR	IPTION			I-80 Phase II (Near Te	erm) LC	GGED BY _	NW
	SECTION	ECTION2013-008B & 2013-009B LOCATION		ION _	SW 1/	4, <b>SEC.</b> 14, <b>TWP.</b> T35N	, <b>RNG.</b> R10E, 3 <sup>rd</sup> <b>PM</b>			
	COUNTY	Will D	RILLING ME	THOD		Mud Rotary		_ HAMMER TYPE _	CME Auto	matic
	Station BORING NO. Station Offset	BSB-44 763+56 37.70ft Left	E P T H	B L O W S	U C S Qu	M O I S T	Surface Water Elev. Stream Bed Elev.  Groundwater Elev.: First Encounter Upon Completion	n/a <b>ft</b> n/a <b>ft</b> n/a <b>ft</b>		
Z:/PROJECTS/2013/13125 HNITB, I-80 PHASE II (NEAR TERM)/13125 BORING LOGS/13125_LOG.GPJ 4/2/15	Ground Surfa SAND & GRA dense (continu Drillers Observ fractured rock	vation: Weathered &			(tsf)	12	After Hrs.	ft		
Z:\PR			-60							



**GSI Job No.** \_\_\_\_13125\_\_\_

Page <u>1</u> of <u>1</u>

**Date** \_\_3/13/14\_\_

ROUIE	F.A.IRTE. 80	DESC	RIPTION		I-80 Phas	se II (Ne	ar Term)			_ LO	GGED	BY	NVV
SECTION	2013-008B & 2013	-009B	LOCATION	SW 1/4	SFC 14	TWP T	35N <b>RN</b> 0	• R10	OF 3 <sup>n</sup>	d PM			
							5511, Tute		<u>,                                    </u>				
COUNTY	Will C	ORING ME	THOD Rot	ary Was	h					R E	R	CORE	S T
							ouble			C		т	R
STRUCT. NO.			RING BARREL	. IYPE 8	SIZE _	Swive	el-10 ft	D	С	0	Q	ı	E
Station		с	ore Diameter		2	_ in		E	0	V	·	M	N
BORING NO.	BSB-44		op of Rock Ele		568.94	_ ft		P T	R E	E R	D	E	G T
Station	763+56	В	egin Core Elev	<b>/</b>	568.94	_ ft		H	_	Y	•		Н
Offset	37.70ft Left							(ft)	/#\		(%)	(min/ft)	
Ground Surfa			N ON HEE						(#)	(%)		(111111/11)	(tsf)
	STEM, NIAGARAN Stray with horizontal to			ed with ru	ıst staining	١.&	568.94	_	1	98	35		
numerous hor	izontal fractures thro	ughout. Nu	merous chert	nodules	to -47.0'.	, Q							
								_					
								-50					
													1119.0
								_					
								_					
								- <u>55</u>					
								_					
End Of Boring	@ -56.0'. Boring ba	ckfilled with	cuttings				558.94						
Lina of Borning	G CC.C. Domig bar	ortimod With	outingo.										
								_					
								-60					
								-					
								-					
								_					
								-65					
								_					

PAGE \_1 \_\_\_ of \_1

DATE \_3/13/2014

LOGGED BY \_JK

GSI JOB No. \_13125

Geo Services, Inc.
Geotechnical, Environmental & Givil Engineering
805 Amherst Court, Suite 204
Naperville, Ullinois 60565
(630) 355+2838

ROUTE	DESCRIPTION <u>I-80 Reconstruction (Near Term Phase 2)</u>	)					
SECTION	LOCATION SEC 14, T35N, R10E, SW 1/4, 3rd PM						
COUNTY Will	CORING METHOD Rotary Wash	D	С	R	R	С	
	CORING BARREL TYPE & SIZE NX Double Swivel—10 ft Core Diameter 2.0 in Top of Rock Elev. 568.9 Begin Core Elev. 568.9	E P T H	ORE RUN	ECO>ER>	· Q · D ·	ORET ME	OHREZGHT (
		(ft)	(#) 1	(%)	(%)		
	by wavy bedding. Weathered with rust staining & ghout. Numerous chert nodules to -47.0'.				35.0		-50.0°





**GSI Job No.** 13125

# **SOIL BORING LOG**

Page  $\underline{1}$  of  $\underline{2}$ 

**Date** 4/24/14

	ROUTE	F.A.I RTE. 80	DESCF	RIPTION			I-80 Phase II (Near T	erm)	LOGG	ED BY	N	IW
	SECTION	2013-008B & 20	13-009B	LOCAT	ION _	SW 1/4	4, <b>SEC.</b> 14, <b>TWP</b> . T35N	I, <b>RNG.</b> R10E, 3	B <sup>rd</sup> <b>PM</b>			
	COUNTY	Will	DRILLING ME	THOD			Mud Rotary	HAMMER T	YPE	CME A	utoma	tic
	BORING NO. Station Offset	BSB-45 763+16 53.10ft Righ	F T H t	L O W	U C S Qu (tsf)	M O I % T %	Surface Water Elev. Stream Bed Elev. Groundwater Elev.: First Encounter Upon Completion		ft EPT H	B L O W S	U C S Qu (tsf)	M O I S T
[		ace Elev. 616. TE BRIDGE DEC		, (10)	(tai)	( /0)	After Hrs.  VOID (continued)		π (15)	(10)	(tai)	( /0)
Z:\PROJECTS\2013\13125 HNTB, 1-80 PHASE II (NEAR TERM)\13125 BORING LOGS\13125_LOG.GPJ 4/2/15	VOID		615.51	5			CRUSHED CONCRE	ETE GRAVEI				
SE II (NEAR			-  -1	5			& STONE-loose to m (Fill)		-35	4 6 6		7
0 PHA			<del></del>							8		_
TB, I-8				-						7 6		6
25 HN				]						6		
3/131			-						_	8		5
\$\201										6		
IECT(			_							6		
PROJ			-						_	5		6
Ϋ́			-2	0					40			6



Z:PROJECTS\2013\13125 HNTB, I-80 PHASE II (NEAR TERM)\13125 BORING LOGS\13125 LOG.GPJ 4/2\15

**GSI Job No.** 13125

# **SOIL BORING LOG**

Page  $\underline{2}$  of  $\underline{2}$ 

**Date** 4/24/14

ROUTE F.A.I RTE. 80	DE	SCRI	PTION			I-80 Phase II (Near Te	erm) LO	GGED BY NW
<b>SECTION</b> 2013-008B & 2013-	-009B	L	OCAT	ION _	SW 1/	4, <b>SEC.</b> 14, <b>TWP.</b> T35N,	, <b>RNG</b> . R10E, 3 <sup>rd</sup> <b>PM</b>	
COUNTY Will DI	RILLING	MET	HOD			Mud Rotary	_ HAMMER TYPE _	CME Automatic
STRUCT. NO.           Station           BORING NO.         BSB-45           Station         763+16           Offset         53.10ft Right		D E P T H	B L O W S	U C S	M O I S T	Surface Water Elev. Stream Bed Elev.  Groundwater Elev.: First Encounter	n/a <b>ft</b> n/a <b>ft</b>	
Ground Surface Elev. 616.30	ft	(ft)	(/6")	(tsf)	(%)	Upon Completion After Hrs.	ft	
CRUSHED CONCRETE, GRAVEL & STONE-loose to medium dense (Fill) (continued)	•		5					
(Till) (Gorianada)		_	6 6		8			
			5 3					
	572.30		3 50/3"		18			
Borehole continued with rock coring.								



**GSI Job No.** \_\_\_\_13125\_\_\_

Page <u>1</u> of <u>1</u>

Date \_\_4/24/14\_

ROUTE	F.A.I RTE. 80	DESCRIPTION	I-80 Phase II (I	Near Term)		_ LO	GGED	BY	NW
SECTION	2013-008B & 2013-00	DOB LOCATION SW	1/4, <b>SEC.</b> 14, <b>TWP</b>	P. T35N, <b>RNG</b> . I	R10E, 3	d PM			
COUNTY	Will COR	RING METHOD Rotary W				R E	R	CORE	S T
<b>-</b>					D C E O	0 V	Q	T I M	R E N
BORING NO. Station Offset		Top of Rock Elev Begin Core Elev	568.50 ft 572.30 ft		P R T E H	E R Y	D	E	G T H
Ground Surfa		_ _ ft		_	ft) (#)	(%)	(%)	(min/ft)	(tsf)
CONCRETE				572.30 — — — — 568.50	1 				
Light gray to g	STEM, NIAGARAN SEI ray with horizontal bedd tures throughout.	RIES DOLOMITE ling. Weathered with rust sta	aining. Numerous		-50 	97	13		593.0
SILURIAN SY Light gray to g	STEM, NIAGARAN SEI ray with horizontal bedd	RIES DOLOMITE ling. Some horizontal fractur	es throughout.		2 -555	100	64		946.0
End Of Boring	@ -59.0'. Boring backf	illed with cuttings.			-60 				

Color pictures of the cores Yes

Cores will be stored for examination until 5 yrs after const.

PAGE	1	of <u>_2</u>	
DATE	4/24/	2014	
LOGGE	D BY	JK	
GSI JC	B No	13125	

Geo Services, Inc.	ROCK CORE LOG	DATE	4/2	4/201	4		
Geotechnical, Environmental & Civil Engineering 805 Amherst Court, Suite 204 Naperville, Illinois 60565		LOGG	ED BY	JK			
(630) 355+2838		GSI .	IOB No	. <u>13</u>	3125		
ROUTE	DESCRIPTION <u>I-80 Reconstruction (Near Term Pr</u>	nase 2)					
SECTION	LOCATION SEC 14, T35N, R10E, SW1/4						
COUNTY WIII	CORING METHOD Rotary Wash						
Station	CORING BARREL TYPE & SIZE NX Double Swivel  Core Diameter 2.0 in	<u>–10 f</u> t	C	R E C O	R Q Q	C O R ET	S T R E
BORING NO. <u>BSB-45</u> Station <u>731+16</u> Offset 53.1' Right	Top of Rock Elev. <u>568.5</u> Begin Core Elev. <u>572.3</u>		H R U	V E R Y	D ·	M E	N G T
Ground Surface Elev. 616.30		(1	t) (#)	1 .	(%)	(min /ft)	
RUN 1 (-44.0' to -54.0') (-44.0 to -47.8') CONCRETE		_			, ,		
(-47.8' to -54.0') SILURIAN SYSTEM Light gray to gray with horizontal be horizontal fractures throughout.	, NIAGARAN SERIES DOLOMITE edding. Weathered with rust staining. Numerous	- - -	1 49	96.7	13.3	n/a	593 <b>@</b> -48.3
		- - -					



PAGE	2	of	2	
DATE	4/24/	2014		
LOGGE	D BY _	JK		
GSI JO	– B No.	13125	5	

Geo Services, Inc.
Geotechnical, Environmental & Civil Engineering
805 Amherst Court, Suite 204
Naperville, Illinois 60565
(630) 355+2838

ROUTE	DESCRIPTION <u>I-80 Reconstruction (Near Term Phase 2)</u>	)					
SECTION	LOCATION SEC 14, T35N, R10E, SW1/4						
COUNTY Will	CORING METHOD Rotary Wash						
Ctation	Top of Rock Elev. 568.5  Begin Core Elev. 572.3	D E P T H	CORE RUN (#)	RECOVERY (%)	R · Q · D · 《	C O R E - M E (min /ft)	
SILURIAN SYSTEM, NIAGARAN SERIES RUN 2 (-54.0' to -59.0') Light gray to gray with horizontal b	DOLOMITE edding. Some horizontal fractures throughout.			<u> </u>	64.0		





