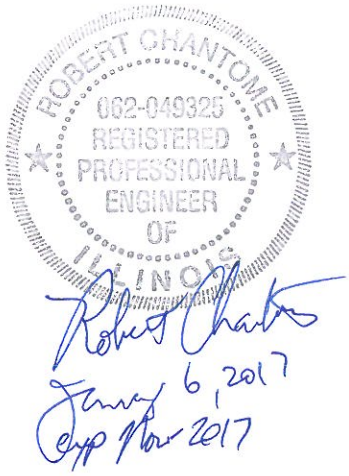

Abbreviated Structure Geotechnical Report

F.A.I. Route 39 (I-39)
Section (201-3)K & (4-1, 5)R
Winnebago County
Job No. P-92-111-06
Contract No. 64C62
PTB No. 141-004
Existing Ramp DA over Ramp BD
Structure No. 101-0204
Existing Structure No. None

Submitted April 2016
Revised Sept. 2016, Dec. 2016, Jan. 2017

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

Structure Designer:
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Fehr Graham
755 South Grand Avenue West
Springfield, Illinois 62704
(217) 544-8477

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

rchantome@hanson-inc.com

Illinois Department of Transportation

Abbreviated Structure Geotechnical Report

Original Report Date: 4/19/16	**Proposed SN:** 101-0204	**Route:**	F.A.I. 39 (I-39)
Revised Date: 1/6/2017	**Existing SN:** None	**Section:**	(201-3)K & (4-1, 5)R
Geotechnical Engineer: Robert Chantome		**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 steel girder bridge. The substructures will consist of pile-supported integral abutments and solid wall encased bent-type piers. According to information provided by the structure designer, the factored vertical loads are anticipated to be approximately 1,450 kips at the abutments, 3,330 kips at Pier 1 and 3,170 kips at Pier 2. The TSL general plan and elevation drawing is 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): Logs of six borings drilled at the site were provided by District 2. The borings were drilled in several phases during March 2006, February 2009, and June 2012. Locations of the borings are as shown on the attached boring location plan. The stations and offsets shown on the logs are relative to existing or superseded alignments. Boring locations along the current Ramp DA aligment are shown on the attached Subsurface Data Profile. The available boring data is sufficient to design the structure.

The subsurface profile consists of rock fill embankment, native silty loam to silty clay loam, glacial till, and limestone or dolomite bedrock. Existing grade, which is the top of the existing Ramp DA embankment, varies from approximately Elev. 855 to Elev. 853, sloping down to the north at 0.5%. Dense limestone rock fill with an average N of 30 blows per foot extends up to 19 ft below grade. Five to 15 ft of stiff silty loam to silty clay loam with an average unconfined strength of 1.9 tsf lies beneath the rock fill across the entire site. A 5 ft layer of medium dense fine sand and a 2.5 ft layer of stiff glacial till is found only near the South Abutment. A 1 ft to 7 ft. thick layer of weathered limestone was first encountered at Elev. 825.5 to Elev. 818.9 in the borings. SPT's taken within the weathered limestone typically had an N-value greater than 100 blows per foot. Limestone and dolomite rock cores taken from three of the borings had an average unconfined strength of 391 tsf

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 proposed structure will be constructed at existing grade and will not require any new fill. No settlement is anticipated.

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 new Ramp BD will be cut through the existing embankment with slopes laid back at 1V:2H under the proposed bridge. The low point of Ramp BD will be approximately 30 feet below the existing embankment crest. A slope stability analysis on a section through the North Abutment end slope indicates a 1.86 factor of safety, which meets IDOT and AASHTO requirements. No special treatment is required.

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 and the Seismic Performance Zone is 1. SDS = 0.10g and SD1 = 0.06g. 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: A Pile Design Table that includes data for several pile sizes at each substructure is attached. H-piles that extend to limestone or dolomite bedrock are preferred for all substructure locations. Hanson recommends precoring through the rock fill to Elevation 836 at the South Abutment and to Elevation 830 at the North Abutment. This will help to avoid pile alignment problems that might occur if a large piece of rock is encountered during pile driving. The nominal diameter of the precore should be 18 inches for HP 10 piles or 24 inches for larger piles. Pile shoes are required. Test piles should be specified at the North Abutment and South Abutment.

The rockfill in the upper portion of the existing embankment is too stiff to meet IDOT's requirements for integral abutments. In order to allow adequate lateral movement of piles, precored holes to a minimum depth of 10 feet below the bottom of abutment should be backfilled with hydrated bentonite after pile driving instead of the typical practice of backfilling the hole with loose sand before pile driving.

The embedded portion of the piles at the two piers will be relatively short due to the shallow bedrock. Socketed piles are recommended at the piers. The socketed piles should be installed in 18 or 24 inch diameter holes in accordance with Guide Bridge Special Provision #56, Setting Piles in Rock. Top of weathered rock is expected to vary but should be assumed to be Elev. 820.4 at Pier 1 and Elev. 825.5 at Pier 2 for plan quantities. Estimated top of sound rock is Elev. 818.0 at Pier 1 and Elev. 817.0 at Pier 2. For design of the socketed piles, the nominal and factored side resistance in sound rock are 32.7 ksf and 18.0 ksf, respectively. Any side resistance from soil strata or weathered rock, as well as any tip resistance should be neglected. Stability during the staged construction is expected to be a significant factor for the pile design. Based on preliminary analyses, it is estimated that a 4 ft embedment into sound rock will be required to develop pile fixity. Final embedment should be determined based on the actual loadings and the parameters for lateral load analyses provided in the attached Pile Design Table. Note that for socketed piles, the structural resistance of the steel member does not need to be limited to the 27 ksi stress used for driven piles.

