Abbreviated Structure Geotechnical Report

F.A.I. Route 39
Section (201-3)K & (4-1, 5)R
Winnebago County
Job No. P-92-111-06
Contract No. 64C62
PTB No. 141-004
I-39 SB (Ramp BD) over US 20
Structure No. 101-0215
Existing Structure No. None

Submitted January 2017
Revised April 2017

Prepared for:
Illinois Department of
Transportation, District 2
819 Depot Avenue
Dixon, Illinois 61021

Structure Designer:
Hanson Professional Services Inc.
1525 South Sixth Street
Springfield, Illinois 62703
(217) 788-2450

Prepared By:
Hanson Professional Services Inc.
13801 Riverport Drive, Suite 300
Maryland Heights, MO 63043
(314) 770-0467

kchepkoit@hanson-inc.com

EXP 11/30/2017

LICENSED PROFESSIONAL ENGINEER
KIPKOECH K. CHEPKOIT
062-063436
STATE OF ILLINOIS

04/04/2017

Illinois Department of Transportation

Abbreviated Structure Geotechnical Report

Original Report Date: 01/12/2017	**Proposed SN:** 101-0215	**Route:**	F.A.I. 39
Revised Date: 04/04/2017	**Existing SN:** 101-0136	**Section:**	(201-3)K & (4-1, 5)R
Geotechnical Engineer: Kipkoech Chepkoit		**County:**	Winnebago
Structural Engineer: Hanson Professional Services Inc.		**Contract:**	64C62

Indicate the proposed structure type, substructure types, and foundation locations (attach plan and elevation drawing):

The new structure will be a three-span bridge with 72" web curved plate girders. The substructures will consist of stub abutments constructed on MSE walls and straddle piers. Each MSE wall will be U-shaped, wrapping around the abutment and extending beyond the bridge approaches. According to information provided by the structural designer, the estimated vertical factored substructure loads are 2,400 kips at the abutments and 1,650 to 2,300 kips at each column of the straddle piers.

The general plan and elevation and unfolded wall elevation drawings for the new structure are attached.

Discuss the existing boring data, existing plans foundation information, new subsurface exploration and need for any additional exploration to be provided with SGR Technical Memo (attach all data and subsurface profile plot):

Four soil boring logs orginally were provided to Hanson Professional Services Inc. (Hanson) by IDOT. Borings B-18 through B-21 were drilled in March and April 2006. After the preliminary bridge layout was determined, Hanson requested an additional 16 soil borings located along the proposed MSE walls and at the straddle column locations. Due to access difficulties and limited drill crew availability, only 10 of these borings were drilled. Borings B-3i, B-6i through B-12i, B-15i and B-16i were drilled in February through April 2016. Two additional Shelby tube borings, B-3i(ST) and B-12i(ST), were drilled in May 2016. Locations of the borings are shown on Boring Location Plan. The stations and offsets on the logs for B-18 through B-21 are relative to a superseded alignment. Boring locations along the current Ramp BD alignment are shown on the attached Subsurface Data Profile. The spacing of the retaining wall borings exceeds the guidelines in the IDOT Geotechnical Manual, but the available boring data is still considered sufficient for preliminary design. We recommend that six additional borings be drilled to provide more complete subsurface information for final design of the embankment and MSE walls. Suggested locations and depths are listed below.

Boring	Depth	Location
B-1i	40’	143+50 11’ RT
B-2i	40’	144+00 11’RT
B-4i	40’	144+65 24’ LT
B-5iST	40’	144+25 43’ LT
B-13i	40’	149+39 CL
B-14iST	40’	149+75 11’RT

The upper soils in the borings generally consisted of silty clay loam, silty clay, clay loam and sandy clay loam, with occasional sandy loam, sand and silt loam. The underlying soils were generally very stiff to hard loam till, and dense to very dense sandy till. Rock cores of 10 to 20 feet were performed in borings B-18, B-20, B-8i, B-9i and B-10i. Based on the cored borings, bedrock varies from El. 772 to El. 782.

Laboratory tests were performed on selected samples from Borings B-3i (ST) and B-12i (ST). Detailed results of triaxial tests and consolidation tests and a tabular summary of strength and index test results are attached.

Underground coal mine information available from ISGS indicates that the project area has not been undermined.

Provide the location and maximum height of any new soil fill or magnitude of footing bearing pressure. Estimate the amount and time of the expected settlement. Indicate if further testing, analysis, and/or ground improvement/treatment is necessary:

The height of the new embankment fill at the north approach varies significantly because the new embankment overlaps the existing embankment. Within the limits of the MSE wall, the new fill will vary from approximately 5 feet to 33 feet. The maximum fill height is located at right side of the abutment, while the minimum fill is located at the end of the MSE wall on the left side. Long term settlement in the area between the north abutment and the toe of the existing embankment is estimated to vary from 1.2 to 2.75 inches with settlement time estimated as 10 months for 90% consolidation. The estimated settlement decreases to nearly zero at the end of the MSE wall on the left side.

The height of the new embankment fill at the south approach within the limits of the MSE wall will vary from approximately 30 to 36 feet. The maximum fill height is located at the end of the MSE wall on the left side, while the minimum fill is located at the right side of the abutment. The magnitude of immediate and long term settlement at the south approach are estimated to be 0.3 to 0.5 inch and 0.6 to 2.4 inches, respectively. Immediate settlement is expected to be complete by end of embankment construction. Long term settlement is estimated to take 2.5 months to achieve 90% consolidation.

Differential settlement is expected to be approximately 1.5 inch at the north wall and 1.9 at the south wall. These values are within the accepted tolerance, 1/200, as per AASHTO LRFD Bridge Design Specifications (Table C11.10.4.1-1). The magnitudes and durations of the expected settlements are acceptable for the proposed embankment, MSE walls and bridge abutments.

With the proposed wall layout, the maximum equivalent uniform bearing pressure is expected to vary from approximately 1.0 to 5.7 ksf and 1.0 to 5.5 ksf at the north and south MSE wall, respectively.The factored bearing resistance of the native soils vary along the wall alignments; 3.6 to 4.6 ksf at the north abutment and 4.5 to 5.0 ksf at the south abutment. These factored resistance consider all soils within a depth equal to the width of reinforced soil mass. The maximum applied bearing pressure for shorter portions of the walls will be less than the factored resistance of the native soils but the taller portions of the wall will exceed the factored resistance of the native soils.

Several possible solutions to remedy the bearing capacity deficiency were considered. Increasing the width of the reinforced soil mass will not sufficiently reduce the applied bearing pressure. Removal and replacement of the subgrade is not cost effective due to the depth of the problem soils and the proximity of the existing roadways. The use of lightweight aggregate in the reinforced soil mass is technically feasible, but is expected to be more costly than the preferred solution. Of the various specialty ground improvement techniques that can be used to improve bearing capacity, aggregate column ground improvement (ACGI) is the most widely-used and cost-effective treatment at sites like this one.

Identify any new cuts or fill slope angles and heights. Estimate the factor of safety against slope failure. Indicate if further testing, analysis or ground improvement/treatment is necessary:

The embankments have an unusual configuration due to the high skew of the crossing and the small clearance between the abutments and US 20. The typical section of the approach embankments has 1V:3H slopes on both sides of the ramp. MSE walls and/or steeper slopes are introduced as the footprint of the typical section encroaches on US 20. The steepest slope is 1V:2H for approximately 27 feet height at the end of the MSE wall on the left side of the north approach. This slope flattens to 1V:3H as the wall height increases. All other slopes in front of the MSE walls are 1V:3H or flatter.

The 1V:2H slope is located at the end slope of the existing Ramp BD overpass and approximately matches the existing slope. Slope stability analyses were completed of three critical sections at each approach. These sections were cut through the left slope, right slope, and abutment. The calculated factors of safety against slope failure ranged from 1.51 to 2.10 using soil parameters from the Shelby tube soil boring. Summaries of the global stability results for selected cross sections are attached to this report.

The global stability factors of safety meet IDOT and AASHTO requirements without considering any ground improvement.

Indicate at each substructure, the 100-year and 200-year total scour depths in the Hydraulics report, the non-granular scour depth reduction, the proposed ground surface, and the recommended foundation design scour elevations:
N/A

Determining the seismic soil site class, the seismic performance zone, the 0.2 and 1.0 second design spectral accelerations and indicate if that the soils are liquefiable:

The seismic Site Class is C, the SPZ is 1, SDS = 0.101g, and SD1 = 0.056g. The soils are not considered to be liquefiable for the design earthquake.

Confirm feasibility of the proposed foundation or wall type and provide design parameters. Attach a pile design table indicating feasible pile types, various nominal required bearings, factored resistances available and corresponding estimated lengths at locations where piles will be used. Provide factored bearing resistance and unit sliding resistance at various elevations and confirm no ground improvement/treatment is necessary where spread footings are proposed. Estimated top of rock elevations as well as preliminary factored unit side and tip resistance values shall be indicated when drilled shafts are proposed:

The bridge designer determined that a three-span bridge with stub abutments on MSE walls is feasible. The abutments are both located on side slopes of the existing US 20 embankment, with one abutment corner located very close to the proposed US 20 shoulder. Existing ground at the abutment corners farthest from the highway are up to 10 feet below the highway. Constructing an MSE wall on the existing grade would result in a maximum wall height of 38 ft (Ramp BD pavement to top of leveling pad) and a factored bearing pressure much greater than the native soils are capable of resisting. The resulting wall would also be very asymmetric, which results in inefficient use of materials, greater construction complexity, and increased potential for differential settlement.

The geometry of the proposed MSE wall was set so that the finished grade in front will be at or above the adjacent highway and the wall under the abutment will be a constant height. The maximum wall height was limited to 31.5 feet on the north approach and 30.5 feet on the south approach. Walls on opposite sides of the ramp were kept at similar heights near the abutments where they are the tallest. This minimizes the earth pressure, eccentricity, and applied bearing pressure.

MSE Walls Foundation Recommendations:

The MSE walls will bear directly on fill placed during construction of the existing highway and on new fill placed over existing embankment or natural or improved ground. In general, the existing fill at higher elevations is stronger than the native soil at lower elevations. In order to increase the bearing resistance and limit settlements, all fill placed between existing grade and the bottom of the reinforced soil mass should be compacted granular fill. This material can be either porous granular embankment, select fill, or rock fill. Figure 1 shows the minimum limits of the granular fill.

Slopes in front of the MSE wall should be no steeper than 1V:3H except from Sta. 142+27 to 142+75, where a transition to a 1V:2H slope is permissible. 1V:2H slopes parallel to the proposed wall are also permissible. A minimum 4-foot bench should be provided in front of the wall as required by AASHTO LRFD Bridge Design Specifications Article 11.10.2.2. The minimum embedment to the top of leveling pad should be 3.5 ft in accordance with IDOT policy.

Geotechnical design parameters for MSE walls are listed below.

1. Nominal Bearing Resistance ----- 5.6 ksf (North), 7.0 ksf (South) *
2. Factored Bearing Resistance ----- 3.6 ksf (North), 4.5 ksf (South) *
3. Friction angle between RSM and compacted granular fill ---- 34°
4. Adhesion between RSM and native soil ---------- 1.2 ksf
5. Sliding Resistance Factor ---------- 1.0
6. Unit weight of embankment fill and/or select fill --- 120 pcf
7. Effective friction angle of embankment fill ---------- 30°
8. Effective friction angle of select fill ---------- 34°
9. Minimum width of reinforced soil mass --------0.8H from Sta. 142+27 to 143+50
   1.0H from Sta. 143+50 to 149+67
   0.8H from Sta. 149+67 to 150+48

where H is the height measured from top of leveling pad to top of roadway pavement.

* Bearing resistance is given for portions of wall where ACGI is not specified. Within ACGI treatment limits, the required bearing resistance(s) should be specified as a performance requirement

In order to achieve the required bearing resistance, ACGI is recommended beneath the taller portions of the MSE wall. The ACGI should be designed by the contractor in accordance with a performance specification (GBSP 71). Depth of treatment should be determined by the contractor, but is generally expected to range from approximately 20 ft to 35 ft below the existing ground surface. For preliminary design, the following approximate horizontal limits are recommended:

North Approach - Station 142+75 to 143+97, 53.25' LT to 10' behind estimated limits of Reinforced Soil Mass
- Station 143+97 to 144+76, 53.25' LT to 21.25' RT

South Approach - Station 149+24 to 149+75, 53.25' LT to 21.25' RT

A Geotechnical Design Memorandum (GDM) should be prepared during final design. The scope of the GDM should include:

1. Recommendations for limits of ACGI treatment, performance requirements, and minimum monitoring instrumentation that will be included in the final plans and special provisions
2. Additional borings and lab testing needed to finalize design and/or provide subsurface data for the contractor-designed ACGI
3. Opinion of construction cost for the ACGI treatment

Bridge Foundation Recommendations:

A Pile Design Table including data for several pile sizes at each substructure is attached. Steel H-piles that extend to limestone or dolomite bedrock are recommended.

Settlements large enough to induce downdrag load are anticipated at the abutments. Since it is not possible to drive piles through the RSM after settlement, pile sleeves are required to mitigate severe geotechnical losses that would otherwise occur. The pile sleeves should extend through the RSM and any granular fill placed below it. Some much smaller geotechnical losses could also occur within the native soil below. Pile lengths and capacities both with and without these losses are provided in the attached Pile Design Table. All geotechnical losses will be eliminated if piles are driven after settlement has occurred, piles are retapped after settlement has occurred, or native soil is precored. The geotechnical losses in the Pile Design Table will occur if the piles are driven before the settlement is complete.

Pile sleeves should be in accordance with Article 522.09 of the IDOT Standard Specifications. If precoring is specified, the pile sleeves should be extended into the precored hole. Precored holes, if specified, should have a diameter large enough to accomodate the pile sleeves and should extend to Elevation 804 at the south abutment and Elevation 810 at the north abutment. The annulus between the precored hole and sleeve should be filled prior to placing any fill.

If piles are to be driven or retapped after settlement has occurred, the driving should be completed when there is less than approximately 0.4 inches of estimated settlement remaining. The estimated waiting period is 2.5 months at the south abutment and 10 months at the north abutment. If this option is chosen, settlement platforms as per Article 204.06 of Standard Specifications should be provided to monitor the settlement during the waiting period. One settlement platform should be required at each abutment, located in the center of the embankment approximately 10 feet behind the abutment.

Shoes are recommended for H-piles to protect against damage during driving.

Four test piles are recommended to determine the pile lengths. One test pile should be specified at each abutment and at each pier. The test piles for the piers are recommended at the outside columns if the construction staging allows those locations to be driven first.

If the lateral loads on the piles supporting the pier are larger than can be resisted with battered piles, the structure designer should evaluate lateral resistance considering both soil and structure properties. Soil parameters for generating P-y curves with the LPILE computer program are provided in the attached table.

Calculate the estimated water surface elevation and determine the need for cofferdams (type 1 or 2), and seal coat:

N/A

Assess the need for sheeting or soil retention or temporary construction slope and provide recommendation for other construction concerns:

The currently proposed construction staging requires completion of the proposed US 20 pavement in Phase 1 and completion of the Ramp BD pavement and bridge in Phase 3. Work in Phase 1 will be completed in four substages while maintaining traffic on US 20. Strengthened outside shoulders will be completed first, followed by completion of new inside lanes and shoulders, outside westbound lanes, then outside eastbound lanes. It is assumed that the Phase 1 US 20 roadway work would be completed at least one year prior to the Phase 3 Ramp BD work. It is also assumed that the piers and MSE walls for this bridge would be completed during Phase 1.

There is sufficient space for excavated slopes between the proposed substructures and the existing US 20 pavement. Excavation for the two pier columns located along the outside of the highway would encroach slightly on the existing shoulder; however, these piers could be constructed during the periods when traffic is shifted to the new inside lanes. No temporary sheeting or soil retention is anticipated.

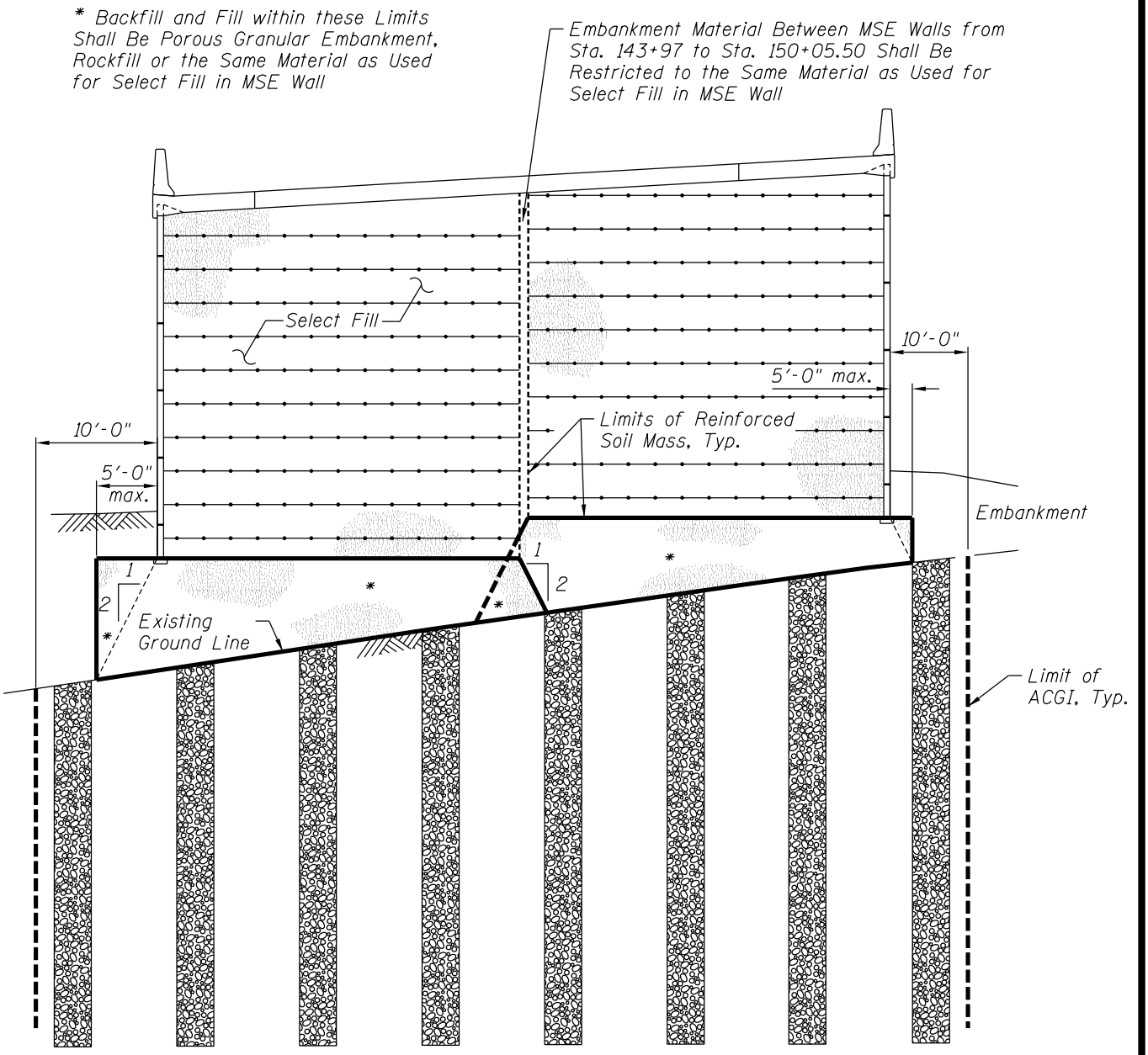


FIGURE 1 - SECTION THRU MSE WALLS

I-39 SB (RAMP BD) OVER US 20
S.N. 101-0215
WINNEBAGO COUNTY, ILLINOIS

HANSON

06S2055 03/31/17

I:\06 Jobs\06S2055\CADD\GeoSheet\N101-0215_I-39 SB over US 20 Wall Sec 3 10 dgn 3/31/2017 chant00843

Structure No. 101-0215
Pile Design Table

			With Geotechnical Losses				Without Geotechnical Losses			
Location	**Cutoff Elevation (ft)**	**Pile Type**	**Factored Resistance Available, R_F (kips)**	**Geotechnical Losses, R_{Sdd} (kips)**	**Nominal Required Bearing, R_N (kips)**	**Estimated Pile Length (ft)**	**Factored Resistance Available, R_F (kips)**	**Geotechnical Losses, R_{Sdd} (kips)**	**Nominal Required Bearing, R_N (kips)**	**Estimated Pile Length (ft)**
North Abutment B-3i & B-21	839.6	HP 10x42	153	31	335	67	184	0	335	68
		HP 12x53	193	37	418	68	230	0	418	69
		HP 12x63	235	38	497	70	273	0	497	70
		HP 14x73	274	44	578	70	318	0	578	70
		HP 14x89	343	45	705	70	388	0	705	70
Pier 1(LT) B-8i	818.0	HP 10x42	184	0	335	39				
		HP 12x53	230	0	418	40				
		HP 12x63	273	0	497	40				
		HP 14x73	318	0	578	40				
		HP 14x89	388	0	705	40				
		HP 14x102	446	0	810	41				
Pier 1(RT) B-9i	817.3	HP 10x42	184	0	335	36				
		HP 12x53	230	0	418	36				
		HP 12x63	273	0	497	37				
		HP 14x73	318	0	578	37				
		HP 14x89	388	0	705	37				
		HP 14x102	446	0	810	38				

Structure No. 101-0215
Pile Design Table

			With Geotechnical Losses				Without Geotechnical Losses			
Location	**Cutoff Elevation (ft)**	**Pile Type**	**Factored Resistance Available, R_F (kips)**	**Geotechnical Losses, R_{Sdd} (kips)**	**Nominal Required Bearing, R_N (kips)**	**Estimated Pile Length (ft)**	**Factored Resistance Available, R_F (kips)**	**Geotechnical Losses, R_{Sdd} (kips)**	**Nominal Required Bearing, R_N (kips)**	**Estimated Pile Length (ft)**
Pier 2(LT) B-19	816.9	HP 10x42	184	0	335	39				
		HP 12x53	230	0	418	39				
		HP 12x63	273	0	497	40				
		HP 14x73	318	0	578	40				
		HP 14x89	388	0	705	41				
		HP 14x102	446	0	810	42				
Pier 2(RT) B-10i	819.2	HP 10x42	184	0	335	44				
		HP 12x53	230	0	418	44				
		HP 12x63	273	0	497	44				
		HP 14x73	318	0	578	44				
		HP 14x89	388	0	705	45				
		HP 14x102	446	0	810	46				
South Abutment B-12i & B-18	838.6	HP 10x42	126	58	335	57	184	0	335	57
		HP 12x53	160	70	418	57	230	0	418	58
		HP 12x63	203	70	497	58	273	0	497	58
		HP 14x73	235	83	578	58	318	0	578	58
		HP 14x89	304	84	705	59	388	0	705	59

Note: Cutoff of the piles are assumed to be 2 feet above bottom of the footing.
See SGR text for options to avoid geotechnical losses.

