Structural Geotechnical Report

IL-132 (Grand Avenue) from Deep Lake Road to Munn Road Dryland Bridge

IDOT Job: D-91-116-17

Proposed SN: 049-D030

Existing SN: 049-D002

Contract No. 62D86

Lake County, Illinois

Prepared for:

Patrick Engineering
4970 Varsity Drive
Lisle, Illinois 60532

Prepared by:

Geo Services, Inc.
805 Amherst Court
Suite 204
Naperville, Illinois 60565
(630) 305-9186

GSI Job No. 17004

11/11/2019

Geo Services, Inc.
Geotechnical, Environmental and Civil Engineering
An MBE - DBE Firm

Revised November 11, 2019
October 8, 2019
February 27, 2019
October 26, 2018

Patrick Engineering
4970 Varsity Drive
Lisle, Illinois 60532

Attn: Mr. Jarrod Cebulski

Job No. 17004

Re: IL-132 Structural Geotechnical Report
IL-132 (Grand Avenue) from Deep Lake Road to Munn Road
IDOT Contract P-91-410-13
Lake County, Illinois

Dear Mr. Cebulski:

The following Structural Geotechnical Report (SGR) report presents our recommendations for the replacement for the existing land bridge along IL-132 (Grand Avenue) just east of Deep Lake Road and west of Munn Road. A total of ten (10) structural soil borings (BSB-01 through BSB-10) were completed at the site by Geo Services, Inc. (GSI). Copies of these boring logs, along with soil profiles, are included in this report.

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

Very truly yours,

GEO SERVICES, Inc.

Andrew J. Ptak, P.E.
Office Manager
Email: drew@geoservicesinc.net

ANDREW J. PTAK
062-052031
LICENSED
PROFESSIONAL
ENGINEER
STATE OF ILLINOIS

expires 11/30/19

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APPENDICES

SECTION 01: PROJECT DESCRIPTION AND SCOPE

This report presents the results of the geotechnical investigation for the proposed land bridge along IL-132 (Grand Avenue) road widening project in Lake County. The results of the ten (10) structure borings (BSB-01 through BSB-10) completed by Geo Services, along with site location map, boring plan and profiles, are included with this report.

Boring locations were selected by Geo Services, Inc. within guidelines of the IDOT Geotechnical Manual. Boring locations were laid out in the field by Geo Services, Inc. personnel at the proposed locations using a GPS device. Elevations were taken from topographic information provided by Patrick Engineering and are shown on the boring logs.

This report includes recommendations for design options for the proposed land bridge, description of soil and groundwater conditions, general construction considerations for the site, site location map, soil profiles, boring location diagram and boring logs.

The existing land bridge is located between Deep Lake Road to the west and Munn Road to the east in Lake County, Illinois. The bridge begins immediately at Victory Drive on the west and runs approximately 940 feet eastward, excluding 20-ft approach slabs on each end. The land bridge currently carries 4 lanes of traffic (2 lanes in each direction) with no sidewalks on either side of the existing bridge. It is proposed to be reconstructed with a larger width to accommodate the 5 lanes of traffic (2-lanes in each direction with a center median lane). There is a box culvert located near station 69+75, and it will be replaced. The proposed culvert will have its own structure number (SN: 049-0615) and its own SGR.

The existing land bridge is proposed to be removed and replaced with a new pile supported land bridge. Factored pile loads per the structural engineer (Patrick Engineering) are 80 kips per pile for the exterior piles and 150 kips per pile for the interior piles.

According to the IL-132 Bridge Condition Report, the existing land bridge consists of 14 – three-span reinforced concrete units supported on 12” metal shell piles (total of 314 piles). Eight piles (spaced 6’-3’) exist at the interior pile lines, while 6 piles (spaced 8’-6”) are located at the exterior pile lines. Bridge units are approximately 67’ long for the 12 interior units while the exterior units are 68 feet in length. The shell piles were driven to a variety of lengths from 39’ to 61’ for purposes of achieving a minimum bearing load of 45 tons, with a designed maximum loading of 34 tons. Underlying the bridge slab is 4 inches of aggregate base course. The bridge is not skewed.

SECTION 02: FIELD EXPLORATION

Subsurface Exploration and Testing

The borings were performed in the month of October, 2017 with a truck-mounted drilling rig and were advanced by means of hollow stem augers or rotary drilling techniques. Representative soil samples were obtained employing split spoon sampling procedures in accordance with AASHTO Method T-206. Samples obtained in the field were returned to our laboratory for further examination and testing.

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

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

The soil testing program included performing water content, density and either unconfined compression and/or calibrated penetrometer tests on the cohesive samples recovered. Water content tests were performed on the non-cohesive samples recovered. These tests were performed upon representative portions of the samples obtained in the field. The results of the above testing, along with a visual classification of the material based upon both the Illinois textural classification and the AASHTO Soil Classification System, are indicated on the boring logs.

Subsurface Conditions

The majority of the borings were performed adjacent to the existing land bridge. Bridge deck cores consisted of approximately 13.75 to 22.5 inches (note: 22.5” is likely in a location of a land bridge pier) of reinforced concrete. Underlying the pavement section, the borings generally encountered soft clay, peat and organic soils ranging in depths of 15 to 25 feet from the surface. Underlying the peat and organics, the borings generally encountered varying strata of stiff to very stiff clay loam with few strata of dense to very dense sandy loams to the end-of-boring elevation near elevation 685 feet.

Moisture contents of the stiff to very stiff clay soils were typically in the tens to twenties, while moisture contents of the non-cohesive soils were around the tens to low twenties.

Organic soils moisture contents were 40% to 60% and the peat soils moisture contents varied in the 60% to 400% range.

Ground water was encountered at depths of 2 to 6 feet below the surface in majority of boring with the exception of BSB-01 and BSB-10 where ground water was encountered at depths 14.5 to 18 ft.

For specific boring information, boring logs are located in Appendix C.

SECTION 03: GEOTECHNICAL EVALUATIONS AND RECOMENDATIONS

Settlement Analysis

Settlement calculations have been performed considering standard fill (120 pcf of cohesive or granular material) with heights ranging from 0 to 6 feet (based on Plan and Profile) of new fill in the widened areas of the roadway and about 2.5 feet of fill in the area where the existing bridge is. The presence of high moisture peat along with very loose organic clay between Sta. 62+00 and Sta. 69+50 were taken into consideration while calculating settlement. Considering these assumptions, a majority of the area will have 6" (primary) to 15" (primary + long term secondary) of settlement. Settlement will be a concern in areas where its greater than 0.4 inches (from Sta. 62+00 to Sta. 69+50), and down drag will need to be addressed in design.

With a fill material that has a unit weigh of 65 pcf, assuming the native soil has a unit weight of 120 pcf, this means 1 foot of the native soil can be replaced with about 1.5 feet of the new fill without increasing the net load on the soils below the removal and replacement line.

The table below has an estimated removal depth required for different fill heights (for different land bridge section) in order to achieve load balance and minimize settlement.

Table 1 – Estimated Removal and Replacement Depths for different fill heights For side embankment

Fill Height (ft.)	Est. Removal and Replacement Depth Required for load balance
3	1.75
6	3.5

We do not recommend the removal and replacement to be performed beyond the depth of the existing ground water. The average ground water depth between Sta. 62+00 to Sta. 69+50 is around EL. 766.2.

Settlement discussion and recommendations for the culvert will be included in the culvert's SGR.

Slope Stability Analysis

The Plans and profile are showing that around 6 feet of shoulder embankment with 1:4 slopes will be required to raise proposed areas to Finished ground elevation.

Due to the presence of peat at elevations between 761.8 to 769.1 from Sta. 62+00 to 69+50 with high moisture content (up to 445%), and based on our slope stability analysis which is resulting a FOS of 1.3 (less than FOS=1.5), we anticipate that slope stability for the proposed side embankment will be a concern, and these subgrade improvements will be addressed in the Roadway Plans (per TS&L) and the Roadway Geotechnical Report (RGR).

In addition, it should be noted that utilities directly north and south of the IL-132 existing land bridge will need to be considered. Additional excavations will likely impact or force a relocation of the utilities, and utility companies will likely need to be consulted with the alternates. The utility companies will likely require protection of the lines, and utilities might need to be pile supported.

Seismic Analysis

The Seismic Site Class for this project is Class D. It was determined using IDOT's LRFD Soil Site Class Definition.

The seismic spectral acceleration parameters were determined using AASHTO as a Design Code Reference Document in U.S. Seismic Design Maps in USGS' website.

As per Fig. 2.3.10-3 in the Bridge Manual, the Seismic Performance Zone is Zone 1

Table 2 – Seismic Data Summary

Site Class	D
Design Spectral Acceleration at 1.0 sec (S_{D1})	0.076 g
Design Spectral Acceleration at 0.2 sec (S_{Ds})	0.124 g
Seismic Performance Zone (SPZ)	1

Coal Mine Activity

According to the data available ISGS website, there are no documented coal mining operations in near vicinity to the project site and seismic activity is noted to be very low. No data for previous mining in Lake County was provided by Illinois State Geological Survey or University of Illinois at Urbana-Champaign.

SECTION 04: FOUNDATION RECOMMENDATIONS

Deep Foundation Recommendations

After the discussions between IDOT, Patrick Engineer, and GSI, it is IDOT's desire to remove the exiting dryland bridge and replace it with a new pile supported dryland bridge using stage construction.

In this report, we will provide recommendations for pile supported dryland bridge.

H-piles are geotechnically feasibly however, since bedrock was not encountered in any of the borings, it is not recommended to use H-piles in this location because it will be difficult to estimate pile driving lengths and they will extend beyond the depth of the borings. In addition to the H-piles being anticipated to be driven deeper and given the highly unpredictable driving depth, having longer driven piles may potentially lead to unplanned splices, resulting in time delays.

Based on the results of the borings and type of structure and loading, we recommend a deep foundation system consisting of friction Metal Shell piles to be used for the support of the proposed land bridge. Since settlement is greater than 0.4 inches between Sta. 62+00 and Sta. 69+50, downdrag should be included in MS-Pile design. Proposed piles should be spaced to avoid the existing piles. It should be noted that Metal Shell piles could be damaged if driven though coarse granular soils; therefore, coarse granular fill should be avoided to be used below the proposed structure.

Pile capacities and lengths were calculated to the piles' maximum Nominal Required Bearing (NRB) for Metal Shell 12"Φ w/.25" and Metal Shell 14"Φ w/.312" as prescribed by IDOT for drivability.

As per the IDOT Design Guide AGMU Memo 10.2, dated October 2011, the Washington State DOT (WSDOT) formula has replaced the FHWA Gates Formula as the standard method of construction verification. A modified IDOT static method was used to develop the SGR pile design tables. Nominal required bearing was calculated from LRFD skin-friction (with pile type correction factors) and end-bearing calculations. A value of 1.04 is used for Bias Factor Ratio (I_G). A geotechnical resistance factor (Φ_G) of 0.55 was used in calculations for the Strength Limit State and a geotechnical

resistance factor (Φ_G) of 1.0 was used for the Extreme Limit State (essentially the NRB = Extreme Limit State).

Table 3 - Estimated Pile Lengths for Metal Shell 12"Φ w/.25" walls With Downdrag from Sta. 62+00 to 69+50

STATION (BORING)	ESTIMATED PILE TIP ELEVATION (FT.)	R_N NOMINAL REQUIRED BEARING OF PILE (KIPS)	FACTORED RESISTANCE AVAILABLE (KIPS)	ESTIMATED PILE DRIVABLE LENGTH (FT.)	ASSUMED PILE CUTOFF ELEVATION (FT.)
60+00 to 62+00 (BSB-01)	720.56	392	216	57	777.86
62+00 to 64+00 (BSB-03)	702.40	392	165	72	774.87
64+00 to 65+50 (BSB-04)	697.60	392	114	76	773.71
65+50 to 66+50 (BSB-05)	701.40	392	183	73	773.94
66+50 to 68+50 (BSB-07)	703.35	392	198	71	774.69
68+50 to 69+50 (BSB-09)	694.30	392	188	81	775.50
69+50 to 71+00 (BSB-10)	714.60	392	216	61	775.88

Table 4 - Estimated Pile Lengths for Metal Shell 14"Φ w/.312" walls With Downdrag from Sta. 62+00 to 69+50

STATION (BORING)	ESTIMATED PILE TIP ELEVATION (FT.)	R_N NOMINAL REQUIRED BEARING OF BORING (KIPS)	FACTORED RESISTANCE AVAILABLE (KIPS)	ESTIMATED PILE DRIVABLE LENGTH (FT.)	ASSUMED PILE CUTOFF ELEVATION (FT.)
60+00 to 62+00 (BSB-01)	709.56	570	314	68	777.86
62+00 to 64+00 (BSB-03)	691.40	570	254	83	774.87
64+00 to 65+50 (BSB-04)	697.60	570	196	76	773.71
65+50 to 66+50 (BSB-05)	701.40	570	275	73	773.94
66+50 to 68+50 (BSB-07)	703.35	570	293	71	774.69
68+50 to 69+50 (BSB-09)	694.30	570	281	81	775.50
69+50 to 71+00 (BSB-10)	705.60	570	314	70	775.88

The modified IDOT static method was used to develop the SGR pile design tables. Nominal required bearing was calculated from LRFD skin-friction (with pile type correction factors) and end-bearing calculations. A geotechnical resistance factor (Φ_G) of 0.55 was used in calculations for the Strength Limit State. Pile lengths were picked with respect to the loadings and geometry of the proposed structures.

The existing piles will be left in place and the top portion of the existing piles maybe cut if needed. The proposed piles should be spaced to avoid conflict with the existing piles.

The pile tables, provided in Appendix G are estimates. For final pile length selections, we recommend that a minimum of one test pile be performed at a spacing of 70 to 100 feet along the alignment of the bridges. The piles should be driven until satisfactory

driving resistance is developed in accordance with an appropriate pile driving formula. The test piles shall be driven to 110 percent of the Nominal Required Bearing indicated in the pile data information.

Lateral Load Analysis

The following table is a summary of lateral soil parameters to be used for design of the deep foundation system

Table 5 – Soil Parameters for Lateral Resistance

Material (elevation, feet)	Unit Weight (pcf)	Drained Friction Angle (°)	Undrained Cohesion (psf)	Lateral Modulus of Subgrade Reaction (pci)	Strain
Surface to 769.1 Silty Clay Medium stiff	120	28	500	50	0.010
769.1 to 753.60 Peat and Organics	80	10	-	-	-
753.60 to 733.0 Clay Loam Stiff to very stiff	120	28	1,500	400	0.006
Below 733.0 Clay Stiff to very stiff	125	28	2,520	750	0.005

1. Values recommended for use in design from L-pile Software Manual.

SECTION 05: CONSTRUCTION CONSIDERATIONS

If excavation for the proposed improvements are in excess of 4 feet, we recommend slopes be in accordance with OSHA safety standards and requirements for temporary side slopes. Movement of adjacent soils near the edge of and into excavation areas should be prevented. All excavations should be performed in accordance with the latest Occupational Safety and Health Administration (OSHA) requirements. Allowances should be made for any surcharge loads adjacent to the excavation areas.

Borings indicate that the water table will be located within clay soils; in general, ground water should be able to be controlled with sump pump and pit procedures. Due to the project site being in/around wet lands, it is anticipated that surficial runoff may have to be controlled with sand bags and/or a temporary berm wall.

Traffic will be maintained using stage construction.

SECTION 06: GENERAL QUALIFICATIONS

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

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

APPENDIX A
General Notes

GENERAL NOTES

CLASSIFICATION

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

Cohesionless Soils

Relative Density	No. of Blows per foot N
Very Loose	0 to 4
Loose	4 to 10
Medium Dense	10 to 30
Dense	30 to 50
Very Dense	Over 50

Cohesive Soils

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

TERMINOLOGY

Streaks are considered to be paper thick. **Lenses** are considered to be less than 2 inches thick. **Layers** are considered to be less than 6 inches thick. **Stratum** are considered to be greater than 6 inches thick.

DRILLING AND SAMPLING SYMBOLS

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

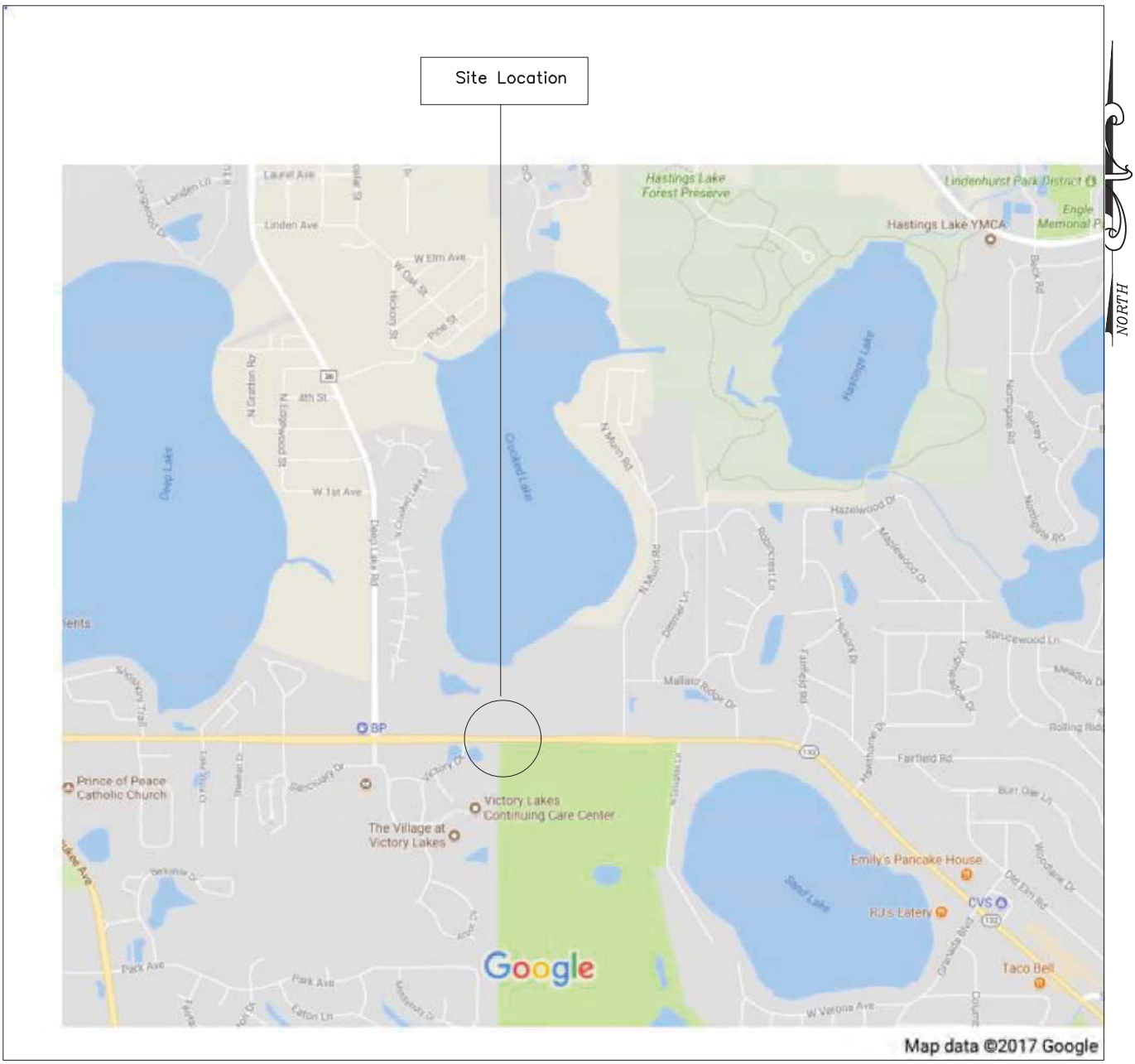
Standard "N" Penetration: Blows per foot of a 140 lb. hammer falling 30" on a 2" O.D. Split Spoon

WATER LEVEL MEASUREMENT SYMBOLS

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

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

APPENDIX B
Site Location Map



SITE MAP			
IL–132 SGR IL–132 From Deep Lake to Munn Lake County, Illinois	Geo Services, Inc. Geotechnical, Environmental & Civil Engineering 805 Amherst Court, Suite 204 Naperville, Illinois 60565 (630) 355-2838	DRAWN BY	SI
		APPROVED BY	AJP
		DATE	August 24, 2018
		GSI JOB No.	17004
		SCALE	Not To Scale

APPENDIX C
Boring Location Plan and Profile and Boring Plot

PRELIMINARY PRINT

VILLAGE OF LINDENHURST

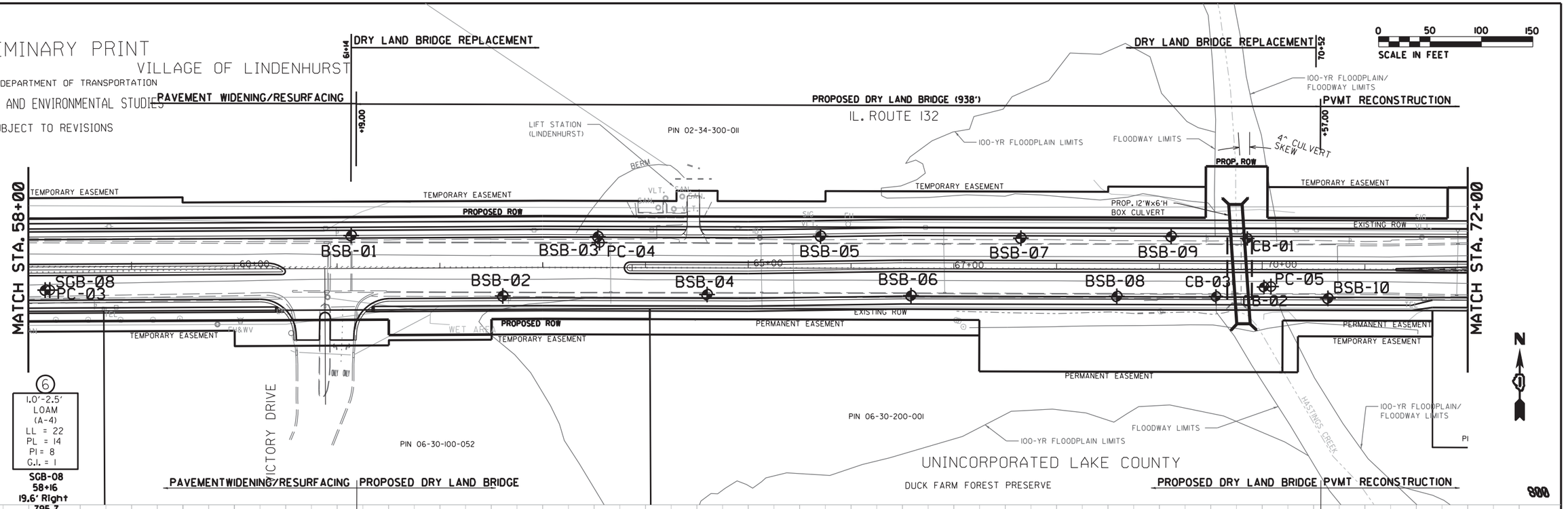
ILLINOIS DEPARTMENT OF TRANSPORTATION

PROJECT AND ENVIRONMENTAL STUDIES

SUBJECT TO REVISIONS

PLAN: SURVEYED, PLOTTED, ALIGNMENT CHECKED, RT. OF WAY CHECKED, CADD FILE NAME, NOTE BOOK, NO., BY, DATE

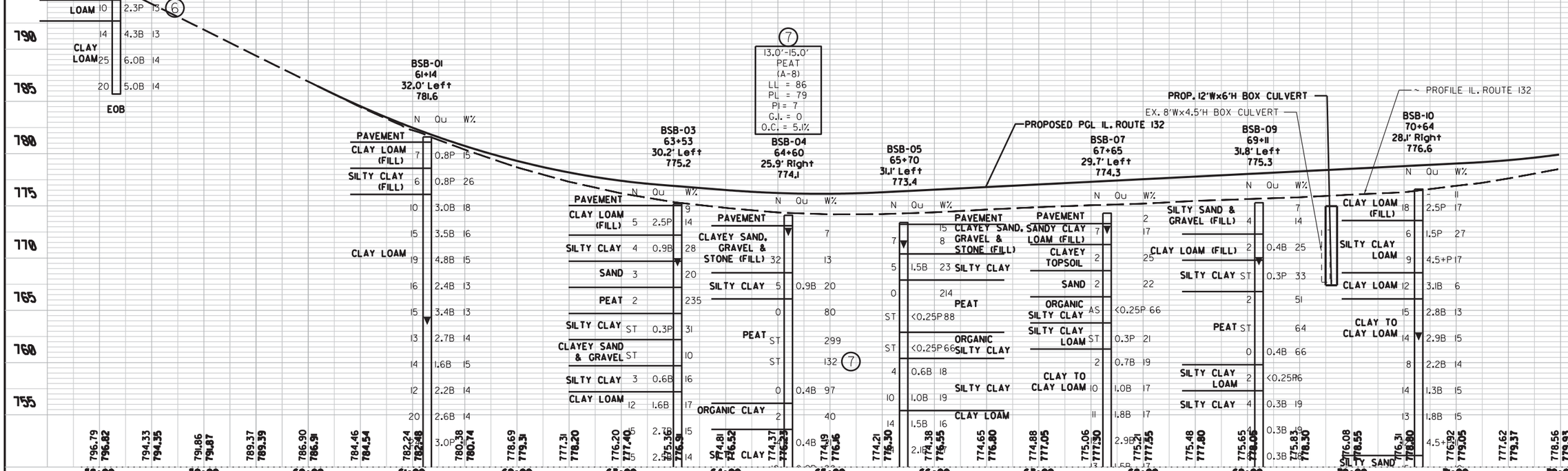
PROFILE: SURVEYED, PLOTTED, GRADES CHECKED, B.M. NOTED, STRUCTURE NO'S/ATN'S CHKD, NOTE BOOK, NO., BY, DATE



⑥ 1.0'-2.5' LOAM (A-4) LL = 22 PL = 14 PI = 8 G.I. = 1

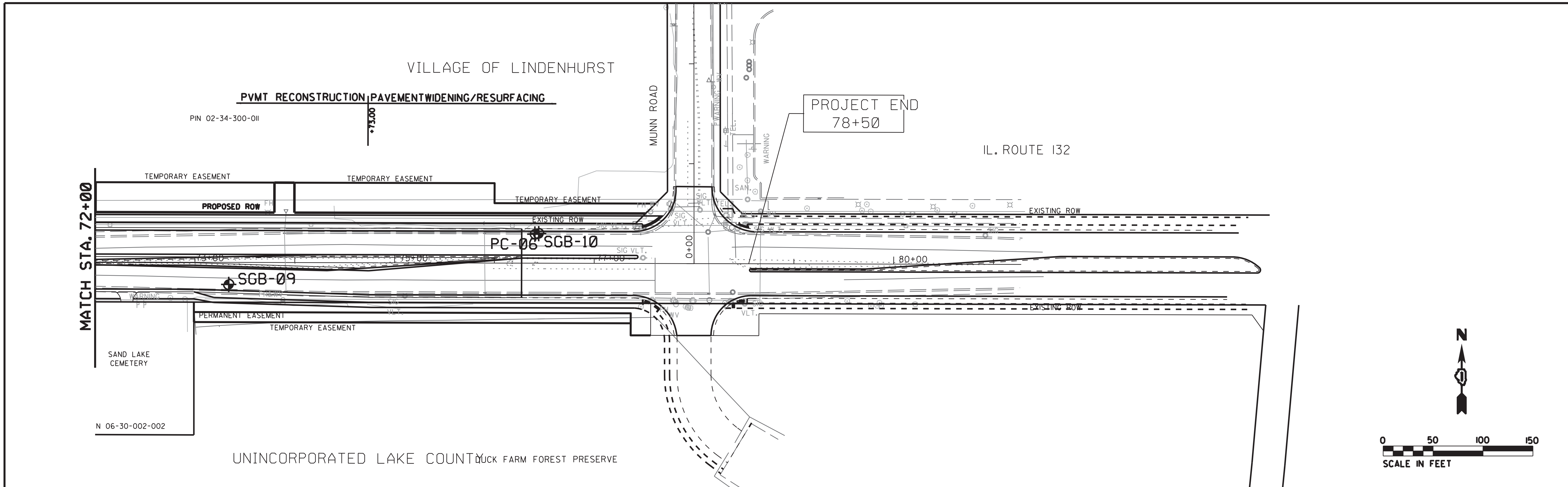
SGB-08 58+16 19.6' Right 795.7

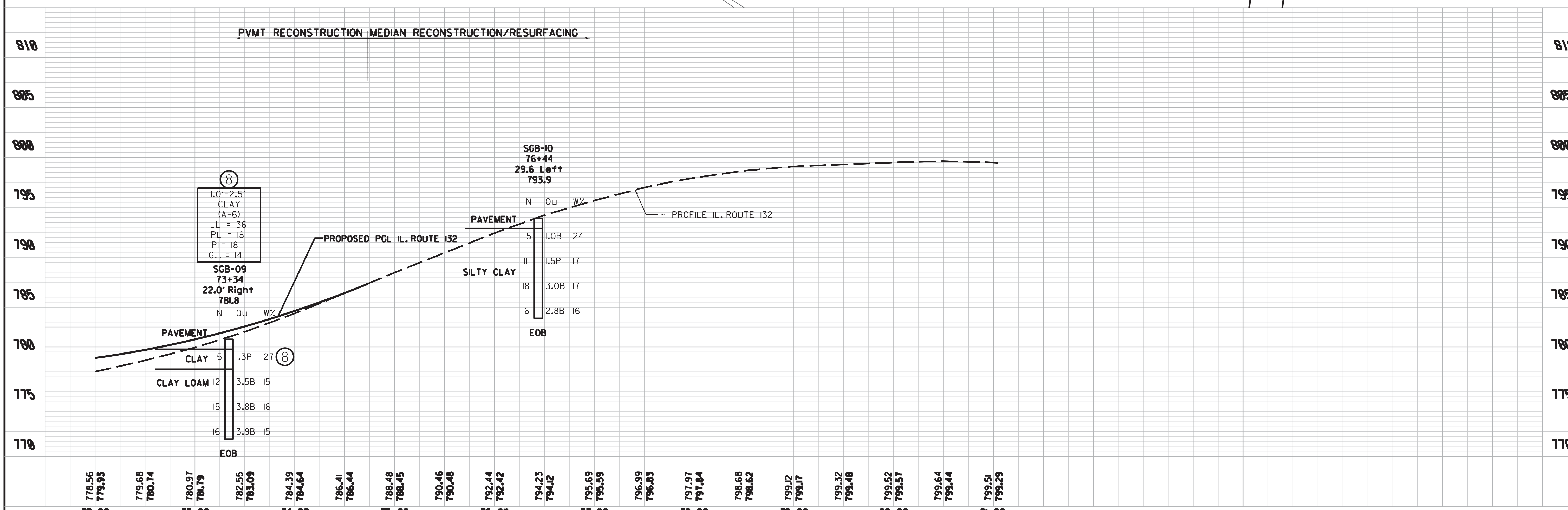
⑦ 13.0'-15.0' PEAT (A-8) LL = 86 PL = 79 PI = 7 G.I. = 0 O.C. = 5.1%



Geo Services, Inc. Geotechnical, Environmental & Civil Engineering 805 Amherst Court, Suite 204 Naperville, Illinois 60565 (630) 355-2838	USER NAME = $USER$	DESIGNED -	REVISED -	STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION	SOIL BORING PLAN & PROFILE IL 132 (GRAND AVE) - DEEP LAKE RD TO McINN RD
		DRAWN - RWC	REVISED -		
	PLOT SCALE = $SCALE$	CHECKED - AJP	REVISED -		SCALE: 1"=50' SHEET 3 OF 4 SHEETS STA. 58+00 TO STA. 72+00
	PLOT DATE = $DATE$	DATE - 11/10/2017	REVISED -		

F.A.P RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
541	A-W&RS-2	LAKE		
		CONTRACT NO.		
		ILLINOIS FED. AID PROJECT		





Geo Services, Inc. Geotechnical, Environmental & Civil Engineering 805 Amherst Court, Suite 204 Naperville, Illinois 60565 (630) 355-2838	USER NAME = $USER$	DESIGNED -	REVISED -
		DRAWN - RWC	REVISED -
	PLOT SCALE = $SCALE$	CHECKED - AJP	REVISED -
	PLOT DATE = $DATE$	DATE - 11/10/2017	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

SOIL BORING PLAN & PROFILE
IL 132 (GRAND AVE) - DEEP LAKE RD TO MUNN RD

SCALE: 1"=50' | SHEET 4 OF 4 SHEETS | STA. 72+00 TO STA. 81+00

F.A.P RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
541	A-W&RS-2	LAKE		

CONTRACT NO.

ILLINOIS FED. AID PROJECT

PLAN: SURVEYED / PLOTTED / ALIGNMENT CHECKED / RT. OF WAY CHECKED / CADD FILE NAME / NOTE BOOK NO. / BY / DATE

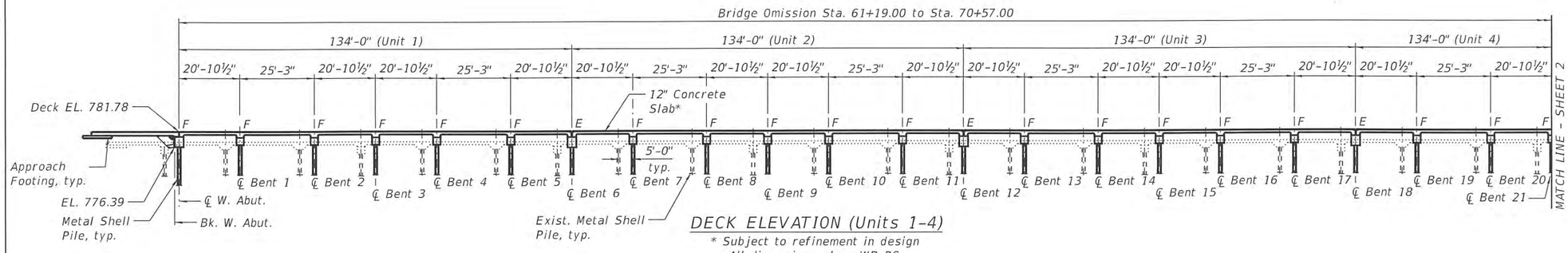
PROFILE: SURVEYED / PLOTTED / GRADES CHECKED / B.M. NOTED / STRUCTURE NOTAT'NS CH'KD / NOTE BOOK NO. / BY / DATE

APPENDIX D
TSL

Benchmark: Chisel "x" on upper flange bolt of fire hydrant at southeast corner of IL Rte. 132 and Victory Dr. intersection just west of dry land bridge, Elev. 791.41

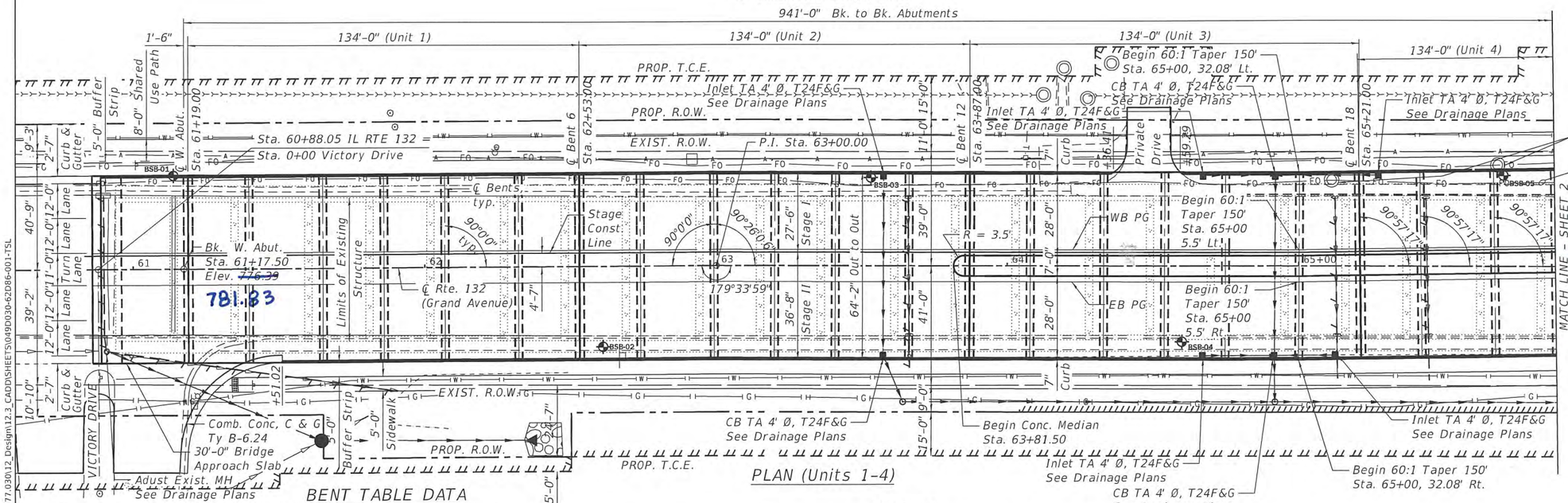
Existing Structure: SN 049-D002, Dry Land Bridge built in 1978 as F.A.P. Rte. 541, Section A-W and RS-1 as 14 three span continuous RC slab units at 67'-0" c.c. piles and 49'-2" wide, 938'-0" total length. Slab is 12" thick at center and tapers to 36" thick at interior supports supported by concrete caps on 12" dia. metal shell piles, 8 piles (interior caps) and 6 piles (exterior caps). Existing bridge, including RC slab, pile caps, and tops of interfering metal shell piles to be removed and replaced. Traffic to be maintained utilizing staged construction.

No salvage.



DECK ELEVATION (Units 1-4)

* Subject to refinement in design
All dimensions along WB PG.

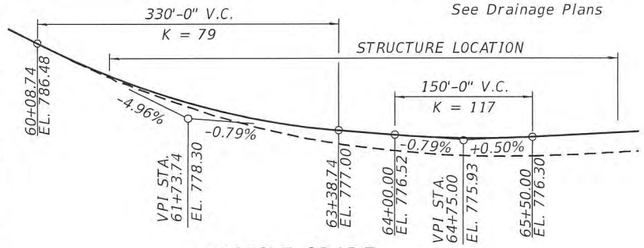


PLAN (Units 1-4)

BENT TABLE DATA

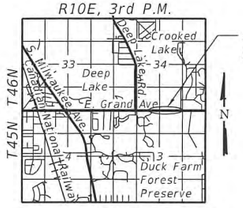
* Subject to refinement in design.

Bent No.	Station at CL Rte. 132	Deck Elev. at WB PG*	Btm. of Cap Elevation*	Bent No.	Station at CL Rte. 132	Deck Elev. at WB PG*	Btm. of Cap Elevation*
Bk. W. Abut.	61+17.50	781.83	776.39	CL of 11	63+66.13	776.79	772.35
CL W. Abut.	61+19.00	781.78	776.34	CL of 12	63+87.00	776.62	771.18
CL of 1	61+39.88	781.07	776.63	CL of 13	64+07.88	776.47	772.03
CL of 2	61+65.13	780.28	775.84	CL of 14	64+33.13	776.31	771.87
CL of 3	61+86.00	779.69	775.25	CL of 15	64+54.00	776.22	771.78
CL of 4	62+06.88	779.14	774.70	CL of 16	64+74.88	776.17	771.73
CL of 5	62+32.13	778.57	774.13	CL of 17	65+00.13	776.16	771.72
CL of 6	62+53.00	778.14	772.70	CL of 18	65+21.00	776.20	770.76
CL of 7	62+73.88	777.78	773.34	CL of 19	65+41.88	776.27	771.83
CL of 8	62+99.13	777.41	772.97	CL of 20	65+67.13	776.39	771.95
CL of 9	63+20.00	777.18	772.74	CL of 21	65+88.00	776.49	772.05
CL of 10	63+40.88	776.98	772.54				



PROFILE GRADE

ALONG EB/WB PG RTE. 132 (GRAND AVE.)



LOCATION SKETCH

HIGHWAY CLASSIFICATION

F.A.P. Rte. 541 IL Rte. 132
Functional Class: Other Principal Arterial
ADT: 21,300 (2013), 29,000 (2040)
ADTT: 1000 (2013), 1470 (2040)
DHV: 1360
Design Speed: 45 m.p.h.
Posted Speed: 45 m.p.h.
Two-Way Traffic
Directional Distribution: 54:46

DESIGN SPECIFICATIONS

2017 AASHTO LRFD Bridge Design Specifications, 8th Edition

DESIGN STRESSES

FIELD UNITS

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

LOADING HL-93

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

SEISMIC DATA

Seismic Performance Zone (SPZ) = 1
Design Spectral Acceleration at 1.0 sec. (SD1) = 0.076 g
Design Spectral Acceleration at 0.2 sec. (SDs) = 0.124 g
Soil Site Class = D

APPROVED
SEP 04 2019
AS A BASIS FOR PREPARATION OF DETAILED PLANS

Note:
Taper stations and offsets relative to roadway centerline.

GENERAL PLAN
IL RTE. 132 DRY LAND BRIDGE
VICTORY DR. TO MUNN RD.
F.A.P. RTE. 541 - SEC. A-W&RS-2
LAKE COUNTY
STATION 65+88.00
STRUCTURE NO. 049-D030

PATRICK ENGINEERING

USER NAME = rhansen	DESIGNED - SSK	REVISED -
	CHECKED - SLC	REVISED -
PLOT SCALE = 40:0.0000 ':' / in.	DRAWN - RMH	REVISED -
PLOT DATE = $DATE	CHECKED - SLC	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

SHEET 1 OF 3 SHEETS

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
541	A-W&RS-2	LAKE	3	1
		CONTRACT NO. 62D86		
	ILLINOIS	FED. AID PROJECT		

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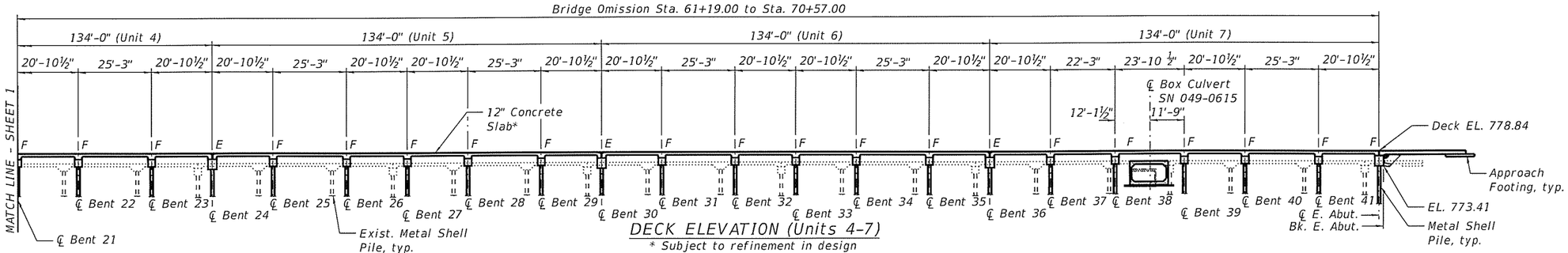
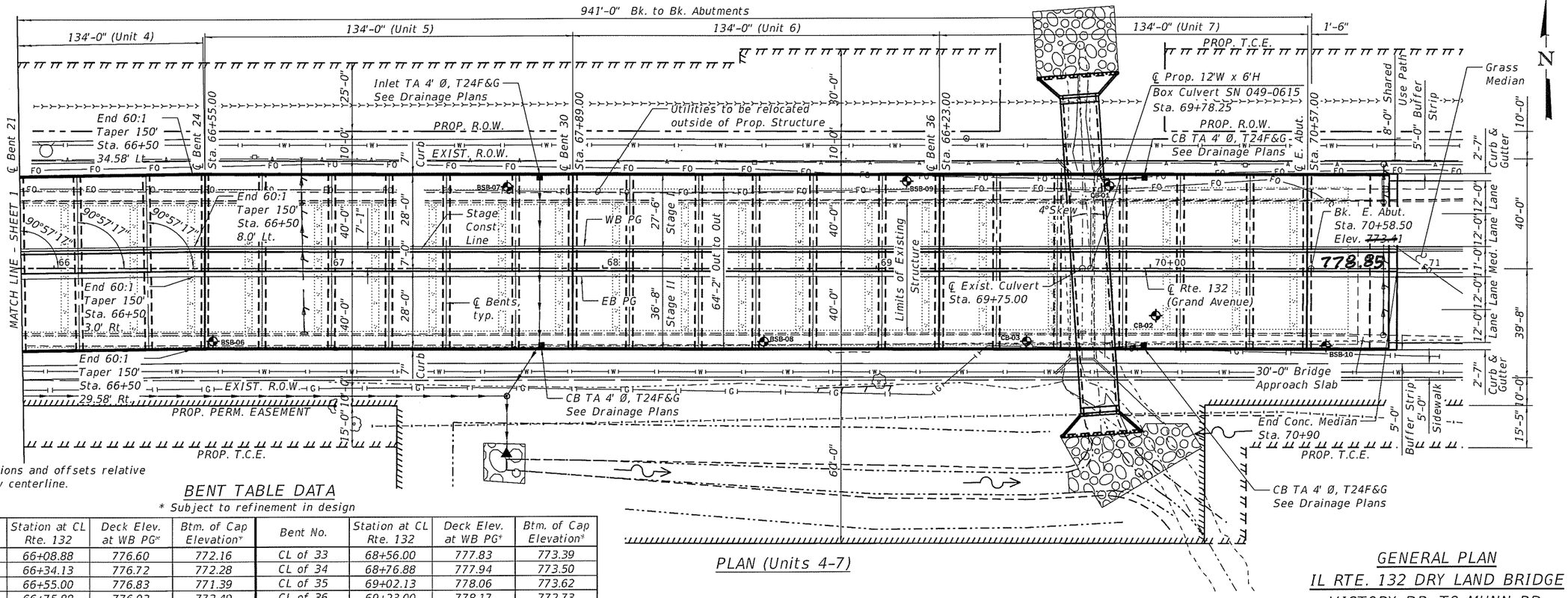


DECK ELEVATION (Units 4-7)

* Subject to refinement in design
All dimensions along WB PG.