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 proposed structure will be staged to maintain traffic on the left half of existing Ramp DA while the right half of the bridge is constructed. It is anticipated that the bridge will be constructed in a top-down sequence where the final excavation for the proposed Ramp BD roadway will be made after traffic is moved to the right half of the new bridge. Excavation during the first phase will be limited to the base of the pile caps at the substructures and to slightly below the girders across the spans. Near-vertical cuts of approximately 10 feet depth will be required at the substructures. Temporary sheet piling is not feasible due to potential driving obstructions within the rock fill. A Temporary Soil Retention System, in accordance with Article 522.07 of the Standard Specifications, should be specified at locations where laid back slopes are not possible.

The precored holes for the abutment piles must remain clear until after the piles are driven and the bentonite backfill is placed. Open holes are likely to slough due to vibrations from the pile driving. To prevent this, the construction plans should include 10 feet long pile sleeves with an inside diameter sufficient to provide 1¾ inches clearance around the piles. The top of the sleeve should be set 1 inch below the bottom of abutment. The following notes are recommended for inclusion in the construction plans.

1. Precored holes are required to allow lateral movement of the abutment piles within the very dense native soil. Hydrated bentonite shall be placed around each pile to a minimum depth of 10 feet below the bottom of abutment.
2. The precored hole for each pile shall remain open and clear until the pile has been driven and the hole backfilled. Contractor shall utilize pile sleeves and remove any sloughed soil as required to maintain the minimum clearance specified.
3. The pile sleeve furnished by the Contractor shall have adequate strength to withstand earth pressures during pile driving without collapse. Pile sleeve material, shape, and wall thickness shall be submitted to the Engineer for approval.
4. The inside of the pile sleeve and any precored hole below shall be backfilled with dry bentonite chips and then flooded with clean water to hydrate the bentonite. Any visible gaps outside the pile sleeve shall be filled with bentonite chips or a thick bentonite slurry. Bentonite shall be topped off to the bottom of the abutment before the abutment concrete is placed. Contact between the pile sleeve and casing shall not be permitted.

Structure No. 101-0204
Pile Design Parameters

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)
South Abutment B-3i	847.3	HP 10x42	184	0	335	31
		HP 12x53	230	0	418	31
		HP 12x63	273	0	497	32
		HP 14x73	318	0	578	32
North Abutment B-2i	845.7	HP 10x42	184	0	335	27
		HP 12x53	230	0	418	27
		HP 12x63	273	0	497	27
		HP 14x73	318	0	578	27

Structure No. 101-0204
Pile Design Parameters

Pier 1 (Boring B-1i)

Elevation	LPILE Soil Type	γ' (pcf)	c (psf)	φ	q_u (psi)	k (pci)	ϵ_{50}
836.0 - 823.9	Stiff Clay w/o Free Water	117	1,900				0.005
823.9 - 818.0	Sand (Reese)	125		38°		225	
818.0 - 800.0	Strong Rock (Vuggy Limestone)	140			5,400		

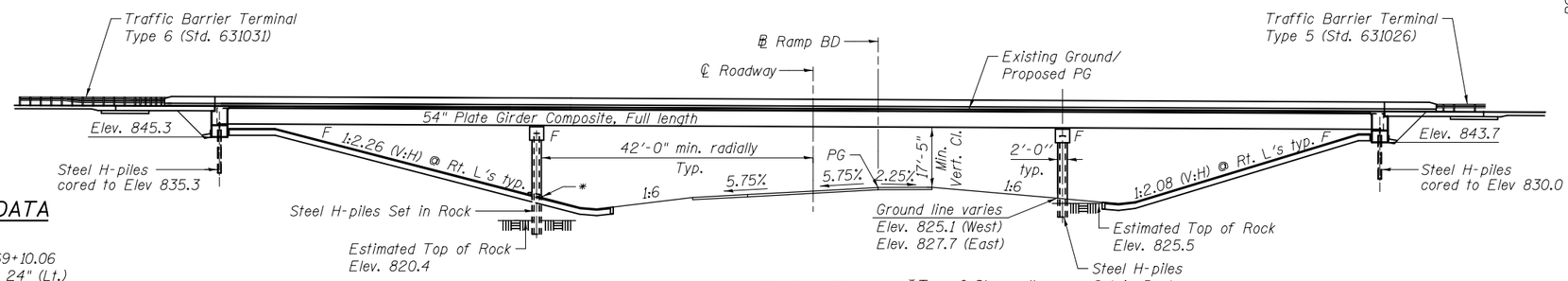
Pier 2 (Boring B-1a)

Elevation	LPILE Soil Type	γ' (pcf)	c (psf)	φ	q_u (psi)	k (pci)	ϵ_{50}
830.0 - 820.8	Stiff Clay w/o Free Water	117	1,900				0.005
820.8 - 817.0	Sand (Reese)	125		38°		225	
817.0 - 800.0	Strong Rock (Vuggy Limestone)	140			5,400		

Benchmark: Cut "□" south side of eastern base of 30 mph ramp sign located east of the ramp connecting I-39 NB to US 20 West (Ramp DA) 0.1 mile north of the centerline of Linden Road. Elev. 851.37, 42°-13'-06.37" N. 89°-00'-39.64" W.