Z.PROJECTS\2013\13125 HNTB, I-80 PHASE II (NEAR TERM)\13125 BORING LOGS\13125\_LOG.GPJ 4/2/15

**GSI Job No.** 13125

# **SOIL BORING LOG**

Page <u>1</u> of <u>1</u>

Date \_\_11/1/13\_

ROUTE	F.A.I RTE. 80	DES	3CRII	PTION			I-80 Phase II (Near Te	erm)	LOG	GED BY _	TZ
SECTION	2013-008B & 2013-	·009B	_ L	OCATI	ION _	SW 1/4	4, SEC. 14, TWP. T35N	I, <b>RNG.</b> R10E, 3	3 <sup>rd</sup> PM		
COUNTY	WillDF	RILLING	MET	HOD		Hollow	Stem Auger/Rotary	HAMMER T	YPE _	CME Auto	omatic
Station BORING NO.	BSB-46		D E P T U	B L O W	U C S	M O I S	Surface Water Elev. Stream Bed Elev. Groundwater Elev.:	n/a	ft		
Offset	765+12 66.70ft Left ace Elev. 582.31	 ft	H (ft)	S (/6")	Qu (tsf)	(%)	First Encounter Upon Completion After Hrs.		ft		
9.0" ASPHALT		581.56		(-,	( ,	(,-)	AILCI III3.		-		
SILTY SAND, 0 STONE-dark b black-medium	rown &			10 16 11		12					
CLAY LOAM w	 vith	579.31		11							
STONE-brown				3	1.3	22					
EDACTI IRED	ROCK-brown-dense	576.81	<u>-5</u>	6	Р						
FRACIONED	ROOK-DIOWII-uciise			8		6					
		574.31		22							
Drillers Observa Bedrock	ation: Apparent										
Borehole contil coring.	nued with rock	572.31	10								



**GSI Job No.** \_\_\_\_13125\_\_\_

Page  $\underline{1}$  of  $\underline{1}$ 

**Date** \_\_\_11/1/13

ROUIE	F.A.IRIE. 80	DESCRIPTION	I-80 Pha	<u>se II (Near</u>	lerm)		LC	<b>IGGED</b>	BY	IZ
SECTION	2013-008B & 2013-00	9B LOCATION SW 1	/4. <b>SEC.</b> 14	. <b>TWP</b> . T3:	5N. <b>RNG</b> .	R10E.	3 <sup>rd</sup> <b>PM</b>			
_				,	,		R		CORE	s
COUNTY	VVIII COR	ING METHOD Rotary Wa	isn				⊢ ĸ	R	CORE	T
CTDUCT NO		CODING DADDEL TYPE	9 CIZE	NX Do			_ c		Т	R
Station		CORING BARREL TYPE	& SIZE _	Swivel-	10 11	D		Q	I	E
Otation		Core Diameter	2			E		<u> </u>	M	N
BORING NO.	BSB-46	Top of Rock Elev	574.31			P F		D	E	G T
Station		Begin Core Elev	572.31	ft		н	Y			H
	66.70ft Left							(0/)	(mains/ft)	
Ground Surfa		_ ft				(ft) (#		(%)	(min/ft)	(tsf)
	STEM, NIAGARAN SEF			:	572.31	1	100	38		
fractures throu	gray, fine grained with no ughout with some chert r	rizontal to wavy bedding. Nur	nerous non	izontai	_					
madiance imee	agnoat with come offert	opiacoment noucleo.								
					-					
						_				
					-					
						-				
					-					
						-15				
					_					1172.0
					_					
					_					
					_					
					-					
End Of Boring	@ -20.0'. Boring backfil				562.31	-20				
Lind of Borning	, we zo.o. Borning backing	iioa witi oattii go.				-				
					-					
					-					
					_					
					_	- <u>25</u>				
						_				
					-					
						$\dashv$				
					-					
						$\dashv$				
					=					
						$\dashv$				
					-					
						-30				
								_		

PAGE <u>1</u> of <u>1</u> DATE November 1, 2013 LOGGED BY JK GSI JOB No. <u>13125</u>

Geo Services, Inc.

Geotechnical, Environmental & Civil Engineering

805 Amherst Court, Suite 204

Naperville, Illinois 60565

(630) 355-2838

ROUTE	DESCRIPTION <u>I-80 Reconstruction (Near Term Phase 2)</u>	)					
SECTION	LOCATION SEC 14, T35N, R10E, SW 1/4, 3rd PM						
COUNTY Will	CORING METHOD Rotary Wash			_			
STRUCT. NO  Station  BORING NO  Station765+12  Offset66.7' Left  Ground Surface Elev582.31	Core Diameter 2.0 in Top of Rock Elev. 574.3 Begin Core Elev. 572.3	D E P T H	CORE RUN (#)	к нсо>ык> 🖔	R · Q · D · %	C O R E T   M E (min /ft)	A HOZBHU
SILURIAN SYSTEM, NIAGARAN SERIES RUN 1 (-10.0' to -20.0') Light gray to gray, fine grained with fractures throughout with some cher	horizontal to wavy bedding. Numerous horizontal		1	100.0	38.0	n/a	1172 <b>©</b> -14.8'





**GSI Job No.** 13125

# **SOIL BORING LOG**

Page <u>1</u> of <u>1</u>

Date \_\_\_11/1/13\_\_

	ROUTE	F.A.I RTE. 80	DES	SCRII	PTION			I-80 Phase II (Near T	erm) I	LOGGED BY	TZ
	SECTION	2013-008B & 201	3-009B	_ L	OCAT	ION _	SW 1/	4, <b>SEC.</b> 14, <b>TWP.</b> T351	N, <b>RNG.</b> R10E, 3 <sup>rd</sup> <b>PN</b>	Λ	
	COUNTY	Will	DRILLING	MET	HOD		Hollow	Stem Auger/Rotary	HAMMER TYPE	CME Aut	tomatic
	Station	BSB-47		DEPT	B L O W	U C S	M O I S	Surface Water Elev. Stream Bed Elev. Groundwater Elev.:			
	Station Offset	764+65 7.20ft Right		Н	S	Qu	Т	First Encounter Upon Completion	n/a ft		
г		ace Elev. <u>582.8</u>	81 ft	(ft)	(/6")	(tsf)	(%)	After Hrs.	ft		
	6.0" ASPHAL		582.31	_							
	CRUSHED S	ΓΟΝΕ-dense (Fill)			6						
					15		7	-			
					16		′				
			F70 04		10			-			
ŀ	CLAY LOAM-	brown-very stiff	579.81								
	(Apparent Fill)				4						
					5	3.3	19	-			
				-5	7	В					
			577.31								
	SANDY CLAY	LOAM with									
	GRAVEL-DIOV	vn-medium dense			6						
2					7		6				
4/2/1					15						
3PJ			574.04								
96.0	FRACTURED	ROCK with	574.31		50/2"						
25_L		vn & gray-very dens	e				7				
1131				-10							
S9C			•								
J Q L			571.81								
ORIN		inued with rock									
25 B	coring.										
)1131											
ERM											
AR T											
(NE											
SE II				- <u>15</u>							
PHA			•								
-80 -80											
Ę,											
25 H											
11312											
2013											
ZTS/2				_							
ODE				-							
Z:PROJECTS\2013\13125 HNTB, I-80 PHASE II (NEAR TERM)\13125 BORING LOGS\13125_LOG.GPJ 4/2/15				-20							



**GSI Job No.** \_\_\_\_13125\_\_\_

Page  $\underline{1}$  of  $\underline{1}$ 

**Date** \_\_11/1/13

ROUTE	F.A.I RTE. 80	DESCRIPTION	I-80 Phase	e II (Near Term)		_ LO	GGED	BY	TZ
SECTION	2013-008B & 2013-00	DOB LOCATION SW 1	1/4, <b>SEC.</b> 14,	TWP. T35N, RNC	<b>3.</b> R10E, 3	rd PM			
COUNTY	Will COR	RING METHOD Rotary W	ash			R	R	CORE	S T
			& SIZE	NX Double Swivel-10 ft	D C	С О	Q Q	T I	R E
		Core Diameter _	<u>2</u> 571.81	_ in ft	E O P R	V E	D	M E	N G
BORING NO. Station		Top of Rock Elev Begin Core Elev	571.81	_ it _ ft	TE	R		_	Т
	7.20ft Right	_			Н	Y			Н
Ground Surf		_ ft			(ft) (#)	(%)	(%)	(min/ft)	(tsf)
Light gray to g fractures throu	ighout numerous some	orizontal to wavy bedding. Nu chert replacement nodules.	merous horizo	571.81 ontal 561.81	1	100	43		1566.0
End Of Boring	g @ -21.0'. Boring backf	illed with cuttings.							

Color pictures of the cores

Cores will be stored for examination until 5 yrs after const.

PAGE \_1 \_\_\_ of \_1

DATE \_November 1, 2013

LOGGED BY \_JK

GSI JOB No. \_\_13125

Geo Services, Inc.

Geotechnical, Environmental & Civil Engineering

805 Amherst Court, Suite 204

Naperville, Ullinois 60565

(630) 355-2838

ROUTE	DESCRIPTION <u>I-80 Reconstruction (Near Term Phase 2)</u>	)					
SECTION	LOCATION SEC 14, T35N, R10E, SW 1/4, 3rd PM						
COUNTY Will	CORING METHOD Rotary Wash				_		
STRUCT. NO  Station  BORING NO  Station  764+65  Offset  Ground Surface Elev  582.81	Core Diameter 2.0 in Top of Rock Elev. 571.8 Begin Core Elev. 571.8	D E P T H	CORE RUN (#)	RECOVERY %	R · Q · D · %	C O R E - M E (m/ft)	
SILURIAN SYSTEM, NIAGARAN SERIES RUN 1 (-11.0' to -21.0') Light gray to gray, fine grained with fractures throughout numerous some	horizontal to wavy bedding. Numerous horizontal		1	100.0	43.0	n/a	1566 <b>(8</b> –15.7'





**GSI Job No.** 13125

# **SOIL BORING LOG**

Page <u>1</u> of <u>1</u>

Date \_\_11/4/13\_

	ROUTE	F.A.I RTE. 80	DES	DESCRIPTION				I-80 Phase II (Near T	erm)	LOGGED BY TZ		
	SECTION	2013-008B & 201	13-009B	_ L	OCAT	ION _	SW 1/	4, <b>SEC.</b> 14, <b>TWP.</b> T35N	N, <b>RNG.</b> R10E, 3 <sup>rd</sup> <b>PN</b>	Л		
	COUNTY	Will	DRILLING	MET	HOD		Hollow	Stem Auger/Rotary	HAMMER TYPE	CME Aut	omatic	
	Station			D E P T	B L O W	U C S	M O I S	Surface Water Elev. Stream Bed Elev. Groundwater Elev.:	n/a ft n/a ft			
	Station Offset	BSB-48 765+02 20.20ft Left		Н	S	Qu	Т	First Encounter Upon Completion	n/a <b>ft</b>			
Г		ace Elev. <u>583.</u>	08 <b>ft</b>	(ft)	(/6")	(tsf)	(%)	After Hrs.	ft			
-	7.0" ASPHAL	TONE-dense (Fill)	582.50	_				-				
	CKUSHED S	I ONE-derise (FIII)			10			-				
					8		4	-				
			•		7							
-	CLAVIOAM	brown & gray-very	580.08									
	stiff to hard (A	pparent Fill)		_	6							
	,	,			7	4.5	16					
				-5	11	Р						
				_								
					4							
				-	5	2.8	14	-				
2/15					6	Р						
J 4/			575.08									
G.GF	FRACTURED	ROCK-very dense	)	_	50/1"							
5_LC				_	50/ I		5	-				
11312				-10								
ogs												
NGL	Danahala aant	:	572.08									
BOR	coring.	inued with rock		_								
3125	g-											
M)/1				_								
削												
NEAI												
)   				- <u>15</u>								
PHAS				-15								
8												
MTB,				$\dashv$								
125 h												
13/13				$\dashv$								
\$\20			,									
Z:/PROJECTS/2013/13125 HNTB, I-80 PHASE II (NEAR TERM)/13125 BORING LOGS/13125_LOG.GPJ 4/2/15												
PRO				 -20								
ίi				-20				II.				