PLAN (Units 4-7)

Note:
Taper stations and offsets relative to roadway centerline.

BENT TABLE DATA

* Subject to refinement in design

Bent No.	Station at CL Rte. 132	Deck Elev. at WB PG*	Btm. of Cap Elevation*	Bent No.	Station at CL Rte. 132	Deck Elev. at WB PG*	Btm. of Cap Elevation*
CL of 22	66+08.88	776.60	772.16	CL of 33	68+56.00	777.83	773.39
CL of 23	66+34.13	776.72	772.28	CL of 34	68+76.88	777.94	773.50
CL of 24	66+55.00	776.83	771.39	CL of 35	69+02.13	778.06	773.62
CL of 25	66+75.88	776.93	772.49	CL of 36	69+23.00	778.17	772.73
CL of 26	67+01.13	777.06	772.62	CL of 37	69+43.88	778.27	773.83
CL of 27	67+22.00	777.16	772.72	CL of 38	69+69.13	778.38	773.94
CL of 28	67+42.88	777.27	772.83	CL of 39	69+90.00	778.50	774.06
CL of 29	67+68.13	777.39	772.95	CL of 40	70+10.88	778.61	774.17
CL of 30	67+89.00	777.50	772.06	CL of 41	70+36.13	778.74	774.30
CL of 31	68+09.88	777.60	773.16	CL E. Abut.	70+57.00	778.84	773.40
CL of 32	68+35.13	777.73	773.29	Bk. E. Abut.	70+58.50	778.85	773.41

GENERAL PLAN
IL RTE. 132 DRY LAND BRIDGE
VICTORY DR. TO MUNN RD.
F.A.P. RTE. 541 - SEC. A-W&RS-2
LAKE COUNTY
STATION 65+88.00
STRUCTURE NO. 049-D030

PATRICK ENGINEERING

USER NAME = rhansen	DESIGNED - SSK	REVISED -	
	CHECKED - SLC	REVISED -	
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PLOT DATE = $DATE	CHECKED - SLC	REVISED -	

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

SHEET 2 OF 3 SHEETS

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
541	A-W&RS-2	LAKE	3	2
		CONTRACT NO. 62D86		
		ILLINOIS	FED. AID PROJECT	

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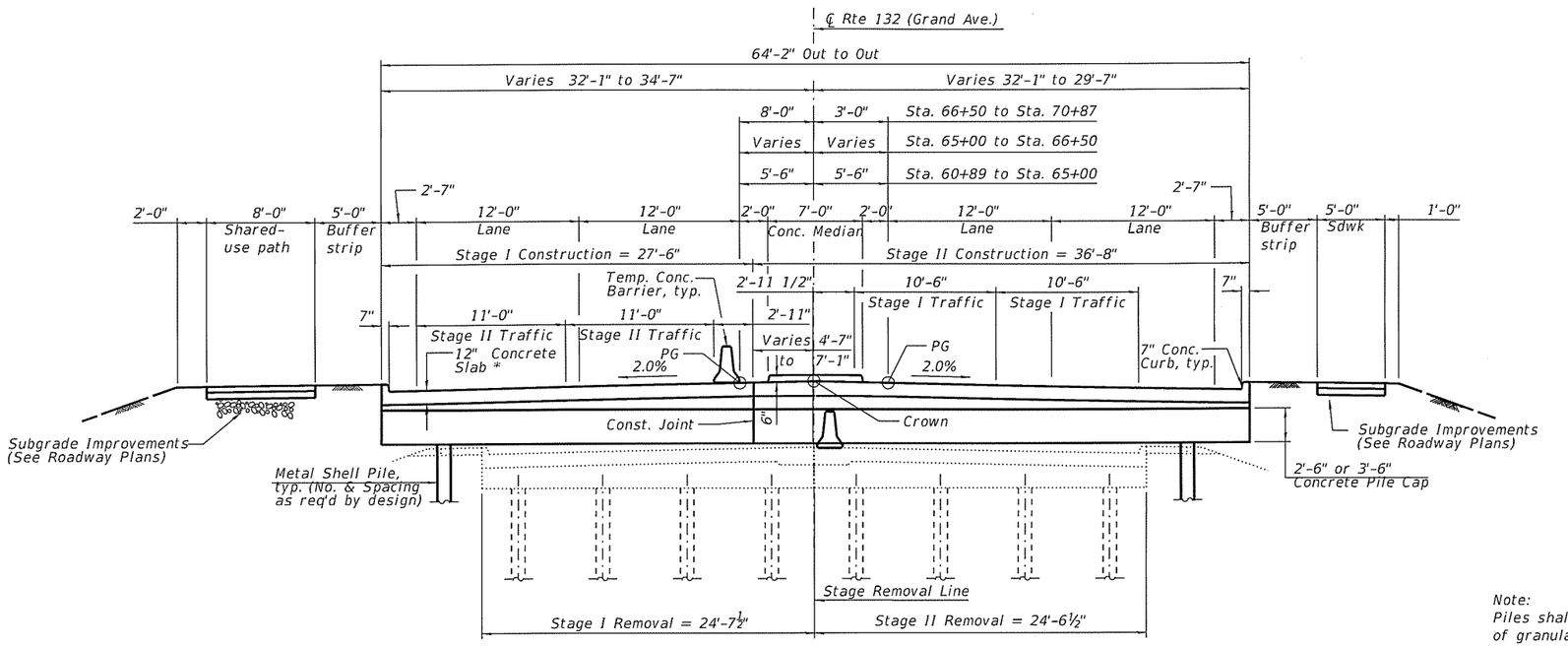
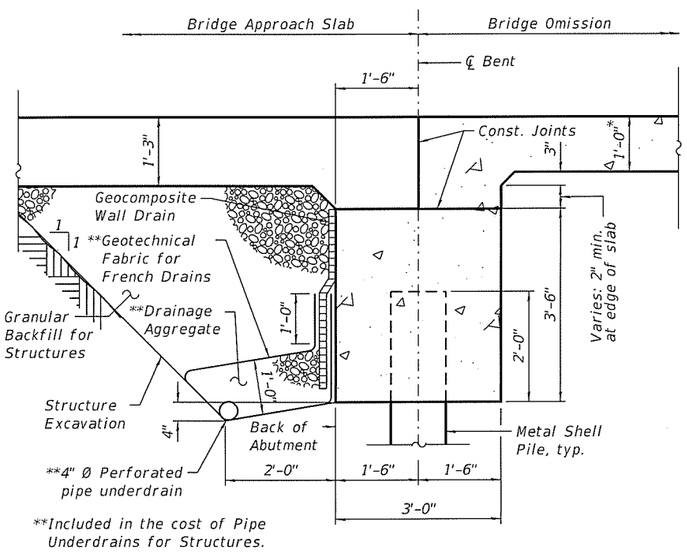


CROSS SECTION

(Looking East)

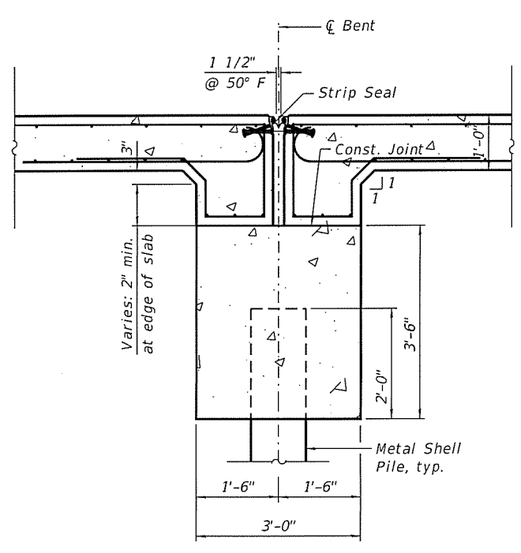
* Subject to refinement during design

Note:
Piles shall be driven before placement of granular backfill.

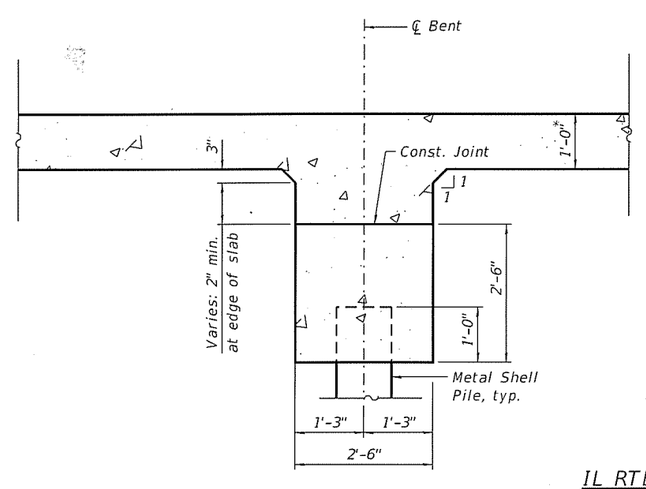


**Included in the cost of Pipe Underdrains for Structures.

SECTION THRU ABUTMENT



SECTION THRU EXPANSION BENT



SECTION THRU FIXED BENT

DETAILS
IL RTE. 132 DRY LAND BRIDGE
VICTORY DR. TO MUNN RD.
F.A.P. RTE. 541 - SEC. A-W&RS-2
LAKE COUNTY
STATION 65+88.00
STRUCTURE NO. 049-D030

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PATRICK ENGINEERING	USER NAME = rhansen	DESIGNED - SSK	REVISED -	STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION	
		CHECKED - SLC	REVISED -		
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9/3/2019 4:05:32 PM	PLOT DATE = $DATE	CHECKED - SLC	REVISED -		SHEET 3 OF 3 SHEETS

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
541	A-W&RS-2	LAKE	3	3
		CONTRACT NO. 62D86		
	ILLINOIS FED. AID PROJECT			

APPENDIX E
Boring Logs

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

SOIL BORING LOG

GSI Job No. 17004

Date 10/27/17

ROUTE IL-132 **DESCRIPTION** IDOT Job No. D-91-116-17, Contract No. 62D86 **LOGGED BY** MM

SECTION A-W&RS-2 **LOCATION** SW 1/4, **SEC.** 34, **TWP.** T46N, **RNG.** R10E, 3rd **PM**

COUNTY Lake **DRILLING METHOD** HSA/Mud Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO.
Station

BORING NO. BSB-01
Station 61+14
Offset 32.00ft Left
Ground Surface Elev. 781.60 ft

Surface Water Elev. n/a ft
Stream Bed Elev. n/a ft

Groundwater Elev.:
First Encounter 763.6 ft ▼
Upon Completion n/a ft
After ____ **Hrs.** ____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
781.10			
6.0" ASPHALT			
CLAY LOAM-dark brown-medium stiff (Fill)	3		
	3 4	0.8 P	15
778.60			
SILTY CLAY-dark brown spotted black-medium stiff (Fill)	3		
-5	3 3	0.8 P	26
776.10			
CLAY LOAM-brown-stiff to hard	3		
	4 6	3.0 B	18
	5		
-10	6 9	3.5 B	16
	6		
	8 11	4.8 B	15
becoming gray @ -13.0'	6		
-15	7 9	2.4 B	13
	6		
	6 9	3.4 B	13
▼	4		
-20	6 7	2.7 B	14

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
CLAY LOAM-brown-stiff to hard *(continued)*	3		
	6 8	1.6 B	15
	3		
-25	4 8	2.2 B	14
	4		
	8 12	2.6 B	14
	5		
-30	13 11	3.0 P	11
749.60			
CLAY-gray-stiff to very stiff	6		
-35	8 11	1.0 P	18
	5		
-40	8 13	2.4 B	17

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)

Geo Services, Inc.
Geotechnical, Environmental & Civil Engineering
805 Amherst Court, Suite 204
Naperville, Illinois 60565
(630) 355-2818

SOIL BORING LOG

GSI Job No. 17004

Date 10/27/17

ROUTE IL-132 **DESCRIPTION** IDOT Job No. D-91-116-17, Contract No. 62D86 **LOGGED BY** MM

SECTION A-W&RS-2 **LOCATION** SW 1/4, **SEC.** 34, **TWP.** T46N, **RNG.** R10E, 3rd **PM**

COUNTY Lake **DRILLING METHOD** HSA/Mud Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO.
Station

BORING NO. BSB-01
Station 61+14
Offset 32.00ft Left
Ground Surface Elev. 781.60 ft

Surface Water Elev. n/a ft
Stream Bed Elev. n/a ft

Groundwater Elev.:
First Encounter 763.6 ft ▼
Upon Completion n/a ft
After ____ **Hrs.** ____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
CLAY-gray-stiff to very stiff *(continued)*				CLAY-gray-stiff to very stiff *(continued)*			
	5				6		
	8	2.1	17		9	2.8	15
-45	11	B		-65	14	B	
	5			silt seams from -68.5' to -70.0'	12		
	9	2.7	17		13	2.2	15
-50	12	B		-70	15	B	
				709.60 SILTY CLAY-gray-very stiff			
	5				15		
	7	1.9	17		38	2.8	15
-55	9	B		-75	42	B	
	8			702.60	14		
	12	3.3	15	SAND-gray-dense	28	4.5	18
-60	19	B		-80	36	P	

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)

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

SOIL BORING LOG

GSI Job No. 17004

Date 10/27/17

ROUTE IL-132 **DESCRIPTION** IDOT Job No. D-91-116-17, Contract No. 62D86 **LOGGED BY** MM

SECTION A-W&RS-2 **LOCATION** SW 1/4, **SEC.** 34, **TWP.** T46N, **RNG.** R10E, 3rd **PM**

COUNTY Lake **DRILLING METHOD** HSA/Mud Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO. _____
Station _____

BORING NO. BSB-01
Station 61+14
Offset 32.00ft Left
Ground Surface Elev. 781.60 ft

Surface Water Elev. n/a ft
Stream Bed Elev. n/a ft

Groundwater Elev.:
First Encounter 763.6 ft ▼
Upon Completion n/a ft
After _____ **Hrs.** _____ ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
SAND-gray-dense *(continued)*		16		
		27		17
	-85	32		
	694.60			
CLAY-gray-hard		12		
End Of Boring @ -90'. Boring backfilled with cuttings.		15	4.0	13
	691.60 -90	18	B	
	-95			
	-100			

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)

Z:\PROJECTS\2017\17004 PATRICK ENG., IL-132 (GRAND AVENUE)-PTB 182 (ITEM 003)\17004 BORING LOGS\17004_LOG.GPJ 8/28/18

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

SOIL BORING LOG

GSI Job No. 17004

Date 10/16/17

ROUTE IL-132 **DESCRIPTION** IDOT Job No. D-91-116-17, Contract No. 62D86 **LOGGED BY** MM

SECTION A-W&RS-2 **LOCATION** NW 1/4, **SEC.** 3, **TWP.** T45N, **RNG.** R10E, 3rd **PM**

COUNTY Lake **DRILLING METHOD** HSA/Mud Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO.
Station

BORING NO. BSB-02
Station 62+61
Offset 27.50ft Right
Ground Surface Elev. 777.30 ft

Surface Water Elev. n/a ft
Stream Bed Elev. n/a ft

Groundwater Elev.:
First Encounter 773.8 ft ▼
Upon Completion n/a ft
After ____ **Hrs.** ____ ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
ASPHALT				
776.30				
CRUSHED ASPHALT & STONE-loose (Fill)		2		
		2		5
		3		
774.30				
CLAY LOAM-dark brown & gray-very stiff (Fill) ▼		4		
		4	2.4	19
	-5	5	B	
771.80				
SILTY CLAY-dark brown & gray-medium stiff		1		
		1	0.7	30
		2	B	
769.30				
SILTY LOAM-gray		ST		
				24
	-10			
766.80				
SAND-gray-loose to medium dense		9		
		11		18
		15		
		5		
		7		17
	-15	1		
761.80				
PEAT-dark brown to black-very loose		ST		
				280
		0		
		0	0.7	258
	-20	1	B	
756.80				
ORGANIC SILTY CLAY-dark gray to black-very loose		0		
		0	0.3	51
		0	B	
		0		
		0	0.2	63
	-25	0	B	
751.80				
SILTY CLAY-brown & gray-medium stiff		2		
		2	0.8	18
		3	B	
		3		
		4	0.8	19
	-30	5	B	
		5		
		6	0.7	17
	-35	8	B	
740.30				
CLAY to CLAY LOAM-gray-stiff to very stiff		8		
		8	2.3	13
	-40	11	B	

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)

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Geo Services, Inc.
Geotechnical, Environmental & Civil Engineering
805 Amherst Court, Suite 204
Naperville, Illinois 60565
(630) 355-2828

SOIL BORING LOG

GSI Job No. 17004

Date 10/16/17

ROUTE IL-132 **DESCRIPTION** IDOT Job No. D-91-116-17, Contract No. 62D86 **LOGGED BY** MM

SECTION A-W&RS-2 **LOCATION** NW 1/4, **SEC.** 3, **TWP.** T45N, **RNG.** R10E, 3rd **PM**

COUNTY Lake **DRILLING METHOD** HSA/Mud Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO.
Station

BORING NO. BSB-02
Station 62+61
Offset 27.50ft Right
Ground Surface Elev. 777.30 ft

Surface Water Elev. n/a ft
Stream Bed Elev. n/a ft

Groundwater Elev.:
First Encounter 773.8 ft ▼
Upon Completion n/a ft
After ____ **Hrs.** ____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
CLAY to CLAY LOAM-gray-stiff to very stiff *(continued)*			
	7		
-45	10 13	2.3 B	13
	7		
-50	11 13	1.8 B	13
	6		
-55	8 10	1.9 B	16
	5		
-60	10 12	2.1 B	17
CLAY to CLAY LOAM-gray-stiff to very stiff *(continued)*			
	7		
-65	11 15	3.1 B	17
	6		
-70	8 14	2.2 B	17
	12		
-75	16 18	2.3 B	16
	14		
-80	15 17	2.0 B	19

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)

Z:\PROJECTS\2017\17004 PATRICK ENG., IL-132 (GRAND AVENUE)-PTB 182 (ITEM 003)\17004 BORING LOGS\17004_LOG.GPJ 8/28/18

Geo Services, Inc.
Geotechnical, Environmental & Civil Engineering
805 Amherst Court, Suite 204
Naperville, Illinois 60565
(630) 355-2818

SOIL BORING LOG

GSI Job No. 17004

Date 10/16/17

ROUTE IL-132 **DESCRIPTION** IDOT Job No. D-91-116-17, Contract No. 62D86 **LOGGED BY** MM

SECTION A-W&RS-2 **LOCATION** NW 1/4, **SEC.** 3, **TWP.** T45N, **RNG.** R10E, 3rd **PM**

COUNTY Lake **DRILLING METHOD** HSA/Mud Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO. _____
Station _____

BORING NO. BSB-02
Station 62+61
Offset 27.50ft Right
Ground Surface Elev. 777.30 ft

Surface Water Elev. n/a ft
Stream Bed Elev. n/a ft

Groundwater Elev.:
First Encounter 773.8 ft ▼
Upon Completion n/a ft
After _____ **Hrs.** _____ ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
CLAY to CLAY LOAM-gray-stiff to very stiff *(continued)*				
695.30				
SILTY CLAY-gray-stiff to very stiff		10		
		19	3.8	17
	-85	24	B	
		12		
End Of Boring @ -90'. Boring backfilled with cuttings.		16	1.8	17
687.30	-90	19	B	
	-95			
	-100			

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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)

Geo Services, Inc.
Geotechnical, Environmental & Civil Engineering
805 Amherst Court, Suite 204
Naperville, Illinois 60565
(630) 355-2818

SOIL BORING LOG

GSI Job No. 17004

Date 10/26/17

ROUTE IL-132 **DESCRIPTION** IDOT Job No. D-91-116-17, Contract No. 62D86 **LOGGED BY** MM

SECTION A-W&RS-2 **LOCATION** SW 1/4, **SEC.** 34, **TWP.** T46N, **RNG.** R10E, 3rd **PM**

COUNTY Lake **DRILLING METHOD** HSA/Mud Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO.
Station

BORING NO. BSB-03
Station 63+53
Offset 30.20ft Left
Ground Surface Elev. 775.20 ft

Surface Water Elev. n/a ft
Stream Bed Elev. n/a ft

Groundwater Elev.:
First Encounter 769.2 ft ▼
Upon Completion n/a ft
After ____ **Hrs.** ____ ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
2.0" ASPHALT 775.03				
CLAY LOAM-dark brown & gray-very stiff (Fill)				9
		2		
		2	2.5	14
		3	P	
772.20				
SILTY CLAY-brown & gray-medium stiff				
		1		
		2	0.9	28
	-5	2	B	
769.70				
SAND-brown & gray-very loose ▼				
		2		
		1		20
		2		
767.20				
PEAT-black-very loose				
		0		
		1		235
	-10	1		
764.70				
SILTY CLAY-dark gray-soft				
		ST		
			0.3	31
			P	
762.20				
CLAYEY SAND & GRAVEL-gray				
		ST		
				10
	-15			
759.70				
SILTY CLAY-gray-medium stiff				
		1		
		1	0.6	16
		2	B	
757.20				
CLAY LOAM-gray-stiff to very stiff				
		3		
		6	1.6	17
	-20	6	B	

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
CLAY LOAM-gray-stiff to very stiff *(continued)*				
		6		
		6	2.7	15
		9	B	
		5		
		7	2.5	14
	-25	8	B	
		4		
		6	1.7	15
		10	B	
		4		
		7	2.4	13
	-30	9	B	
		5		
		8	2.9	15
	-35	11	B	
738.20				
SILTY CLAY LOAM-gray-medium stiff				
		4		
		8	0.5	13
	-40	9	P	

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)

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Geo Services, Inc.
Geotechnical, Environmental & Civil Engineering
805 Amherst Court, Suite 204
Naperville, Illinois 60565
(630) 355-2828

SOIL BORING LOG

GSI Job No. 17004

Date 10/26/17

ROUTE IL-132 **DESCRIPTION** IDOT Job No. D-91-116-17, Contract No. 62D86 **LOGGED BY** MM

SECTION A-W&RS-2 **LOCATION** SW 1/4, **SEC.** 34, **TWP.** T46N, **RNG.** R10E, 3rd **PM**

COUNTY Lake **DRILLING METHOD** HSA/Mud Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO.
Station

BORING NO. BSB-03
Station 63+53
Offset 30.20ft Left
Ground Surface Elev. 775.20 ft

Surface Water Elev. n/a ft
Stream Bed Elev. n/a ft

Groundwater Elev.:
First Encounter 769.2 ft ▼
Upon Completion n/a ft
After ____ **Hrs.** ____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
SILTY CLAY LOAM-gray-medium stiff *(continued)*			
733.20			
CLAY-gray-stiff to very stiff			
	5		
	10	3.5	17
-45	14	B	
	5		
	9	1.9	18
-50	10	B	
	7		
	9	2.8	16
-55	11	P	
	6		
	9	2.8	16
-60	13	B	
CLAY-gray-stiff to very stiff *(continued)*			
	14		
	24	3.0	20
-65	30	B	
some gravel from -68.5' to -70.0'	9		
	28	2.3	11
-70	17	P	
	9		
	12	2.3	18
-75	16	B	
	8		
	13	2.4	16
-80	12	B	

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)

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SOIL BORING LOG

GSI Job No. 17004

Date 10/26/17

ROUTE IL-132 **DESCRIPTION** IDOT Job No. D-91-116-17, Contract No. 62D86 **LOGGED BY** MM

SECTION A-W&RS-2 **LOCATION** SW 1/4, **SEC.** 34, **TWP.** T46N, **RNG.** R10E, 3rd **PM**

COUNTY Lake **DRILLING METHOD** HSA/Mud Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO. _____
Station _____

BORING NO. BSB-03
Station 63+53
Offset 30.20ft Left
Ground Surface Elev. 775.20 ft

Surface Water Elev. n/a ft
Stream Bed Elev. n/a ft

Groundwater Elev.:
First Encounter 769.2 ft ▼
Upon Completion n/a ft
After _____ **Hrs.** _____ ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
CLAY-gray-stiff to very stiff *(continued)*				
693.20				
CLAY LOAM-gray-hard		11		
		20	6.5	12
	-85	26	B	
		24		
End Of Boring @ -90'. Boring backfilled with cuttings.		25	5.1	12
685.20	-90	42	B	
	-95			
	-100			

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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)

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SOIL BORING LOG

GSI Job No. 17004

Date 10/13/17

ROUTE IL-132 **DESCRIPTION** IDOT Job No. D-91-116-17, Contract No. 62D86 **LOGGED BY** MM

SECTION A-W&RS-2 **LOCATION** NE 1/4, **SEC.** 3, **TWP.** T45N, **RNG.** R10E, 3rd **PM**

COUNTY Lake **DRILLING METHOD** HSA/Mud Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO.
Station

BORING NO. BSB-04
Station 64+60
Offset 25.90ft Right
Ground Surface Elev. 774.10 ft

Surface Water Elev. n/a ft
Stream Bed Elev. n/a ft

Groundwater Elev.:
First Encounter 772.1 ft ▼
Upon Completion n/a ft
After ____ **Hrs.** ____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
ASPHALT			
773.10			
CLAYEY SAND, GRAVEL & STONE-dark brown & gray-medium dense to dense (Fill) ▼	1		
	5		7
	6		
	12		
-5	16		13
	16		
768.60			
SILTY CLAY-brown & gray-medium stiff	0		
	2	0.9	20
	3	B	
766.10			
PEAT-dark gray to black-very loose (A-8) O.C.=5.1%	0		
	0		80
-10	0		
	ST		
			299
	ST		
			132
-15			
	0		
	0	0.4	97
	0	B	
756.10			
ORGANIC SILTY CLAY-dark gray-very loose	1		
	1		40
-20	1		

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
753.60			
SILTY CLAY-dark brown & gray-soft to medium stiff	1		
	2	0.4	21
	2	B	
	2		
-25	4	0.9	20
	6	B	
748.60			
CLAY to CLAY LOAM-gray-stiff to hard	3		
	5	1.1	18
	7	B	
	3		
	5	1.6	17
-30	8	B	
	5		
-35	7	1.7	15
	10	B	
	6		
-40	8	1.9	15
	11	B	

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)

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SOIL BORING LOG

GSI Job No. 17004

Date 10/13/17

ROUTE IL-132 **DESCRIPTION** IDOT Job No. D-91-116-17, Contract No. 62D86 **LOGGED BY** MM

SECTION A-W&RS-2 **LOCATION** NE 1/4, **SEC.** 3, **TWP.** T45N, **RNG.** R10E, 3rd **PM**

COUNTY Lake **DRILLING METHOD** HSA/Mud Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO. _____
Station _____

BORING NO. BSB-04
Station 64+60
Offset 25.90ft Right
Ground Surface Elev. 774.10 ft

Surface Water Elev. n/a ft
Stream Bed Elev. n/a ft

Groundwater Elev.:
First Encounter 772.1 ft ▼
Upon Completion n/a ft
After _____ **Hrs.** _____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
CLAY to CLAY LOAM-gray-stiff to hard *(continued)*			
	4		
	8	1.9	15
-45	12	B	
	5		
	9	1.5	13
-50	13	B	
	9		
	15	4.6	14
-55	21	B	
	10		
	15	3.9	16
-60	20	B	
CLAY to CLAY LOAM-gray-stiff to hard *(continued)*			
	6		
	8	2.5	17
-65	13	B	
	8		
	12	1.9	18
-70	14	B	
	6		
	10	2.3	17
-75	14	B	
697.10			
SANDY CLAY LOAM with Gravel-gray-very stiff			
	16		
	29	3.6	10
-80	42	B	

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

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SOIL BORING LOG

GSI Job No. 17004

Date 10/13/17

ROUTE IL-132 **DESCRIPTION** IDOT Job No. D-91-116-17, Contract No. 62D86 **LOGGED BY** MM

SECTION A-W&RS-2 **LOCATION** NE 1/4, **SEC.** 3, **TWP.** T45N, **RNG.** R10E, 3rd **PM**

COUNTY Lake **DRILLING METHOD** HSA/Mud Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO. _____
Station _____

BORING NO. BSB-04
Station 64+60
Offset 25.90ft Right
Ground Surface Elev. 774.10 ft

Surface Water Elev. n/a ft
Stream Bed Elev. n/a ft

Groundwater Elev.:
First Encounter 772.1 ft ▼
Upon Completion n/a ft
After _____ **Hrs.** _____ ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
SANDY CLAY LOAM with Gravel-gray-very stiff *(continued)*				
692.10				
CLAY-gray-very stiff		14		
		27		24
	-85	39		
		8		
End Of Boring @ -90'. Boring backfilled with cuttings.		15	2.1	20
684.10	-90	17	B	
	-95			
	-100			

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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)

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SOIL BORING LOG

GSI Job No. 17004

Date 10/25/17

ROUTE IL-132 **DESCRIPTION** IDOT Job No. D-91-116-17, Contract No. 62D86 **LOGGED BY** MM

SECTION A-W&RS-2 **LOCATION** SE 1/4, **SEC.** 34, **TWP.** T46N, **RNG.** R10E, 3rd **PM**

COUNTY Lake **DRILLING METHOD** HSA/Mud Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO.
Station

BORING NO. BSB-05
Station 65+70
Offset 31.10ft Left
Ground Surface Elev. 773.40 ft

Surface Water Elev. n/a ft
Stream Bed Elev. n/a ft

Groundwater Elev.:
First Encounter 770.9 ft ▼
Upon Completion n/a ft
After ____ **Hrs.** ____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				2.0" ASPHALT 773.23
			15	CLAYEY SAND, GRAVEL & STONE-dark brown & gray spotted black-loose (Fill)
	3			
	3		8	
	4			
				770.40
				SILTY CLAY-dark brown & gray spotted black-stiff
	2			
-5	2 3	1.5 B	23	
				767.90
				PEAT-black-very loose
	0			
	0 0		214	
	ST			
		<0.25 P	88	
-10				
				762.90
				ORGANIC SILTY CLAY-dark gray-very soft
	ST			
		<0.25 P	66	
				760.40
				SILTY CLAY-gray-medium stiff to stiff
	0			
	1	0.6	18	
-15	3	B		
	2			
	4	1.0	19	
	6	B		
				755.40
				CLAY LOAM-gray-stiff to very stiff
	3			
	6	1.5	16	
-20	8	B		

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				CLAY LOAM-gray-stiff to very stiff *(continued)*
	4			
	6	2.1	17	
	8	B		
	4			
	7	3.2	15	
-25	7	B		
	4			
	7	1.7	15	
	8	B		
	5			
	6	2.7	15	
-30	10	B		
	4			
	6	1.5	15	
-35	8	B		
	3			
	6	1.3	15	
-40	7	B		

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)

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805 Amherst Court, Suite 204
Naperville, Illinois 60565
(630) 355-2838

SOIL BORING LOG

GSI Job No. 17004

Date 10/25/17

ROUTE IL-132 **DESCRIPTION** IDOT Job No. D-91-116-17, Contract No. 62D86 **LOGGED BY** MM

SECTION A-W&RS-2 **LOCATION** SE 1/4, **SEC.** 34, **TWP.** T46N, **RNG.** R10E, 3rd **PM**

COUNTY Lake **DRILLING METHOD** HSA/Mud Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO.
Station

BORING NO. BSB-05
Station 65+70
Offset 31.10ft Left
Ground Surface Elev. 773.40 ft

Surface Water Elev. n/a ft
Stream Bed Elev. n/a ft

Groundwater Elev.:
First Encounter 770.9 ft ▼
Upon Completion n/a ft
After ____ **Hrs.** ____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
CLAY LOAM-gray-stiff to very stiff *(continued)*			
	5		
	8	2.2	15
-45	10	B	
	7		
	9	1.6	13
-50	12	B	
721.40			
SILTY SAND & GRAVEL-gray-medium dense			
	12		
	13		12
-55	13		
716.40			
CLAY-gray-stiff to very stiff			
	7		
	9	1.9	18
-60	10	B	

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
CLAY-gray-stiff to very stiff *(continued)*			
	7		
	9		23
-65	11		
	6		
	9	2.4	17
-70	12	B	
	8		
	11	2.1	16
-75	16	B	
	11		
	17	3.3	18
-80	25	B	

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)

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805 Amherst Court, Suite 204
Naperville, Illinois 60565
(630) 355-2818

SOIL BORING LOG

GSI Job No. 17004

Date 10/25/17

ROUTE IL-132 **DESCRIPTION** IDOT Job No. D-91-116-17, Contract No. 62D86 **LOGGED BY** MM

SECTION A-W&RS-2 **LOCATION** SE 1/4, **SEC.** 34, **TWP.** T46N, **RNG.** R10E, 3rd **PM**

COUNTY Lake **DRILLING METHOD** HSA/Mud Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO. _____
Station _____

BORING NO. BSB-05
Station 65+70
Offset 31.10ft Left
Ground Surface Elev. 773.40 ft

Surface Water Elev. n/a ft
Stream Bed Elev. n/a ft

Groundwater Elev.:
First Encounter 770.9 ft ▼
Upon Completion n/a ft
After _____ **Hrs.** _____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
CLAY-gray-stiff to very stiff *(continued)*			
	12		
	12	2.8	19
-85	13	B	
	8		
End Of Boring @ -90'. Boring backfilled with cuttings. 683.40	10	2.0	18
-90	15	B	
-95			
-100			

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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)

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SOIL BORING LOG

GSI Job No. 17004

Date 10/12/17

ROUTE IL-132 **DESCRIPTION** IDOT Job No. D-91-116-17, Contract No. 62D86 **LOGGED BY** MM

SECTION A-W&RS-2 **LOCATION** NE 1/4, **SEC.** 3, **TWP.** T45N, **RNG.** R10E, 3rd **PM**

COUNTY Lake **DRILLING METHOD** HSA/Mud Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO.
Station

BORING NO. BSB-06
Station 66+58
Offset 26.50ft Right
Ground Surface Elev. 774.60 ft

Surface Water Elev. n/a ft
Stream Bed Elev. n/a ft

Groundwater Elev.:
First Encounter 772.6 ft ▼
Upon Completion n/a ft
After ____ **Hrs.** ____ ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
ASPHALT				
773.60				
SAND, GRAVEL, CONCRETE & STONE-dense to very dense (Fill) ▼		4		
		5		11
		35		
		50/1"		
	-5			10
769.10				
PEAT-black (A-8) O.C.=7.0%		ST		
				143
766.60				
ORGANIC SANDY LOAM-black (A-7) O.C.=1.6		ST		
				67
	-10			
764.10				
ORGANIC SILTY CLAY-dark gray-very loose		2		
		2		87
		2		
761.60				
PEAT-dark brown to black-very loose		3		
		3		17
	-15	2		
759.10				
CLAY LOAM-brown-medium stiff to stiff		5		
		4	1.5	17
		6	B	
		6		
		5	0.7	18
	-20	7	B	
754.10				
CLAYEY SAND & GRAVEL-brown-medium dense		4		
		5		16
		7		
751.60				
CLAY LOAM-gray-stiff		4		
		7	1.5	16
	-25	8	B	
		4		
		5	1.3	15
		7	B	
		3		
		6		18
	-30	8		
		5		
		7	1.8	15
	-35	11	B	
737.60				
SAND-gray-medium dense		11		
		14		16
	-40	14		

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

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SOIL BORING LOG

GSI Job No. 17004

Date 10/12/17

ROUTE IL-132 **DESCRIPTION** IDOT Job No. D-91-116-17, Contract No. 62D86 **LOGGED BY** MM

SECTION A-W&RS-2 **LOCATION** NE 1/4, **SEC.** 3, **TWP.** T45N, **RNG.** R10E, 3rd **PM**

COUNTY Lake **DRILLING METHOD** HSA/Mud Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO.
Station

BORING NO. BSB-06
Station 66+58
Offset 26.50ft Right
Ground Surface Elev. 774.60 ft

Surface Water Elev. n/a ft
Stream Bed Elev. n/a ft

Groundwater Elev.:
First Encounter 772.6 ft ▼
Upon Completion n/a ft
After ____ **Hrs.** ____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
SAND-gray-medium dense *(continued)*			
732.60			
CLAY to CLAY LOAM-gray-stiff to hard			
	3		
-45	6 8	2.1 B	23
	5		
-50	9 12	2.5 B	19
	6		
-55	7 11	3.0 B	17
	6		
-60	10 14	1.9 B	17

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
CLAY to CLAY LOAM-gray-stiff to hard *(continued)*			
	11		
-65	15 32	4.1 B	12
	9		
-70	14 22	3.3 B	17
	6		
-75	10 11	2.1 B	18
	11		
-80	13 18	1.9 B	16

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

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SOIL BORING LOG

GSI Job No. 17004

Date 10/12/17

ROUTE IL-132 **DESCRIPTION** IDOT Job No. D-91-116-17, Contract No. 62D86 **LOGGED BY** MM

SECTION A-W&RS-2 **LOCATION** NE 1/4, **SEC.** 3, **TWP.** T45N, **RNG.** R10E, 3rd **PM**

COUNTY Lake **DRILLING METHOD** HSA/Mud Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO. _____
Station _____

BORING NO. BSB-06
Station 66+58
Offset 26.50ft Right
Ground Surface Elev. 774.60 ft

Surface Water Elev. n/a ft
Stream Bed Elev. n/a ft

Groundwater Elev.:
First Encounter 772.6 ft ▼
Upon Completion n/a ft
After _____ **Hrs.** _____ ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
CLAY to CLAY LOAM-gray-stiff to hard *(continued)*		9		
		14	2.8	15
	-85	20	B	
		12		
End Of Boring @ -90'. Boring backfilled with cuttings.		19	3.9	15
684.60	-90	22	B	
	-95			
	-100			

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)

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805 Amherst Court, Suite 204
Naperville, Illinois 60565
(630) 355-2818

SOIL BORING LOG

GSI Job No. 17004

Date 10/20/17

ROUTE IL-132 **DESCRIPTION** IDOT Job No. D-91-116-17, Contract No. 62D86 **LOGGED BY** MM

SECTION A-W&RS-2 **LOCATION** SE 1/4, **SEC.** 34, **TWP.** T40N, **RNG.** R10E, 3rd **PM**

COUNTY Lake **DRILLING METHOD** HSA/Mud Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO.
Station

BORING NO. BSB-07
Station 67+65
Offset 29.70ft Left
Ground Surface Elev. 774.30 ft

Surface Water Elev. n/a ft
Stream Bed Elev. n/a ft

Groundwater Elev.:
First Encounter 772.3 ft ▼
Upon Completion n/a ft
After ____ **Hrs.** ____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
SILTY SAND, ASPHALT & STONE (Fill)			
773.30			2
SANDY CLAY LOAM with Stone-dark brown, gray & black-loose (Fill) ▼	5		
	4 3		17
771.30			
CLAYEY TOPSOIL-black-very loose	0		
	1 1		25
-5			
768.80			
SAND-brown-very loose	2		
	1 1		22
766.30			
ORGANIC SILTY CLAY-black-very loose	AS		
		<0.25 P	66
-10			
763.80			
SILTY CLAY LOAM-gray-soft	ST		
		0.3 P	21
761.30			
CLAY to CLAY LOAM-gray-medium stiff to very stiff	4		
	1 1	0.7 B	19
-15			
	3		
	4 6	1.0 B	17
	3		
	4 7	1.8 B	17
-20			

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
CLAY to CLAY LOAM-gray-medium stiff to very stiff *(continued)*	4		
	5 7	2.9 B	14
	4		
	6 7	1.5 B	17
-25			
	5		
	7 9	2.3 B	15
	4		
	6 9	2.0 B	15
-30			
	5		
	9 11	2.3 B	15
-35			
737.30			
SILTY CLAY LOAM with Sand Seams-gray-dense	10		
	16 16	0.8 P	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)

Geo Services, Inc.
Geotechnical, Environmental & Civil Engineering
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SOIL BORING LOG

GSI Job No. 17004

Date 10/20/17

ROUTE IL-132 **DESCRIPTION** IDOT Job No. D-91-116-17, Contract No. 62D86 **LOGGED BY** MM

SECTION A-W&RS-2 **LOCATION** SE 1/4, **SEC.** 34, **TWP.** T40N, **RNG.** R10E, 3rd **PM**

COUNTY Lake **DRILLING METHOD** HSA/Mud Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO. _____
Station _____

BORING NO. BSB-07
Station 67+65
Offset 29.70ft Left
Ground Surface Elev. 774.30 ft

Surface Water Elev. n/a ft
Stream Bed Elev. n/a ft

Groundwater Elev.:
First Encounter 772.3 ft ▼
Upon Completion n/a ft
After _____ **Hrs.** _____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
SILTY CLAY LOAM with Sand Seams-gray-dense *(continued)*			
732.30			
LOAM-gray-dense			
	14		
	17		18
-45	15		
727.30			
SANDY CLAY LOAM-gray-medium dense			
	5		
	10	2.5	12
-50	13	P	
722.30			
CLAY to CLAY LOAM-gray-stiff to hard			
	5		
	7	2.7	17
-55	8	B	
	8		
	9	1.3	18
-60	12	P	
CLAY to CLAY LOAM-gray-stiff to hard *(continued)*			
	8		
	10	1.7	16
-65	17	B	
	50/4"		
		2.8	18
-70		P	
	8		
	18	7.7	16
-75	24	B	
	10		
	14	2.3	18
-80	24	B	

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

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SOIL BORING LOG

GSI Job No. 17004

Date 10/20/17

ROUTE IL-132 **DESCRIPTION** IDOT Job No. D-91-116-17, Contract No. 62D86 **LOGGED BY** MM

SECTION A-W&RS-2 **LOCATION** SE 1/4, **SEC.** 34, **TWP.** T40N, **RNG.** R10E, 3rd **PM**

COUNTY Lake **DRILLING METHOD** HSA/Mud Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO. _____
Station _____

BORING NO. BSB-07
Station 67+65
Offset 29.70ft Left
Ground Surface Elev. 774.30 ft

Surface Water Elev. n/a ft
Stream Bed Elev. n/a ft

Groundwater Elev.:
First Encounter 772.3 ft ▼
Upon Completion n/a ft
After _____ **Hrs.** _____ ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
CLAY to CLAY LOAM-gray-stiff to hard *(continued)*				
		8		
		12	3.2	15
	-85	15	B	
	687.30			
SILTY CLAY-gray-hard				
		28		
End Of Boring @ -90'. Boring backfilled with cuttings.		46	11.8	11
	684.30 -90	50/3"	B	
	-95			
	-100			

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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)

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SOIL BORING LOG

GSI Job No. 17004

Date 10/11/17

ROUTE IL-132 **DESCRIPTION** IDOT Job No. D-91-116-17, Contract No. 62D86 **LOGGED BY** MM

SECTION A-W&RS-2 **LOCATION** NE 1/4, **SEC.** 3, **TWP.** T45N, **RNG.** R10E, 3rd **PM**

COUNTY Lake **DRILLING METHOD** HSA/Mud Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO.
Station

BORING NO. BSB-08
Station 68+59
Offset 26.60ft Right
Ground Surface Elev. 775.40 ft