Existing Structure: None

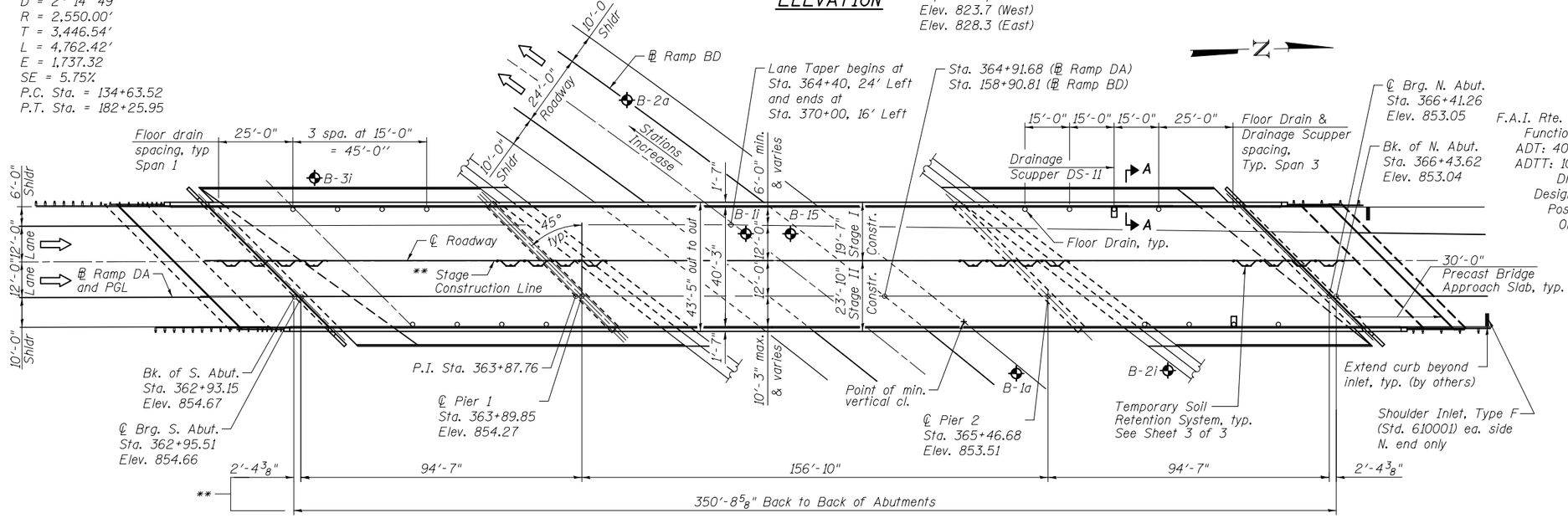
Stage Construction will be utilized to maintain one lane of traffic at all times. Stage I Traffic will be maintained on existing Ramp DA.



ELEVATION

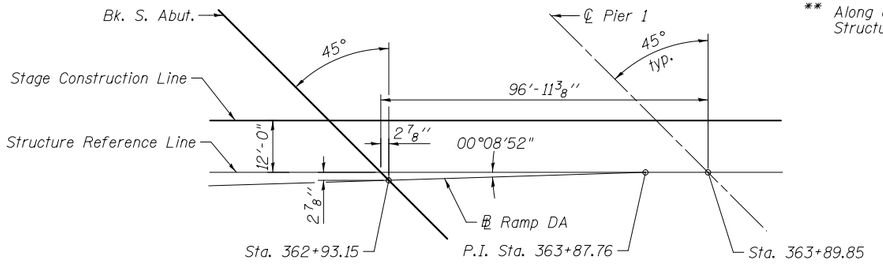
CURVE DATA

Ramp BD
P.I. Sta. = 169+10.06
Δ = 107° 00' 24" (Lt.)
D = 2° 14' 49"
R = 2,550.00'
T = 3,446.54'
L = 4,762.42'
E = 1,737.32
SE = 5.75%
P.C. Sta. = 134+63.52
P.T. Sta. = 182+25.95

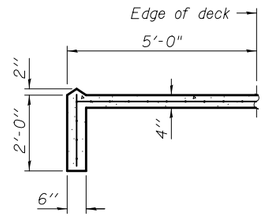


PLAN

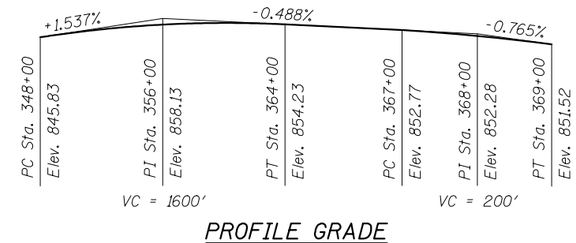
** Along a line parallel to the Structure Reference Line



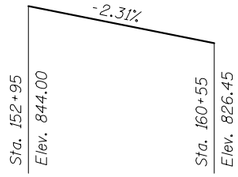
OFFSET SKETCH



SECTION A-A



PROFILE GRADE
(Along ℄ Ramp DA)



PROFILE GRADE
(Along ℄ Ramp BD)

HIGHWAY CLASSIFICATION

F.A.I. Rte. 39 - I-39 NB Ramp DA
Functional Class: Interstate
ADT: 4050(2013); 6400(2040)
ADTT: 1000(2013); 1600(2040)
DHV: 640 (2040)
Design Speed: 50 m.p.h.
Posted Speed: 45 m.p.h.
One-Way Traffic

F.A.I. Rte. 39 - I-39 SB Ramp BD
Functional Class: Interstate
ADT: 10,000(2013); 28,000(2040)
ADTT: 4200(2013); 11,700(2040)
DHV: 2250 (2040)
Design Speed: 70 m.p.h.
Posted Speed: 65 m.p.h.
One-Way Traffic

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

DESIGN STRESSES

FIELD UNITS

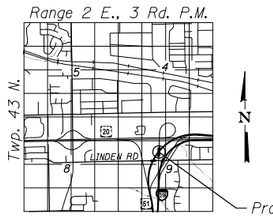
f'c = 3,500 psi
f'c = 4,000 (Superstructure Concrete)
fy = 60,000 psi (Reinforcement)
fy = 50,000 psi (M270 Grade 50)

PRECAST UNITS

f'c = 6,000 psi

SEISMIC DATA

Seismic Performance Zone (SPZ) = 1
Design Spectral Acceleration at 1.0 sec. (S_{D1}) = 0.056 g
Design Spectral Acceleration at 0.2 sec. (S_{DS}) = 0.10 g
Soil Site Class = C



LOCATION SKETCH

GENERAL PLAN
I-39 NB (RAMP DA) OVER I-39 SB (RAMP BD)
F.A.I. RTE. 39 SEC. (201-3)K & (4-1,5)R
WINNEBAGO COUNTY
STATION 364+91.68
STRUCTURE NO. 101-0204