Structure No. 101-0215
Pile Design Parameters

Pier 1 LT (Boring B-8i)

Elevations	LPILE Soil Type	γ' (pcf)	c (psf)/ϕ	k (pci)	ε
XXX - 813.8	Stiff Clay w/o Free Water	118	2,000	1,000	0.004
813.8 - 811.3	Sand	115	30°	30	---
811.3-803.8	Stiff Clay w/o Free Water	110	400	---	0.02
803.8-796.3	Sand	58	32°	60	---
796.3-781.3	Stiff Clay w/o Free Water	58	1,400	500	0.01
881.3-779.3	Sand	68	36°	90	---
779.3 -	Hard Rock	83	Qu = 3000 psi	---	---

Pier 1 RT (Boring B-9i)

Elevations	LPILE Soil Type	γ' (pcf)	c (psf)/ϕ	k (pci)	ε
XXX - 803.8	Stiff Clay w/o Free Water	118	1,300	750	0.01
803.8 - 801.3	Sand	115	28°	25	---
801.3-798.8	Stiff Clay w/o Free Water	110	400	---	0.02
798.8-791.3	Sand	58	30°	25	---
791.3-786.3	Stiff Clay w/o Free Water	58	1,950	1,000	0.004
786.3-781.3	Sand	68	36°	90	---
781.3 -	Hard Rock	83	Qu = 3000 psi	---	---

Structure No. 101-0215
Pile Design Parameters

Pier 2 LT (Boring B-19)

Elevations	LPILE Soil Type	γ' (pcf)	c (psf)/ϕ	k (pci)	ε
XXX - 802.2	Stiff Clay w/o Free Water	118	1,350	750	0.01
802.2 - 794.7	Sand	53	30°	25	---
794.8 -779.7	Stiff Clay w/o Free Water	58	2,300	1,000	0.004
779.7 -775.2	Sand	68	36°	90	---
775.2 -	Hard Rock	83	Qu = 3000 psi	---	---

Pier 2 RT (Boring B-10i)

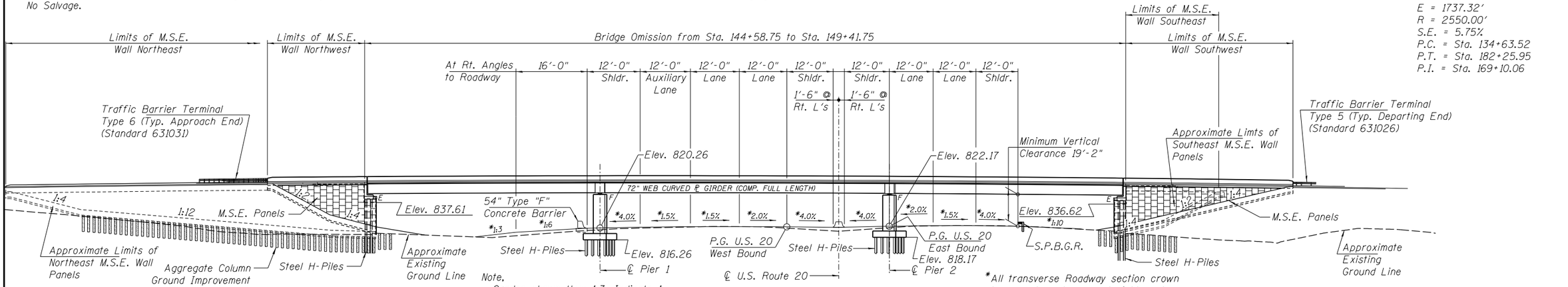
Elevations	LPILE Soil Type	γ' (pcf)	c (psf)/ϕ	k (pci)	ε
XXX - 804.8	Stiff Clay w/o Free Water	118	1,300	750	0.01
804.8 - 799.8	Sand	115	30°	35	---
799.8 -794.8	Soft Clay	110	600	---	0.02
794.8-790.8	Sand	58	32°	35	---
790.8 -780.8	Stiff Clay w/o Free Water	58	2,000	1,000	0.004
780.8-772.3	Sand	68	36°	90	---
772.3 -	Hard Rock	83	Qu = 3000 psi	---	---

BM: #454 - Cut Square South side of Westerly sign base for a 30MPH ramp 0.1 miles North of the Centerline of Linden Rd. - West side of I-39 Elevation = 850.53
#455 - Cut Square South side of Easterly sign base for a 30MPH ramp 0.1 miles North of the Centerline of Linden Rd. - East side of I-39 Elevation = 851.37

Existing Structure (SN 101-0136)
Originally constructed in 1981 as F.A. Route 194, Section 201-3HB-2.
The structure consists of a 3 Span, 56°-25'-55" Rt Fwd. Skewed, concrete deck on curved steel girders, supported on pile bent concrete abutments and 2 (4 Trapazoidal columns) concrete piers on pile supported foundations. The deck width is 28'-0", and the span lengths are 86'-0", 143'-6" and 155'-0" developing a back to back length of 397'-8½".
Traffic shall be maintained on the existing structure during construction of the new structure. See Maintenance of Traffic Plans for more staging information.
No Salvage.

CURVE DATA - I-39 SBL

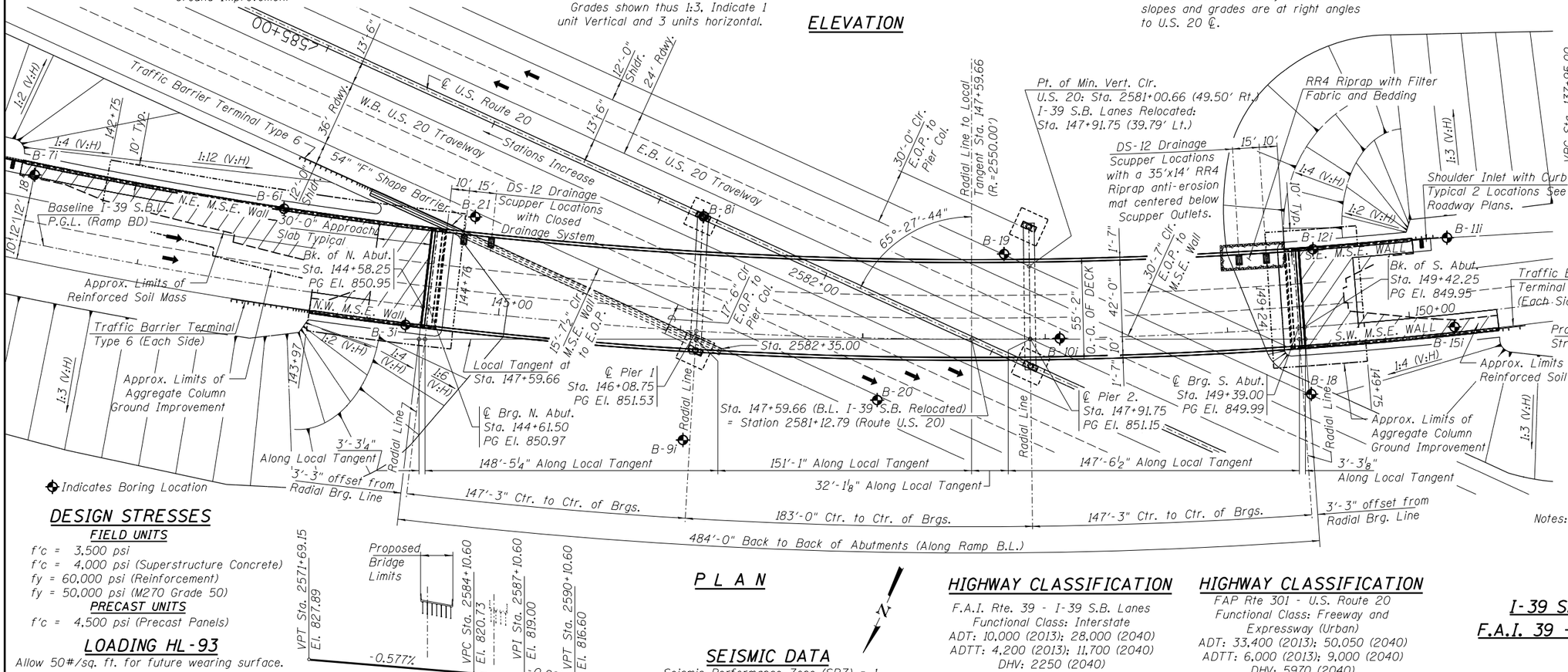
Δ = 107°00'-24" (Lt.)
D = 2°-14'-49"
T = 3446.54'
L = 4762.42'
E = 1737.32'
R = 2550.00'
S.E. = 5.75%
P.C. = Sta. 134+63.52
P.T. = Sta. 182+25.95
P.I. = Sta. 169+10.06



Note, Grades shown thus 1:3, Indicate 1 unit Vertical and 3 units horizontal.

*All transverse Roadway section crown slopes and grades are at right angles to U.S. 20 ℄.

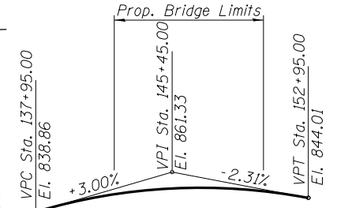
ELEVATION



PLAN

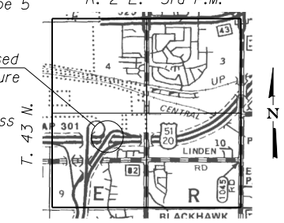
PROPOSED PROFILE

Along US-20 Inside E.O.P.



PROPOSED PROFILE

Along B.L. I-39 S.B.L. Relocated. The Profile Grade shows the Final Elevations after grinding.



LOCATION SKETCH

DESIGN STRESSES

FIELD UNITS
f'c = 3,500 psi
f'c = 4,000 psi (Superstructure Concrete)
fy = 60,000 psi (Reinforcement)
fy = 50,000 psi (M270 Grade 50)

PRECAST UNITS
f'c = 4,500 psi (Precast Panels)

LOADING HL-93

Allow 50#/sq. ft. for future wearing surface.

DESIGN SPECIFICATIONS

2014 AASHTO LRFD Bridge Design Specifications, 7th Edition, with 2015 and 2016 Interims

SEISMIC DATA

Seismic Performance Zone (SPZ) = 1
Design Spectral Acceleration at 1.0 sec. (S_{D1}) = 0.056
Design Spectral Acceleration at 0.2 sec. (S_{DS}) = 0.101
Soil Site Class = C

HIGHWAY CLASSIFICATION

F.A.I. Rte. 39 - I-39 S.B. Lanes
Functional Class: Interstate
ADT: 10,000 (2013); 28,000 (2040)
ADTT: 4,200 (2013); 11,700 (2040)
DHV: 2250 (2040)
Design Speed: 70 m.p.h.
Posted Speed: 65 m.p.h.
1 -Way Traffic

HIGHWAY CLASSIFICATION

FAP Rte 301 - U.S. Route 20
Functional Class: Freeway and Expressway (Urban)
ADT: 33,400 (2013); 50,050 (2040)
ADTT: 6,000 (2013); 9,000 (2040)
DHV: 5970 (2040)
Design Speed: 70 m.p.h.
Posted Speed: 65 m.p.h.
2 -Way Traffic
Directional Distribution: 50:50

Notes: All Structural Steel shall be Metalized. Up to ¼" may be ground off of the bridge deck and the approach slab.

GENERAL PLAN
I-39 S.B.L. (Ramp BD) over U.S.20
F.A.I. 39 - SECTION (201-3)K & (4-1, 5)R
WINNEBAGO COUNTY
STA. 147+59.66
STRUCTURE NUMBER -101-0215

DESIGNED | DRAWN | REVIEWED

HANSON

USER NAME =	DESIGNED - MNM	REVISED -
	CHECKED - TEH	REVISED -
PLOT SCALE =	DRAWN - ROD	REVISED -
PLOT DATE =	CHECKED - MNM	REVISED -

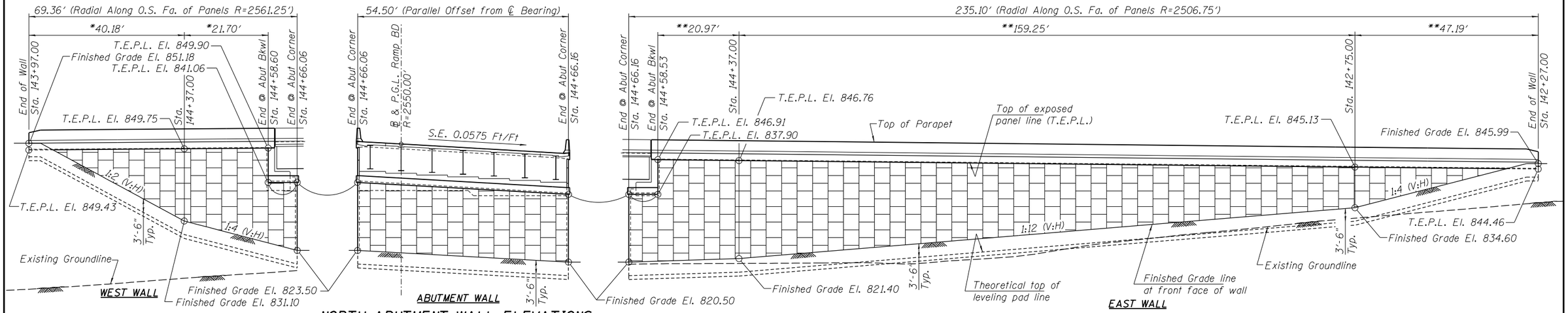
I:\06jobs\06S2055\CADD\Struct\Model\110519_139_SB_Ramp-BD_over_US20_TSL.dgn

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

STRUCTURE NO. 101-0215

SHEET NO. 01 OF 04 SHEETS

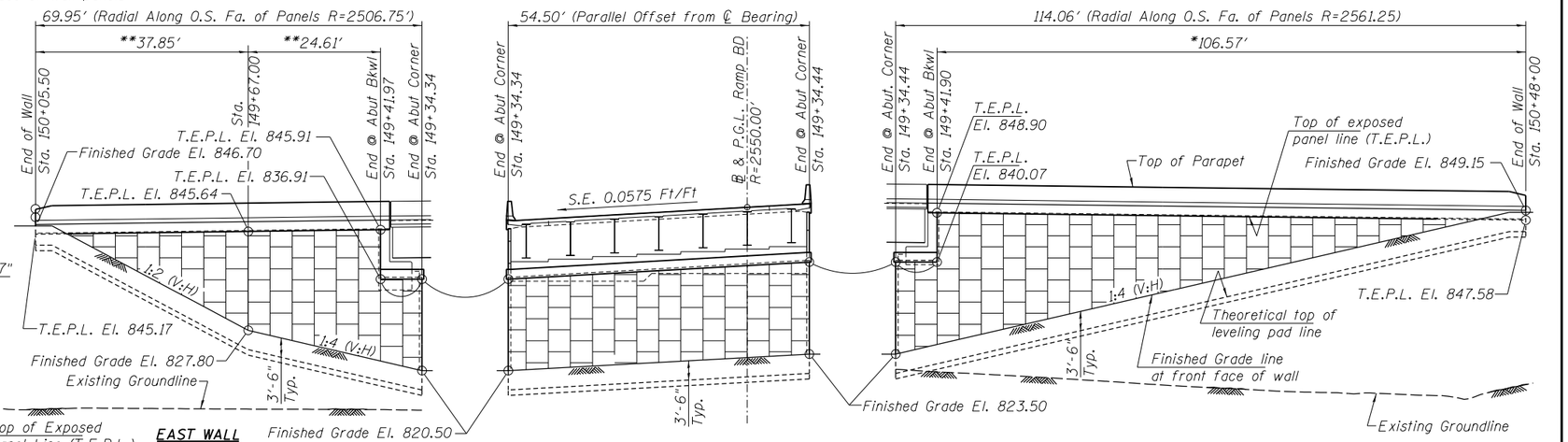
F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
39	(201-3)K & (4-1, 5)R	WINNEBAGO	4	1
		CONTRACT NO. 64C62		
	ILLINOIS FED. AID PROJECT			

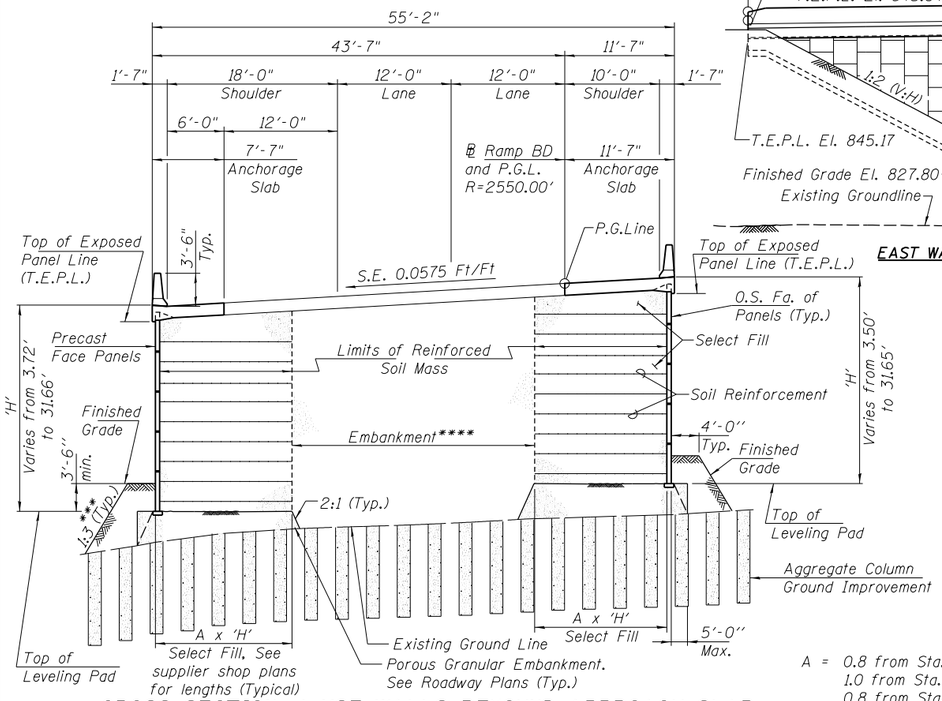


NORTH ABUTMENT WALL ELEVATIONS

Developed along front face of wall panels

* Radial along O.S. Face - R=2561.25'
** Radial along O.S. Face - R=2506.75'
*** 1:2 max. Near End of Wall
**** Embankment Material between MSE Walls from Sta. 143+97 to Sta. 150+05.50 Shall be Restricted to the same material as used for select fill in MSE Wall.





A = 0.8 from Sta. 142+27 to 143+50
1.0 from Sta. 143+50 to 149+67
0.8 from Sta. 149+67 to 150+48

CROSS SECTION at MSE WALLS BEYOUND APPROACH SLAB

Looking South - Upstation
(Horizontal Dimensions Measured Radially)

SOUTH ABUTMENT WALL ELEVATIONS

Developed along front face of wall panels

M.S.E. WALL DETAILS
I-39 S.B.L. (Ramp BD) over U.S.20
F.A.I. 39 - SECTION (201-3)K & (4-1, 5)R
WINNEBAGO COUNTY
STA. 147+59.66
STRUCTURE NUMBER -101-0215

DESIGNED / DRAWN / REVIEWED

I:\06jobs\06S2055\CADD\Struct\Model\110519.139_SB_Ramp-BD_over_US20_TSL.dgn

HANSON

USER NAME =	DESIGNED - MNM	REVISED -
	CHECKED - TEH	REVISED -
PLOT SCALE =	DRAWN - ROD	REVISED -
PLOT DATE =	CHECKED - MNM	REVISED -

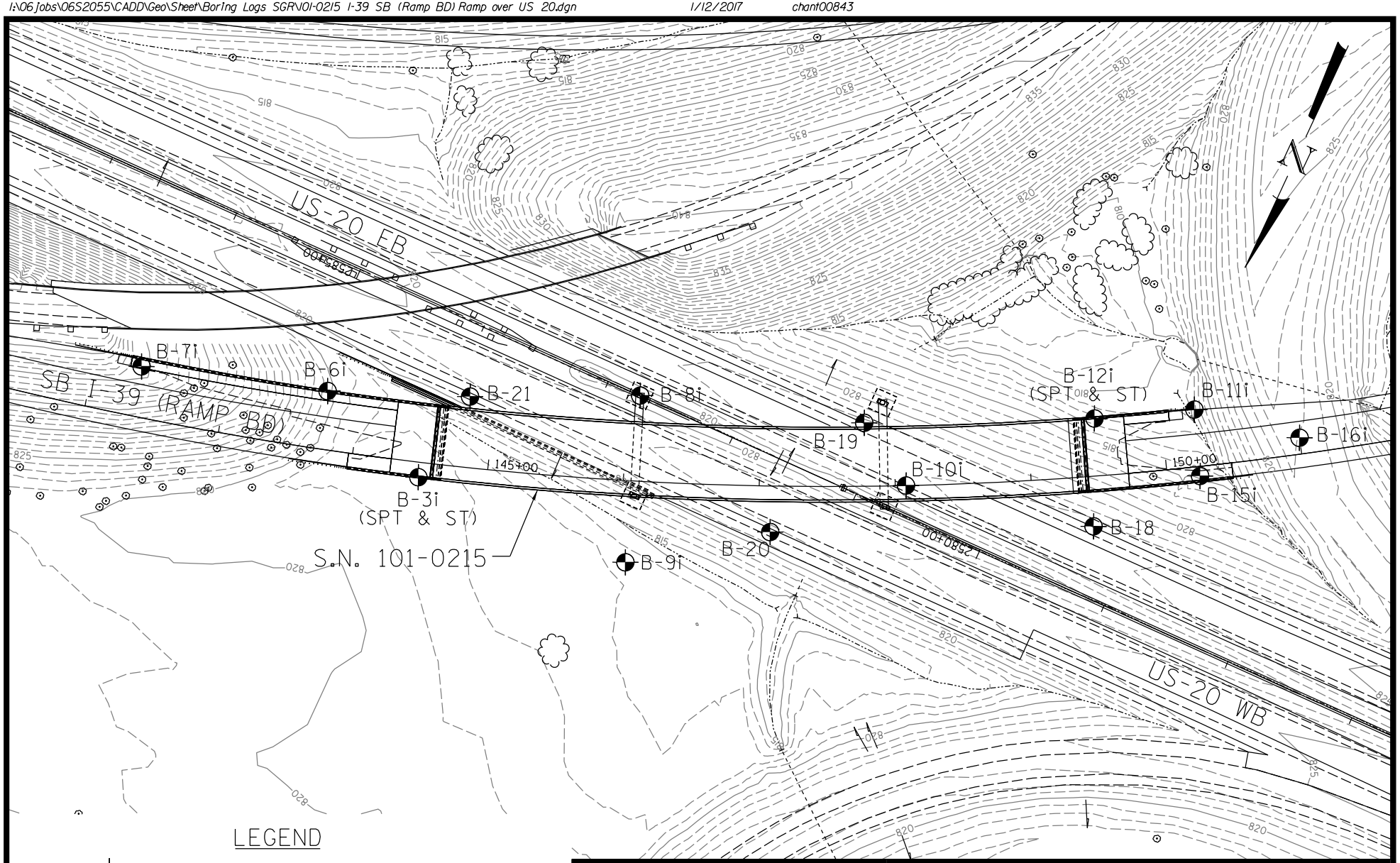
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

STRUCTURE NO. 101-0215

SHEET NO. 03 OF 04 SHEETS

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
39	(201-3)K & (4-1, 5)R	WINNEBAGO	4	3
		CONTRACT NO. 64C62		
	ILLINOIS FED. AID PROJECT			

I:\06Jobs\06S2055\CADD\Geo\Sheet\Boring Logs SGR\101-0215 I-39 SB (Ramp BD) Ramp over US 20.dgn 1/12/2017 chant00843



