STRUCTURE GEOTECHNICAL REPORT

BRIDGE REPLACEMENT
I-72 OVER I-57

Section (10-33HB-2)BR
Champaign County, Illinois
Job No. P-95-008-21
Contract No. 70254
PTB 201-035
Existing Structure No. 010-0034 (EB)/010-0035 (WB)
Proposed Structure No. 010-0296 (EB)/010-0297 (WB)

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March 2024

Table of Contents

Appendices

1.0 Project Description and Scope

1.1 Introduction

The geotechnical investigation summarized herein was performed for the proposed bridges at I-72 over I-57 in Champaign County, Illinois. See Appendix A for Location Map. The purpose of this report is to provide geotechnical design and construction recommendations to aid in the structure planning, final design plans and specification preparation.

1.2 Existing Structure Information

Built in 1965, the existing dual structures (SN 010-0034 EB and SN 010-0035 WB) were originally constructed as a four span continuous steel beam superstructure on pile supported stub abutments and reinforced concrete three column hammerhead piers founded on spread footings. In 1988, the wearing surface and bridge railings were replaced and the deck carrying shoulders were replaced and widened. The face to face of parapets width varies from 48'-0" to 52'-1⅛" with 3'-0" outer and 5'-0" inner shoulders, two 12'-0" thru lanes and a varying width acceleration/deceleration lane for adjacent ramps. Both structures are 260'-0" back-to-back of abutments with a 1°-22'-45" right ahead skew to the local tangent and are located on a 1,800-foot crest vertical curve. The reconstructed superstructure consists of 9 composite steel beam lines of 36WF160. The reinforced concrete deck thickness is 7".

SN 010-0034 has a sufficiency rating of 64.2 with a deck rating of 4 in poor condition with advanced deterioration, superstructure rating of 4 in poor condition with advanced deterioration, and a substructure rating of 6 in satisfactory condition with minor deterioration.

SN 010-0035 has a sufficiency rating of 63.6 with a deck rating of 4 in poor condition with advanced deterioration, superstructure rating of 4 in poor condition with advanced deterioration, and a substructure rating of 6 in satisfactory condition with minor deterioration.

1.3 Proposed Structure Information

The proposed replacement structures are 4 span bridges with W33 rolled steel beams supporting an 8" concrete deck on a 1°-22'-45" right ahead skew. Proposed back-to-back abutment lengths are 272'-4" with span lengths of 51'-10" – 84'-4" – 84'-4" – 51'-10". The structures consist of 9 beams with 6 spaces at 7'-1" and 2 spaces at 10'-2 ⅜" to 14'-2" (varies), for an overall width of 58'-10" to 62'-10" (varies) out-to-out. The roadway cross sections consist of a 6'-0" shoulder, 16'-0' to 20'-0" merge lane, 24'-0" roadway, and 10'-0" shoulder. The structures will be replaced utilizing cross over traffic lanes. For further proposed structure information, see Appendix B for Type, Size, and Location Plan (TS&L).

2.0 Field Exploration

2.1 Subsurface Exploration and Testing

The subsurface investigation consisted of 10 borings (EB-1 through EB-5, and WB-1 through WB-5) drilled by Millennia Professional Services on 11/10/2022. EB-1, EB-2, WB-1, and WB-2 were taken near the west abutment of the structures, WB-3 and EB-3 were taken in the I-57 Median, and EB-4, EB-5, WB-4, and WB-5 were taken near the east abutment of the structures. Soil boring

exploration was performed using a hollow stem auger and/or mud rotary drilling techniques. See Appendix C for Subsurface Data Profile Plot and Appendix D for Soil Boring.

Table 2.1 - Boring Log Summary

Location	Boring No.	Station	Offset	Ground Surface Elevation
SN 010-0296	EB-1	1958+80 (I-72)	17' RT - CL I-72	760.8
SN 010-0296	EB-2	481+25 (I-57)	75' LT - CL I-57	739.8
SN 010-0296	EB-3	480+25 (I-57)	7' LT - CL I-57	737.7
SN 010-0296	EB-4	481+25 (I-57)	78' RT - CL I-57	739.8
SN 010-0296	EB-5	1962+50 (I-72)	18' RT - CL I-72	760.3
SN 010-0297	WB-1	1958+80 (I-72)	17' LT - CL I-72	760.6
SN 010-0297	WB-2	482+40 (I-57)	74' LT - CL I-57	740.1
SN 010-0297	WB-3	481+45 (I-57)	3' LT - CL I-57	739.9
SN 010-0297	WB-4	482+30 (I-57)	75' RT - CL I-57	740.0
SN 010-0297	WB-5	1962+50 (I-72)	18' LT - CL I-72	760.1

2.2 Subsurface Conditions

The groundwater conditions at each soil boring varies. See Table 2.2 below. Temperature, seasonal variations, and recent rainfall conditions may influence the levels of groundwater table. Without extended periods of observation, the measurement of groundwater conditions herein may not give a true indication of typical groundwater levels. Volume of water depends on the permeability of the soils.

Table 2.2 – Groundwater Conditions Summary

Location	Boring No.	First Encounter	Upon Completion	After 24 Hours
SN 010-0296	EB-1	682.8	720.8	-----
SN 010-0296	EB-2	726.8	-----	-----
SN 010-0296	EB-3	-----	-----	-----
SN 010-0296	EB-4	-----	-----	-----
SN 010-0296	EB-5	721.3	720.3	-----
SN 010-0297	WB-1	707.6	-----	-----
SN 010-0297	WB-2	714.1	-----	-----
SN 010-0297	WB-3	700.9	-----	-----
SN 010-0297	WB-4	-----	-----	-----
SN 010-0297	WB-5	734.1	-----	-----

SN 010-0296 – Borings EB-1 and EB-5 encountered Silty Clay to Silty Clay Loam for approximately the first 80 feet of drilling with SPT (N) values from 5 to 20, Qu values of 1.2 to NC (no recovery) and moisture contents ranging between 9% and 22%. From Depths 80 to 100 feet the soil was Silty Loam to Silty Clay Loam, with SPT (N) Values from 59 to 50/2", Qu values of 1.5 to NC, and moisture contents ranging between 6% to 13%.

Borings EB-2, EB-3, and EB-4 encounters Silty Clay and Silty Clay Loam to approximately 55 feet of drilling, with SPT (N) values from 4 to 26, Qu values of 1.4 to 8.1, and moisture contents ranging between 7% and 27%. Between 55 and 75 feet of drilling the soil was Silty Clay and Silty Clay Loam, with SPT (N) values from 43 to 93, Qu values of 3.5 to 11.3, and moisture contents ranging between 9% and 17%. From 75 to 100 feet of drilling the soils varied from Sand, Silt, and Sandy Loam, with SPT (N) values from 50/5.5" to 50/3", Qu values of NC, and with no recovery on most moisture contents, moisture contents that were able to be recovered ranged from 18% to 20%.

SN 010-0297 – Borings WB-1 and WB-5 encountered Silty Clay to Silty Clay Loam for approximately the first 80 feet of drilling with SPT (N) values from 7 to 22, Qu values of 1.4 to NC (no recovery) and moisture contents ranging between 11% and 27%. From Depths 80 to 100 feet the soil was Silty Loam to Silty Clay Loam, with SPT (N) Values from 51 to 50/3.5", Qu values of 8.7 to NC, and moisture contents ranging between 10% to 18%.

Borings WB-2, WB-3, and WB-4 encounters Silty Clay and Sand to approximately 55 feet of drilling, with SPT (N) values from 7 to 30, Qu values of 1.2 to 7.0, and moisture contents ranging between 10% and 26%. Between 55 and 75 feet of drilling the soil was Silty Clay, with SPT (N) values from 50 to 90, Qu values of 5.0 to 12.1, and moisture contents ranging between 8% and 18%. From 75 to 100 feet of drilling the soils varied from Sand, Silt, and Sandy Clay, with SPT (N) values from 44 to 50/2.5", Qu values of 1.4 to NC, and with moisture contents that ranged from 18% to 23%.

For a more detailed representation of the subsurface conditions, see Appendix C and Appendix D.

3.0 Geotechnical Evaluations and Recommendations

3.1 Settlement

Based on the provided plan and profile, the anticipated difference between the existing and proposed elevations at the abutments is less than 1 foot. From preliminary settlement calculations, the proposed structure settlement results in less than 0.4 inches. Per IDOT Geotechnical Manual Section 6.9.2, driven pile capacity need not account for downdrag if total settlement of soil around the piling is less than 0.4 inches.

Regarding settlement of approach slabs, one end of the slab is supported by the pile supported abutment. The other end of the slab is supported by the existing embankment subgrades. Provided proper compaction according to IDOT Standard Specifications is performed during construction, settlement of the approach slab is not a concern.

3.2 Slope Stability

As previously discussed herein, the difference in proposed profile grade and embankment from the existing is minimal. The proposed 1:2 (V:H) sideslopes match the existing sideslopes and the height of the proposed slope is approximately 22 feet. The critical fill is generally stiff silty clay with an average SPT (N) value of 12 and an average Qu value of 3.2 tsf. Using the general rule of thumb equation below, determine a preliminary assessment of the slope stability factor of safety (FOS).

$$FOS = 6c/\gamma h = 6(3{,}200\ psf)/[(120\ pcf)(22')] = 7.2$$

A preliminary FOS of 7.2 is greater than the minimum FOS of 1.5. As validation, no known issues or concerns are present or have been present at the existing slopes which have been in place for over 57 years. In addition, the existing piles supporting the abutments will remain in place and increase the nominal slope stability FOS by intersecting the circular failure planes. For the reasons discussed, a slope stability analysis was not performed as slope stability is not considered a concern given the circumstances at this bridge.

3.3 Seismic Considerations

LRFD Seismic Soil Site Class Definition was determined based on the methodology described in IDOT AGMU 9.1 and the IDOT BBS 149 form for Seismic Site Class Determination. See Appendix E for determination.

Further seismic parameters were determined using the figures and tables provided in AASHTO LRFD Bridge Design Specifications, Article 3.10 for Earthquake Effects, EQ. These parameters are based on a 1000 Year Return Period with a Probability of Exceedance of 7% in 75 years. See table below for a summary of seismic parameters.

Table 3.1 - Summary of Seismic Parameters

Parameter	Value
Seismic Soil Site Class	C
Spectral Acceleration Coefficient at period of 0.2 sec., Ss	0.146g
Spectral Acceleration Coefficient at period of 1.0 sec., S1	0.056g
Site Factor, Short Period, Fa	1.2
Site Factor, Long Period, Fv	1.7
Design Spectral Acceleration at 0.2 sec. (SDS)	0.175g
Design Spectral Acceleration at 1.0 sec. (SD1)	0.095g
Seismic Performance Zone	SPZ 1

The Spectral Acceleration Coefficient at T=1.0 sec. (SD1) and Seismic Performance Zone were confirmed using Bridge Manual Planning Section 2.3.10.3.

3.4 Scour

Scour is not applicable because this is a grade separation structure.

3.5 Mining Activity

Reviewing the Illinois State Geological Survey (ISGS) County Coal Data for Champaign County, no mining activity is present at the bridge location.

3.6 Lateral Load Analysis

The tables below provide soil parameters to structural engineer for lateral or displacement analysis of the foundations. The values were estimated based on the descriptions given in the soil boring logs. Full cohesion was used with a friction angle of 0 degrees for cohesive soils. No specific analyses were performed on the soil to determine the estimated parameters.

Table 3.2 – Soil Parameters for Lateral Load Analysis at SN 010-0296 W Abut. (EB-1)

Soil Description	γ (pcf)	c' (psf)	θ (deg.)	K (pci)	ε_{50}
Stiff to Very Stiff Silty Clay	125	1.2	0	300	0.007
Stiff Silty Clay Loam	125	2.3	0	300	0.007
Medium Stiff Silty Clay	125	1.7	0	300	0.007
Stiff to Very Stiff Silty Clay Loam	125	2.1	0	300	0.007
Medium Stiff to Very Stiff Silty Clay	125	1.9	0	300	0.007
Hard Silty Clay Loam	130	12.1	0	500	0.005
Hard Silt Loam	145	0.0	35	-	0.001

Table 3.3 – Soil Parameters for Lateral Load Analysis at SN 010-0296 Pier 1 (EB-2)

Soil Description	γ (pcf)	c' (psf)	θ (deg.)	K (pci)	ε_{50}
Stiff Silty Clay Loam	125	2.5	0	300	0.007
Medium Stiff to Stiff Silty clay	125	5.0	0	300	0.007
Very Stiff Silty Clay	125	3.4	0	300	0.007
Hard Silty Clay Loam	130	9.7	0	500	0.005
Very Dense Sand	150	0.0	45	-	0.001
Hard Silt	145	0.0	35	500	0.005
Very Dense Sand	150	0.0	45	-	0.001

Table 3.4 – Soil Parameters for Lateral Load Analysis at SN 010-0296 Pier 2 (EB-3)

Soil Description	γ (pcf)	c' (psf)	θ (deg.)	K (pci)	ε_{50}
Medium Dense Sand	125	0.0	30	300	0.007
Stiff to Very Stiff Silty Clay	125	3.3	0	300	0.007
Very Dense Sandy Loam	150	0.0	45	-	0.001
Very Dense Sand	150	0.0	45	-	0.001

Table 3.5 – Soil Parameters for Lateral Load Analysis at SN 010-0296 Pier 3 (EB-4)

Soil Description	γ (pcf)	c' (psf)	θ (deg.)	K (pci)	ε_{50}
Stiff Silty Clay Loam	125	2.9	0	300	0.007
Medium Stiff to Hard Silty Clay	125	1.9	0	300	0.007
Hard Silt	145	0.0	35	500	0.005
Very Dense Sand	150	0.0	45	-	0.001

Table 3.6 – Soil Parameters for Lateral Load Analysis at SN 010-0296 E Abut. (EB-5)

Soil Description	γ (pcf)	c' (psf)	θ (deg.)	K (pci)	ε_{50}
Stiff to Very Stiff Silty Clay Loam	125	3.4	0	300	0.007
Medium Stiff to Stiff Silty Clay	125	2.4	0	300	0.007
Medium Dense Sand	125	0.0	30	-	0.007
Stiff to Very Stiff Silty Clay	125	4.4	0	300	0.005
Hard Silty Loam	130	-	0	500	0.005
Hard Silty Clay Loam	130	12.1	0	500	0.005
Hard Silty Clay	130	10.9	0	500	0.005
Hard Silty Clay Loam	130	0.0	30	500	0.005
Very Dense Sand	150	0.0	45	-	0.001

Table 3.7 – Soil Parameters for Lateral Load Analysis at SN 010-0297 W Abut. (WB-1)

Soil Description	γ (pcf)	c' (psf)	θ (deg.)	K (pci)	ε_{50}
Stiff Silty Clay Loam	125	2.1	0	300	0.007
Stiff Silty Clay	125	3.5	0	300	0.007
Stiff Silty Clay Loam	125	3.2	0	300	0.007
Medium Stiff to Stiff Silty Clay	125	2.7	0	300	0.007
Very Stiff Silty Clay Loam	130	4.5	0	300	0.007
Stiff to Very Stiff Silty Clay	130	2.3	0	300	0.007
Soft Silty Clay Loam	120	0.2	0	100	0.01
Medium Dense Sand	125	0.0	30	-	0.007