FILE NAME = c:\10\0204-64C62-001-sal.dgn

FEHR GRAHAM
ENGINEERING & ENVIRONMENTAL
ILLINOIS DESIGN FIRM NO. 184-003525

FEHR GRAHAM PROJECT NUMBER: 15-1002 CB PROJ. NO.: 06085

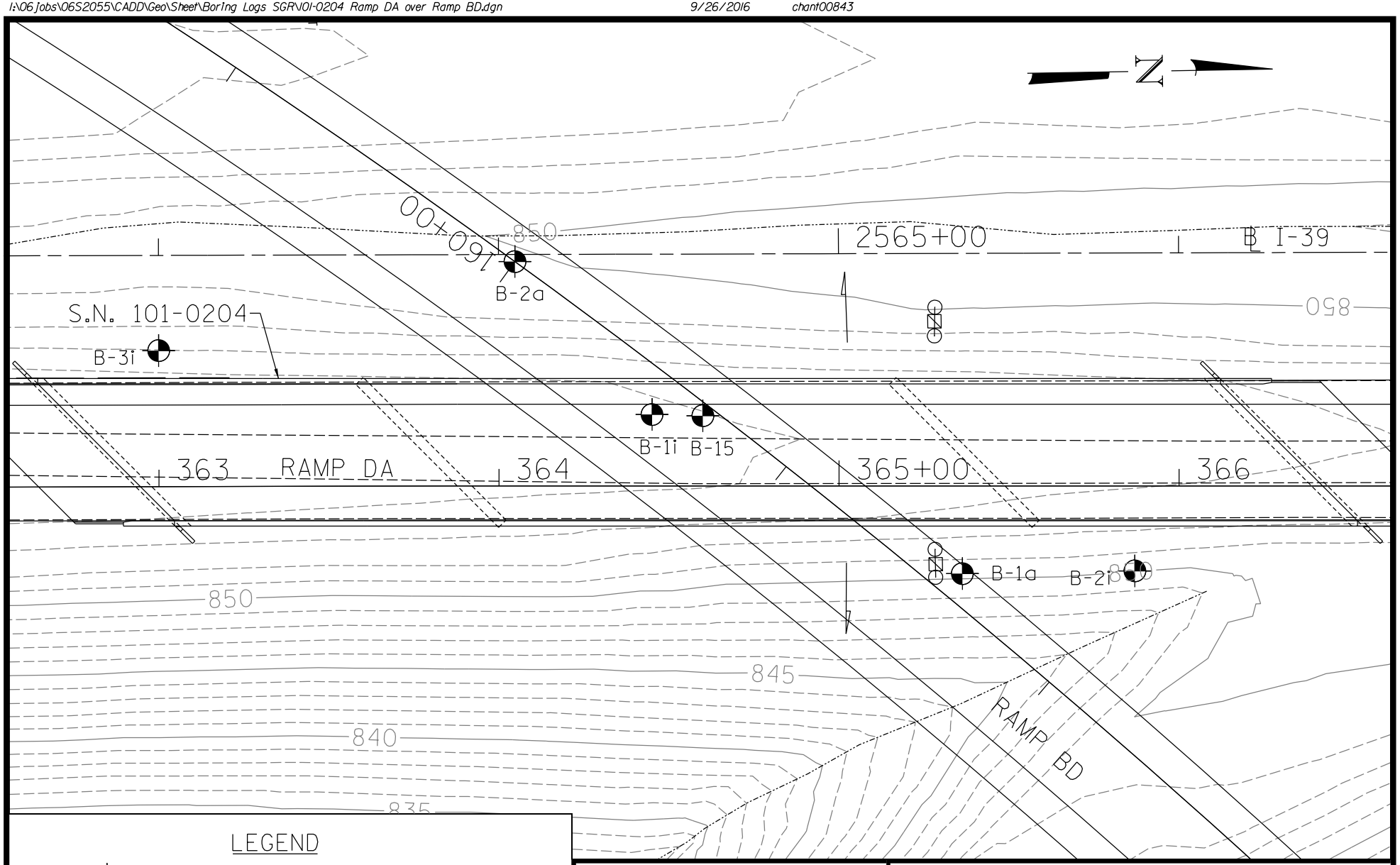
USER NAME = myoung	DESIGNED - GB/CME	REVISED -	
	CHECKED - MCB	REVISED -	
PLOT SCALE = 42.6667 ' / in.	DRAWN - MMY	REVISED -	
PLOT DATE = 1/6/2017	CHECKED - MCB	REVISED -	

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

SHEET NO. 1 OF 3 SHEETS

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

I:\06Jobs\06S2055\CADD\Geo\Sheet\Boring Logs SGR\101-0204 Ramp DA over Ramp BD.dgn 9/26/2016 chant00843



LEGEND

B-1i BORING LOCATION

0 40 80 120

SCALE IN FEET

HANSON

BORING LOCATION PLAN

EXISTING RAMP DA OVER RAMP BD
S.N. 101-0204
WINNEBAGO COUNTY, ILLINOIS

06S2055 09/26/16

B-3i
Sta. 363+00, 40' LT

	N	Qu	w%	
850.9				
	33			DENSE tan ROAD ROCK
	27			MEDIUM tan ROAD ROCK Hard Drilling
	55			VERY DENSE tan ROAD ROCK
838.9				
	11	1.2B	20	STIFF light brown LOAM
	25	1.9S	10	STIFF light brown SANDY LOAM
	6	2.0P	16	STIFF tan SILTY LOAM
	9	1.1P	20	STIFF tan SILTY LOAM
	14	1.1P	15	STIFF tan SILT
826.4				
	18			MEDIUM redish brown fine SAND
	11			MEDIUM redish brown fine SAND
821.4				
	23	1.3P	12	STIFF tan TILL with LIMESTONE fragments
818.9				VERY DENSE tan weathered LIMESTONE
	100/2"			Auger Refusal @ 33'
817.9				Dolomite: tan-buff, 2-foot void encountered from 816.9 to 814.9, mostly fractured thereafter.
	240			Rec. = 50% RQD = 27%
812.9				Dolomite: as above, although massively bedded, pitted and honey-combed.
	452			Rec. = 100% RQD = 77%
807.9				Dolomite: as above.
	497			Rec. = 100% RQD = 73%
802.9				Dolomite: as above.
	537			Rec. = 100% RQD = 58%
797.9				Bottom of Hole = 53.0 feet