LEGEND

B-21 BORING LOCATION

0 100 200 300

SCALE IN FEET

HANSON

BORING LOCATION PLAN

I-39 SB (RAMP BD) OVER US-20
S.N. 101-0215
WINNEBAGO COUNTY, ILLINOIS

06S2055 01/12/17

B-3i
Sta. 144+50, 11' RT
02/25/2016

	N	Qu	w%	
818.4				
		1.0P	20	STIFF brown SILTY CLAY LOAM
	10	1.4B	24	STIFF light brown SILTY CLAY LOAM
	6	0.6P	24	MEDIUM light brown SILTY LOAM
	7	1.3B	30	STIFF light gray SILTY CLAY
	9	1.3B	27	STIFF dark brown SILTY CLAY LOAM
	6	0.8B	24	MEDIUM gray SILTY CLAY
804.4				
	6	0.2P	13	VERY SOFT tan SANDY LOAM TILL w/ GRAVEL
DD ▽ 798.9	11	0.3P	19	SOFT tan SANDY LOAM TILL w/ GRAVEL
	28	1.5S	12	STIFF tan SANDY LOAM TILL
Oh ▽ 795.4	19			No Recovery
	35	1.01S	11	STIFF tan SANDY LOAM TILL w/ CLAY lens
791.9				
	100/9"			VERY DENSE tan well cemented SANDY GRAVEL
	100/10"			VERY DENSE tan well cemented SANDY GRAVEL
786.9				
	45	4.5+P	8	HARD gray SANDY LOAM TILL
	37	2.3P	8	VERY STIFF gray SANDY LOAM TILL w/ SAND lens
781.9				
780.9	100/1"			VERY DENSE light gray LIMESTONE
				Auger Refusal @ 37.5'
				Bottom of Hole = 37.5' feet

B-3i Shelby
Sta. 144+50, 11' RT
05/03/2016

	N	Qu	w%	
818.4				
			24	SILTY CLAY
		0.94		[C] SILTY CLAY (LL=44 PI=25)
			26	[O] SILTY CLAY (LL=39 PI=20)
				SILTY CLAY
		0.98	22	CLAY LOAM
			24	[C] SILTY CLAY (LL=35 PI=17)
		3.49		SILTY CLAY
		1.13	23	CLAY LOAM
				SILTY CLAY
		1.16	23	SILTY CLAY
				SILTY CLAY
		0.58	24	SILTY CLAY
				SILTY CLAY LOAM
				Pushed 9", Rec. 9"
798.4				hit big gravel
				Bottom of Hole = 20.0' feet

B-21
Sta. 144+81, 52' LT
04/18/2006

	N	Qu	w%	
822.8				
		1.3P	16	STIFF brown SILTY CLAY LOAM
	12	2.5B	14	VERY STIFF brown LOAM
	12	1.9B	14	STIFF brown LOAM
	12	1.4P	19	STIFF brown LOAM with SAND lens
813.3				
	7			LOOSE tan medium SAND
810.8				
	7	1.3B	22	STIFF brown SILTY CLAY LOAM
	9	2.3B	24	VERY STIFF brown SILTY CLAY
	8	0.6B	19	MEDIUM gray LOAM
	11	0.8B	29	MEDIUM brown/tan SILTY CLAY LOAM
800.8				
800.3 DD	Oh 17			MEDIUM tan fine SAND
	6		13	LOOSE tan very moist dirty SAND with medium GRAVEL
795.8				
	19	2.6P	11	VERY STIFF tan SANDY LOAM TILL
	53	3.9S	9	VERY STIFF tan SANDY LOAM TILL
	83			VERY DENSE gray SANDY LOAM TILL
	100		6	VERY DENSE gray SANDY LOAM TILL with bottom 6" gray LIMESTONE
	44			DENSE gray SANDY LOAM TILL
	23	3.5P	12	VERY STIFF gray SILTY CLAY TILL
780.8				
	4			VERY LOOSE tan fine SAND
	25			MEDIUM tan medium dirty SAND
	100			Wash VERY DENSE tan weathered LIMESTONE
773.8				
				Bottom of Hole = 49.0' feet

B-6i
Sta. 143+75, 43' LT
03/09/2016

	N	Qu	w%	
820.4				
		0.6P	15	MEDIUM brown SILTY CLAY LOAM
	17	2.1P	18	VERY STIFF brown SILTY CLAY LOAM
	15	2.0B	24	STIFF/VERY STIFF light brown SILTY CLAY LOAM
	7	0.9B	23	MEDIUM tan SILTY LOAM
	12	1.03S	22	STIFF light gray SILTY LOAM
	7	1.6B	22	STIFF gray SILTY CLAY LOAM
	9	0.8B	25	MEDIUM light gray SILTY CLAY LOAM
803.9				
	7	0.9B	24	MEDIUM light gray SILTY CLAY TILL
DD ▽ 798.4	7	0.5P	12	MEDIUM tan SANDY LOAM w/ medium GRAVEL
	10	0.9B	15	MEDIUM tan SANDY LOAM TILL
	13	1.2B	13	STIFF tan SANDY LOAM TILL
793.9				
	27			MEDIUM tan moist dirty SANDY GRAVEL
791.4				
	36	3.1S	9	VERY STIFF tan SANDY LOAM TILL
	18			No Recovery
	10	0.9B	11	MEDIUM gray SANDY LOAM TILL
Oh ▽ 782.9	14	1.5B	10	STIFF gray SANDY LOAM TILL
781.4				
779.4	100/4"			VERY DENSE tan weathered LIMESTONE
				Bottom of Hole = 41.0' feet

LEGEND

N	Standard Penetration Test N (blows/ft)
Qu	Unconfined Strength (tsf)
w%	Natural Moisture Content (%)
[O]	Unconsolidated Undrained Triaxial Test
[C]	Consolidation Test
DD ▽ 507.20	Water Surface Elevation Encountered in Boring DD = during drilling Oh = at completion 24h = 24 hours after completion
	Approximate Finish Grade
	Bottom of Footing
	Theoretical Top of Leveling Pad

FILE NAME =

HANSON

USER NAME =	DESIGNED - RGC	REVISED	
	CHECKED - JLD	REVISED	
PLOT SCALE =	DRAWN - EJM	REVISED	
PLOT DATE = 12/23/2016	CHECKED - KKC	REVISED	

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

SUBSURFACE DATA PROFILE
STRUCTURE NO. 101-0215
SHEET NO. 1 OF 4 SHEETS

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
39	(201-3)K & (4-1,5)R	WINNEBAGO		
		CONTRACT NO.		
	ILLINOIS	FED. AID PROJECT		

B-7i
Sta. 142+35, 37' LT
02/18/2016

	N	Qu	w%	
840.4				
			18	Brown SILTY CLAY LOAM
	13	2.5P	17	VERY STIFF brown SILTY CLAY LOAM
	26	0.79B	15	MEDIUM brown SANDY LOAM w/ LIMESTONE fill at bottom 6"
	13			No Recovery
	8	0.7P	23	MEDIUM gray SILTY CLAY LOAM
	22	2.06B	18	VERY STIFF brown SILTY CLAY LOAM
	18	2.68B	17	VERY STIFF brown SILTY CLAY LOAM
	15	1.9B	19	STIFF brown SILTY CLAY LOAM
	9	0.5P	21	MEDIUM gray SILTY CLAY LOAM
	14	2.47B	21	VERY STIFF brown SILTY CLAY LOAM
	14	3.3B	21	VERY STIFF brown SILTY CLAY LOAM
	11	0.87S	24	MEDIUM brown SANDY LOAM
809.4	22	0.7P	22	MEDIUM brown SANDY LOAM
				Bottom of Hole = 31.0' feet

B-8i
Sta. 146+09, 63' LT
02/23/2016

	N	Qu	w%	
822.3		0.5P	10	MEDIUM brown SANDY LOAM
	13	3.9P	12	VERY STIFF gray SANDY LOAM
	10	2.0P	14	VERY STIFF tan SANDY LOAM
813.8	14	1.1P	15	MEDIUM gray SANDY LOAM w/ SAND lens
811.3	8			LOOSE gray fine SAND
	5	0.6B	27	MEDIUM tan SILTY LOAM
	3	0.3B	25	SOFT tan SILT
803.8	8	0.3P	21	SOFT tan SILT w/ fine SAND lens
DD 800.8	15			MEDIUM tan moist SANDY GRAVEL
	24			MEDIUM tan medium SAND
796.3	23			MEDIUM tan fine SAND
	9	1.0B	16	STIFF tan SANDY LOAM TILL
	7	0.4B	14	STIFF tan SANDY LOAM TILL
	22	2.5B	10	VERY STIFF tan SANDY LOAM TILL
	16	1.4B	10	STIFF tan SANDY LOAM TILL
	13	1.6B	10	STIFF light gray SANDY LOAM TILL
781.3	13			No Recovery
779.3	100/2"			VERY DENSE tan weathered LIMESTONE Auger refusal @ 43'
774.3				VERY POOR buff-white LIMESTONE Rec. = 80% RQD = 0%
769.3	443 270 227			FAIR buff-white LIMESTONE Rec. = 100% RQD = 65%
764.3	230 261			POOR buff-white LIMESTONE Rec. = 100% RQD = 35%
759.3	259 344			POOR buff-white LIMESTONE Rec. = 95% RQD = 43%
				Bottom of Hole = 63.0' feet

B-9i
Sta. 146+05, 60' RT
02/28/2016

	N	Qu	w%	
817.3		1.5P	23	STIFF brown LOAM
	11	1.5P	27	STIFF brown SILTY CLAY LOAM
	11	1.7B	27	STIFF light brown SILTY CLAY LOAM
	7	0.4P	25	SOFT light brown SILTY LOAM
	8	1.8B	23	STIFF brown SILTY CLAY LOAM
	9	1.1B	21	STIFF light gray LOAM
803.8	3			VERY LOOSE light gray moist dirty SAND w/ medium GRAVEL
801.3	7	0.4P	14	SOFT tan SANDY LOAM TILL
798.8 DD 798.3	5			LOOSE tan SAND
	6	0.0P		VERY SOFT tan dirty SAND w/ GRAVEL
791.3	16			No Recovery
	11	2.1B	12	VERY STIFF tan SANDY LOAM TILL
786.3	33	1.8P	12	STIFF gray SANDY LOAM TILL
	100/5"			VERY DENSE tan weathered LIMESTONE
781.8	100/3"			VERY DENSE tan weathered LIMESTONE Auger Refusal @ 35.5'
776.8				VERY POOR buff-white LIMESTONE Rec. = 100% RQD = 0%
771.8	159			VERY POOR buff-white LIMESTONE Rec. = 100% RQD = 11%
766.8	202 166			POOR buff-white LIMESTONE Rec. = 100% RQD = 49%
761.8	497 174			VERY POOR buff-white LIMESTONE Rec. = 100% RQD = 17%
				Bottom of Hole = 55.5' feet

B-20
Sta. 147+09, 34' RT
04/17/2006

	N	Qu	w%	
821.8				Asphalt
		1.3P	12	STIFF dark brown SILTY CLAY LOAM
	10	1.3S	18	STIFF brown SILTY CLAY LOAM
	10	1.4B	20	STIFF brown SILTY CLAY LOAM
	9	1.7B	15	STIFF brown CLAY LOAM
	11	2.1B	15	VERY STIFF brown SANDY CLAY LOAM
	8	0.8B	18	MEDIUM gray SANDY LOAM
	7	1.8B	23	STIFF gray SILTY CLAY
DD 801.8	10	1.2	14	STIFF gray SILTY CLAY LOAM with SAND lens
799.8	21			MEDIUM tan dirty SAND, bottom weathered LIMESTONE
	3	0.0P	12	VERY SOFT tan SANDY LOAM
				5' Run
	9	1.5B	12	STIFF tan SANDY LOAM
	10			No Recovery
	23	2.1B	10	VERY STIFF brown SANDY CLAY LOAM
784.8	36	3.5S	7	VERY STIFF gray SANDY LOAM with TILL
	100/2"			VERY DENSE tan weathered LIMESTONE
781.8				POOR tan LIMESTONE 80% Recovery
776.8				FAIR tan LIMESTONE 100% Recovery
771.8				Bottom of Hole = 50.0' feet

LEGEND

N	Standard Penetration Test N (blows/ft)
Qu	Unconfined Strength (tsf)
w%	Natural Moisture Content (%)
DD ▽ 507.20	Water Surface Elevation Encountered in Boring DD = during drilling 0h = at completion 24h = 24 hours after completion
	Approximate Finish Grade
	Bottom of Footing
	Theoretical Top of Leveling Pad

FILE NAME =	USER NAME =	DESIGNED - RGC	REVISED
HANSON		CHECKED - JLD	REVISED
	PLOT SCALE =	DRAWN - EJM	REVISED
	PLOT DATE = 12/23/2016	CHECKED - KKC	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

SUBSURFACE DATA PROFILE
STRUCTURE NO. 101-0215
SHEET NO. 2 OF 4 SHEETS

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
39	(201-3)K & (4-1,5)R	WINNEBAGO		
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			

B-19
Sta. 147+78, 47' LT
03/14/2006

	N	Qu	w%	
821.2				
		3.3P	12	Asphalt VERY STIFF brown SANDY LOAM
	15	4.5+P	12	HARD brown SANDY LOAM
	10	2.7B	16	VERY STIFF brown SANDY LOAM
	13	1.4B	21	STIFF brown SANDY CLAY LOAM
	6	1.0S	17	MEDIUM dark brown SANDY LOAM
	8	1.5B	24	STIFF tan/gray SILTY CLAY LOAM
	5	1.0B	27	MEDIUM tan/gray SILTY CLAY LOAM
	6	0.5B	20	SOFT tan SILTY CLAY
802.2				
DD 799.2	16			MEDIUM red/brown dirty fine SAND, moist with LIMESTONE fragments
	17			MEDIUM brown dirty fine SAND with GRAVEL
	13			MEDIUM brown fine SAND
794.7				
	39	2.0	9	STIFF brown SANDY LOAM TILL
0h 790.2	75	4.5+P	7	HARD gray SANDY LOAM TILL
	26	2.5S	7	VERY STIFF gray SANDY LOAM TILL
	22	1.7B	9	STIFF gray SANDY LOAM TILL
	39	3.0B	9	VERY STIFF gray SANDY LOAM TILL
	100/11"	2.2B	12	VERY STIFF gray SANDY LOAM TILL
779.7				
	100/2"			VERY DENSE tan weathered LIMESTONE
	100/1"			VERY DENSE tan weathered LIMESTONE
775.2				Bottom of Hole = 46.0' feet

B-10i
Sta. 148+08, ℄
03/18/2016

	N	Qu	w%	
822.8				
		1.3P	14	STIFF gray LOAM
	13	3.6P	13	VERY STIFF light brown SANDY CLAY LOAM w/ medium GRAVEL
	16	1.6P	15	STIFF light brown SANDY CLAY LOAM w/ SAND lens
	10	2.6P	8	VERY STIFF tan SANDY LOAM
	12	1.6B	16	STIFF gray LOAM w/ SAND lens
	12	2.1S	23	VERY STIFF light gray CLAY LOAM
804.8				
	22			MEDIUM tan dirty SAND
799.8				
	9	0.6B	12	MEDIUM tan SANDY LOAM TILL
794.8				
	80			VERY DENSE tan weathered LIMESTONE
790.8				
	21	2.5B	8	VERY STIFF gray SANDY LOAM TILL
	30			No Recovery (TILL)
	25	1.5B	12	STIFF tan SANDY LOAM TILL w/ SAND lens
780.8				
	36			DENSE light gray SANDY GRAVEL
	100/1"			
772.3				VERY POOR buff-white LIMESTONE
				Rec. = 100% RQD = 0%
767.3				POOR buff-white LIMESTONE
	365			Rec. = 100%
	249			RQD = 35%
762.3				POOR buff-white LIMESTONE
	505			Rec. = 100%
	379			RQD = 40%
757.3				FAIR buff-white LIMESTONE
	503			Rec. = 100%
	562			RQD = 61%
752.3				Bottom of Hole = 70.5' feet

B-11i
Sta. 150+25, 42' LT
04/25/2016

	N	Qu	w%	
811.7				
		0.5P	23	MEDIUM brown SILTY CLAY LOAM
	8	0.7P	24	MEDIUM light brown SILTY CLAY LOAM
	4	0.2B	21	VERY SOFT tan SILTY LOAM
805.2				
	13			MEDIUM tan clean moist medium SAND
802.7 DD 802.2	4	0.2P	12	VERY SOFT tan SANDY LOAM
800.2				
	12			MEDIUM tan clean medium SAND
	26			MEDIUM tan SANDY GRAVEL
	20			MEDIUM tan clean medium coarse SAND
791.7				Wash
	56			VERY DENSE tan weathered LIMESTONE
789.2	100/2"			VERY DENSE tan weathered LIMESTONE
				Bottom of Hole = 22.5' feet

B-12i
Sta. 149+50, 42' LT
04/26/2016

	N	Qu	w%	
812.3				
	13	2.3P	18	VERY STIFF light brown SILTY LOAM
	14	3.1P	18	VERY STIFF gray SANDY LOAM w/ GRAVEL
	6	0.2B	30	VERY SOFT gray SILTY LOAM
	6	0.3P	29	SOFT gray SILTY LOAM
800.8 DD 800.3	6			LOOSE gray fine SAND
797.3 0h	3			VERY LOOSE tan very fine SAND
	5			LOOSE tan dirty SANDY GRAVEL w/ LIMESTONE fragments
	3	0.2P	16	VERY SOFT tan SANDY LOAM
	8			LOOSE tan dirty SAND w/ LIMESTONE
788.3				
	23	3.5S	9	VERY STIFF tan SANDY LOAM
785.8				
	100/7"			VERY DENSE tan weathered LIMESTONE
783.8				Bottom of Hole = 28.5' feet

LEGEND

N	Standard Penetration Test N (blows/ft)
Qu	Unconfined Strength (tsf)
w%	Natural Moisture Content (%)
DD 507.20	Water Surface Elevation Encountered in Boring DD = during drilling 0h = at completion 24h = 24 hours after completion
	Approximate Finish Grade
	Bottom of Footing
	Theoretical Top of Leveling Pad

FILE NAME =	USER NAME =	DESIGNED - RGC	REVISED
HANSON		CHECKED - JLD	REVISED
	PLOT SCALE =	DRAWN - EJM	REVISED
	PLOT DATE = 12/23/2016	CHECKED - KKC	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

SUBSURFACE DATA PROFILE
STRUCTURE NO. 101-0215
SHEET NO. 3 OF 4 SHEETS

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
39	(201-3)K & (4-1,5)R	WINNEBAGO		
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			

B-12i Shelby
Sta. 149+50, 42' LT
05/05/2016

	N	Qu	w%	
812.3				SILTY CLAY
	3.5		14	SILTY LOAM
			17 [C]	SILTY CLAY LOAM (LL=42 PI=22)
	1.73			SILTY CLAY LOAM
				SILTY LOAM
	1.56		19	SILTY CLAY
			[Q]	SILTY CLAY/SANDY LOAM
	0.46		27	SILTY CLAY
				SILTY CLAY LOAM
	0.61		25	SILTY CLAY LOAM
797.3				SAND - 15" Wash

Bottom of Hole = 15.0' feet

B-18
Sta. 149+40, 35' RT
03/14/2006

	N	Qu	w%	
821.0		1.2P	15	STIFF brown SILTY CLAY LOAM
	11	1.6P	19	STIFF brown SILTY CLAY LOAM
	7	0.8P	24	MEDIUM tan LOAM
	7	0.2P	24	VERY SOFT tan SILT
	10	2.1B	26	VERY STIFF light gray SILTY CLAY
	9	2.1B	25	VERY STIFF dark brown SILTY CLAY LOAM
	7	1.2B	22	STIFF gray SILTY CLAY TILL
801.5	6	0.0P	31	VERY SOFT light gray SILT
	11			MEDIUM tan moist SAND
	21			MEDIUM tan dirty SAND with LIMESTONE fragments
794.0	32			DENSE tan dirty moist SAND & GRAVEL
DD 791.0	28	1.9S	9	STIFF tan SANDY LOAM TILL
	18	1.7B	10	STIFF tan SANDY LOAM TILL
789.0	42			DENSE tan very moist dirty SAND & GRAVEL
	42			DENSE tan friable SANDY LOAM TILL
	100/1"			VERY DENSE tan weathered LIMESTONE
	100/2"			VERY DENSE tan weathered LIMESTONE Auger Refusal @ 41.0'
780.0				POOR tan LIMESTONE 100% Recovery
775.0				FAIR tan LIMESTONE 100% Recovery
770.0				

Bottom of Hole = 51.0' feet

B-15i
Sta. 150+24, 7' RT
04/27/2016

	N	Qu	w%	
811.7	8	1.8P	14	STIFF brown LOAM
	4	0.2P	20	VERY SOFT light brown SANDY LOAM
	9	1.03B	22	STIFF light gray SILT
802.7 DD 802.2	12			MEDIUM gray medium SAND
800.2	9	0.8B	10	MEDIUM tan SANDY LOAM
	4	0.2P	13	VERY SOFT tan SANDY LOAM w/ SAND lens
795.2	29	4.0P	9	HARD tan SANDY LOAM TILL
792.2 Oh	44			No Recovery (SANDY LOAM TILL)
790.2	100/1"			VERY DENSE tan weathered LIMESTONE
789.2				

Bottom of Hole = 22.5' feet

B-16i
Sta. 151+00, 12' LT
03/10/2016

	N	Qu	w%	
822.0		0.2P	19	VERY SOFT brown LOAM
	15	2.3B	17	VERY STIFF light brown LOAM w/ SAND lens
	14	1.8B	16	STIFF tan SILTY LOAM/LOAM w/ medium GRAVEL
	25	3.9S	15	VERY STIFF gray LOAM
	17	2.2S	25	VERY STIFF tan/gray SILTY CLAY
	13	2.1B	23	VERY STIFF tan SILTY CLAY
	14	0.8B	16	MEDIUM tan SANDY LOAM w/ SAND lens
DD 805.0	5	0.4P	14	SOFT tan SANDY LOAM
803.0 Oh				
801.0	40			DENSE light gray SAND w/ medium GRAVEL

Bottom of Hole = 21.0' feet

LEGEND

N	Standard Penetration Test N (blows/ft)
Qu	Unconfined Strength (tsf)
w%	Natural Moisture Content (%)
[Q]	Unconsolidated Undrained Triaxial Test
[C]	Consolidation Test
DD 507.20	Water Surface Elevation Encountered in Boring DD = during drilling Oh = at completion 24h = 24 hours after completion
	Approximate Finish Grade
	Bottom of Footing
	Theoretical Top of Leveling Pad

FILE NAME =	USER NAME =	DESIGNED - RGC	REVISED
HANSON		CHECKED - JLD	REVISED
	PLOT SCALE =	DRAWN - EJM	REVISED
	PLOT DATE = 12/23/2016	CHECKED - KKC	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

SUBSURFACE DATA PROFILE
STRUCTURE NO. 101-0215
SHEET NO. 4 OF 4 SHEETS

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
39	(201-3)K & (4-1,5)R	WINNEBAGO		
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			

Illinois Department of Transportation
Division of Highways
IDOT

SOIL BORING LOG

Date 3/14/06

ROUTE FAI 39 DESCRIPTION P92-075-05 I-39 @ Bypass 20 Soil Survey, south edge of Rockford, I-39 SB at US 20 LOGGED BY W. Garza

SECTION (201-3) K LOCATION , SEC. , TWP. , RNG.