Stiff to Very Stiff Silty Clay	130	4.9	0	300	0.007
Hard Silty Clay Loam	130	8.7	0	500	0.005
Hard Silty Clay	130	9.3	0	500	0.005

Table 3.8 – Soil Parameters for Lateral Load Analysis at SN 010-0297 Pier 1 (WB-2)

Soil Description	γ (pcf)	c' (psf)	θ (deg.)	K (pci)	ε_{50}
Stiff Silt Loam	125	0.0	30	300	0.007
Stiff to Very Stiff Silty Clay	125	3.3	0	300	0.007
Very Stiff Sandy Loam	130	0.0	30	500	0.005
Very Stiff Silty Clay	125	0.6	0	300	0.007
Very Stiff Silt	125	0.0	30	500	0.005
Very Stiff to Hard Silty Clay	130	4.5	0	500	0.005
Very Dense Sand	150	0.0	45	-	0.001
Hard Silt	145	1.4	0	500	0.005

Table 3.9 – Soil Parameters for Lateral Load Analysis at SN 010-0297 Pier 2 (WB-3)

Soil Description	γ (pcf)	c' (psf)	θ (deg.)	K (pci)	ε_{50}
Stiff Sandy Clay	125	2.4	0	300	0.007
Medium Dense Sand	125	0.0	30	-	0.007
Medium Stiff to Stiff Silty Clay	125	2.5	0	300	0.007
Medium Dense Sand	125	0.0	30	300	0.007
Stiff to Hard Silty Clay	125	3.0	0	500	0.005
Hard Silt	145	0.0	35	500	0.005
Very Dense Sand	150	0.0	45	-	0.001

Table 3.10 – Soil Parameters for Lateral Load Analysis at SN 010-0297 Pier 3 (WB-4)

Soil Description	γ (pcf)	c' (psf)	θ (deg.)	K (pci)	ε_{50}
Medium Stiff to Very Stiff Silty Clay	125	1.2	0	300	0.007
Medium Dense Sand	125	0.0	30	-	0.001
Very Stiff to Hard Silt	130	3.5	0	500	0.005
Hard Silty Clay	135	10.3	0	500	0.005
Very Dense Sand	150	0.0	45	-	0.001
Hard Silt	145	4.2	0	500	0.005
Hard Silty Clay	135	4.6	0	500	0.005

Table 3.11 – Soil Parameters for Lateral Load Analysis at SN 010-0297 E Abut. (WB-5)

Soil Description	γ (pcf)	c' (psf)	θ (deg.)	K (pci)	ε_{50}
Stiff Silty Clay	125	1.4	0	300	0.007
Stiff Sandy Clay Loam	125	4.1	0	300	0.007
Medium Stiff to Stiff Silty Clay	125	2.1	0	300	0.007
Hard Silt Loam	145	0.0	35	500	0.005
Hard Silty Clay	145	11.5	0	500	0.005

3.7 Liquefaction

According to IDOT AGMU Memo 10.1, liquefaction is not applicable in Seismic Performance Zone 1.

4.0 Foundation Recommendations

4.1 Integral Abutment Feasibility

Integral abutments are preferred to eliminate joints in the bridge decks, decreasing maintenance costs and increasing service life. The proposed structure length typically fits in the range of applicability for integral abutments; however, the soil at a critical depth of 10 feet below the abutment is very stiff (Weighted unconfined compressive strength, Qu > 3.0 tsf). According to the IDOT Bridge Manual 3.8.3-Note 21, the integral abutment study only pertains to soils with Qu less than 3.0 tsf.

To allow the use of integral abutments when Qu exceeds 3.0 tsf, the pile locations may be pre-cored to 10 ft below the bottom of abutment and backfilled with bentonite pellets, which reduces the soil pressures on the pile during expansion and contraction. To simulate the effects of bentonite, assume Qu = 1.5 tsf over the critical depth. The bentonite backfill option satisfies integral abutment applicability and is recommended at each abutment.

For results of the preliminary Integral Abutment Feasibility Analysis, see Appendix F. The designer shall verify integral abutment feasibility analysis with final configuration. Bridge Manual General Note #38 shall be placed on the appropriate abutment plan sheets. A 24" diameter precored hole shall be used for all metal shell piles. See IDOT Bridge Manual 3.8.3 for further integral abutment design guidance.

4.2 Abutment Foundation Type

Preliminary superstructure loads for the proposed structure configuration discussed above were provided by Veenstra & Kimm Inc. See tables below for total factored loads at each substructure. These loads include the approach slab and abutment self-weight.

Table 4.1 – SN 010-0296 Abut. Load

Location	Total Factored Reaction (k)
W. Abut.	1,550
E. Abut.	1,550

Table 4.2 – SN 010-0297 Abut. Load

Location	Total Factored Reaction (k)
W. Abut.	1,550
E. Abut.	1,550

Per the preliminary TS&L, integral abutments are anticipated with the bottom of the west abutment at Elev. 753.87 (W.B.) and Elev. 753.81 (E.B.) and bottom of east abutment at Elev. 753.52 (W.B.) and 753.56 (E.B.).

The use of H-piles and metal shell piles were both evaluated. While hard till is present at approximately 80 feet below the surface, the soil above provides opportunity to develop side friction and achieve sufficient axial resistance with a much shorter pile. H-piles have a smaller relative cross sectional displacement when driven and are typically considered a non-displacement pile; while metal shell piles have a larger relative cross sectional displacement when driven and are considered a more effective displacement pile. Metal shell piles will develop an equivalent required bearing at shorter pile lengths than H-piles in friction soil situations. Thus, metal shell piles are the more effective pile for the given conditions.

Tables 4.3 through 4.6 below summarize the nominal required bearing (R_N), factored resistance available (R_F), estimated pile length and estimated pile tip elevation for the strength limit state. R_N indicates the resistance of the pile during driving, which assists the Contractor from causing damage to the pile. R_F represents the net long term axial geotechnical resistance available to support the factored structure loads. The estimated pile lengths include a 2 foot embedment into the abutment. Analyses have been performed using the IDOT Static Method of Estimating Pile Length. See Appendix G.

The factored resistance available values shown in the tables are intended to provide the designer with a range of feasible options for the anticipated vertical loading. Piles shall be evaluated for lateral resistance in final design. IDOT integral abutment policy requires one pile under each beam. One test pile is recommended at each abutment location. Due to the presence of stiff cohesive materials, pile shoes (conical tips) are recommended.

Table 4.3 – Pile Capacity at SN 010-0296 West Abutment (EB-1) – Strength Limit State

Pile Size	Nominal Required Bearing, R_N (kips)	Factored Resistance Available, R_F (kips)	Estimated Pile Length (ft.)	Estimated Pile Tip Elevation (ft.)
MS 12x0.250 (Max. R_N = 392 Kips)	297	163	49	706.8
	337	185	54	701.8
	378	208	59	696.8
	392	215	62	693.8
MS 14x0.250 (Max. R_N = 459 Kips)	349	192	49	706.8
	399	219	54	701.8
	447	246	59	696.8
	459	252	62	693.8
MS 14x0.312 (Max. R_N = 570 Kips)	447	246	59	696.8
	477	263	64	691.8
	510	280	69	686.8
	527	290	74	681.8
	570	314	80	675.8
MS 16x0.312 (Max. R_N = 655 Kips)	517	285	59	696.8
	549	302	64	691.8
	586	322	69	686.8
	603	332	74	681.8
	655	360	80	675.8

Table 4.4 – Pile Capacity at SN 010-0296 East Abutment (EB-5) – Strength Limit State

Pile Size	Nominal Required Bearing, R_N (kips)	Factored Resistance Available, R_F (kips)	Estimated Pile Length (ft.)	Estimated Pile Tip Elevation (ft.)
MS 12x0.250 (Max. R_N = 392 Kips)	290	160	46	709.5
	327	180	49	706.5
	380	209	54	701.5
	392	215	56	699.5
MS 14x0.250 (Max. R_N = 459 Kips)	346	190	46	709.5
	389	214	49	706.5
	451	248	54	701.5
	459	252	56	699.5
MS 14x0.312 (Max. R_N = 570 Kips)	346	190	46	709.5
	389	214	49	706.5
	451	248	54	701.5
	523	287	59	696.5
	570	314	62	693.5
MS 16x0.312 (Max. R_N = 655 Kips)	404	222	46	709.5
	454	250	49	706.5
	525	289	54	701.5
	608	335	59	696.5
	655	360	62	693.5

Table 4.5 – Pile Capacity at SN 010-0297 West Abutment (WB-1) – Strength Limit State

Pile Size	Nominal Required Bearing, R_N (kips)	Factored Resistance Available, R_F (kips)	Estimated Pile Length (ft.)	Estimated Pile Tip Elevation (ft.)
MS 12x0.250 (Max. R_N = 392 Kips)	274	151	42	713.8
	287	158	47	708.8
	392	215	52	703.8
MS 14x0.250 (Max. R_N = 459 Kips)	324	178	42	713.8
	335	185	47	708.8
	459	252	52	703.8
MS 14x0.312 (Max. R_N = 570 Kips)	324	178	42	713.8
	335	185	47	708.8
	540	297	52	703.8
	570	314	54	701.8
MS 16x0.312 (Max. R_N = 655 Kips)	376	207	42	713.8
	384	211	47	708.8
	655	360	52	703.8

Table 4.6 – Pile Capacity at SN 010-0297 East Abutment (WB-5) – Strength Limit State

Pile Size	Nominal Required Bearing, R_N (kips)	Factored Resistance Available, R_F (kips)	Estimated Pile Length (ft.)	Estimated Pile Tip Elevation (ft.)
MS 12x0.250 (Max. R_N = 392 Kips)	271	149	43	712.5
	319	175	48	707.5
	366	201	53	702.5
	392	215	55	700.5
MS 14x0.250 (Max. R_N = 459 Kips)	323	178	43	712.5
	379	208	48	707.5
	434	239	53	702.5
	459	252	55	700.5
MS 14x0.312 (Max. R_N = 570 Kips)	379	208	48	707.5
	434	239	53	702.5
	490	269	58	697.5
	545	300	63	692.5
	570	314	70	685.5
MS 16x0.312 (Max. R_N = 655 Kips)	441	242	48	707.5
	504	277	53	702.5
	567	312	58	697.5
	631	347	63	692.5
	655	360	70	685.5

4.3 Pier Foundation Type

Preliminary superstructure loads for the proposed structure configuration discussed above were provided by Veenstra & Kimm Inc. See tables below for total factored loads at each substructure including self weight.

Table 4.7 – SN 010-0296 Pier Load

Location	Total Factored Reaction (k)
Pier 1	3,000
Pier 2	3,400
Pier 3	3,000

Table 4.8 – SN 010-0297 Pier Load

Location	Total Factored Reaction (k)
Pier 1	3,000
Pier 2	3,400
Pier 3	3,000

A shallow foundation (spread footing) and deep foundation (pile supported spread footing) were investigated for the proposed pier foundation type. While the existing piers are founded on spread footings, the proposed design vertical and lateral loadings including the 600 kip vehicular collision force are greater than the existing design conditions. Thus, a pile supported footing is anticipated to be more adequately suited foundation type. In addition, driven piles are recommended at the abutments so pile driving equipment will already be mobilized.

Per the preliminary TS&L, the proposed piers are multi-column with 2 rows of piles in the footing with the bottom of footing near the bottom of existing pier footing. The number of pile rows shall be verified in final design. Similar to the abutments, metal shell piles are considered more effective than H-Piles for the given conditions.

Tables 4.9 through 4.14 below summarize the nominal required bearing (R_N), factored resistance available (R_F), estimated pile length and estimated pile tip elevation. R_N indicates the resistance of the pile during driving, which assists the Contractor from causing damage to the pile. R_F represents the net long term axial geotechnical resistance available to support the factored structure loads. The estimated pile lengths include a 1 foot embedment into the pier footing. Analysis has been performed using the IDOT Static Method of Estimating Pile Length. See Appendix G.

The factored resistance available values shown in the tables are intended to provide the designer with a range of feasible options for the anticipated vertical loading. Piles shall be evaluated for lateral resistance in final design. One test pile is recommended at each pier location. Due to the presence of stiff cohesive materials, pile shoes (conical tips) are recommended.

Table 4.9 – Pile Capacity at SN 010-0296 Pier 1 (EB-2) – Strength Limit State

Pile Size	Nominal Required Bearing, R_N (kips)	Factored Resistance Available, R_F (kips)	Estimated Pile Length (ft.)	Estimated Pile Tip Elevation (ft.)
MS 12x0.250 (Max. R_N = 392 Kips)	301	165	27	705.5
	326	179	32	700.5
	354	195	37	695.5
	392	215	38	694.5
MS 14x0.250 (Max. R_N = 459 Kips)	359	198	27	705.5
	384	211	32	700.5
	416	229	37	695.5
	459	252	38	694.5
MS 14x0.312 (Max. R_N = 570 Kips)	384	211	32	700.5
	416	229	37	695.5
	488	269	42	690.5
	570	314	48	684.5
MS 16x0.312 (Max. R_N = 655 Kips)	442	243	32	700.5
	479	264	37	695.5
	568	312	42	690.5
	655	360	48	684.5

Table 4.10 – Pile Capacity at SN 010-0296 Pier 2 (EB-3) – Strength Limit State

Pile Size	Nominal Required Bearing, R_N (kips)	Factored Resistance Available, R_F (kips)	Estimated Pile Length (ft.)	Estimated Pile Tip Elevation (ft.)
MS 12x0.250 (Max. R_N = 392 Kips)	285	157	39	693.5
	321	176	44	688.5
	348	191	49	683.5
	392	215	54	678.5
MS 14x0.250 (Max. R_N = 459 Kips)	335	184	39	693.5
	379	209	44	688.5
	409	225	49	683.5
	459	252	54	678.5
MS 14x0.312 (Max. R_N = 570 Kips)	335	184	39	693.5
	379	209	44	688.5
	409	225	49	683.5
	570	314	54	678.5
MS 16x0.312 (Max. R_N = 655 Kips)	386	212	39	693.5
	439	241	44	688.5
	471	259	49	683.5
	655	360	54	678.5

Table 4.11 – Pile Capacity at SN 010-0296 Pier 3 (EB-4) – Strength Limit State

Pile Size	Nominal Required Bearing, R_N (kips)	Factored Resistance Available, R_F (kips)	Estimated Pile Length (ft.)	Estimated Pile Tip Elevation (ft.)
MS 12x0.250 (Max. R_N = 392 Kips)	248	136	37	695.5
	311	171	42	690.5
	332	182	47	685.5
	392	215	52	680.5
MS 14x0.250 (Max. R_N = 459 Kips)	292	161	37	695.5
	374	205	42	690.5
	391	215	47	685.5
	459	252	52	680.5
MS 14x0.312 (Max. R_N = 570 Kips)	292	161	37	695.5
	374	205	42	690.5
	391	215	47	685.5
	570	314	52	680.5
MS 16x0.312 (Max. R_N = 655 Kips)	337	186	37	695.5
	439	241	42	690.5
	452	248	47	685.5
	655	360	52	680.5