**GSI Job No.** \_\_\_\_13125\_\_\_

Page  $\underline{1}$  of  $\underline{1}$ 

**Date** \_\_\_11/4/13\_\_

ROUIE	F.A.IRTE. 80	DE	ESCRIPTION		1-80 Pha	<u>se II (Nea</u>	r Lerm)			_ LO	GGED	BY	IZ
OFOTION	0040 0000 8 0	040 0000	LOCATION	004.474	050 44	TAID TO	SEN DNO	D40	\_ O <sup>r</sup>	d DN4			
SECTION	2013-0088 & 2	013-009B	LOCATION	SVV 1/4	i, <b>SEC.</b> 14	, <b>IVVP.</b> 13	SON, KNG	. K 10	ı⊑, 3	PIVI		I	
COUNTY	Will	CORING	METHOD Ro	tary Was	h					R		CORE	S
		-				NX Do	nuble			E	R	_	T
STRUCT. NO.			CORING BARREI	L TYPE 8	SIZE	Swivel-		_	_	С		Ţ	R E
Station					_			D E	C O	0 V	Q	I M	N
			Core Diameter		2 572.08			P	R	Ē	D.	E	G
BORING NO.			Top of Rock El Begin Core Ele		572.08			Т	Ε	R		_	T
Station Offset	765+02 20.20ft Le		begin core Ele	·v	012.00			н		Υ			н
		3.08 <b>ft</b>						(ft)	(#)	(%)	(%)	(min/ft)	(tsf)
	STEM, NIAGARA	•					572.08	-	1	100	39	, ,	
	gray with horizonta			ıs horizor	ntal fractur	es & cher		-		100			
replacement r	ก่อdules throughoเ	ut.	J				-						
								-					
							-						
							-						
							_	-15					
							-						
							-						1450.0
								_					
								-					
							-	_					
								-					
							-	-20					
							562.08	-					
End Of Boring	g @ -21.0'. Boring	backfilled	with cuttings.				002.00						
							_						
							-						
								$\dashv$					
							-	-25					
								$\dashv$					
							-	_					
								-					
							-	-					
								$\dashv$					
							=	-					
								$\dashv$					
							-						
								- <u>30</u>					
							- -						

PAGE <u>1</u>	of <u>1</u>
DATE Novem	ber 4, 2013
LOGGED BY	JK
GSI JOB No.	13125

Geo Services, Inc.

Geotechnical, Environmental & Givil Engineering
805 Amherst Court, Suite 204
Naperville, Illinois 60565
(630) 355-2838

ROUTE	DESCRIPTION <u>I-80 Reconstruction (Near Term Phase 2)</u>	)					
SECTION	LOCATION SEC 14, T35N, R10E, SW 1/4, 3rd PM						
COUNTY Will	CORING METHOD Rotary Wash		С	R	R	С	_
Station	Top of Rock Elev. 572.1  Begin Core Elev. 572.1	E P T H	ORE RUZ	ECOVERY (%)	· Q · D ·	O R E - M E in /ft)	
SILURIAN SYSTEM, NIAGARAN SERIES RUN 1 (-11.0' to -21.0') Light gray to gray with horizontal to fractures & chert replacement nodu	o wavy bedding. Numerous horizontal		1	100.0	39.0	n/a	1450 <b>@</b>





**GSI Job No.** 13125

# **SOIL BORING LOG**

Page <u>1</u> of <u>1</u>

**Date** \_\_11/4/13\_\_

	ROUTE	F.A.I RTE. 80	DES	SCRI	PTION			I-80 Phase II (Near T	erm)	LOGGED BYTZ		
	SECTION	2013-008B & 2013	3-009B	_ ı	_OCAT	ION _	SW 1/	4, <b>SEC.</b> 14, <b>TWP.</b> T35N	I, <b>RNG.</b> R10E, 3 <sup>rd</sup> <b>P</b>	M		
	COUNTY	Will D	RILLING	MET	THOD		Hollow	Stem Auger/Rotary	HAMMER TYPE	CME Automa	atic	
	STRUCT. NO. Station			D E P	B L O	U C S	M O I	Surface Water Elev. Stream Bed Elev.				
	Station Offset	BSB-49 764+48 62.00ft Right ace Elev. 583.64		H (ft)	W S (/6")	Qu (tsf)	S T (%)	Groundwater Elev.: First Encounter Upon Completion After Hrs.	n/a_ <b>ft</b>			
	Ground Surre	300.02	583.02		(, ,	(10.7)	(70)	Aitei nis.				
	CRUSHED ST	ONE-dense (Fill)			21							
					19		5					
			580.64	_	7							
	SANDY CLAY LOAM-brown-	medium dense (Fill)			6							
		,			7		14					
			578.14	<u>-5</u>	9							
	CLAY LOAM-(	gray-very stiff	070.11									
				_	10	3.3	15					
4/2/15				_	11	В						
3.GPJ			575.14									
25_LO(	Drillers Observ Bedrock	ation: Apparent						-				
\$\$\131	Danahala aant		573.64	-10								
IG LOG	coring.	inued with rock		_								
BORIN												
13125												
(LERM)					-							
VEAR -					-							
SE II (I				 -15								
30 PHA				- <u>15</u>	-							
ATB, Le												
1125 HI												
013/13												
ECTS/2				_								
Z:\PROJECTS\2013\13125 HNTB, I-80 PHASE II (NEAR TERM)\13125 BORING LOGS\13125_LOG.GPJ 4/2/15				-20								



**GSI Job No.** \_\_\_\_13125

Page <u>1</u> of <u>1</u>

Date 11/4/13

F.A.I RTE. 80 DESCRIPTION I-80 Phase II (Near Term) LOGGED BY TZ SECTION 2013-008B & 2013-009B LOCATION SW 1/4, SEC. 14, TWP. T35N, RNG. R10E, 3<sup>rd</sup> PM R **CORE** S COUNTY \_\_\_\_\_ Will CORING METHOD Rotary Wash Ε R Т NX Double С Т R STRUCT. NO. CORING BARREL TYPE & SIZE Swivel-10 ft D С 0 Q Ε Т Station Ε 0 ٧ Ν **Core Diameter** Ρ Ε R D Ε G 575.14 BORING NO. BSB-49 Top of Rock Elev. \_\_\_ Т Т R Ε 
 Station
 764+48

 Offset
 62.00ft Right
 573.64 Begin Core Elev. \_ Υ Н Н (ft) (%) (min/ft) (#) (%) (tsf) Ground Surface Elev. 583.64 ft SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE 573.64 100 60 Light gray to gray with horizontal to wavy bedding. Numerous horizontal fractures & chert replacement nodules throughout. 564.0 End Of Boring @ -20.0'. Boring backfilled with cuttings.

Color pictures of the cores Yes

Cores will be stored for examination until 5 yrs after const.

The "Strength" column represents the uniaxial compressive strength of the core sample (ASTM D-2938)

PAGE	_1	of	_1
DATE	Novem	nber 4,	2013
LOGGE	D BY	JK	
CCI 10	- - No.	1710	:

Geo Services, Inc.

Geotechnical, Environmental & Givil Engineering

805 Amherst Court, Suite 204

Naperville, Ulinois 60565

(630) 355-2838

			110.		120		
ROUTE	DESCRIPTION <u>I-80 Reconstruction (Near Term Phase 2</u> )	)					
SECTION	LOCATION SEC 14, T35N, R10E, SW 1/4, 3rd PM						
COUNTY Will	CORING METHOD Rotary Wash		С				
Station	Top of Rock Elev. $\underline{575.1}$ Begin Core Elev. $\underline{573.6}$	D E P T H	ORE RUN	RECOVERY (%)	R · Q · D · %	CORE ME in (/ft)	S F R E Z G F H (tsf)
SILURIAN SYSTEM, NIAGARAN SERIES RUN 1 (-10.0' to -20.0') Light gray to gray with horizontal to fractures & chert replacement nodul	o wavy bedding. Numerous horizontal es throughout.		1	100.0	60.0	n/a	564 <b>@</b>





**GSI Job No.** 13125

# **SOIL BORING LOG**

Page  $\underline{1}$  of  $\underline{2}$ 

**Date** 1/13/14

	ROUTE _		F.A.I RTE	. 80	DES	SCRII	PTION			I-80 Phase II (Near Te	rm)	LC	OGGE	ED BY	N	W
	SECTION	2	013-008E	8 & 2013	-009B	_ L	OCAT	ION _	SW 1/-	4, <b>SEC.</b> 14, <b>TWP.</b> T35N,	<b>RNG.</b> R10E,	3 <sup>rd</sup> PM				
	COUNTY		Will	D	RILLING	MET	HOD		Hollow	Stem Auger/Rotary	HAMMER	TYPE _	(	CME A	<u>utoma</u>	tic
	BORING N Station	IO		3-50 5+69		D E P T H	B L O W S	U C S	M O I S T	Surface Water Elev. Stream Bed Elev. Groundwater Elev.: First Encounter Upon Completion	621.4	_ft <u>▼</u>	DEPTH	B L O W S	U C s Qu	M O I S T
ſ			Elev.	623.94	ft	(ft)	(/6")	(tsf)	(%)	After Hrs		_ ft	(ft)	(/6")	(tsf)	(%)
	12.0" CON CRUSHEI	O STO	NE				12 19		6	CLAY to CLAY LOAM- & spotted black-medium hard (Fill) (continued)	n stiff to			3	2.7	20
	CLAY to C	ΊΔΥΙ	OAM-bro	wn grav	621.44	<u></u>	13						_	6	В	
	& spotted hard (Fill)	black-ı	medium si	tiff to		_	3						_	6		
							10 8	5.0 B	16				 -25	6 10	2.3 P	23
							3						_	8		
15							4 6	3.5 P	24					9	2.3 B	20
.GPJ 4/2/													_		U	
Z:\PROJECTS\2013\13125 HNTB, I-80 PHASE II (NEAR TERM)\13125 BORING LOGS\13125_LOG.GPJ 4/2/15							4 6 8	1.9 B	22					4 4 10	1.0 P	27
3 LOGS/1						<u>-10</u>	0	В					<u>-30</u>	10	Р	
25 BORIN						_	3	0.5	34			591.94	_			
M)\131							8	Р		CLAY-brown-very stiff						
AR TER						_	4							4		
SE II (NE)						-15	4 7	0.8 B	22				-35	8 7	2.1 B	20
80 PHA						_										
INTB, I							3	2.0	22							
13125 F							6 8	3.0 P	23	SILTY SAND-brown-m	nedium	586.94				
3\2013\1										dense						
JECTS							6 8	2.1	20					3		19
Z:\PRC						 -20	10	2.1 B	20				<u> </u>	7		19



**GSI Job No.** 13125

# **SOIL BORING LOG**

Page  $\underline{2}$  of  $\underline{2}$ 

**Date** \_\_\_1/13/14

	ROUTE	F.A.I RTE. 80	DES	CRIPTION			I-80 Phase II (Near Te	erm) Lo	LOGGED BY		
	SECTION	2013-008B & 2013-	009B	LOCAT	ION _	SW 1/	4, <b>SEC.</b> 14, <b>TWP</b> . T35N	, <b>RNG.</b> R10E, 3 <sup>rd</sup> <b>PM</b>			
	COUNTY	Will DF	RILLING	METHOD		Hollow	Stem Auger/Rotary	_ HAMMER TYPE	CME Auto	omatic	
	STRUCT. NO. Station	E L P O		U C S	M O I	Surface Water Elev. Stream Bed Elev.	n/a <b>ft</b> n/a <b>ft</b>				
	Station Offset	BSB-50 766+69 55.40ft Left ace Elev. 623.94	_	T W H S (ft) (/6")	Qu (tsf)	S T (%)	Groundwater Elev.: First Encounter Upon Completion After Hrs.				
		brown-medium	_ "				7461 11161	··			
	CLAY-brown &	₹ gray-medium dense	581.94								
			-	4 6 -45 9		24					
2			576.94								
JG.GPJ 4/2/1	FRACTURED	ROCK-very dense	- 574.94								
OGS\13125_L0	Drillers Observ Bedrock	ation: Apparent	574.94	-50		14					
Z:\PROJECTS\2013\13125 HNTB, I-80 PHASE II (NEAR TERM)\13125 BORING LOGS\13125_LOG.GPJ 4/2/15	Borehole conticoring.	inued with rock	572.94 -								
E II (NEAR TERM			-								
HNTB, I-80 PHAS			_	-55 							
STS\2013\13125			_								
Z:\PROJEC			_	-60							