COUNTY Winnebago DRILLING METHOD Hollow Stem Auger HAMMER TYPE B-53 Diedrich Automatic

STRUCT. NO.
Station
BORING NO. B-18
Station 12583+70 - US 20
Offset 65.00ft Lt CL
Ground Surface Elev. 821.0 ft

Surface Water Elev. ft
Stream Bed Elev. ft
Groundwater Elev.:
First Encounter 791.0 ft ▼
Upon Completion Core ft
After Hrs. ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
STIFF brown SILTY CLAY LOAM			1.2 P	15
	818.50			
STIFF brown SILTY CLAY LOAM		8 4 7	1.6 P	19
	817.00			
	-5			
MEDIUM tan LOAM		1 3 4	0.8 P	24
	814.50			
VERY SOFT tan SILT		2 3 4	0.2 P	24
	812.00			
	-10			
VERY STIFF light gray SILTY CLAY		4 5 5	2.1 B	26
	809.50			
VERY STIFF dark brown SILTY CLAY LOAM		2 3 6	2.1 B	25
	807.00			
	-15			
STIFF gray SILTY CLAY TILL		2 3 4	1.2 B	22
	804.50			
VERY SOFT light gray SILT		2 3 3	0.0 P	31
	801.50			
	-20			

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
MEDIUM tan moist SAND		2 4 7		
	799.50			
MEDIUM tan dirty SAND with LIMESTONE fragments		9 9 12		
	797.00			
	-25			
DENSE tan dirty moist SAND & GRAVEL		4 10 22		
	794.00			
STIFF tan SANDY LOAM TILL		11 11 17	1.9 S	9
	792.00			
	▼-30			
STIFF tan SANDY LOAM TILL		4 8 10	1.7 B	10
	789.00			
DENSE tan very moist dirty SAND & GRAVEL		7 17 25		
	787.00			
	-35			
DENSE tan friable SANDY LOAM TILL		14 20 22		
	784.50			
VERY DENSE tan weathered LIMESTONE		8 100/1"		
	782.00			
	-40			

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

FIGURE 2

BBS, from 137 (Rev. 8-99)

Illinois Department of Transportation
Division of Highways
IDOT

SOIL BORING LOG

Date 3/14/06

ROUTE FAI 39 DESCRIPTION P92-075-05 I-39 @ Bypass 20 Soil Survey, south edge of Rockford, I-39 SB at US 20 LOGGED BY W. Garza

SECTION (201-3) K LOCATION , SEC. , TWP. , RNG.

COUNTY Winnebago DRILLING METHOD Hollow Stem Auger HAMMER TYPE B-53 Diedrich Automatic

STRUCT. NO.
Station

BORING NO. B-18
Station 12583+70 - US 20
Offset 65.00ft Lt CL
Ground Surface Elev. 821.0 ft

Surface Water Elev. ft
Stream Bed Elev. ft

Groundwater Elev.:
First Encounter 791.0 ft ▼
Upon Completion Core ft
After Hrs. ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
VERY DENSE tan weathered LIMESTONE	780.00	100/2"		
Auger Refusal @ 41.0'				
Box #25 Time: 7 minutes POOR tan LIMESTONE 100% Recovery	-45			
	775.00			
Time: 6 minutes FAIR tan LIMESTONE 100% Recovery	-50			
	770.00			
End of Boring	-55			
	-60			

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

FIGURE 2

BBS, from 137 (Rev. 8-99)

Illinois Department of Transportation
Division of Highways
IDOT

SOIL BORING LOG

Date 3/14/06

ROUTE FAI 39 DESCRIPTION P92-075-05 I-39 @ Bypass 20, Soil Survey, I-39 SB at US 20 LOGGED BY M. Jacoby

SECTION (201-3) K LOCATION , SEC. , TWP. , RNG.

COUNTY Winnebago DRILLING METHOD Hollow Stem Auger HAMMER TYPE CME-45 Automatic

STRUCT. NO. _____
Station _____

BORING NO. B-19
Station 12581+26 - US 20
Offset 56.00ft Lt CL
Ground Surface Elev. 821.2 ft

Surface Water Elev. _____ ft
Stream Bed Elev. _____ ft

Groundwater Elev.:
First Encounter 799.2 ft ▼
Upon Completion 790.2 ft ▽
After _____ Hrs. _____ ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Asphalt VERY STIFF brown SANDY LOAM			3.3 P	12
	819.20			
HARD brown SANDY LOAM		4 6 9	4.5+ P	12
	817.70			
VERY STIFF brown SANDY LOAM	-5	6 4 6	2.7 B	16
	815.20			
STIFF brown SANDY CLAY LOAM		3 6 7	1.4 B	21
	812.70			
MEDIUM dark brown SANDY LOAM	-10	3 2 4	1.0 S	17
	810.20			
STIFF tan/gray SILTY CLAY LOAM		3 3 5	1.5 B	24
	807.70			
MEDIUM tan/gray SILTY CLAY LOAM	-15	1 2 3	1.0 B	27
	805.20			
SOFT tan SILTY CLAY		2 2 4	0.5 B	20
	802.20			
	-20			

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
MEDIUM red/brown dirty fine SAND, moist with LIMESTONE fragments *(continued)*	800.20	5 6 10		
MEDIUM brown dirty fine SAND with GRAVEL		8 9 8		
	797.70			
MEDIUM brown fine SAND	-25	2 3 10		
	794.70			
STIFF brown SANDY LOAM TILL		9 15 24	2.0	9
	792.70			
HARD gray SANDY LOAM TILL	-30	26 37 38	4.5+ P	7
	790.20▽			
VERY STIFF gray SANDY LOAM TILL		10 12 14	2.5 S	7
	787.70			
STIFF gray SANDY LOAM TILL	-35	9 10 12	1.7 B	9
	785.20			
VERY STIFF gray SANDY LOAM TILL		12 20 19	3.0 B	9
	782.70			
	-40			

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

FIGURE 2

BBS, from 137 (Rev. 8-99)

Illinois Department of Transportation
Division of Highways
IDOT

SOIL BORING LOG

Date 3/14/06

ROUTE FAI 39 DESCRIPTION P92-075-05 I-39 @ Bypass 20, Soil Survey, I-39 SB at US 20 LOGGED BY M. Jacoby

SECTION (201-3) K LOCATION , SEC. , TWP. , RNG.

COUNTY Winnebago DRILLING METHOD Hollow Stem Auger HAMMER TYPE CME-45 Automatic

STRUCT. NO.
Station

BORING NO. B-19
Station 12581+26 - US 20
Offset 56.00ft Lt CL
Ground Surface Elev. 821.2 ft

Surface Water Elev. ft
Stream Bed Elev. ft

Groundwater Elev.:
First Encounter 799.2 ft ▼
Upon Completion 790.2 ft ▽
After Hrs. ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
VERY STIFF gray SANDY LOAM TILL *(continued)*		13 100/11"	2.2 B	12
779.70				
VERY DENSE tan weathered LIMESTONE		100/2"		
777.70				
VERY DENSE tan weathered LIMESTONE	-45	100/1"		
775.20				
End of Boring	-50 -55 -60			

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

FIGURE 2

BBS, from 137 (Rev. 8-99)

Illinois Department of Transportation
Division of Highways
IDOT

SOIL BORING LOG

Date 4/17/06

ROUTE FAI 39 DESCRIPTION P92-075-05 I-39 @ Bypass 20, Soil Survey, I-39 SB at US 20 LOGGED BY W. Garza

SECTION (201-3) K LOCATION , SEC. , TWP. , RNG.

COUNTY Winnebago DRILLING METHOD Hollow Stem Auger HAMMER TYPE B-53 Diedrich Automatic

STRUCT. NO.
Station

BORING NO. B-20
Station 12579+04
Offset 56.00ft Rt CL
Ground Surface Elev. 821.8 ft

Surface Water Elev. ft
Stream Bed Elev. ft

Groundwater Elev.:
First Encounter 801.8 ft ▼
Upon Completion ft
After Hrs. ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
		1.3 P	12	Asphalt STIFF dark brown SILTY CLAY LOAM
819.30				
	3 4 6	1.3 S	18	STIFF brown SILTY CLAY LOAM
817.80				
-5				
	3 4 6	1.4 B	20	STIFF brown SILTY CLAY LOAM
815.30				
	3 4 5	1.7 B	15	STIFF brown CLAY LOAM
812.80				
-10				
	2 5 6	2.1 B	15	VERY STIFF brown SANDY CLAY LOAM
810.30				
	2 4 4	0.8 B	18	MEDIUM gray SANDY LOAM
807.80				
-15				
	3 3 4	1.8 B	23	STIFF gray SILTY CLAY
805.30				
	2 4 6	1.2	14	STIFF gray SILTY CLAY LOAM with SAND lens
802.80				
▼-20				
	3 10 11			MEDIUM tan dirty SAND, bottom weathered LIMESTONE
799.80				
	1 1 2	0.0 P	12	VERY SOFT tan SANDY LOAM
797.80				
-25				
				5' Run
795.30				
	2 4 5	1.5 B	12	STIFF tan SANDY LOAM
792.80				
-30				
	4 4 6			No Recovery
790.30				
	2 9 14	2.1 B	10	VERY STIFF brown SANDY CLAY LOAM
787.80				
-35				
	12 17 19	3.5 S	7	VERY STIFF gray SANDY LOAM with TILL
784.80				
	100/2"			VERY DENSE tan weathered LIMESTONE
782.80				
-40				

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

FIGURE 2

BBS, from 137 (Rev. 8-99)

Illinois Department of Transportation
Division of Highways
IDOT

SOIL BORING LOG

Date 4/17/06

ROUTE FAI 39 DESCRIPTION P92-075-05 I-39 @ Bypass 20, Soil Survey, I-39 SB at US 20 LOGGED BY W. Garza

SECTION (201-3) K LOCATION , SEC. , TWP. , RNG.

COUNTY Winnebago DRILLING METHOD Hollow Stem Auger HAMMER TYPE B-53 Diedrich Automatic

STRUCT. NO. _____
Station _____

BORING NO. B-20
Station 12579+04
Offset 56.00ft Rt CL
Ground Surface Elev. 821.8 ft

Surface Water Elev. _____ ft
Stream Bed Elev. _____ ft

Groundwater Elev.:
First Encounter 801.8 ft ▼
Upon Completion _____ ft
After _____ Hrs. _____ ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Box #19 Time: 11 minutes POOR tan LIMESTONE 80% Recovery				
776.80	-45			
Time: 12 minutes FAIR tan LIMESTONE 100% Recovery				
771.80	-50			
End of Boring				
	-55			
	-60			

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

FIGURE 2

BBS, from 137 (Rev. 8-99)

Illinois Department of Transportation
Division of Highways
IDOT

SOIL BORING LOG

Date 4/18/06

ROUTE FAI 39 **DESCRIPTION** P92-075-05 I-39 @ Bypass 20, Soil Survey, I-39 SB atUS 20 EB **LOGGED BY** W. Garza

SECTION (201-3) K **LOCATION** , SEC. , TWP. , RNG.

COUNTY Winnebago **DRILLING METHOD** Hollow Stem Auger **HAMMER TYPE** B-53 Diedrich Automatic

STRUCT. NO. E. Abut.
Station EB US 20

BORING NO. B-21
Station 12580+94
Offset 56.00ft Rt CL
Ground Surface Elev. 822.8 ft

Surface Water Elev. ft
Stream Bed Elev. ft

Groundwater Elev.:
First Encounter 800.3 ft ▼
Upon Completion 800.3 ft ▽
After Hrs. ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
STIFF brown SILTY CLAY LOAM			1.3 P	16
	820.30			
VERY STIFF brown LOAM		3 5 7	2.5 B	14
	818.80			
	-5			
STIFF brown LOAM		3 6 6	1.9 B	14
	816.30			
STIFF brown LOAM with SAND lens		5 5 7	1.4 P	19
	813.30			
	-10			
LOOSE tan medium SAND		3 3 4		
	810.80			
STIFF brown SILTY CLAY LOAM		1 3 4	1.3 B	22
	808.80			
	-15			
VERY STIFF brown SILTY CLAY		2 4 5	2.3 B	24
	806.30			
MEDIUM gray LOAM		2 3 5	0.6 B	19
	803.80			
	-20			
MEDIUM brown/tan SILTY CLAY LOAM		3 3 8	0.8 B	29
	800.80			
MEDIUM tan fine SAND		3 9 8		
	798.80			
	-25			
LOOSE tan very moist dirty SAND with medium GRAVEL		2 4 2		13
	795.80			
VERY STIFF tan SANDY LOAM TILL		5 8 11	2.6 P	11
	793.80			
	-30			
VERY STIFF tan SANDY LOAM TILL		13 23 30	3.9 S	9
	791.30			
VERY DENSE gray SANDY LOAM TILL		41 45 38		
	788.80			
	-35			
VERY DENSE gray SANDY LOAM TILL with bottom 6" gray LIMESTONE		20 35 65		6
	786.30			
DENSE gray SANDY LOAM TILL		22 21 23		
	783.80			
	-40			

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

FIGURE 2

BBS, from 137 (Rev. 8-99)

Illinois Department of Transportation
Division of Highways
IDOT

SOIL BORING LOG

Date 4/18/06

ROUTE FAI 39 DESCRIPTION P92-075-05 I-39 @ Bypass 20, Soil Survey, I-39 SB atUS 20 EB LOGGED BY W. Garza

SECTION (201-3) K LOCATION , SEC. , TWP. , RNG.

COUNTY Winnebago DRILLING METHOD Hollow Stem Auger HAMMER TYPE B-53 Diedrich Automatic

STRUCT. NO. E. Abut.
Station EB US 20

BORING NO. B-21
Station 12580+94
Offset 56.00ft Rt CL
Ground Surface Elev. 822.8 ft

Surface Water Elev. ft
Stream Bed Elev. ft

Groundwater Elev.:
First Encounter 800.3 ft ▼
Upon Completion 800.3 ft ▽
After Hrs. ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
VERY STIFF gray SILTY CLAY TILL		6 9 14	3.5 P	12
	780.80			
VERY LOOSE tan fine SAND		1 2 2		
	778.80			
	-45			
MEDIUM tan medium dirty SAND		10 11 14		
	776.30			
Wash VERY DENSE tan weathered LIMESTONE		16 20 80		
	773.80			
End of Boring				
	-50			
	-55			
	-60			

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

FIGURE 2

BBS, from 137 (Rev. 8-99)

Illinois Department of Transportation
Division of Highways
IDOT

SOIL BORING LOG

Date 2/25/16

ROUTE FAI 39 & FAP 301 DESCRIPTION P92-111-06 Proposed I-39 SB Ramp Bridge W. 600' LOGGED BY W. Garza

SECTION (201-3)K & (4-1,5)K LOCATION , SEC. , TWP. , RNG.

COUNTY Winnebago DRILLING METHOD Hollow Stem Auger HAMMER TYPE CME-45

STRUCT. NO.
Station

Latitude 42° 13' 13.97" Northing 2,025,028.9376
Longitude -89° 00' 24.47" Easting 2,610,751.2024

BORING NO. B-3i
Station 144+50
Offset 11.00ft Rt
Ground Surface Elev. 818.40 ft

Surface Water Elev. ft
Stream Bed Elev. ft
Groundwater Elev.:
First Encounter 798.9 ft
Upon Completion 795.4 ft
After Hrs. ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
STIFF brown SILTY CLAY LOAM			1.0 P	20.0
	816.40			
STIFF light brown SILTY CLAY LOAM		4 4 6	1.4 B	24.0
	814.90			
MEDIUM light brown SILTY LOAM	-5	1 3 3	0.6 P	24.0
	812.40			
STIFF light gray SILTY CLAY		2 3 4	1.3 B	30.0
	809.90			
STIFF dark brown SILTY CLAY LOAM	-10	3 3 6	1.3 B	27.0
	807.40			
MEDIUM gray SILTY CLAY		1 2 4	0.8 B	24.0
	804.40			
VERY SOFT tan SANDY LOAM TILL with GRAVEL	-15	1 2 4	0.2 P	13.0
	802.40			
SOFT tan SANDY LOAM TILL with GRAVEL		1 1 10	0.3 P	19.0
	799.90			
STIFF tan SANDY LOAM TILL	-20	4		
STIFF tan SANDY LOAM TILL *(continued)*		9 19	1.5 S	12.0
	797.40			
No Recovery		1 7 12		
	794.90			
STIFF tan SANDY LOAM TILL with CLAY lens	-25	8 17 18	1.0 S	11.0
	791.90			
VERY DENSE tan well-cemented SANDY GRAVEL		17 100/9"		
	789.90			
VERY DENSE tan well-cemented SANDY GRAVEL	-30	100/10"		
	786.90			
HARD gray SANDY LOAM TILL		14 21 24	4.5 P	8.0
	784.90			
VERY STIFF gray SANDY LOAM TILL with SAND lens	-35	6 17 20	2.3 P	8.0
	781.90			
VERY DENSE light gray LIMESTONE Auger Refusal @ 37.5' End of Boring	780.90	100/1"		
	-40			

Northing and Easting were calculated using the ILHP-WF coordinate system

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

Illinois Department of Transportation
Division of Highways
IDOT

SOIL BORING LOG

Date 5/3/16

ROUTE FAI 39 & FAP 301 DESCRIPTION P92-111-06 Proposed I-39 SB Ramp Bridge W. 600' LOGGED BY W. Garza

SECTION (201-3)K & 4-1,5)K LOCATION , SEC. , TWP. , RNG.

COUNTY Winnebago DRILLING METHOD Shelby HAMMER TYPE Shelby

STRUCT. NO.
Station

Latitude
Longitude

Northing
Easting

BORING NO. B3i Shelby
Station 144+50
Offset 11.00ft Rt
Ground Surface Elev. 818.40 ft

Surface Water Elev. ft
Stream Bed Elev. ft

Groundwater Elev.:
First Encounter ft
Upon Completion ft
After Hrs. ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
30" Recovery				
815.90				
17" Recovery				
813.40	-5			
23" Recovery				
810.90				
30" Recovery				
808.40	-10			
24" Recovery				
805.90				
28" Recovery, moist				
803.40	-15			
28" Recovery				
800.90				
Pushed 9", Rec. 9" hit big gravel End of Boring				
798.40	-20			

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

Illinois Department of Transportation
Division of Highways
IDOT

SOIL BORING LOG

Date 3/9/16

ROUTE FAI 39 & FAP 301 DESCRIPTION P92-111-06 Proposed I-39 SB Ramp Bridge W. 600' LOGGED BY W. Garza

SECTION (201-3)K & 4-1,5)K LOCATION , SEC. , TWP. , RNG.

COUNTY Winnebago DRILLING METHOD Hollow Stem Auger HAMMER TYPE CME-45

STRUCT. NO.
Station

Latitude 42° 13' 13.64" Northing 2,024,996.5431
Longitude -89° 00' 23.37" Easting 2,610,834.8154

BORING NO. B-6i
Station 143+75
Offset 43.00ft Lt
Ground Surface Elev. 820.40 ft

Surface Water Elev. ft
Stream Bed Elev. ft

Groundwater Elev.:
First Encounter 798.4 ft ▼
Upon Completion 782.9 ft ▽
After Hrs. ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
MEDIUM brown SILTY CLAY LOAM			0.6 P	15.0
	818.40			
VERY STIFF brown SILTY CLAY LOAM		7 8 9	2.1 P	18.0
	816.90			
STIFF/VERY STIFF light brown SILTY CLAY LOAM	-5	4 6 9	2.0 B	24.0
	814.40			
MEDIUM tan SILTY LOAM		2 3 4	0.9 B	23.0
	811.90			
STIFF light gray SILTY LOAM	-10	3 5 7	1.0 S	22.0
	809.40			
STIFF gray SILTY CLAY LOAM		2 3 4	1.6 B	22.0
	806.90			
MEDIUM light gray SILTY CLAY LOAM	-15	3 4 5	0.8 B	25.0
	803.90			
MEDIUM light gray SILTY CLAY TILL		2 3 4	0.9 B	24.0
	801.90			
	-20	1		

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
MEDIUM tan SANDY LOAM with medium GRAVEL *(continued)*		3 4	0.5 P	12.0
	799.40			
MEDIUM tan SANDY LOAM TILL	▼	4 4 6	0.9 B	15.0
	796.90			
STIFF tan SANDY LOAM TILL	-25	1 5 8	1.2 B	13.0
	793.90			
MEDIUM tan dirty moist SANDY GRAVEL		6 17 10		
	791.40			
VERY STIFF tan SANDY LOAM TILL	-30	5 15 21	3.1 S	9.0
	789.40			
No Recovery		5 8 10		
	786.90			
MEDIUM gray SANDY LOAM TILL	-35	1 4 6	0.9 B	11.0
	784.40			
STIFF gray SANDY LOAM TILL	▽	3 6 8	1.5 B	10.0
	781.40			
	-40	100/4"		

Northing and Easting were calculated using the ILHP-WF coordinate system.

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

Illinois Department of Transportation
Division of Highways
IDOT

SOIL BORING LOG

Date 3/9/16

ROUTE FAI 39 & FAP 301 DESCRIPTION P92-111-06 Proposed I-39 SB Ramp Bridge W. 600' LOGGED BY W. Garza

SECTION (201-3)K & 4-1,5)K LOCATION , SEC. , TWP. , RNG.

COUNTY Winnebago DRILLING METHOD Hollow Stem Auger HAMMER TYPE CME-45

STRUCT. NO.
Station

Latitude 42° 13' 13.64" Northing 2,024,996.5431
Longitude -89° 00' 23.37" Easting 2,610,834.8154

BORING NO. B-6i
Station 143+75
Offset 43.00ft Lt
Ground Surface Elev. 820.40 ft

Surface Water Elev. ft
Stream Bed Elev. ft

Groundwater Elev.:
First Encounter 798.4 ft
Upon Completion 782.9 ft
After Hrs. ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	
VERY DENSE tan weathered LIMESTONE *(continued)* 779.40				
End of Boring				
-45				
-50				
-55				
-60				

Northing and Easting were calculated using the ILHP-WF coordinate system

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

Illinois Department of Transportation

Division of Highways
IDOT

SOIL BORING LOG

Date 2/18/16

ROUTE FAI 39 & FAP 301 DESCRIPTION P92-111-06 Proposed I-39 SB Ramp Bridge, 1 mile east of Alpine Road LOGGED BY W. Garza

SECTION (201-3)K & 4-1,5)K LOCATION , SEC. , TWP. , RNG.

COUNTY Winnebago DRILLING METHOD Hollow Stem Auger HAMMER TYPE CME-45

STRUCT. NO.
Station

Latitude 42° 13' 14.06" Northing 2,025,040.3461
Longitude -89° 00' 21.52" Easting 2,610,973.4715

BORING NO. B-7i
Station 142+35
Offset 37.00ft Lt
Ground Surface Elev. 840.40 ft

Surface Water Elev. ft
Stream Bed Elev. ft

Groundwater Elev.:
First Encounter ft
Upon Completion ft
After Hrs. ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
brown SILTY CLAY LOAM				18.0
	838.40			
VERY STIFF brown SILTY CLAY LOAM		4 6 7	2.5 P	17.0
	836.90			
MEDIUM brown SANDY LOAM with LIMESTONE FILL bottom 6"	-5	7 9 17	0.8 B	15.0
	834.40			
No Recovery		4 6 7		
	831.90			
MEDIUM gray SILTY CLAY LOAM	-10	0 2 6	0.7 P	23.0
	829.40			
VERY STIFF brown SILTY CLAY LOAM		3 9 13	2.1 B	18.0
	826.90			
VERY STIFF brown SILTY CLAY LOAM	-15	2 7 11	2.7 B	17.0
	824.40			
STIFF brown SILTY CLAY LOAM		2 6 9	1.9 B	19.0
	821.90			
MEDIUM gray SILTY CLAY LOAM	-20	3		

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
MEDIUM gray SILTY CLAY LOAM *(continued)*		3 6	0.5 P	21.0
	819.40			
VERY STIFF brown SILTY CLAY LOAM		2 6 8	2.5 B	21.0
	816.90			
VERY STIFF brown SILTY CLAY LOAM	-25	2 6 8	3.3 B	21.0
	814.40			
MEDIUM brown SANDY LOAM		2 4 7	0.9 S	24.0
	811.90			
MEDIUM brown SANDY LOAM	-30	9 10 12	0.7 P	22.0
	809.40			
End of Boring				
	-35			
	-40			

Northing and Easting were calculated using the ILHP-WF coordinate system

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

Illinois Department of Transportation
Division of Highways
IDOT

SOIL BORING LOG

Date 2/23/16

ROUTE FAI 39 & FAP 301 DESCRIPTION P92-111-06 Proposed I-39 SB Ramp Bridge W. 600' LOGGED BY W. Garza

SECTION (201-3)K & 4-1,5)K LOCATION , SEC. , TWP. , RNG.