B-2a
Sta. 364+05, 66' LT

	N	Qu	w%	
850.1				
		0.5P	9.0	MEDIUM brown SILTY CLAY LOAM
848.1				
	14			MEDIUM tan weathered LIMESTONE fill
	34			DENSE tan weathered LIMESTONE fill
	26			MEDIUM tan weathered LIMESTONE fill
	32			DENSE tan weathered LIMESTONE fill
	21			MEDIUM tan weathered LIMESTONE fill
836.1				
	12	0.3P	17.0	SOFT tan/brown SANDY LOAM with tan weathered LIMESTONE
	17	3.5B	18.0	VERY STIFF brown SILTY CLAY LOAM
	13	2.0B	23.0	STIFF brown SILTY CLAY LOAM
	11	1.8P	14.0	STIFF brown/gray SILTY LOAM with SAND lens
	14	1.3S	12.0	STIFF tan/gray SANDY LOAM
821.6	5	1.1S	13.0	STIFF tan/gray SANDY LOAM

Bottom of Hole = 28.5 feet

B-1i
Sta. 364+45, 21' LT

	N	Qu	w%	
850.9				
	21			MEDIUM tan ROAD ROCK (fill)
	28			MEDIUM tan ROAD ROCK (fill)
	33			DENSE tan ROAD ROCK (fill)
	35			DENSE tan ROAD ROCK (fill)
	33			DENSE tan ROAD ROCK
836.4				
	6	1.1P	19	STIFF gray/tan SILTY CLAY LOAM
	19	3.3B	17	VERY STIFF brown SILTY CLAY LOAM
	13	2.0S	18	STIFF/VERY STIFF brown LOAM
	14	1.4S	14	STIFF gray SILTY LOAM
	15	1.6B	14	STIFF tan SANDY LOAM
823.9				VERY DENSE tan weathered LIMESTONE
821.9	100/3"			Auger Refusal @ 29'

Bottom of Hole = 29.0 feet

DD. Oh
Dry ▽

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 Oh = at completion 24h = 24 hours after completion

FILE NAME =	USER NAME =	DESIGNED - RGC	REVISED
HANSON		CHECKED - JLD	REVISED
	PLOT SCALE =	DRAWN - EJM	REVISED
	PLOT DATE = 03/30/16	CHECKED - RGC	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

SUBSURFACE DATA PROFILE
STRUCTURE NO. 101-0204
SHEET NO. 1 OF 2 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-15
Sta. 364+60, 21' LT

	N	Qu	w%	
850.2				
		0.3P	15	SOFT brown SANDY LOAM
848.2				
	20			MEDIUM tan weathered LIMESTONE fill
	29			MEDIUM tan weathered LIMESTONE fill
	27			MEDIUM tan weathered LIMESTONE fill
	41			DENSE tan weathered LIMESTONE fill
	47			DENSE tan weathered LIMESTONE fill
	42			DENSE tan weathered LIMESTONE fill
	37			DENSE tan weathered LIMESTONE fill with SILTY CLAY lens
830.7				
	26	3.3P	10	VERY STIFF dark gray LOAM
	22	3.5S	13	VERY STIFF redish brown SANDY LOAM
	10	1.1S	18	STIFF brown SILTY LOAM
823.2				
	22			MEDIUM tan weathered LIMESTONE
	46			DENSE tan weathered LIMESTONE
				VERY DENSE tan weathered LIMESTONE
	100/9"			Auger Refusal @ 34.0'
816.2				FAIR tan LIMESTONE
				Rec. = 100%
811.2				FAIR tan LIMESTONE
				Rec. = 100%
806.2				FAIR tan LIMESTONE
				Rec. = 100%
801.2				Bottom of Hole = 49.0 feet

DD. 0h
Dry ▽

B-1a
Sta. 365+36, 26' RT

	N	Qu	w%	
849.8				
		0.5P	26.0	MEDIUM tan SILTY CLAY LOAM
848.3				
	12			MEDIUM tan weathered LIMESTONE fill
	16			MEDIUM tan weathered LIMESTONE fill
	16			MEDIUM tan weathered LIMESTONE fill
	34			DENSE tan weathered LIMESTONE fill
	29			MEDIUM tan weathered LIMESTONE fill
	25			MEDIUM tan weathered LIMESTONE fill
833.3				
	8	3.0P	16.0	VERY STIFF tan LOAM
830.8				
	15			MEDIUM tan weathered LIMESTONE
828.3				
	19	5.0B	17.0	HARD tan SILTY CLAY LOAM
	11	1.9B	23.0	STIFF tan SILTY CLAY LOAM
	15	1.7S	20.0	STIFF reddish brown CLAY LOAM
820.8				
819.8	100/8"			VERY DENSE tan weathered LIMESTONE

Bottom of Hole = 30.0 feet

B-2i
Sta. 365+87, 25' RT

	N	Qu	w%	
850.0				
	60			VERY DENSE tan ROAD ROCK
	29			MEDIUM tan ROAD ROCK
	33			DENSE tan ROAD ROCK
	11			MEDIUM tan ROAD ROCK
	32			DENSE tan ROAD ROCK
	28			MEDIUM tan dirty LIMESTONE (probably ROAD ROCK)
830.5				
	18	2.3B	23	VERY STIFF light brown SILTY CLAY LOAM
	11	1.0P	20	STIFF light brown SILTY CLAY LOAM
825.5				
	84			VERY DENSE tan weathered LIMESTONE
	100/3"			VERY DENSE tan weathered LIMESTONE
821.0				Dolomite: tan-buff, pitted, fractured and laminated, aphanitic and dense.
	267			Rec. = 95%
				RQD = 27%
816.0				Dolomite: as above, although massively bedded.
	355			Rec. = 100%
				RQD = 82%
811.0				