**GSI Job No.** \_\_\_\_13125\_\_\_

Page <u>1</u> of <u>1</u>

**Date** \_\_\_1/13/14\_\_

ROUIE	F.A.IRTE. 80	DESCRIPTION	I-80 Phas	e II (Near Term)		_ LO	GGED	RA	NVV
SECTION	2013-008B & 2013	B-009B LOCATION S	SW 1/4, <b>SEC.</b> 14,	<b>TWP.</b> T35N, <b>RNG</b>	i. R10E, 3	rd PM			
COUNTY	Will C	CORING METHOD Rotal	ry Wash			R	_	CORE	s
STRUCT. NO.		CORING BARREL 1		NX Double Swivel-10 ft	D C	E C O	R Q	T	T R E
Station		Core Diameter	2		E O P R	V E	D	M E	N G
BORING NO.		Top of Rock Elev Begin Core Elev.		_ ft ft	TE	R		-	T
Station Offset	766+69 55.40ft Left	begin core Elev.	372.34	_ 10	н	Y			Н
	ace Elev. 623.94	4 ft			(ft) (#)	(%)	(%)	(min/ft)	(tsf)
Light gray to g	gray & varved with ho	SERIES DOLOMITE orizontal bedding. Weathere I fractures throughout.	d with some chert		1	99	16		906.0
End Of Boring	g <b>@</b> -61.0'. Boring ba	ackfilled with cuttings.		562.94	-60				
End Of Boring	g @ -o i.∪ . Bolling ba	ackililea with cuttings.			-65 				

PAGE <u>1</u> of <u>1</u> DATE <u>1/13/2014</u> LOGGED BY JK GSL JOB No. 13125

Geo Services, Inc. Geotechnical, Environmental & Civil Engineering	ROCK	CORE	LOG	DATE	1/13	<u>/201</u>	4		
Geotechnical, Environmental & Çivil Engineering 805 Amherst Court, Suite 204 Naperville, Illinois 60565				LOGG	ED BY	_JK			
(630) 355+2838				GSI .	OB No	. <u>13</u>	3125		
ROUTE	DESCRIPTION <u>I-80</u>	) Reconstruc	tion (Near Term Phase	2)					
SECTION	LOCATION <u>SEC 14</u>	, T35N, R10	E, SW 1/4, 3rd PM						
COUNTY Will	CORING METHOD	Rotary Was	h						
STRUCT. NO Station BORING NO. <u>BSB-50</u> Station766+69	Core Diameter	2.0 in		_ft  [	R E H R	RECOVE	R . Q . D .	C O R E - M	STRENG
Offset 55.4' Left Ground Surface Elev. 623.94	•			(f	t) (#)	R Y (%)	(%)	E (min /ft)	
SILURIAN SYSTEM, NIAGARAN SERIES RUN 1 (-51.0' to -61.0') Light gray to gray & varved with ho replacement. Numerous horizontal fr	orizontal bedding. V	Weathered wi	ith some chert		56	99.0	16.0	n/a	906 <b>⊕</b> -53.7'





Z:PROJECTS\2013\13125 HNTB, I-80 PHASE II (NEAR TERM)\13125 BORING LOGS\13125 LOG.GPJ 4/2\15

**GSI Job No.** 13125

# **SOIL BORING LOG**

Page  $\underline{1}$  of  $\underline{2}$ 

**Date** 4/1/14

ROUTE	F.A.I RTE. 80	D	ESCRI	PTION	-		I-80 Phase II (Near T	erm)	LC	OGGE	D BY	N	W
SECTION	2013-008B & 201	3-009B	ı	LOCAT	ION _	SW 1/-	4, <b>SEC.</b> 14, <b>TWP.</b> T35N	N, <b>RNG.</b> R10E,	3 <sup>rd</sup> PM				
COUNTY	Will	DRILLIN	IG ME	THOD		Hollow	Stem Auger/Rotary	HAMMER	TYPE	(	CME A	<u>utoma</u>	tic
Station BORING NO. Station	BSB-51 765+96 26.40ft Right		D E P T H	B L O W S	U C S	M O I S T	Surface Water Elev. Stream Bed Elev. Groundwater Elev.: First Encounter Upon Completion	n/a	_ ft _ ft	DEPTH	B L O W S	n c » G	M O I S T
	ace Elev. 623.6		(ft)	(/6")	(tsf)	(%)	After Hrs.		_ ft	(ft)	(/6")	(tsf)	(%)
10.0" ASPHAL	_T	600.0					CLAY to CLAY LOAN						
CLAY to CLAY gray-stiff to ha	Y LOAM-brown & rd (Fill)	622.8	<u></u>	3 2 2		21	gray-stiff to hard (Fill)	(continuea)			6 9 13	2.8 B	20
			_	3							9		
				6	1.0 P	23					9 13	4.5 P	18
				4 5 6	2.3 B	28					7 9 10	2.8 B	22
				5	Б						9	<b>D</b>	
			-10	9	3.7 B	23				-30	7 8	3.0 B	19
				3 4 4	1.5 B	31							
				6 9 10	2.6 B	21					5 10 14		29
			<u>15</u> 	7	5.7	18			586.63	<u>35</u> 	14		
				14 6 6	B 3.5	21	SANDY CLAY LOAM gray-medium dense (		200.00		8	3.0	18
			-20	9	В					-40	10	Р	



**GSI Job No.** 13125

# **SOIL BORING LOG**

Page  $\underline{2}$  of  $\underline{2}$ 

Date \_\_\_4/1/14

	ROUTE	F.A.I RTE. 80	DESCR	PTION			I-80 Phase II (Near T	erm) L	OGGED BY	NW
	SECTION _	2013-008B & 201	3-009B	LOCAT	ION _	SW 1/-	4, <b>SEC.</b> 14, <b>TWP.</b> T351	N, <b>RNG.</b> R10E, 3 <sup>rd</sup> <b>PM</b>		
	COUNTY	Will I	DRILLING ME	THOD	!	Hollow	Stem Auger/Rotary	HAMMER TYPE	CME Aut	omatic
	Station BORING NO. Station Offset	BSB-51 765+96 26.40ft Right face Elev. 623.6	E   P   T   H	B L O W S	U C S Qu (tsf)	M O I S T (%)	Surface Water Elev. Stream Bed Elev.  Groundwater Elev.: First Encounter Upon Completion After Hrs.	n/aftftn/aft		
Z./PROJECTS/2013/13125 HNTB, 1-80 PHASE II (NEAR TERM)/13125 BORING LOGS/13125_LOG.GPJ 4/2/15	Ground Surf SANDY CLAY gray-medium (continued) CLAY LOAM (Apparent Fill)	Acc Elev. 623.6  / LOAM-brown & dense (Apparent Fill w/ Gravel-brown-stif	) (ft) ) – 581.63	3 8 9	(tsf)	16	After Hrs.	n/a π ft		
Z:\PROJECTS\2013\13125 HNTE										



**GSI Job No.** \_\_\_\_13125\_\_\_

Page <u>1</u> of <u>1</u>

**Date** 4/1/14

ROUTE	F.A.I RTE. 80	DE	SCRIPTION	N	I-80 Pha	se II (Nea	ır Term)			_ LO	GGED	BY	NW
SECTION	2013-008B & 20	013-009B	LOCA	TION SW	1/4, <b>SEC.</b> 14	, <b>TWP.</b> T3	35N, <b>RNG</b>	i. R10	DE, 3 <sup>r</sup>	d PM			
COUNTY				Rotary V						R		CORE	s
	VVIII	COMMO	METHOD		Vaori	NX Do	nuble			Ε	R		Т
			CORING BA	ARREL TYP	PE & SIZE _	Swivel		D	С	C	Q Q	T	R E
Station			Core Dia	meter	2	in		E	0	٧		M	N
BORING NO.			Top of Ro	ock Elev.	576.63	ft		P T	R E	E R	D	E	G T
Station			Begin Co	re Elev.	575.13	ft		H	_	Y	•		H
Offset Ground Sur	26.40ft Rigl face Elev. 623	nt 3.63 <b>ft</b>						(ft)	(#)	(%)	(%)	(min/ft)	(tsf)
SILURIAN S'	YSTEM. NIAGARA	N SERIES	DOLOMIT	E			575.13	` '	1	100	34	, ,	
Light gray to	gray with horizonta ctures throughout.	al to wavy b	edding. We	eathered &	cherty with nu	ımerous							900.0
Honzoniailia	ciules illoughout.							-50					
								_					
								_					
								-55					
								_					
								_					
							565.13						
End Of Borin	g @ -58.5'. Boring	backfilled v	with cutting:	S.			000.10						
								60					
								-					
								-65					
								-					

Color pictures of the cores

Yes

Cores will be stored for examination until

5 yrs after const.

PAGE _	1	of <u>_1</u>	
DATE _	4/1/20	014	
LOGGE	BY ,	JK	
	_	13125	

Geo Services, Inc.
Geotechnical, Environmental & Givil Engineering
805 Amherst Court Suite 204
Naperville, Ullinois 60565
(630) 355-2838

		ol JOE	NO.	_13	123		
ROUTE	DESCRIPTION <u>I-80 Reconstruction (Near Term Phase 2</u>	)					
SECTION	LOCATION SEC 14, T35N, R10E, SW 1/4, 3rd PM						
COUNTY Will	CORING METHOD Rotary Wash			В	В		
Station		E P T	CORE	RECO	R · Q	C O R ET	S T R E
BORING NO. <u>BSB-51</u> Station 765+96 Offset 26.4' Right	Top of Rock Elev. $\underline{576.6}$ Begin Core Elev. $\underline{575.1}$	Ĥ	R U N	) > E R >	D ·	M E (min	N G T
Ground Surface Elev. 623.63		(ft)	(#)	(%)		/ft)	
SILURIAN SYSTEM, NIAGARAN SERIES RUN 1 (-48.5' to -58.5') Light gray to gray with horizontal to horizontal fractures throughout.	o wavy bedding. Weathered & cherty with numerous	-53.5	1	100.0	34.0	n/a	900 <b>9</b>



# APPENDIX 9 PILE CAPACITY & LENGTH TABLES

#### **Estimated Pile Length and Capacities For Bridge Abutments**

			West Abut. S	ta. 759+64, E	Boring BSB-33	(Elevation 59	6.0 Begin Fric	tion, 597.5 for	Pile Cutoff)			
	HP 8	3x36	HP 1	0x42	HP 1	2x53	HP 1	4x73	Metal S	hell 12"	Metal S	hell 14"
Estimated Pile Length (ft.)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)										
10	12	23	16	29	20	37	24	44				
13	15	27	19	35	25	45	31	56				
15	18	32	23	41	29	52	35	64				
18	20	37	26	47	32	59	40	73				
20	23	42	29	53	36	66	45	81				
23	26	47	32	59	40	73	49	89				
25	28	51	36	65	44	80	54	98				
28	31	56	39	70	48	87	58	106				
30	34	61	42	76	52	94	63	114				
33	36	66	45	82	56	101	68	123				
35	39	71	48	88	60	108	72	131				
38	48	87	61	112	77	141	96	175				
40	49	90	63	115	79	144	99	180				
43	51	92	65	118	81	148	101	184				
45	52	95	66	121	83	152	104	188				
48	53	97	68	124	86	155	106	193				
50	70	127	87	158	104	189	126	230				
53	81	147	100	182	120	219	147	268				
52.8	94	172	117	213	140	255	171	312				
53	108	196	134	243	160	291	195	355				
53.3	121	220	150	273	180	327	219	398				
53.5	134	244	167	303	200	363	243	442				
53.8	148	268	184	334	220	400	267	485				
54							291	529				
54.3							315	572				