COUNTY Winnebago DRILLING METHOD Hollow Stem Auger HAMMER TYPE CME-45

STRUCT. NO.
Station

Latitude 42° 13' 13.03" Northing 2,024,932.3037
Longitude -89° 00' 25.96" Easting 2,610,640.6273

BORING NO. B-8i
Station 146+09
Offset 63.00ft Lt
Ground Surface Elev. 822.30 ft

Surface Water Elev. ft
Stream Bed Elev. ft
Groundwater Elev.:
First Encounter 800.8 ft
Upon Completion ft
After Hrs. ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
MEDIUM brown SANDY LOAM			0.5 P	10.0
	820.80			
VERY STIFF gray SANDY LOAM		4 5 8	3.9 P	12.0
	819.30			
VERY STIFF tan SANDY LOAM	-5	4 4 6	2.0 P	14.0
	816.80			
MEDIUM gray SANDY LOAM with SAND lens		3 5 9	1.1 P	15.0
	813.80			
LOOSE gray fine SAND	-10	3 3 5		
	811.30			
MEDIUM tan SILTY LOAM		0 2 3	0.6 B	27.0
	809.30			
SOFT tan SILT	-15	0 1 2	0.3 B	25.0
	806.80			
SOFT tan SILT with fine SAND lens		1 2 6	0.3 P	21.0
	803.80			
MEDIUM tan SANDY GRAVEL	-20	1 8		
MEDIUM tan SANDY GRAVEL *(continued)*	801.80	7		
MEDIUM tan medium SAND		3 11 13		
	799.30			
MEDIUM tan fine SAND	-25	11 11 12		
	796.30			
STIFF tan SANDY LOAM TILL		6 5 4	1.0 B	16.0
	794.30			
SOFT tan SANDY LOAM TILL	-30	1 3 4	0.4 B	14.0
	791.80			
VERY STIFF tan SANDY LOAM TILL		7 10 12	2.5 B	10.0
	789.30			
STIFF tan SANDY LOAM TILL	-35	3 7 9	1.4 B	10.0
	786.80			
STIFF light gray SANDY LOAM TILL		2 6 7	1.6 B	10.0
	784.30			
No Recovery	-40	0 4		

Northing and Easting were calculated using the ILHP-WF coordinate system

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

Illinois Department of Transportation
Division of Highways
IDOT

SOIL BORING LOG

Date 2/23/16

ROUTE FAI 39 & FAP 301 DESCRIPTION P92-111-06 Proposed I-39 SB Ramp Bridge W. 600' LOGGED BY W. Garza

SECTION (201-3)K & 4-1,5)K LOCATION , SEC. , TWP. , RNG.

COUNTY Winnebago DRILLING METHOD Hollow Stem Auger HAMMER TYPE CME-45

STRUCT. NO.
Station

Latitude 42° 13' 13.03" Northing 2,024,932.3037
Longitude -89° 00' 25.96" Easting 2,610,640.6273

BORING NO. B-8i
Station 146+09
Offset 63.00ft Lt
Ground Surface Elev. 822.30 ft

Surface Water Elev. ft
Stream Bed Elev. ft

Groundwater Elev.:
First Encounter 800.8 ft
Upon Completion ft
After Hrs. ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
No Recovery *(continued)*		9		
781.30				
VERY DENSE tan weathered LIMESTONE		100/2"		
Auger Refusal @ 43'				
779.30				
Borehole continued with rock coring.				
	-45			
	-50			
	-55			
	-60			

Northing and Easting were calculated using the ILHP-WF coordinate system

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

Illinois Department of Transportation
Division of Highways
IDOT

ROCK CORE LOG

Date 2/23/16

ROUTE FAI 39 & FAP 301 DESCRIPTION P92-111-06 Proposed I-39 SB Ramp Bridge W. 600' LOGGED BY W. Garza

SECTION (201-3)K & 4-1,5)K LOCATION , SEC. , TWP. , RNG.

COUNTY Winnebago CORING METHOD

CORING BARREL TYPE & SIZE

STRUCT. NO.
Station

Core Diameter 2 in
Top of Rock Elev. 781.30 ft
Begin Core Elev. 779.30 ft

BORING NO. B-8i
Station 146+09
Offset 63.00ft Lt
Ground Surface Elev. 822.30 ft

Latitude 42° 13' 13.03"
Longitude -89° 00' 25.96"
Northing 2,024,932.3037
Easting 2,610,640.6273

		DEPTH (ft)	CORE (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
Dolomite: buff-white, some crystalline surfaces, mostly chalky, fractured, pitted and pocked and fractured. No testable segments.	779.30	-45	1	80	0	5	
	774.30						
Dolomite: as above, though more dense, with banded bedding and not as pitted or fractured.		-50	2	100	65	1.4	313.0
	769.30						
Dolomite: As above.		-55	3	100	35	1.6	249.0
	764.30						
Dolomite: As above.		-60	4	95	43	1.8	301.0
	759.30						

End of Boring

Color pictures of the cores
Cores will be stored for examination until

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

Northing and Easting were calculated using the ILHP-WF coordinate system

Illinois Department of Transportation
Division of Highways
IDOT

SOIL BORING LOG

Date 2/28/16

ROUTE FAI 39 & FAP 301 DESCRIPTION P92-111-06 Proposed I-39 SB Ramp Bridge W. 600' LOGGED BY W. Garza

SECTION (201-3)K & 4-1,5)K LOCATION , SEC. , TWP. , RNG.

COUNTY Winnebago DRILLING METHOD Hollow Stem Auger HAMMER TYPE CME-45

STRUCT. NO.
Station

Latitude 42° 13' 13.90" Northing 2,025,019.6265
Longitude -89° 00' 26.45" Easting 2,610,602.5946

BORING NO. B-9i
Station 146+05
Offset 60.00ft Rt
Ground Surface Elev. 817.30 ft

Surface Water Elev. ft
Stream Bed Elev. ft

Groundwater Elev.:
First Encounter 798.3 ft
Upon Completion ft
After Hrs. ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
		1.5 P	23.0	STIFF brown LOAM
815.80				
	4 5 6	1.5 P	27.0	STIFF brown SILTY CLAY LOAM
814.30				
-5	3 4 7	1.7 B	27.0	STIFF light brown SILTY CLAY LOAM
811.80				
	1 2 5	0.4 P	25.0	SOFT light brown SILTY LOAM
809.30				
-10	1 3 5	1.8 B	23.0	STIFF brown SILTY CLAY LOAM
806.80				
	2 3 6	1.1 B	21.0	STIFF light gray LOAM
803.80				
-15	1 1 2			VERY LOOSE light gray moist dirty SAND with medium GRAVEL
801.30				
	1 2 5	0.4 P	14.0	SOFT tan SANDY LOAM TILL
798.80				
-20	1 2			LOOSE tan SAND
796.80				LOOSE tan SAND *(continued)*
	3			
794.30	1 2 4	0.0 P		VERY SOFT tan dirty SAND & GRAVEL
-25	5 7 9			No Recovery
791.30				
	3 3 8	2.1 B	12.0	VERY STIFF tan SANDY LOAM TILL
789.30				
-30	11 13 20	1.8 P	12.0	STIFF gray SANDY LOAM TILL
786.30				
	7 100/5"			VERY DENSE tan weathered LIMESTONE
784.30				
-35	100/3"			VERY DENSE tan weathered LIMESTONE Auger Refusal @ 35.5'
781.80				
-40				Borehole continued with rock coring.

Northing and Easting were calculated using the ILHP-WF coordinate system

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

Illinois Department of Transportation

Division of Highways
IDOT

ROCK CORE LOG

Date 2/28/16

ROUTE FAI 39 & FAP 301 DESCRIPTION P92-111-06 Proposed I-39 SB Ramp Bridge W. 600' LOGGED BY W. Garza

SECTION (201-3)K & 4-1,5)K LOCATION , SEC. , TWP. , RNG.

COUNTY Winnebago CORING METHOD

CORING BARREL TYPE & SIZE

STRUCT. NO.
Station

Core Diameter 2 in
Top of Rock Elev. 786.30 ft
Begin Core Elev. 781.80 ft

BORING NO. B-9i
Station 146+05
Offset 60.00ft Rt
Ground Surface Elev. 817.30 ft

Latitude 42° 13' 13.90"
Longitude -89° 00' 26.45"
Northing 2,025,019.6265
Easting 2,610,602.5946

		DEPTH (ft)	CORE (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
Dolomite: buff-white, fractured in 1/2" to 3" segments, chalky, crumbly, pitted and pocked, iron stains on fracture faces. No testable segments.	781.80		1	100	0	1.4	
		-40					
Dolomite: as above, laminated and slightly less fractured.	776.80		2	100	11	1.2	159.0
		-45					
Dolomite: as above, though thick bedded, dense and tenacious.	771.80		3	100	49	1	184.0
		-50					
Dolomite: as above, with a well detectable fracture zone visible from 765.0 to 764.3.	766.80		4	100	19	1.2	335.0
		-55					
End of Boring	761.80						

Color pictures of the cores
Cores will be stored for examination until

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

Northing and Easting were calculated using the ILHP-WF coordinate system

Illinois Department of Transportation
Division of Highways
IDOT

SOIL BORING LOG

Date 3/18/16

ROUTE FAI 39 & FAP 301 DESCRIPTION P92-111-06 Proposed I-39 SB Ramp Bridge W. 600' LOGGED BY W. Garza

SECTION (201-3)K & 4-1,5)K LOCATION , SEC. , TWP. , RNG.

COUNTY Winnebago DRILLING METHOD Hollow Stem Auger HAMMER TYPE CME-45

STRUCT. NO.
Station

Latitude
Longitude

Northing
Easting

BORING NO. B-10i
Station 148+08
Offset 0.00ft BL
Ground Surface Elev. 822.80 ft

Surface Water Elev. ft
Stream Bed Elev. ft

Groundwater Elev.:
First Encounter ft
Upon Completion ft
After Hrs. ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
STIFF gray LOAM				
			1.3 P	14.0
	820.30			
VERY STIFF light brown SANDY CLAY LOAM with medium GRAVEL		6 5 8	3.6 P	13.0
	818.80			
	-5			
STIFF light brown SANDY CLAY LOAM with SAND lens		6 8 8	1.6 P	15.0
	816.30			
VERY STIFF tan SANDY LOAM		5 5 5	2.6 P	8.0
	813.80			
	-10			
STIFF gray LOAM with SAND lens		2 6 6	1.6 B	16.0
	811.30			
	808.80			
	-15			
VERY STIFF light gray CLAY LOAM		3 4 8	2.1 S	23.0
	804.80			
			S	
	-20			

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
MEDIUM tan dirty SAND				
		1 9 13		
	799.80			
	-25			
MEDIUM tan SANDY LOAM TILL		6 5 4	0.6 B	12.0
	794.80			
	-30			
VERY DENSE tan weathered LIMESTONE		11 46 34		
	790.80			
VERY STIFF gray SANDY LOAM TILL		6 9 12	2.5 B	8.0
	788.80			
	-35			
No Recovery (till)		10 11 19		
	786.30			
	-40			

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

Illinois Department of Transportation
Division of Highways
IDOT

SOIL BORING LOG

Date 3/18/16

ROUTE FAI 39 & FAP 301 DESCRIPTION P92-111-06 Proposed I-39 SB Ramp Bridge W. 600' LOGGED BY W. Garza

SECTION (201-3)K & 4-1,5)K LOCATION , SEC. , TWP. , RNG.

COUNTY Winnebago DRILLING METHOD Hollow Stem Auger HAMMER TYPE CME-45

STRUCT. NO. _____ Latitude _____ Northing _____
Station _____ Longitude _____ Easting _____

BORING NO. B-10i
Station 148+08
Offset 0.00ft BL
Ground Surface Elev. 822.80 ft

Surface Water Elev. _____ ft
Stream Bed Elev. _____ ft

Groundwater Elev.:
First Encounter _____ ft
Upon Completion _____ ft
After _____ Hrs. _____ ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
STIFF tan SANDY LOAM TILL with SAND lens		9 9 16	1.5 B	12.0
780.30				
	-45			
DENSE light gray SANDY GRAVEL		13 16 20		
		100/1"		
772.30	-50			
Borehole continued with rock coring.				
	-55			
	-60			

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

Illinois Department of Transportation
Division of Highways
IDOT

ROCK CORE LOG

Date 3/18/16

ROUTE FAI 39 & FAP 301 DESCRIPTION P92-111-06 Proposed I-39 SB Ramp Bridge W. 600' LOGGED BY W. Garza

SECTION (201-3)K & 4-1,5)K LOCATION , SEC. , TWP. , RNG.

COUNTY Winnebago CORING METHOD

CORING BARREL TYPE & SIZE

STRUCT. NO.
Station

Core Diameter 2 in
Top of Rock Elev. 772.80 ft
Begin Core Elev. 772.30 ft

BORING NO. B-10i
Station 148+08
Offset 0.00ft BL
Ground Surface Elev. 822.80 ft

Latitude
Longitude
Northing
Easting

	DEPTH (ft)	CORE (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
Dolomite: buff-white, micritic, fractured, pitted and pocked with minor laminations. No testable segments.	772.30	1	100	0	1.6	
	-55					
	767.30					
Dolomite: as above, though less fractured and more tenacious throughout.		2	100	35	1.8	307.0
	-60					
	762.30					
Dolomite: as above.		3	100	40	2	442.0
	-65					
	757.30					
Dolomite: as above, though less pocked.		4	100	61	1.6	532.0
	-70					
	752.30					

End of Boring

Color pictures of the cores
Cores will be stored for examination until

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

Illinois Department of Transportation
Division of Highways
IDOT

SOIL BORING LOG

Date 4/25/16

ROUTE FAI 39 & FAP 301 DESCRIPTION P92-111-06 Proposed I-39 SB Bridge, S. 200' of US 20 Bypass LOGGED BY W. Garza

SECTION (201-3)K & 4-1,5)K LOCATION , SEC. , TWP. , RNG.

COUNTY Winnebago DRILLING METHOD Hollow Stem Auger HAMMER TYPE CME-45

STRUCT. NO.
Station

Latitude
Longitude

Northing
Easting

BORING NO. B-11i
Station 150+25
Offset 42.00ft Lt
Ground Surface Elev. 811.70 ft

Surface Water Elev. ft
Stream Bed Elev. ft

Groundwater Elev.:
First Encounter 802.2 ft
Upon Completion Wash ft
After ____ Hrs. ft

		DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
MEDIUM brown SILTY CLAY LOAM	809.70			0.5 P	23.0
MEDIUM light brown SILTY CLAY LOAM	808.20		2 3 5	0.7 P	24.0
VERY SOFT tan SILTY LOAM	805.20	-5	0 1 3	0.2 B	21.0
MEDIUM tan clean moist medium SAND	802.70		5 7 6		
VERY SOFT tan SANDY LOAM	800.20	-10	0 1 3	0.2 P	12.0
MEDIUM tan clean medium SAND	798.20		1 3 9		
MEDIUM tan SANDY GRAVEL	795.70	-15	10 12 14		
MEDIUM tan clean medium coarse SAND	793.20		5 9 11		
		-20	12		
Wash			21		
VERY DENSE tan weathered LIMESTONE *(continued)*	790.70		35		
VERY DENSE tan weathered LIMESTONE	789.20		100/2"		
Auger Refusal @ 22.5'					
End of Boring		-25			
		-30			
		-35			
		-40			

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

BBS, from 137 (Rev. 8-99)

Illinois Department of Transportation
Division of Highways
IDOT

SOIL BORING LOG

Date 4/26/16

ROUTE FAI 39 & FAP 301 DESCRIPTION P92-111-06 Proposed I-39 SB Bridge, S. 200' of US 20 Bypass LOGGED BY W. Garza

SECTION (201-3)K & 4-1,5)K LOCATION , SEC. , TWP. , RNG.

COUNTY Winnebago DRILLING METHOD Hollow Stem Auger HAMMER TYPE CME-45

STRUCT. NO.
Station

Latitude
Longitude

Northing
Easting

BORING NO. B-12i
Station 149+50
Offset 42.00ft Lt
Ground Surface Elev. 812.30 ft

Surface Water Elev. ft
Stream Bed Elev. ft

Groundwater Elev.:
First Encounter 800.3 ft
Upon Completion 797.3 ft
After Hrs. ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
810.30				
VERY STIFF light brown SILTY LOAM		3 5 8	2.3 P	18.0
808.80				
VERY STIFF gray SANDY LOAM with GRAVEL	-5	4 6 8	3.1 P	18.0
806.30				
VERY SOFT gray SILTY LOAM		2 2 4	0.2 B	30.0
803.80				
SOFT gray SILTY LOAM	-10	1 2 4	0.3 P	29.0
800.80				
LOOSE gray fine SAND		1 3 3		
798.80				
VERY LOOSE tan very fine SAND	-15	0 1 2		
796.30				
LOOSE tan dirty SANDY GRAVEL with LIMESTONE fragments		6 2 3		
793.80				
VERY SOFT tan SANDY LOAM	-20	0		

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
VERY SOFT tan SANDY LOAM		1	0.2	16.0
(continued)		2	P	
791.30				
LOOSE tan dirty SAND with LIMESTONE		1 1 7		
788.30				
VERY STIFF tan SANDY LOAM	-25	8 8 15	3.5 S	9.0
785.80				
VERY DENSE tan weathered LIMESTONE Auger Refusal @ 28.5'		100/7"		
783.80				
End of Boring	-30			
	-35			
	-40			

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

Illinois Department of Transportation
Division of Highways
IDOT

SOIL BORING LOG

Date 5/5/16

ROUTE FAI 39 & FAP 301 DESCRIPTION P92-111-06 Proposed I-39 SB Bridge, S. 200' of US 20 Bypass LOGGED BY W. Garza

SECTION (201-3)K & 4-1,5)K LOCATION , SEC. , TWP. , RNG.

COUNTY Winnebago DRILLING METHOD Shelby HAMMER TYPE Shelby

STRUCT. NO.
Station

Latitude
Longitude

Northing
Easting

BORING NO. B-12i Shelby
Station 149+50
Offset 42.00ft Lt
Ground Surface Elev. 812.30 ft

Surface Water Elev. ft
Stream Bed Elev. ft

Groundwater Elev.:
First Encounter ft
Upon Completion ft
After Hrs. ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
22" Recovery 809.80				
21" Recovery 807.30	-5			
20" Recovery 804.80				
27" Recovery 802.30	-10			
30" Recovery 799.80				
22" Recovery 797.30	-15			
15" Wash End of Boring 794.80				
End of Boring	-20			

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

Illinois Department of Transportation
Division of Highways
IDOT

SOIL BORING LOG

Date 4/27/16

ROUTE FAI 39 & FAP 301 DESCRIPTION P92-111-06 Proposed I-39 SB Bridge, S. 200' of US 20 Bypass LOGGED BY W. Garza

SECTION (201-3)K & 4-1,5)K LOCATION , SEC. , TWP. , RNG.

COUNTY Winnebago DRILLING METHOD Hollow Stem Auger HAMMER TYPE CME-45

STRUCT. NO.
Station

Latitude
Longitude

Northing
Easting

BORING NO. B-15i
Station 150+24
Offset 7.00ft Rt
Ground Surface Elev. 811.70 ft

Surface Water Elev. ft
Stream Bed Elev. ft

Groundwater Elev.:
First Encounter 802.2 ft ▼
Upon Completion 792.2 ft ▽
After ____ Hrs. ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
809.70				
STIFF brown LOAM		3 4 4	1.8 P	14.0
808.20				
VERY SOFT light brown SANDY LOAM	-5	2 2 2	0.2 P	20.0
805.70				
STIFF light gray SILT		0 3 6	1.0 B	22.0
802.70				
▼ MEDIUM gray medium SAND	-10	3 6 6		
800.20				
MEDIUM tan SANDY LOAM		3 5 4	0.8 B	10.0
798.20				
VERY SOFT tan SANDY LOAM with SAND lens	-15	0 2 2	0.2 P	13.0
795.20				
HARD tan SANDY LOAM TILL		5 12 17	4.0 P	9.0
793.20				
▽ No Recovery (SANDY LOAM TILL)	-20	17		
No Recovery (SANDY LOAM TILL) *(continued)*		17 27		
790.20				
VERY DENSE tan weathered LIMESTONE		100/1"		
789.20				
Auger Refusal @ 22.5'				
End of Boring				

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
	-25			
	-30			
	-35			
	-40			

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

Illinois Department of Transportation
Division of Highways
IDOT

SOIL BORING LOG

Date 3/10/16

ROUTE FAI 39 & FAP 301 DESCRIPTION P92-111-06 Proposed I-39 SB Bridge, S. 200' of US 20 Bypass LOGGED BY W. Garza

SECTION (201-3)K & 4-1,5)K LOCATION , SEC. , TWP. , RNG.