Bottom of Hole = 39.0 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

FILE NAME =	USER NAME =	DESIGNED - RGC	REVISED
HANSON		CHECKED - JLD	REVISED
	PLOT SCALE =	DRAWN - EJM	REVISED
	PLOT DATE = 03/30/16	CHECKED - RGC	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

SUBSURFACE DATA PROFILE
STRUCTURE NO. 101-0204
SHEET NO. 2 OF 2 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 2/23/09

ROUTE FAP 301 DESCRIPTION P92-075-05x Proposed I-39 SB Ramp BD LOGGED BY W. Garza

SECTION (201-3)K (4-1, 5)K LOCATION Cherry Valley Twp. - 9NW, SW, SEC. , TWP. 43N, RNG. 2E

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

STRUCT. NO.
Station

Latitude
Longitude

Northing
Easting

BORING NO. B-1a
Station 158+40
Offset 8.00ft Rt CL
Ground Surface Elev. 849.80 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 (%)
MEDIUM tan SILTY CLAY LOAM			0.5 P	26.0
	848.30			
MEDIUM tan weathered LIMESTONE fill		10 6 6		
	846.30			
MEDIUM tan weathered LIMESTONE fill	-5	12 9 7		
	843.80			
MEDIUM tan weathered LIMESTONE fill		9 7 9		
	841.30			
DENSE tan weathered LIMESTONE fill	-10	16 20 14		
	838.80			
MEDIUM tan weathered LIMESTONE fill		8 14 15		
	836.30			
MEDIUM tan weathered LIMESTONE fill	-15	16 13 12		
	833.30			
VERY STIFF tan LOAM		7 4 4	3.0 P	16.0
	830.80			
	-20	11		
MEDIUM tan weathered LIMESTONE *(continued)*		8 7		
	828.30			
HARD tan SILTY CLAY LOAM		6 7 12	5.0 B	17.0
	826.30			
STIFF tan SILTY CLAY LOAM	-25	5 4 7	1.9 B	23.0
	823.80			
STIFF reddish brown CLAY LOAM		3 5 10	1.7 S	20.0
	820.80			
VERY DENSE tan weathered LIMESTONE	819.80 -30	100/8"		
End of Boring				
	-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 1/21/09

ROUTE FAP 301 DESCRIPTION P92-075-05x Proposed I-39 SB Ramp BD LOGGED BY W. Garza

SECTION (201-3)K (4-1, 5)K LOCATION Cherry Valley Twp. - 9NW, SW, SEC. , TWP. 43N, RNG. 2E

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

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

BORING NO. B-2a
Station 160+00
Offset 0.00ft CL
Ground Surface Elev. 850.10 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 (%)
MEDIUM brown SILTY CLAY LOAM			0.5 P	9.0
	848.10			
MEDIUM tan weathered LIMESTONE fill		10 8 6		
	846.60			
DENSE tan weathered LIMESTONE fill	-5	16 10 24		
	844.10			
MEDIUM tan weathered LIMESTONE fill		5 5 21		
	841.60			
DENSE tan weathered LIMESTONE fill	-10	8 16 16		
	839.10			
MEDIUM tan weathered LIMESTONE fill		16 13 8		
	836.10			
SOFT tan/brown SANDY LOAM with tan weathered LIMESTONE	-15	6 5 7	0.3 P	17.0
	834.10			
VERY STIFF brown SILTY CLAY LOAM		7 7 10	3.5 B	18.0
	831.60			
STIFF brown SILTY CLAY LOAM	-20	4		
STIFF brown SILTY CLAY LOAM *(continued)*		5 8	2.0 B	23.0
	829.10			
STIFF brown/gray SILTY LOAM with SAND lens		4 5 6	1.8 P	14.0
	826.60			
STIFF tan/gray SANDY LOAM	-25	3 6 8	1.3 S	12.0
	824.10			
STIFF tan/gray SANDY LOAM		3 2 3	1.1 S	13.0
	821.60			
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
Illinois Department of Transportation

SOIL BORING LOG

Date 6/19/12

ROUTE Bypass 20, FAP 301 DESCRIPTION P92-075-08 Proposed bridge, I-39 NB to WB US 20 Bypass - Ramp bridge LOGGED BY W. Garza

SECTION (3, 4) R LOCATION Cherry Valley Twp. - 9NW, SEC. , TWP. 43N, RNG. 2E

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

STRUCT. NO. _____
Station _____

BORING NO. B-1i
Station 2564+45
Offset 21.00ft Lt BL
Ground Surface Elev. 850.9 ft

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

Groundwater Elev.:
First Encounter None ft
Upon Completion Dry ft
After _____ Hrs. _____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
848.40				MEDIUM tan ROAD ROCK (fill)
	9			
	8			
846.90	13			
-5				
	12			MEDIUM tan ROAD ROCK (fill)
	14			
844.40	14			
	3			DENSE tan ROAD ROCK (fill)
	13			
841.90	20			
-10				
	16			DENSE tan ROAD ROCK (fill)
	18			
839.40	17			
	13			DENSE tan ROAD ROCK
	20			
	13			
836.40				
-15				
	4			STIFF gray/tan SILTY CLAY LOAM
	2	1.1	19	
834.40	4	P		
	6			VERY STIFF brown SILTY CLAY LOAM
	8	3.3	17	
831.90	11	B		
-20				

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
	6			STIFF/VERY STIFF brown LOAM
	6	2.0	18	
829.40	7	S		
	3			STIFF gray SILTY LOAM
	5	1.4	14	
826.90	9	S		
-25				
	5			STIFF tan SANDY LOAM
	6	1.6	14	
	9	B		
823.90				
	7			VERY DENSE tan weathered LIMESTONE
	100/3"			
821.90				Auger Refusal @ 29'
				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)

BBS, from 137 (Rev. 8-99)

Illinois Department of Transportation
Division of Highways
Illinois Department of Transportation

SOIL BORING LOG

Date 6/20/12

ROUTE Bypass 20, FAP 301 DESCRIPTION P92-075-08 Proposed bridge, I-39 NB to WB US 20 Bypass - Ramp bridge LOGGED BY W. Garza