Surface Water Elev. n/a ft
Stream Bed Elev. n/a ft

Groundwater Elev.:
First Encounter 769.4 ft ▼
Upon Completion n/a ft
After ____ **Hrs.** ____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				ASPHALT
774.40				
	4			CLAY LOAM with Gravel-brown-very stiff (Fill)
	9	3.5	15	
	8	P		
772.40				
				CLAYEY SAND & GRAVEL-brown-loose
	2			
	2		10	
-5	3			
769.90				
				SILTY CLAY-dark brown, gray & black-soft ▼
	ST			
		0.3	34	
		P		
767.40				
	ST			ORGANIC SILTY CLAY-dark gray to black-very soft
		0.3	45	
		P		
-10				
764.90				
				PEAT-dark brown & gray-very loose
	0			
	0	0.2	105	
	1	P		
	ST			
			445	
-15				
759.90				
				SILTY CLAY LOAM to SILTY LOAM-gray-very loose
	0			
	0	0.3	20	
	1	P		
757.40				
				ORGANIC SILTY CLAY-dark brown & gray-very loose
	2			
	0	0.3	40	
-20	1	B		
754.90				
				SILTY CLAY-dark gray-medium stiff
	2			
	3	0.5	26	
	2	B		
752.40				
				CLAYEY SAND & GRAVEL-dark brown & gray-loose
	4			
	5		13	
-25	3			
749.90				
				SILTY SAND & GRAVEL-dark brown & gray-medium dense
	5			
	7		13	
	9			
747.40				
				CLAY LOAM-gray-stiff to hard
	5			
	6	1.8	15	
-30	8	B		
	2			
	4	1.8	19	
-35	6	P		
	6			
	8	1.9	15	
-40	10	B		

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)

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SOIL BORING LOG

GSI Job No. 17004

Date 10/11/17

ROUTE IL-132 **DESCRIPTION** IDOT Job No. D-91-116-17, Contract No. 62D86 **LOGGED BY** MM

SECTION A-W&RS-2 **LOCATION** NE 1/4, **SEC.** 3, **TWP.** T45N, **RNG.** R10E, 3rd **PM**

COUNTY Lake **DRILLING METHOD** HSA/Mud Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO. _____
Station _____

BORING NO. BSB-08
Station 68+59
Offset 26.60ft Right
Ground Surface Elev. 775.40 ft

Surface Water Elev. n/a ft
Stream Bed Elev. n/a ft

Groundwater Elev.:
First Encounter 769.4 ft ▼
Upon Completion n/a ft
After _____ **Hrs.** _____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
CLAY LOAM-gray-stiff to hard *(continued)*			
	6		
	9	2.2	14
-45	17	B	
727.40			
CLAYEY SAND & GRAVEL-gray-medium dense			
	14		
	11		11
-50	16		
723.40			
SILTY LOAM to LOAM-gray-medium dense			
	10		
	8		18
-55	6		
718.40			
CLAY to CLAY LOAM-gray-stiff to hard			
	5		
	7	1.5	13
-60	10	B	

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
CLAY to CLAY LOAM-gray-stiff to hard *(continued)*			
	6		
	8	2.3	18
-65	10	B	
	7		
	10	2.8	16
-70	14	B	
	8		
	14	3.2	16
-75	16	B	
	8		
	15	5.9	14
-80	31	B	

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)

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SOIL BORING LOG

GSI Job No. 17004

Date 10/11/17

ROUTE IL-132 **DESCRIPTION** IDOT Job No. D-91-116-17, Contract No. 62D86 **LOGGED BY** MM

SECTION A-W&RS-2 **LOCATION** NE 1/4, **SEC.** 3, **TWP.** T45N, **RNG.** R10E, 3rd **PM**

COUNTY Lake **DRILLING METHOD** HSA/Mud Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO. _____
Station _____

BORING NO. BSB-08
Station 68+59
Offset 26.60ft Right
Ground Surface Elev. 775.40 ft

Surface Water Elev. n/a ft
Stream Bed Elev. n/a ft

Groundwater Elev.:
First Encounter 769.4 ft ▼
Upon Completion n/a ft
After _____ **Hrs.** _____ ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
CLAY to CLAY LOAM-gray-stiff to hard *(continued)*				
		13		
		22	5.8	16
	-85	27	B	
		11		
End Of Boring @ -90'. Boring backfilled with cuttings.		14	2.8	19
685.40	-90	20	B	
	-95			
	-100			

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

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SOIL BORING LOG

GSI Job No. 17004

Date 10/19/17

ROUTE IL-132 **DESCRIPTION** IDOT Job No. D-91-116-17, Contract No. 62D86 **LOGGED BY** MM

SECTION A-W&RS-2 **LOCATION** SE 1/4, **SEC.** 34, **TWP.** T40N, **RNG.** R10E, 3rd **PM**

COUNTY Lake **DRILLING METHOD** HSA/Mud Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO.
Station

BORING NO. BSB-09
Station 69+11
Offset 31.80ft Left
Ground Surface Elev. 775.30 ft

Surface Water Elev. n/a ft
Stream Bed Elev. n/a ft

Groundwater Elev.:
First Encounter 769.3 ft ▼
Upon Completion n/a ft
After ____ **Hrs.** ____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Material
				SILTY SAND, GRAVEL & STONE-dark brown to black-very loose (Fill)
			7	
	5			
	2		14	
	2			
772.30				
				CLAY LOAM-dark brown & gray spotted black-very loose (Fill)
	1			
	1	0.4	25	
-5	1	B		
769.80				
				SILTY CLAY-dark gray-soft ▼
	ST			
		0.3	33	
		P		
766.80				
	1			PEAT-dark brown & gray-very loose
	1		51	
-10	1			
	ST			
			64	
	0			
	0	0.4	66	
-15	0	B		
759.80				
				SILTY CLAY LOAM-gray-very loose
	1			
	1	<0.25	16	
	1	P		
757.30				
				SILTY CLAY-brown & gray-soft
	0			
	1	0.3	19	
-20	3	B		

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Material
				SILTY CLAY-brown & gray-soft *(continued)*
	1			
	2	0.3	19	
	2	B		
	3			
	3	0.3	18	
-25	5	B		
749.80				
				CLAY LOAM-gray-stiff
	5			
	6	1.3	14	
	10	B		
	6			
	7	1.9	14	
-30	9	B		
	7			
	9	1.6	15	
-35	12	B		
	3			
	6	1.7	15	
-40	8	B		

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)

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SOIL BORING LOG

GSI Job No. 17004

Date 10/19/17

ROUTE IL-132 **DESCRIPTION** IDOT Job No. D-91-116-17, Contract No. 62D86 **LOGGED BY** MM

SECTION A-W&RS-2 **LOCATION** SE 1/4, **SEC.** 34, **TWP.** T40N, **RNG.** R10E, 3rd **PM**

COUNTY Lake **DRILLING METHOD** HSA/Mud Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO.
Station

BORING NO. BSB-09
Station 69+11
Offset 31.80ft Left
Ground Surface Elev. 775.30 ft

Surface Water Elev. n/a ft
Stream Bed Elev. n/a ft

Groundwater Elev.:
First Encounter 769.3 ft ▼
Upon Completion n/a ft
After ____ **Hrs.** ____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
CLAY LOAM-gray-stiff *(continued)*			
	5		
	8	1.8	15
-45	11	B	
728.30			
SAND-gray-medium dense			
	7		
	8		20
-50	9		
723.30			
CLAY to CLAY LOAM-gray-stiff to hard			
	6		
	6	2.0	23
-55	8	B	
	13		
	19	4.1	16
-60	19	B	

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
CLAY to CLAY LOAM-gray-stiff to hard *(continued)*			
	9		
	12	2.8	17
-65	16	B	
	11		
	14	2.8	16
-70	19	B	
	8		
	15	1.7	17
-75	19	B	
	7		
	10	2.5	18
-80	12	B	

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)

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SOIL BORING LOG

GSI Job No. 17004

Date 10/19/17

ROUTE IL-132 **DESCRIPTION** IDOT Job No. D-91-116-17, Contract No. 62D86 **LOGGED BY** MM

SECTION A-W&RS-2 **LOCATION** SE 1/4, **SEC.** 34, **TWP.** T40N, **RNG.** R10E, 3rd **PM**

COUNTY Lake **DRILLING METHOD** HSA/Mud Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO. _____
Station _____

BORING NO. BSB-09
Station 69+11
Offset 31.80ft Left
Ground Surface Elev. 775.30 ft

Surface Water Elev. n/a ft
Stream Bed Elev. n/a ft

Groundwater Elev.:
First Encounter 769.3 ft ▼
Upon Completion n/a ft
After _____ **Hrs.** _____ ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
CLAY to CLAY LOAM-gray-stiff to hard *(continued)*				
		10		
		16	3.7	17
	-85	19	B	
	688.30			
CLAY LOAM with Fractured Rock-gray-very dense				
		34		
End Of Boring @ -90'. Boring backfilled with cuttings.		33	2.0	10
	685.30 -90	30	P	
	-95			
	-100			

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)

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SOIL BORING LOG

GSI Job No. 17004

Date 10/9/17

ROUTE IL-132 **DESCRIPTION** IDOT Job No. D-91-116-17, Contract No. 62D86 **LOGGED BY** MM

SECTION A-W&RS-2 **LOCATION** NE 1/4, **SEC.** 3, **TWP.** T45N, **RNG.** R10E, 3rd **PM**

COUNTY Lake **DRILLING METHOD** HSA/Mud Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO. _____
Station _____

BORING NO. BSB-10
Station 70+64
Offset 28.10ft Right
Ground Surface Elev. 776.60 ft

Surface Water Elev. n/a ft
Stream Bed Elev. n/a ft

Groundwater Elev.:
First Encounter 762.1 ft ▼
Upon Completion n/a ft
After _____ **Hrs.** _____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
CLAY LOAM-brown & gray-very stiff (Fill)			
			11
	2		
	9	2.5	17
	9	P	
773.60			
SILTY CLAY LOAM-brown & gray-stiff to hard			
	1		
	3	1.5	27
-5	3	P	
	4		
	4	4.5	17
	5	P	
768.60			
CLAY LOAM-brown & gray-very stiff			
	3		
	5	3.1	6
-10	7	B	
766.10			
CLAY to CLAY LOAM-gray-stiff to hard			
	5		
	6	2.8	13
	9	B	
	5		
▼	6	2.9	15
-15	8	B	
	5		
	6	2.2	14
	2	B	
	3		
	6	1.3	15
-20	8	B	
CLAY to CLAY LOAM-gray-stiff to hard *(continued)*			
	4		
	5	1.8	15
	8	B	
	4		
	5	4.5	11
-25	7	P	
751.10			
SILTY SAND & GRAVEL-gray-medium dense			
	5		
	6		10
	9		
748.60			
SAND & GRAVEL-gray-medium dense			
	4		
	6		10
-30	8		
744.60			
SILTY CLAY LOAM-gray-stiff			
	3		
	4	1.0	19
-35	6	P	
739.60			
CLAY to CLAY LOAM-gray-stiff to very stiff			
	5		
	9	3.3	17
-40	15	B	

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)

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SOIL BORING LOG

GSI Job No. 17004

Date 10/9/17

ROUTE IL-132 **DESCRIPTION** IDOT Job No. D-91-116-17, Contract No. 62D86 **LOGGED BY** MM

SECTION A-W&RS-2 **LOCATION** NE 1/4, **SEC.** 3, **TWP.** T45N, **RNG.** R10E, 3rd **PM**

COUNTY Lake **DRILLING METHOD** HSA/Mud Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO. _____
Station _____

BORING NO. BSB-10
Station 70+64
Offset 28.10ft Right
Ground Surface Elev. 776.60 ft

Surface Water Elev. n/a ft
Stream Bed Elev. n/a ft

Groundwater Elev.:
First Encounter 762.1 ft ▼
Upon Completion n/a ft
After _____ **Hrs.** _____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
CLAY to CLAY LOAM-gray-stiff to very stiff *(continued)*			
	6		
	9	2.3	18
-45	11	B	
	9		
	10	2.1	16
-50	13	B	
	6		
	11	1.7	17
-55	11	B	
	5		
	9	1.8	19
-60	11	B	
CLAY to CLAY LOAM-gray-stiff to very stiff *(continued)*			
	9		
	17	2.1	15
-65	21	B	
	10		
	19	3.3	14
-70	24	B	
704.60			
SILTY LOAM to LOAM-gray-dense to very dense			
	19		
	31		13
-75	32		
	29		
	26		16
-80	30		

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)

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805 Amherst Court, Suite 204
Naperville, Illinois 60565
(630) 355-2838

SOIL BORING LOG

GSI Job No. 17004

Date 10/9/17

ROUTE IL-132 **DESCRIPTION** IDOT Job No. D-91-116-17, Contract No. 62D86 **LOGGED BY** MM

SECTION A-W&RS-2 **LOCATION** NE 1/4, **SEC.** 3, **TWP.** T45N, **RNG.** R10E, 3rd **PM**

COUNTY Lake **DRILLING METHOD** HSA/Mud Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO. _____
Station _____

BORING NO. BSB-10
Station 70+64
Offset 28.10ft Right
Ground Surface Elev. 776.60 ft

Surface Water Elev. n/a ft
Stream Bed Elev. n/a ft

Groundwater Elev.:
First Encounter 762.1 ft ▼
Upon Completion n/a ft
After _____ **Hrs.** _____ ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
SILTY LOAM to LOAM-gray-dense to very dense *(continued)*				
694.60				
SILTY CLAY-gray-hard		12		
692.10		21	4.8	12
SILTY LOAM-gray-very dense	-85	50/5"	B	
		50/5"		
End Of Boring @ -90'. Boring backfilled with cuttings.	-90			16
686.60				
	-95			
	-100			

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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)

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SOIL BORING LOG

GSI Job No. 17004

Date 10/18/17

ROUTE IL-132 **DESCRIPTION** IDOT Job No. D-91-116-17, Contract No. 62D86 **LOGGED BY** MM

SECTION A-W&RS-2 **LOCATION** SE 1/4, **SEC.** 34, **TWP.** T40N, **RNG.** R10E, 3rd **PM**

COUNTY Lake **DRILLING METHOD** HSA/Mud Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO.
Station

BORING NO. CB-01
Station 69+85
Offset 30.00ft Left
Ground Surface Elev. 775.10 ft

Surface Water Elev. n/a ft
Stream Bed Elev. n/a ft

Groundwater Elev.:
First Encounter 769.6 ft ▼
Upon Completion n/a ft
After ____ **Hrs.** ____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Material
				6.0" TOPSOIL-black 774.60
			19	SAND & GRAVEL-brown-loose (Fill)
	6			
	6		6	
	3			
				772.10
				CLAY LOAM-dark brown, gray & black-medium stiff (Fill)
	2			
	1	0.7	19	
-5	2			
				769.60 ▼
				CLAYEY SAND & GRAVEL-gray
	ST			
			11	
				767.10
				PEAT-dark brown, gray & black-very loose
	0			
	0	0.4	83	
-10	0			
				764.60
				CLAY to CLAY LOAM-brown & gray-stiff to very stiff
	ST			
		1.8 P	19	
	2			
	5	1.2	18	
-15	5	B		
	2			
	4	1.4	17	
	5	B		
	2			
	5	1.0	17	
-20	5	B		

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Material
				CLAY to CLAY LOAM-brown & gray-stiff to very stiff *(continued)* becoming gray @ -20.5'
	5			
	6	1.2	15	
	9	B		
	5			
	7	1.8	15	
-25	8	B		
	4			
	8	1.8	14	
	12	B		
	3			
	5	1.6	15	
-30	8	B		
	3			
	7	1.8	16	
-35	10	B		
	5			
	12	2.0	14	
-40	14	B		

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)

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SOIL BORING LOG

GSI Job No. 17004

Date 10/18/17

ROUTE IL-132 **DESCRIPTION** IDOT Job No. D-91-116-17, Contract No. 62D86 **LOGGED BY** MM

SECTION A-W&RS-2 **LOCATION** SE 1/4, **SEC.** 34, **TWP.** T40N, **RNG.** R10E, 3rd **PM**

COUNTY Lake **DRILLING METHOD** HSA/Mud Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO. _____
Station _____

BORING NO. CB-01
Station 69+85
Offset 30.00ft Left
Ground Surface Elev. 775.10 ft

Surface Water Elev. n/a ft
Stream Bed Elev. n/a ft

Groundwater Elev.:
First Encounter 769.6 ft ▼
Upon Completion n/a ft
After _____ **Hrs.** _____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
CLAY to CLAY LOAM-brown & gray-stiff to very stiff *(continued)*			
733.10			
SILTY SAND-gray-medium dense			
	9		
	10		18
-45	11		
728.10			
SILTY CLAY LOAM-gray-medium stiff			
	5		
	7	0.9	19
-50	11	B	
723.10			
CLAY to CLAY LOAM-gray-stiff to very stiff			
	6		
	7	1.3	15
-55	8	B	
	4		
	8	1.9	18
-60	12	B	
CLAY to CLAY LOAM-gray-stiff to very stiff *(continued)*			
	6		
	11	2.8	14
-65	15	B	
	6		
	12	2.4	18
-70	13	B	
	5		
	9	2.1	18
-75	12	B	
	6		
	14	2.9	17
-80	19	B	

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

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SOIL BORING LOG

GSI Job No. 17004

Date 10/18/17

ROUTE IL-132 **DESCRIPTION** IDOT Job No. D-91-116-17, Contract No. 62D86 **LOGGED BY** MM

SECTION A-W&RS-2 **LOCATION** SE 1/4, **SEC.** 34, **TWP.** T40N, **RNG.** R10E, 3rd **PM**

COUNTY Lake **DRILLING METHOD** HSA/Mud Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO. _____
Station _____

BORING NO. CB-01
Station 69+85
Offset 30.00ft Left
Ground Surface Elev. 775.10 ft

Surface Water Elev. n/a ft
Stream Bed Elev. n/a ft

Groundwater Elev.:
First Encounter 769.6 ft ▼
Upon Completion n/a ft
After _____ **Hrs.** _____ ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
CLAY to CLAY LOAM-gray-stiff to very stiff *(continued)*				
some fractured rock from -83.5' to -85.0'		26		
		32		15
	-85	46		
	688.10			
SILTY CLAY-gray-hard				
		14		
End Of Boring @ -90'. Boring backfilled with cuttings.		23	5.2	10
	685.10 -90	32	B	
	-95			
	-100			

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)

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SOIL BORING LOG

GSI Job No. 17004

Date 10/30/17

ROUTE IL-132 **DESCRIPTION** IDOT Job No. D-91-116-17, Contract No. 62D86 **LOGGED BY** MM

SECTION A-W&RS-2 **LOCATION** NE 1/4, **SEC.** 3, **TWP.** T45N, **RNG.** R10E, 3rd **PM**

COUNTY Lake **DRILLING METHOD** HSA/Mud Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO.
Station

BORING NO. CB-02
Station 70+02
Offset 17.20ft Right
Ground Surface Elev. 775.70 ft

Surface Water Elev. n/a ft
Stream Bed Elev. n/a ft

Groundwater Elev.:
First Encounter 772.2 ft ▼
Upon Completion n/a ft
After ____ **Hrs.** ____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				SANDY TOPSOIL-black
			21	774.70
	6			CLAYEY SAND & GRAVEL-brown-loose
	5		7	
	4			
				772.70
				SILTY CLAY-dark brown & gray spotted black-medium stiff ▼
	4			
	3	0.9	23	
-5	3	B		
				770.20
				CLAY LOAM-gray-stiff to very stiff
	2			
	3	1.5	19	
	4	B		
	3			
	4	2.0	17	
-10	4	B		
	4			
	3	1.0	18	
	4	P		
				becoming gray @ -13.0'
	3			
	5	1.5	15	
-15	7	P		
	4			
	5	1.0	15	
	7	B		
	3			
	4	2.1	15	
-20	7	B		

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				CLAY LOAM-gray-stiff to very stiff *(continued)*
	6			
	7	1.7	15	
	10	B		
	4			
	6	1.9	15	
-25	9	B		
	5			
	8	1.8	15	
	11	B		
	7			
	8	1.8	15	
-30	12	P		
				743.70
				SILTY SAND with Gravel-gray-medium dense
	11			
	10		12	
-35	9			
				738.70
				CLAY-gray-stiff to very stiff
	6			
	8	1.7	20	
-40	6	B		

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

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SOIL BORING LOG

GSI Job No. 17004

Date 10/30/17

ROUTE IL-132 **DESCRIPTION** IDOT Job No. D-91-116-17, Contract No. 62D86 **LOGGED BY** MM

SECTION A-W&RS-2 **LOCATION** NE 1/4, **SEC.** 3, **TWP.** T45N, **RNG.** R10E, 3rd **PM**

COUNTY Lake **DRILLING METHOD** HSA/Mud Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO.
Station

BORING NO. CB-02
Station 70+02
Offset 17.20ft Right
Ground Surface Elev. 775.70 ft

Surface Water Elev. n/a ft
Stream Bed Elev. n/a ft

Groundwater Elev.:
First Encounter 772.2 ft ▼
Upon Completion n/a ft
After ____ **Hrs.** ____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				CLAY-gray-stiff to very stiff *(continued)*
	5			
-45	7 8	2.0 P	16	
	6			
-50	6 7	1.3 B	18	
	6			
-55	10 15	2.4 B	15	
	5			
-60	7 9	2.5 B	22	
				silt seams from -63.5' to -65.0'
-65	8 10 13	2.5 P	18	
	11			
-70	14 19	1.8 P	18	
	10			
-75	12 17	3.5 B	16	
				698.70
				SILT-gray-very dense
	28			
-80	43 50/3"		17	

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)

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Naperville, Illinois 60565
(630) 355-2838

SOIL BORING LOG

GSI Job No. 17004

Date 10/30/17

ROUTE IL-132 **DESCRIPTION** IDOT Job No. D-91-116-17, Contract No. 62D86 **LOGGED BY** MM

SECTION A-W&RS-2 **LOCATION** NE 1/4, **SEC.** 3, **TWP.** T45N, **RNG.** R10E, 3rd **PM**

COUNTY Lake **DRILLING METHOD** HSA/Mud Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO. _____
Station _____

BORING NO. CB-02
Station 70+02
Offset 17.20ft Right
Ground Surface Elev. 775.70 ft

Surface Water Elev. n/a ft
Stream Bed Elev. n/a ft

Groundwater Elev.:
First Encounter 772.2 ft ▼
Upon Completion n/a ft
After _____ **Hrs.** _____ ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
SILT-gray-very dense *(continued)*				
693.70				
SANDY LOAM-gray-very dense		30		
		39		12
	-85	42		
		33		
End Of Boring @ -90'. Boring backfilled with cuttings.		40		14
685.70	-90	50/5"		
	-95			
	-100			

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)

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SOIL BORING LOG

GSI Job No. 17004

Date 10/10/17

ROUTE IL-132 **DESCRIPTION** IDOT Job No. D-91-116-17, Contract No. 62D86 **LOGGED BY** MM

SECTION A-W&RS-2 **LOCATION** NE 1/4, **SEC.** 3, **TWP.** T45N, **RNG.** R10E, 3rd **PM**

COUNTY Lake **DRILLING METHOD** HSA/Mud Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO.
Station

BORING NO. CB-03
Station 69+55
Offset 26.50ft Right
Ground Surface Elev. 775.60 ft

Surface Water Elev. n/a ft
Stream Bed Elev. n/a ft

Groundwater Elev.:
First Encounter 768.1 ft ▼
Upon Completion n/a ft
After ____ **Hrs.** ____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Material
				SANDY SILT with Gravel-brown (Fill)
			11	774.60
	2			SANDY CLAY LOAM-dark brown & gray spotted black-loose to medium dense (Fill)
	4	4.5	16	
	9	P		
	1			
	3		18	
-5	3			
				770.10
	ST			SILTY CLAY-dark gray to black-very soft
		<0.25	17	
		P		▼
				767.60
	ST			SILTY CLAY LOAM-dark gray-very soft
		<0.25	22	
-10		P		
				765.10
	ST			SILTY CLAY-gray-very soft
		<0.25	18	
		P		
	1			
	2	0.2	18	
-15	2	B		
				760.10
	2			CLAY LOAM-gray-stiff to very stiff
	4	1.1	17	
	4	B		
	3			
	5	2.0	16	
-20	9	B		

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Material
				CLAY LOAM-gray-stiff to very stiff *(continued)*
	6			
	10	3.2	13	
	10	B		
				752.60
	6			SILTY LOAM-gray-medium dense
	7		16	
-25	11			
				750.10
	5			CLAY LOAM-gray-stiff to very stiff
	8	2.2	15	
	11	B		
	5			
	7	1.1	15	
-30	9	B		
	5			
	16	2.3	14	
-35	12	B		
				738.60
	5			SILTY LOAM to LOAM-gray-medium dense
	9		11	
-40	16			

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)

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SOIL BORING LOG

GSI Job No. 17004

Date 10/10/17

ROUTE IL-132 **DESCRIPTION** IDOT Job No. D-91-116-17, Contract No. 62D86 **LOGGED BY** MM

SECTION A-W&RS-2 **LOCATION** NE 1/4, **SEC.** 3, **TWP.** T45N, **RNG.** R10E, 3rd **PM**

COUNTY Lake **DRILLING METHOD** HSA/Mud Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO. _____
Station _____

BORING NO. CB-03
Station 69+55
Offset 26.50ft Right
Ground Surface Elev. 775.60 ft

Surface Water Elev. n/a ft
Stream Bed Elev. n/a ft

Groundwater Elev.:
First Encounter 768.1 ft ▼
Upon Completion n/a ft
After _____ **Hrs.** _____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
SILTY LOAM to LOAM-gray-medium dense *(continued)*			
	6		
-45	8 11		17
728.60			
SILT-gray-medium dense			
	6		
-50	7 6		17
723.60			
CLAY-gray-stiff to very stiff			
	4		
-55	7 8	2.3 B	18
	5		
-60	7 9	1.8 B	17
CLAY-gray-stiff to very stiff *(continued)*			
	9		
-65	12 14	3.0 B	17
	4		
-70	7 11	2.3 B	18
	7		
-75	12 23	2.5 B	17
	10		
-80	18 21	2.7 B	18

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

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SOIL BORING LOG

GSI Job No. 17004

Date 10/10/17

ROUTE IL-132 **DESCRIPTION** IDOT Job No. D-91-116-17, Contract No. 62D86 **LOGGED BY** MM

SECTION A-W&RS-2 **LOCATION** NE 1/4, **SEC.** 3, **TWP.** T45N, **RNG.** R10E, 3rd **PM**

COUNTY Lake **DRILLING METHOD** HSA/Mud Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO. _____
Station _____

BORING NO. CB-03
Station 69+55
Offset 26.50ft Right
Ground Surface Elev. 775.60 ft

Surface Water Elev. n/a ft
Stream Bed Elev. n/a ft

Groundwater Elev.:
First Encounter 768.1 ft ▼
Upon Completion n/a ft
After _____ **Hrs.** _____ ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
CLAY-gray-stiff to very stiff *(continued)*		9		
		13	2.7	16
	-85	11	B	
	688.60			
SILTY CLAY LOAM-gray-dense		20		
End Of Boring @ -90'. Boring backfilled with cuttings.		27		11
	685.60 -90	30		
	-95			
	-100			

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)

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GSI Job No. 17004

SOIL BORING LOG

Date 10/17/17

ROUTE IL-132 **DESCRIPTION** IDOT Job No. D-91-116-17, Contract No. 62D86 **LOGGED BY** MM

SECTION A-W&RS-2 **LOCATION** SE 1/4, **SEC.** 33, **TWP.** T46N, **RNG.** R10E, 3rd **PM**

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

STRUCT. NO. _____
Station _____

BORING NO. SGB-01
Station 36+79
Offset 24.00ft Left
Ground Surface Elev. 803.50 ft

Surface Water Elev. n/a ft
Stream Bed Elev. n/a ft

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

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
ASPHALT				
802.50				
CLAY LOAM-brown & gray-hard (Fill)		5		
		7	5.7	14
		5	B	
800.50				
SILTY LOAM-brown & gray-medium dense (A-4)		5		
		7	3.5	14
	-5	9	B	
798.00				
CLAY LOAM-brown & gray-very stiff		6		
		8	2.9	11
		8	S	
		6		
		9	2.7	12
793.50	-10	9	B	
End Of Boring @ -10'. Boring backfilled with cuttings.				
	-15			
	-20			

Z:\PROJECTS\2017\17004 PATRICK ENG., IL-132 (GRAND AVENUE)-PTB 182 (ITEM 003)\17004 BORING LOGS\17004_LOG.GPJ 8/28/18

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)

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SOIL BORING LOG

GSI Job No. 17004

Date 10/23/17

ROUTE IL-132 **DESCRIPTION** IDOT Job No. D-91-116-17, Contract No. 62D86 **LOGGED BY** MM

SECTION A-W&RS-2 **LOCATION** NW 1/4, **SEC.** 3, **TWP.** T45N, **RNG.** R10E, 3rd **PM**

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

STRUCT. NO. _____
Station _____

BORING NO. SGB-02
Station 39+85
Offset 19.00ft Right
Ground Surface Elev. 814.50 **ft**

Surface Water Elev. n/a **ft**
Stream Bed Elev. n/a **ft**

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

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	
12.0" ASPHALT				
813.50				
CLAY LOAM-dark brown & gray-very stiff (A-6)	6			
	4 6	3.6 B	17	
becoming gray @ -3.0'	5			
-5	8 9	3.6 B	14	
	5			
	5 6	2.8 B	16	
	4			
	5 7	2.9 B	16	
804.50 -10				
End Of Boring @ -10'. Boring backfilled with cuttings.				
-15				
-20				

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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)

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SOIL BORING LOG

GSI Job No. 17004

Date 10/17/17

ROUTE IL-132 **DESCRIPTION** IDOT Job No. D-91-116-17, Contract No. 62D86 **LOGGED BY** MM

SECTION A-W&RS-2 **LOCATION** SW 1/4, **SEC.** 34, **TWP.** T46N, **RNG.** R10E, 3rd **PM**

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

STRUCT. NO. _____
Station _____

BORING NO. SGB-03
Station 43+04
Offset 31.40ft Left
Ground Surface Elev. 821.20 ft

Surface Water Elev. n/a ft
Stream Bed Elev. n/a ft

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

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	
ASPHALT				
820.20				
CLAY LOAM-brown & gray-hard (Fill)	6			
	7 8	7.0 B	12	
818.20				
CLAY LOAM-brown & gray-very stiff to hard	5			
	8 11	5.6 B	15	
-5				
	5			
	7 10	3.9 B	15	
	7			
	12 12	4.8 B	14	
811.20 -10				
End Of Boring @ -10'. Boring backfilled with cuttings.				
-15				
-20				

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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)

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SOIL BORING LOG

GSI Job No. 17004

Date 10/23/17

ROUTE IL-132 **DESCRIPTION** IDOT Job No. D-91-116-17, Contract No. 62D86 **LOGGED BY** MM

SECTION A-W&RS-2 **LOCATION** NW 1/4, **SEC.** 3, **TWP.** T45N, **RNG.** R10E, 3rd **PM**

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

STRUCT. NO. _____
Station _____

BORING NO. SGB-04
Station 46+36
Offset 26.90ft Right
Ground Surface Elev. 822.30 ft

Surface Water Elev. n/a ft
Stream Bed Elev. n/a ft

Groundwater Elev.:
First Encounter 818.8 ft ▼
Upon Completion n/a ft
After _____ **Hrs.** _____ ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
6.0" ASPHALT 821.80				
CLAY LOAM with Stone-brown & gray-very stiff (Apparent Fill)		6		
		2 3	3.0 P	14
819.30				
SILTY LOAM-brown-medium dense (A-4) ▼		2		
		5 7	2.0 P	13
816.80	-5			
CLAY LOAM-brown-very stiff		4		
		5 8	2.4 B	15
		6		
		11 12	3.2 B	14
812.30	-10			
End Of Boring @ -10'. Boring backfilled with cuttings.	-15			
	-20			

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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)

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SOIL BORING LOG

GSI Job No. 17004

Date 10/17/17

ROUTE IL-132 **DESCRIPTION** IDOT Job No. D-91-116-17, Contract No. 62D86 **LOGGED BY** MM

SECTION A-W&RS-2 **LOCATION** SW 1/4, **SEC.** 34, **TWP.** T46N, **RNG.** R10E, 3rd **PM**

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

STRUCT. NO. _____
Station _____

BORING NO. SGB-05
Station 48+97
Offset 30.20ft Left
Ground Surface Elev. 817.40 ft

Surface Water Elev. n/a ft
Stream Bed Elev. n/a ft

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

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				ASPHALT
816.40				
	14			SAND & GRAVEL-brown-dense (Fill)
	15		3	
	16			
814.40				
				LOAM-black (A-6) (Topsoil)
	4			
	6	1.8	22	
-5	8	P		
811.90				
				SILTY CLAY LOAM-brown & gray-stiff
	3			
	4	1.3	16	
	3	P		
809.40				
	ST			CLAYEY SAND & GRAVEL-brown & gray
			15	
807.40 -10				
				End Of Boring @ -10'. Boring backfilled with cuttings.
-15				
-20				

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

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GSI Job No. 17004

SOIL BORING LOG

Page 1 **of** 1

Date 10/23/17

ROUTE IL-132 **DESCRIPTION** IDOT Job No. D-91-116-17, Contract No. 62D86 **LOGGED BY** MM

SECTION A-W&RS-2 **LOCATION** NW 1/4, **SEC.** 3, **TWP.** T45N, **RNG.** R10E, 3rd **PM**

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

STRUCT. NO.
Station

BORING NO. SGB-06
Station 52+07
Offset 26.80ft Right
Ground Surface Elev. 811.90 ft

Surface Water Elev. n/a ft
Stream Bed Elev. n/a ft

Groundwater Elev.:
First Encounter 803.4 ft ▼
Upon Completion n/a ft
After ____ **Hrs.** ____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
12.0" ASPHALT			
810.90			
CLAY LOAM-brown & gray-very stiff to hard (Apparent Fill)	9		
	7 7	4.5 P	15
	5		
	7 8	4.5 P	14
-5			
806.40			
CLAY LOAM-dark brown & gray-very stiff	4		
	5 5	2.4 B	26
becoming brown & gray @ -8.0' ▼	3		
	5 7	2.7 B	18
801.90 -10			
End Of Boring @ -10'. Boring backfilled with cuttings.			
-15			
-20			

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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)

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SOIL BORING LOG

GSI Job No. 17004

Date 10/17/17

ROUTE IL-132 **DESCRIPTION** IDOT Job No. D-91-116-17, Contract No. 62D86 **LOGGED BY** MM

SECTION A-W&RS-2 **LOCATION** SW 1/4, **SEC.** 34, **TWP.** T46N, **RNG.** R10E, 3rd **PM**

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

STRUCT. NO. _____
Station _____

BORING NO. SGB-07
Station 55+17
Offset 28.10ft Left
Ground Surface Elev. 807.90 **ft**

Surface Water Elev. n/a **ft**
Stream Bed Elev. n/a **ft**

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

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	
ASPHALT				
806.90				
SILTY LOAM-brown & gray-medium dense (A-4)	4			
	5 6	3.5 B	16	
804.90				
CLAY LOAM-brown & gray-very stiff to hard	4			
	10 15	3.9 S	16	
-5	8			
	11 11	8.4 B	15	
	6			
	12 17	4.2 B	15	
797.90 -10				
End Of Boring @ -10'. Boring backfilled with cuttings.				
-15				
-20				

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

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SOIL BORING LOG

GSI Job No. 17004

Date 10/23/17

ROUTE IL-132 **DESCRIPTION** IDOT Job No. D-91-116-17, Contract No. 62D86 **LOGGED BY** MM

SECTION A-W&RS-2 **LOCATION** NW 1/4, **SEC.** 3, **TWP.** T45N, **RNG.** R10E, 3rd **PM**

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

STRUCT. NO. _____
Station _____

BORING NO. SGB-08
Station 58+16
Offset 19.60ft Right
Ground Surface Elev. 795.70 **ft**

Surface Water Elev. n/a **ft**
Stream Bed Elev. n/a **ft**

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

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	
12.0" ASPHALT				
794.70				
LOAM-brown-medium dense (A-4)	6			
	5 5	2.3 P	13	
792.70				
CLAY LOAM-brown-hard	4			
	7 7	4.3 B	13	
-5	7			
	11 14	6.0 B	14	
	7			
	9 11	5.0 B	14	
785.70 -10				
End Of Boring @ -10'. Boring backfilled with cuttings.				
-15				
-20				

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

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SOIL BORING LOG

GSI Job No. 17004

Date 10/23/17

ROUTE IL-132 **DESCRIPTION** IDOT Job No. D-91-116-17, Contract No. 62D86 **LOGGED BY** MM

SECTION A-W&RS-2 **LOCATION** NW 1/4, **SEC.** 3, **TWP.** T45N, **RNG.** R10E, 3rd **PM**

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

STRUCT. NO. _____
Station _____

BORING NO. SGB-09
Station 73+34
Offset 22.00ft Right
Ground Surface Elev. 781.80 **ft**

Surface Water Elev. n/a **ft**
Stream Bed Elev. n/a **ft**

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

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
12.0" ASPHALT				
780.80				
CLAY-dark brown & gray-stiff (A-6)		3		
		2 3	1.3 P	27
778.80				
CLAY LOAM-brown & gray-very stiff		3		
	-5	5 7	3.5 B	15
		5		
		7 8	3.8 B	16
		5		
		8 8	3.9 B	15
771.80	-10			
End Of Boring @ -10'. Boring backfilled with cuttings.				
	-15			
	-20			

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

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SOIL BORING LOG

GSI Job No. 17004

Date 10/17/17

ROUTE IL-132 **DESCRIPTION** IDOT Job No. D-91-116-17, Contract No. 62D86 **LOGGED BY** MM

SECTION A-W&RS-2 **LOCATION** SW 1/4, **SEC.** 34, **TWP.** T46N, **RNG.** R10E, 3rd **PM**

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

STRUCT. NO. _____
Station _____

BORING NO. SGB-10
Station 76+44
Offset 29.60ft Left
Ground Surface Elev. 793.90 ft

Surface Water Elev. n/a ft
Stream Bed Elev. n/a ft

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

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				ASPHALT
792.90				
	1			SILTY CLAY-brown-medium stiff to very stiff
	2 3	1.0 B	24	
	4			
	7 4	1.5 P	17	
-5				
	4			
	6 12	3.0 B	17	
	7			
	7 9	2.8 B	16	
783.90 -10				
				End Of Boring @ -10'. Boring backfilled with cuttings.
-15				
-20				

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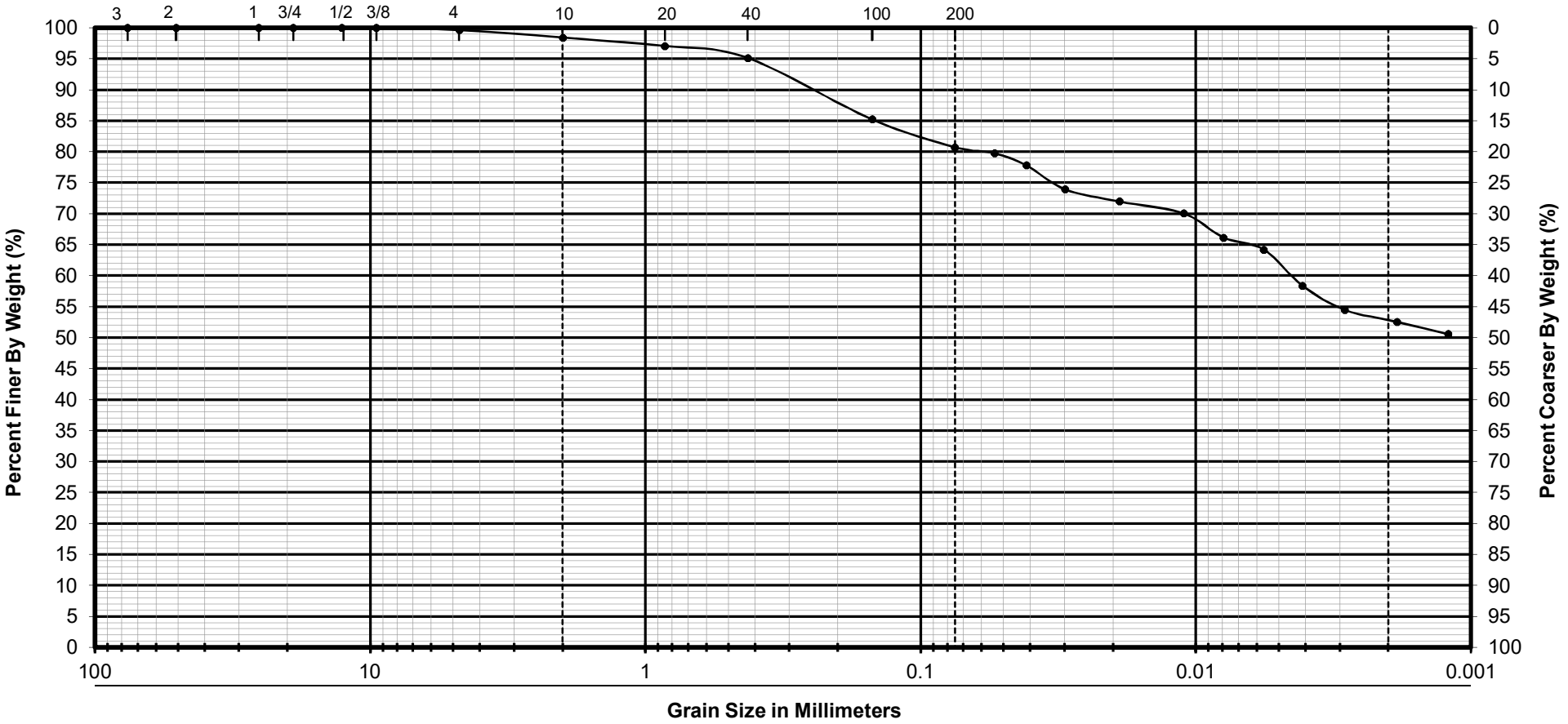
The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, from 137 (Rev. 8-99)

APPENDIX F
Lab Data



GRAVEL	SAND		SILT	CLAY
	COARSE	FINE		

Boring No.	SGB-09	CLASSIFICATION		PARTICLE SIZE ANALYSIS-AASHTO T88
Sample No.	2			
Depth	1.0'-2.5'	CLAY		IL-132 (Grand Avenue)-PTB 182 (Item 003)
Liquid Limit	36	A-6		Grand Ave. from Deep Lake Rd. to Munn Rd.
Plastic Limit	18	brown/gray		Lake County, Illinois
Plasticity Index	18	Group Index	14	
Test By	MT	% Gravel	1.6	
Date	11/9/17	% Sand	17.7	
Reviewed By	AB	% Silt	28.2	
Job No	17004	% Clay	52.5	

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Arlington Heights, IL 60005-2131
Phone (847) 253-3845
Fax (847) 253-0482

Project Name IL-132 (Grand Avenue)-PTB 182 (Item 003) Job No 17004

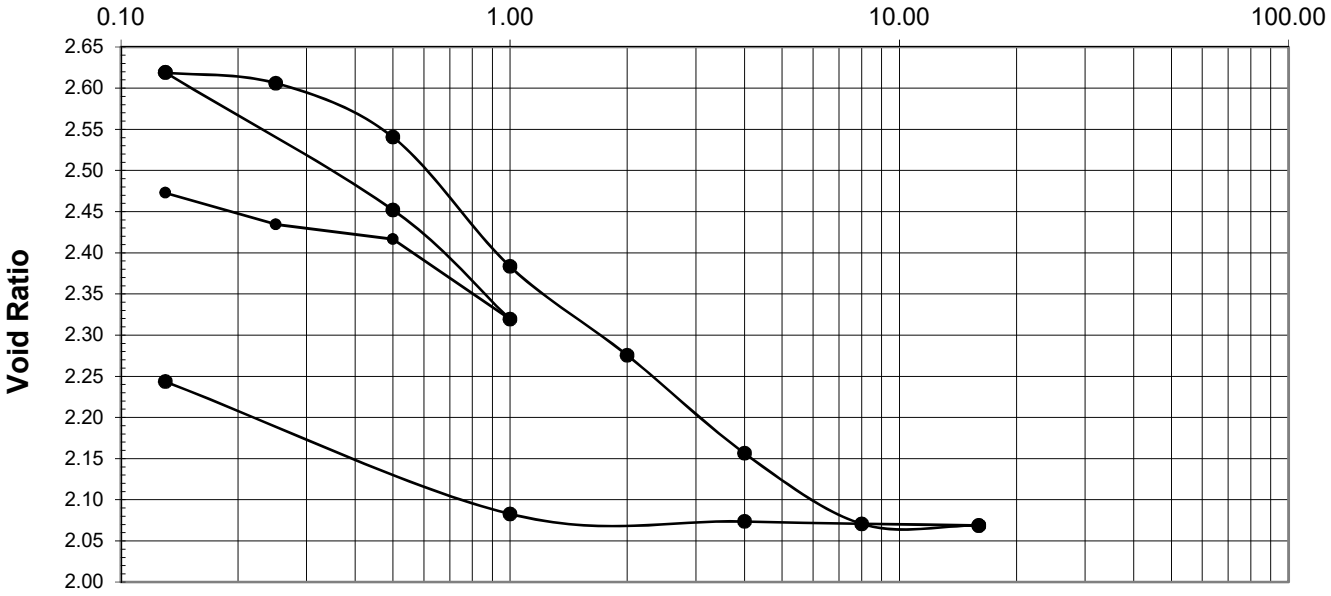
Location Grand Ave. from Deep Lake Rd. to Munn Rd. Test Date 10-18-17 to 11-10-17