COUNTY Winnebago DRILLING METHOD Hollow Stem Auger HAMMER TYPE CME-45

STRUCT. NO.
Station

Latitude 42° 13' 11.24" Northing 2,024,744.8095
Longitude -89° 00' 31.49" Easting 2,610,227.3124

BORING NO. B-16i
Station 151+00
Offset 12.00ft Lt
Ground Surface Elev. 822.00 ft

Surface Water Elev. ft
Stream Bed Elev. ft

Groundwater Elev.:
First Encounter 805.0 ft ▼
Upon Completion 803.0 ft ▽
After ____ Hrs. ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
		0.2 P	19.0	VERY SOFT brown LOAM
820.00				
	6 7 8	2.3 B	17.0	VERY STIFF light brown LOAM with SAND lens
818.50				
-5	3 6 8	1.8 B	16.0	STIFF tan SILTY LOAM/LOAM with medium GRAVEL
816.00				
	6 10 15	3.9 S	15.0	VERY STIFF gray LOAM
813.50				
-10	3 7 10	2.2 S	25.0	VERY STIFF tan/gray SILTY CLAY
811.00				
	3 5 8	2.1 B	23.0	VERY STIFF tan SILTY CLAY
808.50				
-15	2 6 8	0.8 B	16.0	MEDIUM tan SANDY LOAM with SAND lens
806.00				
▼	0 1 4	0.4 P	14.0	SOFT tan SANDY LOAM
803.00 ▽				
-20	6			

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
	16 24			DENSE light gray SAND with medium GRAVEL *(continued)*
801.00				End of Boring
-25				
-30				
-35				
-40				

Northing and Easting were calculated using the ILHP-WF coordinate system

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

SUMMARY OF LABORATORY TEST RESULTS

Project: Ramp BD North, Ramp BD South, Perryville, Mulford
Client: WBK
Wang Job: 412-04-10

Prepared by: C. Iordache
Checked by: L. Iordache
Date: 8/1/2016

SAMPLE IDENTIFICATION				LABORATORY TESTS AND SOIL CLASSIFICATION													
				Water Content AASHTO T265	**Atterberg Limits** AASHTO T89 & T90			**Visual Soil Classification** IDOT 1999	**Unconfined Compressive Strength** AASHTO T208	**One-Dimensional Consolidation** AASHTO T216			**UU Triaxial Compression** AASHTO T296				
Site	**Boring**	**Sample**	**Top Depth**														
				w	LL	PL	PI	IDH	q_u	Cc	Cs	OCR	σ_1	S_u	σ_1	S_u	σ_1	S_u
			ft	%	%	%	%		tsf				psi	tsf	psi	tsf	psi	tsf
Ramp BD North	B-3i	ST 1a	0.0	24				SILTY CLAY										
Ramp BD North	B-3i	ST 1b	1.0		44	19	25	SILTY CLAY	0.94	0.164	0.030	9.89						
Ramp BD North	B-3i	ST 2	2.5	26	39	19	20	SILTY CLAY					NA	NA	7.50	0.76	12.50	1.09
Ramp BD North	B-3i	ST 3a	5.0					SILTY CLAY										
Ramp BD North	B-3i	ST 3b	6.5	22				CLAY LOAM	0.98									
Ramp BD North	B-3i	ST 4a	7.5	24	35	18	17	SILTY CLAY		0.111	0.018	6.88						
Ramp BD North	B-3i	ST 4b	8.5					SILTY CLAY	3.49									
Ramp BD North	B-3i	ST 5a	10.0	23				CLAY LOAM	1.13									
Ramp BD North	B-3i	ST 5b	11.0					SILTY CLAY										
Ramp BD North	B-3i	ST 6a	12.5	23				SILTY CLAY	1.16									
Ramp BD North	B-3i	ST 6b	13.5					SILTY CLAY										
Ramp BD North	B-3i	ST 7a	15.0	24				SILTY CLAY	0.58									
Ramp BD North	B-3i	ST 7b	16.5					SILTY CLAY LOAM										
Mulford	B-4g	ST-1a	0.0					SILTY CLAY LOAM										
Mulford	B-4g	ST-1b	1.0	21				SILTY CLAY	3.54									

SUMMARY OF LABORATORY TEST RESULTS

Project: Ramp BD North, Ramp BD South, Perryville, Mulford
Client: WBK
Wang Job: 412-04-10

Prepared by: C. Iordache
Checked by: L. Iordache
Date: 8/1/2016

SAMPLE IDENTIFICATION				LABORATORY TESTS AND SOIL CLASSIFICATION														
				Water Content	**Atterberg Limits**			**Visual Soil Classification**	**Unconfined Compressive Strength**	**One-Dimensional Consolidation**					**UU Triaxial Compression**			
				AASHTO	AASHTO			IDOT	AASHTO	AASHTO					AASHTO			
				T265	T89 & T90			1999	T208	T216					T296			
Site	**Boring**	**Sample**	**Top Depth**	w	LL	PL	PI	IDH	q_u	Cc	Cs	OCR	σ_1	S_u	σ_1	S_u	σ_1	S_u
			ft	%	%	%	%		tsf				psi	tsf	psi	tsf	psi	tsf
Perryville	B-6e	ST-3b	5.0					SILTY CLAY										
Perryville	B-6e	ST-4a	7.5	27	38	19	19	SILTY CLAY LOAM	0.71									
Perryville	B-6e	ST-4b	8.5					SILTY CLAY										
Perryville	B-6e	ST-5a	10.0	27				SILTY CLAY	1.25									
Perryville	B-6e	ST-5b	11.0					SILTY CLAY										
Perryville	B-6e	ST-6a	12.5	26				SILTY CLAY	0.68									
Perryville	B-6e	ST-6b	13.5					SAND										
Ramp BD South	B-12i	ST-1a	0.0					SILTY CLAY										
Ramp BD South	B-12i	ST-1b	1.0	14				SILTY LOAM	3.5									
Ramp BD South	B-12i	ST-2a	2.5	17	42	20	22	SILTY CLAY LOAM		0.113	0.020	5.76						
Ramp BD South	B-12i	ST-2b	3.5					SILTY CLAY LOAM	1.73									
Ramp BD South	B-12i	ST-3a	5.0					SILTY LOAM										
Ramp BD South	B-12i	ST-3b	6.0	19				SILTY CLAY	1.56									
Ramp BD South	B-12i	ST-4	7.5					SILTY CLAY/SANDY LOAM					3.50	0.31	7.50	0.40	12.50	0.29
Ramp BD South	B-12i	ST-5a	10.0	27				SILTY CLAY	0.46									

SUMMARY OF LABORATORY TEST RESULTS

Project: Ramp BD North, Ramp BD South, Perryville, Mulford
Client: WBK
Wang Job: 412-04-10

Prepared by: C. Iordache
Checked by: L. Iordache
Date: 8/1/2016

SAMPLE IDENTIFICATION				LABORATORY TESTS AND SOIL CLASSIFICATION														
				Water Content	**Atterberg Limits**			**Visual Soil Classification**	**Unconfined Compressive Strength**	**One-Dimensional Consolidation**					**UU Triaxial Compression**			
				AASHTO	AASHTO			IDOT	AASHTO	AASHTO					AASHTO			
				T265	T89 & T90			1999	T208	T216					T296			
Site	**Boring**	**Sample**	**Top Depth**	w	LL	PL	PI	IDH	q_u	Cc	Cs	OCR	σ_1	S_u	σ_1	S_u	σ_1	S_u
			ft	%	%	%	%		tsf				psi	tsf	psi	tsf	psi	tsf
Ramp BD South	B-12i	ST-5b	11.0					SILTY CLAY LOAM										
Ramp BD South	B-12i	ST-6a	12.5	25				SILTY CLAY LOAM	0.61									
Ramp BD South	B-12i	ST-6b	13.5					SAND										

Wang Engineering

1145 North Main Street
Lombard, Illinois 60148
Phone (630) 953-9928
www.wangeng.com

UNCONFINED COMPRESSIVE STRENGTH of COHESIVE SOIL

(AASHTO T 208 / ASTM D 2166)

Project: SN 101-0215 Ramp BD North
Client: Wills, Burke, Kelsey Associates
WEI Job No.: 412-04-10
Soil Sample ID: B-3i, ST #4b, 8.5 to 10.0 feet
Type/Condition: ST/ Undisturbed
Liquid Limit (%): NA
Plastic Limit (%): NA

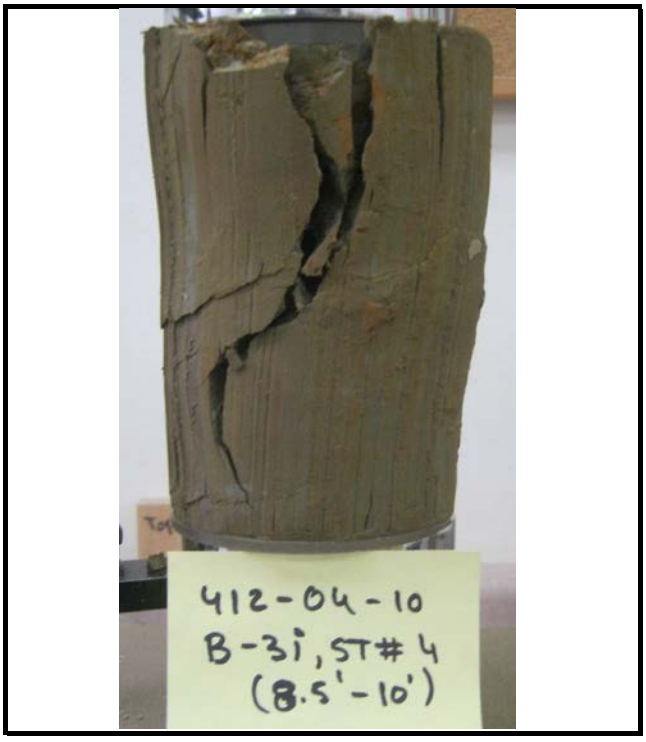
Analyst name: A. Mohammed
Date received: 6/3/2016
Test date: 7/7/2016
Sample description: Brown SILTY CLAY

Sand(%): NA
Silt(%): NA
Clay(%): NA

Average initial height h_0 =	5.93	in
Average initial diameter d_0 =	2.86	in
Height to diameter ratio=	2.07	
Mass of wet sample =	1260.07	g
Mass of dry sample and tare =	1029.58	g
Mass of tare =	13.79	g
Specific gravity =	2.75	(estimated)

Initial water content w =	24.05%	(specimen)
Initial unit weight g =	126.41	pcf
Initial dry unit weight g_d =	101.90	pcf
Initial void ratio e_0 =	0.68	
Initial degree of saturation S_r =	97%	
Average Rate of Strain=	1%/min	
Unconfined compressive strength q_u =	3.49	tsf
Shear Strength=	1.74	tsf

Displacement (in) Δh	Force (lbs) F	Strain (%) e	Stress (tsf) s
0.00	0.00	0.00	0.00
0.03	39.41	0.51	0.44
0.06	74.66	1.01	0.83
0.09	103.70	1.52	1.15
0.12	134.81	2.03	1.48
0.15	161.77	2.53	1.77
0.18	186.66	3.04	2.03
0.21	209.47	3.54	2.27
0.24	230.21	4.05	2.48
0.27	248.88	4.56	2.67
0.30	261.32	5.06	2.79
0.35	288.29	5.91	3.05
0.40	309.03	6.75	3.24
0.45	321.47	7.59	3.34
0.50	331.84	8.44	3.41
0.55	342.21	9.28	3.49
0.60	342.21	10.13	3.45
0.65	342.21	10.97	3.42
0.70	331.84	11.81	3.29
0.80	302.80	13.50	2.94
0.90	180.44	15.19	1.72
1.00	93.33	16.88	0.87

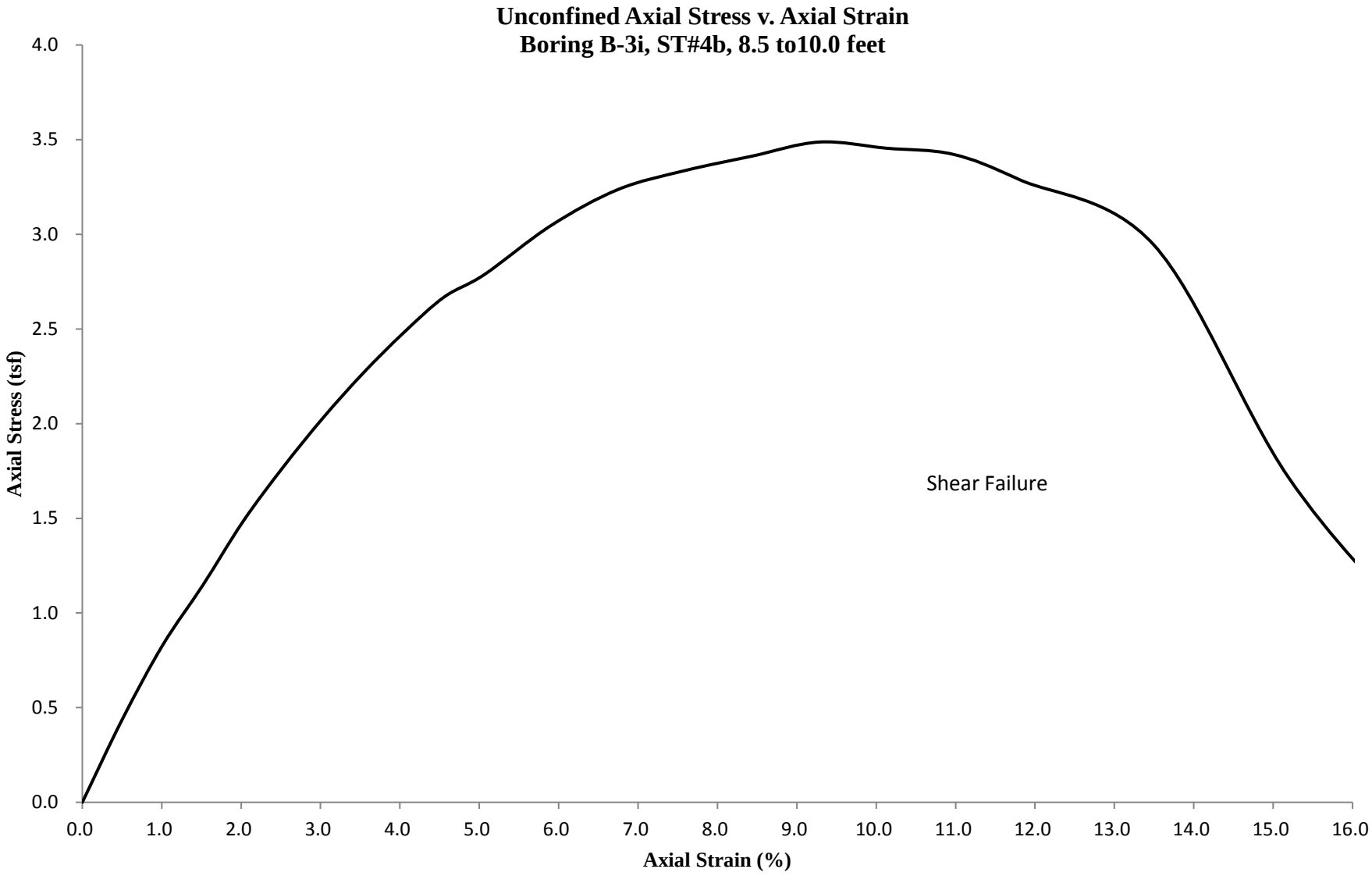


NOTES:

Prepared by: _____ Date: _____

Checked by: _____ Date: _____

1145 North Main Street
Lombard, Illinois 60148
Phone (630) 953-9928
www.wangeng.com



Wang Engineering

1145 North Main Street
Lombard, Illinois 60148
Phone (630) 953-9928
www.wangeng.com

ONE-DIMENSIONAL CONSOLIDATION TEST

AASHTO T 216 / ASTM D 2435

Project: SN 101-0215, Ramp BD North Abutment
Client: Wills, Burke, Kelsey & Associates
Soil Sample ID: Boring B-3i, ST#4a, 7.5 to 8.5 feet
Sample Description: Brown SILTY CLAY

Tested by: M. Snider
Prepared by: M. Snider
Test date: 7/5/2016
WEI: 412-04-10

Initial sample height =	1.006	in	Ring diameter =	2.495	in
Initial sample mass =	161.72	g	Ring mass =	109.57	g
Initial water content =	24.60%		Initial sample and ring mass =	271.29	g
Initial dry unit weight =	100.55	pcf	Tare mass =	84.94	g
Initial void ratio =	0.688		Final ring and sample mass =	269.28	g
Initial degree of saturation =	97.25%		Mass of wet sample and tare =	244.12	g
			Mass of dry sample and tare =	214.73	g
Final sample mass =	159.18	g	Initial dial reading =	0.01000	in
Final dry sample mass =	129.79	g	Final dial reading =	0.06789	in
Final water content =	22.64%		LL=	35	%
Final dry unit weight =	106.69	pcf	PL=	18	%
Final void ratio =	0.591		% Sand=	n.a.	%
Final degree of saturation =	100.00%		% Silt=	n.a.	%
Estimated specific gravity =	2.72		% Clay=	n.a.	%
			In-Situ Vertical Effective Stress =	600	psf

Compression and Swelling Indices

Compression index C_c =	0.106	**Preconsolidation pressure,s_C**	
Field corrected C_c =	0.111	Casagrande Method =	4127 psf
Swelling index C_s =	0.018	**Over-Consolidation Ratio (OCR) =**	6.88

Load number	Vertical stress	Dial reading	System deflection	Vertical strain	Void ratio	C_v	Cae	Elapsed time
	psf	in	in	%		ft^2/day	%	min
1	100.0	0.00991	0.00010	0.00	0.688	N/A	N/A	480
2	200.0	0.01172	0.00023	0.19	0.685	0.2469	0.07	960
3	500.0	0.01733	0.00058	0.79	0.675	0.2666	0.05	480
4	1000.0	0.02230	0.00090	1.31	0.666	0.2621	0.10	922
5	2000.0	0.02898	0.00135	2.02	0.654	0.2198	0.10	480
6	4000.0	0.03642	0.00193	2.82	0.640	0.1914	0.09	960
7	8000.0	0.04537	0.00253	3.77	0.624	0.1880	0.11	960
8	16000.0	0.06340	0.00324	5.63	0.593	0.1448	0.11	488
9	32000.0	0.08148	0.00413	7.51	0.561	0.1687	0.25	480
10	8000.0	0.08032	0.00295	7.28	0.565	N/A	N/A	480
11	2000.0	0.07459	0.00198	6.62	0.576	N/A	N/A	960
11	500.0	0.06880	0.00123	5.97	0.587	N/A	N/A	1200

Prepared by: _____ Date: _____

Checked by: _____ Date: _____

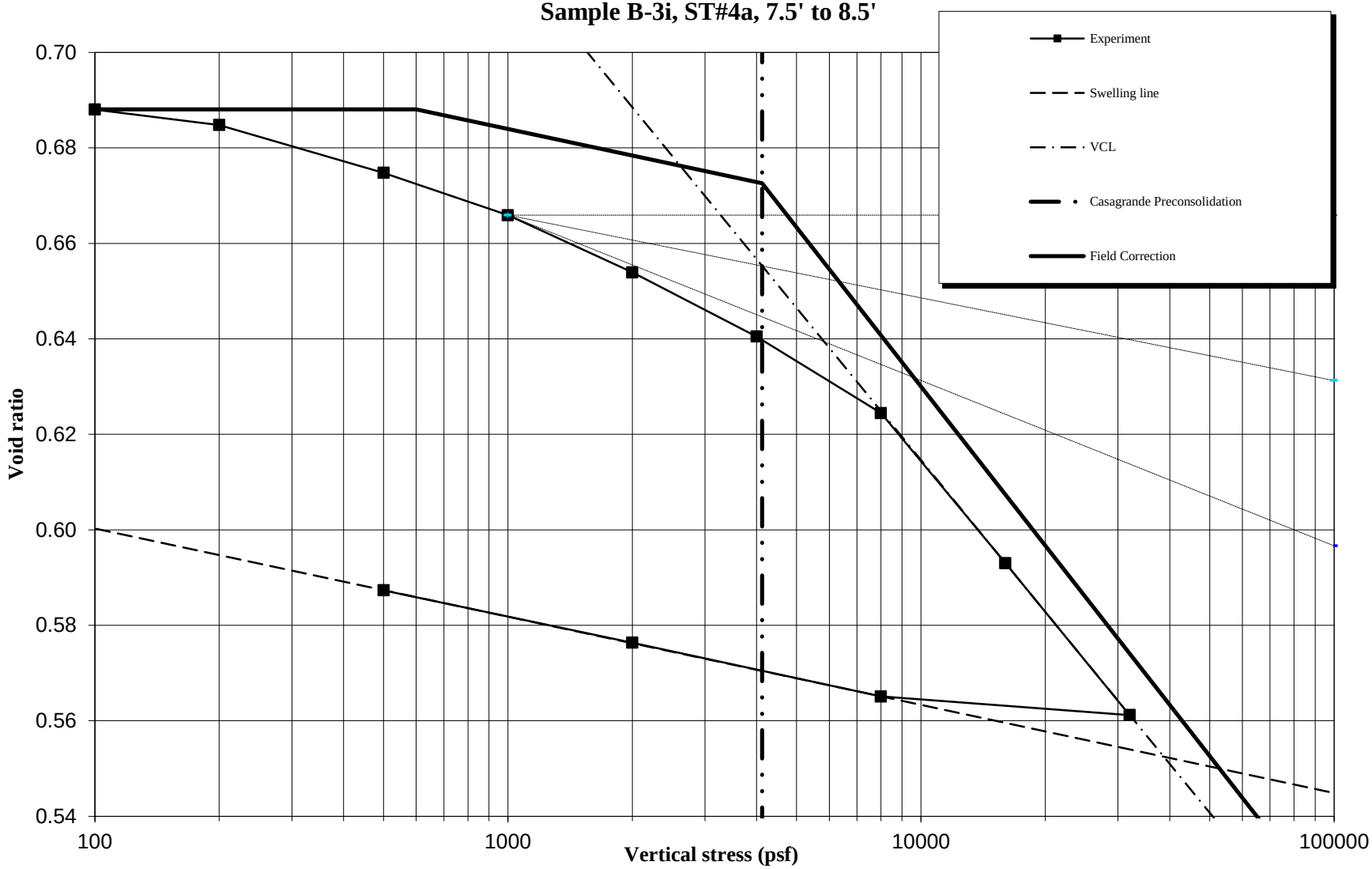
AASHTO R18

Wang Engineering

1145 North Main Street
Lombard, Illinois 60148
Phone (630) 953-9928
www.wangeng.com

CONSOLIDATION CURVE

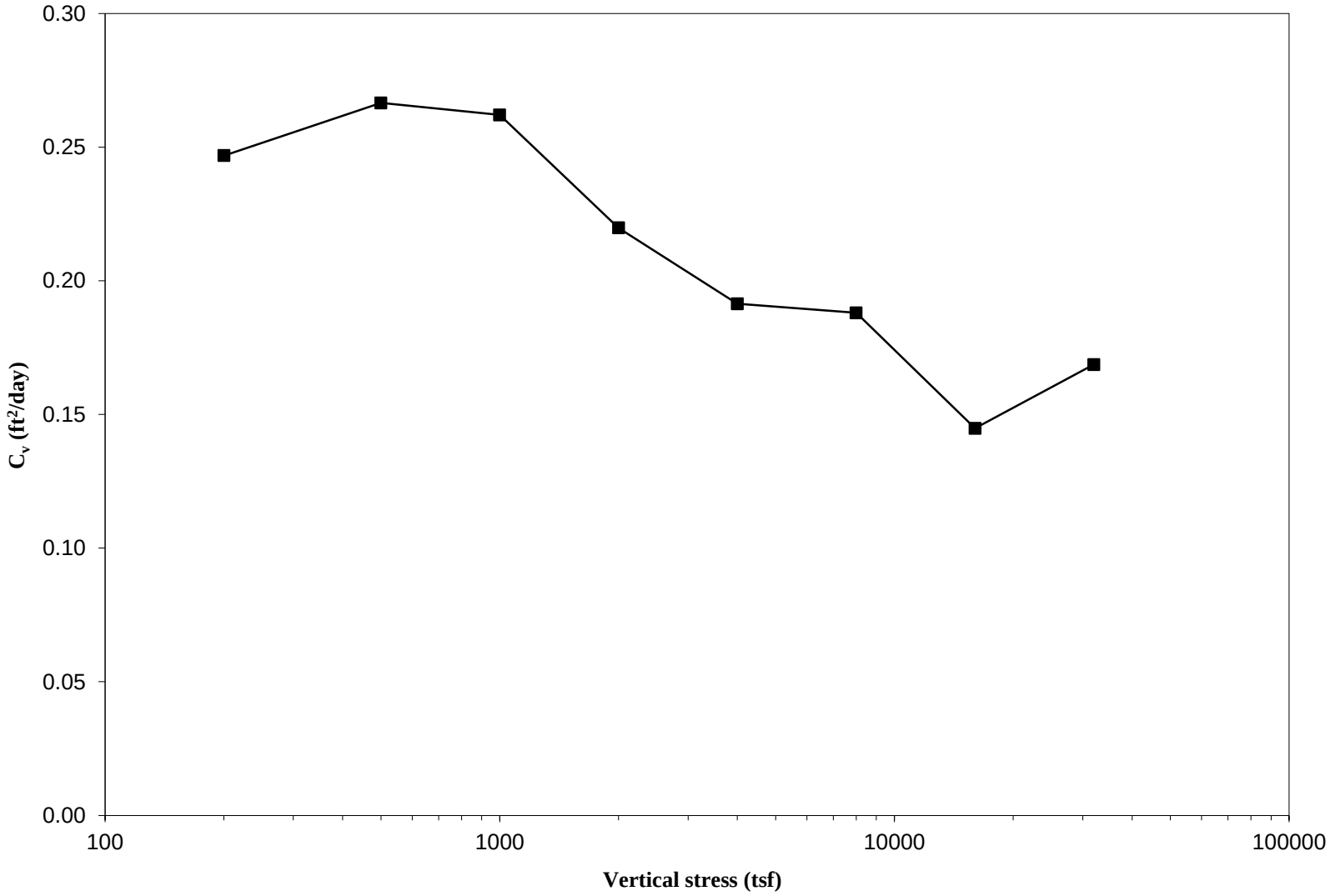
Sample B-3i, ST#4a, 7.5' to 8.5'