# PILE BEARING (FRA) VS. ESTIMATED PILE LENGTH BORING BSB-33 West Abut. Sta. 759+64

Elevation 596.0 Begin Friction, 597.5 for Pile Cutoff (pile length = 0.0 feet)

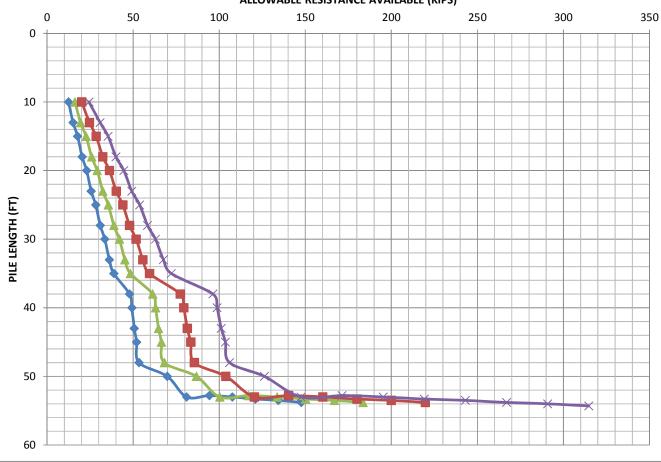
── HP 8x36

→ HP 10x42

HP 12x53

→ HP 14x73





#### PILE BEARING (NRB) VS. ESTIMATED PILE LENGTH BORING BSB-33 West Abut. Sta. 759+64

Elevation 596.0 Begin Friction, 597.5 for Pile Cutoff (pile length = 0.0 feet)

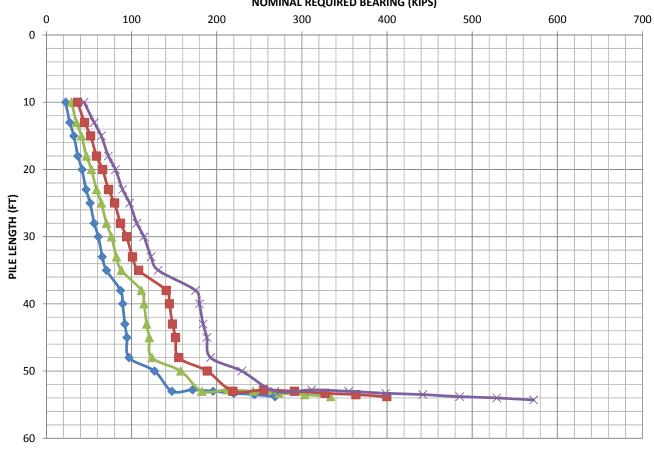
**──** HP 8x36

──HP 10x42

HP 12x53

→ HP 14x73

#### **NOMINAL REQUIRED BEARING (KIPS)**



#### **Estimated Pile Length and Capacities For Bridge Abutments**

			East Abut. St	a. 759+64, B	oring BSB-34	(Elevation 59	8.7 Begin Frict	ion, 600.2 for	Pile Cutoff)			
	HP 8	3x36	HP 1	0x42	HP 1	2x53	HP 1	4x73	Metal S	hell 12"	Metal S	hell 14"
Estimated Pile Length (ft.)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)										
10	12	23	16	29	20	37	24	44				
13	15	27	19	35	25	45	31	56				
15	18	32	23	41	29	52	35	64				
18	20	37	26	47	32	59	40	73				
20	23	42	29	53	36	66	45	81				
23	26	47	32	59	40	73	49	89				
25	28	51	36	65	44	80	54	98				
28	31	56	39	70	48	87	58	106				
30	34	61	42	76	52	94	63	114				
33	36	66	45	82	56	101	68	123				
35	39	71	48	88	60	108	72	131				
38	60	109	74	135	89	162	108	197				
40	72	131	90	163	108	196	131	238				
43	85	154	105	192	126	229	153	278				
45	95	173	121	220	145	263	176	319				
48	104	188	135	246	163	297	198	360				
50	112	204	146	266	182	331	220	401				
53	121	220	157	285	200	363	243	441				
55	130	236	167	304	212	386	265	482				
58	138	251	178	323	225	409	281	512				
59							307	558				

#### PILE BEARING (FRA) VS. ESTIMATED PILE LENGTH BORING BSB-34 East Abut. Sta. 759+64

Elevation 598.7 Begin Friction, 600.2 for Pile Cutoff (pile length = 0.0 feet)

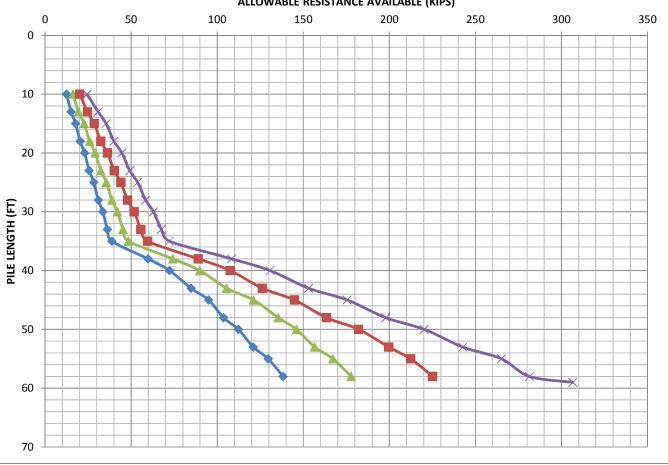
── HP 8x36

→ HP 10x42

HP 12x53

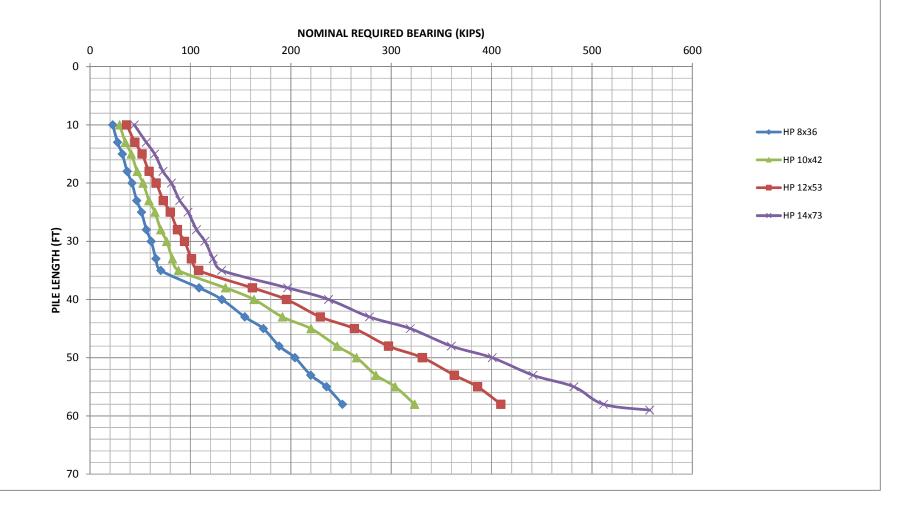
→ HP 14x73

#### ALLOWABLE RESISTANCE AVAILABLE (KIPS)



# PILE BEARING (NRB) VS. ESTIMATED PILE LENGTH BORING BSB-34 East Abut. Sta.759+64

Elevation 598.7 Begin Friction, 600.2 for Pile Cutoff (pile length = 0.0 feet)



#### **Estimated Pile Length and Capacities For Bridge Abutments**

	East Abut. Sta. 759+64, Boring BSB-50 (Elevation 616.6 Begin Friction, 618.1 for Pile Cutoff)  HP 8x36 HP 10x42 HP 12x53 HP 14x73 Metal Shell 12" Metal Shell 14"													
	HP 8	3x36	HP 1	0x42	HP 1	2x53	HP 1	4x73	Metal S	hell 12"	Metal S	hell 14"		
Estimated Pile Length (ft.)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)		
10	12	23	16	29	20	37	24	44						
13	15	27	19	35	25	45	31	56						
15	18	32	23	41	29	52	35	64						
18	20	37	26	47	32	59	40	73						
20	23	42	29	53	36	66	45	81						
23	26	47	32	59	40	73	49	89						
25	28	51	36	65	44	80	54	98						
28	35	63	45	81	56	102	70	127						
30	39	71	50	91	63	114	78	142						
33	41	75	52	95	65	117	79	143						
35	42	76	53	96	65	119	80	145						
38	45	81	56	103	70	128	87	158						
40	45	82	57	104	71	130	88	160						
42	61	111	76	137	91	165	110	200						
44	73	133	91	165	109	198	134	243						
43.8	87	158	107	195	129	234	158	287						
44	100	182	124	226	149	271	182	330						
44.3	113	206	141	256	169	307	205	374						
44.5	127	230	157	286	189	343	229	417						
44.8	140	255	174	316	208	379	253	461						
45.0	153	279			228	415	277	504						
45.3							301	547						

#### PILE BEARING (FRA) VS. ESTIMATED PILE LENGTH BORING BSB-50, East Abut. Sta. 759+64

Elevation 616.6 Begin Friction, 618.1 for Pile Cutoff (pile length = 0.0 feet)

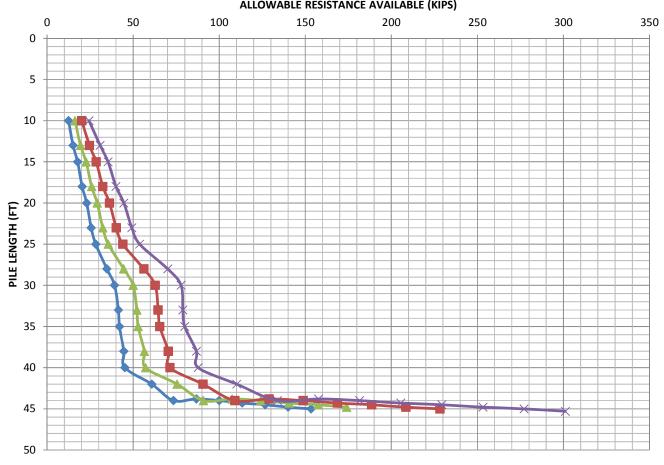
→ HP 8x36

→ HP 10x42

HP 12x53

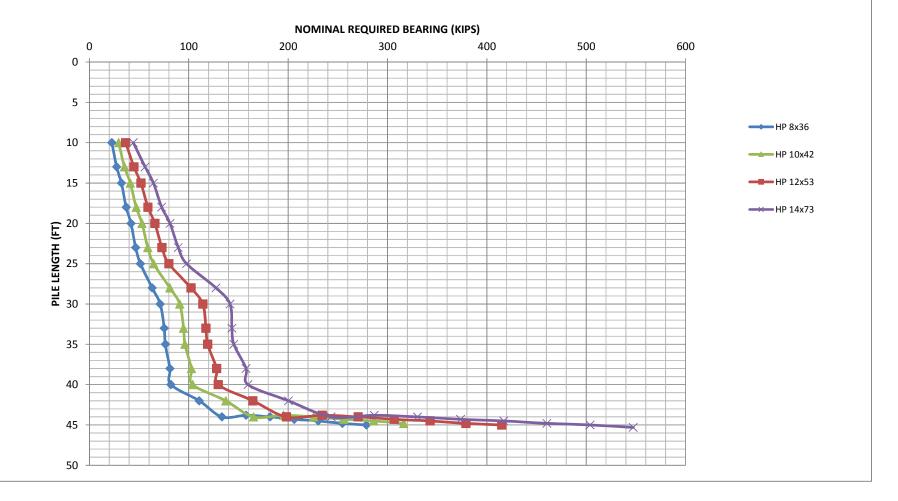
₩ HP 14x73

#### **ALLOWABLE RESISTANCE AVAILABLE (KIPS)**



# PILE BEARING (NRB) VS. ESTIMATED PILE LENGTH BORING BSB-50 East Abut. Sta. 759+64

Elevation 616.6 Begin Friction, 618.1 for Pile Cutoff (pile length = 0.0 feet)