SECTION (3, 4) R LOCATION Cherry Valley Twp. - 9NW, SEC. , TWP. 43N, RNG. 2E

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

STRUCT. NO. _____
Station _____

BORING NO. B-2i
Station 2565+87
Offset 25.00ft Rt BL
Ground Surface Elev. 850.0 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 (%)
VERY STIFF light brown SILTY CLAY LOAM		7 9 9	2.3 B	23
	828.50			
STIFF light brown SILTY CLAY LOAM		4 4 7	1.0 P	20
	825.50			
	-25			
VERY DENSE tan weathered LIMESTONE		14 20 64		
	823.50			
VERY DENSE tan weathered LIMESTONE		100/3"		
	821.00			
Borehole continued with rock coring.				
	-30			
	-35			
	-40			
VERY DENSE tan ROAD ROCK		31 43 17		
	847.50			
	846.00			
	-5			
MEDIUM tan ROAD ROCK		19 14 15		
	843.50			
	841.00			
	-10			
DENSE tan ROAD ROCK		23 22 11		
	838.50			
MEDIUM tan ROAD ROCK		8 6 5		
	836.00			
	-15			
DENSE tan ROAD ROCK		23 19 13		
	833.50			
MEDIUM tan dirty LIMESTONE (probably ROAD ROCK)		5 9 19		
	830.50			
	-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
Illinois Department of Transportation

ROCK CORE LOG

Date 6/20/12

ROUTE Bypass 20, FAP 301 DESCRIPTION P92-075-08 Proposed bridge, I-39 NB to WB US 20 Bypass - Ramp bridge LOGGED BY W. Garza

SECTION (3, 4) R LOCATION Cherry Valley Twp. - 9NW, SEC. , TWP. 43N, RNG. 2E

COUNTY Winnebago CORING METHOD

STRUCT. NO.
Station

CORING BARREL TYPE & SIZE

Core Diameter 2 in
Top of Rock Elev. 825.50 ft
Begin Core Elev. 821.00 ft

BORING NO. B-2i
Station 2565+87
Offset 25.00ft Rt BL
Ground Surface Elev. 850.0 ft

		DEPTH (ft)	CORE (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
Dolomite: tan-buff, pitted, fractured and laminated, aphanitic and dense. t.s.f.: 818.4 to 817.8	821.00	-30	1	95	27	2	267
	816.00						
Dolomite: as above, although massively bedded. t.s.f.: 813.6 to 813.0		-35	2	100	82	1.6	355
	811.00						
End of Boring		-40					
		-45					

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
Illinois Department of Transportation

SOIL BORING LOG

Date 6/26/12

ROUTE Bypass 20, FAP 301 DESCRIPTION P92-075-08 Proposed bridge, I-39 NB to WB US 20 Bypass - Ramp bridge LOGGED BY W. Garza

SECTION (3, 4) R LOCATION Cherry Valley Twp. - 9NW, SEC. , TWP. 43N, RNG. 2E

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

STRUCT. NO. _____
Station _____

BORING NO. B-3i
Station 2563+00
Offset 40.00ft Lt BL
Ground Surface Elev. 850.9 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 (%)
DENSE tan ROAD ROCK	848.40	11 19 14		
	846.90			
	-5			
MEDIUM tan ROAD ROCK Hard Drilling		5 10 17		
	844.40			
	841.90			
	-10			
VERY DENSE tan ROAD ROCK		6 32 23		
	838.90			
STIFF light brown LOAM		3 3 8	1.2 B	20
	836.90			
	-15			
STIFF light brown SANDY LOAM		8 13 12	1.9 S	10
	834.40			
STIFF tan SILTY LOAM		2 3 3	2.0 P	16
	831.90			
	-20			
STIFF tan SILTY LOAM		2 3 6	1.1 P	20
	829.40			
STIFF tan SILT		5 5 9	1.1 P	15
	826.40			
	-25			
MEDIUM redish brown fine SAND		6 7 11		
	824.40			
MEDIUM redish brown fine SAND		6 5 6		
	821.40			
	-30			
STIFF tan TILL with LIMESTONE fragments		4 15 8	1.3 P	12
	818.90			
VERY DENSE tan weathered LIMESTONE	817.90	100/2"		
Auger Refusal @ 33'				
Borehole continued with rock coring.				
	-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
Illinois Department of Transportation

ROCK CORE LOG

Date 6/26/12

ROUTE Bypass 20, FAP 301 DESCRIPTION P92-075-08 Proposed bridge, I-39 NB to WB US 20 Bypass - Ramp bridge LOGGED BY W. Garza

SECTION (3, 4) R LOCATION Cherry Valley Twp. - 9NW, SEC. , TWP. 43N, RNG. 2E

COUNTY Winnebago CORING METHOD

STRUCT. NO.
Station

CORING BARREL TYPE & SIZE

Core Diameter 2 in
Top of Rock Elev. 821.40 ft
Begin Core Elev. 817.90 ft

BORING NO. B-3i
Station 2563+00
Offset 40.00ft Lt BL
Ground Surface Elev. 850.9 ft

	DEPTH (ft)	CORE (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
Dolomite: tan-buff, pitted, 2-foot void encountered from 816.9 to 814.9, mostly fractured thereafter. t.s.f.: 813.9 to 813.4	817.90	1	50	27	1	240
	-35					
	812.90					
Dolomite: as above, although massively bedded, pitted and honey-combed. t.s.f.: 811.2 to 808.9		2	100	77	1.6	452
	-40					
	807.90					
Dolomite: as above. t.s.f.: 805.3 to 804.8		3	100	73	1.6	497
	-45					
	802.90					
Dolomite: as above. t.s.f.: 799.7 to 798.6		4	100	58	1.8	537
	-50					
	797.90					

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 3/7/06

ROUTE FAI 39 DESCRIPTION P92-075-05 Soil Survey, I-39 S.B. Bridge at Bypass 20, south edge of Rockford 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-15
Station 12564+44
Offset 40.00ft Lt CL
Ground Surface Elev. 850.2 ft