Table 4.12 – Pile Capacity at SN 010-0297 Pier 1 (WB-2) – Strength Limit State

Pile Size	Nominal Required Bearing, R_N (kips)	Factored Resistance Available, R_F (kips)	Estimated Pile Length (ft.)	Estimated Pile Tip Elevation (ft.)
MS 12x0.250 (Max. R_N = 392 Kips)	244	134	31	701.5
	289	159	36	696.5
	345	190	41	691.5
	392	215	45	687.5
MS 14x0.250 (Max. R_N = 459 Kips)	285	157	31	701.5
	344	189	36	696.5
	411	226	41	691.5
	459	252	45	687.5
MS 14x0.312 (Max. R_N = 570 Kips)	344	189	36	696.5
	411	226	41	691.5
	469	258	46	686.5
	570	314	51	681.5
MS 16x0.312 (Max. R_N = 655 Kips)	402	221	36	696.5
	479	264	41	691.5
	546	300	46	686.5
	655	360	51	681.5

Table 4.13 – Pile Capacity at SN 010-0297 Pier 2 (WB-3) – Strength Limit State

Pile Size	Nominal Required Bearing, R_N (kips)	Factored Resistance Available, R_F (kips)	Estimated Pile Length (ft.)	Estimated Pile Tip Elevation (ft.)
MS 12x0.250 (Max. R_N = 392 Kips)	293	161	34	698.5
	317	174	38	694.5
	358	197	42	690.5
	392	215	45	687.5
MS 14x0.250 (Max. R_N = 459 Kips)	347	191	34	698.5
	375	206	38	694.5
	425	234	42	690.5
	459	252	45	687.5
MS 14x0.312 (Max. R_N = 570 Kips)	375	206	38	694.5
	425	234	42	690.5
	479	264	47	685.5
	570	314	52	680.5
MS 16x0.312 (Max. R_N = 655 Kips)	434	239	38	694.5
	494	272	42	690.5
	556	306	47	685.5
	655	360	52	680.5

Table 4.14 – Pile Capacity at SN 010-0297 Pier 3 (WB-4) – Strength Limit State

Pile Size	Nominal Required Bearing, R_N (kips)	Factored Resistance Available, R_F (kips)	Estimated Pile Length (ft.)	Estimated Pile Tip Elevation (ft.)
MS 12x0.250 (Max. R_N = 392 Kips)	303	167	32	700.5
	345	190	39	693.5
	386	213	43	689.5
	392	215	44	688.5
MS 14x0.250 (Max. R_N = 459 Kips)	362	199	32	700.5
	411	226	39	693.5
	459	252	43	689.5
MS 14x0.312 (Max. R_N = 570 Kips)	362	199	32	700.5
	411	226	39	693.5
	459	252	43	689.5
	570	314	47	685.5
MS 16x0.312 (Max. R_N = 655 Kips)	424	233	32	700.5
	479	263	39	693.5
	533	293	43	689.5
	655	360	47	685.5

5.0 Construction Considerations

5.1 Construction Activities

All construction activities shall be performed in accordance with the current IDOT Standard Specifications for Road and Bridge Construction and any pertinent Special Provisions or Policies.

5.2 Temporary Soil Retention System / Sheet Piling

Temporary sheet piling will not be required to construct the abutments because the structures will be constructed utilizing cross over lanes. At the pier locations, the distance from ground surface to the bottom of proposed pier spread footing is approximately 5-8 feet. At Pier 2, construction of the footing appears feasible without the need for temporary retention. Though, the designer shall verify the final excavation depth and evaluate the proposed I-57 traffic staging to determine if temporary retention is required. At Piers 1 and 3, temporary soil retention systems will be necessary due to the proximity to the I-57 roadway and soil layers within the sheet piling embedment with a Qu value larger than 4.5 tsf.

5.3 Foundation Construction

Conventional pile driving equipment and methodologies shall be assumed.

5.4 Excavation

Excavation shall be performed in accordance with IDOT Standard Specifications Section 202. Substructure construction shall occur after removal of the existing structure is complete.

A Joint Utility Locating Information for Excavators (J.U.L.I.E.) locate shall be performed prior to commencing construction activities to determine underground utilities within the project limits. In addition, IDOT shall be contacted to locate private utilities.

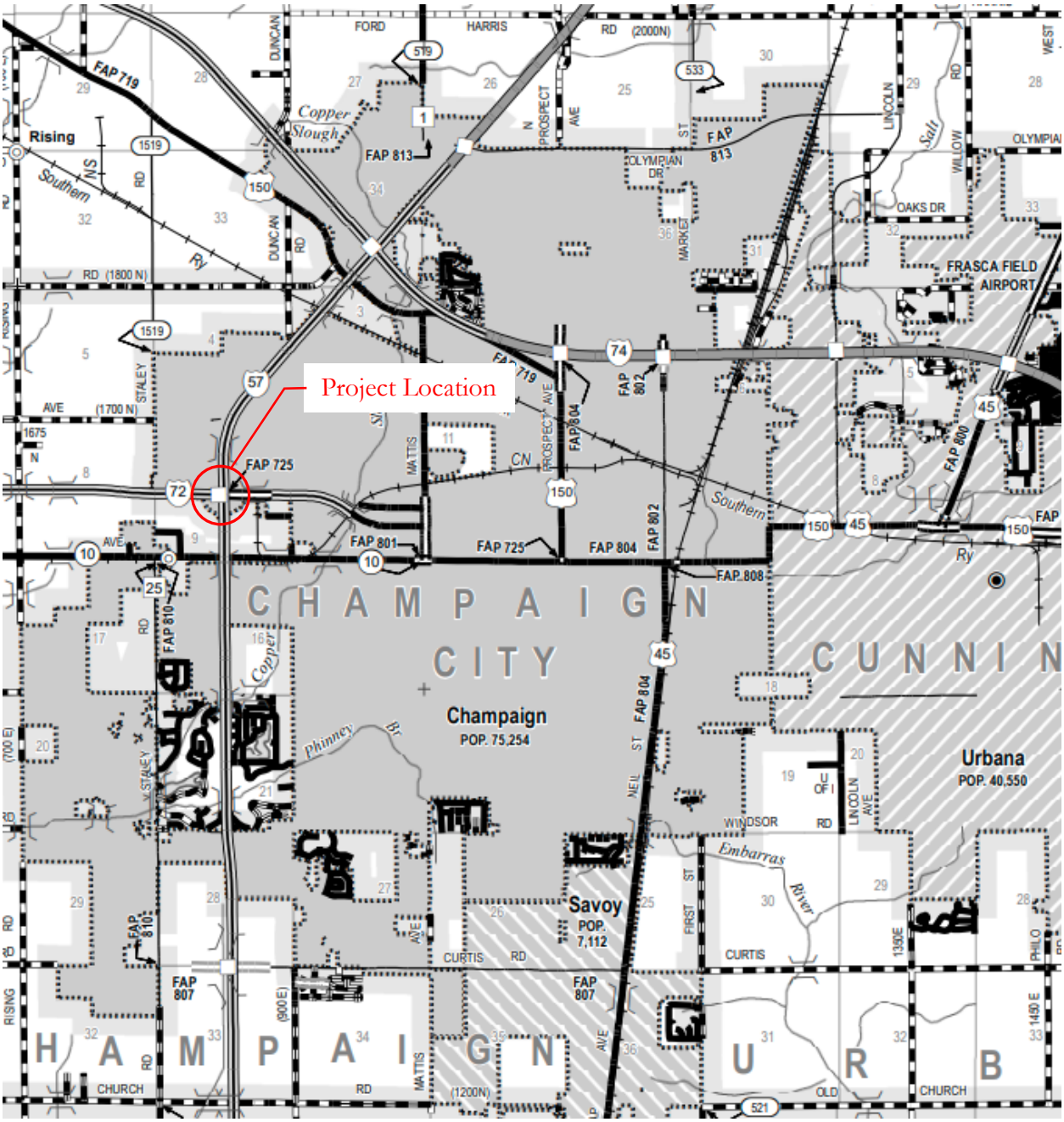
At foundation and structural fill locations, the exposed subgrade shall be proofrolled to aid in locating any unstable and unsuitable materials. Unstable and unsuitable materials shall be removed and replaced with compacted structural fill.

6.0 Limitations

The analysis and discussion provided herein are for the exclusive use of IDOT and Veenstra & Kimm Inc. They are based upon the subsurface data obtained at boring locations within the bridge area and are specific to the project described, our understanding of the project as described herein, and geotechnical engineering practice consistent with the standard of care.

Appendix A

Location Map



Location Map

I-72 over I-57

Champaign County, Illinois

Appendix B

Type, Size, and Location Plan (TS&L)

Bench Mark: BM #5050–1: Chiseled "□" in center ofeast headwall of across road culvert on NB FAI 57
in the NE quadrant of the interchange. Sta. 483+50.16, 91.88' Rt., Elevation – 736.664

Existing Structures: Structure Numbers 010–0034 (E.B.) and 010–0035 (W.B.) were originally built in 1965 as FAI Route 72, Section 10–33HB–2 at Sta. 1960+69.89. The dual structures each consist of four span continuous steel beam superstructure on pile supported stub abutments and reinforced concrete three column frame piers founded on spread footings. In 1988, the curb and railing were replaced with a new parapet. The face–face of parapets width varies from 48'–0" to 52'–1⅛". Both structures are 260'–0" back–to–back of abutments. Structures to be removed and replaced.

Traffic to be maintained utilizing cross overs.

No salvage.

LOADING HL–93

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

DESIGN SPECIFICATIONS

2020 AASHTO LRFD Bridge Design Specifications, 9th Edition.

DESIGN STRESSES

FIELD UNITS

f'_c = 3,500 psi
f'_c = 4,000 psi (Superstructure Concrete)
f_y = 60,000 psi (Reinforcement)
*f_y = 50,000 psi (M270 Grade 50)
*All new structural steel shall be galvanized

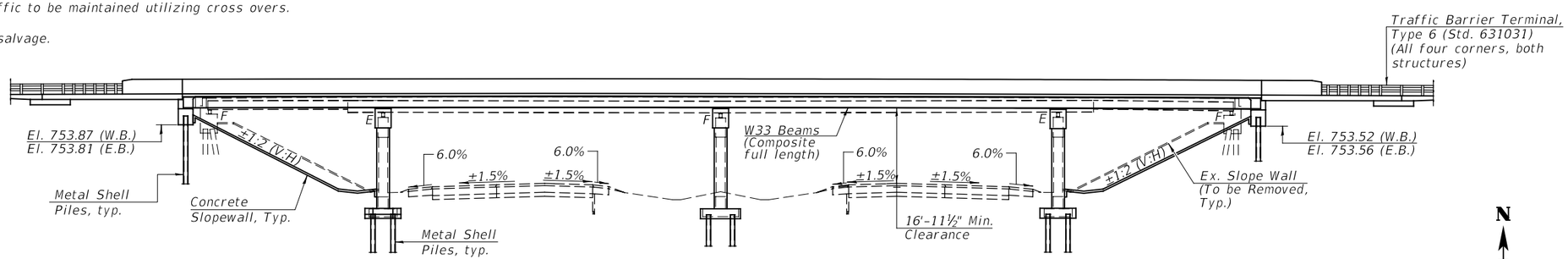
SEISMIC DATA

Seismic Performance Zone (SPZ) = 1
Design Spectral Acceleration at 1.0 sec. (SD1) = 0.175
Design Spectral Acceleration at 0.2 sec. (SDS) = 0.095
Soil Site Class = C

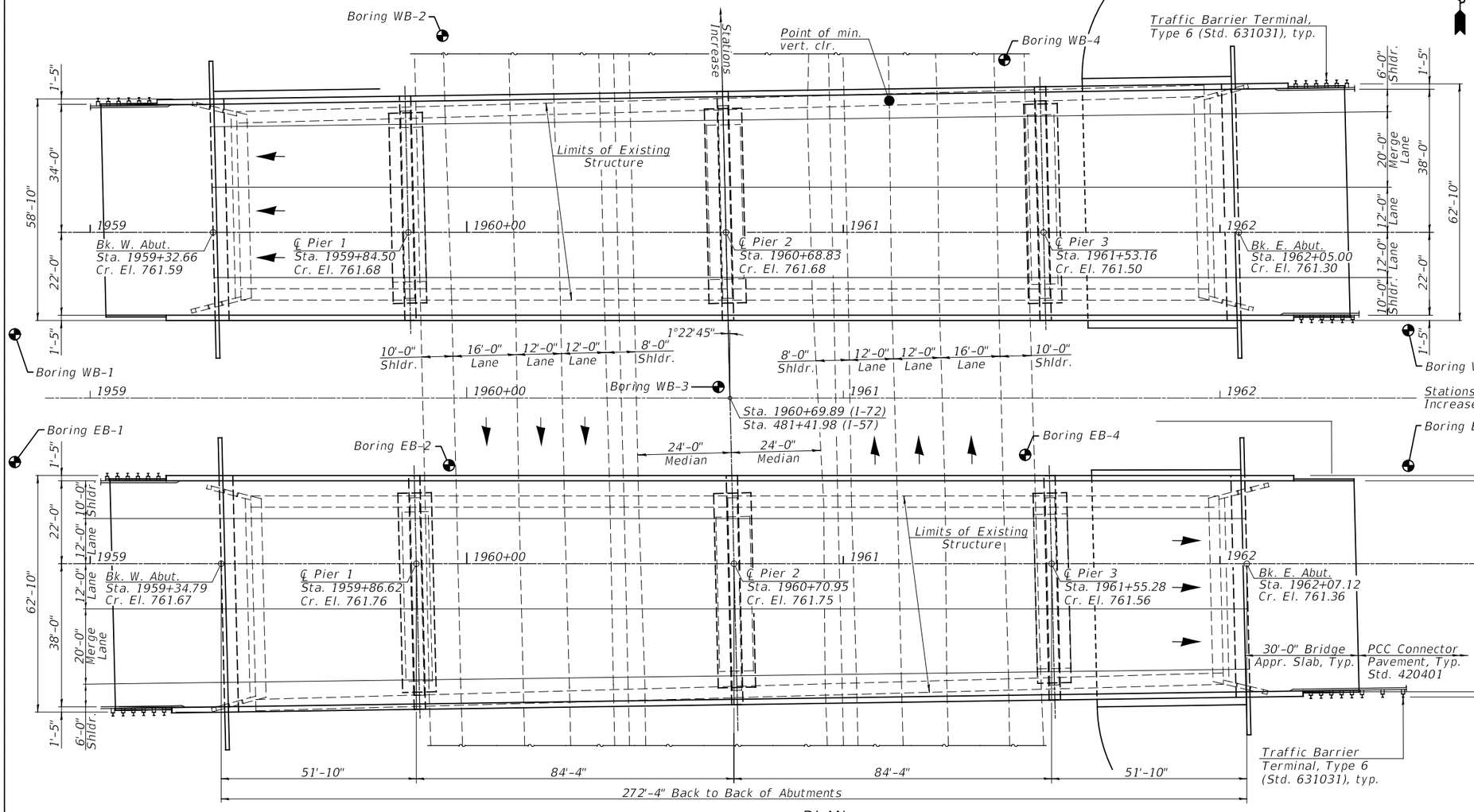
HIGHWAY CLASSIFICATION

F.A.I. Route 72 – (I–72)
Functional Class: Interstate
ADT: 8400 (2021); 9700 (2041)(One–way)
ADTT: 1478 (2021); 1707 (2041)(One–way)
DHV: 1000 (2041)
Design Speed: 55 m.p.h.
Posted Speed; 55 m.p.h.
One–way traffic
Directional Dist.: 100