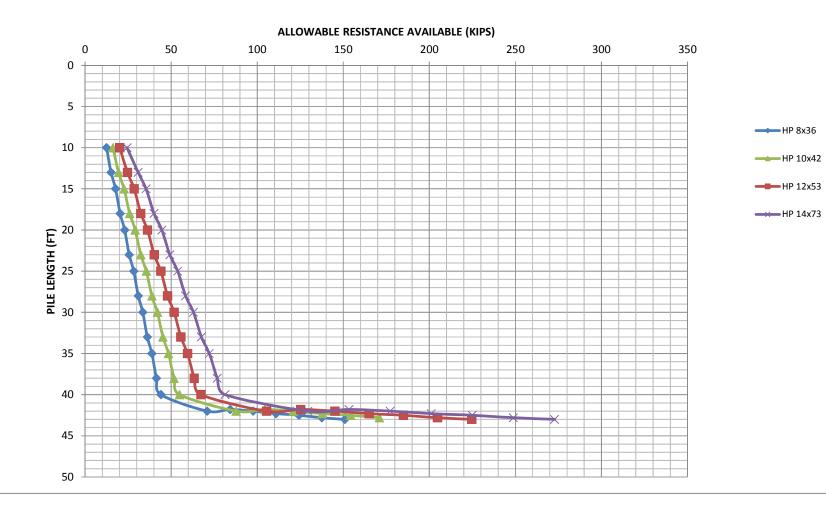


#### **Estimated Pile Length and Capacities For Bridge Abutments**

			East Abut. St	ta. 759+64, B	oring BSB-51	(Elevation 61	7.4 Begin Frict	ion, 618.9 for	Pile Cutoff)			
	HP 8	3x36	HP 1	0x42	HP 1	2x53	HP 1	4x73	Metal S	hell 12"	Metal S	hell 14"
Estimated Pile Length (ft.)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)										
10	12	23	16	29	20	37	24	44				
13	15	27	19	35	25	45	31	56				
15	18	32	23	41	29	52	35	64				
18	20	37	26	47	32	59	40	73				
20	23	42	29	53	36	66	45	81				
23	26	47	32	59	40	73	49	89				
25	28	51	36	65	44	80	54	98				
28	31	56	39	70	48	87	58	106				
30	34	61	42	76	52	94	63	114				
33	36	66	45	82	56	101	68	123				
35	39	71	48	88	60	108	72	131				
38	41	75	52	94	63	115	77	140				
40	44	80	55	100	67	122	81	148				
42	71	129	88	160	105	192	129	235				
41.8	84	153	104	190	125	228	153	279				
42	98	177	121	220	145	264	177	322				
42.3	111	202	138	250	165	300	201	366				
42.5	124	226	154	281	185	336	225	409				
42.8	138	250	171	311	205	372	249	452				
43	151	274			225	408	273	496				
							297	539				

## PILE BEARING (FRA) VS. ESTIMATED PILE LENGTH BORING BSB-51 East Abut. Sta. 759+64

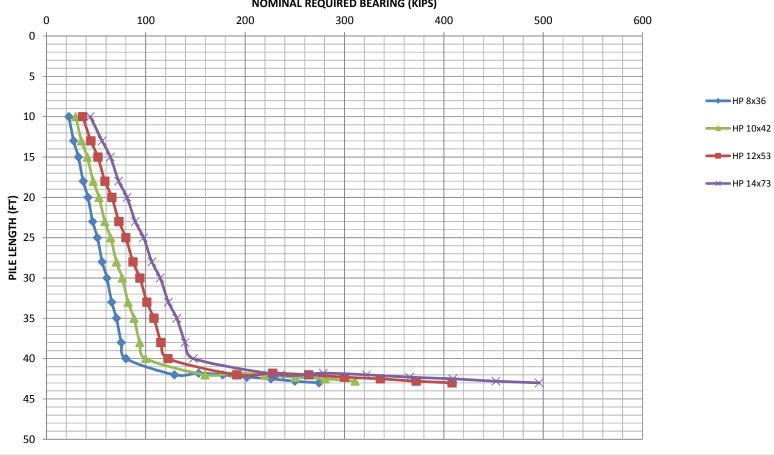
Elevation 617.4 Begin Friction, 618.9 for Pile Cutoff (pile length = 0.0 feet)



## PILE BEARING (NRB) VS. ESTIMATED PILE LENGTH BORING BSB-51 East Abut. Sta. 759+64

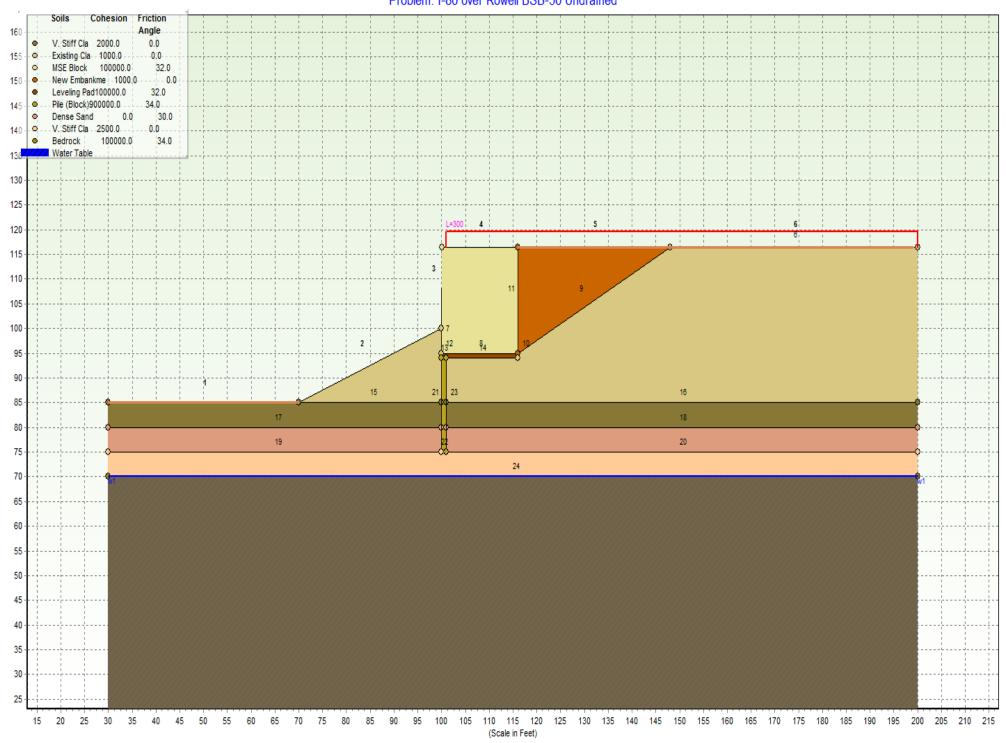
Elevation 617.4 Begin Friction, 618.9 for Pile Cutoff (pile length = 0.0 feet)

### NOMINAL REQUIRED BEARING (KIPS)

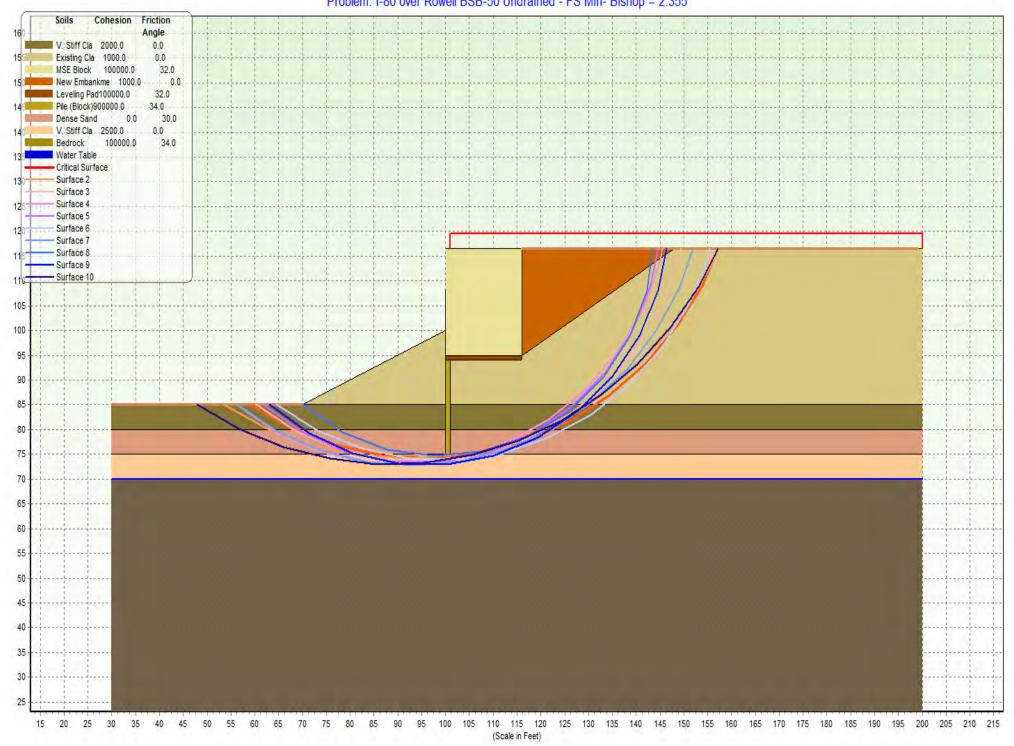


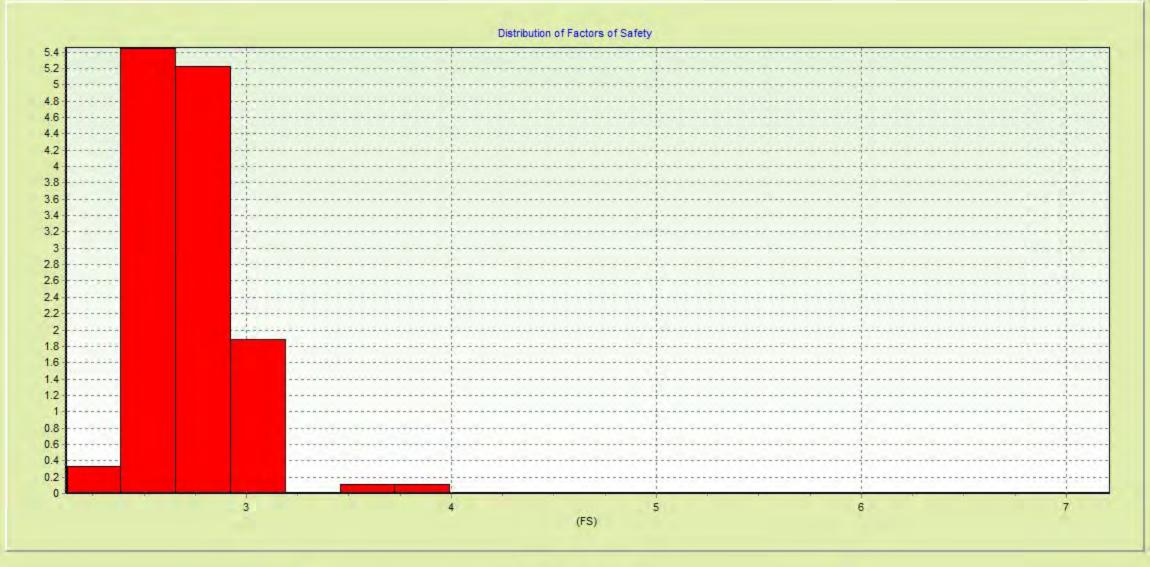
# APPENDIX F SLOPE STABILITY (STABL) RESULTS