Boring No BSB-04 Sample No ST-1 Depth 13.0'-15.0' Tested by MT

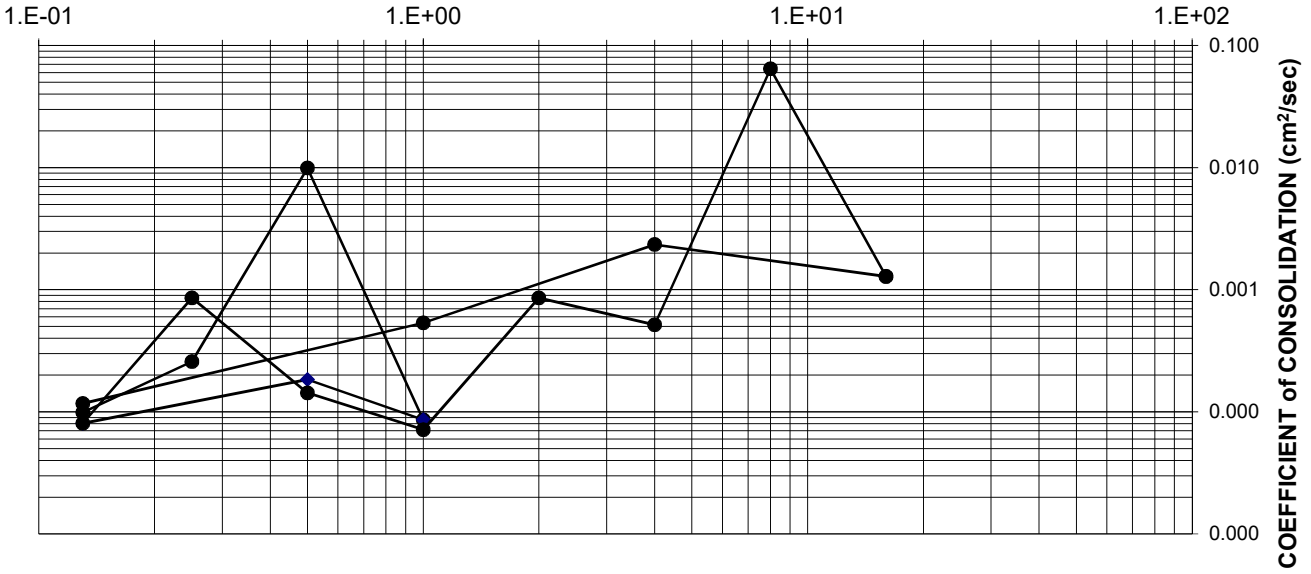
Sample Description PEAT-dark gray to black (A-8) Cc= 0.340

Pc= .28 ksc Ccr= 0.096

Consolidation Test (16 tsf)-AASHTO T216
Summary Report



VERTICAL EFFECTIVE STRESS (kg/cm²)



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Project Name IL-132 (Grand Avenue)-PTB 182 (Item 003) Job No 17004

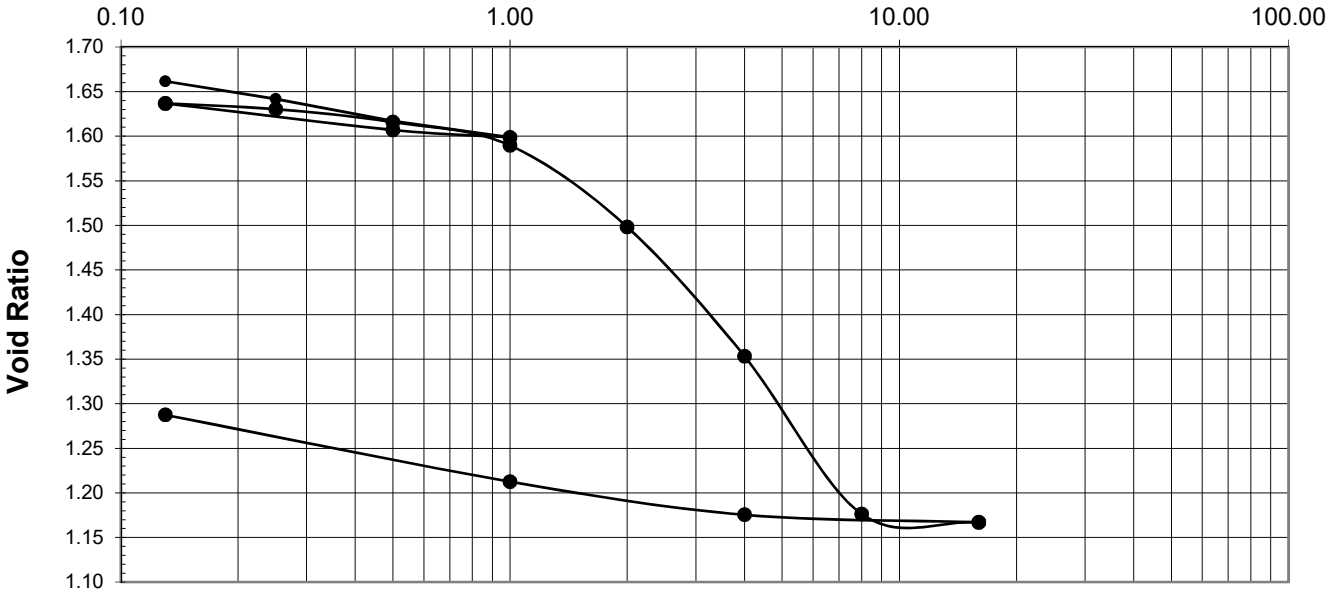
Location Grand Ave. from Deep Lake Rd. to Munn Rd. Test Date 10-18-17 to 11-10-17

Boring No BSB-06 Sample No ST-1 Depth 6.0'-8.0' Tested by MT

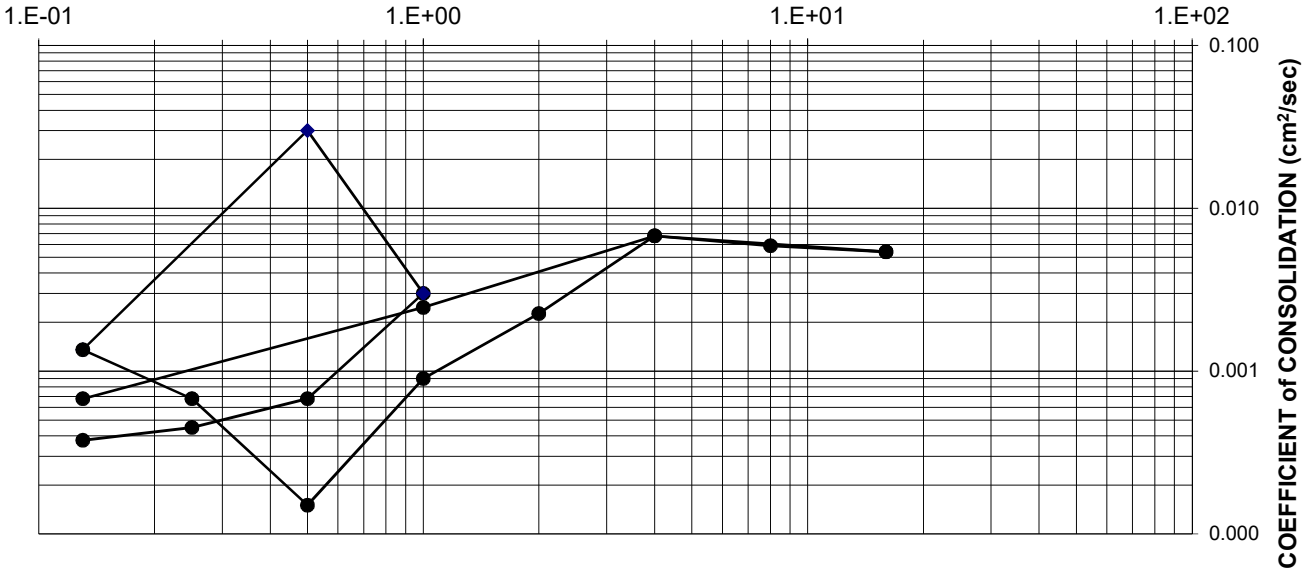
Sample Description PEAT-black (A-8) Cc= 0.587

Pc= 1.2 ksc Ccr= 0.076

Consolidation Test (16 tsf)-AASHTO T216
Summary Report



VERTICAL EFFECTIVE STRESS (kg/cm²)



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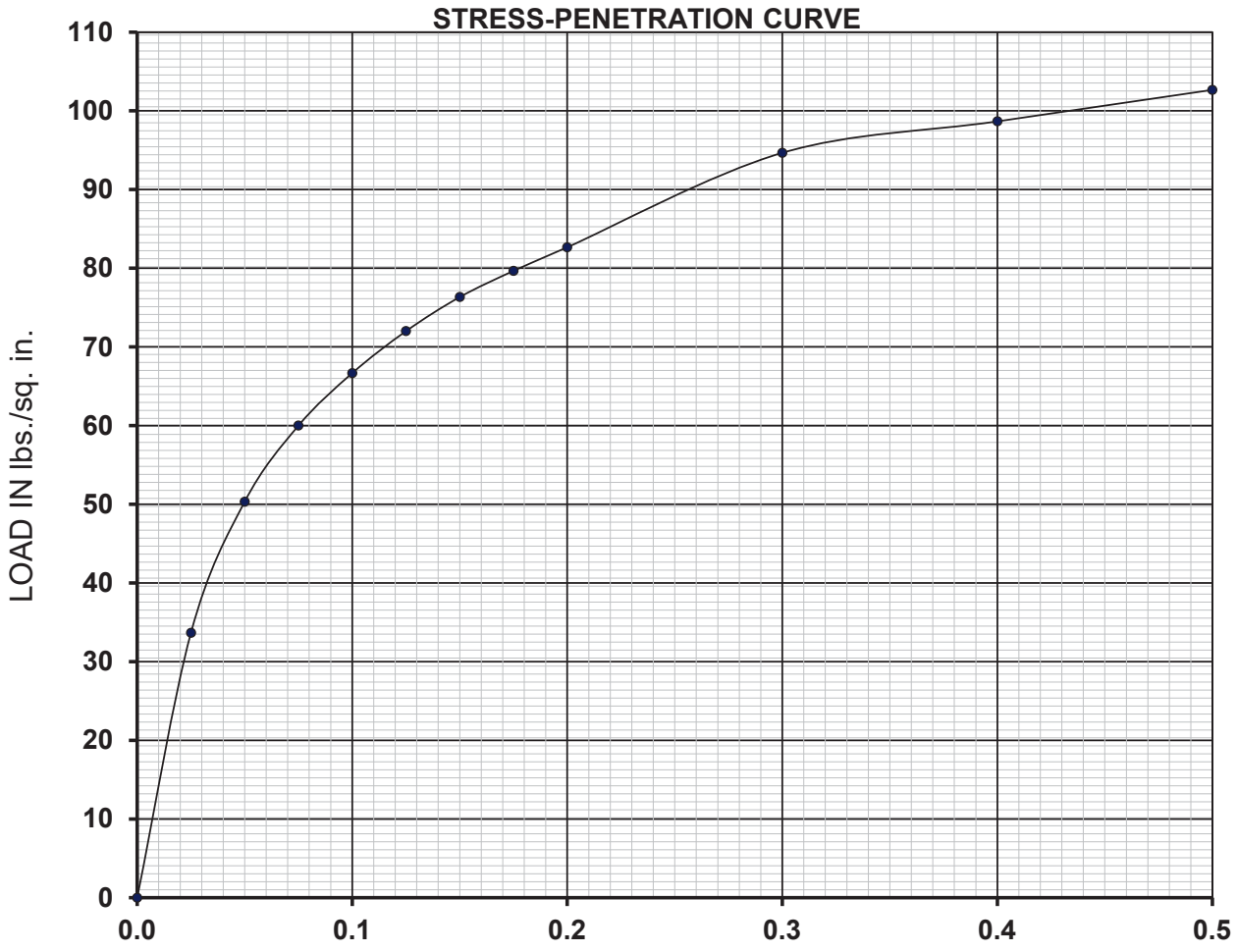
CBR (California Bearing Ratio) of Laboratory-Compacted Soils-ASTM D 1883

Project Name	IL-132 (Grand Avenue)-PTB 182 (Item 003)				Test Results
Location	IL-132 /Deep Lake Road	Max. Dry Density (PCF)	125.3		% of
Job No.	17004	Target Moisture (%)	10.8		Expansion 0.2
Date	10/30/2017	Method of Compaction	Standard		**BR 0.1" 6.7**
Boring No	SGB-05		Molded	Soaked	**BR 0.2" 5.5**
		Actual Dry Density (PCF)	120.0	118.0	LL -
Depth	1'-6.0'	Actual W/C (%)	10.6	13.7	PL -
					PI -
Sample Description	Calyey Sandy Silt-w/ Gravel Dark Brown				Pen. Correction 0.0
					Tested by AT



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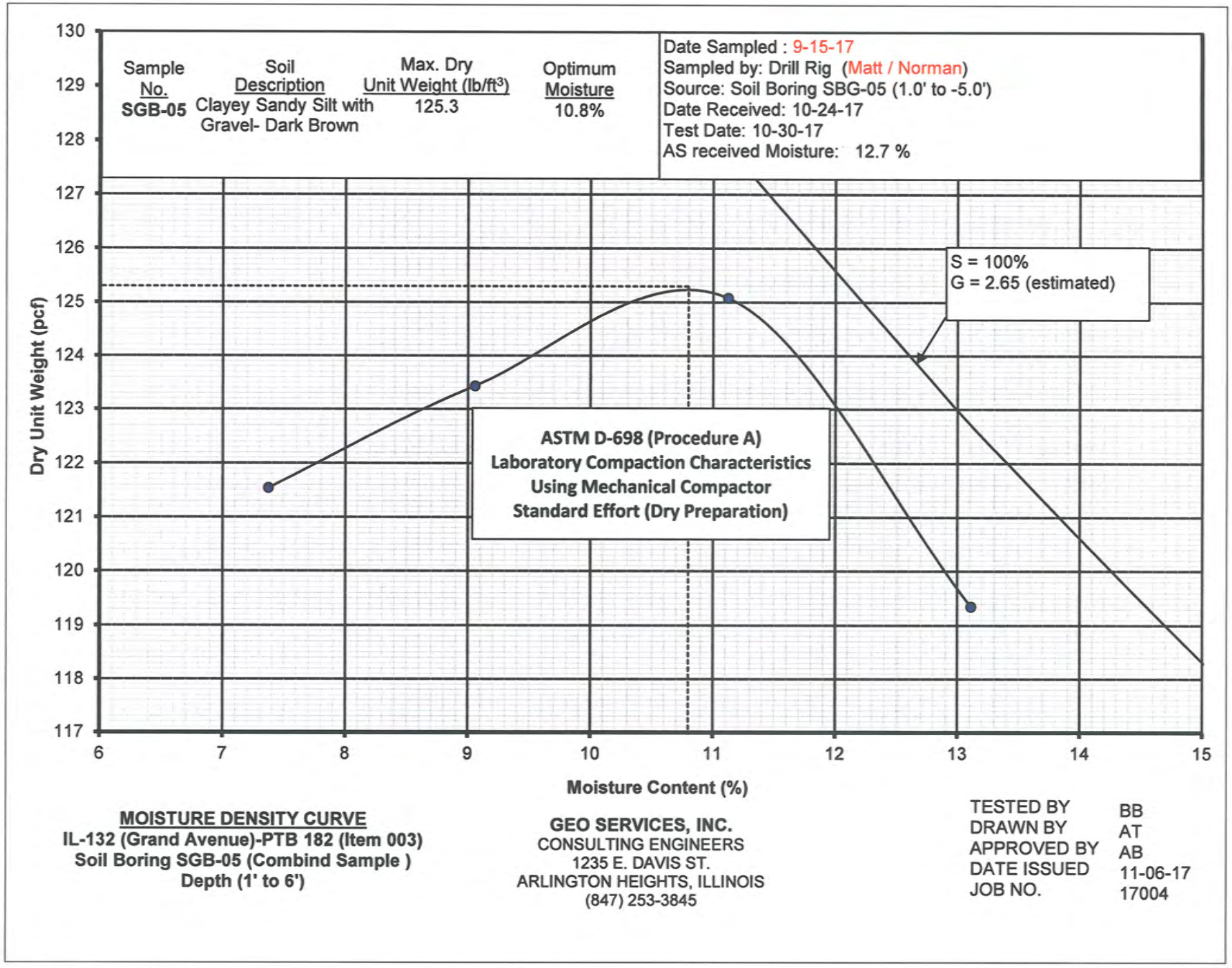
Fax (847) 253-0482

ORGANIC MATTER of SOILS
AASHTO T 267

Project Name	**IL-132 (Grand Avenue)-PTB 182 (Item 003)**	**Date**	11/07/17
Location	**Grand Ave. from Deep Lake Rd. to Munn Rd., Illinois**	**Job No**	17004

Boring No	BSB-06
Sample No.	ST
Depth	6.0'-8.0'
% Organic Content	7.0

Tested By MT



MOISTURE DENSITY CURVE
IL-132 (Grand Avenue)-PTB 182 (Item 003)
Soil Boring SGB-05 (Combind Sample)
Depth (1' to 6')

GEO SERVICES, INC.
CONSULTING ENGINEERS
1235 E. DAVIS ST.
ARLINGTON HEIGHTS, ILLINOIS
(847) 253-3845

TESTED BY	BB
DRAWN BY	AT
APPROVED BY	AB
DATE ISSUED	11-06-17
JOB NO.	17004

Geo Services, Inc.
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An MBE - DBE Firm

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

Project Name IL-132 (Grand Avenue)-PTB 182 (Item 003) Job No 17004

Location Grand Avenue from Deep Lake Road to Munn Road, Illinois Date 11/13/17

SAMPLE NO.	SGB-01/S-3	SGB-02/S-2	SGB-04/S-3	SGB-05/S-3	SGB-07/S-2	SGB-08/S-2	SGB-09/S-2
DEPTH	3.5-5.0'	1.0'-2.5'	3.5-5.0'	3.5-5.0'	1.0'-2.5'	1.0'-2.5'	1.0'-2.5'
LIQUID LIMIT (LL)	21	30	19	28	25	22	36
PLASTIC LIMIT (PL)	15	15	13	17	15	14	18
PLASTICITY INDEX (PI)	6	15	6	11	10	8	18

Test by MT

TEM Environmental Inc.

BULK ASBESTOS SAMPLE EVALUATION
POLARIZED LIGHT MICROSCOPY (PLM) TECHNIQUE
WITH GRAVIMETRIC REDUCTION

NVLAP LAB ID 101130-0

Company Name:	Geo Services, Inc.	**Client Project Ref:**	#17004
Contact	Alex Barlan	**Project Location:**	IL-132 (Grand Avenue)
Address:	1235 East Davis Street	**TEM Project:**	54794
	Arlington Hts. Illinois 60005-	**Analyzed by:**	Lori Boersma
		Date Analyzed:	12/12/2017

Sample Information				Fibrous Materials				Non-Fibrous Materials	
Client Sample ID Description	TEM ID.	COLOR	ACM	Asbestos Fibers Type	Asbestos Fibers Percent	Non-Asbestos Fibers Type	Non-Asbestos Fibers Percent	Filler Binder	Comments
PC-04 13.75" Concrete Core	324039	Gray	N/D	Chrysotile Amosite		Organic Mtl. Acid Soluble	2.24 96.98	0.78	
PC-05 22.5" Concrete Core	324040	Gray	N/D	Chrysotile Amosite		Organic Mtl. Acid Soluble	5.33 94.23	0.44	

Samples were analyzed following the procedures contained in the EPA Method 600/R-93/116, July 1993,including the use of gravimetric reduction to enhance the abiltiy to aobserve asbesos fibers in the sample. This report applies only to samples tested.

SLM: The optical resolution of polarized light microscopy limits the size of fibers that are visible. In samples where very small fibers may be present, the asbestos fibers may be smaller than the resolution limit of a polarized light microscope. In those cases, the result of the PLM analysis is not conclusive where the sample is reported as non-asbestos. Samples that are expected to contain small fibers (such as floor tile samples) and that are reported as non-asbestos by PLM should be further anlayzed by transmission electron microscopy.

Key: ACM = Asbestos Containing Material as defined in USEPA NESHAP Regulation; TR = Trace; N/D = None Detected

Signature of Analyst

443 Duane Street. Glen Ellyn. Illinois 60137 Phone (630) 790-0880 Fax (630) 790-0882

X

TEM, Incorporated

CHAIN OF CUSTODY REPORT

www.tem-inc.com

443 Duane Street
Glen Ellyn, IL 60137
(630) 790-0880
FAX (630) 790-0882

CLIENT: Geo Services Inc. Date: 12/06/17	TAT 6 HOUR 12 HOUR 24 HOUR 48 HOUR 72 HOUR >4 DAYS
Contact: Alex Barlan E-Mail: alex@geoservicesinc.net	Project Name/No. IL-132 (Grand Avnenue) / GSI project #17004
Address: 1235 E. Davis Street	Results Due by: (Date & Time) Standard turn-around
City/State/Zip Arlington Heights, Illinois 60005	TEM Project#: 54794
Phone 847-253-3845 X206 FAX 847-253-0482	NVLAP ID 101130 AIHA-PAT 101151 AIHA-AAR 101151

Comments: test as per IDOT BDE Procedures #10-05 (11/01/10)

PO/Quote#:

Client ID No.	Description	Sample Volume	PLM: Bulk	PLM: Point Count	PLM: Gravimetric	TEM: Air-AHERA	TEM: Air-Other	TEM: Bulk	TEM: Chatfield	TEM: Water	TEM: Micro-Vac	TEM: PCM-Air	TEM: Other	Comments
PC-04	~13.75" Concrete				X									
PC-05	~22.5" Concrete				X									

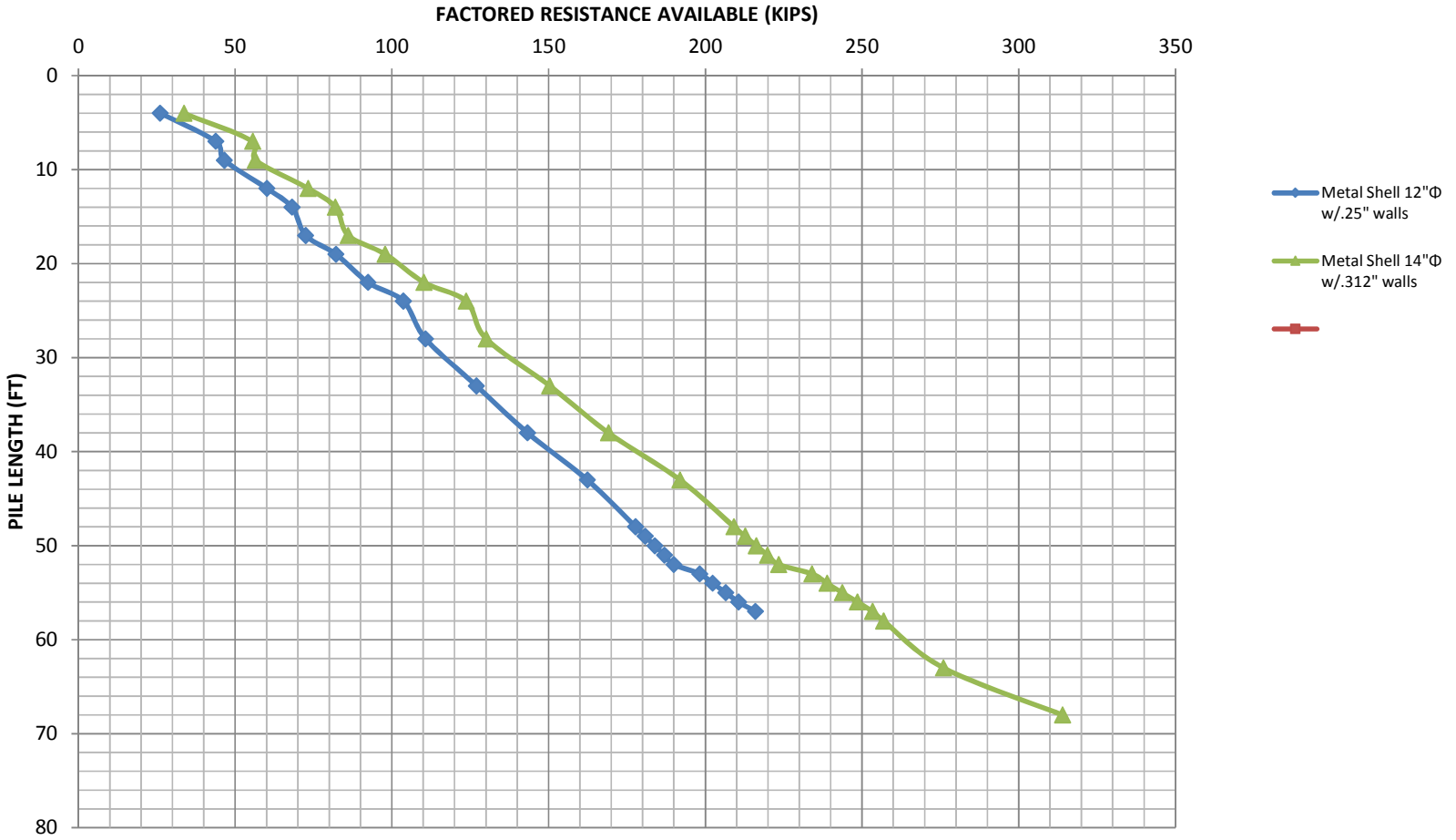
RELINQUISHED (SIGNATURE)	DATE/TIME 12/06/17 9:55 AM PM	RECEIVED BY (SIGNATURE)	DATE/TIME 10:00 am 12-6-17
RELINQUISHED (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)	DATE/TIME
LOGGED IN BY (SIGNATURE)	DATE/TIME	ANALYZED BY (SIGNATURE)	DATE/TIME

APPENDIX G
Pile Capacity Tables and Spreadsheets

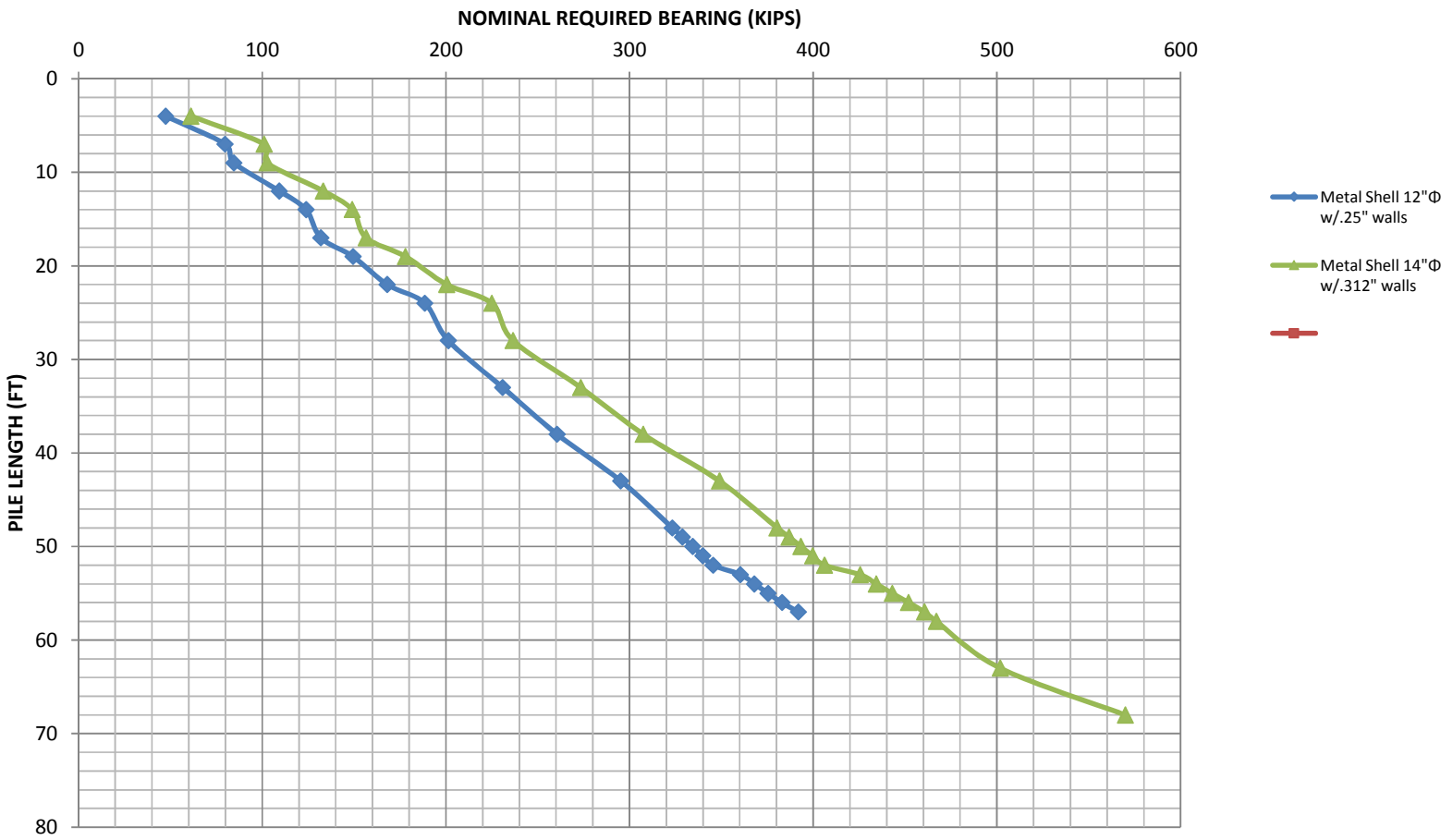
IL 132 Dryland Bridge SN 049-D030, Boring BSB-01 (777.86 for Pile Cutoff)												
Estimated Pile Length (ft.)	Metal Shell 12"Φ w/.25" walls		Metal Shell 14"Φ w/.312" walls									
	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)
4	26	47	34	61								
7	44	80	56	101								
9	47	85	56	103								
12	60	109	73	133								
14	68	124	82	149								
17	73	132	86	157								
19	82	149	98	178								
22	92	168	110	200								
24	104	189	124	225								
28	111	201	130	237								
33	127	231	150	273								
38	143	261	169	307								
43	162	295	192	349								
48	178	323	209	380								
49	181	329	213	387								
50	184	334	216	393								
51	187	340	220	400								
52	190	345	223	406								
53	198	360	234	426								
54	202	368	239	434								
55	207	375	244	443								
56	211	383	249	452								
57	216	392	253	461								
58			257	467								
63			276	502								
68			314	570								

Notes: 1) Estimated bottom of cap footing elevation at 775.86 feet & pile cutoff at 777.86 feet.

PILE BEARING (FRA) VS. ESTIMATED PILE LENGTH
IL 132 Dryland Bridge SN 049-D030
(777.86 for Pile Cutoff)



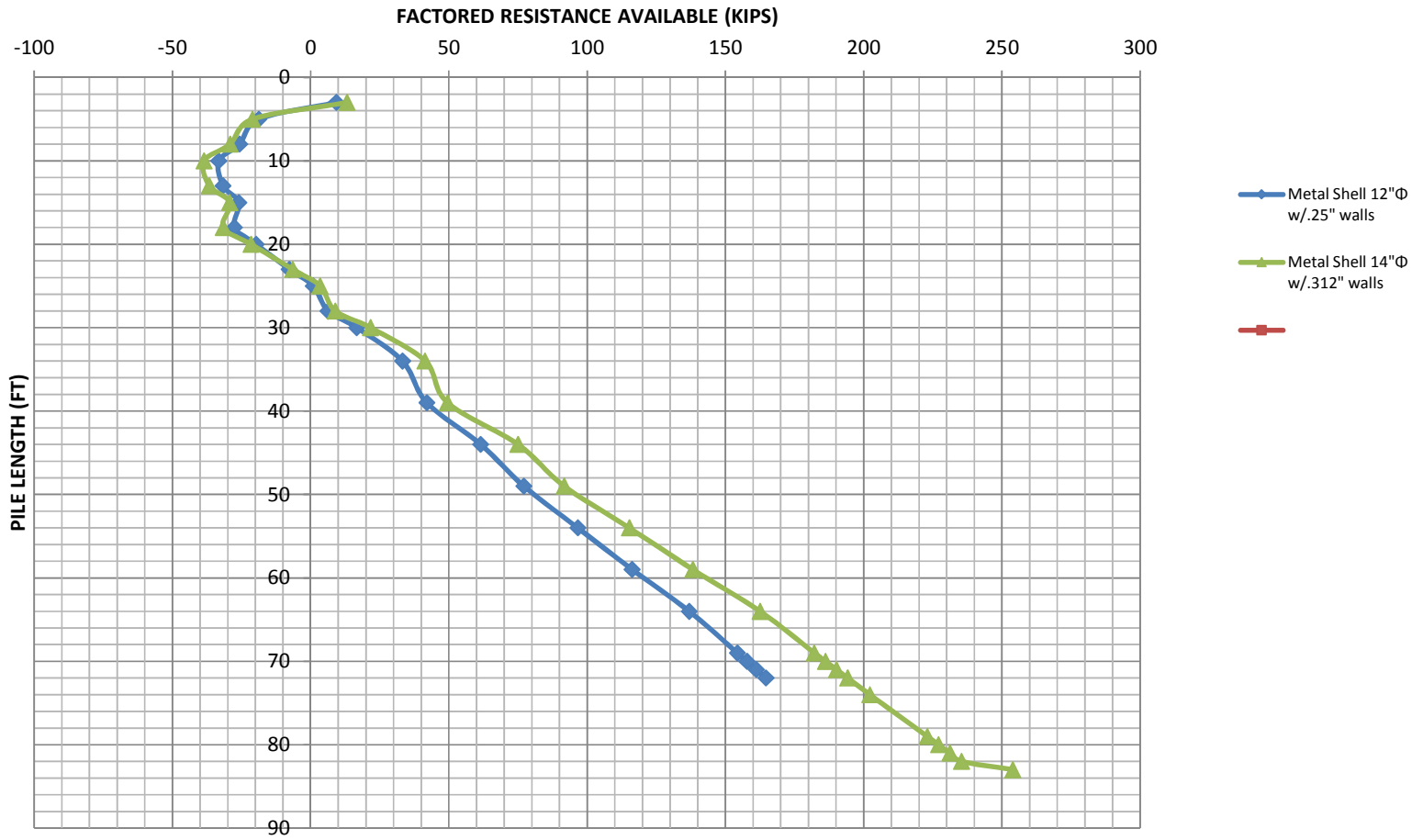
PILE BEARING (NRB) VS. ESTIMATED PILE LENGTH
IL 132 Dryland Bridge SN 049-D030
(777.86 for Pile Cutoff)



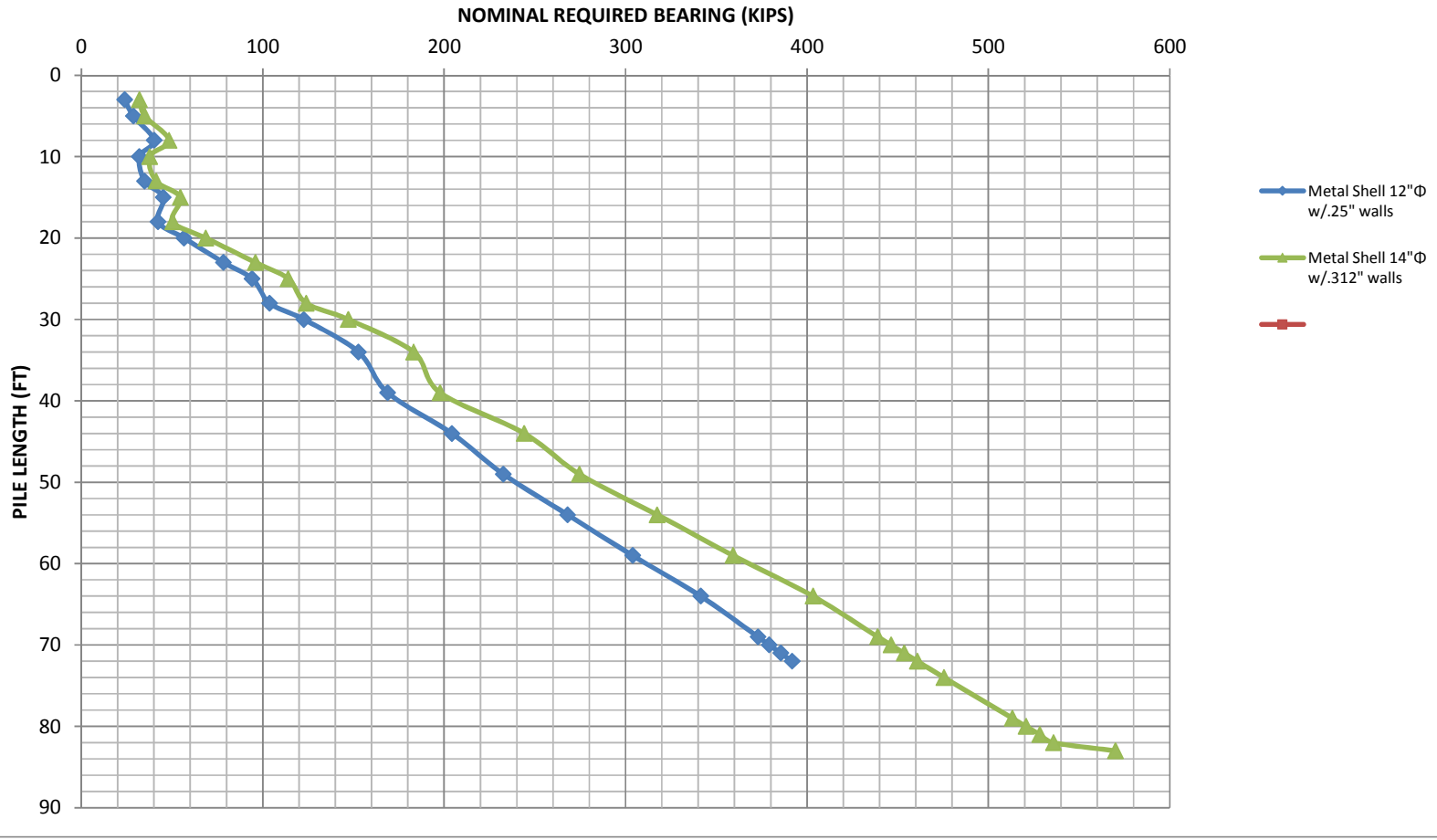
IL 132 Dryland Bridge SN 049-D030, Boring BSB-03, Downdrag to 762.20 (774.87 for Pile Cutoff)												
Estimated Pile Length (ft.)	Metal Shell 12"Φ w/.25" walls		Metal Shell 14"Φ w/.312" walls									
	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)
3	9	24	13	32								
5	-19	29	-21	35								
8	-26	40	-29	48								
10	-33	32	-39	38								
13	-32	35	-37	41								
15	-26	45	-29	55								
18	-28	42	-32	50								
20	-20	57	-22	69								
23	-8	78	-7	96								
25	1	94	3	114								
28	6	104	9	124								
30	17	123	22	147								
34	33	153	41	183								
39	42	169	49	198								
44	62	204	75	244								
49	77	233	92	275								
54	97	268	115	317								
59	116	304	138	359								
64	137	341	163	403								
69	154	373	182	439								
70	158	379	186	446								
71	161	386	190	454								
72	165	392	194	461								
74			202	476								
79			223	513								
80			227	521								
81			231	528								
82			235	536								
83			254	570								

Notes: 1) Estimated bottom of cap footing elevation at 772.87 feet & pile cutoff at 774.87 feet.