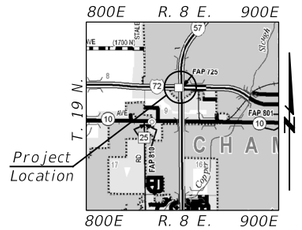
F.A.I. Route 57 – (I–57)
Functional Class: Interstate
ADT: 43000 (2021); 53300 (2041)
ADTT: 9417 (2021); 11673 (2042)
DHV: 4235 (2041)
Design Speed: 70 m.p.h.
Posted Speed; 70 m.p.h.
One–way traffic
Directional Dist.: 100



ELEVATION



PLAN



LOCATION SKETCH

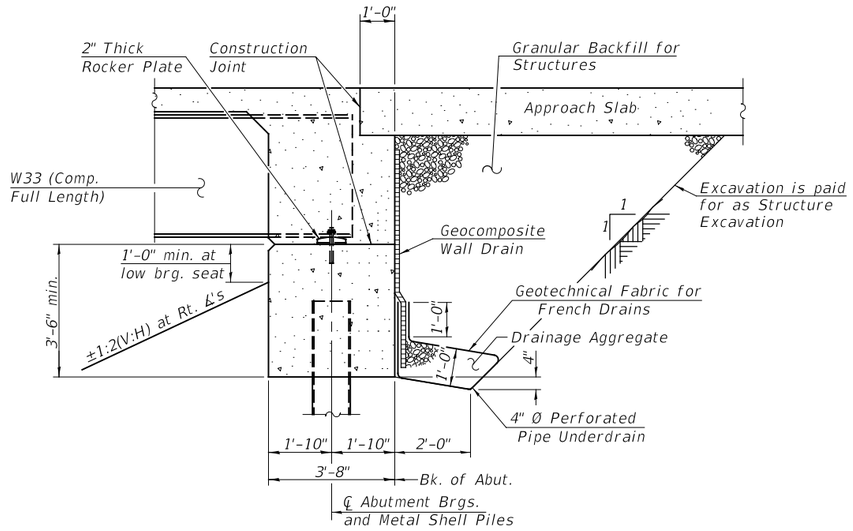
GENERAL PLAN & ELEVATION
I–72 OVER I–57
F.A.I. ROUTE 72 – SECTION (10–33HB–2)BR
CHAMPAIGN COUNTY
STATION 1960+69.89
STRUCTURE NO. 010–0296 (E.B)
STRUCTURE NO. 010–0297 (W.B)

VEENSTRA & KIMM INC. Springfield, IL. Phone: (217)544-8033 IL. Design Firm No. 184-001939	USER NAME = ___	DESIGNED – ___	REVISED – ___
		CHECKED – ___	REVISED – ___
	PLOT SCALE = ___	DRAWN – ___	REVISED – ___
	PLOT DATE = ___	CHECKED – ___	REVISED – ___

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

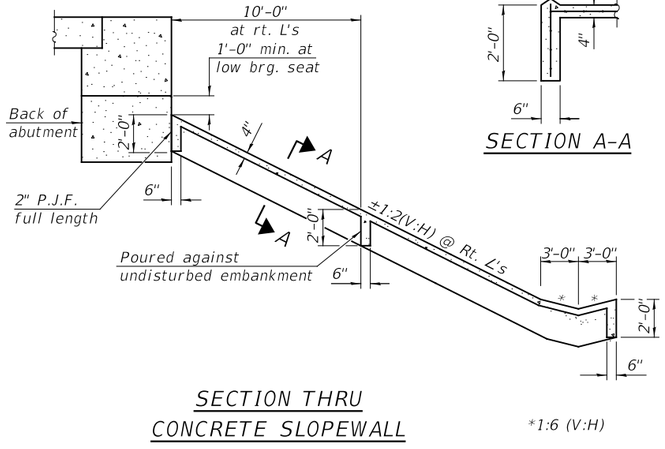
GENERAL PLAN & ELEVATION
STRUCTURE NO. 010–0296 (E.B.) &010–0297 (W.B.)
SHEET NO. 1 OF 2 SHEETS

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
72	(10–33HB–2)BR	CHAMPAIGN	___	___
		CONTRACT NO. 70254		
	ILLINOIS FED. AID PROJECT			



SECTION THRU INTEGRAL ABUTMENT

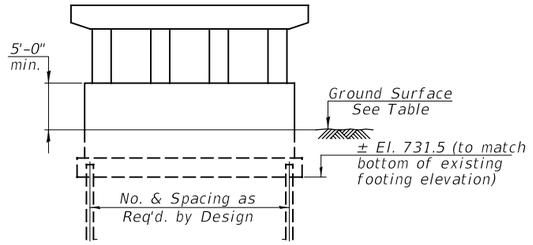
(Horiz. dim. @ Rt. L's)



SECTION THRU CONCRETE SLOPEWALL

*1:6 (V:H)

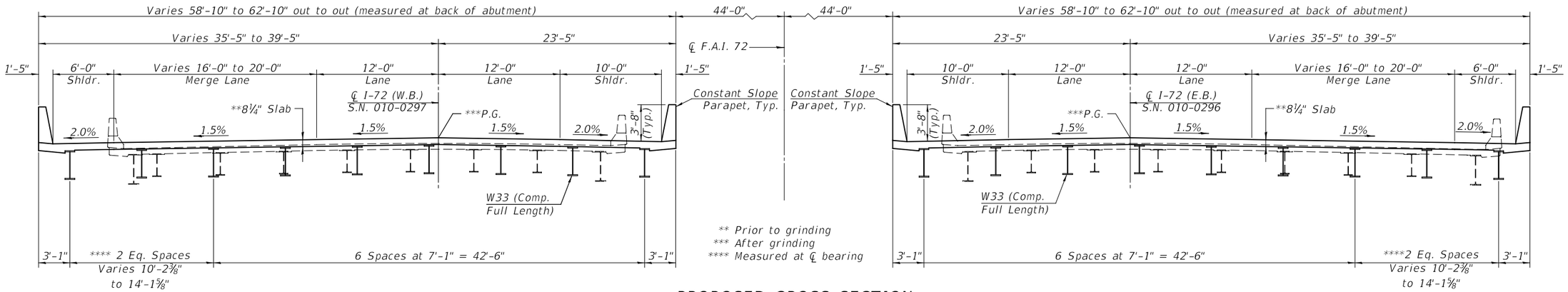
SECTION A-A



PIER SKETCH

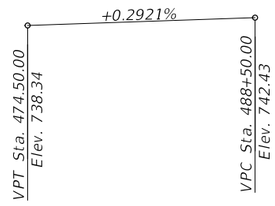
GROUND ELEV. AT PIERS

W.B. Pier 1	El. 739.7
W.B. Pier 2	El. 739.0
W.B. Pier 3	El. 739.7
E.B. Pier 1	El. 738.8
E.B. Pier 2	El. 738.8
E.B. Pier 3	El. 739.3



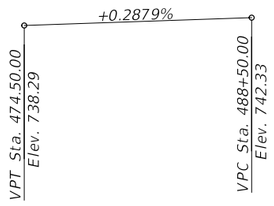
PROPOSED CROSS SECTION

(Looking East)



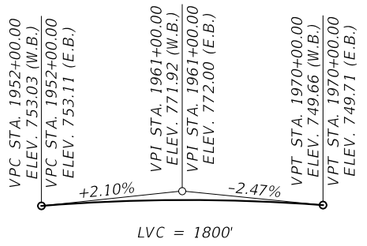
PROFILE GRADE

(Along NB I-57)
(Centerline of Thru Lanes)
(Stations increase South to North)



PROFILE GRADE

(Along SB I-57)
(Centerline of Thru Lanes)
(Stations increase South to North)



PROFILE GRADE

DETAILS
I-72 OVER I-57
F.A.I. ROUTE 72 - SECTION (10-33HB-2)BR
CHAMPAIGN COUNTY
STATION 1960+69.89
STRUCTURE NO. 010-0296 (E.B)
STRUCTURE NO. 010-0297 (W.B)

Veenstra & Kimm, Inc.
Springfield, IL. Phone: (217)544-8033

USER NAME = ___	DESIGNED - ___	REVISED - ___
	CHECKED - ___	REVISED - ___
PLOT SCALE = ___	DRAWN - ___	REVISED - ___
PLOT DATE = 8-4-2020	CHECKED - ___	REVISED - ___

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

GENERAL DETAILS
STRUCTURE NO. 010-0296 (E.B.) & 010-0297 (W.B.)
SHEET NO. 2 OF 2 SHEETS

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
	(10-33HB-2)BR	CHAMPAIGN	___	___
		CONTRACT NO. 70254		
	ILLINOIS FED. AID PROJECT			

Appendix C

Subsurface Data Profile Plot

LEGEND

EL = Elevation (FT)
D = Depth Below Existing Ground Surface (FT)
N = SPT N-VALUE (AASHTO T206)
Qu = Unconfined Compressive Strength in tons per sq. ft. (tsf)
Failure Mode (B=bulge, S=shear, P=penetrometer)

W% = Moisture Content Percentage
R% = Recovery Percentage
RQD% = Rock Quality Designation Percentage

▼ = Groundwater Level First Encountered
▽ = Groundwater Upon Completion
▽ = Groundwater After 24 to 72 hours

Soil profile is for illustrative purposes only. Actual conditions will vary.

Boring EB-1 (I-72)
STA 1958+80
OFFSET 17 FT LT
EL 760.8 FT
12/19/22

EL	D	N	Qu	W%	R%	RQD%
760.8 Brown, stiff to very stiff, dry, SILTY CLAY		20	2.9 B	11		
	5	13	1.2 B	11		
		11	4.0 B	13		
750.30 Brown and grey, stiff, dry, SILTY CLAY LOAM	10	12	4.0 S	15		
		13	2.3 B	16		
	15	11	4.1 B	13		
		–	–	13		
740.30 Brown and grey, medium stiff, dry, SILTY CLAY	20	11	3.6 B	16		
		5	2.7 B	22		
735.30 Brown, stiff to very stiff, dry, SILTY CLAY LOAM	25	5	1.7 B	16		
		13	5.2 B	13	–	–
	30	14	4.8 B	15	–	–
		–	–	–	–	–
	35	24	2.1 B	13	–	–
724.05 Grey, medium stiff to very stiff, dry to moist, SILTY CLAY		–	–	–	–	–
▼	40	9	2.9 B	13	–	–
		–	–	–	–	–
	45	8	3.2 B	12	–	–
		–	–	–	–	–
	50	24	NC	–	–	–
		–	–	–	–	–
	55	21	1.7 B	12	–	–
		–	–	–	–	–
	60	13	3.4 B	12	–	–
		–	–	–	–	–
	65	10	3.4 B	12	–	–
		–	–	–	–	–
	70	27	NC	–	–	–
		–	–	–	–	–
	75	33	1.9 B	16	–	–
		–	–	–	–	–
▼	80	18	0.6 B	17	–	–
		–	–	–	–	–
	85	50/3"	1.5 B	12	–	–
674.05 Grey, hard, moist, SILTY CLAY LOAM	90	97	12.1 S	8	–	–
		–	–	–	–	–
664.05 Grey, hard, moist, SILT LOAM	95	81	12.1 S	10	–	–
		–	–	–	–	–
661.05 End of Boring	100	77	NC	13	–	–
		–	–	–	–	–
	105	–	–	–	–	–

Boring EB-2 (I-57)
STA 482+40
OFFSET 75 FT LT
EL. 739.8 FT
01/05/23

EL	D	N	Qu	W%	R%	RQD%
739.80 ASPHALT (8.0")		15	2.5 P	17		
739.14 FILL: Crushed Limestone Aggregate Base (6.0")	5	7	1.3 B	13		
738.63 Brown and grey, stiff, dry, SILTY CLAY LOAM		14	6.1 B	13		
736.8 Brown, medium stiff to stiff, dry SILTY CLAY	10	9	6.2 B	16		
▼		–	–	–		
	15	20	8.1 B	11		
		17	5.3 B	12		
719.80 Grey, very stiff, moist, SILTY CLAY, trace gravel	20	17	4.9 B	12		
		15	4.8 B	13		
	25	17	5.1 B	13		
		16	3.4 B	14	–	–
	30	23	7.7 B	12	–	–
		–	–	–	–	–
	35	20	5.0 B	12	–	–
		–	–	–	–	–
699.80 Grey, very stiff, moist, SILTY CLAY, trace gravel	40	17	2.0 B	14	–	–
		–	–	–	–	–
	45	16	1.9 B	13	–	–
		–	–	–	–	–
	50	20	5.3 B	12	–	–
		–	–	–	–	–
	55	25	NC	14	–	–
683.05 Grey, hard, dry, SILTY CLAY LOAM		–	–	–	–	–
	60	93	10.9 B	11	–	–
		–	–	–	–	–
	65	89	3.5 S	10	–	–
		–	–	–	–	–
	70	73	9.7 B	12	–	–
		–	–	–	–	–
	75	92	10.1 B	13	–	–
663.05 Grey, very dense, dry, SAND, fine grained		–	–	–	–	–
	80	50/3"	NC	–	–	–
		–	–	–	–	–
	85	50/5"	NC	–	–	–
653.05 Grey, hard, dry, SILT		–	–	–	–	–
	90	50/5.5"	NC	19	–	–
648.05 Grey, very dense, dry, SAND, fine-grained		–	–	–	–	–
	95	50/3"	NC	–	–	–
		–	–	–	–	–
640.90 End of Boring	100	50/5"	NC	–	–	–
		–	–	–	–	–
	105	–	–	–	–	–

Boring EB-3 (I-57)
STA 480+25
OFFSET 7 FT LT
EL. 737.7 FT
12/08/22

EL	D	N	Qu	W%	R%	RQD%
737.70 Brown, medium dense, dry, SAND, fine-grained		17	NC	13		
734.70 Brown to grey, stiff to very stiff, dry, SILTY CLAY	5	9	3.3 B	14		
		10	4.1 B	7		
	10	12	6.1 B	11		
		–	–	11		
	15	11	4.9 B	12		
		16	2.9 S	13		
	20	16	4.2 B	11		
		–	5.1 B	11		
	25	12	1.8 B	13		
		9	3.1 B	13	–	–
	30	11	3.6 B	15	–	–
		–	–	–	–	–
	35	4	0.5 B	18	–	–
		–	–	–	–	–
	40	10	0.9 B	13	–	–
		–	–	–	–	–
	45	17	1.5 P	14	–	–
		–	–	–	–	–
	50	21	2.9 B	14	–	–
		–	–	–	–	–
	55	26	1.8 P	16	–	–
		–	–	–	–	–
	60	86	NC	–	–	–
		–	–	–	–	–
	65	53	8.2 S	9	–	–
		–	–	–	–	–
	70	43	7.6 B	13	–	–
665.95 Grey, very dense, dry, SANDY LOAM		–	–	–	–	–
	75	50/4.5"	NC	13	–	–
660.95 Grey, very dense, dry, SAND, fine-grained		–	–	–	–	–
	80	50/5.5"	NC	–	–	–
		–	–	–	–	–
	85	50/3.5"	NC	–	–	–
		–	–	–	–	–
	90	50/5.5"	NC	–	–	–
		–	–	–	–	–
	95	50/4"	NC	–	–	–
		–	–	–	–	–
638.95 End of Boring	100	50/3"	NC	–	–	–
		–	–	–	–	–
	105	–	–	–	–	–

CIVIL DESIGN, INC.
WBE | DBE
EFFINGHAM, IL
LICENSE #184.003222

USER NAME =	DESIGNED – TAW	REVISED –	
	CHECKED – TJZ	REVISED –	
PLOT SCALE =	DRAWN – DCS	REVISED –	
PLOT DATE =	CHECKED – TJZ	REVISED –	

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

SUBSURFACE DATA PROFILE
I-72 OVER I-57 SN 010-0034 (EB)
SHEET OF SHEETS

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
72	(10-33HB-2)BR	CHAMPAIGN		
		ILLINOIS	FED. AID PROJECT	

LEGEND

EL = Elevation (FT)
D = Depth Below Existing Ground Surface (FT)
N = SPT N-VALUE (AASHTO T206)
Qu = Unconfined Compressive Strength in tons per sq. ft. (tsf)
Failure Mode (B=bulge, S=shear, P=penetrometer)

W% = Moisture Content Percentage
R% = Recovery Percentage
RQD% = Rock Quality Designation Percentage

▼ = Groundwater Level First Encountered
▽ = Groundwater Upon Completion
▽ = Groundwater After 24 to 72 hours

Soil profile is for illustrative purposes only. Actual conditions will vary.