Wang Engineering
1145 North Main Street
Lombard, Illinois 60148
Phone (630) 953-9928
www.wangeng.com

CONSOLIDATION COEFFICIENT (C_v) vs. VERTICAL STRESS

Sample B-3i, ST#4a, 7.5' to 8.5'



AASHTO R18

Wang Engineering

1145 North Main Street
Lombard, Illinois 60148
Phone (630) 953-9928
www.wangeng.com

UNCONFINED COMPRESSIVE STRENGTH of COHESIVE SOIL

(AASHTO T 208 / ASTM D 2166)

Project: SN 101-0125: Ramp BD South
Client: Wills, Burke Kelsey Associates
WEI Job No.: 412-04-10
Soil Sample ID: B-12i, ST # 2b, 3.5 to 5.0 feet
Type/Condition: ST/ Undisturbed
Liquid Limit (%): NA
Plastic Limit (%): NA

Analyst name: A. Mohammed
Date received: 6/3/2016
Test date: 7/7/2016
Sample description: Brown SILTY CLAY LOAM

Sand(%): NA
Silt(%): NA
Clay(%): NA

Average initial height h_0 =	6.13	in
Average initial diameter d_0 =	2.80	in
Height to diameter ratio=	2.19	
Mass of wet sample =	1262.63	g
Mass of dry sample and tare =	1080.63	g
Mass of tare =	14.22	g
Specific gravity =	2.70	(estimated)

Initial water content w =	18.40%	(specimen)
Initial unit weight g =	127.08	pcf
Initial dry unit weight g_d =	107.33	pcf
Initial void ratio e_0 =	0.57	
Initial degree of saturation S_r =	87%	
Average Rate of Strain=	1%/min	
Unconfined compressive strength q_u =	1.73	tsf
Shear Strength=	0.87	tsf

Displacement (in) Δh	Force (lbs) F	Strain (%) e	Stress (tsf) s
0.00	0.00	0.00	0.00
0.03	24.89	0.49	0.29
0.06	35.26	0.98	0.41
0.09	45.63	1.47	0.52
0.12	51.85	1.96	0.59
0.15	62.22	2.45	0.71
0.18	70.52	2.93	0.80
0.21	74.66	3.42	0.84
0.24	78.81	3.91	0.88
0.27	84.00	4.40	0.94
0.30	89.18	4.89	0.99
0.35	99.55	5.71	1.09
0.40	109.92	6.52	1.20
0.45	116.14	7.34	1.26
0.50	126.51	8.15	1.36
0.55	136.88	8.97	1.45
0.60	145.18	9.78	1.53
0.65	145.18	10.60	1.51
0.70	153.48	11.41	1.59
0.80	160.74	13.04	1.63
0.90	174.22	14.67	1.73
1.00	176.29	16.31	1.72

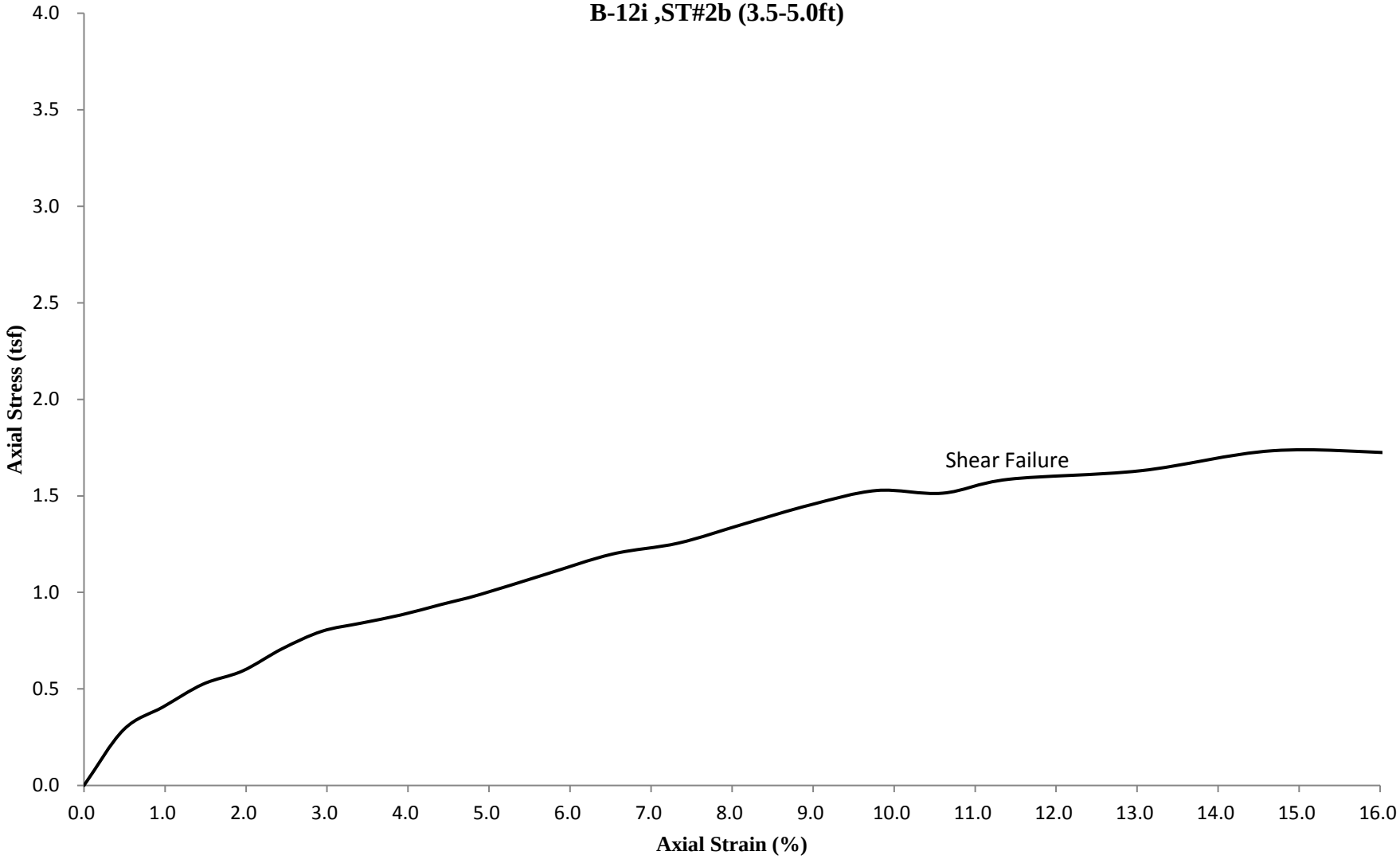
NOTES:

Prepared by: _____ Date: _____

Checked by: _____ Date: _____

1145 North Main Street
Lombard, Illinois 60148
Phone (630) 953-9928
www.wangeng.com

Unconfined Axial Stress v. Axial Strain
B-12i ,ST#2b (3.5-5.0ft)



Wang Engineering

1145 North Main Street
Lombard, Illinois 60148
Phone (630) 953-9928
www.wangeng.com

ONE-DIMENSIONAL CONSOLIDATION TEST

AASHTO T 216 / ASTM D 2435

Project: SN 101-0215, Ramp BD South Abutment
Client: Wills, Burke, Kelsey & Associates
Soil Sample ID: Boring B-12i, ST#2a, 2.5 to 3.5 feet
Sample Description: Brown SILTY CLAY LOAM

Tested by: M. Snider
Prepared by: M. Snider
Test date: 7/5/2016
WEI: 412-04-10

Initial sample height =	1.016	in	Ring diameter =	2.495	in
Initial sample mass =	168.37	g	Ring mass =	109.92	g
Initial water content =	18.55%		Initial sample and ring mass =	278.29	g
Initial dry unit weight =	108.94	pcf	Tare mass =	70.61	g
Initial void ratio =	0.558		Final ring and sample mass =	275.66	g
Initial degree of saturation =	90.44%		Mass of wet sample and tare =	236.30	g
			Mass of dry sample and tare =	212.63	g
Final sample mass =	165.69	g	Initial dial reading =	0.01000	in
Final dry sample mass =	142.02	g	Final dial reading =	0.07951	in
Final water content =	16.67%		LL=	42	%
Final dry unit weight =	116.94	pcf	PL=	20	%
Final void ratio =	0.451		% Sand=	n.a.	%
Final degree of saturation =	100.00%		% Silt=	n.a.	%
Estimated specific gravity =	2.72		% Clay=	n.a.	%
			In-Situ Vertical Effective Stress =	600	psf

Compression and Swelling Indices

Compression index C_c =	0.105	**Preconsolidation pressure,s_C**	
Field corrected C_c =	0.113	Casagrande Method =	3457 psf
Swelling index C_s =	0.020	**Over-Consolidation Ratio (OCR) =**	5.76

Load number	Vertical stress	Dial reading	System deflection	Vertical strain	Void ratio	C_v	Cae	Elapsed time
	psf	in	in	%		ft^2/day	%	min
1	100.0	0.01015	0.00010	0.02	0.558	N/A	N/A	480
2	200.0	0.01129	0.00023	0.15	0.556	0.2066	0.07	960
3	500.0	0.01491	0.00058	0.54	0.550	0.1468	0.04	480
4	1000.0	0.02042	0.00090	1.11	0.541	0.1235	0.14	922
5	2000.0	0.02873	0.00135	1.98	0.527	0.1525	0.15	480
6	4000.0	0.04122	0.00193	3.26	0.507	0.1446	0.11	960
7	8000.0	0.05607	0.00253	4.78	0.484	0.1765	0.14	960
8	16000.0	0.07654	0.00324	6.87	0.451	0.1694	0.05	488
9	32000.0	0.09618	0.00413	8.89	0.420	0.1999	0.20	480
10	8000.0	0.09491	0.00295	8.65	0.423	N/A	N/A	480
11	2000.0	0.08846	0.00198	7.92	0.435	N/A	N/A	960
11	500.0	0.08091	0.00123	7.10	0.447	N/A	N/A	1200

Prepared by: _____ Date: _____

Checked by: _____ Date: _____

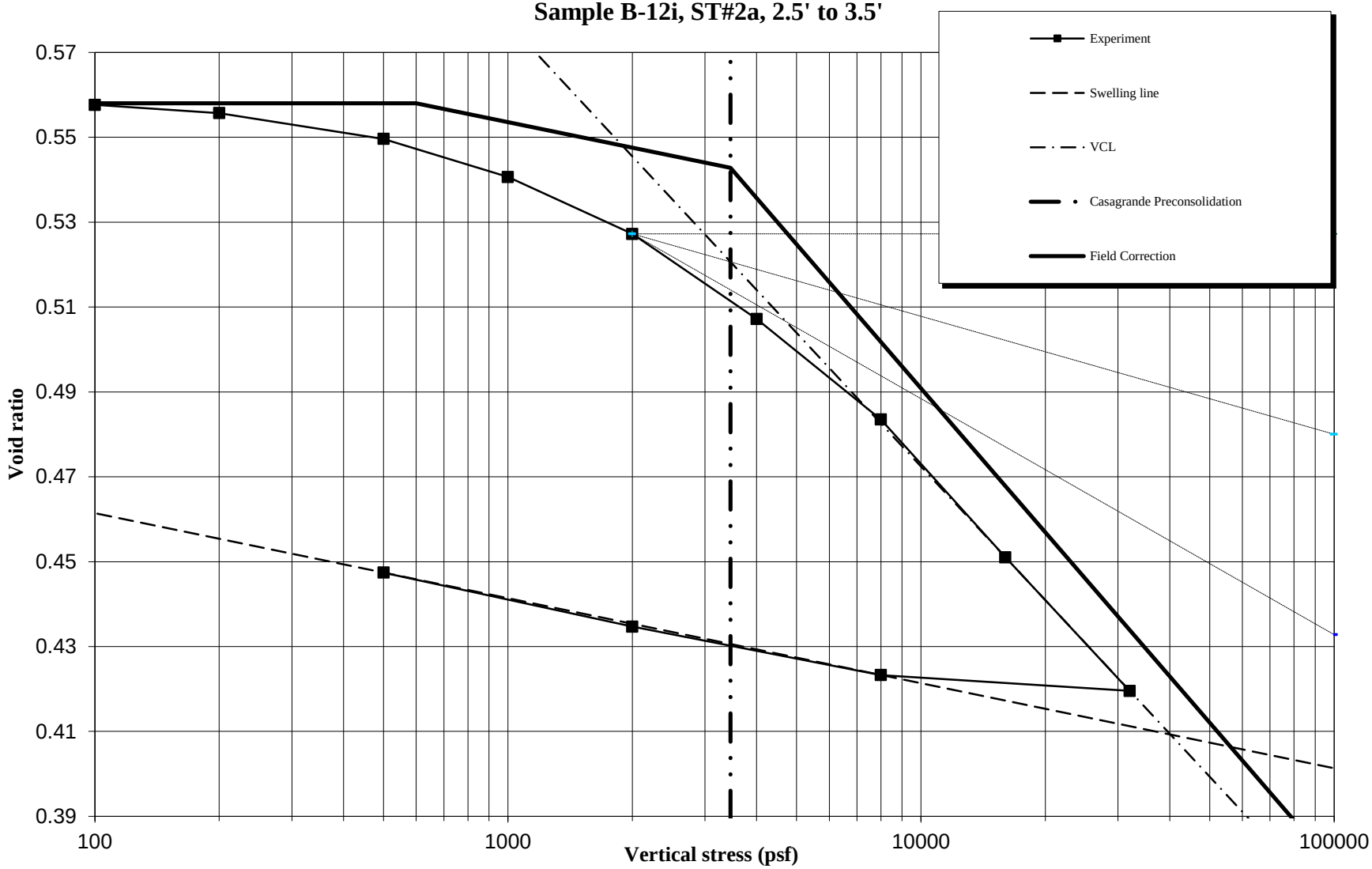
AASHTO R18

Wang Engineering

1145 North Main Street
Lombard, Illinois 60148
Phone (630) 953-9928
www.wangeng.com

CONSOLIDATION CURVE

Sample B-12i, ST#2a, 2.5' to 3.5'

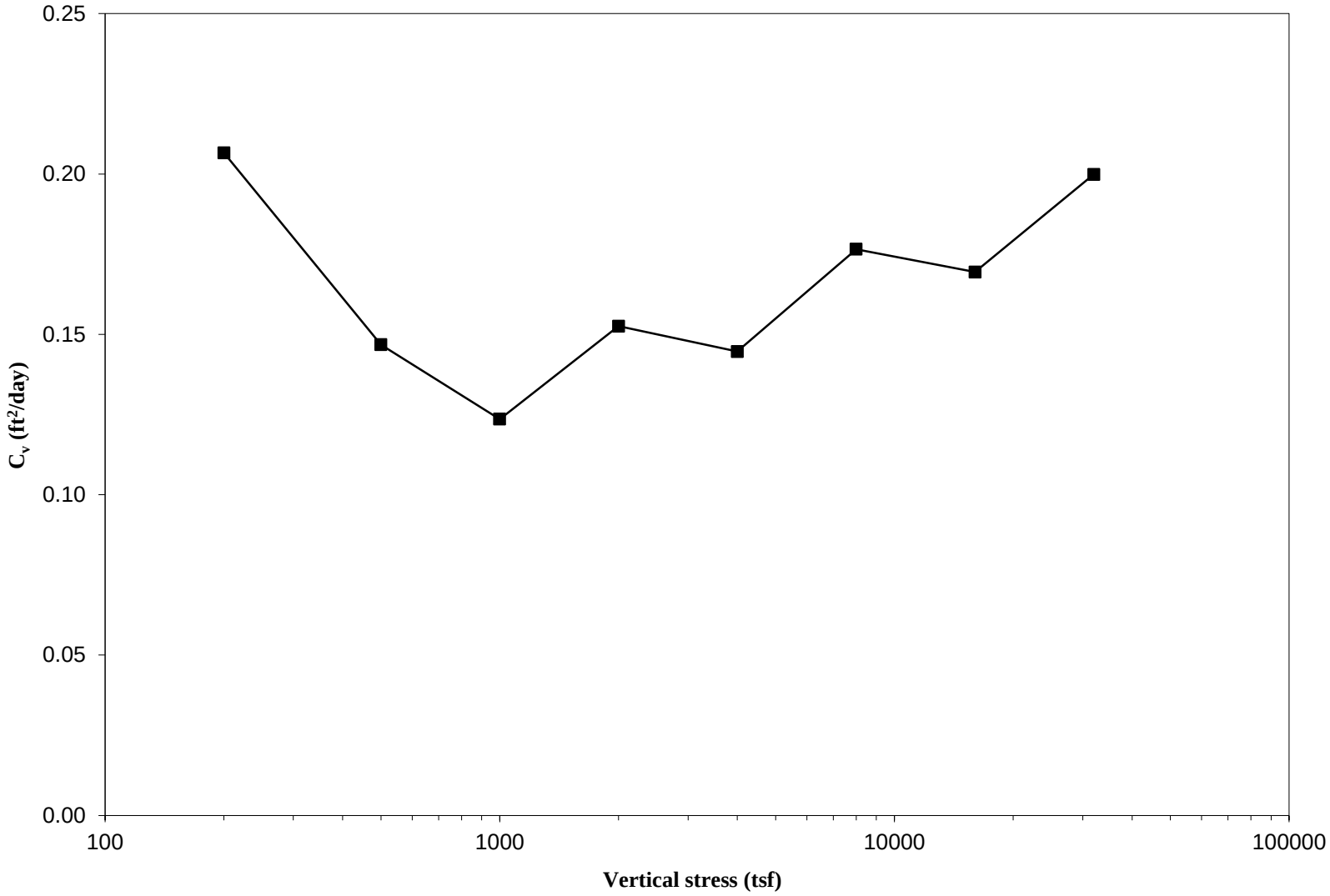


AASHTO R18

Wang Engineering
1145 North Main Street
Lombard, Illinois 60148
Phone (630) 953-9928
www.wangeng.com

CONSOLIDATION COEFFICIENT (C_v) vs. VERTICAL STRESS

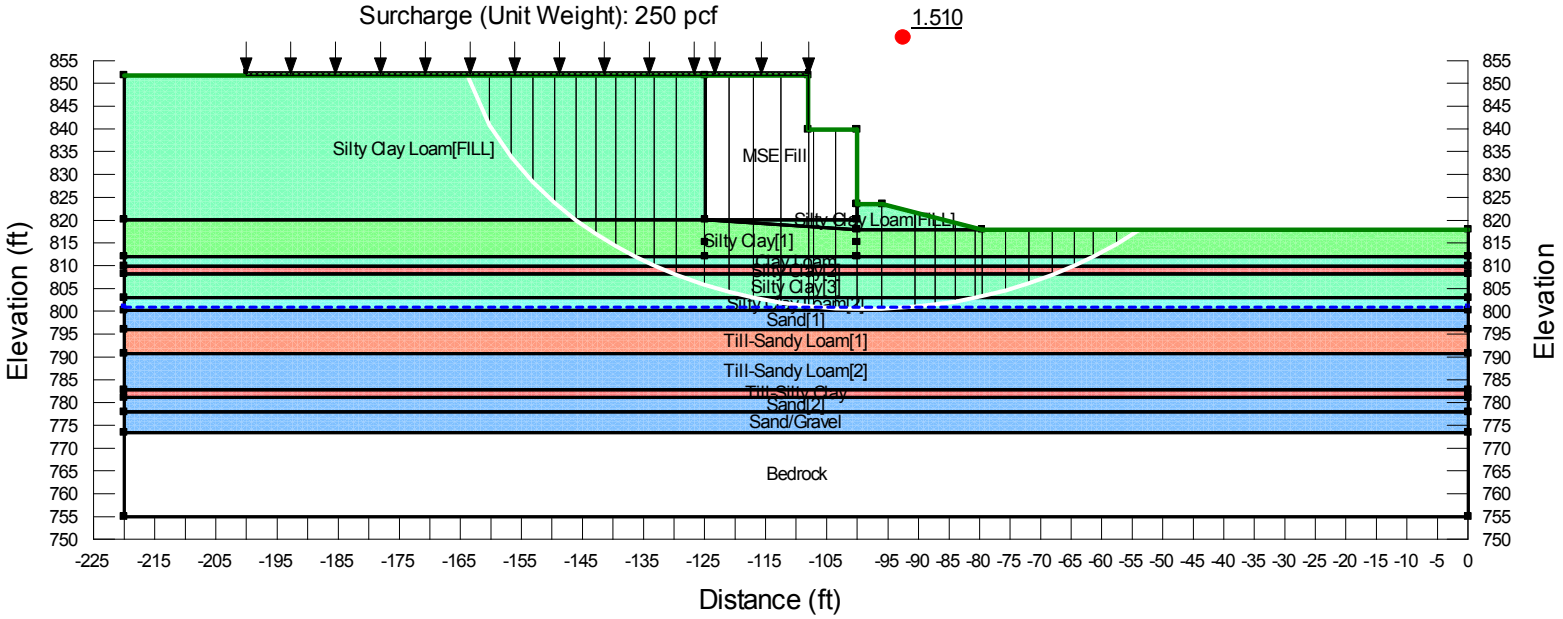
Sample B-12i, ST#2a, 2.5' to 3.5'



AASHTO R18

Title: Ramp BD Over US20 - North Abutment
File Name: Ramp BD over US20-NA(ST-2017 01 11).gsz
Last Edited By: Kipkoech Chepkoit
Date: 1/12/2017

I-39 Ramp BD Over US20
North Abutment (ST Boring B-3i)