PILE BEARING (FRA) VS. ESTIMATED PILE LENGTH
IL 132 Dryland Bridge SN 049-D030, Boring BSB-03, Downdrag to 762.20 (774.87 for Pile Cutoff)



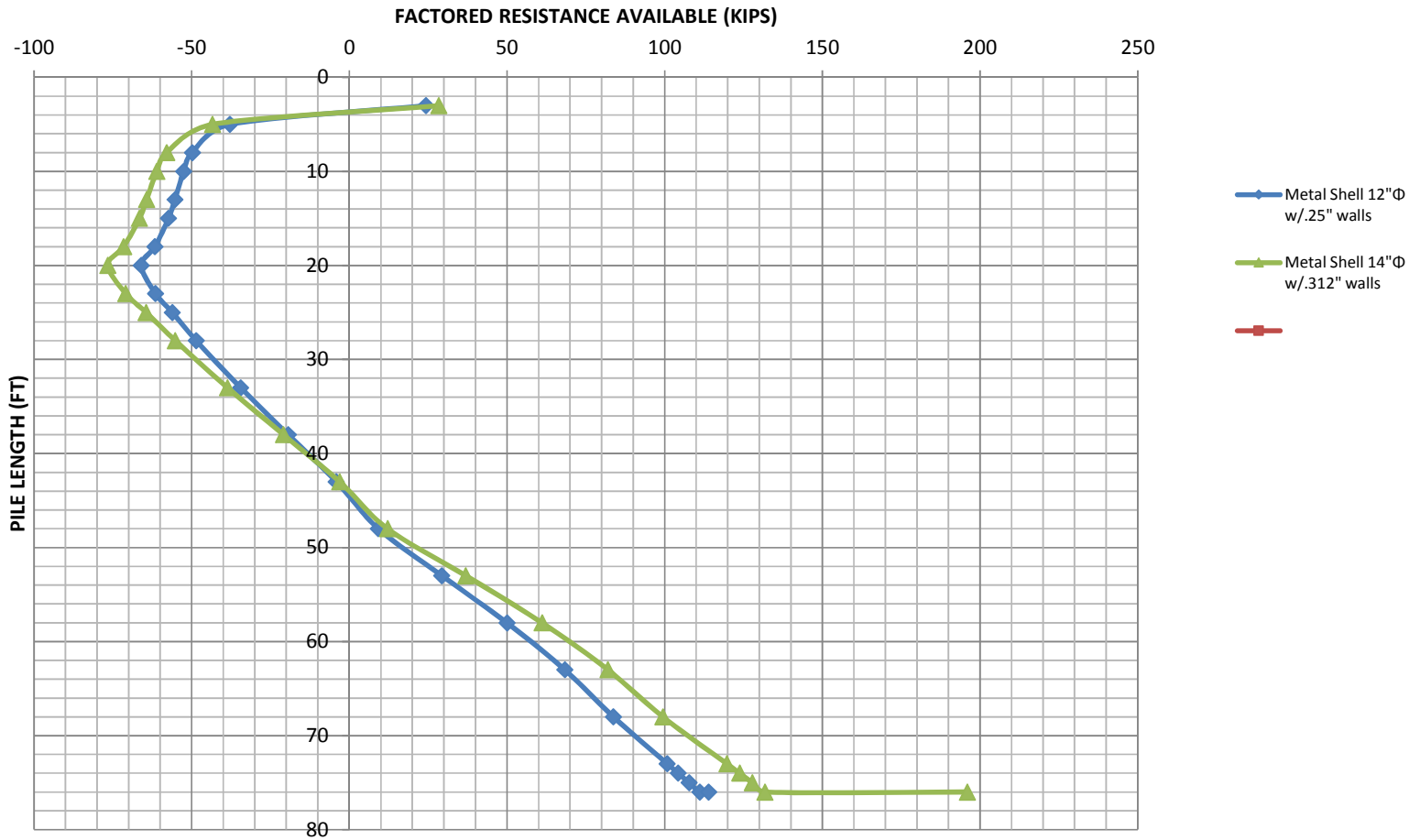
PILE BEARING (NRB) VS. ESTIMATED PILE LENGTH
IL 132 Dryland Bridge SN 049-D030, Boring BSB-03, Downdrag to 762.20 (774.87 for Pile Cutoff)



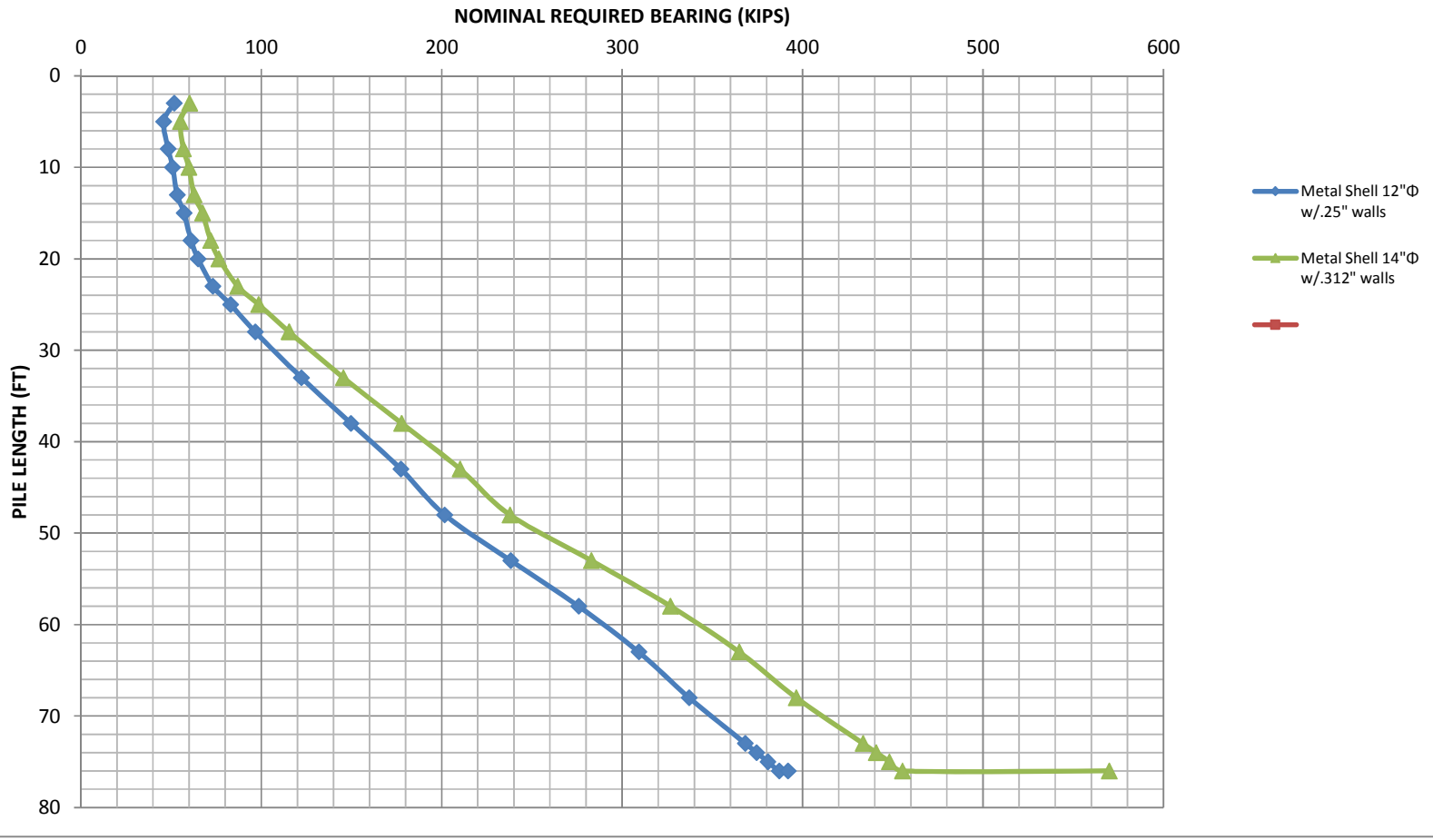
IL 132 Dryland Bridge SN 049-D030, Boring BSB-04, Downdrag to 753.60 (773.71 for Pile Cutoff)												
Estimated Pile Length (ft.)	Metal Shell 12"Φ w/.25" walls		Metal Shell 14"Φ w/.312" walls									
	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)
3	24	52	28	60								
5	-38	46	-43	55								
8	-50	48	-58	57								
10	-53	51	-61	60								
13	-55	53	-64	63								
15	-57	57	-67	67								
18	-62	61	-72	72								
20	-66	65	-77	77								
23	-61	73	-71	87								
25	-56	83	-64	99								
28	-49	97	-55	115								
33	-34	122	-39	145								
38	-19	150	-21	178								
43	-4	177	-3	210								
48	9	202	12	238								
53	29	238	37	283								
58	50	276	61	327								
63	68	309	82	365								
68	84	337	99	397								
73	101	368	120	434								
74	104	375	124	441								
75	108	381	128	448								
76	111	387	132	455								
76	114	392	196	570								

Notes: 1) Estimated bottom of cap footing elevation at 771.71 feet & pile cutoff at 773.71 feet.

PILE BEARING (FRA) VS. ESTIMATED PILE LENGTH
IL 132 Dryland Bridge SN 049-D030, Boring BSB-04, Downdrag to 753.60 (773.71 for Pile Cutoff)



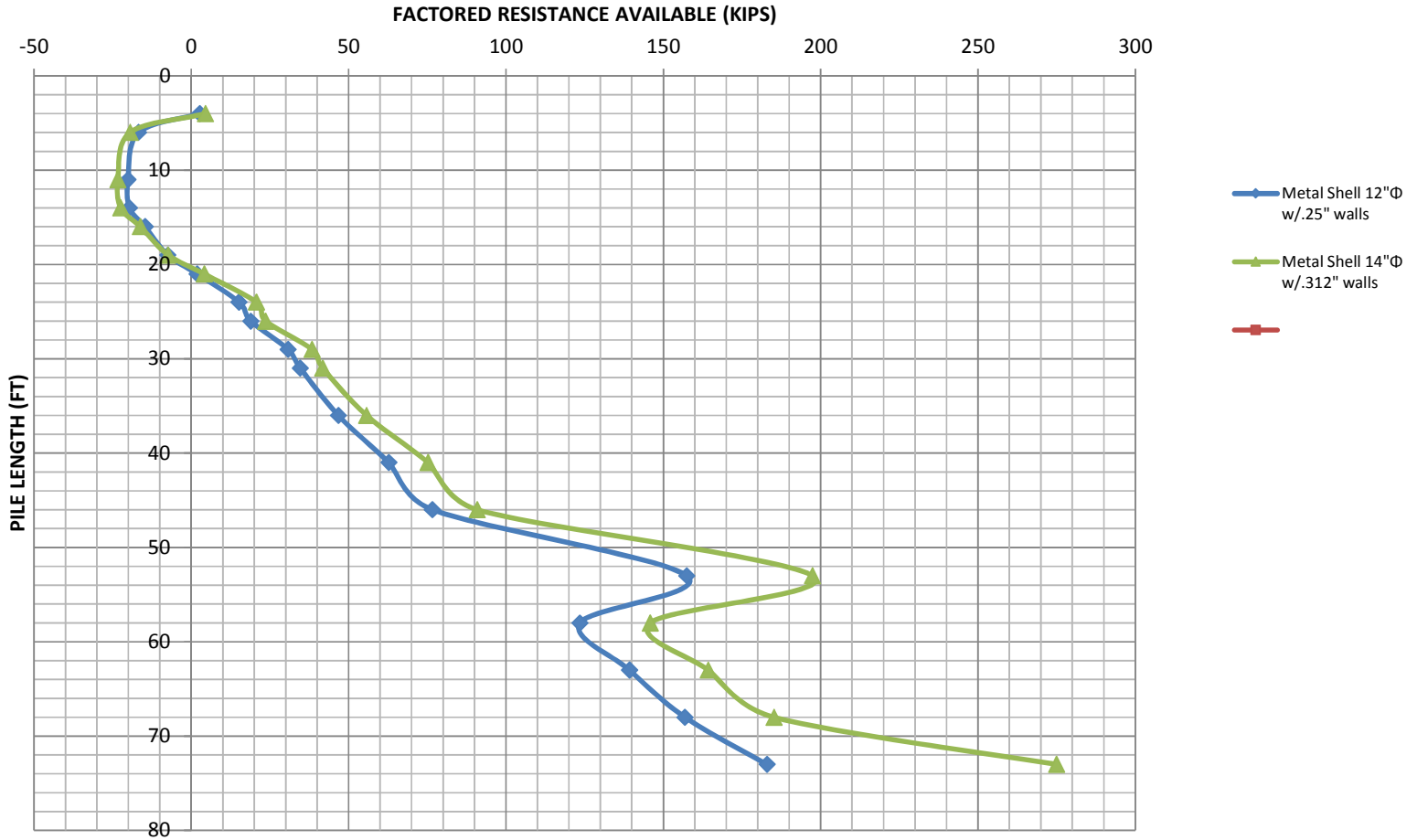
PILE BEARING (NRB) VS. ESTIMATED PILE LENGTH
IL 132 Dryland Bridge SN 049-D030, Boring BSB-04, Downdrag to 753.60 (773.71 for Pile Cutoff)



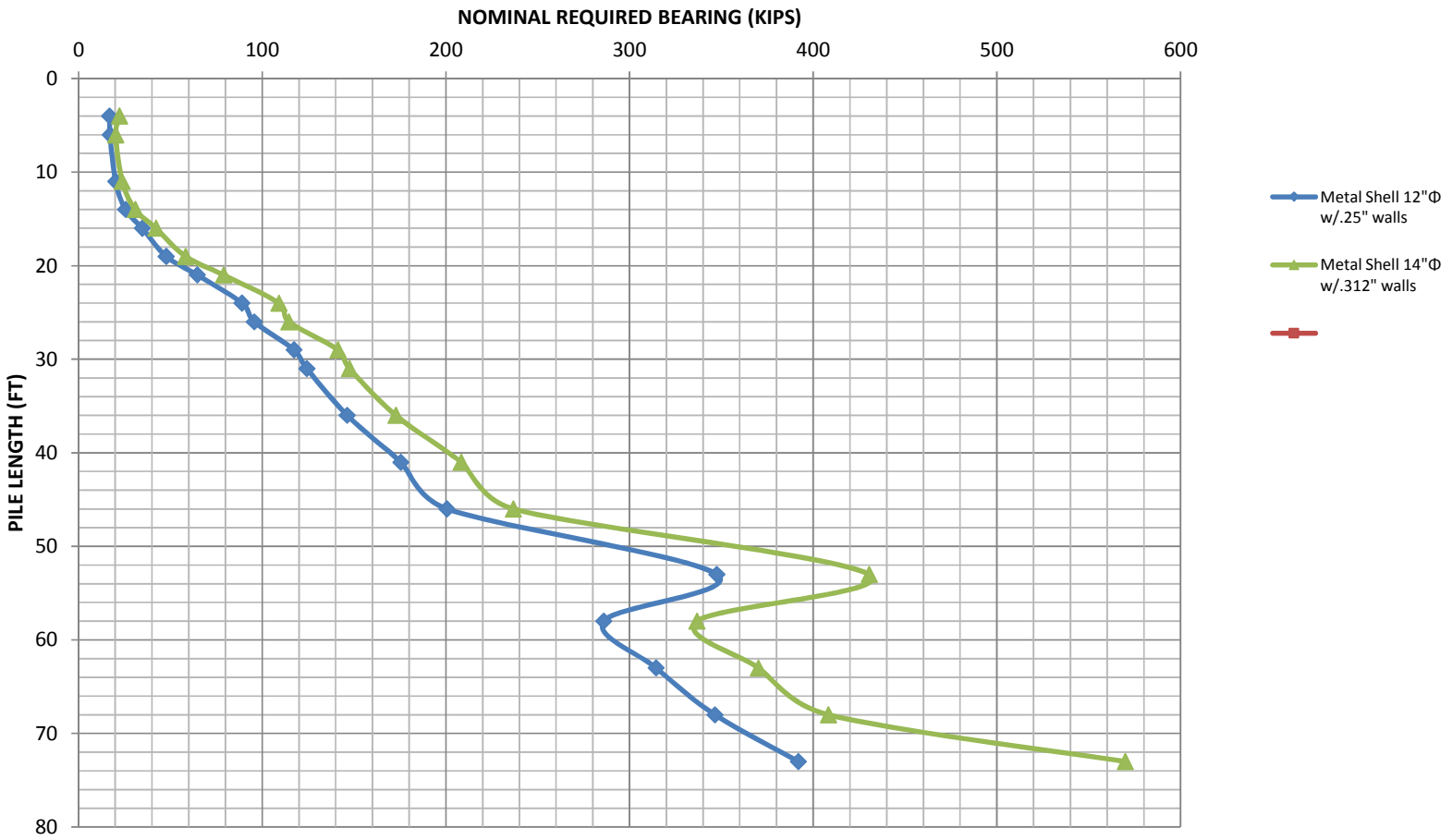
IL 132 Dryland Bridge SN 049-D030, Boring BSB-05, Downdrag to 760.40 (773.94 for Pile Cutoff)												
Estimated Pile Length (ft.)	Metal Shell 12"Φ w/.25" walls		Metal Shell 14"Φ w/.312" walls									
	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)
4	3	17	5	22								
6	-17	17	-19	20								
11	-20	20	-23	24								
14	-20	26	-22	31								
16	-15	35	-16	42								
19	-7	48	-7	58								
21	2	65	4	79								
24	15	89	21	109								
26	19	96	24	115								
29	31	117	38	141								
31	35	124	42	148								
36	47	146	56	173								
41	63	175	75	208								
46	77	201	91	237								
53	157	348	197	430								
58	124	286	146	337								
63	139	314	164	370								
68	157	347	185	408								
73	183	392	275	570								

Notes: 1) Estimated bottom of cap footing elevation at 771.94 feet & pile cutoff at 773.94 feet.

PILE BEARING (FRA) VS. ESTIMATED PILE LENGTH
IL 132 Dryland Bridge SN 049-D030, Boring BSB-05, Downdrag to 760.40 (773.94 for Pile Cutoff)



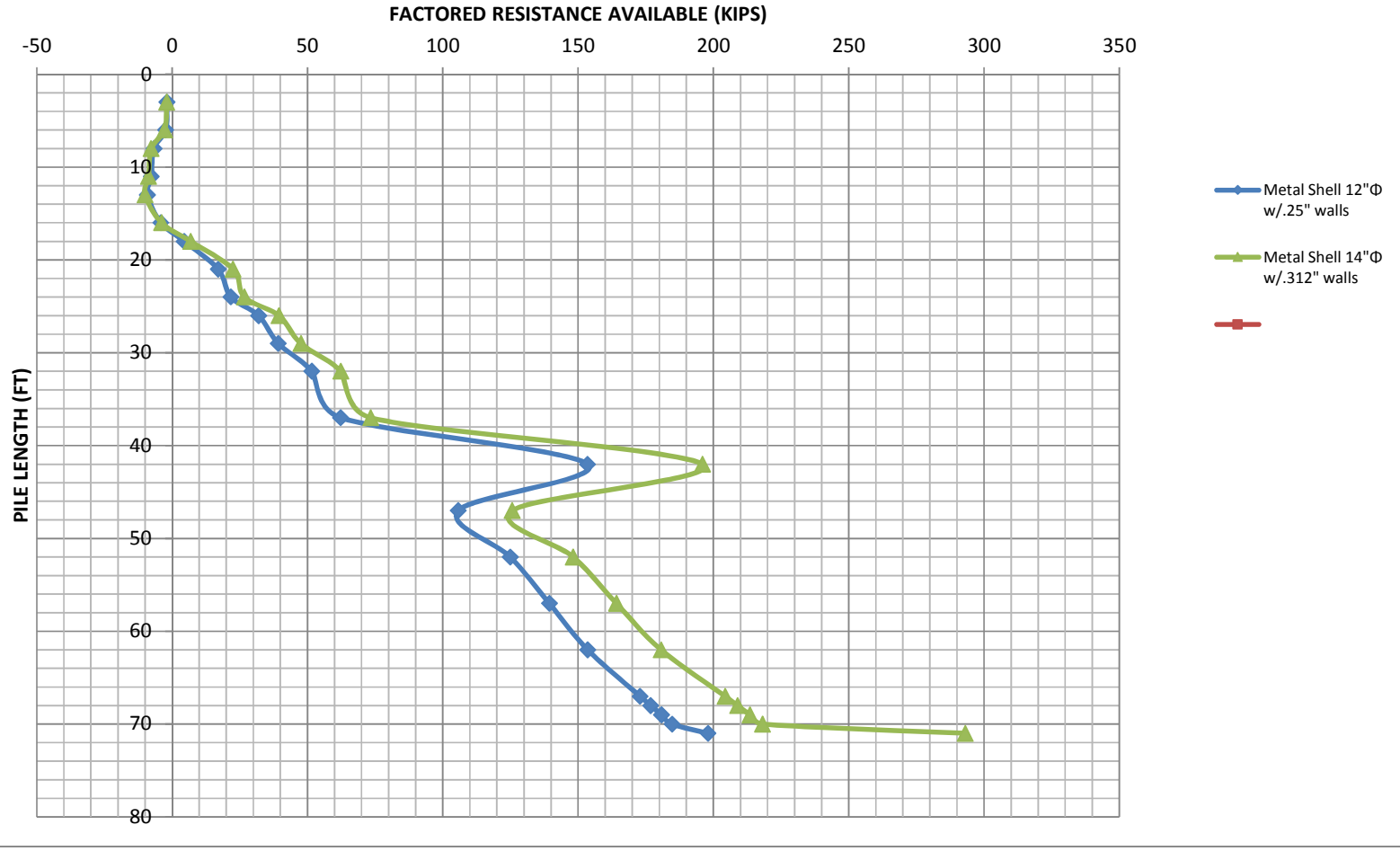
PILE BEARING (NRB) VS. ESTIMATED PILE LENGTH
IL 132 Dryland Bridge SN 049-D030, Boring BSB-05, Downdrag to 760.40 (773.94 for Pile Cutoff)



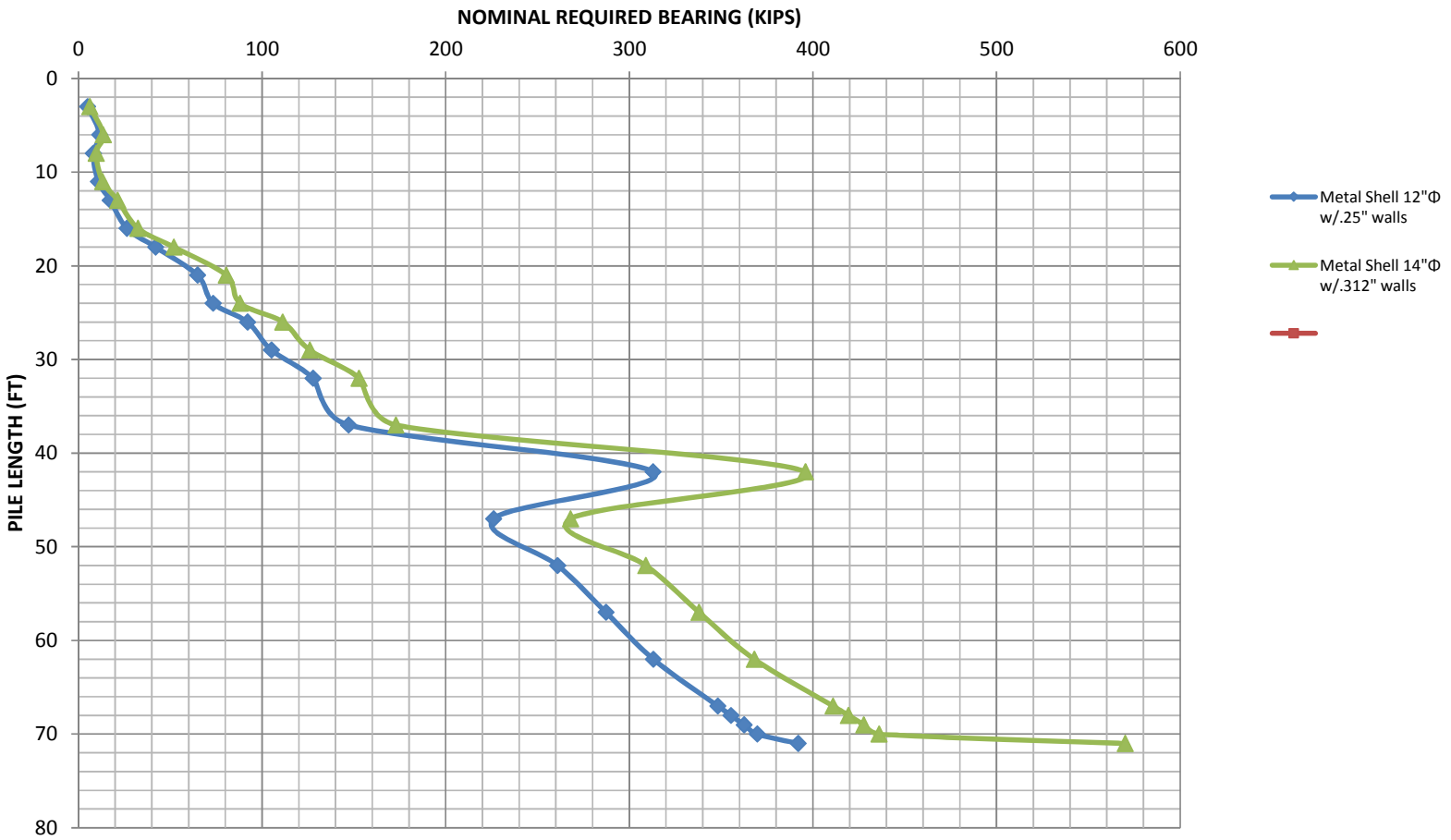
IL 132 Dryland Bridge SN 049-D030, Boring BSB-07, Downdrag to 761.30 (774.69 for Pile Cutoff)												
Estimated Pile Length (ft.)	Metal Shell 12"Φ w/.25" walls		Metal Shell 14"Φ w/.312" walls									
	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)
3	-2	5	-2	6								
6	-2	12	-3	14								
8	-7	8	-8	10								
11	-8	11	-9	13								
13	-9	17	-10	21								
16	-4	26	-4	32								
18	4	42	7	52								
21	17	65	23	80								
24	22	73	27	88								
26	32	92	39	111								
29	39	105	48	126								
32	52	128	62	153								
37	62	147	73	173								
42	153	313	196	396								
47	106	226	126	268								
52	125	261	148	309								
57	139	287	164	338								
62	154	313	181	368								
67	173	348	204	411								
68	177	355	209	419								
69	181	363	214	428								
70	185	370	218	436								
71	198	392	293	570								

Notes: 1) Estimated bottom of cap footing elevation at 772.69 feet & pile cutoff at 774.69 feet.

PILE BEARING (FRA) VS. ESTIMATED PILE LENGTH
IL 132 Dryland Bridge SN 049-D030, Boring BSB-07, Downdrag to 761.30 (774.69 for Pile Cutoff)



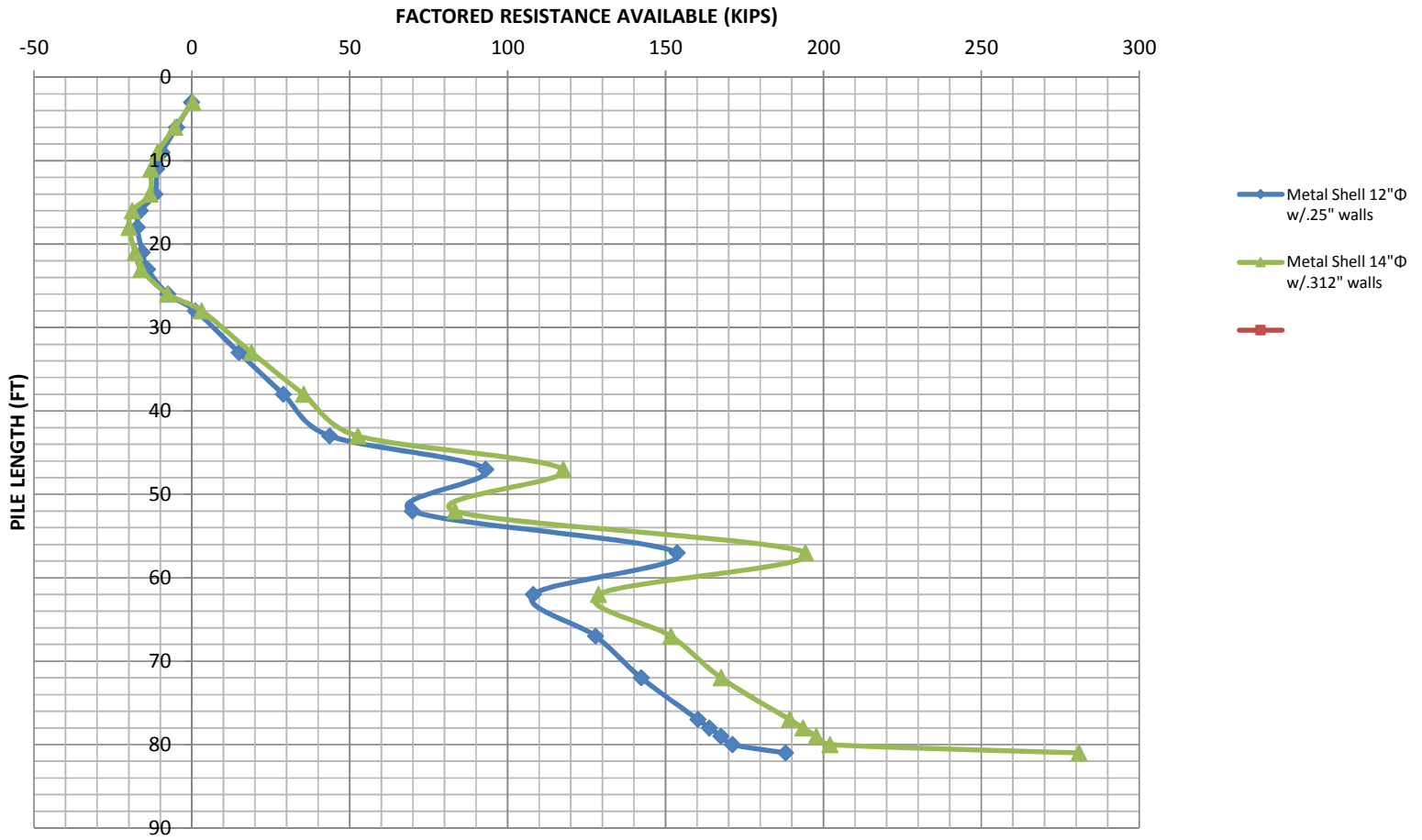
PILE BEARING (NRB) VS. ESTIMATED PILE LENGTH
IL 132 Dryland Bridge SN 049-D030, Boring BSB-07, Downdrag to 761.30 (774.69 for Pile Cutoff)



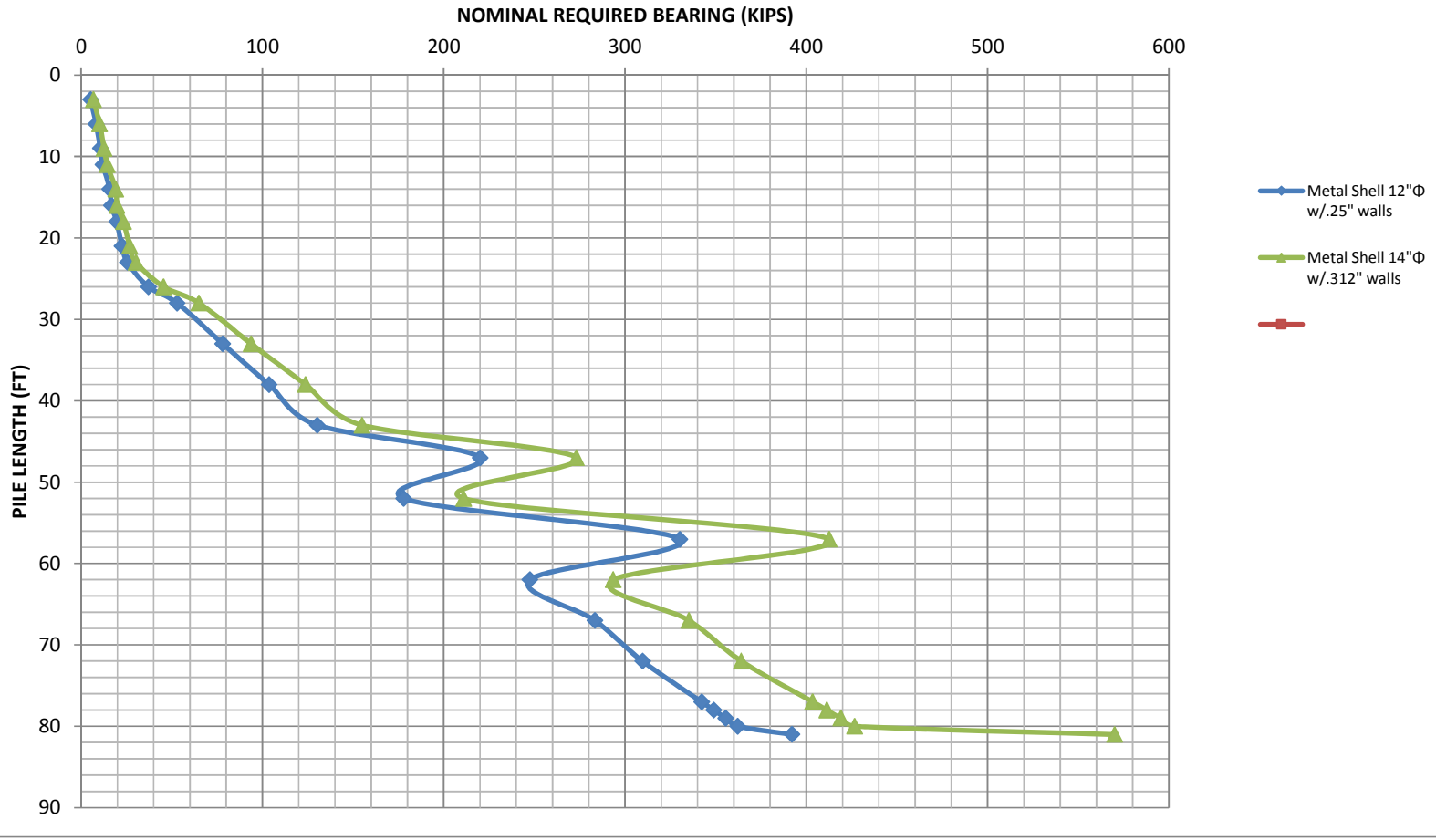
IL 132 Dryland Bridge SN 049-D030, Boring BSB-09, Downdrag to 757.30 (775.50 for Pile Cutoff)												
Estimated Pile Length (ft.)	Metal Shell 12"Φ w/.25" walls		Metal Shell 14"Φ w/.312" walls									
	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)
3	0	5	0	7								
6	-5	8	-5	10								
9	-9	11	-11	13								
11	-11	12	-13	14								
14	-12	16	-13	19								
16	-16	17	-19	20								
18	-17	20	-20	23								
21	-16	23	-18	27								
23	-14	25	-16	30								
26	-8	37	-8	45								
28	1	53	3	65								
33	15	78	19	94								
38	29	104	35	124								
43	44	130	53	155								
47	93	220	118	273								
52	70	178	83	211								
57	154	330	194	413								
62	108	248	129	293								
67	128	283	152	335								
72	142	310	168	364								
77	160	342	189	404								
78	164	349	194	411								
79	168	356	198	419								
80	171	362	202	427								
81	188	392	281	570								

Notes: 1) Estimated bottom of cap footing elevation at 773.50 feet & pile cutoff at 775.50 feet.

PILE BEARING (FRA) VS. ESTIMATED PILE LENGTH
IL 132 Dryland Bridge SN 049-D030, Boring BSB-09, Downdrag to 757.30 (775.50 for Pile Cutoff)



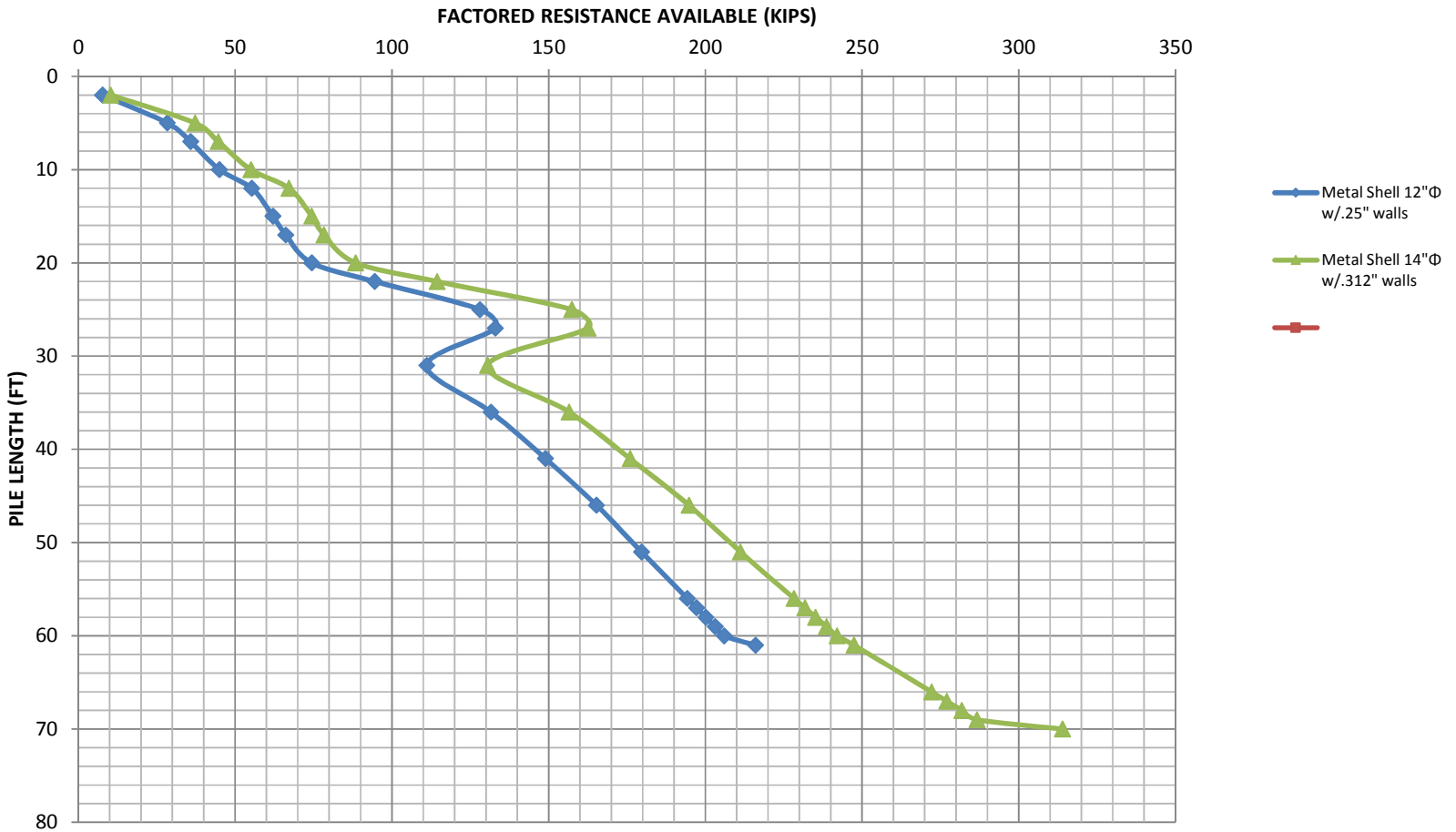
PILE BEARING (NRB) VS. ESTIMATED PILE LENGTH
IL 132 Dryland Bridge SN 049-D030, Boring BSB-09, Downdrag to 757.30 (775.50 for Pile Cutoff)



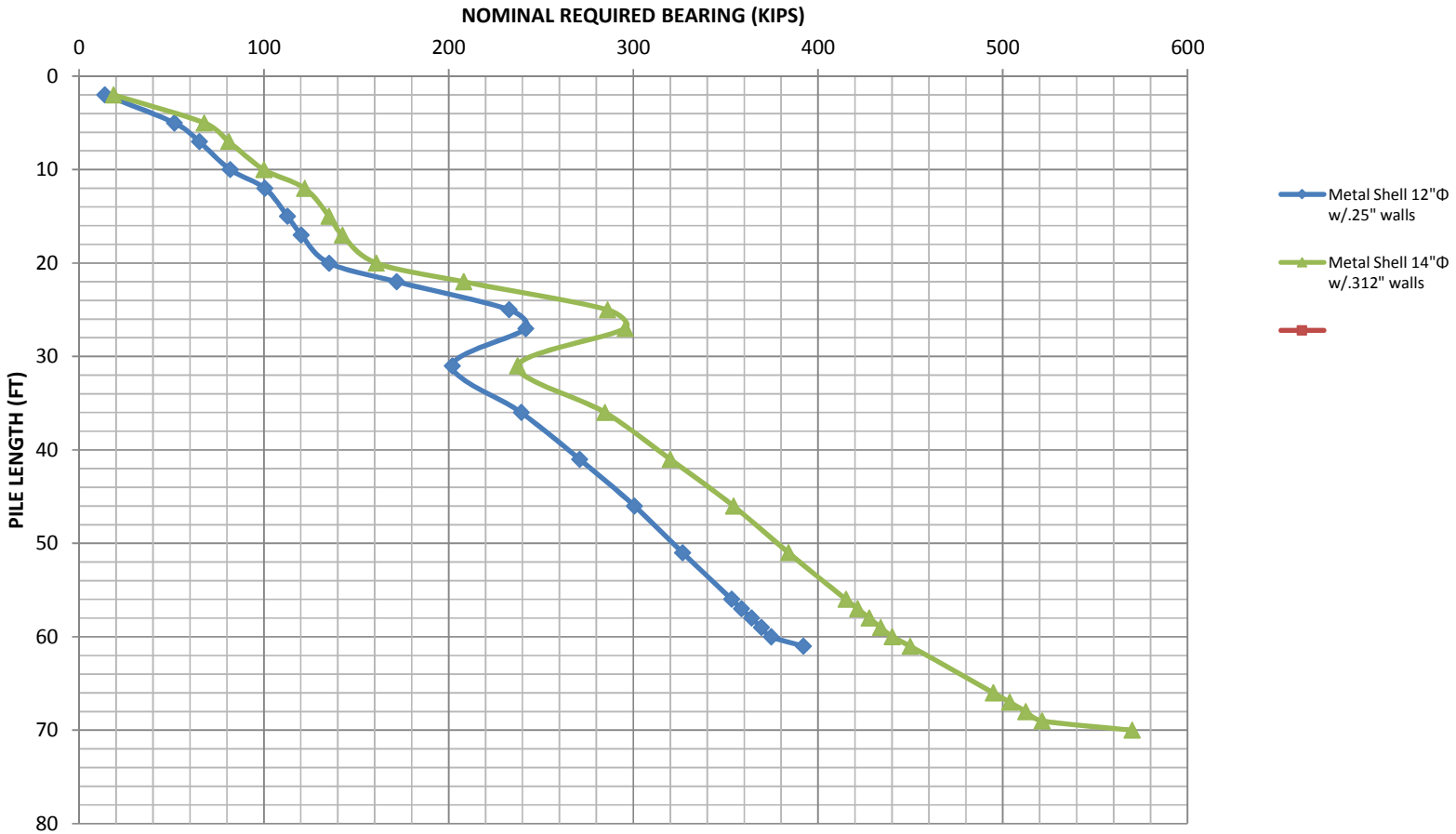
IL 132 Dryland Bridge SN 049-D030, Boring BSB-10, (775.88 for Pile Cutoff)												
Estimated Pile Length (ft.)	Metal Shell 12"Φ w/.25" walls		Metal Shell 14"Φ w/.312" walls									
	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)
2	8	14	10	19								
5	28	52	37	68								
7	36	65	45	81								
10	45	82	55	100								
12	55	101	67	122								
15	62	113	74	135								
17	66	120	78	143								
20	74	135	88	161								
22	95	172	114	208								
25	128	233	157	286								
27	133	242	163	296								
31	111	202	131	237								
36	132	239	157	285								
41	149	271	176	320								
46	165	301	195	354								
51	180	327	211	384								
56	194	353	228	415								
57	197	359	232	421								
58	200	364	235	428								
59	203	369	239	434								
60	206	375	242	440								
61	216	392	247	450								
66			272	495								
67			277	504								
68			282	512								
69			287	521								
70			314	570								

Notes: 1) Estimated bottom of cap footing elevation at 773.88 feet & pile cutoff at 775.88 feet.

PILE BEARING (FRA) VS. ESTIMATED PILE LENGTH
IL 132 Dryland Bridge SN 049-D030, Boring BSB-10
(775.88 for Pile Cutoff)



PILE BEARING (NRB) VS. ESTIMATED PILE LENGTH
IL 132 Dryland Bridge SN 049-D030, Boring BSB-10
(775.88 for Pile Cutoff)



Illinois Department of Transportation

IDOT STATIC METHOD OF ESTIMATING PILE LENGTH

SUBSTRUCTURE========== 049-D030
REFERENCE BORING ========== Boring BSB-01
LRFD or ASD or SEISMIC ========== LRFD
PILE CUTOFF ELEV. ========== 777.86 ft
GROUND SURFACE ELEV. AGAINST PILE DURING DRIVING 775.86 ft
GEOTECHNICAL LOSS TYPE (None, Scour, Liquef., DD) ===== None
BOTTOM ELEV. OF SCOUR, LIQUEF., or DD ========== ft
TOP ELEV. OF LIQUEF. (so layers above apply DD) ========== ft

TOTAL FACTORED SUBSTRUCTURE LOAD ========== 1245 kips
TOTAL LENGTH OF SUBSTRUCTURE (along skew)========== 62.20 ft
NUMBER OF ROWS OF PILES PER SUBSTRUCTURE ====== 1
Approx. Factored Loading Applied per pile at 8 ft. Cts ========== 160.13 KIPS
Approx. Factored Loading Applied per pile at 3 ft. Cts ========== 60.05 KIPS

PILE TYPE AND SIZE ========== Metal Shell 12"Φ w/.25" walls
Pile Perimeter========== 3.142 FT.
Pile End Bearing Area========== 0.785 SQFT.

MAX. REQUIRED BEARING & RESISTANCE for Selected Pile, Soil Profile, & Losses

Maximum Nominal Req'd Bearing of Pile	Maximum Nominal Req.d Bearing of Boring	Maximum Factored Resistance Available in Boring	Maximum Pile Driveable Length in Boring
392 KIPS	**391** KIPS	**215** KIPS	**57** FT.