Boring EB-3 (I-57)
STA 480+25
OFFSET 7 FT LT
EL. 737.7 FT
12/08/22

EL	D	N	Qu	W%	R%	RQD%
737.70 Brown, medium dense, dry, SAND, fine-grained		17	NC	13		
734.70 Brown to grey, stiff to very stiff, dry, SILTY CLAY	5	9	3.3 B	14		
		10	4.1 B	7		
	10	12	6.1 B	11		
		–	–	11		
	15	11	4.9 B	12		
		16	2.9 S	13		
	20	16	4.2 B	11		
		13	5.1 B	11		
	25	12	1.8 B	13		
		9	3.1 B	13	–	–
	30	11	3.6 B	15	–	–
		–	–	–	–	–
	35	4	0.5 B	18	–	–
		–	–	–	–	–
	40	10	0.9 B	13	–	–
		–	–	–	–	–
	45	17	1.5 P	14	–	–
		–	–	–	–	–
	50	21	2.9 B	14	–	–
		–	–	–	–	–
	55	26	1.8 P	16	–	–
		–	–	–	–	–
	60	86	NC	–	–	–
		–	–	–	–	–
	65	53	8.2 S	9	–	–
		–	–	–	–	–
	70	43	7.6 B	13	–	–
665.95		–	–	–	–	–
Grey, very dense, dry, SANDY LOAM	75	50/4.5"	NC	13	–	–
660.95		–	–	–	–	–
Grey, very dense, dry, SAND, fine-grained	80	50/5.5"	NC	–	–	–
		–	–	–	–	–
	85	50/3.5"	NC	–	–	–
		–	–	–	–	–
	90	50/5.5"	NC	–	–	–
		–	–	–	–	–
	95	50/4"	NC	–	–	–
		–	–	–	–	–
End of Boring 638.95	100	50/3"	NC	–	–	–
		–	–	–	–	–
	105	–	–	–	–	–

Boring EB-4 (I-57)
STA 481+25
OFFSET 78 FT RT
EL. 739.8 FT
01/10/23

EL	D	N	Qu	W%	R%	RQD%
739.80 ASPHALT (8.0")		12	4.6 B	27		
739.05 FILL: Crushed limestone aggregate (4.0")	5	9	2.9 B	20		
738.80 Brown and grey, stiff, dry, SILTY CLAY LOAM		12	3.1 B	14		
	10	10	2.9 B	11		
729.30 Grey, medium stiff to hard, dry, SILTY CLAY, trace gravel		–	–	13		
	15	12	3.9 B	12		
		11	2.9 B	14		
	20	11	2.4 B	13		
		9	1.8 B	13		
	25	8	1.7 B	13		
		9	1.9 B	14	–	–
	30	7	1.4 B	13	–	–
		–	–	–	–	–
	35	50/5.5"	NC	–	–	–
		–	–	–	–	–
	40	17	4.0 B	12	–	–
		–	–	–	–	–
	45	25	1.9 S	14	–	–
		–	–	–	–	–
	50	26	6.1 B	12	–	–
		–	–	–	–	–
	55	17	2.5 B	6	–	–
		–	–	–	–	–
	60	73	7.3 S	9	–	–
		–	–	–	–	–
	65	62	9.4 S	11	–	–
		–	–	–	–	–
	70	66	11.3 B	13	–	–
		–	–	–	–	–
	75	88	8.5 S	17	–	–
663.05 Grey, hard, dry, SILT, trace gravel		–	–	–	–	–
	80	50/4"	NC	19	–	–
		–	–	–	–	–
	85	50/3.5"	NC	18	–	–
		–	–	–	–	–
	90	50/3"	NC	20	–	–
648.05 Grey, very dense, dry, SAND, fine-grained		–	–	–	–	–
	95	50/3"	NC	–	–	–
		–	–	–	–	–
End of Boring 640.55	100	50/3"	NC	–	–	–
		–	–	–	–	–
	105	–	–	–	–	–

Boring EB-5 (I-72)
STA 1962+50
OFFSET 18 FT RT
EL. 760.3 FT
12/20/22

EL	D	N	Qu	W%	R%	RQD%
760.3 Brown, stiff to very stiff, dry SILTY CLAY LOAM		16	4.9 B	11		
	5	12	5.7 B	16		
		10	3.4 B	16		
	10	–	–	14		
		13	6.6 B	15		
	15	17	4.6 S	9		
		14	4.0 B	12		
739.80 Brown and grey, medium stiff to stiff, dry, SILTY CLAY	20	12	4.7 B	13		
		10	2.9 B	20		
	25	8	3.5 B	19		
		10	2.4 B	14	–	–
	30	11	3.9 B	13	–	–
		–	–	–	–	–
	35	11	2.5 P	12	–	–
723.55 Grey, medium dense, saturated, SAND, fine-grained		–	–	–	–	–
▼	40	11	NC	–	–	–
▽ 718.55 Grey, stiff to very stiff, moist, SILTY CLAY		–	–	–	–	–
	45	11	4.4 B	15	–	–
		–	–	–	–	–
	50	10	4.6 B	13	–	–
		–	–	–	–	–
	55	12	4.8 B	11	–	–
		–	–	–	–	–
	60	13	5.8 B	12	–	–
		–	–	–	–	–
	65	17	6.0 B	12	–	–
		–	–	–	–	–
	70	21	6.8 B	12	–	–
		–	–	–	–	–
	75	17	5.5 B	15	–	–
683.55 Grey, hard, moist, SILTY LOAM, with gravel		–	–	–	–	–
	80	79	NC	6	–	–
678.55 Dark brown, hard, moist, SILTY CLAY LOAM		–	–	–	–	–
	85	59	12.1 B	9	–	–
673.55 Dark brown, hard, moist, SILTY CLAY		–	–	–	–	–
	90	66	10.9 B	9	–	–
668.55 Dark brown, hard, moist, SILTY CLAY LOAM		–	–	–	–	–
	95	50/2.5"	>4.5 P	7	–	–
663.55 Light brown, very dense, saturated, SAND, fine-grained		–	–	–	–	–
	100	50/2"	NC	–	–	–
661.60 End of Boring		–	–	–	–	–
	105	–	–	–	–	–

CIVIL DESIGN, INC.
WBE | DBE
EFFINGHAM, IL
LICENSE #184.003222

USER NAME =	DESIGNED - TAW	REVISED -	
	CHECKED - TJZ	REVISED -	
PLOT SCALE =	DRAWN - DCS	REVISED -	
PLOT DATE =	CHECKED - TJZ	REVISED -	

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

SUBSURFACE DATA PROFILE
I-72 OVER I-57 SN 010-0034 (EB)
SHEET OF SHEETS

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
72	(10-33HB-2)BR	CHAMPAIGN		
		ILLINOIS	FED. AID PROJECT	

LEGEND

EL = Elevation (FT)
D = Depth Below Existing Ground Surface (FT)
N = SPT N-VALUE (AASHTO T206)
Qu = Unconfined Compressive Strength in tons per sq. ft. (tsf)
Failure Mode (B=bulge, S=shear, P=penetrometer)

W% = Moisture Content Percentage
R% = Recovery Percentage
RQD% = Rock Quality Designation Percentage

▼ = Groundwater Level First Encountered
▽ = Groundwater Upon Completion
▼▽ = Groundwater After 24 to 72 hours

Soil profile is for illustrative purposes only. Actual conditions will vary.

Boring WB-1 (I-72)
STA 1958+80
OFFSET 17 FT LT
EL 760.6 FT
12/14/22

EL	D	N	Qu	W%	R%	RQD%
760.60 Brown, stiff, dry, SILTY CLAY LOAM						
757.60 Grey, stiff, dry, SILTY CLAY		10	2.1 B	14	–	–
	5	9	4.0 B	21		
		12	3.5 B	15		
	10	10	3.7 B	18		
750.10 Brown, stiff, dry, SILTY CLAY LOAM, trace gravel		–	–	21		
	15	15	3.2 B	15		
745.10 Grey, medium stiff to stiff, dry, SILTY CLAY		10	5.3 B	15		
	20	9	2.8 B	18		
		8	3.8 B	25		
	25	7	2.7 B	26		
735.10 Brown to reddish brown, very stiff, dry, SILTY CLAY LOAM		21	9.6 S	13	–	–
	30	18	4.5 B	13	–	–
728.85 Grey, stiff to very stiff, dry, SILTY CLAY		–	–	–	–	–
	35	16	7.2 B	11	–	–
		–	–	–	–	–
	40	13	2.3 B	14	–	–
		–	–	–	–	–
	45	11	2.9 B	13	–	–
		–	–	–	–	–
	50	12	2.8 B	14	–	–
708.85 Grey, soft, moist, SILTY CLAY LOAM		–	–	–	–	–
	55	11	0.2 S	19	–	–
703.85 Grey, medium dense, saturated, SAND, fine-grained		–	–	–	–	–
	60	30	NC		–	–
698.85 Grey, stiff to very stiff, moist, SILTY CLAY		–	–	–	–	–
	65	24	4.9 S	17	–	–
		–	–	–	–	–
	70	16	NC		–	–
		–	–	–	–	–
	75	15	NC		–	–
683.85 Grey, hard, moist, SILTY CLAY LOAM		–	–	–	–	–
	80	51	8.7 S	16	–	–
678.85 Grey, hard, moist, SILTY CLAY		–	–	–	–	–
	85	64	10.9 S	11	–	–
	90	53	12.1 S	11	–	–
		–	–	–	–	–
	95	53	12.1 B	11	–	–
		–	–	–	–	–
661.14 End of Boring	100	50/5.5"	9.3 S	18	–	–
		–	–	–	–	–
	105	–	–	–	–	–

Boring WB-2 (I-57)
STA 482+40
OFFSET 74 FT LT
EL. 740.1 FT
01/06/23

EL	D	N	Qu	W%	R%	RQD%
740.10 ASPHALT (8.0")						
739.35 FILL: Crushed Limestone Aggregate Base (6.0")		12	NC	19		
738.90 Brown and grey, stiff, dry, SILT LOAM	5	10	3.4 B	16		
737.10 Brown to grey, stiff to very stiff, dry, SILTY CLAY		15	5.5 B	14		
	10	12	3.6 B	14		
		–	–	11		
	15	19	7.0 B	11		
		17	3.3 B	13		
	20	17	3.4 B	13		
		18	4.6 B	13		
	25	17	4.7 B	12		
714.60 Grey, very stiff, moist, SANDY LOAM, with fine grained sand		17	NC	11	–	–
712.10 Grey, very stiff, moist, SILTY CLAY, trace gravel	30	20	6.6 B	13	–	–
		–	–	–	–	–
	35	18	0.6 B	15	–	–
703.35 Grey, very stiff, dry, SILT		–	–	–	–	–
	40	30	NC	18	–	–
698.35 Grey, very stiff to hard, moist, SILTY CLAY		–	–	–	–	–
	45	25	4.5 S	18	–	–
		–	–	–	–	–
	50	26	5.1 B	12	–	–
		–	–	–	–	–
	55	23	5.0 S	18	–	–
		–	–	–	–	–
	60	62	10.1 B	10	–	–
		–	–	–	–	–
	65	86	12.1 S	8	–	–
		–	–	–	–	–
	70	71	12.1 S	10	–	–
		–	–	–	–	–
	75	50	7.7 B	14	–	–
663.35 Grey, very dense, dry, SAND, fine-grained		–	–	–	–	–
	80	50/4"	NC		–	–
658.35 Grey, hard, dry, SILT		–	–	–	–	–
	85	44	2.8 S	20	–	–
		–	–	–	–	–
	90	75	5.5 S	21	–	–
		–	–	–	–	–
	95	89	1.4 S	21	–	–
		–	–	–	–	–
641.20 End of Boring	100	50/5"	NC	23	–	–
		–	–	–	–	–
	105	–	–	–	–	–

Boring WB-3 (I-57)
STA 481+45
OFFSET 3 FT LT
EL. 739.9 FT
12/07/22

EL	D	N	Qu	W%	R%	RQD%
739.90 Brown, stiff, dry, SANDY CLAY		14	2.4 S	16		
736.90 Brown, medium dense, unsaturated, SAND, fine-grained	5	21	NC	14		
734.40 Brown to grey, medium stiff to stiff, dry, SILTY CLAY		8	2.6 B	14		
	10	12	2.5 B	13		
		–	–	12		
	15	13	5.5 B	11		
		12	6.2 B	11		
	20	8	6.0 B	11		
		12	6.5 B	11		
	25	14	>4.5 P	11		
		12	2.8 B	14	–	–
	30	12	3.3 B	13	–	–
		–	–	–	–	–
	35	11	5.9 B	13	–	–
703.15 Grey, medium dense, saturated, SAND, fine-grained		–	–	–	–	–
	40	12	NC	14	–	–
698.15 Grey, stiff to hard, moist, SILTY CLAY		–	–	–	–	–
	45	14	3.0 B	12	–	–
		–	–	–	–	–
	50	17	4.3 B	11	–	–
		–	–	–	–	–
	55	10	4.0 B	12	–	–
		–	–	–	–	–
	60	77	8.0 S	9	–	–
		–	–	–	–	–
	65	90	6.7 S	8	–	–
		–	–	–	–	–
	70	63	11.1 S	11	–	–
		–	–	–	–	–
	75	50/1.5"	>4.5 P	12	–	–
		–	–	–	–	–
	80	89	8.0 S	20		
		–	–	–	–	–
	85	68	6.5 S	18	–	–
		–	–	–	–	–
	90	100	3.3 S	18	–	–
648.15 Grey, hard, moist, SILT		–	–	–	–	–
	95	100	NC	22	–	–
643.15 Grey, very dense, moist, SAND, fine-grained		–	–	–	–	–
640.60 End of Boring	100	50/3.5"	NC	–	–	–
		–	–	–	–	–
	105	–	–	–	–	–

CIVIL DESIGN, INC.
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EFFINGHAM, IL
LICENSE #184.003222

USER NAME =	DESIGNED - TAW	REVISED -	
	CHECKED - TJZ	REVISED -	
PLOT SCALE =	DRAWN - DCS	REVISED -	
PLOT DATE =	CHECKED - TJZ	REVISED -	

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

SUBSURFACE DATA PROFILE
I-72 OVER I-57 SN 010-0035 (WB)
SHEET OF SHEETS

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
72	(10-33HB-2)BR	CHAMPAIGN		
ILLINOIS	FED. AID PROJECT			

LEGEND

EL = Elevation (FT)
D = Depth Below Existing Ground Surface (FT)
N = SPT N-VALUE (AASHTO T206)
Qu = Unconfined Compressive Strength in tons per sq. ft. (tsf)
Failure Mode (B=bulge, S=shear, P=penetrometer)

W% = Moisture Content Percentage
R% = Recovery Percentage
RQD% = Rock Quality Designation Percentage

▼ = Groundwater Level First Encountered
▽ = Groundwater Upon Completion
▽ = Groundwater After 24 to 72 hours

Soil profile is for illustrative purposes only. Actual conditions will vary.