Problem: I-80 over Rowell BSB-50 Undrained



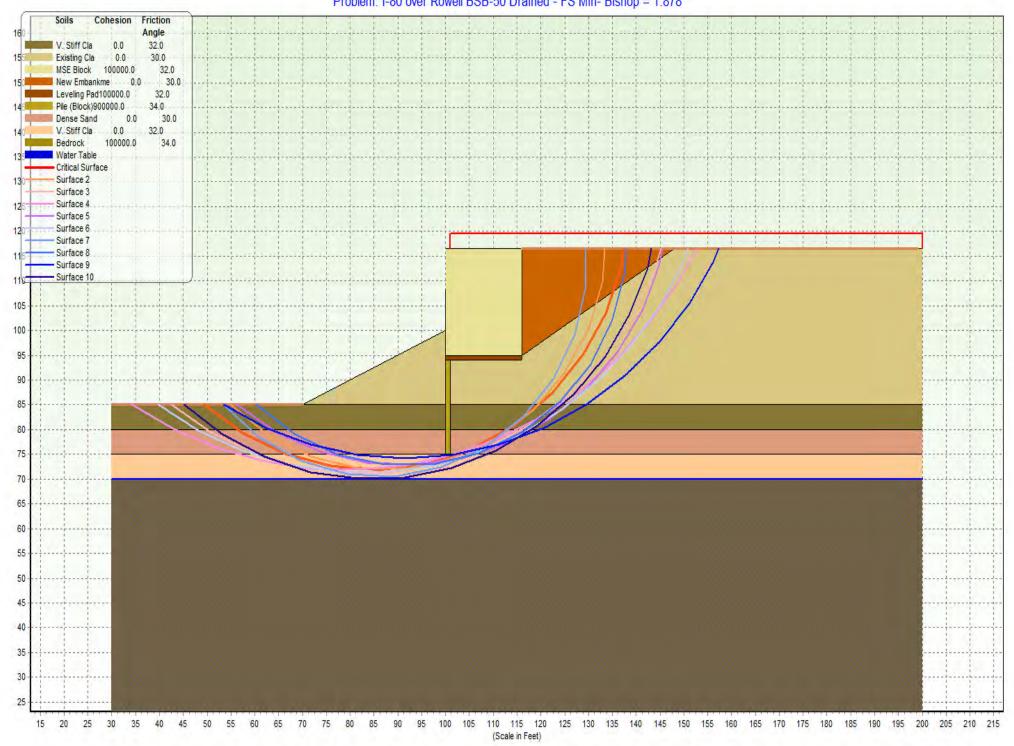
Problem: I-80 over Rowell BSB-50 Undrained - FS Min- Bishop = 2.355





Factor of safety distribution	
Factor of Safety	
2.355	
2.358	
2.369	
2.404	
2.405	
2.412	
2.422	
2.431	
2.447	
2.457	
	Factor of Safety 2.355 2.358 2.369 2.404 2.405 2.412 2.422 2.431 2.447

Problem: I-80 over Rowell BSB-50 Drained - FS Min- Bishop = 1.878





	Factor of safety distribution	
Surface	Factor of Safety	
Surface # 1	1.878	
Surface # 2	1.91	
Surface # 3	1.956	
Surface # 4	1.978	
Surface # 5	1.981	
Surface # 6	2.002	
Surface # 7	2.002	
Surface # 8	2.005	
Surface # 9	2.007	
Surface # 10	2.031	

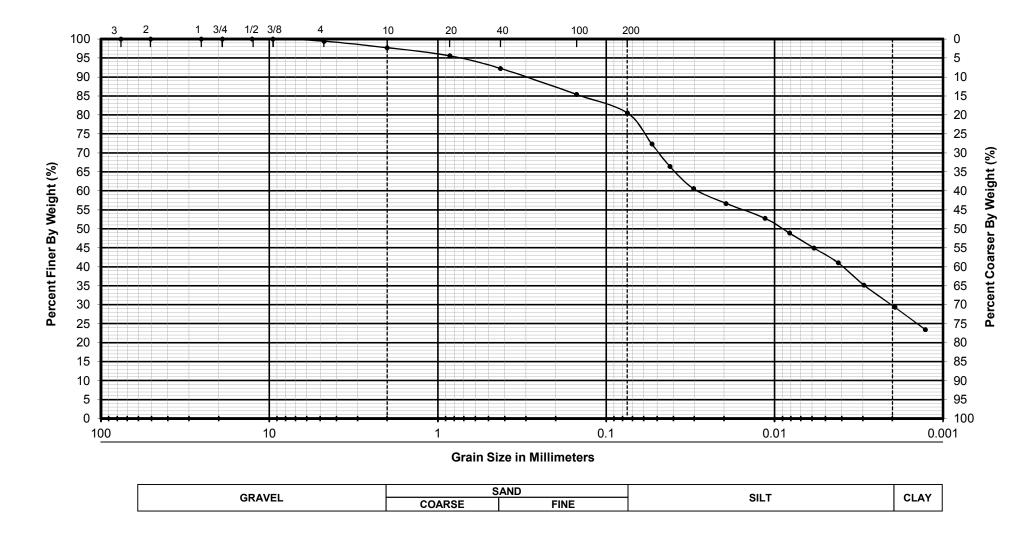
## APPENDIX G LAB TESTING DATA

1235 East Davis Street, Suite 101 Arlington Heights, IL 60005 (847) 253-3845

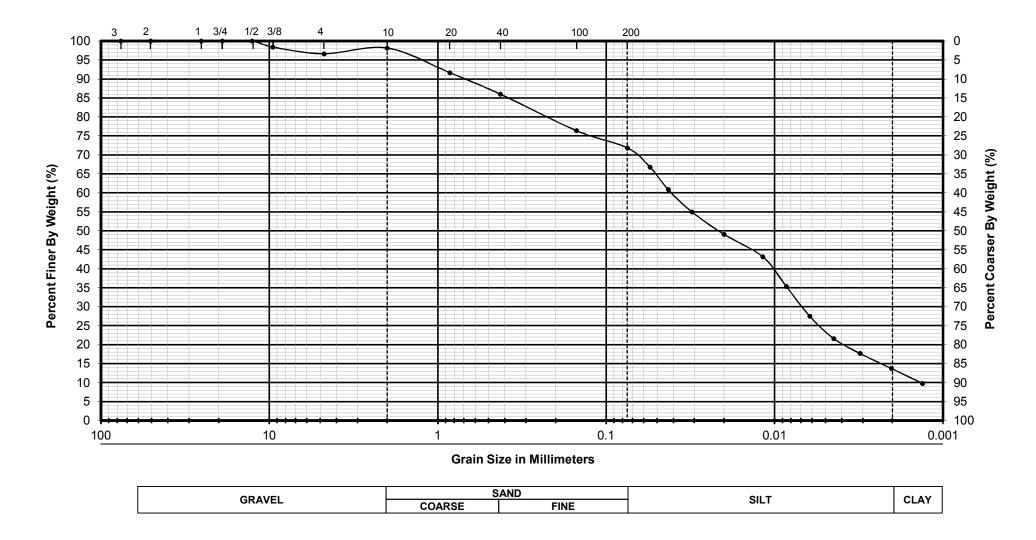
### Liquid Limit, Plastic Limit, and Plasticity Index of Soils AASHTO T89/T90

Project Name I-80 Phase II	Job No <u>13125</u>
Location Will County, Illinois	Date 5/8/14

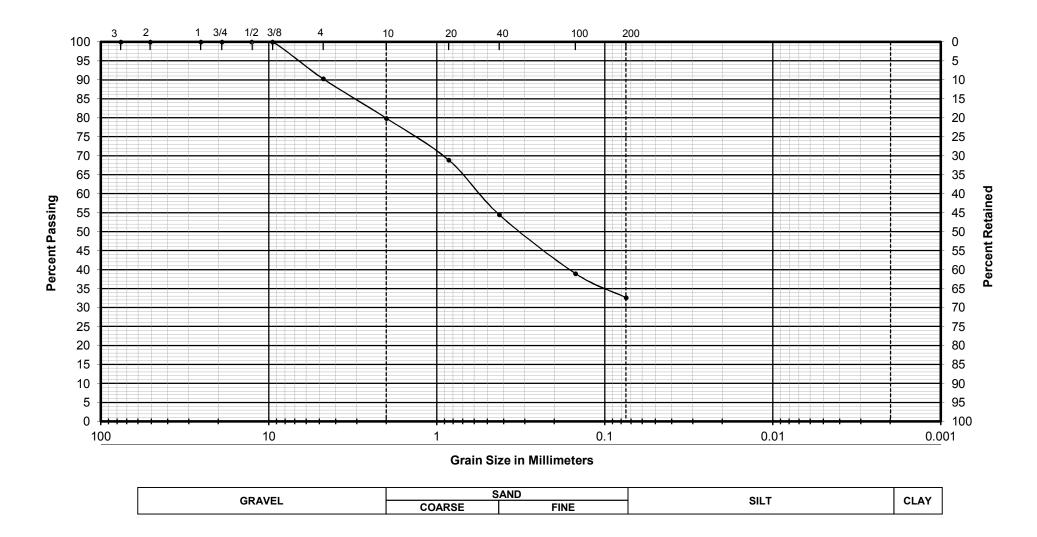
SAMPLE NO.	BSB-35	BSB-36			
DEPTH	5.0'-8.0'	6.0'-7.5'			
LIQUID LIMIT (LL)	43	58			
PLASTIC LIMIT (PL)	52	56			
PLASTICITY INDEX (PI)	2	2			



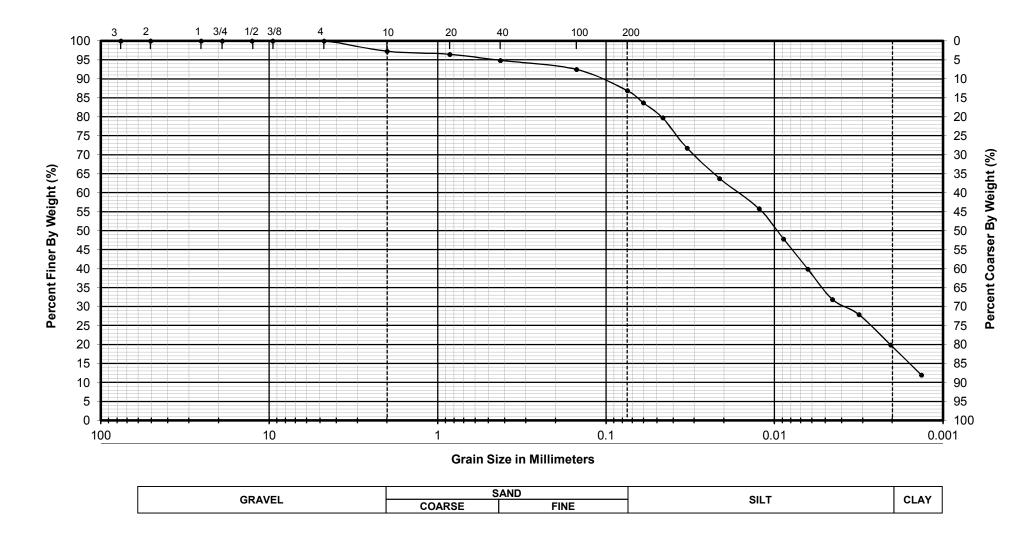
Boring No.	BSB-33	CLASSIFIC	ATION	PARTICLE SIZE ANALYSIS-AASHTO T88
Sample No.	24 & 25			
Depth	57.5'-60.0'	SILTY CLAY	LOAM	I-80 Phase II
Liquid Limit	30	A-6		Will County, Illinois
Plastic Limit	18	brown	1	
Plasticity Index	12	Group Index	8	
Test By	CC/NOB	% Gravel	2.3	Geo Services, Inc.  Geotechnical, Environmental and Civil Engineering
Date	6/17/14	% Sand	17.2	Geotechnical, Environmental and Civil Engineering  An MBE - DBE Firm
Reviewed By	RR	% Silt	51.2	1235 E. Davis St., Arlington Heights, IL 60005
Job No	13125	% Clay	29.3	Phone 847-253-3845 ● Fax 847-253-0482