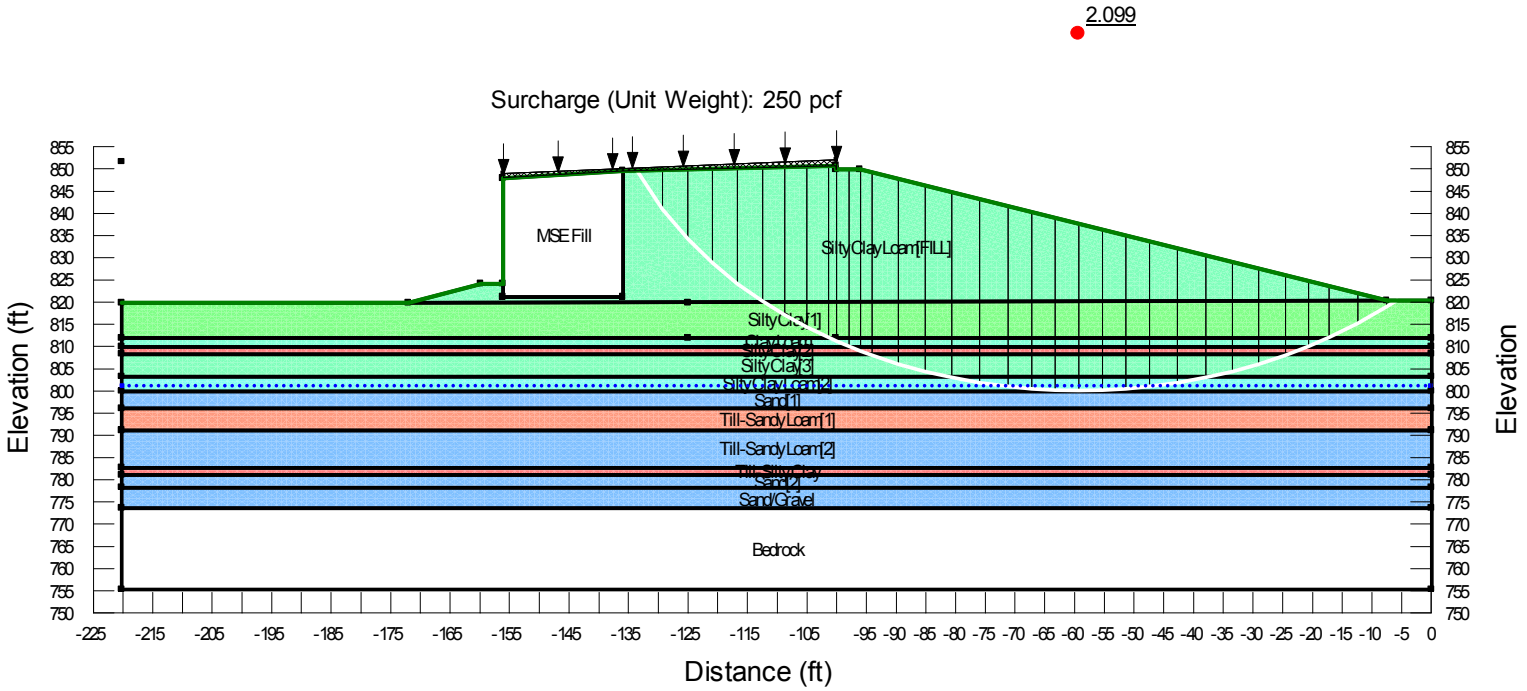


Name: MSE Fill Unit Weight: 130 pcf
Name: Silty Clay Loam[FILL] Unit Weight: 120 pcf Cohesion': 1,000 psf Phi': 0 °
Name: Clay Loam Unit Weight: 118 pcf Cohesion': 980 psf Phi': 0 °
Name: Till-Sandy Loam[1] Unit Weight: 128 pcf Cohesion': 3,250 psf Phi': 0 °
Name: Bedrock
Name: Till-Silty Clay Unit Weight: 128 pcf Cohesion': 3,500 psf Phi': 0 °
Name: Silty Clay[1] Unit Weight: 120 pcf Cohesion': 1,520 psf Phi': 0 °
Name: Sand[1] Unit Weight: 124 pcf Cohesion': 0 psf Phi': 30 °
Name: Till-Sandy Loam[2] Unit Weight: 130 pcf Cohesion': 0 psf Phi': 34 °
Name: Silty Clay Loam[2] Unit Weight: 115 pcf Cohesion': 660 psf Phi': 0 °
Name: Sand[2] Unit Weight: 118 pcf Cohesion': 0 psf Phi': 28 °
Name: Sand/Gravel Unit Weight: 130 pcf Cohesion': 0 psf Phi': 34 °
Name: Silty Clay[2] Unit Weight: 125 pcf Cohesion': 3,490 psf Phi': 0 °
Name: Silty Clay[3] Unit Weight: 120 pcf Cohesion': 1,145 psf Phi': 0 °

HANSON
Engineering | Planning | Allied Services

Title: Ramp BD Over US20 - North Abutment
File Name: Ramp BD over US20-NA144+00(ST-2017 01 11).gsz
Last Edited By: Kipkoech Chepkoit
Date: 1/12/2017

I-39 Ramp BD Over US20
North Abutment STA 144+00 (ST Boring B-3i)

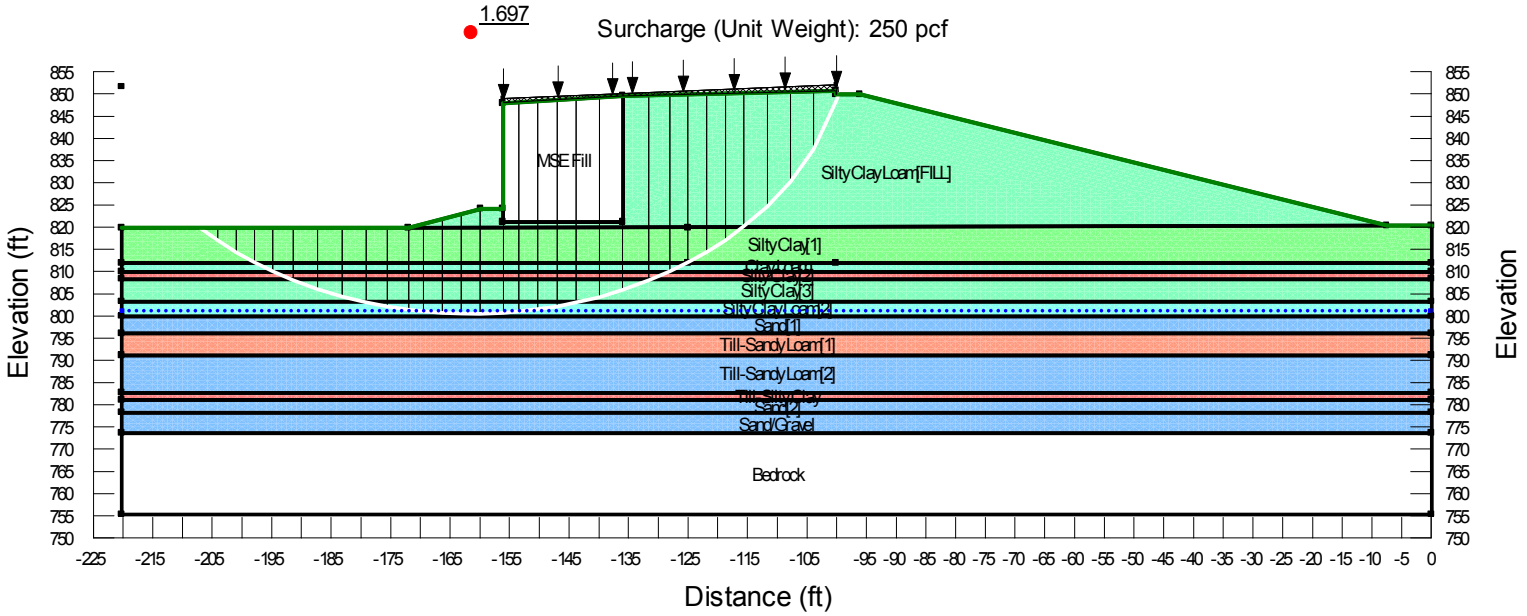


Name: MSE Fill Unit Weight: 130 pcf
Name: Silty Clay Loam[FILL] Unit Weight: 120 pcf Cohesion': 1,000 psf Phi': 0 °
Name: Clay Loam Unit Weight: 118 pcf Cohesion': 980 psf Phi': 0 °
Name: Till-Sandy Loam[1] Unit Weight: 128 pcf Cohesion': 3,250 psf Phi': 0 °
Name: Bedrock
Name: Till-Silty Clay Unit Weight: 128 pcf Cohesion': 3,500 psf Phi': 0 °
Name: Silty Clay[1] Unit Weight: 120 pcf Cohesion': 1,520 psf Phi': 0 °
Name: Sand[1] Unit Weight: 124 pcf Cohesion': 0 psf Phi': 30 °
Name: Till-Sandy Loam[2] Unit Weight: 130 pcf Cohesion': 0 psf Phi': 34 °
Name: Silty Clay Loam[2] Unit Weight: 115 pcf Cohesion': 660 psf Phi': 0 °
Name: Sand[2] Unit Weight: 118 pcf Cohesion': 0 psf Phi': 28 °
Name: Sand/Gravel Unit Weight: 130 pcf Cohesion': 0 psf Phi': 34 °
Name: Silty Clay[2] Unit Weight: 125 pcf Cohesion': 3,490 psf Phi': 0 °
Name: Silty Clay[3] Unit Weight: 120 pcf Cohesion': 1,145 psf Phi': 0 °

HANSON
Engineering | Planning | Allied Services

Title: Ramp BD Over US20 - North Abutment
File Name: Ramp BD over US20-NA144+00(ST-2017 01 11)-rev.gsz
Last Edited By: Kipkoech Chepkoit
Date: 1/12/2017

I-39 Ramp BD Over US20
North Abutment STA 144+00 (ST Boring B-3i)

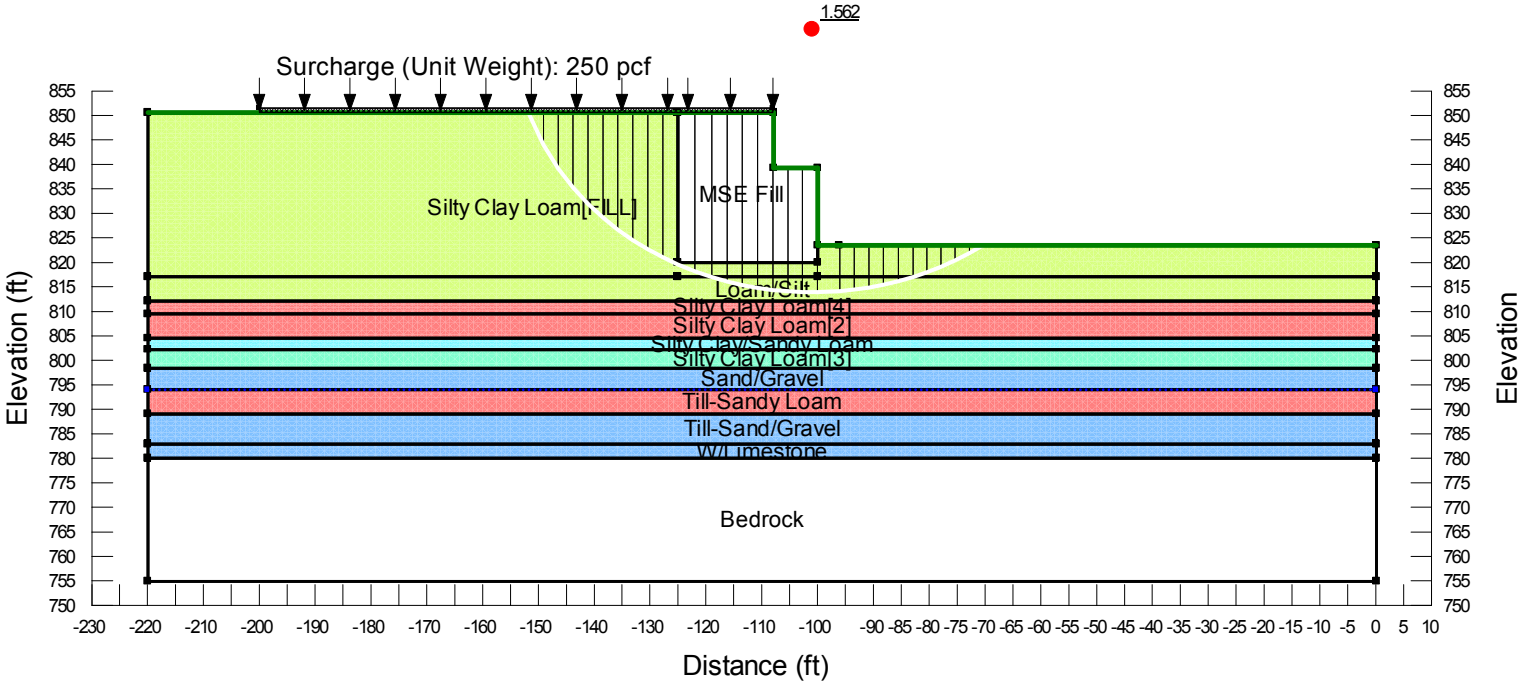


Name: MSE Fill Unit Weight: 130 pcf
Name: Silty Clay Loam[FILL] Unit Weight: 120 pcf Cohesion': 1,000 psf Phi': 0 °
Name: Clay Loam Unit Weight: 118 pcf Cohesion': 980 psf Phi': 0 °
Name: Till-Sandy Loam[1] Unit Weight: 128 pcf Cohesion': 3,250 psf Phi': 0 °
Name: Bedrock
Name: Till-Silty Clay Unit Weight: 128 pcf Cohesion': 3,500 psf Phi': 0 °
Name: Silty Clay[1] Unit Weight: 120 pcf Cohesion': 1,520 psf Phi': 0 °
Name: Sand[1] Unit Weight: 124 pcf Cohesion': 0 psf Phi': 30 °
Name: Till-Sandy Loam[2] Unit Weight: 130 pcf Cohesion': 0 psf Phi': 34 °
Name: Silty Clay Loam[2] Unit Weight: 115 pcf Cohesion': 660 psf Phi': 0 °
Name: Sand[2] Unit Weight: 118 pcf Cohesion': 0 psf Phi': 28 °
Name: Sand/Gravel Unit Weight: 130 pcf Cohesion': 0 psf Phi': 34 °
Name: Silty Clay[2] Unit Weight: 125 pcf Cohesion': 3,490 psf Phi': 0 °
Name: Silty Clay[3] Unit Weight: 120 pcf Cohesion': 1,145 psf Phi': 0 °

HANSON
Engineering | Planning | Allied Services

Title: Ramp BD Over US20 - South Abutment
File Name: Ramp BD over US20-SA(ST-2017 01 12).gsz
Last Edited By: Kipkoech Chepkoit
Date: 1/12/2017

I-39 Ramp BD Over US20
South Abutment (ST Boring B-12i)

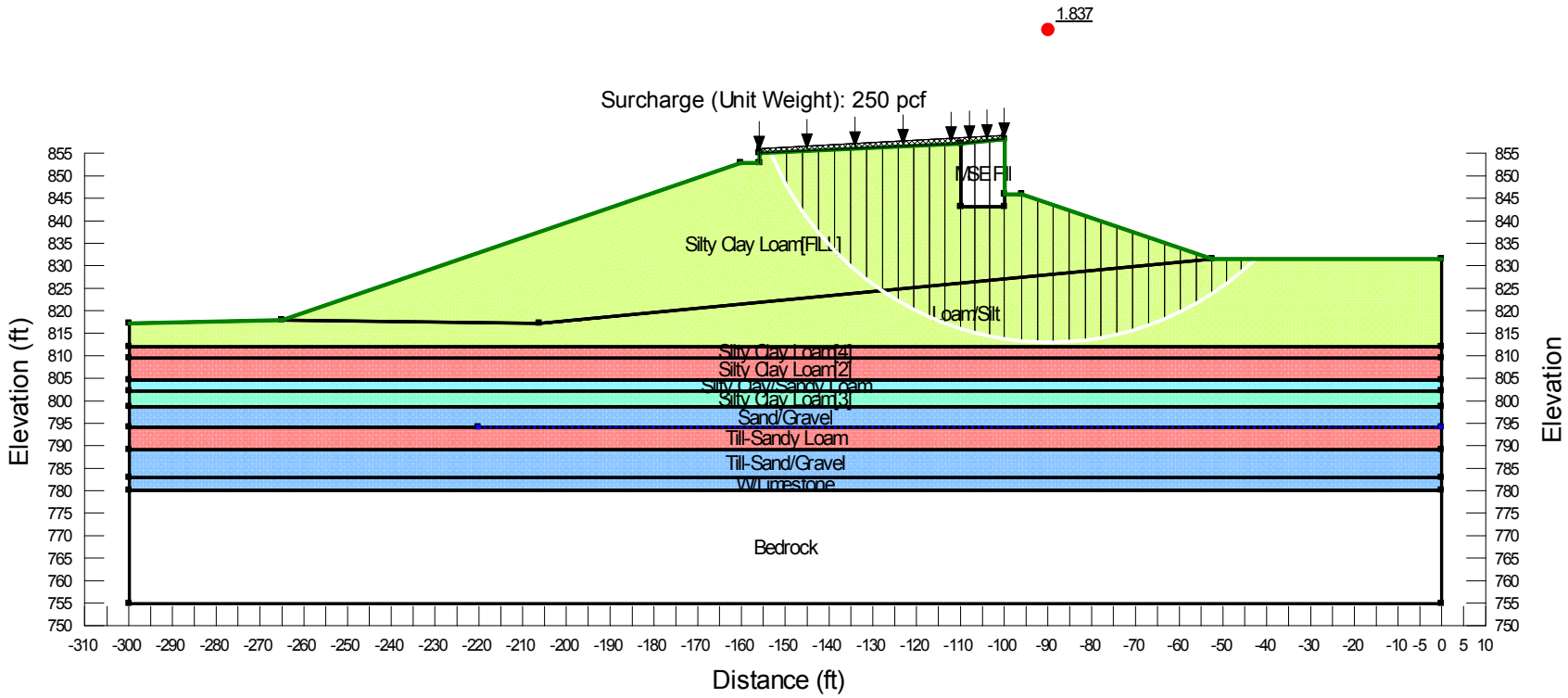


Name: MSE Fill Unit Weight: 130 pcf
Name: Silty Clay Loam[FILL] Unit Weight: 120 pcf Cohesion': 1,000 psf Phi': 0 °
Name: Sand/Gravel Unit Weight: 126 pcf Cohesion': 0 psf Phi': 32 °
Name: Till-Sandy Loam Unit Weight: 128 pcf Cohesion': 1,800 psf Phi': 0 °
Name: Bedrock
Name: Till-Sand/Gravel Unit Weight: 130 pcf Cohesion': 0 psf Phi': 33 °
Name: Silty Clay/Sandy Loam Unit Weight: 118 pcf Cohesion': 350 psf Phi': 14 °
Name: Silty Clay Loam[2] Unit Weight: 127 pcf Cohesion': 1,645 psf Phi': 0 °
Name: Loam/Silt Unit Weight: 116 pcf Cohesion': 1,000 psf Phi': 0 °
Name: W/Limestone Unit Weight: 130 pcf Cohesion': 0 psf Phi': 36 °
Name: Silty Clay Loam[3] Unit Weight: 115 pcf Cohesion': 535 psf Phi': 0 °
Name: Silty Clay Loam[4] Unit Weight: 125 pcf Cohesion': 1,800 psf Phi': 0 °

HANSON
Engineering | Planning | Allied Services

Title: Ramp BD Over US20 - South Abutment
File Name: Ramp BD over US20-SA 150+00(2017 01 12).gsz
Last Edited By: Kipkoech Chepkoit
Date: 1/12/2017

I-39 Ramp BD Over US20
South Abutment STA 150+00 (ST Boring B-12i)

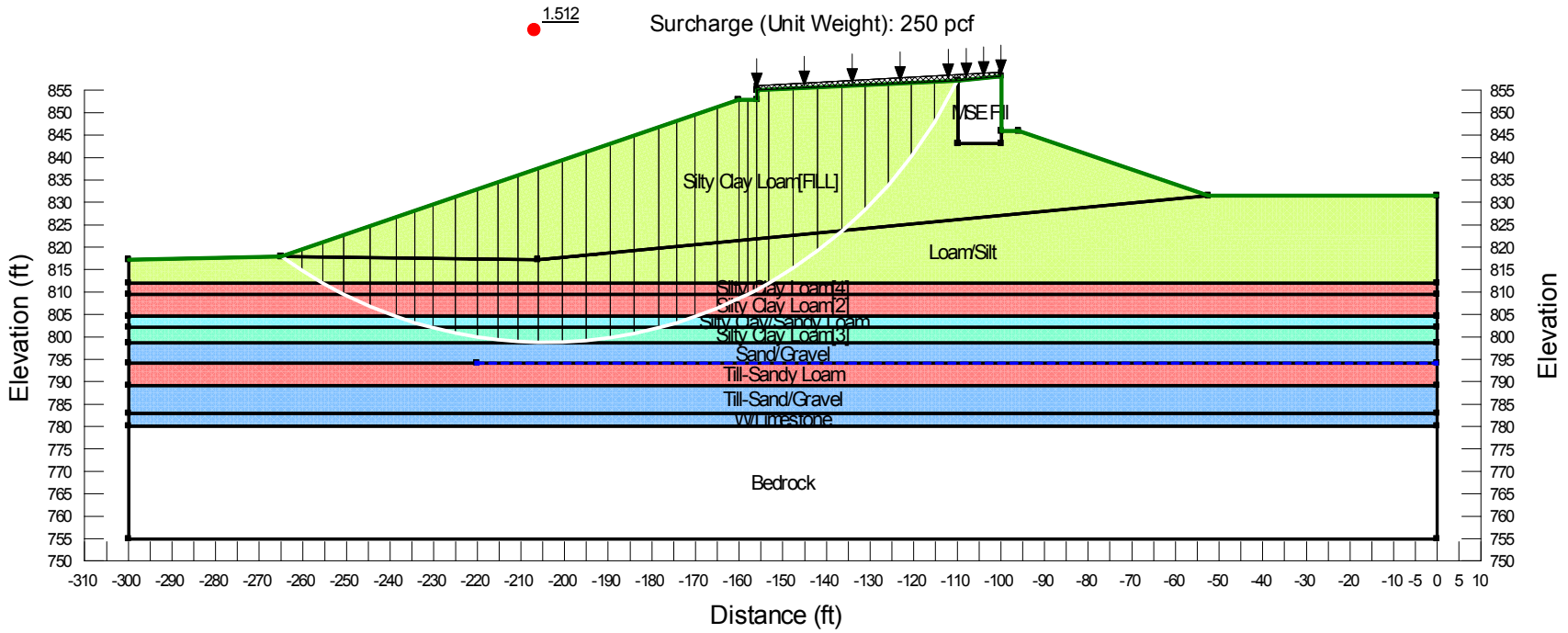


Name: MSE Fill Unit Weight: 130 pcf
Name: Silty Clay Loam[FILL] Unit Weight: 120 pcf Cohesion': 1,000 psf Phi': 0 °
Name: Sand/Gravel Unit Weight: 126 pcf Cohesion': 0 psf Phi': 32 °
Name: Till-Sandy Loam Unit Weight: 128 pcf Cohesion': 1,800 psf Phi': 0 °
Name: Bedrock
Name: Till-Sand/Gravel Unit Weight: 130 pcf Cohesion': 0 psf Phi': 33 °
Name: Silty Clay/Sandy Loam Unit Weight: 118 pcf Cohesion': 350 psf Phi': 14 °
Name: Silty Clay Loam[2] Unit Weight: 127 pcf Cohesion': 1,645 psf Phi': 0 °
Name: Loam/Silt Unit Weight: 116 pcf Cohesion': 1,000 psf Phi': 0 °
Name: W/Limestone Unit Weight: 130 pcf Cohesion': 0 psf Phi': 36 °
Name: Silty Clay Loam[3] Unit Weight: 115 pcf Cohesion': 535 psf Phi': 0 °
Name: Silty Clay Loam[4] Unit Weight: 125 pcf Cohesion': 1,800 psf Phi': 0 °

HANSON
Engineering | Planning | Allied Services

Title: Ramp BD Over US20 - South Abutment
File Name: Ramp BD over US20-SA 150+00(2017 01 12)-rev.gsz
Last Edited By: Kipkoech Chepkoit
Date: 1/12/2017

I-39 Ramp BD Over US20
South Abutment STA 150+00 (ST Boring B-12i)



Name: MSE Fill Unit Weight: 130 pcf
Name: Silty Clay Loam[FILL] Unit Weight: 120 pcf Cohesion': 1,000 psf Phi': 0 °
Name: Sand/Gravel Unit Weight: 126 pcf Cohesion': 0 psf Phi': 32 °
Name: Till-Sandy Loam Unit Weight: 128 pcf Cohesion': 1,800 psf Phi': 0 °
Name: Bedrock
Name: Till-Sand/Gravel Unit Weight: 130 pcf Cohesion': 0 psf Phi': 33 °
Name: Silty Clay/Sandy Loam Unit Weight: 118 pcf Cohesion': 350 psf Phi': 14 °
Name: Silty Clay Loam[2] Unit Weight: 127 pcf Cohesion': 1,645 psf Phi': 0 °
Name: Loam/Silt Unit Weight: 116 pcf Cohesion': 1,000 psf Phi': 0 °
Name: W/Limestone Unit Weight: 130 pcf Cohesion': 0 psf Phi': 36 °
Name: Silty Clay Loam[3] Unit Weight: 115 pcf Cohesion': 535 psf Phi': 0 °
Name: Silty Clay Loam[4] Unit Weight: 125 pcf Cohesion': 1,800 psf Phi': 0 °

HANSON
Engineering | Planning | Allied Services