Boring WB-3 (I-57)
STA 481+45
OFFSET 3 FT LT
EL. 739.9 FT
12/07/22

EL	D	N	Qu	W%	R%	RQD%
739.90 Brown, stiff, dry, SANDY CLAY		14	2.4 S	16		
736.90 Brown, medium dense, unsaturated, SAND, fine-grained	5	21	NC	14		
734.40 Brown to grey, medium stiff to stiff, dry, SILTY CLAY		8	2.6 B	14		
	10	12	2.5 B	13		
		–	–	12		
	15	13	5.5 B	11		
		12	6.2 B	11		
	20	8	6.0 B	11		
		12	6.5 B	11		
	25	14	>4.5 P	11		
		12	2.8 B	14	–	–
	30	12	3.3 B	13	–	–
		–	–	–	–	–
	35	11	5.9 B	13	–	–
703.15		–	–	–	–	–
Grey, medium dense, saturated, SAND, fine-grained	40	12	NC	14	–	–
698.15		–	–	–	–	–
Grey, stiff to hard, moist, SILTY CLAY	45	14	3.0 B	12	–	–
		–	–	–	–	–
	50	17	4.3 B	11	–	–
		–	–	–	–	–
	55	10	4.0 B	12	–	–
		–	–	–	–	–
	60	77	8.0 S	9	–	–
		–	–	–	–	–
	65	90	6.7 S	8	–	–
		–	–	–	–	–
	70	63	11.1 S	11	–	–
		–	–	–	–	–
	75	50/1.5"	>4.5 P	12	–	–
		–	–	–	–	–
	80	89	8.0 S	20	–	–
		–	–	–	–	–
	85	68	6.5 S	18	–	–
		–	–	–	–	–
	90	100	3.3 S	18	–	–
648.15 Grey, hard, moist, SILT		–	–	–	–	–
	95	100	NC	22	–	–
643.15 Grey, very dense, moist, SAND, fine-grained		–	–	–	–	–
640.60 End of Boring	100	50/3.5"	NC	–	–	–
		–	–	–	–	–
	105	–	–	–	–	–

Boring WB-4 (I-57)
STA 482+30
OFFSET 75 FT RT
EL. 740.0 FT
01/11/23

EL	D	N	Qu	W%	R%	RQD%
740.00 ASPHALT (8.0")		10	3.4 B	24		
739.10 FILL: Crushed limestone aggregate (4.0")	5	7	1.5 B	26		
738.70 Brown and grey, medium stiff to very stiff, dry, SILTY CLAY		7	1.2 B	16		
	10	10	3.5 B	14		
		–	–	15		
	15	12	4.0 B	13		
		15	4.6 B	10		
	20	17	4.6 B	12		
		15	3.7 S	12		
	25	12	2.9 B	12		
		15	3.6 B	12	–	–
	30	16	2.5 B	14	–	–
		–	–	–	–	–
	35	14	3.9 B	13	–	–
		–	–	–	–	–
	40	17	5.1 B	13	–	–
698.25		–	–	–	–	–
Grey, medium dense, unsaturated, SAND, fine-grained	45	13	NC	–	–	–
693.25		–	–	–	–	–
Grey, very stiff to hard, dry, SILT	50	24	4.7 S	14	–	–
		–	–	–	–	–
	55	35	3.5 S	16	–	–
683.25		–	–	–	–	–
Grey, hard, dry, SILTY CLAY, trace gravel	60	75	11.0 B	10	–	–
		–	–	–	–	–
	65	88	12.1 S	11	–	–
		–	–	–	–	–
	70	90	12.1 S	11	–	–
		–	–	–	–	–
	75	71	10.3 B	12	–	–
663.25		–	–	–	–	–
Grey, very dense, dry, SAND, fine-grained	80	50/2.5"	NC	–	–	–
		–	–	–	–	–
	85	50/4"	NC	–	–	–
		–	–	–	–	–
	90	50/5"	NC	–	–	–
648.25		–	–	–	–	–
Grey, hard, dry, SILT	95	89	4.2 S	19	–	–
643.25		–	–	–	–	–
Grey, hard, dry, SILTY CLAY	100	90	4.6 S	19	–	–
640.00 End of Boring		–	–	–	–	–
	105	–	–	–	–	–

Boring WB-5 (I-72)
STA 1962+50
OFFSET 18 FT LT
EL. 760.1 FT
12/12/22

EL	D	N	Qu	W%	R%	RQD%
760.10 Brown, stiff, dry, SILTY CLAY		15	1.4 B	14		
754.60 Grey, stiff, dry, SANDY CLAY LOAM	5	12	2.8 B	37		
752.10 Brown and grey, medium stiff to stiff, dry to moist, SILTY CLAY		13	4.1 S	11		
	10	16	5.2 B	15		
		12	5.0 S	13		
	15	17	2.1 S	13		
		–	–	12		
	20	13	3.1 B	12		
		9	3.0 B	27		
	25	7	2.3 B	18		
		7	1.9 B	15	–	–
	30	10	2.3 B	14	–	–
		–	–	–	–	–
	35	20	5.8 B	11	–	–
		–	–	–	–	–
	40	16	5.2 B	12	–	–
		–	–	–	–	–
	45	13	4.1 B	12	–	–
		–	–	–	–	–
	50	18	NC	11	–	–
		–	–	–	–	–
	55	18	NC	–	–	–
		–	–	–	–	–
	60	22	NC	–	–	–
		–	–	–	–	–
	65	20	4.1 B	11	–	–
		–	–	–	–	–
	70	49	NC	7	–	–
		–	–	–	–	–
	75	16	3.8 B	12	–	–
		–	–	–	–	–
	80	92	>4.5 P	9	–	–
678.35 Grey, hard, moist, SILT LOAM		–	–	–	–	–
	85	50/5"	NC	11	–	–
673.35 Grey, hard, moist, SILTY CLAY		–	–	–	–	–
	90	60	11.5 B	11	–	–
		–	–	–	–	–
	95	50/5.5"	12.1 B	10	–	–
		–	–	–	–	–
661.30 End of Boring	100	50/3.5"	NC	13	–	–
		–	–	–	–	–
	105	–	–	–	–	–

MODEL: Default
FILE NAME: P:\SXXX\52XX-53XX\5288 - PTB 201-035 D5 VK_I-72 over I-57\24-Structures\CAD\5288 SGR - WB Borings 3-5.dgn

CIVIL DESIGN, INC.
WBE | DBE
EFFINGHAM, IL
LICENSE #184.003222

USER NAME =	DESIGNED – TAW	REVISED –	
	CHECKED – TJZ	REVISED –	
PLOT SCALE =	DRAWN – DCS	REVISED –	
PLOT DATE =	CHECKED – TJZ	REVISED –	

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

SUBSURFACE DATA PROFILE
I-72 OVER I-57 SN 010-0035 (WB)
SHEET OF SHEETS

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
72	(10-33HB-2)BR	CHAMPAIGN		
	ILLINOIS FED. AID PROJECT			

4/25/2023 9:54:10 AM

Appendix D

Soil Boring Logs

Millennia Professional Services of Illinois, Ltd.

11 Executive Drive, Suite 12 · Fairview Heights, Illinois 62208 · (Office) 618.624.8610 · (Fax) 618.624.8611

IDOT District 5
FAI 72 over Interstate 57
Structure No. 010-0034 & 010-0035
Champaign County, Illinois
PTB 195-042 Work Order No. 3
MG22080

GEOTECHNICAL SERVICES

Subsurface Exploration

A subsurface exploration program was implemented for the replacement of bridge structures located in Champaign County, Illinois. The bridges (dual structures) carry Interstate 72 over Interstate 57 on the west side of Champaign.

The subsurface exploration included six (6) borings advanced to 100-feet below the ground surface for the dual structures 010-0034 & 010-0034. The approximate boring locations have been provided by IDOT district personnel. The elevations of the borings were estimated from topographic survey data provided by IDOT, and the stationing and offsets were estimated from plans and profile sheets provided by IDOT District personnel. All the borings were advanced using Standard SPT methods using hollow stem auger and/or mud rotary drilling techniques. SPT samples were taken on 2.5-intervals to a depth of 30 feet and 5-foot intervals to termination. RIMAC strength tests were performed on all intact cohesive samples. The drilling procedures followed the subsurface exploration guidelines as stated in the IDOT Geotechnical Manual dated 2015 (Revised December 2020) and all current applicable Department AGMUs. The generated gINT logs are attached.

Laboratory testing on representative samples included:

- Moisture contents;
- Visual descriptions; and
- Dry Unit Weights.

Sincerely,
Millennia Professional Services, Ltd.

Charles R. Graham
Geotechnical Engineer/Project Manager

Millennia Professional Services

11 Executive Dr #12, Fairview Heights, IL 62208

Phone: (618) 624-8610

Fax: (618) 624-8611

Project No.: MG22080

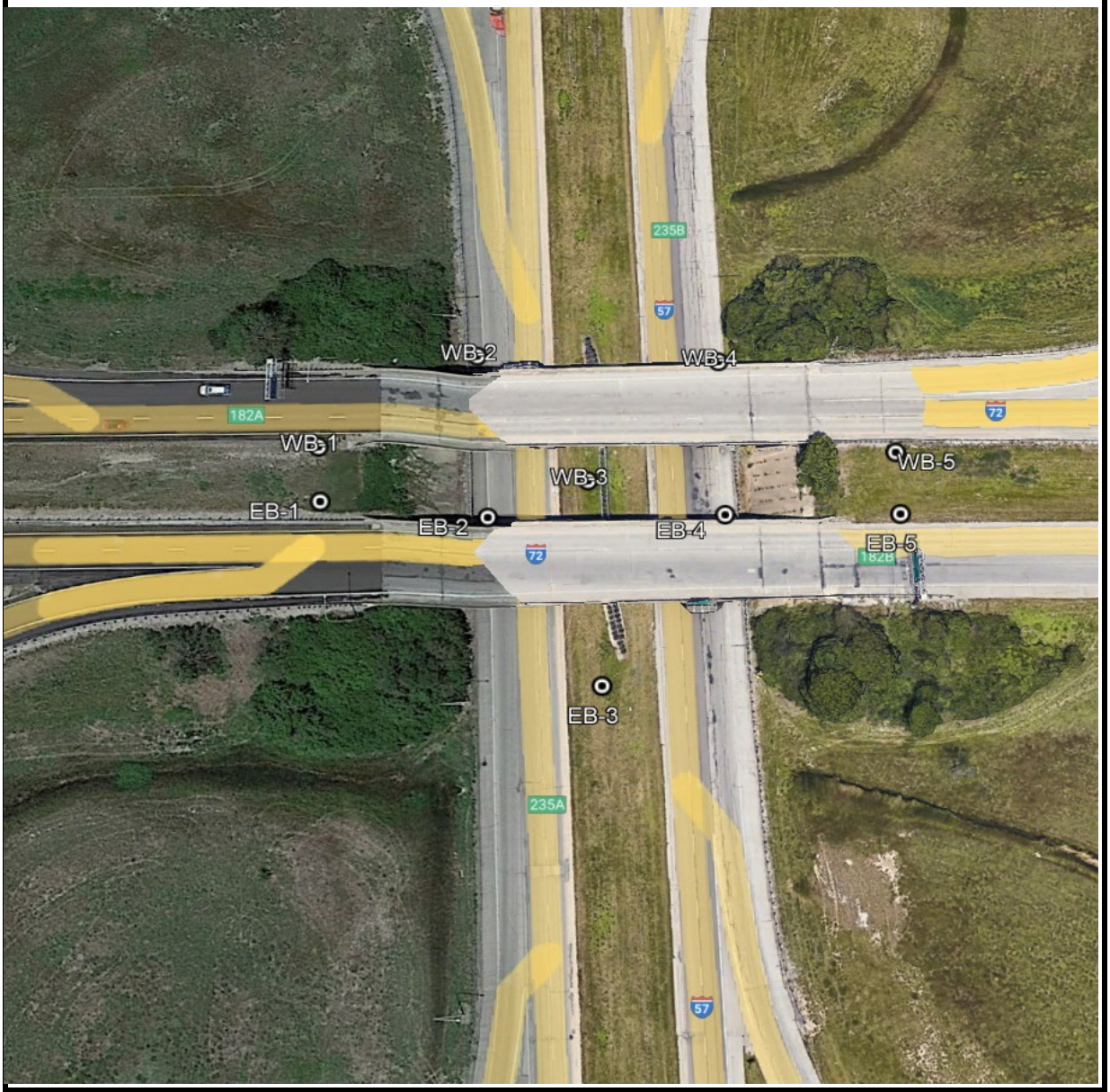

FIGURE 2.1: BORING LOCATION PLAN

PTB 195-042 WO #3 Bridge Replacement
Champaign, Illinois

N

Approximate Boring Location:

Image obtained from Google Earth

*Not to scale

Drawn by:	C. Graham	Checked by:	C. Graham
Project No.:	MG22080	Date:	11/10/2022

MILLENNIA PROFESSIONAL SERVICES
www.millennia.pro

EB-1
SOIL BORING LOG

Sheet 1 of 3

COUNTY Champaign
SECTION (10-33HB-2)BR
ROUTE IL-72 and W Kirby over I-57
JOB NO. MG22080
DATE 12/19/2022

DESCRIPTION PTB 195-042, WO #3
LOCATION Champaign, Illinois
DRILLED BY MET
DRILLING METHOD Hollow Stem Auger
DISTRICT 5
CONSULTANT Millennia Professional Services
LOGGED BY L. Williams
HAMMER TYPE Automatic
RIG TYPE Diedrich D50
EFFICIENCY N/A

BORING NO. EB-1
Note I-72
Offset 17 ft Right
Stationing 1958+80 (I-72)
E
Ground Surface Elev. 760.8 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft
Groundwater Elev.:
First Encounter 682.8 ft ▼
Upon Completion 720.8 ft ▽
After N/A Hrs. N/A ft

LITHOLOGY	ELEV (ft)	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Brown, stiff to very stiff, dry, SILTY CLAY			4		
			7 13	2.9 B	11
			4		
		-5	6 7	1.2 B	11
- grey below 6.0 ft.			3		
			5 6	4.0 B	13
			2		
		-10	5 7	4.0 S	15
	750.30				
Brown and grey, stiff, dry, SILTY CLAY LOAM			5		
			5 8	2.3 B	16
			3		
		-15	5 6	4.1 B	13
- Dry Unit Weight: 121 pcf					13
- brown below 18.5 ft.			4		
		-20	4 7	3.6 B	16
	740.30				
Brown and grey, medium stiff, dry, SILTY CLAY			3		
			2 3	2.7 B	22
			2		
		-25	2 3	1.7 B	16
	735.30				
Brown, stiff to very stiff, dry SILTY CLAY LOAM			3		
			5 8	5.2 B	13
- trace gravel below 28.5 ft.			3		
		-30	6 8	4.8 B	15
- brown and grey below 33.5 ft.			3		
		-35	13 11	2.1 B	13
	724.05				
Grey, medium stiff to very stiff, dry to moist, SILTY CLAY			3		
		▽ -40	3 6	2.9 B	13

The Unconfined Compressive Strength (UCS) Qu column represents either the IDOT Rimac or AASHTO T 208 Test Procedure. The Qu failure mode is indicated by B for Bulge or S for Shear. P is a Pocket Penetrometer test. The Standard Penetration Test (SPT) N value is the sum of the second and third Blows /6 in. values in each sample using AASHTO T 206.