Surface Water Elev. ft
Stream Bed Elev. ft

Groundwater Elev.:
First Encounter None ft
Upon Completion Dry ft
After Hrs. ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
SOFT brown SANDY LOAM			0.3 P	15
	848.20			
MEDIUM tan weathered LIMESTONE fill		14 11 9		
	846.20			
	-5			
MEDIUM tan weathered LIMESTONE fill		16 15 14		
	843.70			
MEDIUM tan weathered LIMESTONE fill		21 15 12		
	841.20			
	-10			
DENSE tan weathered LIMESTONE fill		17 15 26		
	838.70			
DENSE tan weathered LIMESTONE fill		14 26 21		
	836.20			
	-15			
DENSE tan weathered LIMESTONE fill		12 26 16		
	833.70			
DENSE tan weathered LIMESTONE fill with SILTY CLAY lens		10 18 19		
	830.70			
	-20			
VERY STIFF dark gray LOAM		6 6 20	3.3 P	10
	828.70			
VERY STIFF redish brown SANDY LOAM		8 10 12	3.5 S	13
	826.20			
	-25			
STIFF brown SILTY LOAM		4 5 5	1.1 S	18
	823.20			
MEDIUM tan weathered LIMESTONE		5 11 11		
	821.20			
	-30			
DENSE tan weathered LIMESTONE		4 8 38		
	818.70			
VERY DENSE tan weathered LIMESTONE		36 100/9"		
	816.20			
Auger Refusal @ 34.0'				
Box #10				
Time: 8 minutes				
FAIR tan LIMESTONE				
100% Recovery				
	811.20			
	-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 3/7/06

ROUTE FAI 39 DESCRIPTION P92-075-05 Soil Survey, I-39 S.B. Bridge at Bypass 20, south edge of Rockford 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-15
Station 12564+44
Offset 40.00ft Lt CL
Ground Surface Elev. 850.2 ft

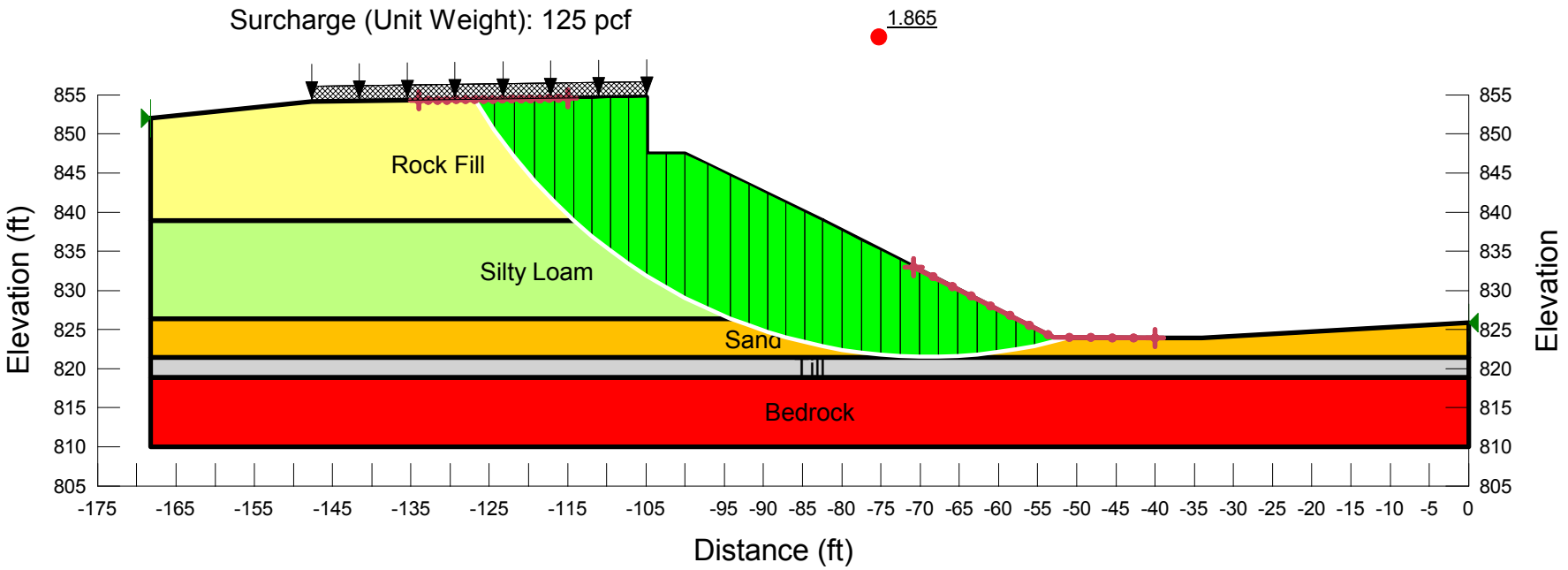
Surface Water Elev. ft
Stream Bed Elev. ft

Groundwater Elev.:
First Encounter None ft
Upon Completion Dry ft
After Hrs. ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Time: 8 minutes FAIR tan LIMESTONE 100% Recovery *(continued)*				
806.20				
Time: 8 minutes FAIR tan LIMESTONE 100% Recovery	-45			
801.20				
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)

I-39 Ramp DA Over Ramp BD



Name: Rock Fill Unit Weight: 125 pcf Cohesion': 0 psf Phi': 40 °
Name: Silty Loam Unit Weight: 115 pcf Cohesion': 1,450 psf Phi': 0 °
Name: Sand Unit Weight: 120 pcf Cohesion': 0 psf Phi': 32 °
Name: Till Unit Weight: 120 pcf Cohesion': 1,300 psf Phi': 0 °
Name: Bedrock

Title: Ramp DA Over BD
File Name: Ramp DA over BD.gsz
Last Edited By: Ryan Damery
Date: 2/25/2016

HANSON
Engineering | Planning | Allied Services