BOT. OF LAYER ELEV. (FT.)	LAYER THICK. (FT.)	UNCONF. COMPR. STRENGTH (TSF.)	S.P.T. N VALUE (BLOWS)	GRANULAR OR ROCK LAYER DESCRIPTION	NOMINAL SIDE RESIST. (KIPS)	NOMINAL END BRG. RESIST. (KIPS)	NOMINAL TOTAL RESIST. (KIPS)	NOMINAL REQ'D BEARING (KIPS)	FACTORED GEOTECH. LOSS FROM SCOUR or DD (KIPS)	FACTORED GEOTECH. LOSS LOAD FROM DD (KIPS)	FACTORED RESISTANCE AVAILABLE (KIPS)	ESTIMATED PILE LENGTH (FT.)
773.56	2.30	3.00			17.3		***47.5***	47	0	0	26	4
771.06	2.50	3.50	15		21.1	30.2	***79.7***	80	0	0	44	7
768.56	2.50	4.80	19		25.6	41.4	***84.6***	85	0	0	47	9
766.06	2.50	2.40			16.1	20.7	***109.3***	109	0	0	60	12
763.56	2.50	3.40	15		20.6	29.3	***123.9***	124	0	0	68	14
761.06	2.50	2.70			17.5	23.3	***131.9***	132	0	0	73	17
758.56	2.50	1.60			12.4	13.8	***149.4***	149	0	0	82	19
756.06	2.50	2.20			15.2	19.0	***168.1***	168	0	0	92	22
753.56	2.50	2.60			17.0	22.4	***188.5***	189	0	0	104	24
749.56	4.00	3.00			30.1	25.8	***201.4***	201	0	0	111	28
744.56	5.00	1.00			17.5	8.6	***230.9***	231	0	0	127	33
739.56	5.00	2.40			32.2	20.7	***260.5***	261	0	0	143	38
734.56	5.00	2.10			29.5	18.1	***295.2***	295	0	0	162	43
729.56	5.00	2.70			34.9	23.3	***323.3***	323	0	0	178	48
728.56	1.00	1.90			5.5	16.4	***328.8***	329	0	0	181	49
727.56	1.00	1.90			5.5	16.4	***334.3***	334	0	0	184	50
726.56	1.00	1.90			5.5	16.4	***339.9***	340	0	0	187	51
725.56	1.00	1.90			5.5	16.4	***345.4***	345	0	0	190	52
724.56	1.00	1.90			5.5	16.4	***360.4***	360	0	0	198	53
723.56	1.00	3.00			7.5	25.8	***368.0***	368	0	0	202	54
722.56	1.00	3.00			7.5	25.8	***375.5***	375	0	0	207	55
721.56	1.00	3.00			7.5	25.8	***383.0***	383	0	0	211	56
720.56	1.00	3.00			7.5	25.8	***390.5***	391	0	0	215	57
719.56	1.00	3.00			7.5	25.8	***396.3***	~~396~~	~~0~~	~~0~~	~~218~~	~~58~~
714.56	5.00	2.80			35.8	24.1	***427.0***	~~427~~	~~0~~	~~0~~	~~235~~	~~63~~
709.56	5.00	2.20			30.4	19.0	***462.6***	~~463~~	~~0~~	~~0~~	~~254~~	~~68~~
702.56	7.00	2.80			50.1	24.1	***805.0***	~~805~~	~~0~~	~~0~~	~~443~~	~~75~~
701.56	1.00		64	Medium Sand	33.8	316.4	***838.8***	~~839~~	~~0~~	~~0~~	~~461~~	~~76~~
700.56	1.00		64	Medium Sand	33.8	316.4	***872.7***	~~873~~	~~0~~	~~0~~	~~480~~	~~77~~
699.56	1.00		64	Medium Sand	33.8	316.4	***906.5***	~~907~~	~~0~~	~~0~~	~~499~~	~~78~~
698.56	1.00		64	Medium Sand	33.8	316.4	***915.6***	~~916~~	~~0~~	~~0~~	~~504~~	~~79~~
694.56	4.00		59	Medium Sand	117.7	291.7	***1058.0***	~~1058~~	~~0~~	~~0~~	~~582~~	~~83~~
693.56	1.00		64	Medium Sand	33.8	316.4	***1091.9***	~~1092~~	~~0~~	~~0~~	~~601~~	~~84~~
692.56	1.00		64	Medium Sand	33.8	316.4	***1101.0***	~~1101~~	~~0~~	~~0~~	~~606~~	~~85~~
688.56	4.00		59	Medium Sand		291.7						

Illinois Department of Transportation

IDOT STATIC METHOD OF ESTIMATING PILE LENGTH

SUBSTRUCTURE==========049-D030
REFERENCE BORING ==========Boring BSB-01
LRFD or ASD or SEISMIC ==========LRFD
PILE CUTOFF ELEV. ==========777.86 ft
GROUND SURFACE ELEV. AGAINST PILE DURING DRIVING 775.86 ft
GEOTECHNICAL LOSS TYPE (None, Scour, Liquef., DD) =====None
BOTTOM ELEV. OF SCOUR, LIQUEF., or DD ========== ft
TOP ELEV. OF LIQUEF. (so layers above apply DD) ========== ft

TOTAL FACTORED SUBSTRUCTURE LOAD ==========1245 kips
TOTAL LENGTH OF SUBSTRUCTURE (along skew)==========62.20 ft
NUMBER OF ROWS OF PILES PER SUBSTRUCTURE ======1
Approx. Factored Loading Applied per pile at 8 ft. Cts ========== 160.13 KIPS
Approx. Factored Loading Applied per pile at 3 ft. Cts ========== 60.05 KIPS

PILE TYPE AND SIZE ==========Metal Shell 14"Φ w/.312" walls
Pile Perimeter========== 3.665 FT.
Pile End Bearing Area========== 1.069 SQFT.

MAX. REQUIRED BEARING & RESISTANCE for Selected Pile, Soil Profile, & Losses

Maximum Nominal Req'd Bearing of Pile	Maximum Nominal Req.d Bearing of Boring	Maximum Factored Resistance Available in Boring	Maximum Pile Driveable Length in Boring
570 KIPS	**544** KIPS	**299** KIPS	**68** FT.

BOT. OF LAYER ELEV. (FT.)	LAYER THICK. (FT.)	UNCONF. COMPR. STRENGTH (TSF.)	S.P.T. N VALUE (BLOWS)	GRANULAR OR ROCK LAYER DESCRIPTION	NOMINAL SIDE RESIST. (KIPS)	NOMINAL END BRG. RESIST. (KIPS)	NOMINAL TOTAL RESIST. (KIPS)				NOMINAL REQ'D BEARING (KIPS)	FACTORED GEOTECH. LOSS FROM SCOUR or DD (KIPS)	FACTORED GEOTECH. LOSS LOAD FROM DD (KIPS)	FACTORED RESISTANCE AVAILABLE (KIPS)	ESTIMATED PILE LENGTH (FT.)
773.56	2.30	3.00			20.2		***61.2***				61	0	0	34	4
771.06	2.50	3.50	15		24.6	41.0	***101.0***				101	0	0	56	7
768.56	2.50	4.80	19		29.8	56.3	***102.7***				103	0	0	56	9
766.06	2.50	2.40			18.8	28.1	***133.2***				133	0	0	73	12
763.56	2.50	3.40	15		24.0	39.9	***149.1***				149	0	0	82	14
761.06	2.50	2.70			20.4	31.7	***156.5***				157	0	0	86	17
758.56	2.50	1.60			14.4	18.8	***178.0***				178	0	0	98	19
756.06	2.50	2.20			17.7	25.8	***200.4***				200	0	0	110	22
753.56	2.50	2.60			19.8	30.5	***225.0***				225	0	0	124	24
749.56	4.00	3.00			35.1	35.2	***236.6***				237	0	0	130	28
744.56	5.00	1.00			20.4	11.7	***273.4***				273	0	0	150	33
739.56	5.00	2.40			37.6	28.1	***307.5***				307	0	0	169	38
734.56	5.00	2.10			34.4	24.6	***349.0***				349	0	0	192	43
729.56	5.00	2.70			40.7	31.7	***380.3***				380	0	0	209	48
728.56	1.00	1.90			6.5	22.3	***386.8***				387	0	0	213	49
727.56	1.00	1.90			6.5	22.3	***393.2***				393	0	0	216	50
726.56	1.00	1.90			6.5	22.3	***399.7***				400	0	0	220	51
725.56	1.00	1.90			6.5	22.3	***406.2***				406	0	0	223	52
724.56	1.00	1.90			6.5	22.3	***425.5***				426	0	0	234	53
723.56	1.00	3.00			8.8	35.2	***434.3***				434	0	0	239	54
722.56	1.00	3.00			8.8	35.2	***443.1***				443	0	0	244	55
721.56	1.00	3.00			8.8	35.2	***451.9***				452	0	0	249	56
720.56	1.00	3.00			8.8	35.2	***460.6***				461	0	0	253	57
719.56	1.00	3.00			8.8	35.2	***467.1***				467	0	0	257	58
714.56	5.00	2.80			41.8	32.8	***501.8***				502	0	0	276	63
709.56	5.00	2.20			35.5	25.8	***544.4***				544	0	0	299	68
702.56	7.00	2.80			58.5	32.8	***1000.7***				~~1001~~	~~0~~	~~0~~	~~550~~	~~75~~
701.56	1.00		64	Medium Sand	39.5	430.7	***1040.2***				~~1040~~	~~0~~	~~0~~	~~572~~	~~76~~
700.56	1.00		64	Medium Sand	39.5	430.7	***1079.6***				~~1080~~	~~0~~	~~0~~	~~594~~	~~77~~
699.56	1.00		64	Medium Sand	39.5	430.7	***1119.1***				~~1119~~	~~0~~	~~0~~	~~616~~	~~78~~
698.56	1.00		64	Medium Sand	39.5	430.7	***1124.9***				~~1125~~	~~0~~	~~0~~	~~619~~	~~79~~
694.56	4.00		59	Medium Sand	137.3	397.0	***1295.9***				~~1296~~	~~0~~	~~0~~	~~713~~	~~83~~
693.56	1.00		64	Medium Sand	39.5	430.7	***1335.4***				~~1335~~	~~0~~	~~0~~	~~734~~	~~84~~
692.56	1.00		64	Medium Sand	39.5	430.7	***1341.2***				~~1341~~	~~0~~	~~0~~	~~738~~	~~85~~
688.56	4.00		59	Medium Sand		397.0									

Illinois Department of Transportation

IDOT STATIC METHOD OF ESTIMATING PILE LENGTH

SUBSTRUCTURE========== 049-D030
REFERENCE BORING ========== Boring BSB-03
LRFD or ASD or SEISMIC ========== LRFD
PILE CUTOFF ELEV. ========== 774.87 ft
GROUND SURFACE ELEV. AGAINST PILE DURING DRIVING 772.87 ft
GEOTECHNICAL LOSS TYPE (None, Scour, Liquef., DD) ===== DD
BOTTOM ELEV. OF SCOUR, LIQUEF., or DD ========== 762.20 ft
TOP ELEV. OF LIQUEF. (so layers above apply DD) ========== ft

TOTAL FACTORED SUBSTRUCTURE LOAD ========== 1245 kips
TOTAL LENGTH OF SUBSTRUCTURE (along skew)========== 62.20 ft
NUMBER OF ROWS OF PILES PER SUBSTRUCTURE ====== 1
Approx. Factored Loading Applied per pile at 8 ft. Cts ========== 160.13 KIPS
Approx. Factored Loading Applied per pile at 3 ft. Cts ========== 60.05 KIPS

PILE TYPE AND SIZE ========== Metal Shell 12"Φ w/.25" walls
Pile Perimeter========== 3.142 FT.
Pile End Bearing Area========== 0.785 SQFT.

MAX. REQUIRED BEARING & RESISTANCE for Selected Pile, Soil Profile, & Losses

Maximum Nominal Req'd Bearing of Pile	Maximum Nominal Req.d Bearing of Boring	Maximum Factored Resistance Available in Boring	Maximum Pile Driveable Length in Boring
392 KIPS	**392** KIPS	**165** KIPS	**72** FT.

BOT. OF LAYER ELEV. (FT.)	LAYER THICK. (FT.)	UNCONF. COMPR. STRENGTH (TSF.)	S.P.T. N VALUE (BLOWS)	GRANULAR OR ROCK LAYER DESCRIPTION	NOMINAL SIDE RESIST. (KIPS)	NOMINAL END BRG. RESIST. (KIPS)	NOMINAL TOTAL RESIST. (KIPS)				NOMINAL REQ'D BEARING (KIPS)	FACTORED GEOTECH. LOSS FROM SCOUR or DD (KIPS)	FACTORED GEOTECH. LOSS LOAD FROM DD (KIPS)	FACTORED RESISTANCE AVAILABLE (KIPS)	ESTIMATED PILE LENGTH (FT.)
772.20	0.67	1.00			2.3		***23.9***				24	1	3	9	3
769.40	2.80	2.50			18.5	21.5	***28.6***				29	11	23	-19	5
766.90	2.50	0.90			8.0	7.8	***40.0***				40	16	32	-26	8
764.40	2.50		3	Very Fine Silty Sand	1.9	11.1	***32.0***				32	17	34	-33	10
761.90	2.50	0.15			1.5	1.3	***34.9***				35	17	34	-32	13
759.40	2.50	0.30			3.0	2.6	***45.1***				45	17	34	-26	15
756.90	2.50		2	Sandy Gravel	1.9	9.9	***42.3***				42	17	34	-28	18
754.40	2.50	0.60			5.6	5.2	***56.5***				57	17	34	-20	20
751.90	2.50	1.60			12.4	13.8	***78.4***				78	17	34	-8	23
749.40	2.50	2.70			17.5	23.3	***94.1***				94	17	34	1	25
746.90	2.50	2.50			16.6	21.5	***103.8***				104	17	34	6	28
744.40	2.50	1.70			12.9	14.6	***122.7***				123	17	34	17	30
740.40	4.00	2.40			25.8	20.7	***152.8***				153	17	34	33	34
735.40	5.00	2.90			36.7	25.0	***168.8***				169	17	34	42	39
730.40	5.00	0.50			9.6	4.3	***204.2***				204	17	34	62	44
725.40	5.00	3.50	24		42.1	30.2	***232.6***				233	17	34	77	49
720.40	5.00	1.90			27.7	16.4	***268.0***				268	17	34	97	54
715.40	5.00	2.80			35.8	24.1	***303.9***				304	17	34	116	59
710.40	5.00	2.80			35.8	24.1	***341.4***				341	17	34	137	64
705.40	5.00	3.00			37.6	25.8	***373.0***				373	17	34	154	69
704.40	1.00	2.30			6.3	19.8	***379.2***				379	17	34	158	70
703.40	1.00	2.30			6.3	19.8	***385.5***				386	17	34	161	71
702.40	1.00	2.30			6.3	19.8	***391.8***				392	17	34	165	72
700.40	2.00	2.30			12.5	19.8	***404.3***				~~404~~	~~17~~	~~34~~	~~172~~	~~74~~
695.40	5.00	2.30			31.3	19.8	***436.5***				~~436~~	~~17~~	~~34~~	~~189~~	~~79~~
694.40	1.00	2.40			6.4	20.7	***442.9***				~~443~~	~~17~~	~~34~~	~~193~~	~~80~~
693.40	1.00	2.40			6.4	20.7	***449.4***				~~449~~	~~17~~	~~34~~	~~196~~	~~81~~
692.40	1.00	2.40			6.4	20.7	***455.8***				~~456~~	~~17~~	~~34~~	~~200~~	~~82~~
691.40	1.00	2.40			6.4	20.7	***462.3***				~~462~~	~~17~~	~~34~~	~~203~~	~~83~~
690.40	1.00	2.40			6.4	20.7	***618.6***				~~619~~	~~17~~	~~34~~	~~289~~	~~84~~
685.40	5.00		46	Hard Till	44.5	170.6	***740.9***				~~741~~	~~17~~	~~34~~	~~357~~	~~89~~
682.40	3.00		67	Hard Till		248.4									

Illinois Department of Transportation

IDOT STATIC METHOD OF ESTIMATING PILE LENGTH

SUBSTRUCTURE==========049-D030
REFERENCE BORING ==========Boring BSB-03
LRFD or ASD or SEISMIC ==========LRFD
PILE CUTOFF ELEV. ==========774.87 ft
GROUND SURFACE ELEV. AGAINST PILE DURING DRIVING 772.87 ft
GEOTECHNICAL LOSS TYPE (None, Scour, Liquef., DD) =====DD
BOTTOM ELEV. OF SCOUR, LIQUEF., or DD ==========762.20 ft
TOP ELEV. OF LIQUEF. (so layers above apply DD) ==========ft

TOTAL FACTORED SUBSTRUCTURE LOAD ==========1245 kips
TOTAL LENGTH OF SUBSTRUCTURE (along skew)==========62.20 ft
NUMBER OF ROWS OF PILES PER SUBSTRUCTURE ======1
Approx. Factored Loading Applied per pile at 8 ft. Cts ==========160.13 KIPS
Approx. Factored Loading Applied per pile at 3 ft. Cts ==========60.05 KIPS

PILE TYPE AND SIZE ==========Metal Shell 14"Φ w/.312" walls
Pile Perimeter==========3.665 FT.
Pile End Bearing Area==========1.069 SQFT.

MAX. REQUIRED BEARING & RESISTANCE for Selected Pile, Soil Profile, & Losses

Maximum Nominal Req'd Bearing of Pile	Maximum Nominal Req.d Bearing of Boring	Maximum Factored Resistance Available in Boring	Maximum Pile Driveable Length in Boring
570 KIPS	**543** KIPS	**240** KIPS	**83** FT.

BOT. OF LAYER ELEV. (FT.)	LAYER THICK. (FT.)	UNCONF. COMPR. STRENGTH (TSF.)	S.P.T. N VALUE (BLOWS)	GRANULAR OR ROCK LAYER DESCRIPTION	NOMINAL SIDE RESIST. (KIPS)	NOMINAL END BRG. RESIST. (KIPS)	NOMINAL TOTAL RESIST. (KIPS)				NOMINAL REQ'D BEARING (KIPS)	FACTORED GEOTECH. LOSS FROM SCOUR or DD (KIPS)	FACTORED GEOTECH. LOSS LOAD FROM DD (KIPS)	FACTORED RESISTANCE AVAILABLE (KIPS)	ESTIMATED PILE LENGTH (FT.)
772.20	0.67	1.00			2.7		***32.0***				32	2	3	13	3
769.40	2.80	2.50			21.6	29.3	***34.9***				35	13	27	-21	5
766.90	2.50	0.90			9.4	10.6	***48.4***				48	19	37	-29	8
764.40	2.50		3	Very Fine Silty Sand	2.2	14.7	***37.6***				38	20	40	-39	10
761.90	2.50	0.15			1.8	1.8	***41.2***				41	20	40	-37	13
759.40	2.50	0.30			3.5	3.5	***54.6***				55	20	40	-29	15
756.90	2.50		2	Sandy Gravel	2.2	13.5	***50.3***				50	20	40	-32	18
754.40	2.50	0.60			6.6	7.0	***68.7***				69	20	40	-22	20
751.90	2.50	1.60			14.4	18.8	***96.0***				96	20	40	-7	23
749.40	2.50	2.70			20.4	31.7	***114.0***				114	20	40	3	25
746.90	2.50	2.50			19.3	29.3	***123.9***				124	20	40	9	28
744.40	2.50	1.70			15.0	19.9	***147.2***				147	20	40	22	30
740.40	4.00	2.40			30.1	28.1	***183.1***				183	20	40	41	34
735.40	5.00	2.90			42.8	34.0	***197.8***				198	20	40	49	39
730.40	5.00	0.50			11.2	5.9	***244.1***				244	20	40	75	44
725.40	5.00	3.50	24		49.1	41.0	***274.5***				275	20	40	92	49
720.40	5.00	1.90			32.3	22.3	***317.4***				317	20	40	115	54
715.40	5.00	2.80			41.8	32.8	***359.2***				359	20	40	138	59
710.40	5.00	2.80			41.8	32.8	***403.3***				403	20	40	163	64
705.40	5.00	3.00			43.9	35.2	***439.0***				439	20	40	182	69
704.40	1.00	2.30			7.3	27.0	***446.3***				446	20	40	186	70
703.40	1.00	2.30			7.3	27.0	***453.6***				454	20	40	190	71
702.40	1.00	2.30			7.3	27.0	***460.9***				461	20	40	194	72
700.40	2.00	2.30			14.6	27.0	***475.5***				476	20	40	202	74
695.40	5.00	2.30			36.5	27.0	***513.2***				513	20	40	223	79
694.40	1.00	2.40			7.5	28.1	***520.8***				521	20	40	227	80
693.40	1.00	2.40			7.5	28.1	***528.3***				528	20	40	231	81
692.40	1.00	2.40			7.5	28.1	***535.8***				536	20	40	235	82
691.40	1.00	2.40			7.5	28.1	***543.3***				543	20	40	240	83
690.40	1.00	2.40			7.5	28.1	***754.9***				~~755~~	~~20~~	~~40~~	~~356~~	~~84~~
685.40	5.00		46	Hard Till	51.9	232.2	***912.7***				~~913~~	~~20~~	~~40~~	~~443~~	~~89~~
682.40	3.00		67	Hard Till		338.2									

Illinois Department of Transportation

IDOT STATIC METHOD OF ESTIMATING PILE LENGTH

SUBSTRUCTURE========== 049-D030
REFERENCE BORING ========== Boring BSB-04
LRFD or ASD or SEISMIC ========== LRFD
PILE CUTOFF ELEV. ========== 773.71 ft
GROUND SURFACE ELEV. AGAINST PILE DURING DRIVING 771.71 ft
GEOTECHNICAL LOSS TYPE (None, Scour, Liquef., DD) ===== DD
BOTTOM ELEV. OF SCOUR, LIQUEF., or DD ========== 753.60 ft
TOP ELEV. OF LIQUEF. (so layers above apply DD) ========== ft

TOTAL FACTORED SUBSTRUCTURE LOAD ========== 1245 kips
TOTAL LENGTH OF SUBSTRUCTURE (along skew)========== 62.20 ft
NUMBER OF ROWS OF PILES PER SUBSTRUCTURE ====== 1
Approx. Factored Loading Applied per pile at 8 ft. Cts ========== 160.13 KIPS
Approx. Factored Loading Applied per pile at 3 ft. Cts ========== 60.05 KIPS

PILE TYPE AND SIZE ========== Metal Shell 12"Φ w/.25" walls
Pile Perimeter========== 3.142 FT.
Pile End Bearing Area========== 0.785 SQFT.

MAX. REQUIRED BEARING & RESISTANCE for Selected Pile, Soil Profile, & Losses

Maximum Nominal Req'd Bearing of Pile	Maximum Nominal Req.d Bearing of Boring	Maximum Factored Resistance Available in Boring	Maximum Pile Driveable Length in Boring
392 KIPS	**390** KIPS	**113** KIPS	**76** FT.

BOT. OF LAYER ELEV. (FT.)	LAYER THICK. (FT.)	UNCONF. COMPR. STRENGTH (TSF.)	S.P.T. N VALUE (BLOWS)	GRANULAR OR ROCK LAYER DESCRIPTION	NOMINAL SIDE RESIST. (KIPS)	NOMINAL END BRG. RESIST. (KIPS)	NOMINAL TOTAL RESIST. (KIPS)				NOMINAL REQ'D BEARING (KIPS)	FACTORED GEOTECH. LOSS FROM SCOUR or DD (KIPS)	FACTORED GEOTECH. LOSS LOAD FROM DD (KIPS)	FACTORED RESISTANCE AVAILABLE (KIPS)	ESTIMATED PILE LENGTH (FT.)
771.10	0.61		11	Sandy Gravel	2.5		***51.7***				52	1	3	24	3
768.60	2.50		32	Sandy Gravel	35.7	49.2	***46.0***				46	21	42	-38	5
766.10	2.50	0.90			8.0	7.8	***48.4***				48	25	51	-50	8
763.60	2.50	0.25			2.5	2.2	***50.9***				51	27	54	-53	10
761.10	2.50	0.25			2.5	2.2	***53.4***				53	28	56	-55	13
758.60	2.50	0.25			2.5	2.2	***57.2***				57	30	59	-57	15
756.10	2.50	0.40			3.9	3.4	***61.1***				61	32	64	-62	18
753.60	2.50	0.40			3.9	3.4	***65.0***				65	34	68	-66	20
751.10	2.50	0.40			3.9	3.4	***73.2***				73	34	68	-61	23
748.60	2.50	0.90			8.0	7.8	***82.9***				83	34	68	-56	25
746.10	2.50	1.10			9.4	9.5	***96.7***				97	34	68	-49	28
741.10	5.00	1.60			24.7	13.8	***122.3***				122	34	68	-34	33
736.10	5.00	1.70			25.7	14.6	***149.7***				150	34	68	-19	38
731.10	5.00	1.90			27.7	16.4	***177.4***				177	34	68	-4	43
726.10	5.00	1.90			27.7	16.4	***201.7***				202	34	68	9	48
721.10	5.00	1.50			23.7	12.9	***238.3***				238	34	68	29	53
716.10	5.00	3.00	36		37.6	25.8	***275.9***				276	34	68	50	58
711.10	5.00	3.00	35		37.6	25.8	***309.2***				309	34	68	68	63
706.10	5.00	2.50			33.1	21.5	***337.1***				337	34	68	84	68
701.10	5.00	1.90			27.7	16.4	***368.3***				368	34	68	101	73
700.10	1.00	2.30			6.3	19.8	***374.5***				375	34	68	104	74
699.10	1.00	2.30			6.3	19.8	***380.8***				381	34	68	108	75
698.10	1.00	2.30			6.3	19.8	***387.1***				387	34	68	111	76
697.60	0.50	2.30			3.1	19.8	***390.2***				390	34	68	113	76
697.10	0.50	2.30			3.1	19.8	***636.8***				~~637~~	~~34~~	~~68~~	~~249~~	~~77~~
696.10	1.00		71	Hard Till	18.2	263.3	***655.0***				~~655~~	~~34~~	~~68~~	~~259~~	~~78~~
695.10	1.00		71	Hard Till	18.2	263.3	***673.2***				~~673~~	~~34~~	~~68~~	~~269~~	~~79~~
694.10	1.00		71	Hard Till	18.2	263.3	***691.3***				~~691~~	~~34~~	~~68~~	~~279~~	~~80~~
693.10	1.00		71	Hard Till	18.2	263.3	***709.5***				~~710~~	~~34~~	~~68~~	~~289~~	~~81~~
692.10	1.00		71	Hard Till	18.2	263.3	***709.2***				~~709~~	~~34~~	~~68~~	~~288~~	~~82~~
691.10	1.00		66	Hard Till	16.0	244.7	***725.2***				~~725~~	~~34~~	~~68~~	~~297~~	~~83~~
690.10	1.00		66	Hard Till	16.0	244.7	***741.1***				~~741~~	~~34~~	~~68~~	~~306~~	~~84~~
689.10	1.00		66	Hard Till	16.0	244.7	***757.1***				~~757~~	~~34~~	~~68~~	~~315~~	~~85~~
688.10	1.00		66	Hard Till		244.7									

Illinois Department of Transportation

IDOT STATIC METHOD OF ESTIMATING PILE LENGTH

SUBSTRUCTURE========== 049-D030
REFERENCE BORING ========== Boring BSB-04
LRFD or ASD or SEISMIC ========== LRFD
PILE CUTOFF ELEV. ========== 773.71 ft
GROUND SURFACE ELEV. AGAINST PILE DURING DRIVING 771.71 ft
GEOTECHNICAL LOSS TYPE (None, Scour, Liquef., DD) ===== DD
BOTTOM ELEV. OF SCOUR, LIQUEF., or DD ========== 753.60 ft
TOP ELEV. OF LIQUEF. (so layers above apply DD) ========== ft

TOTAL FACTORED SUBSTRUCTURE LOAD ========== 1245 kips
TOTAL LENGTH OF SUBSTRUCTURE (along skew)========== 62.20 ft
NUMBER OF ROWS OF PILES PER SUBSTRUCTURE ====== 1
Approx. Factored Loading Applied per pile at 8 ft. Cts ========== 160.13 KIPS
Approx. Factored Loading Applied per pile at 3 ft. Cts ========== 60.05 KIPS

PILE TYPE AND SIZE ========== Metal Shell 14"Φ w/.312" walls
Pile Perimeter========== 3.665 FT.
Pile End Bearing Area========== 1.069 SQFT.

MAX. REQUIRED BEARING & RESISTANCE for Selected Pile, Soil Profile, & Losses

Maximum Nominal Req'd Bearing of Pile	Maximum Nominal Req.d Bearing of Boring	Maximum Factored Resistance Available in Boring	Maximum Pile Driveable Length in Boring
570 KIPS	**459** KIPS	**134** KIPS	**76** FT.

BOT. OF LAYER ELEV. (FT.)	LAYER THICK. (FT.)	UNCONF. COMPR. STRENGTH (TSF.)	S.P.T. N VALUE (BLOWS)	GRANULAR OR ROCK LAYER DESCRIPTION	NOMINAL SIDE RESIST. (KIPS)	NOMINAL END BRG. RESIST. (KIPS)	NOMINAL TOTAL RESIST. (KIPS)				NOMINAL REQ'D BEARING (KIPS)	FACTORED GEOTECH. LOSS FROM SCOUR or DD (KIPS)	FACTORED GEOTECH. LOSS LOAD FROM DD (KIPS)	FACTORED RESISTANCE AVAILABLE (KIPS)	ESTIMATED PILE LENGTH (FT.)
771.10	0.61		11	Sandy Gravel	2.9		***60.3***				60	2	3	28	3
768.60	2.50		32	Sandy Gravel	41.7	57.4	***55.1***				55	25	49	-43	5
766.10	2.50	0.90			9.4	10.6	***56.9***				57	30	59	-58	8
763.60	2.50	0.25			2.9	2.9	***59.8***				60	31	63	-61	10
761.10	2.50	0.25			2.9	2.9	***62.7***				63	33	66	-64	13
758.60	2.50	0.25			2.9	2.9	***67.4***				67	34	69	-67	15
756.10	2.50	0.40			4.6	4.7	***71.9***				72	37	74	-72	18
753.60	2.50	0.40			4.6	4.7	***76.5***				77	39	79	-77	20
751.10	2.50	0.40			4.6	4.7	***86.9***				87	39	79	-71	23
748.60	2.50	0.90			9.4	10.6	***98.6***				99	39	79	-64	25
746.10	2.50	1.10			11.0	12.9	***115.5***				115	39	79	-55	28
741.10	5.00	1.60			28.8	18.8	***145.5***				145	39	79	-39	33
736.10	5.00	1.70			30.0	19.9	***177.9***				178	39	79	-21	38
731.10	5.00	1.90			32.3	22.3	***210.2***				210	39	79	-3	43
726.10	5.00	1.90			32.3	22.3	***237.8***				238	39	79	12	48
721.10	5.00	1.50			27.6	17.6	***283.0***				283	39	79	37	53
716.10	5.00	3.00	36		43.9	35.2	***326.9***				327	39	79	61	58
711.10	5.00	3.00	35		43.9	35.2	***364.9***				365	39	79	82	63
706.10	5.00	2.50			38.6	29.3	***396.5***				397	39	79	99	68
701.10	5.00	1.90			32.3	22.3	***433.5***				434	39	79	120	73
700.10	1.00	2.30			7.3	27.0	***440.8***				441	39	79	124	74
699.10	1.00	2.30			7.3	27.0	***448.1***				448	39	79	128	75
698.10	1.00	2.30			7.3	27.0	***455.4***				455	39	79	132	76
697.60	0.50	2.30			3.7	27.0	***459.1***				459	39	79	134	76
697.10	0.50	2.30			3.7	27.0	***794.1***				~~794~~	~~39~~	~~79~~	~~318~~	~~77~~
696.10	1.00		71	Hard Till	21.2	358.3	***815.3***				~~815~~	~~39~~	~~79~~	~~330~~	~~78~~
695.10	1.00		71	Hard Till	21.2	358.3	***836.5***				~~837~~	~~39~~	~~79~~	~~341~~	~~79~~
694.10	1.00		71	Hard Till	21.2	358.3	***857.8***				~~858~~	~~39~~	~~79~~	~~353~~	~~80~~
693.10	1.00		71	Hard Till	21.2	358.3	***879.0***				~~879~~	~~39~~	~~79~~	~~365~~	~~81~~
692.10	1.00		71	Hard Till	21.2	358.3	***874.9***				~~875~~	~~39~~	~~79~~	~~363~~	~~82~~
691.10	1.00		66	Hard Till	18.7	333.1	***893.6***				~~894~~	~~39~~	~~79~~	~~373~~	~~83~~
690.10	1.00		66	Hard Till	18.7	333.1	***912.3***				~~912~~	~~39~~	~~79~~	~~383~~	~~84~~
689.10	1.00		66	Hard Till	18.7	333.1	***930.9***				~~931~~	~~39~~	~~79~~	~~393~~	~~85~~
688.10	1.00		66	Hard Till		333.1									

Illinois Department of Transportation

IDOT STATIC METHOD OF ESTIMATING PILE LENGTH

SUBSTRUCTURE========== 049-D030
REFERENCE BORING ========== Boring BSB-05
LRFD or ASD or SEISMIC ========== LRFD
PILE CUTOFF ELEV. ========== 773.94 ft
GROUND SURFACE ELEV. AGAINST PILE DURING DRIVING 771.94 ft
GEOTECHNICAL LOSS TYPE (None, Scour, Liquef., DD) ===== DD
BOTTOM ELEV. OF SCOUR, LIQUEF., or DD ========== 760.40 ft
TOP ELEV. OF LIQUEF. (so layers above apply DD) ========== ft

TOTAL FACTORED SUBSTRUCTURE LOAD ========== 1245 kips
TOTAL LENGTH OF SUBSTRUCTURE (along skew)========== 62.20 ft
NUMBER OF ROWS OF PILES PER SUBSTRUCTURE ====== 1
Approx. Factored Loading Applied per pile at 8 ft. Cts ========== 160.13 KIPS
Approx. Factored Loading Applied per pile at 3 ft. Cts ========== 60.05 KIPS

PILE TYPE AND SIZE ========== Metal Shell 12"Φ w/.25" walls
Pile Perimeter========== 3.142 FT.
Pile End Bearing Area========== 0.785 SQFT.

MAX. REQUIRED BEARING & RESISTANCE for Selected Pile, Soil Profile, & Losses

Maximum Nominal Req'd Bearing of Pile	Maximum Nominal Req.d Bearing of Boring	Maximum Factored Resistance Available in Boring	Maximum Pile Driveable Length in Boring
392 KIPS	**376** KIPS	**173** KIPS	**73** FT.

BOT. OF LAYER ELEV. (FT.)	LAYER THICK. (FT.)	UNCONF. COMPR. STRENGTH (TSF.)	S.P.T. N VALUE (BLOWS)	GRANULAR OR ROCK LAYER DESCRIPTION	NOMINAL SIDE RESIST. (KIPS)	NOMINAL END BRG. RESIST. (KIPS)	NOMINAL TOTAL RESIST. (KIPS)				NOMINAL REQ'D BEARING (KIPS)	FACTORED GEOTECH. LOSS FROM SCOUR or DD (KIPS)	FACTORED GEOTECH. LOSS LOAD FROM DD (KIPS)	FACTORED RESISTANCE AVAILABLE (KIPS)	ESTIMATED PILE LENGTH (FT.)
770.40	1.54		7	Sandy Gravel	4.0		***16.9***				17	2	4	3	4
767.90	2.50	1.50			11.8	12.9	***17.1***				17	9	17	-17	6
762.90	5.00	0.15			3.1	1.3	***20.2***				20	10	21	-20	11
760.40	2.50	0.15			1.5	1.3	***25.6***				26	11	22	-20	14
757.90	2.50	0.60			5.6	5.2	***34.7***				35	11	22	-15	16
755.40	2.50	1.00			8.7	8.6	***47.7***				48	11	22	-7	19
752.90	2.50	1.50			11.8	12.9	***64.7***				65	11	22	2	21
750.40	2.50	2.10			14.8	18.1	***88.9***				89	11	22	15	24
747.90	2.50	3.20	14		19.7	27.6	***95.7***				96	11	22	19	26
745.40	2.50	1.70			12.9	14.6	***117.2***				117	11	22	31	29
742.90	2.50	2.70			17.5	23.3	***124.3***				124	11	22	35	31
737.90	5.00	1.50			23.7	12.9	***146.3***				146	11	22	47	36
732.90	5.00	1.30			21.4	11.2	***175.4***				175	11	22	63	41
727.90	5.00	2.20			30.4	19.0	***200.6***				201	11	22	77	46
721.40	6.50	1.60			32.1	13.8	***347.5***				348	11	22	157	53
716.40	5.00		26	Sandy Gravel	50.5	128.5	***285.9***				286	11	22	124	58
711.40	5.00	1.90			27.7	16.4	***314.5***				314	11	22	139	63
706.40	5.00	2.00			28.6	17.2	***346.5***				347	11	22	157	68
701.40	5.00	2.40			32.2	20.7	***376.2***				376	11	22	173	73
696.40	5.00	2.10			29.5	18.1	***543.3***				~~543~~	~~11~~	~~22~~	~~265~~	~~78~~
695.40	1.00		42	Hard Till	7.8	155.7	***551.1***				~~551~~	~~11~~	~~22~~	~~269~~	~~79~~
694.40	1.00		42	Hard Till	7.8	155.7	***558.9***				~~559~~	~~11~~	~~22~~	~~274~~	~~80~~
693.40	1.00		42	Hard Till	7.8	155.7	***566.7***				~~567~~	~~11~~	~~22~~	~~278~~	~~81~~
692.40	1.00		42	Hard Till	7.8	155.7	***574.5***				~~575~~	~~11~~	~~22~~	~~282~~	~~82~~
691.40	1.00		42	Hard Till	7.8	155.7	***450.7***				~~451~~	~~11~~	~~22~~	~~214~~	~~83~~
686.40	5.00	2.80			35.8	24.1	***479.7***				~~480~~	~~11~~	~~22~~	~~230~~	~~88~~
681.40	5.00	2.00				17.2									

Illinois Department of Transportation

IDOT STATIC METHOD OF ESTIMATING PILE LENGTH

SUBSTRUCTURE========== 049-D030
REFERENCE BORING ========== Boring BSB-05
LRFD or ASD or SEISMIC ========== LRFD
PILE CUTOFF ELEV. ========== 773.94 ft
GROUND SURFACE ELEV. AGAINST PILE DURING DRIVING 771.94 ft
GEOTECHNICAL LOSS TYPE (None, Scour, Liquef., DD) ===== DD
BOTTOM ELEV. OF SCOUR, LIQUEF., or DD ========== 760.40 ft
TOP ELEV. OF LIQUEF. (so layers above apply DD) ========== ft

TOTAL FACTORED SUBSTRUCTURE LOAD ========== 1245 kips
TOTAL LENGTH OF SUBSTRUCTURE (along skew)========== 62.20 ft
NUMBER OF ROWS OF PILES PER SUBSTRUCTURE ====== 1
Approx. Factored Loading Applied per pile at 8 ft. Cts ========== 160.13 KIPS
Approx. Factored Loading Applied per pile at 3 ft. Cts ========== 60.05 KIPS

PILE TYPE AND SIZE ========== Metal Shell 14"Φ w/.312" walls
Pile Perimeter========== 3.665 FT.
Pile End Bearing Area========== 1.069 SQFT.

MAX. REQUIRED BEARING & RESISTANCE for Selected Pile, Soil Profile, & Losses

Maximum Nominal Req'd Bearing of Pile	Maximum Nominal Req.d Bearing of Boring	Maximum Factored Resistance Available in Boring	Maximum Pile Driveable Length in Boring
570 KIPS	**442** KIPS	**204** KIPS	**73** FT.

BOT. OF LAYER ELEV. (FT.)	LAYER THICK. (FT.)	UNCONF. COMPR. STRENGTH (TSF.)	S.P.T. N VALUE (BLOWS)	GRANULAR OR ROCK LAYER DESCRIPTION	NOMINAL SIDE RESIST. (KIPS)	NOMINAL END BRG. RESIST. (KIPS)	NOMINAL TOTAL RESIST. (KIPS)				NOMINAL REQ'D BEARING (KIPS)	FACTORED GEOTECH. LOSS FROM SCOUR or DD (KIPS)	FACTORED GEOTECH. LOSS LOAD FROM DD (KIPS)	FACTORED RESISTANCE AVAILABLE (KIPS)	ESTIMATED PILE LENGTH (FT.)
770.40	1.54		7	Sandy Gravel	4.7		***22.3***				22	3	5	5	4
767.90	2.50	1.50			13.8	17.6	***20.2***				20	10	20	-19	6
762.90	5.00	0.15			3.6	1.8	***23.8***				24	12	24	-23	11
760.40	2.50	0.15			1.8	1.8	***30.8***				31	13	26	-22	14
757.90	2.50	0.60			6.6	7.0	***42.1***				42	13	26	-16	16
755.40	2.50	1.00			10.2	11.7	***58.2***				58	13	26	-7	19
752.90	2.50	1.50			13.8	17.6	***79.0***				79	13	26	4	21
750.40	2.50	2.10			17.2	24.6	***109.1***				109	13	26	21	24
747.90	2.50	3.20	14		23.0	37.5	***114.5***				115	13	26	24	26
745.40	2.50	1.70			15.0	19.9	***141.3***				141	13	26	38	29
742.90	2.50	2.70			20.4	31.7	***147.6***				148	13	26	42	31
737.90	5.00	1.50			27.6	17.6	***172.8***				173	13	26	56	36
732.90	5.00	1.30			24.9	15.2	***208.3***				208	13	26	75	41
727.90	5.00	2.20			35.5	25.8	***236.8***				237	13	26	91	46
721.40	6.50	1.60			37.5	18.8	***430.5***				430	13	26	197	53
716.40	5.00		26	Sandy Gravel	59.0	175.0	***336.7***				337	13	26	146	58
711.40	5.00	1.90			32.3	22.3	***370.2***				370	13	26	164	63
706.40	5.00	2.00			33.4	23.5	***408.3***				408	13	26	185	68
701.40	5.00	2.40			37.6	28.1	***442.4***				442	13	26	204	73
696.40	5.00	2.10			34.4	24.6	***664.2***				~~664~~	~~13~~	~~26~~	~~326~~	~~78~~
695.40	1.00		42	Hard Till	9.1	212.0	***673.3***				~~673~~	~~13~~	~~26~~	~~331~~	~~79~~
694.40	1.00		42	Hard Till	9.1	212.0	***682.4***				~~682~~	~~13~~	~~26~~	~~336~~	~~80~~
693.40	1.00		42	Hard Till	9.1	212.0	***691.5***				~~691~~	~~13~~	~~26~~	~~341~~	~~81~~
692.40	1.00		42	Hard Till	9.1	212.0	***700.6***				~~701~~	~~13~~	~~26~~	~~346~~	~~82~~
691.40	1.00		42	Hard Till	9.1	212.0	***530.5***				531	13	26	252	83
686.40	5.00	2.80			41.8	32.8	***562.9***				563	13	26	270	88
681.40	5.00	2.00				23.5									

Illinois Department of Transportation

IDOT STATIC METHOD OF ESTIMATING PILE LENGTH

SUBSTRUCTURE==========049-D030
REFERENCE BORING ==========Boring BSB-07
LRFD or ASD or SEISMIC ==========LRFD
PILE CUTOFF ELEV. ==========774.69 ft
GROUND SURFACE ELEV. AGAINST PILE DURING DRIVING 772.69 ft
GEOTECHNICAL LOSS TYPE (None, Scour, Liquef., DD) =====DD
BOTTOM ELEV. OF SCOUR, LIQUEF., or DD ==========761.30 ft
TOP ELEV. OF LIQUEF. (so layers above apply DD) ==========ft

TOTAL FACTORED SUBSTRUCTURE LOAD ==========1245 kips
TOTAL LENGTH OF SUBSTRUCTURE (along skew)==========62.20 ft
NUMBER OF ROWS OF PILES PER SUBSTRUCTURE ======1
Approx. Factored Loading Applied per pile at 8 ft. Cts ========== 160.13 KIPS
Approx. Factored Loading Applied per pile at 3 ft. Cts ========== 60.05 KIPS

PILE TYPE AND SIZE ==========Metal Shell 12"Φ w/.25" walls
Pile Perimeter========== 3.142 FT.
Pile End Bearing Area========== 0.785 SQFT.

MAX. REQUIRED BEARING & RESISTANCE for Selected Pile, Soil Profile, & Losses

Maximum Nominal Req'd Bearing of Pile	Maximum Nominal Req.d Bearing of Boring	Maximum Factored Resistance Available in Boring	Maximum Pile Driveable Length in Boring
392 KIPS	**377** KIPS	**189** KIPS	**71** FT.