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EB-1
SOIL BORING LOG

Sheet 2 of 3

COUNTY Champaign
SECTION (10-33HB-2)BR
ROUTE IL-72 and W Kirby over I-57
JOB NO. MG22080
DATE 12/19/2022

DESCRIPTION PTB 195-042, WO #3
LOCATION Champaign, Illinois
DRILLED BY MET
DRILLING METHOD Hollow Stem Auger
DISTRICT 5
CONSULTANT Millennia Professional Services
LOGGED BY L. Williams
HAMMER TYPE Automatic
RIG TYPE Diedrich D50
EFFICIENCY N/A

BORING NO. EB-1
Note I-72
Offset 17 ft Right
Stationing 1958+80 (I-72)
Ground Surface Elev. 760.8 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft
Groundwater Elev.:
First Encounter 682.8 ft ▼
Upon Completion 720.8 ft ▽
After N/A Hrs. N/A ft

LITHOLOGY	ELEV (ft)	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Grey, medium stiff to very stiff, dry to moist, SILTY CLAY *(continued)* - trace gravel above 40.0 ft.			4		
		-45	3 5	3.2 B	12
- no recovery			6		
		-50	9 15		
			5		
		-55	8 13	1.7 B	12
			5		
		-60	6 7	3.4 B	12

LITHOLOGY	ELEV (ft)	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Grey, medium stiff to very stiff, dry to moist, SILTY CLAY *(continued)*			5		
		-65	4 6	3.4 B	12
- no recovery			7		
		-70	12 15		
- hard, trace gravel from 73.5 to 75.0 ft.			6		
		-75	13 20	1.9 B	16
			4		
		-80	7 11	0.6 B	17

The Unconfined Compressive Strength (UCS) Qu column represents either the IDOT Rimac or AASHTO T 208 Test Procedure. The Qu failure mode is indicated by B for Bulge or S for Shear. P is a Pocket Penetrometer test. The Standard Penetration Test (SPT) N value is the sum of the second and third Blows /6 in. values in each sample using AASHTO T 206.

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EB-1
SOIL BORING LOG

Sheet 3 of 3

COUNTY Champaign
SECTION (10-33HB-2)BR
ROUTE IL-72 and W Kirby over I-57
JOB NO. MG22080
DATE 12/19/2022

DESCRIPTION	PTB 195-042, WO #3	**DISTRICT**	5		
LOCATION	Champaign, Illinois	**CONSULTANT**	Millennia Professional Services		
DRILLED BY	MET	**LOGGED BY**	L. Williams	**RIG TYPE**	Diedrich D50
DRILLING METHOD	Hollow Stem Auger	**HAMMER TYPE**	Automatic	**EFFICIENCY**	N/A

BORING NO. EB-1
Note I-72
Offset 17 ft Right
Stationing 1958+80 (I-72)
Ground Surface Elev. 760.8 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft
Groundwater Elev.:
First Encounter 682.8 ft ▼
Upon Completion 720.8 ft ▽
After N/A **Hrs.** N/A ft

LITHOLOGY	ELEV (ft)	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Grey, medium stiff to very stiff, dry to moist, SILTY CLAY *(continued)*					
- hard below 83.5 ft.			13		
			50/3"	1.5 B	12
		-85			
	674.05				
Grey, hard, moist, SILTY CLAY LOAM					
			17		
			47	12.1	8
		-90	50/3"	S	
			27		
			35	12.1	10
		-95	46	S	
	664.05				
Grey, hard, moist, SILT LOAM					
			16		
			27		13
	661.05	-100	50/3"		
End of Boring					

The Unconfined Compressive Strength (UCS) Qu column represents either the IDOT Rimac or AASHTO T 208 Test Procedure. The Qu failure mode is indicated by B for Bulge or S for Shear. P is a Pocket Penetrometer test. The Standard Penetration Test (SPT) N value is the sum of the second and third Blows /6 in. values in each sample using AASHTO T 206.

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EB-2
SOIL BORING LOG

Sheet 1 of 3

COUNTY Champaign
SECTION (10-33HB-2)BR
ROUTE IL-72 and W Kirby over I-57
JOB NO. MG22080
DATE 1/5/2023

DESCRIPTION PTB 195-042, WO #3
LOCATION Champaign, Illinois
DRILLED BY MET
DRILLING METHOD Hollow Stem Auger, Mud-Rotary
DISTRICT 5
CONSULTANT Millennia Professional Services
LOGGED BY L. Williams
HAMMER TYPE Automatic
RIG TYPE Diedrich D50
EFFICIENCY N/A

BORING NO. EB-2
Note I-57
Offset 75 ft Left
Stationing 481+25 (I-57)
Ground Surface Elev. 739.8 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft
Groundwater Elev.:
First Encounter 726.8 ft ▼
Upon Completion N/A ft
After N/A Hrs. N/A ft

LITHOLOGY	ELEV (ft)	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
ASPHALT (8.0")	739.14				
FILL: Crushed Limestone Aggregate Base (6.0")	738.63		5		
Brown and grey, stiff, dry, SILTY CLAY LOAM			7 8	2.5 P	17
	736.80				
Brown, medium stiff to stiff, dry, SILTY CLAY			3		
		-5	3 4	1.3 B	13
			5		
			6 8	6.1 B	13
			3		
		-10	4 5	6.2 B	16
- brown and grey below 11.0 ft.					12
			5		
- grey, very stiff, moist, trace gravel below 13.5 ft.		-15	9 11	8.1 B	11
- drilling method switched to Mud-Rotary below 15.0 ft.			5		
			7 10	5.3 B	12
			5		
	719.80	-20	7 10	4.9 B	12

LITHOLOGY	ELEV (ft)	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Grey, very stiff, moist, SILTY CLAY, trace gravel			4		
			7 8	4.8 B	13
			5		
		-25	7 10	5.1 B	13
			4		
			7 9	3.4 B	14
			5		
		-30	11 12	7.7 B	12
			5		
		-35	9 11	5.0 B	12
			5		
			8 9	2.0 B	14
	699.80	-40			

The Unconfined Compressive Strength (UCS) Qu column represents either the IDOT Rimac or AASHTO T 208 Test Procedure. The Qu failure mode is indicated by B for Bulge or S for Shear. P is a Pocket Penetrometer test. The Standard Penetration Test (SPT) N value is the sum of the second and third Blows /6 in. values in each sample using AASHTO T 206.

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EB-2
SOIL BORING LOG

Sheet 2 of 3

COUNTY Champaign
SECTION (10-33HB-2)BR
ROUTE IL-72 and W Kirby over I-57
JOB NO. MG22080
DATE 1/5/2023

DESCRIPTION	PTB 195-042, WO #3	**DISTRICT**	5
LOCATION	Champaign, Illinois	**CONSULTANT**	Millennia Professional Services
DRILLED BY	MET	**LOGGED BY**	L. Williams
DRILLING METHOD	Hollow Stem Auger, Mud-Rotary	**HAMMER TYPE**	Automatic

RIG TYPE Diedrich D50
EFFICIENCY N/A

BORING NO. EB-2
Note I-57
Offset 75 ft Left
Stationing 481+25 (I-57)
Ground Surface Elev. 739.8 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft
Groundwater Elev.:
First Encounter 726.8 ft ▼
Upon Completion N/A ft
After N/A **Hrs.** N/A ft

LITHOLOGY	ELEV (ft)	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Grey, very stiff, moist, SILTY CLAY, trace gravel			5		
			7	1.9	13
		-45	9	B	
			9		
			9	5.3	12
		-50	11	B	
			9		
			11		14
		-55	14		
	683.05				
Grey, hard, dry, SILTY CLAY LOAM			20		
- 2.0" coarse-grained sand seam at 59.5 ft.			48	10.9	11
		-60	45	B	
Grey, hard, dry, SILTY CLAY LOAM *(continued)*					
- with gravel below 63.5 ft.			39	3.5	10
			50/5"	S	
		-65			
			20		
			31	9.7	12
		-70	42	B	
			31		
			42	10.1	13
		-75	50/4"	B	
	663.05				
Grey, very dense, dry, SAND, fine-grained			50/3"		
		-80			

The Unconfined Compressive Strength (UCS) Qu column represents either the IDOT Rimac or AASHTO T 208 Test Procedure. The Qu failure mode is indicated by B for Bulge or S for Shear. P is a Pocket Penetrometer test. The Standard Penetration Test (SPT) N value is the sum of the second and third Blows /6 in. values in each sample using AASHTO T 206.

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EB-2
SOIL BORING LOG

Sheet 3 of 3

COUNTY Champaign
SECTION (10-33HB-2)BR
ROUTE IL-72 and W Kirby over I-57
JOB NO. MG22080
DATE 1/5/2023

DESCRIPTION	PTB 195-042, WO #3	**DISTRICT**	5		
LOCATION	Champaign, Illinois	**CONSULTANT**	Millennia Professional Services		
DRILLED BY	MET	**LOGGED BY**	L. Williams	**RIG TYPE**	Diedrich D50
DRILLING METHOD	Hollow Stem Auger, Mud-Rotary	**HAMMER TYPE**	Automatic	**EFFICIENCY**	N/A

BORING NO. EB-2
Note I-57
Offset 75 ft Left
Stationing 481+25 (I-57)
Ground Surface Elev. 739.8 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft
Groundwater Elev.:
First Encounter 726.8 ft ▼
Upon Completion N/A ft
After N/A **Hrs.** N/A ft

LITHOLOGY	ELEV (ft)	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Grey, very dense, dry, SAND, fine-grained *(continued)*			50/5"		
		-85			
	653.05				
Grey, hard, dry, SILT			50/5.5"		19
		-90			
	648.05				
Grey, very dense, dry, SAND, fine-grained			42		
			50/3"		
		-95			
	640.90		50/5.5"		
End of Boring		-100			

LITHOLOGY

The Unconfined Compressive Strength (UCS) Qu column represents either the IDOT Rimac or AASHTO T 208 Test Procedure. The Qu failure mode is indicated by B for Bulge or S for Shear. P is a Pocket Penetrometer test. The Standard Penetration Test (SPT) N value is the sum of the second and third Blows /6 in. values in each sample using AASHTO T 206.

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EB-3
SOIL BORING LOG

Sheet 1 of 3

COUNTY Champaign
SECTION (10-33HB-2)BR
ROUTE IL-72 and W Kirby over I-57
JOB NO. MG22080
DATE 12/8/2022

DESCRIPTION PTB 195-042, WO #3
LOCATION Champaign, Illinois
DRILLED BY MET
DRILLING METHOD Hollow Stem Auger, Mud-Rotary
DISTRICT 5
CONSULTANT Millennia Professional Services
LOGGED BY L. Williams
HAMMER TYPE Automatic
RIG TYPE Diedrich D50
EFFICIENCY N/A

BORING NO. EB-3
Note I-57
Offset 7 ft Left
Stationing 480+25 (I-57)
Ground Surface Elev. 737.7 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft
Groundwater Elev.:
First Encounter N/E ft
Upon Completion N/A ft
After N/A Hrs. N/A ft

LITHOLOGY	ELEV (ft)	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Brown, medium dense, dry, SAND, fine-grained			5		
			8 9		13
	734.70				
Brown to grey, stiff to very stiff, dry, SILTY CLAY			3		
		-5	4 5	3.3 B	14
- grey below 6.0 ft.			3		
			5 5	4.1 B	7
			4		
		-10	6 6	6.1 B	11
-Dry Unit Weight: 129 pcf					11
			1		
		-15	4 7	4.9 B	12
			5		
			7 9	2.9 S	13
- trace gravel below 18.5 ft.			5		
		-20	7 9	4.2 B	11
Brown to grey, stiff to very stiff, dry, SILTY CLAY *(continued)*			4		
			6 7	5.1 B	11
			4		
		-25	5 7	1.8 B	13
			3		
			4 5	3.1 B	13
			4		
-switched to mud-rotary @ 30-feet		-30	5 6	3.6 B	15
- fine gravel seam at 33.0 ft.			4		
- soft from 33.5-35.0 ft.		-35	2 2	0.5 B	18
			4		
		-40	4 6	0.9 B	13

The Unconfined Compressive Strength (UCS) Qu column represents either the IDOT Rimac or AASHTO T 208 Test Procedure. The Qu failure mode is indicated by B for Bulge or S for Shear. P is a Pocket Penetrometer test. The Standard Penetration Test (SPT) N value is the sum of the second and third Blows /6 in. values in each sample using AASHTO T 206.

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EB-3
SOIL BORING LOG

Sheet 2 of 3

COUNTY Champaign
SECTION (10-33HB-2)BR
ROUTE IL-72 and W Kirby over I-57
JOB NO. MG22080
DATE 12/8/2022

DESCRIPTION PTB 195-042, WO #3
LOCATION Champaign, Illinois
DRILLED BY MET
DRILLING METHOD Hollow Stem Auger, Mud-Rotary
DISTRICT 5
CONSULTANT Millennia Professional Services
LOGGED BY L. Williams
HAMMER TYPE Automatic
RIG TYPE Diedrich D50
EFFICIENCY N/A

BORING NO. EB-3
Note I-57
Offset 7 ft Left
Stationing 480+25 (I-57)
Ground Surface Elev. 737.7 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft
Groundwater Elev.:
First Encounter N/E ft
Upon Completion N/A ft
After N/A Hrs. N/A ft

LITHOLOGY	ELEV (ft)	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Brown to grey, stiff to very stiff, dry, SILTY CLAY *(continued)* - difficulty drilling from 40.0-45.0 ft. due to gravel caving into hole					
- with gravel from 43.5-45.0 ft.			4		
			6	1.5	14
		-45	11	P	
			5		
			9	2.9	14
		-50	12	B	
			6		
- trace gravel below 53.5 ft.			12	1.8	16
		-55	14	P	
			28		
- hard below 58.5 ft.			38		
		-60	48		
Brown to grey, stiff to very stiff, dry, SILTY CLAY *(continued)*					
			15		
			25	8.2	9
		-65	28	S	
			12		
			14	7.6	13
		-70	29	B	
	665.95				
Grey, very dense, dry, SANDY LOAM			50/4.5"		13
		-75			
	660.95				
Grey, very dense, dry, SAND, fine-grained			50/5.5"		
		-80			

The Unconfined Compressive Strength (UCS) Qu column represents either the IDOT Rimac or AASHTO T 208 Test Procedure. The Qu failure mode is indicated by B for Bulge or S for Shear. P is a Pocket Penetrometer test. The Standard Penetration Test (SPT) N value is the sum of the second and third Blows /6 in. values in each sample using AASHTO T 206.