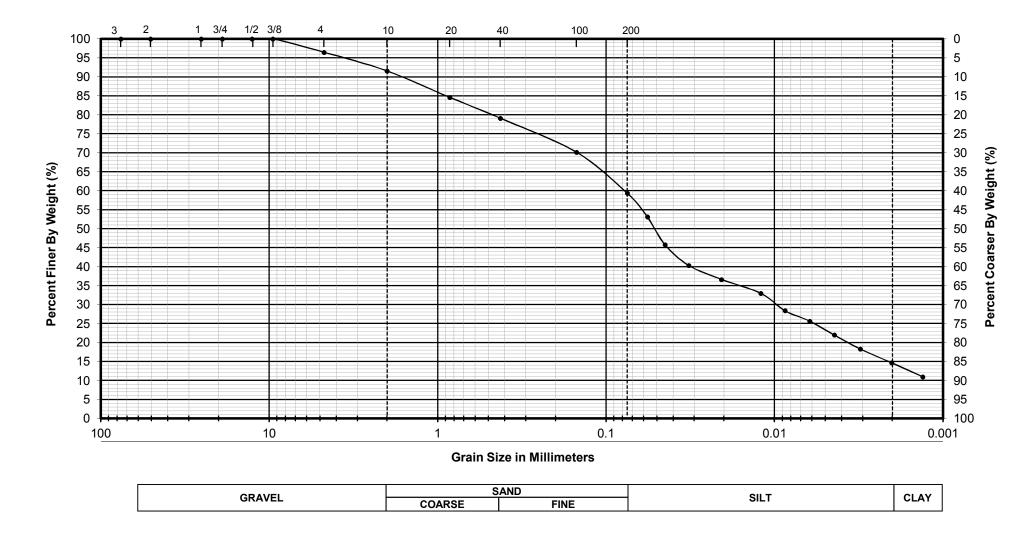
Boring No.	BSB-35	CLASSIFICATION	PARTICLE SIZE ANALYSIS-AASHTO T88
Sample No.	3		
Depth	3.5'-5.0'	ORGANIC SILTY LOAM	I-80 Phase II
Liquid Limit	41	A-7	Will County, Illinois
Plastic Limit	30	dark brown	
Plasticity Index	11	Group Index 8	
Test By	CC/NOB	% Gravel 1.8	Geo Services, Inc.  Geotechnical, Environmental and Civil Engineering
Date	6/17/14	% Sand 26.3	Geotechnical, Environmental and Civil Engineering  An MBE - DBE Firm
Reviewed By	RR	% Silt 58.1	1235 E. Davis St., Arlington Heights, IL 60005
Job No	13125	% Clay 13.7	Phone 847-253-3845 ● Fax 847-253-0482



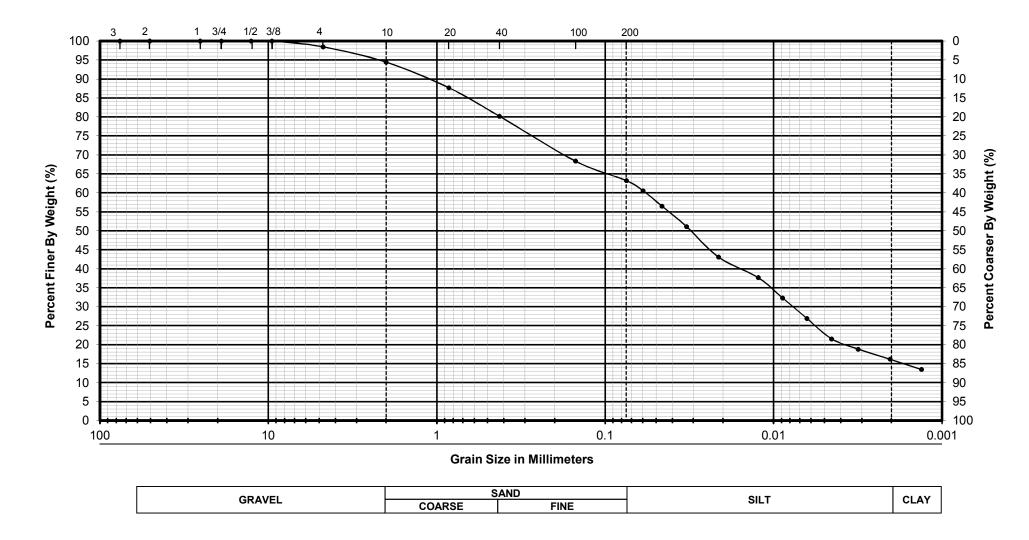
Boring No.	BSB-35	CLASSIFICATION		GRAIN-SIZE ANALYSIS-AASHTO T 311
Sample No.	3 & 4			
Depth	5.0'-8.0'	ORGANIC SAN	DY LOAM	I-80 Phase II
Liquid Limit	-	A-8		Will County, Illinois
Plastic Limit	-	dark bro	wn	
Plasticity Index	-	Group Index	0	
Test By	JE/CC	% Gravel	20.1	Geo Services, Inc. Geotechnical, Environmental and Civil Engineering
Date	6/19/14	% Sand	47.2	Geotechnical, Environmental and Civil Engineering  An MBE - DBE Firm
Reviewed By	RR	% Silt / Clay	32.6	1235 E. Davis St., Arlington Heights, IL 60005
Job No	13125			Phone 847-253-3845 ● Fax 847-253-0482



Boring No.	BSB-35	CLASSIFICATION		PARTICLE SIZE ANALYSIS-AASHTO T88
Sample No.	5			
Depth	8.0'-10.0'	ORGANIC SIL	TY LOAM	I-80 Phase II
Liquid Limit	53	<b>A-7</b>		Will County, Illinois
Plastic Limit	41	gray		
Plasticity Index	12	Group Index	15	
Test By	CC/NOB	% Gravel	2.7	Geo Services, Inc. Geotechnical, Environmental and Civil Engineering
Date	6/17/14	% Sand	10.4	Geotechnical, Environmental and Civil Engineering  An MBE - DBE Firm
Reviewed By	RR	% Silt	67.0	1235 E. Davis St., Arlington Heights, IL 60005
Job No	13125	% Clay	19.9	Phone 847-253-3845 ● Fax 847-253-0482



Boring No.	BSB-36	CLASSIFICATION		PARTICLE SIZE ANALYSIS-AASHTO T88
Sample No.	3 & 4			
Depth	3.5'-8.0'	LOAN	1	I-80 Phase II
Liquid Limit	-	A-4		Will County, Illinois
Plastic Limit	-	brown/g	ray	
Plasticity Index	-	Group Index	0	
Test By	CC/NOB	% Gravel	8.4	Geo Services, Inc.  Geotechnical, Environmental and Civil Engineering
Date	6/17/14	% Sand	32.2	Geotechnical, Environmental and Civil Engineering  An MBE - DBE Firm
Reviewed By	RR	% Silt	44.7	1235 E. Davis St., Arlington Heights, IL 60005
Job No	13125	% Clay	14.6	Phone 847-253-3845 ● Fax 847-253-0482



Boring No.	BSB-41	CLASSIFIC	ATION	PARTICLE SIZE ANALYSIS-AASHTO T88
Sample No.	17 & 18			
Depth	38.0'-42.0'	ORGANIC I	LOAM	I-80 Phase II
Liquid Limit	-	A-7		Will County, Illinois
Plastic Limit	-	brown/bl	ack	
Plasticity Index	-	Group Index	7	
Test By	CC/NOB	% Gravel	5.6	Geo Services, Inc. Geotechnical, Environmental and Civil Engineering
Date	6/17/14	% Sand	31.2	Geotechnical, Environmental and Civil Engineering  An MBE - DBE Firm
Reviewed By	RR	% Silt	47.1	1235 E. Davis St., Arlington Heights, IL 60005
Job No	13125	% Clay	16.1	Phone 847-253-3845 ● Fax 847-253-0482



1235 E. DAVIS STREET ARLINGTON HEIGHTS, IL 60005 (847) 253-3845 FAX (847) 253-0482

## DETERMINATION of ORGANIC CONTENT in SOILS by LOSS on IGNITION AASHTO T267

Project Name 1-80	0 Phase I	Date	5/9/14		
Location Wil	I County,	Job No	13125		
	·				
<b>Boring No</b> B	SB-33	BSB-36			
Sample No.	44	4			
Depth 58.	.5'-60.0'	6.0'-7.5'			
Sample Description					
% Organic Content	16.2	24.1			
Tested By JE					



## 1235 E. DAVIS STREET ARLINGTON HEIGHTS, IL 60005 (847) 253-3845 FAXES (847) 253-0482

## Organic Matter in Soils by Wet Combustion AASHTO T 194

Date

6/19/14

Project Name I-80 Phase II

Location	Will County	ı, Illinois	Job No			13125		
Sample Location	BSB-33	BSB-35	BSB-35	BSB-35	BSB-36	BSB-41		
Sample No	24 & 25	3	3 & 4	5	3 & 4	17 & 18		
Depth	57.5'-60.0'	3.5'-5.0'	5.0'-8.0'	8.0'-10.0'	3.5'-8.0'	38.0'-41.0'		
Total Organic Matter								
%	0.5	4.0	7.8	8 1	1.0	8.2		

Comments: -		

Performed by: JE	i citotilica by. oL
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#### 1235 E. Davis Street Arlington Heights, Illinois 60005

Phone: (847) 253-3845 Fax: (847) 253-0482

#### UNCONFINED COMPRESSIVE STRENGTH of INTACT ROCK CORE SPECIMENS - ASTM D 7012

 Project Name
 I-80 Reconstruction (Near Term Phase 2)
 Date
 11/7/13

 Location
 Various
 Job No.
 13125

 County
 Will
 Tested By:
 RWC

Sample Type Drilled Bedrock Core Sample

Sample	Depth	Length	Diameter	Weight	Load	Area	Unit Weight	Compressive Strength	
No.	(ft)	(in)	(in)	(g)	(lbs)	(in <sup>2</sup> )	(lbs ft <sup>3</sup> )	(tsf)	(psi)
BSB-33 Run 1	61.4	4.088	2.064	582.2	55000	3.35	162.1	1184	16438
BSB-34 Run 1	65.3	4.084	2.060	605.2	48020	3.33	169.3	1037	14408
BSB-35 Run 1	13.7	4.115	2.053	578.4	43990	3.31	161.7	957	13289
BSB-36 Run 1	15.1	4.081	2.048	574.5	53570	3.29	162.7	1171	16262
BSB-37 Run 1	49.1	4.111	2.056	572.2	40920	3.32	159.7	888	12331
BSB-38 Run 1	49.7	4.068	2.045	563.3	29360	3.28	160.5	644	8939
BSB-39 Run 1	48.2	4.094	2.046	543.1	26380	3.29	153.7	578	8026
BSB-40 Run 1	49.8	4.074	2.050	576.2	50040	3.30	163.2	1092	15161
BSB-41 Run 1	52.5	4.075	2.036	560.5	37600	3.26	160.9	832	11549
BSB-42 Run 1	41.5	4.025	1.989	541.1	30650	3.11	164.8	710	9864
BSB-43 Run 1	52.3	4.035	2.046	555.3	42900	3.29	159.5	940	13055
BSB-44 Run 1	50.0	4.091	2.048	564.6	51220	3.29	159.5	1119	15549
BSB-45 Run 1	48.3	4.081	2.040	543.7	27120	3.27	155.2	597	8297
BSB-45 Run 2	54.6	4.091	2.045	554.3	43150	3.28	157.1	946	13137
BSB-46 Run 1	14.8	4.100	2.057	594.3	54100	3.32	166.1	1172	16279
BSB-47 Run 1	15.7	4.114	2.063	603.0	72700	3.34	167.0	1566	21749
BSB-48 Run 1	16.5	4.105	2.056	607.2	66880	3.32	169.6	1450	20145
BSB-49 Run 1	13.2	4.103	2.057	559.2	26030	3.32	156.2	564	7833
BSB-50 Run 1	53.7	4.169	2.101	608.7	43650	3.47	160.3	906	12588
BSB-51 Run 1	48.9	4.039	2.045	557.0	41050	3.28	159.9	900	12498