BOT. OF LAYER ELEV. (FT.)	LAYER THICK. (FT.)	UNCONF. COMPR. STRENGTH (TSF.)	S.P.T. N VALUE (BLOWS)	GRANULAR OR ROCK LAYER DESCRIPTION	NOMINAL SIDE RESIST. (KIPS)	NOMINAL END BRG. RESIST. (KIPS)	NOMINAL TOTAL RESIST. (KIPS)				NOMINAL REQ'D BEARING (KIPS)	FACTORED GEOTECH. LOSS FROM SCOUR or DD (KIPS)	FACTORED GEOTECH. LOSS LOAD FROM DD (KIPS)	FACTORED RESISTANCE AVAILABLE (KIPS)	ESTIMATED PILE LENGTH (FT.)
771.30	1.39		7	Medium Sand	2.8		***5.0***				5	2	3	-2	3
768.80	2.50	0.25			2.5	2.2	***11.6***				12	3	6	-2	6
766.30	2.50		2	Medium Sand	1.4	6.3	***8.1***				8	4	7	-7	8
763.80	2.50	0.15			1.5	1.3	***10.9***				11	5	9	-8	11
761.30	2.50	0.30			3.0	2.6	***17.3***				17	6	12	-9	13
758.80	2.50	0.70			6.5	6.0	***26.4***				26	6	12	-4	16
756.30	2.50	1.00			8.7	8.6	***42.0***				42	6	12	4	18
753.80	2.50	1.80			13.4	15.5	***64.8***				65	6	12	17	21
751.00	2.80	2.90			20.6	25.0	***73.3***				73	6	12	22	24
748.50	2.50	1.50			11.8	12.9	***92.0***				92	6	12	32	26
746.00	2.50	2.30			15.7	19.8	***105.1***				105	6	12	39	29
742.50	3.50	2.00			20.0	17.2	***127.7***				128	6	12	52	32
737.35	5.15	2.30			32.3	19.8	***147.1***				147	6	12	62	37
732.35	5.00	0.80			14.5	6.9	***312.9***				313	6	12	153	42
727.35	5.00		32	Medium Sand	49.9	158.2	***226.1***				226	6	12	106	47
722.35	5.00	2.50			33.1	21.5	***261.0***				261	6	12	125	52
717.35	5.00	2.70			34.9	23.3	***287.3***				287	6	12	139	57
712.35	5.00	1.70			25.7	14.6	***313.0***				313	6	12	154	62
707.35	5.00	1.70			25.7	14.6	***348.2***				348	6	12	173	67
706.35	1.00	2.80			7.2	24.1	***355.4***				355	6	12	177	68
705.35	1.00	2.80			7.2	24.1	***362.6***				363	6	12	181	69
704.35	1.00	2.80			7.2	24.1	***369.7***				370	6	12	185	70
703.35	1.00	2.80			7.2	24.1	***376.9***				377	6	12	189	71
702.35	1.00	2.80			7.2	24.1	***515.7***				~~516~~	~~6~~	~~12~~	~~265~~	~~72~~
701.35	1.00		42	Hard Till	7.8	155.7	***523.5***				~~523~~	~~6~~	~~12~~	~~269~~	~~73~~
700.35	1.00		42	Hard Till	7.8	155.7	***531.3***				~~531~~	~~6~~	~~12~~	~~274~~	~~74~~
699.35	1.00		42	Hard Till	7.8	155.7	***539.1***				~~539~~	~~6~~	~~12~~	~~278~~	~~75~~
697.35	2.00		42	Hard Till	15.6	155.7	***418.8***				~~419~~	~~6~~	~~12~~	~~212~~	~~77~~
692.35	5.00	2.30			31.3	19.8	***457.8***				~~458~~	~~6~~	~~12~~	~~233~~	~~82~~
687.35	5.00	3.20	27		39.4	27.6	***840.5***				~~840~~	~~6~~	~~12~~	~~444~~	~~87~~
684.35	3.00		100	Hard Till		370.8									

Illinois Department of Transportation

IDOT STATIC METHOD OF ESTIMATING PILE LENGTH

SUBSTRUCTURE========== 049-D030
REFERENCE BORING ========== Boring BSB-07
LRFD or ASD or SEISMIC ========== LRFD
PILE CUTOFF ELEV. ========== 774.69 ft
GROUND SURFACE ELEV. AGAINST PILE DURING DRIVING 772.69 ft
GEOTECHNICAL LOSS TYPE (None, Scour, Liquef., DD) ===== DD
BOTTOM ELEV. OF SCOUR, LIQUEF., or DD ========== 761.30 ft
TOP ELEV. OF LIQUEF. (so layers above apply DD) ========== ft

TOTAL FACTORED SUBSTRUCTURE LOAD ========== 1245 kips
TOTAL LENGTH OF SUBSTRUCTURE (along skew)========== 62.20 ft
NUMBER OF ROWS OF PILES PER SUBSTRUCTURE ====== 1
Approx. Factored Loading Applied per pile at 8 ft. Cts ========== 160.13 KIPS
Approx. Factored Loading Applied per pile at 3 ft. Cts ========== 60.05 KIPS

PILE TYPE AND SIZE ========== Metal Shell 14"Φ w/.312" walls
Pile Perimeter========== 3.665 FT.
Pile End Bearing Area========== 1.069 SQFT.

MAX. REQUIRED BEARING & RESISTANCE for Selected Pile, Soil Profile, & Losses

Maximum Nominal Req'd Bearing of Pile	Maximum Nominal Req.d Bearing of Boring	Maximum Factored Resistance Available in Boring	Maximum Pile Driveable Length in Boring
570 KIPS	**444** KIPS	**223** KIPS	**71** FT.

BOT. OF LAYER ELEV. (FT.)	LAYER THICK. (FT.)	UNCONF. COMPR. STRENGTH (TSF.)	S.P.T. N VALUE (BLOWS)	GRANULAR OR ROCK LAYER DESCRIPTION	NOMINAL SIDE RESIST. (KIPS)	NOMINAL END BRG. RESIST. (KIPS)	NOMINAL TOTAL RESIST. (KIPS)				NOMINAL REQ'D BEARING (KIPS)	FACTORED GEOTECH. LOSS FROM SCOUR or DD (KIPS)	FACTORED GEOTECH. LOSS LOAD FROM DD (KIPS)	FACTORED RESISTANCE AVAILABLE (KIPS)	ESTIMATED PILE LENGTH (FT.)
771.30	1.39		7	Medium Sand	3.3		***6.2***				6	2	4	-2	3
768.80	2.50	0.25			2.9	2.9	***13.6***				14	3	7	-3	6
766.30	2.50		2	Medium Sand	1.7	7.4	***9.6***				10	4	9	-8	8
763.80	2.50	0.15			1.8	1.8	***13.2***				13	5	11	-9	11
761.30	2.50	0.30			3.5	3.5	***21.4***				21	7	14	-10	13
758.80	2.50	0.70			7.6	8.2	***32.4***				32	7	14	-4	16
756.30	2.50	1.00			10.2	11.7	***52.0***				52	7	14	7	18
753.80	2.50	1.80			15.6	21.1	***80.5***				80	7	14	23	21
751.00	2.80	2.90			24.0	34.0	***88.1***				88	7	14	27	24
748.50	2.50	1.50			13.8	17.6	***111.2***				111	7	14	39	26
746.00	2.50	2.30			18.3	27.0	***126.0***				126	7	14	48	29
742.50	3.50	2.00			23.4	23.5	***152.9***				153	7	14	62	32
737.35	5.15	2.30			37.6	27.0	***172.9***				173	7	14	73	37
732.35	5.00	0.80			16.9	9.4	***395.8***				396	7	14	196	42
727.35	5.00		32	Medium Sand	58.2	215.3	***268.0***				268	7	14	126	47
722.35	5.00	2.50			38.6	29.3	***309.0***				309	7	14	148	52
717.35	5.00	2.70			40.7	31.7	***338.0***				338	7	14	164	57
712.35	5.00	1.70			30.0	19.9	***368.0***				368	7	14	181	62
707.35	5.00	1.70			30.0	19.9	***411.0***				411	7	14	204	67
706.35	1.00	2.80			8.4	32.8	***419.3***				419	7	14	209	68
705.35	1.00	2.80			8.4	32.8	***427.7***				428	7	14	214	69
704.35	1.00	2.80			8.4	32.8	***436.1***				436	7	14	218	70
703.35	1.00	2.80			8.4	32.8	***444.4***				444	7	14	223	71
702.35	1.00	2.80			8.4	32.8	***631.9***				~~632~~	~~7~~	~~14~~	~~326~~	~~72~~
701.35	1.00		42	Hard Till	9.1	212.0	***641.0***				~~641~~	~~7~~	~~14~~	~~331~~	~~73~~
700.35	1.00		42	Hard Till	9.1	212.0	***650.1***				~~650~~	~~7~~	~~14~~	~~336~~	~~74~~
699.35	1.00		42	Hard Till	9.1	212.0	***659.2***				~~659~~	~~7~~	~~14~~	~~341~~	~~75~~
697.35	2.00		42	Hard Till	18.2	212.0	***492.4***				492	7	14	249	77
692.35	5.00	2.30			36.5	27.0	***539.5***				540	7	14	275	82
687.35	5.00	3.20	27		46.0	37.5	***1052.7***				~~1053~~	~~7~~	~~14~~	~~557~~	~~87~~
684.35	3.00		100	Hard Till		504.7									

Illinois Department of Transportation

IDOT STATIC METHOD OF ESTIMATING PILE LENGTH

SUBSTRUCTURE========== 049-D030
REFERENCE BORING ========== Boring BSB-09
LRFD or ASD or SEISMIC ========== LRFD
PILE CUTOFF ELEV. ========== 775.50 ft
GROUND SURFACE ELEV. AGAINST PILE DURING DRIVING 773.50 ft
GEOTECHNICAL LOSS TYPE (None, Scour, Liquef., DD) ===== DD
BOTTOM ELEV. OF SCOUR, LIQUEF., or DD ========== 757.30 ft
TOP ELEV. OF LIQUEF. (so layers above apply DD) ========== ft

TOTAL FACTORED SUBSTRUCTURE LOAD ========== 1245 kips
TOTAL LENGTH OF SUBSTRUCTURE (along skew)========== 62.20 ft
NUMBER OF ROWS OF PILES PER SUBSTRUCTURE ====== 1
Approx. Factored Loading Applied per pile at 8 ft. Cts ========== 160.13 KIPS
Approx. Factored Loading Applied per pile at 3 ft. Cts ========== 60.05 KIPS

PILE TYPE AND SIZE ========== Metal Shell 12"Φ w/.25" walls
Pile Perimeter========== 3.142 FT.
Pile End Bearing Area========== 0.785 SQFT.

MAX. REQUIRED BEARING & RESISTANCE for Selected Pile, Soil Profile, & Losses

Maximum Nominal Req'd Bearing of Pile	Maximum Nominal Req.d Bearing of Boring	Maximum Factored Resistance Available in Boring	Maximum Pile Driveable Length in Boring
392 KIPS	**369** KIPS	**175** KIPS	**81** FT.

BOT. OF LAYER ELEV. (FT.)	LAYER THICK. (FT.)	UNCONF. COMPR. STRENGTH (TSF.)	S.P.T. N VALUE (BLOWS)	GRANULAR OR ROCK LAYER DESCRIPTION	NOMINAL SIDE RESIST. (KIPS)	NOMINAL END BRG. RESIST. (KIPS)	NOMINAL TOTAL RESIST. (KIPS)				NOMINAL REQ'D BEARING (KIPS)	FACTORED GEOTECH. LOSS FROM SCOUR or DD (KIPS)	FACTORED GEOTECH. LOSS LOAD FROM DD (KIPS)	FACTORED RESISTANCE AVAILABLE (KIPS)	ESTIMATED PILE LENGTH (FT.)
772.30	1.20		4	Sandy Gravel	1.8		***5.2***				5	1	2	0	3
769.80	2.50	0.40			3.9	3.4	***8.3***				8	3	6	-5	6
766.80	3.00	0.30			3.6	2.6	***10.5***				11	5	10	-9	9
764.30	2.50	0.15			1.5	1.3	***12.1***				12	6	12	-11	11
761.80	2.50	0.15			1.5	1.3	***15.8***				16	7	14	-12	14
759.80	2.00	0.40			3.1	3.4	***16.7***				17	8	17	-16	16
757.30	2.50	0.15			1.5	1.3	***19.5***				20	9	19	-17	18
754.80	2.50	0.30			3.0	2.6	***22.5***				23	9	19	-16	21
752.30	2.50	0.30			3.0	2.6	***25.5***				25	9	19	-14	23
749.80	2.50	0.30			3.0	2.6	***37.1***				37	9	19	-8	26
747.30	2.50	1.30			10.7	11.2	***52.9***				53	9	19	1	28
742.30	5.00	1.90			27.7	16.4	***78.1***				78	9	19	15	33
737.30	5.00	1.60			24.7	13.8	***103.6***				104	9	19	29	38
732.30	5.00	1.70			25.7	14.6	***130.3***				130	9	19	44	43
728.30	4.00	1.80			21.4	15.5	***220.2***				220	9	19	93	47
723.30	5.00		17	Medium Sand	24.6	84.0	***178.0***				178	9	19	70	52
718.30	5.00	2.00			28.6	17.2	***330.3***				330	9	19	154	57
713.30	5.00		38	Hard Till	34.1	140.9	***247.5***				248	9	19	108	62
708.30	5.00	2.80			35.8	24.1	***283.4***				283	9	19	128	67
703.30	5.00	2.80			35.8	24.1	***309.7***				310	9	19	142	72
698.30	5.00	1.70			25.7	14.6	***342.3***				342	9	19	160	77
697.30	1.00	2.50			6.6	21.5	***349.0***				349	9	19	164	78
696.30	1.00	2.50			6.6	21.5	***355.6***				356	9	19	168	79
695.30	1.00	2.50			6.6	21.5	***362.2***				362	9	19	171	80
694.30	1.00	2.50			6.6	21.5	***368.8***				369	9	19	175	81
693.30	1.00	2.50			6.6	21.5	***483.7***				~~484~~	~~9~~	~~19~~	~~238~~	~~82~~
692.30	1.00		35	Hard Till	6.1	129.8	***489.8***				~~490~~	~~9~~	~~19~~	~~241~~	~~83~~
691.30	1.00		35	Hard Till	6.1	129.8	***496.0***				~~496~~	~~9~~	~~19~~	~~245~~	~~84~~
690.30	1.00		35	Hard Till	6.1	129.8	***502.1***				~~502~~	~~9~~	~~19~~	~~248~~	~~85~~
689.30	1.00		35	Hard Till	6.1	129.8	***508.3***				~~508~~	~~9~~	~~19~~	~~252~~	~~86~~
688.30	1.00		35	Hard Till	6.1	129.8	***401.9***				~~402~~	~~9~~	~~19~~	~~193~~	~~87~~
685.30	3.00	2.00				17.2									

Illinois Department of Transportation

IDOT STATIC METHOD OF ESTIMATING PILE LENGTH

SUBSTRUCTURE========== 049-D030
REFERENCE BORING ========== Boring BSB-09
LRFD or ASD or SEISMIC ========== LRFD
PILE CUTOFF ELEV. ========== 775.50 ft
GROUND SURFACE ELEV. AGAINST PILE DURING DRIVING 773.50 ft
GEOTECHNICAL LOSS TYPE (None, Scour, Liquef., DD) ===== DD
BOTTOM ELEV. OF SCOUR, LIQUEF., or DD ========== 757.30 ft
TOP ELEV. OF LIQUEF. (so layers above apply DD) ========== ft

TOTAL FACTORED SUBSTRUCTURE LOAD ========== 1245 kips
TOTAL LENGTH OF SUBSTRUCTURE (along skew)========== 62.20 ft
NUMBER OF ROWS OF PILES PER SUBSTRUCTURE ====== 1
Approx. Factored Loading Applied per pile at 8 ft. Cts ========== 160.13 KIPS
Approx. Factored Loading Applied per pile at 3 ft. Cts ========== 60.05 KIPS

PILE TYPE AND SIZE ========== Metal Shell 14"Φ w/.312" walls
Pile Perimeter========== 3.665 FT.
Pile End Bearing Area========== 1.069 SQFT.

MAX. REQUIRED BEARING & RESISTANCE for Selected Pile, Soil Profile, & Losses

Maximum Nominal Req'd Bearing of Pile	Maximum Nominal Req.d Bearing of Boring	Maximum Factored Resistance Available in Boring	Maximum Pile Driveable Length in Boring
570 KIPS	**434** KIPS	**206** KIPS	**81** FT.

BOT. OF LAYER ELEV. (FT.)	LAYER THICK. (FT.)	UNCONF. COMPR. STRENGTH (TSF.)	S.P.T. N VALUE (BLOWS)	GRANULAR OR ROCK LAYER DESCRIPTION	NOMINAL SIDE RESIST. (KIPS)	NOMINAL END BRG. RESIST. (KIPS)	NOMINAL TOTAL RESIST. (KIPS)				NOMINAL REQ'D BEARING (KIPS)	FACTORED GEOTECH. LOSS FROM SCOUR or DD (KIPS)	FACTORED GEOTECH. LOSS LOAD FROM DD (KIPS)	FACTORED RESISTANCE AVAILABLE (KIPS)	ESTIMATED PILE LENGTH (FT.)
772.30	1.20		4	Sandy Gravel	2.1		***6.8***				7	1	2	0	3
769.80	2.50	0.40			4.6	4.7	***10.1***				10	4	7	-5	6
766.80	3.00	0.30			4.2	3.5	***12.6***				13	6	12	-11	9
764.30	2.50	0.15			1.8	1.8	***14.3***				14	7	14	-13	11
761.80	2.50	0.15			1.8	1.8	***19.1***				19	8	16	-13	14
759.80	2.00	0.40			3.6	4.7	***19.8***				20	10	20	-19	16
757.30	2.50	0.15			1.8	1.8	***23.3***				23	11	22	-20	18
754.80	2.50	0.30			3.5	3.5	***26.8***				27	11	22	-18	21
752.30	2.50	0.30			3.5	3.5	***30.2***				30	11	22	-16	23
749.80	2.50	0.30			3.5	3.5	***45.4***				45	11	22	-8	26
747.30	2.50	1.30			12.5	15.2	***65.0***				65	11	22	3	28
742.30	5.00	1.90			32.3	22.3	***93.8***				94	11	22	19	33
737.30	5.00	1.60			28.8	18.8	***123.8***				124	11	22	35	38
732.30	5.00	1.70			30.0	19.9	***155.0***				155	11	22	53	43
728.30	4.00	1.80			25.0	21.1	***273.2***				273	11	22	118	47
723.30	5.00		17	Medium Sand	28.7	114.4	***211.0***				211	11	22	83	52
718.30	5.00	2.00			33.4	23.5	***412.7***				413	11	22	194	57
713.30	5.00		38	Hard Till	39.7	191.8	***293.5***				293	11	22	129	62
708.30	5.00	2.80			41.8	32.8	***335.3***				335	11	22	152	67
703.30	5.00	2.80			41.8	32.8	***364.2***				364	11	22	168	72
698.30	5.00	1.70			30.0	19.9	***403.6***				404	11	22	189	77
697.30	1.00	2.50			7.7	29.3	***411.3***				411	11	22	194	78
696.30	1.00	2.50			7.7	29.3	***419.0***				419	11	22	198	79
695.30	1.00	2.50			7.7	29.3	***426.8***				427	11	22	202	80
694.30	1.00	2.50			7.7	29.3	***434.5***				434	11	22	206	81
693.30	1.00	2.50			7.7	29.3	***589.5***				~~590~~	~~11~~	~~22~~	~~292~~	~~82~~
692.30	1.00		35	Hard Till	7.2	176.6	***596.7***				~~597~~	~~11~~	~~22~~	~~296~~	~~83~~
691.30	1.00		35	Hard Till	7.2	176.6	***603.9***				~~604~~	~~11~~	~~22~~	~~299~~	~~84~~
690.30	1.00		35	Hard Till	7.2	176.6	***611.1***				~~611~~	~~11~~	~~22~~	~~303~~	~~85~~
689.30	1.00		35	Hard Till	7.2	176.6	***618.2***				~~618~~	~~11~~	~~22~~	~~307~~	~~86~~
688.30	1.00		35	Hard Till	7.2	176.6	***472.2***				472	11	22	227	87
685.30	3.00	2.00				23.5									

Illinois Department of Transportation

IDOT STATIC METHOD OF ESTIMATING PILE LENGTH

SUBSTRUCTURE========== 049-D030
REFERENCE BORING ========== Boring BSB-10
LRFD or ASD or SEISMIC ========== LRFD
PILE CUTOFF ELEV. ========== 775.88 ft
GROUND SURFACE ELEV. AGAINST PILE DURING DRIVING 773.88 ft
GEOTECHNICAL LOSS TYPE (None, Scour, Liquef., DD) ===== None
BOTTOM ELEV. OF SCOUR, LIQUEF., or DD ========== ft
TOP ELEV. OF LIQUEF. (so layers above apply DD) ========== ft

TOTAL FACTORED SUBSTRUCTURE LOAD ========== 1245 kips
TOTAL LENGTH OF SUBSTRUCTURE (along skew)========== 62.20 ft
NUMBER OF ROWS OF PILES PER SUBSTRUCTURE ====== 1
Approx. Factored Loading Applied per pile at 8 ft. Cts ========== 160.13 KIPS
Approx. Factored Loading Applied per pile at 3 ft. Cts ========== 60.05 KIPS

PILE TYPE AND SIZE ========== Metal Shell 12"Φ w/.25" walls
Pile Perimeter========== 3.142 FT.
Pile End Bearing Area========== 0.785 SQFT.

MAX. REQUIRED BEARING & RESISTANCE for Selected Pile, Soil Profile, & Losses

Maximum Nominal Req'd Bearing of Pile	Maximum Nominal Req.d Bearing of Boring	Maximum Factored Resistance Available in Boring	Maximum Pile Driveable Length in Boring
392 KIPS	**383** KIPS	**210** KIPS	**61** FT.

BOT. OF LAYER ELEV. (FT.)	LAYER THICK. (FT.)	UNCONF. COMPR. STRENGTH (TSF.)	S.P.T. N VALUE (BLOWS)	GRANULAR OR ROCK LAYER DESCRIPTION	NOMINAL SIDE RESIST. (KIPS)	NOMINAL END BRG. RESIST. (KIPS)	NOMINAL TOTAL RESIST. (KIPS)				NOMINAL REQ'D BEARING (KIPS)	FACTORED GEOTECH. LOSS FROM SCOUR or DD (KIPS)	FACTORED GEOTECH. LOSS LOAD FROM DD (KIPS)	FACTORED RESISTANCE AVAILABLE (KIPS)	ESTIMATED PILE LENGTH (FT.)
773.60	0.28	1.00			1.0		***13.9***				14	0	0	8	2
771.10	2.50	1.50			11.8	12.9	***51.6***				52	0	0	28	5
768.60	2.50	4.50	9		25.6	38.8	***65.1***				65	0	0	36	7
766.10	2.50	3.10	12		19.3	26.7	***81.7***				82	0	0	45	10
763.60	2.50	2.80			17.9	24.1	***100.5***				101	0	0	55	12
761.10	2.50	2.90			18.4	25.0	***112.8***				113	0	0	62	15
758.60	2.50	2.20			15.2	19.0	***120.3***				120	0	0	66	17
756.10	2.50	1.30			10.7	11.2	***135.3***				135	0	0	74	20
753.60	2.50	1.80			13.4	15.5	***171.9***				172	0	0	95	22
751.10	2.50	4.50	12		25.6	38.8	***232.9***				233	0	0	128	25
748.60	2.50		15	Sandy Gravel	13.9	74.2	***241.8***				242	0	0	133	27
744.60	4.00		14	Sandy Gravel	20.8	69.2	***202.0***				202	0	0	111	31
739.60	5.00	1.00			17.5	8.6	***239.3***				239	0	0	132	36
734.60	5.00	3.30	24		40.3	28.4	***271.0***				271	0	0	149	41
729.60	5.00	2.30			31.3	19.8	***300.6***				301	0	0	165	46
724.60	5.00	2.10			29.5	18.1	***326.7***				327	0	0	180	51
719.60	5.00	1.70			25.7	14.6	***353.3***				353	0	0	194	56
718.60	1.00	1.80			5.3	15.5	***358.6***				359	0	0	197	57
717.60	1.00	1.80			5.3	15.5	***364.0***				364	0	0	200	58
716.60	1.00	1.80			5.3	15.5	***369.3***				369	0	0	203	59
715.60	1.00	1.80			5.3	15.5	***374.7***				375	0	0	206	60
714.60	1.00	1.80			5.3	15.5	***382.6***				383	0	0	210	61
709.60	5.00	2.10			29.5	18.1	***419.9***				~~420~~	~~0~~	~~0~~	~~231~~	~~66~~
708.60	1.00	3.00			7.5	25.8	***427.4***				~~427~~	~~0~~	~~0~~	~~235~~	~~67~~
707.60	1.00	3.00			7.5	25.8	***434.9***				~~435~~	~~0~~	~~0~~	~~239~~	~~68~~
706.60	1.00	3.00			7.5	25.8	***442.4***				~~442~~	~~0~~	~~0~~	~~243~~	~~69~~
705.60	1.00	3.00			7.5	25.8	***450.0***				~~450~~	~~0~~	~~0~~	~~247~~	~~70~~
704.60	1.00	3.00			7.5	25.8	***743.1***				~~743~~	~~0~~	~~0~~	~~409~~	~~71~~
699.60	5.00		63	Medium Sand	164.7	311.5	***873.2***				~~873~~	~~0~~	~~0~~	~~480~~	~~76~~
694.60	5.00		56	Medium Sand	133.9	276.9	***1008.4***				~~1008~~	~~0~~	~~0~~	~~555~~	~~81~~
692.10	2.50		75	Hard Till	50.1	278.1	***1274.9***				~~1275~~	~~0~~	~~0~~	~~701~~	~~84~~
687.10	5.00		100	Medium Sand		494.4									

Illinois Department of Transportation

IDOT STATIC METHOD OF ESTIMATING PILE LENGTH

SUBSTRUCTURE========== 049-D030
REFERENCE BORING ========== Boring BSB-10
LRFD or ASD or SEISMIC ========== LRFD
PILE CUTOFF ELEV. ========== 775.88 ft
GROUND SURFACE ELEV. AGAINST PILE DURING DRIVING 773.88 ft
GEOTECHNICAL LOSS TYPE (None, Scour, Liquef., DD) ===== None
BOTTOM ELEV. OF SCOUR, LIQUEF., or DD ========== ft
TOP ELEV. OF LIQUEF. (so layers above apply DD) ========== ft

TOTAL FACTORED SUBSTRUCTURE LOAD ========== 1245 kips
TOTAL LENGTH OF SUBSTRUCTURE (along skew)========== 62.20 ft
NUMBER OF ROWS OF PILES PER SUBSTRUCTURE ====== 1
Approx. Factored Loading Applied per pile at 8 ft. Cts ========== 160.13 KIPS
Approx. Factored Loading Applied per pile at 3 ft. Cts ========== 60.05 KIPS

PILE TYPE AND SIZE ========== Metal Shell 14"Φ w/.312" walls
Pile Perimeter========== 3.665 FT.
Pile End Bearing Area========== 1.069 SQFT.

MAX. REQUIRED BEARING & RESISTANCE for Selected Pile, Soil Profile, & Losses

Maximum Nominal Req'd Bearing of Pile	Maximum Nominal Req.d Bearing of Boring	Maximum Factored Resistance Available in Boring	Maximum Pile Driveable Length in Boring
570 KIPS	**530** KIPS	**291** KIPS	**70** FT.

BOT. OF LAYER ELEV. (FT.)	LAYER THICK. (FT.)	UNCONF. COMPR. STRENGTH (TSF.)	S.P.T. N VALUE (BLOWS)	GRANULAR OR ROCK LAYER DESCRIPTION	NOMINAL SIDE RESIST. (KIPS)	NOMINAL END BRG. RESIST. (KIPS)	NOMINAL TOTAL RESIST. (KIPS)	NOMINAL REQ'D BEARING (KIPS)	FACTORED GEOTECH. LOSS FROM SCOUR or DD (KIPS)	FACTORED GEOTECH. LOSS LOAD FROM DD (KIPS)	FACTORED RESISTANCE AVAILABLE (KIPS)	ESTIMATED PILE LENGTH (FT.)
773.60	0.28	1.00			1.1		***18.7***	19	0	0	10	2
771.10	2.50	1.50			13.8	17.6	***67.7***	68	0	0	37	5
768.60	2.50	4.50	9		29.8	52.8	***81.1***	81	0	0	45	7
766.10	2.50	3.10	12		22.5	36.3	***100.1***	100	0	0	55	10
763.60	2.50	2.80			20.9	32.8	***122.1***	122	0	0	67	12
761.10	2.50	2.90			21.4	34.0	***135.3***	135	0	0	74	15
758.60	2.50	2.20			17.7	25.8	***142.5***	143	0	0	78	17
756.10	2.50	1.30			12.5	15.2	***160.9***	161	0	0	88	20
753.60	2.50	1.80			15.6	21.1	***208.1***	208	0	0	114	22
751.10	2.50	4.50	12		29.8	52.8	***286.1***	286	0	0	157	25
748.60	2.50		15	Sandy Gravel	16.2	100.9	***295.6***	296	0	0	163	27
744.60	4.00		14	Sandy Gravel	24.2	94.2	***237.3***	237	0	0	131	31
739.60	5.00	1.00			20.4	11.7	***284.7***	285	0	0	157	36
734.60	5.00	3.30	24		47.0	38.7	***320.0***	320	0	0	176	41
729.60	5.00	2.30			36.5	27.0	***354.2***	354	0	0	195	46
724.60	5.00	2.10			34.4	24.6	***383.9***	384	0	0	211	51
719.60	5.00	1.70			30.0	19.9	***415.2***	415	0	0	228	56
718.60	1.00	1.80			6.2	21.1	***421.4***	421	0	0	232	57
717.60	1.00	1.80			6.2	21.1	***427.6***	428	0	0	235	58
716.60	1.00	1.80			6.2	21.1	***433.9***	434	0	0	239	59
715.60	1.00	1.80			6.2	21.1	***440.1***	440	0	0	242	60
714.60	1.00	1.80			6.2	21.1	***449.9***	450	0	0	247	61
709.60	5.00	2.10			34.4	24.6	***494.9***	495	0	0	272	66
708.60	1.00	3.00			8.8	35.2	***503.6***	504	0	0	277	67
707.60	1.00	3.00			8.8	35.2	***512.4***	512	0	0	282	68
706.60	1.00	3.00			8.8	35.2	***521.2***	521	0	0	287	69
705.60	1.00	3.00			8.8	35.2	***530.0***	530	0	0	291	70
704.60	1.00	3.00			8.8	35.2	***927.5***	~~928~~	~~0~~	~~0~~	~~510~~	~~71~~
699.60	5.00		63	Medium Sand	192.2	424.0	***1072.6***	~~1073~~	~~0~~	~~0~~	~~590~~	~~76~~
694.60	5.00		56	Medium Sand	156.3	376.8	***1230.6***	~~1231~~	~~0~~	~~0~~	~~677~~	~~81~~
692.10	2.50		75	Hard Till	58.5	378.5	***1583.5***	~~1583~~	~~0~~	~~0~~	~~871~~	~~84~~
687.10	5.00		100	Medium Sand		672.9						

APPENDIX H
Slope Stability and Settlement Calculations

Illinois Department of Transportation

COHESIVE SOIL SETTLEMENT ESTIMATE

LOCATION AND BORING USED ====: IL 132 Dry Land Bridge BSB-01
TYPE OF SURCHARGE ================================ 3 (1=2:1 bridge cone, 2=continuous embank., 3=rectangular surch.)
DEPTH TO WATER TABLE (below top of existing embankment) == 0 FT

NEW EMBANKMENT:
- NEW EMBANKMENT FILL UNIT WEIGHT ========== 120 PCF
- NEW EMBANKMENT FILL HEIGHT ========== 4.5 FT
- PROPOSED WIDTH AT TOP ========== 50 FT
- PROPOSED WIDTH AT BOTTOM ========== 50 FT (which is a MUST EQU
- PROPOSED LENGTH OF RECTANGULAR SURCHARGE=== 10 FT

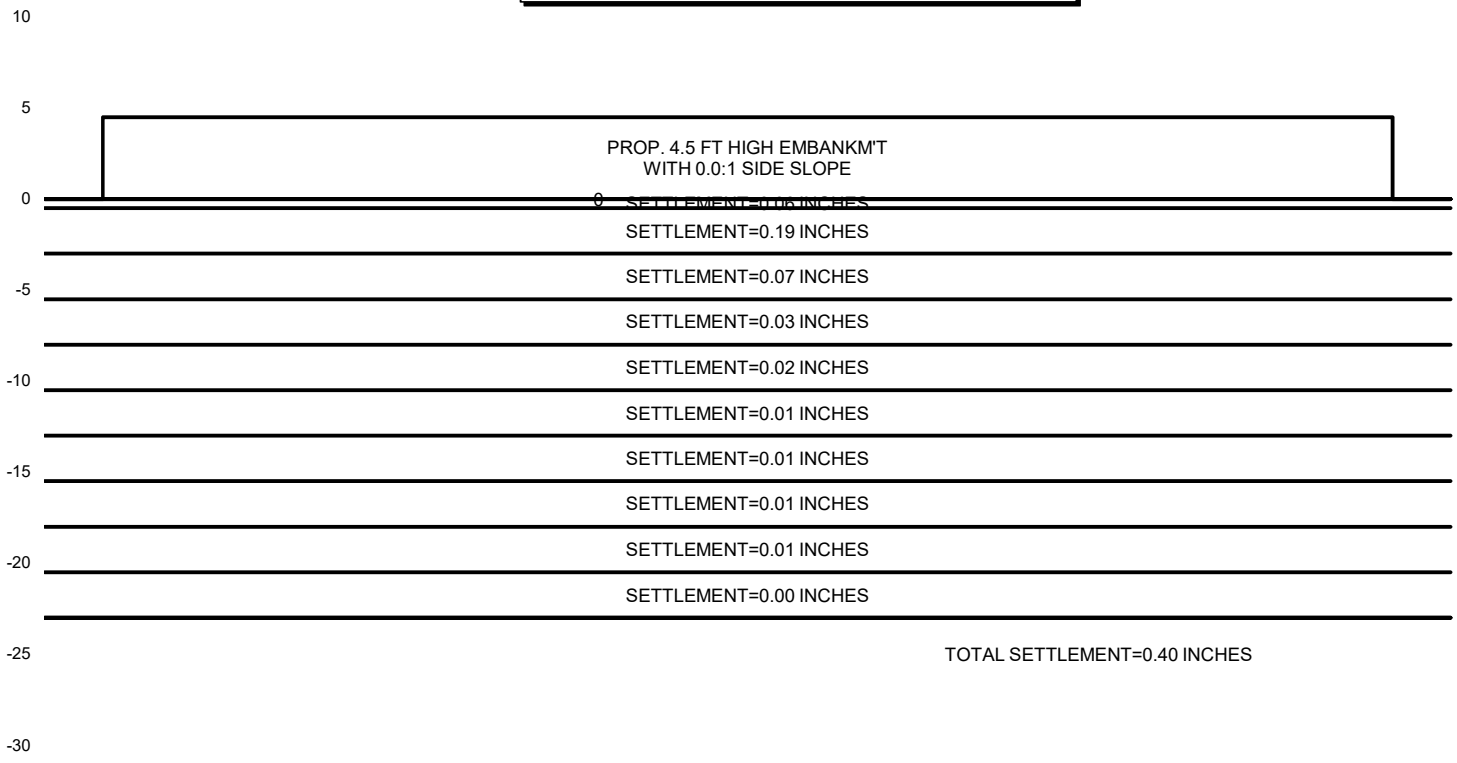
EXISTING EMBANKMENT (IF ANY):
- EXISTING EMBANKMENT UNIT WEIGHT ========== PCF
- EXISTING EMBANKMENT HEIGHT ========== FT
- EXISTING WIDTH AT TOP ========== FT
- EXISTING WIDTH AT BASE ========== FT (which is a 0.0:1 slope)
- EXISTING LENGTH OF RECTANGULAR SURCHARGE========== FT

ASSUMPTIONS:
- Soil Deposit is Normally Consolidated
- Cohesive Layers are Saturated
- Soils have a Low Sensitivity
- Liquid Limit (LL)=Moist. Content (MC%)
- Initial Void Ratio (Eo)=2.7*(MC%)/100
- Comp. Index (Cc)=0.009*(LL-10)
- Neglecting Granular & Secondary Settlem't

LAYER THICK (FT)	*TOTAL UNIT WT. (PCF)*	*UNCONF. COMP. STRENGTH (Qu) (TSF)*	*MOIST. CONTENT (%)*	*EXISTING PRESSURE (KSF)*	*PRESSURE INCREASE (KSF)*	*INITIAL VOID RATIO*	*COMPRESSION INDEX (Cc)*	*Qu CORRECTION FACTOR*	*LAYER SETTLEMENT (IN.)*
0.5	120	1.00	15	0.014	0.540	0.405	0.045	0.200	**0.06**
2.5	120	0.80	15	0.101	0.531	0.405	0.045	0.242	**0.19**
2.5	120	3.00	18	0.245	0.467	0.486	0.072	0.100	**0.07**
2.5	120	3.50	16	0.389	0.383	0.432	0.054	0.100	**0.03**
2.5	120	4.80	15	0.533	0.312	0.405	0.045	0.100	**0.02**
2.5	120	2.40	13	0.677	0.258	0.351	0.027	0.100	**0.01**
2.5	120	3.40	13	0.821	0.218	0.351	0.027	0.100	**0.01**
2.5	120	2.70	14	0.965	0.186	0.378	0.036	0.100	**0.01**
2.5	120	1.50	15	1.109	0.160	0.405	0.045	0.142	**0.01**
2.5	120	2.20	14	1.253	0.140	0.378	0.036	0.102	**0.00**

TOTAL SETTLEMENT UNDER CENTER OF RECTANGULAR FOOTING = 0.40 IN.

EMBANKMENT AND SOIL PROFILE



Illinois Department of Transportation

COHESIVE SOIL SETTLEMENT ESTIMATE

LOCATION AND BORING USED ====: IL 132 Dry Land Bridge BSB-03
TYPE OF SURCHARGE ================================ 3 (1=2:1 bridge cone, 2=continuous embank., 3=rectangular surch.)
DEPTH TO WATER TABLE (below top of existing embankment) == 0 FT

NEW EMBANKMENT:
- NEW EMBANKMENT FILL UNIT WEIGHT ========== 120 PCF
- NEW EMBANKMENT FILL HEIGHT ========== 6 FT
- PROPOSED WIDTH AT TOP ========== 50 FT
- PROPOSED WIDTH AT BOTTOM ========== 50 FT (which is a MUST EQU
- PROPOSED LENGTH OF RECTANGULAR SURCHARGE=== 10 FT

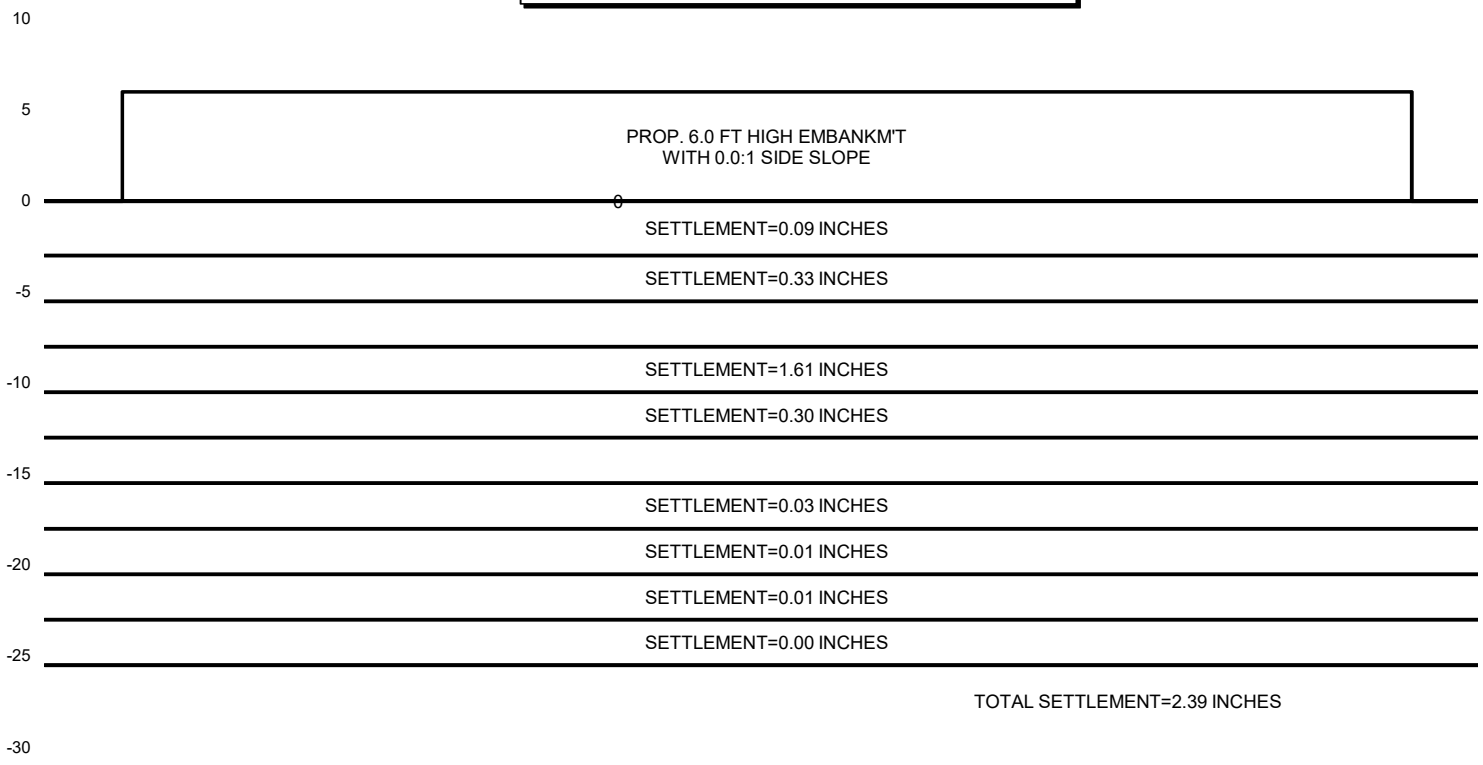
EXISTING EMBANKMENT (IF ANY):
- EXISTING EMBANKMENT UNIT WEIGHT ========== PCF
- EXISTING EMBANKMENT HEIGHT ========== FT
- EXISTING WIDTH AT TOP ========== FT
- EXISTING WIDTH AT BASE ========== FT (which is a 0.0:1 slope)
- EXISTING LENGTH OF RECTANGULAR SURCHARGE========== FT

ASSUMPTIONS:
- Soil Deposit is Normally Consolidated
- Cohesive Layers are Saturated
- Soils have a Low Sensitivity
- Liquid Limit (LL)=Moist. Content (MC%)
- Initial Void Ratio (Eo)=2.7*(MC%)/100
- Comp. Index (Cc)=0.009*(LL-10)
- Neglecting Granular & Secondary Settlem't

LAYER THICK (FT)	*TOTAL UNIT WT. (PCF)*	*UNCONF. COMP. STRENGTH (Qu) (TSF)*	*MOIST. CONTENT (%)*	*EXISTING PRESSURE (KSF)*	*PRESSURE INCREASE (KSF)*	*INITIAL VOID RATIO*	*COMPRESSION INDEX (Cc)*	*Qu CORRECTION FACTOR*	*LAYER SETTLEMENT (IN.)*
3.0	120	2.50	14	0.086	0.713	0.378	0.036	0.100	**0.09**
2.5	120	0.90	28	0.245	0.623	0.756	0.162	0.219	**0.33**
2.5	120	0.00	20	0.389	0.510	0.540	0.090	1.000	**Granular**
2.5	120	0.15	235	0.533	0.416	6.345	2.025	0.775	**1.61**
2.5	120	0.30	31	0.677	0.345	0.837	0.189	0.550	**0.30**
2.5	120	0.00	10	0.821	0.290	0.270	0.000	1.000	**Granular**
2.5	120	0.60	16	0.965	0.248	0.432	0.054	0.309	**0.03**
2.5	120	1.60	17	1.109	0.214	0.459	0.063	0.134	**0.01**
2.5	120	2.70	15	1.253	0.186	0.405	0.045	0.100	**0.01**
2.5	120	2.50	14	1.397	0.164	0.378	0.036	0.100	**0.00**

TOTAL SETTLEMENT UNDER CENTER OF RECTANGULAR FOOTING = 2.39 IN.

EMBANKMENT AND SOIL PROFILE



Illinois Department of Transportation

COHESIVE SOIL SETTLEMENT ESTIMATE

LOCATION AND BORING USED ====: IL 132 Dry Land Bridge BSB-04
TYPE OF SURCHARGE ================================ 3 (1=2:1 bridge cone, 2=continuous embank., 3=rectangular surch.)
DEPTH TO WATER TABLE (below top of existing embankment) == 0 FT

NEW EMBANKMENT:
- NEW EMBANKMENT FILL UNIT WEIGHT ============== 120 PCF
- NEW EMBANKMENT FILL HEIGHT ================== 6 FT
- PROPOSED WIDTH AT TOP ======================== 50 FT
- PROPOSED WIDTH AT BOTTOM ===================== 50 FT (which is a MUST EQU
- PROPOSED LENGTH OF RECTANGULAR SURCHARGE=== 10 FT

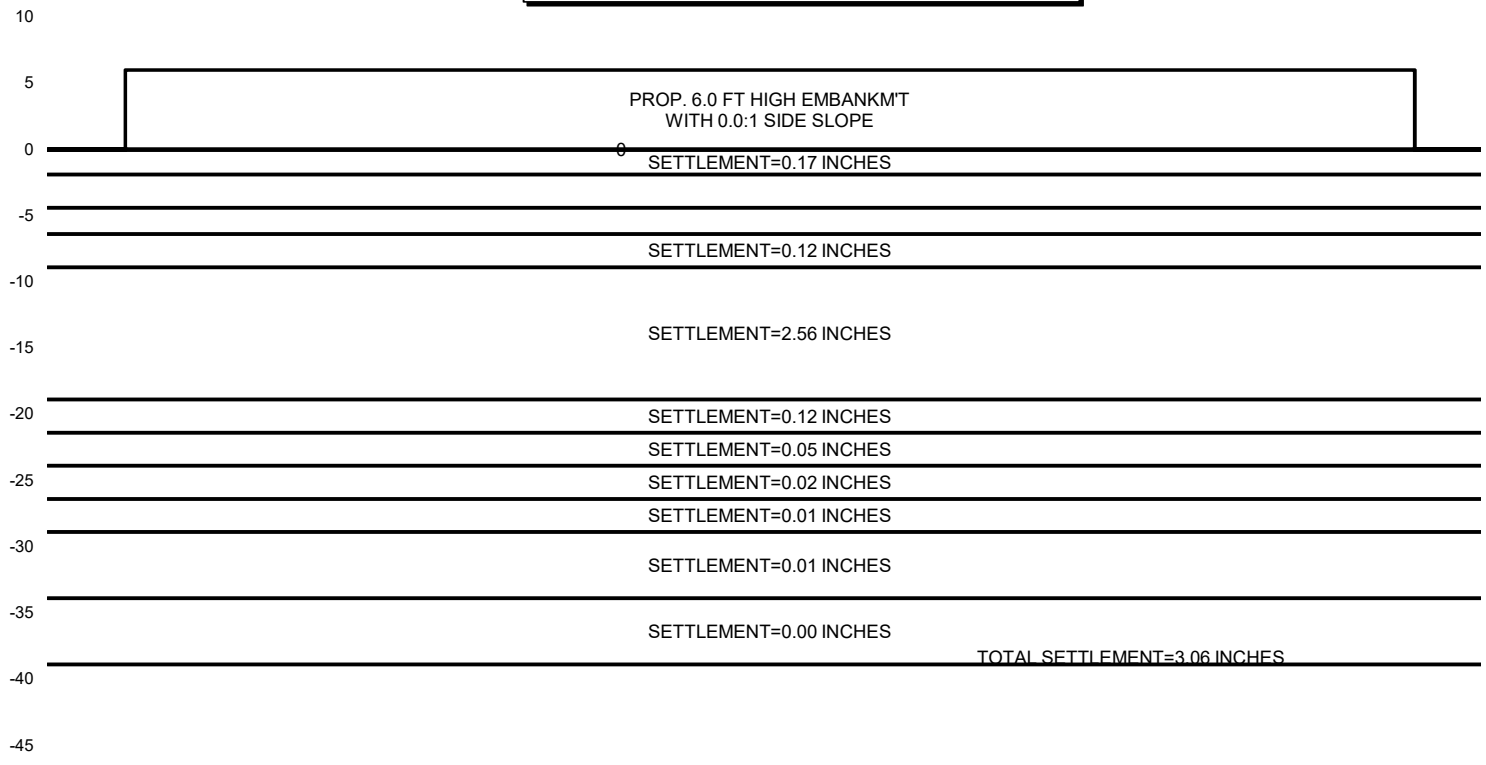
EXISTING EMBANKMENT (IF ANY):
- EXISTING EMBANKMENT UNIT WEIGHT ========== PCF
- EXISTING EMBANKMENT HEIGHT ========== FT
- EXISTING WIDTH AT TOP ========== FT
- EXISTING WIDTH AT BASE ========== FT (which is a 0.0:1 slope)
- EXISTING LENGTH OF RECTANGULAR SURCHARGE========== FT

ASSUMPTIONS:
- Soil Deposit is Normally Consolidated
- Cohesive Layers are Saturated
- Soils have a Low Sensitivity
- Liquid Limit (LL)=Moist. Content (MC%)
- Initial Void Ratio (Eo)=2.7*(MC%)/100
- Comp. Index (Cc)=0.009*(LL-10)
- Neglecting Granular & Secondary Settlem't

LAYER THICK (FT)	*TOTAL UNIT WT. (PCF)*	*UNCONF. COMP. STRENGTH (Qu) (TSF)*	*MOIST. CONTENT (%)*	*EXISTING PRESSURE (KSF)*	*PRESSURE INCREASE (KSF)*	*INITIAL VOID RATIO*	*COMPRESSION INDEX (Cc)*	*Qu CORRECTION FACTOR*	*LAYER SETTLEMENT (IN.)*
1.9	120	1.00	15	0.055	0.718	0.405	0.045	0.200	**0.17**
2.5	120	0.00	7	0.181	0.669	0.189	0.000	1.000	**Granular**
2.0	120	0.00	13	0.311	0.570	0.351	0.027	1.000	**Granular**
2.5	120	0.90	20	0.441	0.474	0.540	0.090	0.219	**0.12**
10.0	120	0.25	150	0.801	0.297	4.050	1.260	0.625	**2.56**
2.5	120	0.40	40	1.161	0.203	1.080	0.270	0.436	**0.12**
2.5	120	0.40	21	1.305	0.178	0.567	0.099	0.436	**0.05**
2.5	120	0.90	20	1.449	0.156	0.540	0.090	0.219	**0.02**
2.5	120	1.10	18	1.593	0.138	0.486	0.072	0.184	**0.01**
5.0	120	1.60	17	1.809	0.117	0.459	0.063	0.134	**0.01**
5.0	120	1.70	15	2.097	0.094	0.405	0.045	0.127	**0.00**

TOTAL SETTLEMENT UNDER CENTER OF RECTANGULAR FOOTING = 3.06 IN.

EMBANKMENT AND SOIL PROFILE



Illinois Department of Transportation

COHESIVE SOIL SETTLEMENT ESTIMATE

LOCATION AND BORING USED ====: IL 132 Dry Land Bridge BSB-05
TYPE OF SURCHARGE ================================ 3 (1=2:1 bridge cone, 2=continuous embank., 3=rectangular surch.)
DEPTH TO WATER TABLE (below top of existing embankment) == 0 FT

NEW EMBANKMENT:
- NEW EMBANKMENT FILL UNIT WEIGHT ========== 120 PCF
- NEW EMBANKMENT FILL HEIGHT ========== 6 FT
- PROPOSED WIDTH AT TOP ========== 50 FT
- PROPOSED WIDTH AT BOTTOM ========== 50 FT (which is a MUST EQU
- PROPOSED LENGTH OF RECTANGULAR SURCHARGE=== 10 FT

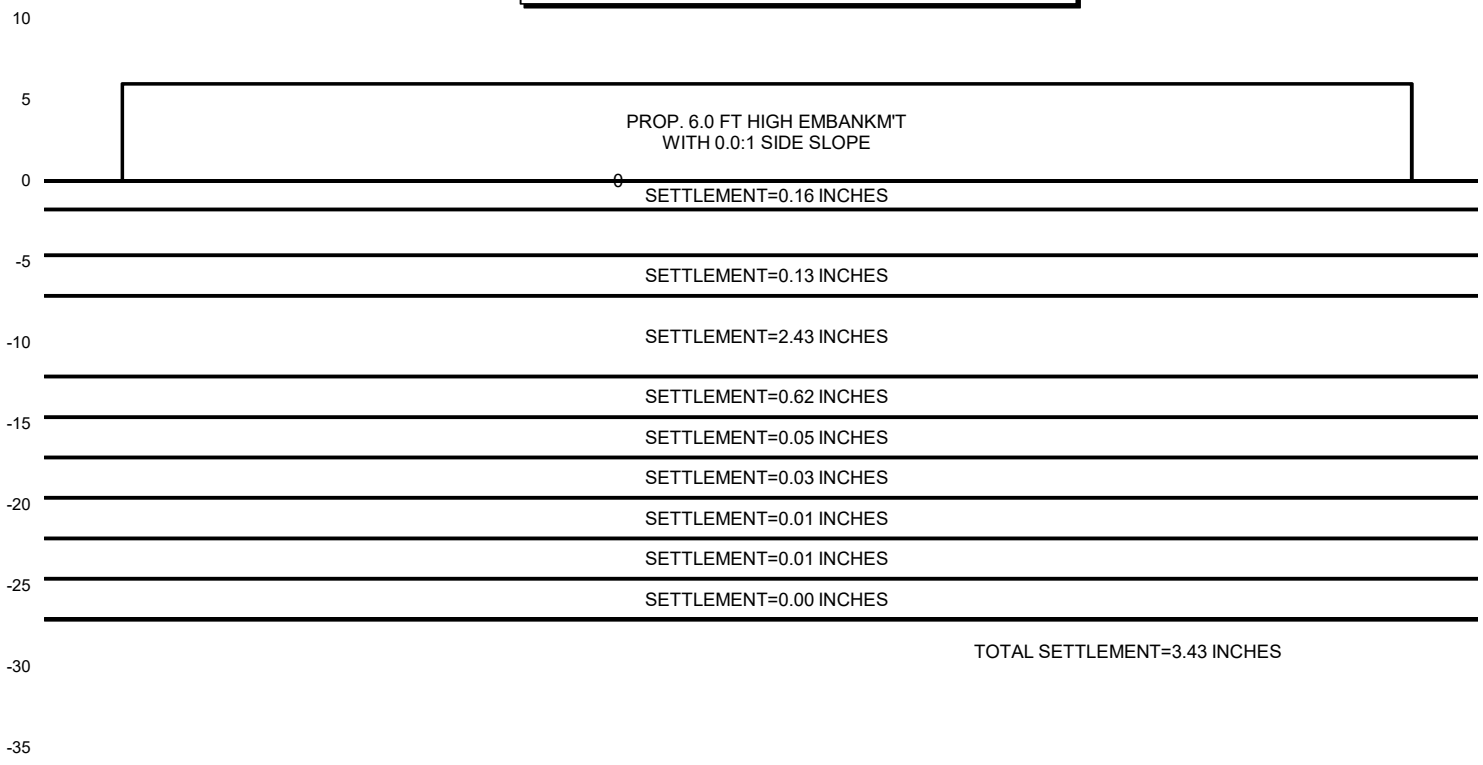
EXISTING EMBANKMENT (IF ANY):
- EXISTING EMBANKMENT UNIT WEIGHT ========== PCF
- EXISTING EMBANKMENT HEIGHT ========== FT
- EXISTING WIDTH AT TOP ========== FT
- EXISTING WIDTH AT BASE ========== FT (which is a 0.0:1 slope)
- EXISTING LENGTH OF RECTANGULAR SURCHARGE========== FT

ASSUMPTIONS:
- Soil Deposit is Normally Consolidated
- Cohesive Layers are Saturated
- Soils have a Low Sensitivity
- Liquid Limit (LL)=Moist. Content (MC%)
- Initial Void Ratio (Eo)=2.7*(MC%)/100
- Comp. Index (Cc)=0.009*(LL-10)
- Neglecting Granular & Secondary Settlem't

LAYER THICK (FT)	*TOTAL UNIT WT. (PCF)*	*UNCONF. COMP. STRENGTH (Qu) (TSF)*	*MOIST. CONTENT (%)*	*EXISTING PRESSURE (KSF)*	*PRESSURE INCREASE (KSF)*	*INITIAL VOID RATIO*	*COMPRESSION INDEX (Cc)*	*Qu CORRECTION FACTOR*	*LAYER SETTLEMENT (IN.)*
1.8	120	1.00	15	0.051	0.718	0.405	0.045	0.200	**0.16**
2.8	120	0.00	15	0.183	0.668	0.405	0.045	1.000	**Granular**
2.5	120	1.50	23	0.337	0.550	0.621	0.117	0.142	**0.13**
5.0	120	0.15	100	0.553	0.405	2.700	0.810	0.775	**2.43**
2.5	120	0.15	66	0.769	0.308	1.782	0.504	0.775	**0.62**
2.5	120	0.60	18	0.913	0.262	0.486	0.072	0.309	**0.05**
2.5	120	1.00	19	1.057	0.225	0.513	0.081	0.200	**0.03**
2.5	120	1.50	16	1.201	0.196	0.432	0.054	0.142	**0.01**
2.5	120	2.10	17	1.345	0.171	0.459	0.063	0.106	**0.01**
2.5	120	3.20	15	1.489	0.151	0.405	0.045	0.100	**0.00**

TOTAL SETTLEMENT UNDER CENTER OF RECTANGULAR FOOTING = 3.43 IN.

EMBANKMENT AND SOIL PROFILE



Illinois Department of Transportation

COHESIVE SOIL SETTLEMENT ESTIMATE

LOCATION AND BORING USED ====: IL 132 Dry Land Bridge BSB-07
TYPE OF SURCHARGE ================================ 3 (1=2:1 bridge cone, 2=continuous embank., 3=rectangular surch.)
DEPTH TO WATER TABLE (below top of existing embankment) == 0 FT

NEW EMBANKMENT:
- NEW EMBANKMENT FILL UNIT WEIGHT ========== 120 PCF
- NEW EMBANKMENT FILL HEIGHT ========== 7 FT
- PROPOSED WIDTH AT TOP ========== 50 FT
- PROPOSED WIDTH AT BOTTOM ========== 50 FT (which is a MUST EQU
- PROPOSED LENGTH OF RECTANGULAR SURCHARGE=== 10 FT

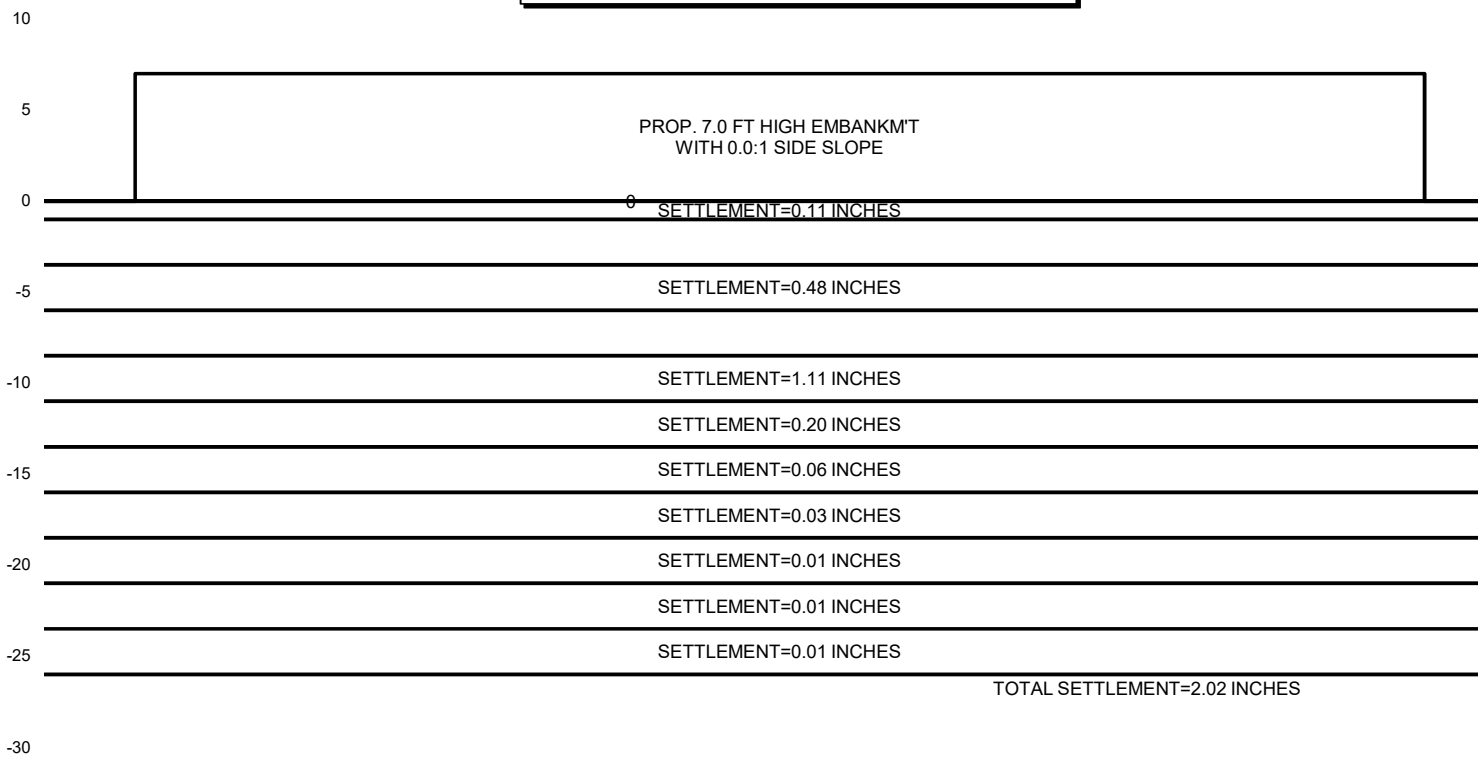
EXISTING EMBANKMENT (IF ANY):
- EXISTING EMBANKMENT UNIT WEIGHT ========== PCF
- EXISTING EMBANKMENT HEIGHT ========== FT
- EXISTING WIDTH AT TOP ========== FT
- EXISTING WIDTH AT BASE ========== FT (which is a 0.0:1 slope)
- EXISTING LENGTH OF RECTANGULAR SURCHARGE========== FT

ASSUMPTIONS:
- Soil Deposit is Normally Consolidated
- Cohesive Layers are Saturated
- Soils have a Low Sensitivity
- Liquid Limit (LL)=Moist. Content (MC%)
- Initial Void Ratio (Eo)=2.7*(MC%)/100
- Comp. Index (Cc)=0.009*(LL-10)
- Neglecting Granular & Secondary Settlem't

LAYER THICK (FT)	*TOTAL UNIT WT. (PCF)*	*UNCONF. COMP. STRENGTH (Qu) (TSF)*	*MOIST. CONTENT (%)*	*EXISTING PRESSURE (KSF)*	*PRESSURE INCREASE (KSF)*	*INITIAL VOID RATIO*	*COMPRESSION INDEX (Cc)*	*Qu CORRECTION FACTOR*	*LAYER SETTLEMENT (IN.)*
1.0	120	1.00	15	0.029	0.840	0.405	0.045	0.200	**0.11**
2.5	120	0.00	17	0.130	0.814	0.459	0.063	1.000	**Granular**
2.5	120	0.50	25	0.274	0.700	0.675	0.135	0.361	**0.48**
2.5	120	0.00	22	0.418	0.571	0.594	0.108	1.000	**Granular**
2.5	120	0.15	66	0.562	0.467	1.782	0.504	0.775	**1.11**
2.5	120	0.30	21	0.706	0.388	0.567	0.099	0.550	**0.20**
2.5	120	0.70	19	0.850	0.328	0.513	0.081	0.271	**0.06**
2.5	120	1.00	17	0.994	0.280	0.459	0.063	0.200	**0.03**
2.5	120	1.80	17	1.138	0.243	0.459	0.063	0.121	**0.01**
2.5	120	2.90	14	1.282	0.212	0.378	0.036	0.100	**0.01**
2.5	120	1.50	17	1.426	0.186	0.459	0.063	0.142	**0.01**

TOTAL SETTLEMENT UNDER CENTER OF RECTANGULAR FOOTING = 2.02 IN.

EMBANKMENT AND SOIL PROFILE



Illinois Department of Transportation

COHESIVE SOIL SETTLEMENT ESTIMATE

LOCATION AND BORING USED ====: IL 132 Dry Land Bridge BSB-09
TYPE OF SURCHARGE ================================ 3 (1=2:1 bridge cone, 2=continuous embank., 3=rectangular surch.)
DEPTH TO WATER TABLE (below top of existing embankment) == 0 FT

NEW EMBANKMENT:
- NEW EMBANKMENT FILL UNIT WEIGHT ========== 120 PCF
- NEW EMBANKMENT FILL HEIGHT ========== 7 FT
- PROPOSED WIDTH AT TOP ========== 50 FT
- PROPOSED WIDTH AT BOTTOM ========== 50 FT (which is a MUST EQU
- PROPOSED LENGTH OF RECTANGULAR SURCHARGE=== 10 FT

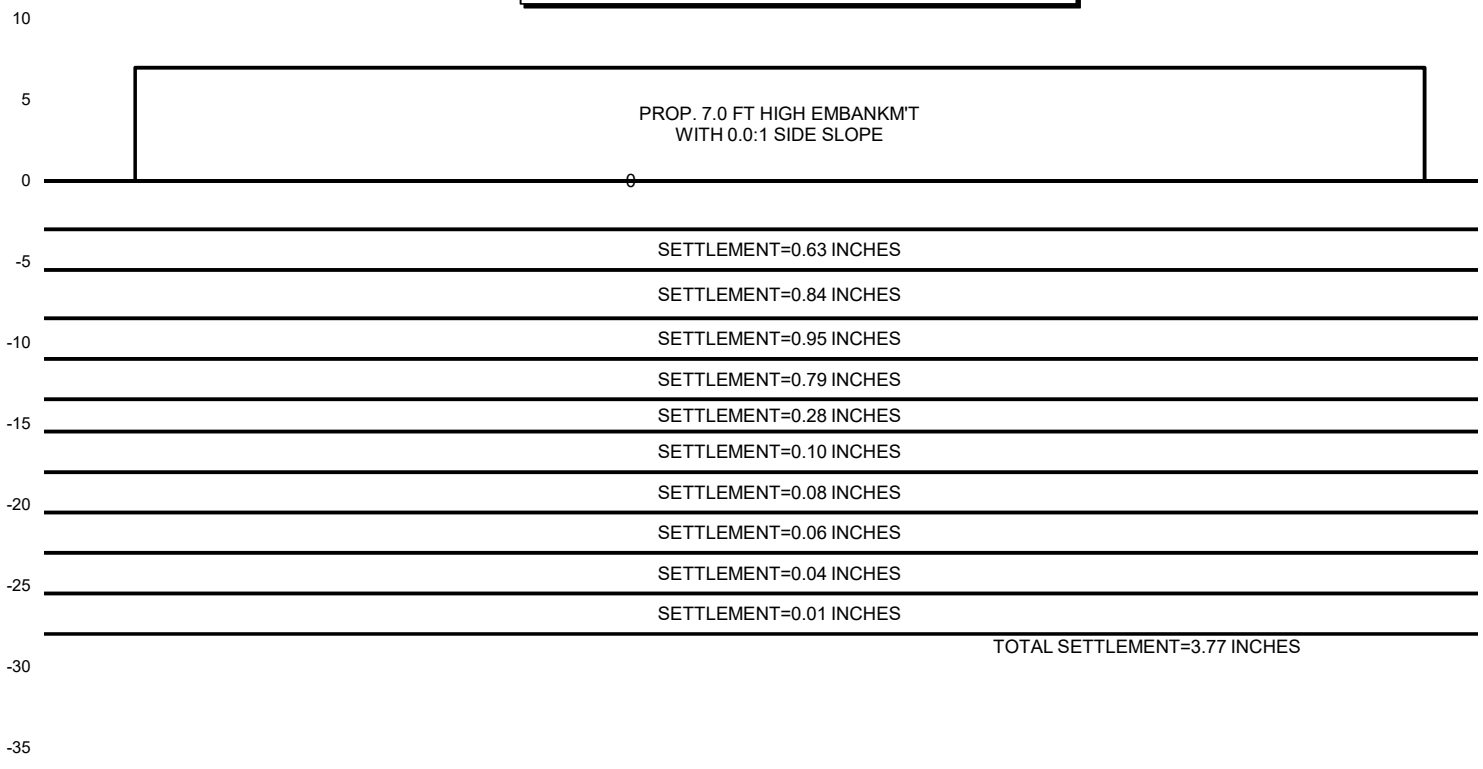
EXISTING EMBANKMENT (IF ANY):
- EXISTING EMBANKMENT UNIT WEIGHT ========== PCF
- EXISTING EMBANKMENT HEIGHT ========== FT
- EXISTING WIDTH AT TOP ========== FT
- EXISTING WIDTH AT BASE ========== FT (which is a 0.0:1 slope)
- EXISTING LENGTH OF RECTANGULAR SURCHARGE========== FT

ASSUMPTIONS:
- Soil Deposit is Normally Consolidated
- Cohesive Layers are Saturated
- Soils have a Low Sensitivity
- Liquid Limit (LL)=Moist. Content (MC%)
- Initial Void Ratio (Eo)=2.7*(MC%)/100
- Comp. Index (Cc)=0.009*(LL-10)
- Neglecting Granular & Secondary Settlem't

LAYER THICK (FT)	*TOTAL UNIT WT. (PCF)*	*UNCONF. COMP. STRENGTH (Qu) (TSF)*	*MOIST. CONTENT (%)*	*EXISTING PRESSURE (KSF)*	*PRESSURE INCREASE (KSF)*	*INITIAL VOID RATIO*	*COMPRESSION INDEX (Cc)*	*Qu CORRECTION FACTOR*	*LAYER SETTLEMENT (IN.)*
3.0	120	0.00	10	0.086	0.831	0.270	0.000	1.000	**Granular**
2.5	120	0.40	25	0.245	0.727	0.675	0.135	0.436	**0.63**
3.0	120	0.30	33	0.403	0.583	0.891	0.207	0.550	**0.84**
2.5	120	0.15	51	0.562	0.467	1.377	0.369	0.775	**0.95**
2.5	120	0.15	64	0.706	0.388	1.728	0.486	0.775	**0.79**
2.0	120	0.40	66	0.835	0.333	1.782	0.504	0.436	**0.28**
2.5	120	0.15	16	0.965	0.289	0.432	0.054	0.775	**0.10**
2.5	120	0.30	19	1.109	0.250	0.513	0.081	0.550	**0.08**
2.5	120	0.30	19	1.253	0.217	0.513	0.081	0.550	**0.06**
2.5	120	0.30	18	1.397	0.191	0.486	0.072	0.550	**0.04**
2.5	120	1.30	14	1.541	0.169	0.378	0.036	0.160	**0.01**

TOTAL SETTLEMENT UNDER CENTER OF RECTANGULAR FOOTING = 3.77 IN.

EMBANKMENT AND SOIL PROFILE



Illinois Department of Transportation

COHESIVE SOIL SETTLEMENT ESTIMATE

LOCATION AND BORING USED ====: IL 132 Dry Land Bridge BSB-10
TYPE OF SURCHARGE ================================ 3 (1=2:1 bridge cone, 2=continuous embank., 3=rectangular surch.)
DEPTH TO WATER TABLE (below top of existing embankment) == 0 FT

NEW EMBANKMENT:
- NEW EMBANKMENT FILL UNIT WEIGHT ========== 120 PCF
- NEW EMBANKMENT FILL HEIGHT ========== 6 FT
- PROPOSED WIDTH AT TOP ========== 50 FT
- PROPOSED WIDTH AT BOTTOM ========== 50 FT (which is a MUST EQU
- PROPOSED LENGTH OF RECTANGULAR SURCHARGE=== 10 FT

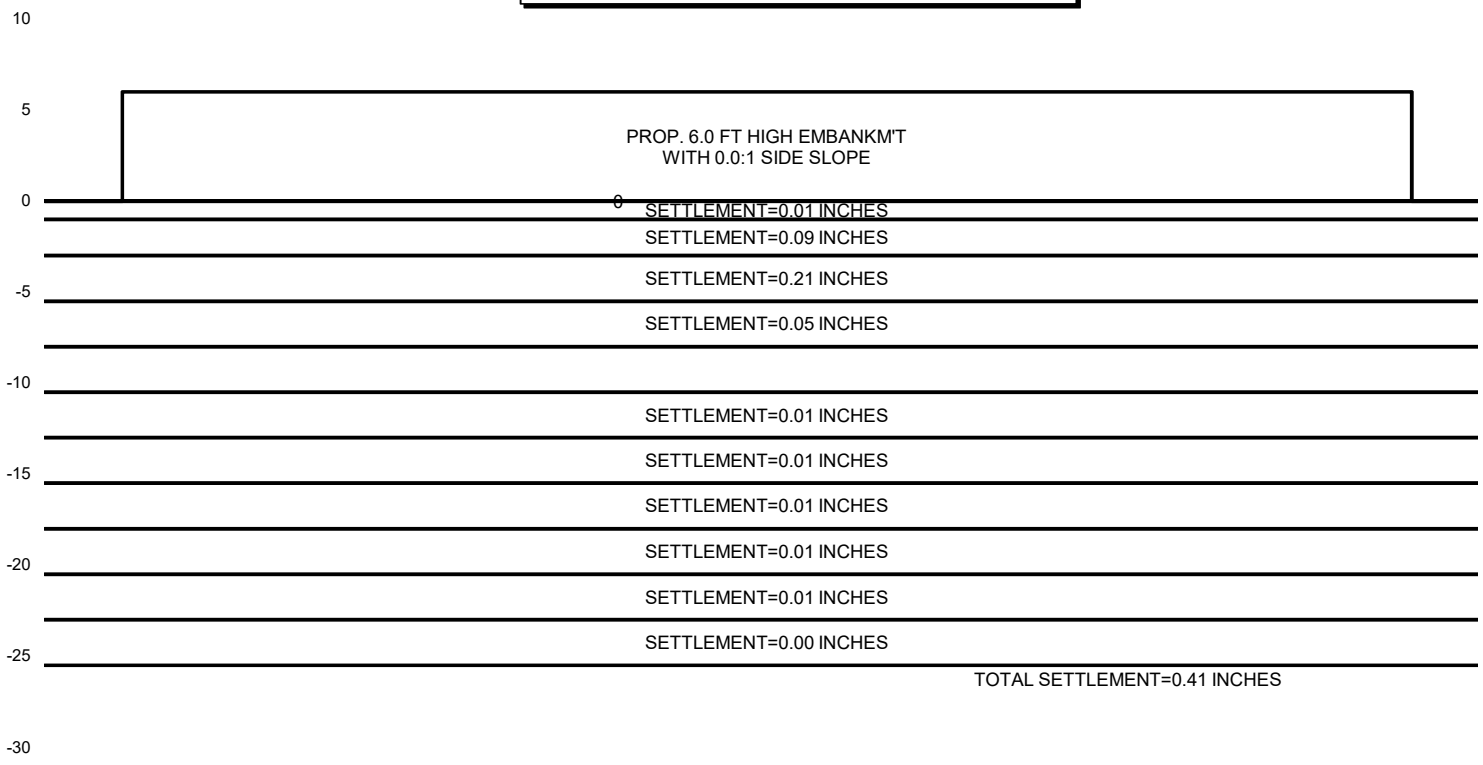
EXISTING EMBANKMENT (IF ANY):
- EXISTING EMBANKMENT UNIT WEIGHT ========== PCF
- EXISTING EMBANKMENT HEIGHT ========== FT
- EXISTING WIDTH AT TOP ========== FT
- EXISTING WIDTH AT BASE ========== FT (which is a 0.0:1 slope)
- EXISTING LENGTH OF RECTANGULAR SURCHARGE========== FT

ASSUMPTIONS:
- Soil Deposit is Normally Consolidated
- Cohesive Layers are Saturated
- Soils have a Low Sensitivity
- Liquid Limit (LL)=Moist. Content (MC%)
- Initial Void Ratio (Eo)=2.7*(MC%)/100
- Comp. Index (Cc)=0.009*(LL-10)
- Neglecting Granular & Secondary Settlem't

LAYER THICK (FT)	*TOTAL UNIT WT. (PCF)*	*UNCONF. COMP. STRENGTH (Qu) (TSF)*	*MOIST. CONTENT (%)*	*EXISTING PRESSURE (KSF)*	*PRESSURE INCREASE (KSF)*	*INITIAL VOID RATIO*	*COMPRESSION INDEX (Cc)*	*Qu CORRECTION FACTOR*	*LAYER SETTLEMENT (IN.)*
1.0	120	2.50	11	0.029	0.720	0.297	0.009	0.100	**0.01**
2.0	120	2.50	17	0.115	0.704	0.459	0.063	0.100	**0.09**
2.5	120	1.50	27	0.245	0.623	0.729	0.153	0.142	**0.21**
2.5	120	4.50	17	0.389	0.510	0.459	0.063	0.100	**0.05**
2.5	120	3.10	6	0.533	0.416	0.162	0.000	0.100	**0.00**
2.5	120	2.80	13	0.677	0.345	0.351	0.027	0.100	**0.01**
2.5	120	2.90	15	0.821	0.290	0.405	0.045	0.100	**0.01**
2.5	120	2.20	14	0.965	0.248	0.378	0.036	0.102	**0.01**
2.5	120	1.30	15	1.109	0.214	0.405	0.045	0.160	**0.01**
2.5	120	1.80	15	1.253	0.186	0.405	0.045	0.121	**0.01**
2.5	120	4.50	11	1.397	0.164	0.297	0.009	0.100	**0.00**

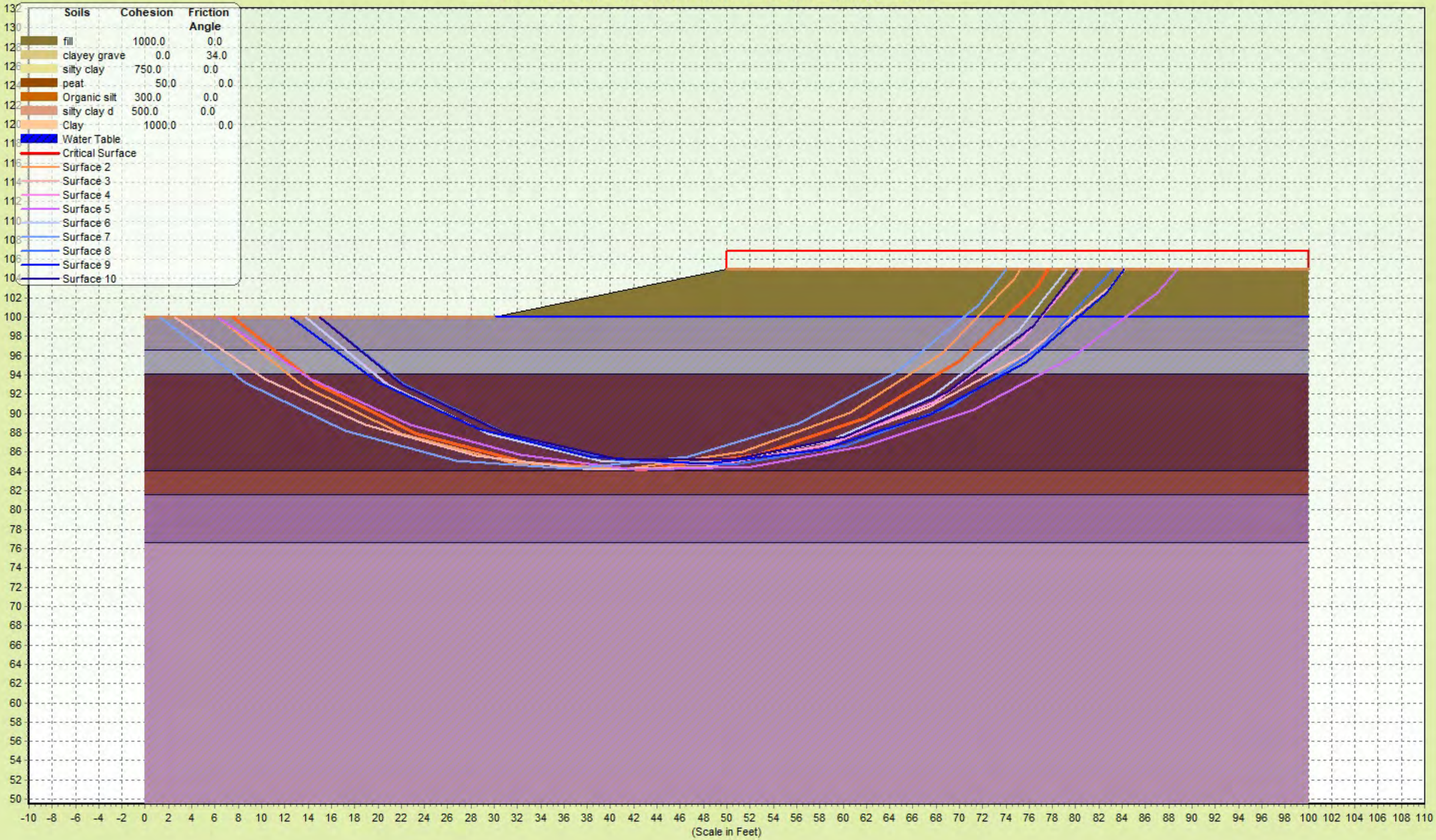
TOTAL SETTLEMENT UNDER CENTER OF RECTANGULAR FOOTING = 0.41 IN.

EMBANKMENT AND SOIL PROFILE



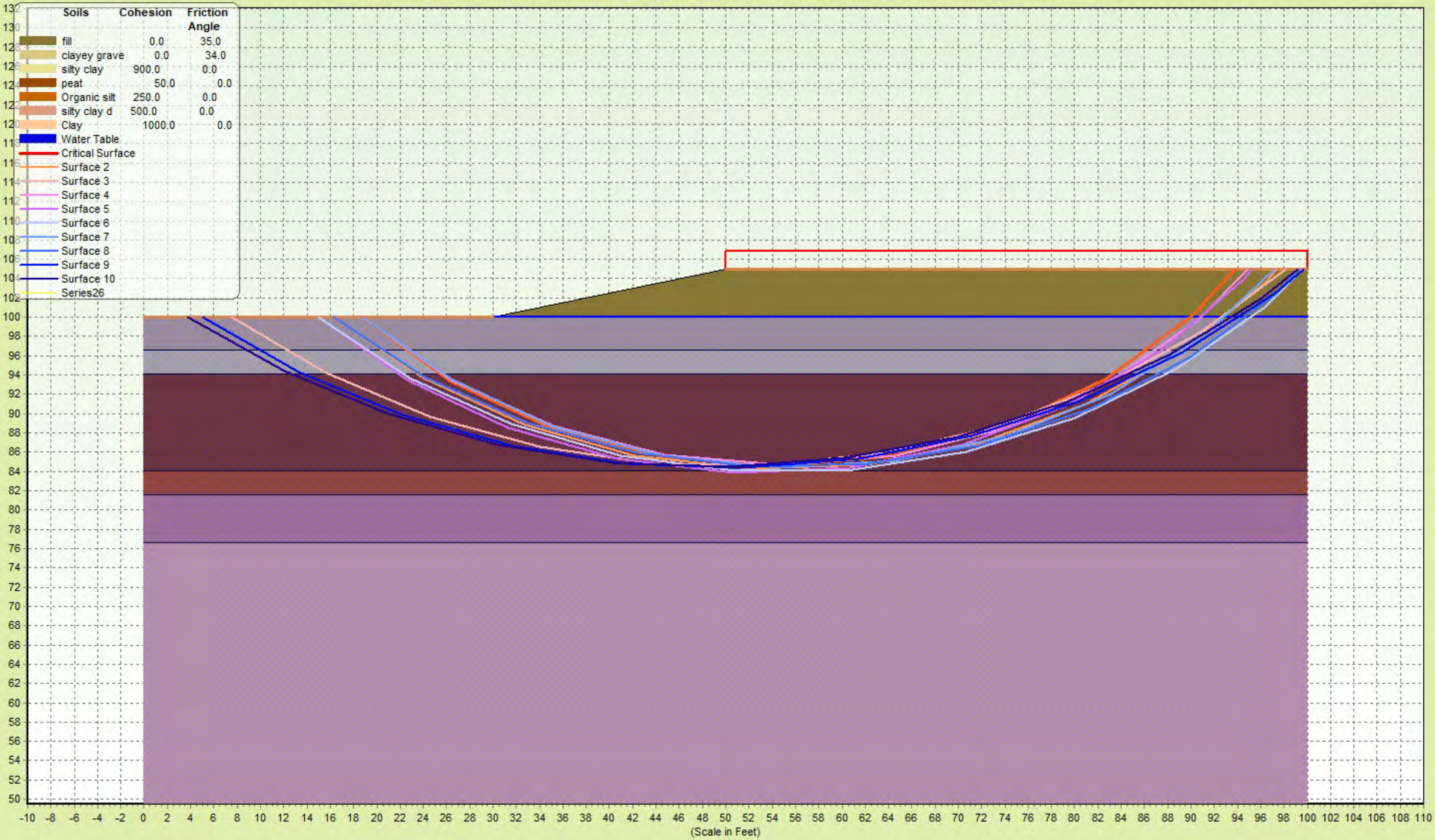
Problem: IL-132 BSB-04 Undrained - FS Min- Bishop = 1.368

Soils	Cohesion	Friction Angle
fill	1000.0	0.0
clayey grave	0.0	34.0
silty clay	750.0	0.0
peat	50.0	0.0
Organic silt	300.0	0.0
silty clay d	500.0	0.0
Clay	1000.0	0.0
Water Table		
Critical Surface		
Surface 2		
Surface 3		
Surface 4		
Surface 5		
Surface 6		
Surface 7		
Surface 8		
Surface 9		
Surface 10		



Problem: IL-132 BSB-04 Undrained_ 2 layers of geosy TRIAX TX190L - FS Min- Bishop = 1.552

Soils	Cohesion	Friction Angle
fill	0.0	35.0
clayey grave	0.0	34.0
silty clay	900.0	0.0
peat	50.0	0.0
Organic silt	250.0	0.0
silty clay d	500.0	0.0
Clay	1000.0	0.0
Water Table		
Critical Surface		
Surface 2		
Surface 3		
Surface 4		
Surface 5		
Surface 6		
Surface 7		
Surface 8		
Surface 9		
Surface 10		
Series26		



APPENDIX I
Disposition of Comments

Comments by: **IDOT** Date received: 11/05/19
IL-132 (Grand Avenue)
Proposed Structure Number SN 049-D030
IDOT Job No. D-91-116-17
FAP Route 541, Section A-W&RS-2
Lake County, IL
Geo Services SGR (10/26/18)
DISPOSITION OF COMMENTS

Spec./Item No.	Dwg. No./Page No.	Comments	Responses
Report			
1		Section 3 – *Geotechnical Evaluations and Recommendations*: The recommended treatment for settlement (under both the multi-use path and the sidewalk) is partial removal of unsuitable material and replacement with lightweight fill, while the recommended treatment for slope stability on the same locations is the installation of geogrids with CA-1 fill. These recommendations appear to be conflicting; however, since these subgrade improvements will be addressed in the Roadway Plans (according to the TSL), we ask that these recommendations are removed from the SGR.	Conflicting recommended treatments has been removed. Subgrade improvements will be addressed in the Roadway Plans and RGR. Please remove shoulder/bike path settlement improvement recommendations, since subgrade improvements (for the shoulder and bike path) will be addressed in the Roadway Plans. *Addressed.*
2		Section 4 – *Foundation Recommendations*: a. Pile Design Tables 3 and 4 need to be revised to include more entries. Also, the tables headings should not show "Maximum". b. The maximum factored resistances in Tables 3 and 4 are incorrect values since they reflect the factored resistances corresponding to the Maximum Nominal Bearing value indicated by the spreadsheets in the appendix, not the Maximum Nominal Bearing for that pile size (spreadsheet truncated the value).	Addressed and revised. These comments were not addressed in the SGR. Only the table headings were changed. The spreadsheet truncates the Maximum Nominal Required Bearing values and then the Maximum Factored Resistances do not correspond to the Maximum Nominal Bearing for the pile size. Please revise Appendix G and Tables 3 and accordingly. *Addressed and revised per discussion with Doris Gonzalez (IDOT).*
3		c. The assumed pile cutoff elevation needs to be 2 ft above the bottom of abutment cap elevation (as per the TSL). Tables 3 and 4 need to be revised to reflect this. Additionally, the inputs in the *IDOT Static Method of Estimating Pile Length* Spreadsheet need to be revised to reflect the following: i. The "Pile Cutoff Elevation" and the "Ground Surface Elevation Against Pile During Driving" are not the same. ii. "Total Length of Substructure (along skew)" input does not agree with the TSL.	Addressed and revised.
4		Appendix G – *Pile Capacity Tables and Spreadsheets*: a. The Pile Design Tables need to show the piles driven to their Maximum (IDOT Maximums) Nominal Required Bearing. Tables 3 and 4 of the SGR need to be revised to reflect this. b. There is a note regarding a wall footing and some pile sleeves at the bottom of the Pile Tables. Please delete this note from the SGR.	Addressed and revised.
5		Settlement and slope stability calculations should be included in the appendices section.	Included. See Appendix H of the SGR.
By: Richard Realeza			Date: 11/11/19