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EB-3
SOIL BORING LOG

Sheet 3 of 3

COUNTY Champaign
SECTION (10-33HB-2)BR
ROUTE IL-72 and W Kirby over I-57
JOB NO. MG22080
DATE 12/8/2022

DESCRIPTION PTB 195-042, WO #3
LOCATION Champaign, Illinois
DRILLED BY MET
DRILLING METHOD Hollow Stem Auger, Mud-Rotary
DISTRICT 5
CONSULTANT Millennia Professional Services
LOGGED BY L. Williams
HAMMER TYPE Automatic
RIG TYPE Diedrich D50
EFFICIENCY N/A

BORING NO. EB-3
Note I-57
Offset 7 ft Left
Stationing 480+25 (I-57)
Ground Surface Elev. 737.7 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft
Groundwater Elev.:
First Encounter N/E ft
Upon Completion N/A ft
After N/A Hrs. N/A ft

LITHOLOGY	ELEV (ft)	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Grey, very dense, dry, SAND, fine-grained *(continued)*					
			50/3.5"		
		-85			
			50/5.5"		
		-90			
			50/4"		
		-95			
	638.95		50/3"		
End of Boring		-100			

LITHOLOGY

The Unconfined Compressive Strength (UCS) Qu column represents either the IDOT Rimac or AASHTO T 208 Test Procedure. The Qu failure mode is indicated by B for Bulge or S for Shear. P is a Pocket Penetrometer test. The Standard Penetration Test (SPT) N value is the sum of the second and third Blows /6 in. values in each sample using AASHTO T 206.

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EB-4
SOIL BORING LOG

Sheet 1 of 3

COUNTY Champaign
SECTION (10-33HB-2)BR
ROUTE IL-72 and W Kirby over I-57
JOB NO. MG22080
DATE 1/10/2023

DESCRIPTION	PTB 195-042, WO #3	**DISTRICT**	5
LOCATION	Champaign, Illinois	**CONSULTANT**	Millennia Professional Services
DRILLED BY	MET	**LOGGED BY**	L. Williams
DRILLING METHOD	Hollow Stem Auger, Mud-Rotary	**HAMMER TYPE**	Automatic

RIG TYPE Diedrich D50
EFFICIENCY N/A

BORING NO. EB-4
Note I-57
Offset 78 ft Right
Stationing 481+25 (I-57)
Ground Surface Elev. 739.8 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft
Groundwater Elev.:
First Encounter N/E ft
Upon Completion N/A ft
After N/A **Hrs.** N/A ft

LITHOLOGY	ELEV (ft)	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
ASPHALT (8.0")	739.05				
FILL: Crushed limestone aggregate (4.0")	738.80		4		
Brown and grey, stiff, dry, SILTY CLAY LOAM			5 7	4.6 B	27
			3		
		-5	5 4	2.9 B	20
- brown below 6.0 ft.			5		
			5 7	3.1 B	14
			3		
		-10	4 6	2.9 B	11
	729.30				
Grey, medium stiff to hard, dry, SILTY CLAY, trace gravel					
-Dry Unit Weight 125 pcf					13
			4		
		-15	5 7	3.9 B	12
			3		
			5 6	2.9 B	14
			3		
		-20	5 6	2.4 B	13

LITHOLOGY	ELEV (ft)	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Grey, medium stiff to hard, dry, SILTY CLAY, trace gravel *(continued)*			3		
			4 5	1.8 B	13
			2		
		-25	3 5	1.7 B	13
			3		
			4 5	1.9 B	14
			2		
-switched to mud-rotary 30-feet		-30	3 4	1.4 B	13
- very stiff to hard below 33.5 ft.			50/5.5"		
-no recovery		-35			
			5		
		-40	7 10	4.0 B	12

The Unconfined Compressive Strength (UCS) Qu column represents either the IDOT Rimac or AASHTO T 208 Test Procedure. The Qu failure mode is indicated by B for Bulge or S for Shear. P is a Pocket Penetrometer test. The Standard Penetration Test (SPT) N value is the sum of the second and third Blows /6 in. values in each sample using AASHTO T 206.

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EB-4
SOIL BORING LOG

Sheet 2 of 3

COUNTY Champaign
SECTION (10-33HB-2)BR
ROUTE IL-72 and W Kirby over I-57
JOB NO. MG22080
DATE 1/10/2023

DESCRIPTION PTB 195-042, WO #3
LOCATION Champaign, Illinois
DRILLED BY MET
DRILLING METHOD Hollow Stem Auger, Mud-Rotary
DISTRICT 5
CONSULTANT Millennia Professional Services
LOGGED BY L. Williams
HAMMER TYPE Automatic
RIG TYPE Diedrich D50
EFFICIENCY N/A

BORING NO. EB-4
Note I-57
Offset 78 ft Right
Stationing 481+25 (I-57)
Ground Surface Elev. 739.8 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft
Groundwater Elev.:
First Encounter N/E ft
Upon Completion N/A ft
After N/A Hrs. N/A ft

LITHOLOGY	ELEV (ft)	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Grey, medium stiff to hard, dry, SILTY CLAY, trace gravel *(continued)*			10		
- thin fine-grained sand seam at 44.0 ft.		-45	11 14	1.9 S	14
			7		
		-50	11 15	6.1 B	12
			5		
		-55	7 10	2.5 B	6
			20		
- hard below 58.5 ft.		-60	32 41	7.3 S	9
			20		
		-65	29 33	9.4 S	11
			15		
		-70	26 40	11.3 B	13
			15		
		-75	33 50/5.5"	8.5 S	17
	663.05				
Grey, hard, dry, SILT, trace gravel			32		
		-80	50/4"		19

The Unconfined Compressive Strength (UCS) Qu column represents either the IDOT Rimac or AASHTO T 208 Test Procedure. The Qu failure mode is indicated by B for Bulge or S for Shear. P is a Pocket Penetrometer test. The Standard Penetration Test (SPT) N value is the sum of the second and third Blows /6 in. values in each sample using AASHTO T 206.

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EB-4
SOIL BORING LOG

Sheet 3 of 3

COUNTY Champaign
SECTION (10-33HB-2)BR
ROUTE IL-72 and W Kirby over I-57
JOB NO. MG22080
DATE 1/10/2023

DESCRIPTION	PTB 195-042, WO #3	**DISTRICT**	5
LOCATION	Champaign, Illinois	**CONSULTANT**	Millennia Professional Services
DRILLED BY	MET	**LOGGED BY**	L. Williams
DRILLING METHOD	Hollow Stem Auger, Mud-Rotary	**HAMMER TYPE**	Automatic

RIG TYPE Diedrich D50
EFFICIENCY N/A

BORING NO. EB-4
Note I-57
Offset 78 ft Right
Stationing 481+25 (I-57)
Ground Surface Elev. 739.8 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft
Groundwater Elev.:
First Encounter N/E ft
Upon Completion N/A ft
After N/A **Hrs.** N/A ft

LITHOLOGY	ELEV (ft)	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Grey, hard, dry, SILT, trace gravel *(continued)*					
			39		
			50/3.5"		18
		-85			
			29		
			50/3"		20
		-90			
	648.05				
Grey, very dense, dry, SAND, fine-grained					
			41		
			50/3"		
		-95			
			41		
	640.55		50/3"		
End of Boring		-100			

LITHOLOGY

The Unconfined Compressive Strength (UCS) Qu column represents either the IDOT Rimac or AASHTO T 208 Test Procedure. The Qu failure mode is indicated by B for Bulge or S for Shear. P is a Pocket Penetrometer test. The Standard Penetration Test (SPT) N value is the sum of the second and third Blows /6 in. values in each sample using AASHTO T 206.

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EB-5
SOIL BORING LOG

Sheet 1 of 3

COUNTY Champaign
SECTION (10-33HB-2)BR
ROUTE IL-72 and W Kirby over I-57
JOB NO. MG22080
DATE 12/20/2022

DESCRIPTION PTB 195-042, WO #3
LOCATION Champaign, Illinois
DRILLED BY MET
DRILLING METHOD Hollow Stem Auger

DISTRICT 5
CONSULTANT Millennia Professional Services
LOGGED BY L. Williams
HAMMER TYPE Automatic

RIG TYPE Diedrich D50
EFFICIENCY N/A

BORING NO. EB-5
Note I-72
Offset 18 ft Right
Stationing 1962+50 (I-72)
Ground Surface Elev. 760.3 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft
Groundwater Elev.:
First Encounter 721.3 ft ▼
Upon Completion 720.3 ft ▽
After N/A Hrs. N/A ft

LITHOLOGY	ELEV (ft)	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Brown, stiff to very stiff, dry, SILTY CLAY LOAM			10		
			10 6	4.9 B	11
			4		
		-5	5 7	5.7 B	16
- grey below 6.0 ft.			4		
			4 6	3.4 B	16
- brown and grey below 8.5 ft.					
-Dry Unit Weight: 121 pcf		-10			14
			3		
			6 7	6.6 B	15
			4		
		-15	6 11	4.6 S	9
			4		
			6 8	4.0 B	12
- brown below 18.5 ft.			4		
		-20	5 7	4.7 B	13
	739.80				
Brown and grey, medium stiff to stiff, dry, SILTY CLAY			5		
			4 6	2.9 B	120
			4		
		-25	4 4	3.5 B	19
- brown below 26.0 ft.			3		
			4 6	2.4 B	14
- trace gravel below 28.5 ft.			3		
		-30	5 6	3.9 B	13
			3		
		-35	5 6	2.5 P	12
	723.55				
Grey, medium dense, saturated, SAND, fine-grained			3		
		▽ -40	6 5		

The Unconfined Compressive Strength (UCS) Qu column represents either the IDOT Rimac or AASHTO T 208 Test Procedure. The Qu failure mode is indicated by B for Bulge or S for Shear. P is a Pocket Penetrometer test. The Standard Penetration Test (SPT) N value is the sum of the second and third Blows /6 in. values in each sample using AASHTO T 206.

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EB-5
SOIL BORING LOG

Sheet 2 of 3

COUNTY Champaign
SECTION (10-33HB-2)BR
ROUTE IL-72 and W Kirby over I-57
JOB NO. MG22080
DATE 12/20/2022

DESCRIPTION PTB 195-042, WO #3
LOCATION Champaign, Illinois
DRILLED BY MET
DRILLING METHOD Hollow Stem Auger
DISTRICT 5
CONSULTANT Millennia Professional Services
LOGGED BY L. Williams
HAMMER TYPE Automatic
RIG TYPE Diedrich D50
EFFICIENCY N/A

BORING NO. EB-5
Note I-72
Offset 18 ft Right
Stationing 1962+50 (I-72)
Ground Surface Elev. 760.3 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft
Groundwater Elev.:
First Encounter 721.3 ft ▼
Upon Completion 720.3 ft ▽
After N/A Hrs. N/A ft

LITHOLOGY	ELEV (ft)	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Grey, medium dense, saturated, SAND, fine-grained *(continued)*					
	718.55				
Grey, stiff to very stiff, moist, SILTY CLAY			3		
		-45	5 6	4.4 B	15
			2		
		-50	4 6	4.6 B	13
			3		
		-55	6 6	4.8 B	11
			6		
		-60	7 6	5.8 B	12
Grey, stiff to very stiff, moist, SILTY CLAY *(continued)*			4		
		-65	8 9	6.0 B	12
			6		
		-70	9 12	6.8 B	12
			3		
		-75	7 10	5.5 B	15
	683.55				
Grey, hard, moist, SILTY LOAM, with gravel			8		
		-80	35 44		6

The Unconfined Compressive Strength (UCS) Qu column represents either the IDOT Rimac or AASHTO T 208 Test Procedure. The Qu failure mode is indicated by B for Bulge or S for Shear. P is a Pocket Penetrometer test. The Standard Penetration Test (SPT) N value is the sum of the second and third Blows /6 in. values in each sample using AASHTO T 206.

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EB-5
SOIL BORING LOG

Sheet 3 of 3

COUNTY Champaign
SECTION (10-33HB-2)BR
ROUTE IL-72 and W Kirby over I-57
JOB NO. MG22080
DATE 12/20/2022

DESCRIPTION	PTB 195-042, WO #3	**DISTRICT**	5		
LOCATION	Champaign, Illinois	**CONSULTANT**	Millennia Professional Services		
DRILLED BY	MET	**LOGGED BY**	L. Williams	**RIG TYPE**	Diedrich D50
DRILLING METHOD	Hollow Stem Auger	**HAMMER TYPE**	Automatic	**EFFICIENCY**	N/A

BORING NO. EB-5
Note I-72
Offset 18 ft Right
Stationing 1962+50 (I-72)
Ground Surface Elev. 760.3 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft
Groundwater Elev.:
First Encounter 721.3 ft ▼
Upon Completion 720.3 ft ▽
After N/A **Hrs.** N/A ft

LITHOLOGY	ELEV (ft)	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Grey, hard, moist, SILTY LOAM, with gravel *(continued)*					
	678.55				
Dark brown, hard, moist, SILTY CLAY LOAM			8		
			23	12.1	9
		-85	36	B	
	673.55				
Dark brown, hard, moist, SILTY CLAY			23		
			32	10.9	9
		-90	34	B	
	668.55				
Dark brown, hard, moist, SILTY CLAY LOAM			50/2.5"	>4.5 P	7
		-95			
	663.55				
Light brown, very dense, saturated, SAND, fine-grained					
	661.60		50/2"		
End of Boring		-100			

The Unconfined Compressive Strength (UCS) Qu column represents either the IDOT Rimac or AASHTO T 208 Test Procedure. The Qu failure mode is indicated by B for Bulge or S for Shear. P is a Pocket Penetrometer test. The Standard Penetration Test (SPT) N value is the sum of the second and third Blows /6 in. values in each sample using AASHTO T 206.

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WB-1
SOIL BORING LOG

Sheet 1 of 3

COUNTY Champaign
SECTION (10-33HB-2)BR
ROUTE IL-72 and W Kirby over I-57
JOB NO. MG22080
DATE 12/14/2022

DESCRIPTION PTB 195-042, WO #3
LOCATION Champaign, Illinois
DRILLED BY MET
DRILLING METHOD Hollow Stem Auger, Mud-Rotary
DISTRICT 5
CONSULTANT Millennia Professional Services
LOGGED BY L. Williams
HAMMER TYPE Automatic
RIG TYPE Diedrich D50
EFFICIENCY N/A

BORING NO. WB-1
Note I-72
Offset 17 ft Left
Stationing 1958+80 (I-72)
Ground Surface Elev. 760.6 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft
Groundwater Elev.:
First Encounter 707.6 ft ▼
Upon Completion N/A ft
After N/A Hrs. N/A ft

LITHOLOGY	ELEV (ft)	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Brown, stiff, dry, SILTY CLAY LOAM			3		
			4 6	2.1 B	14
	757.60				
Grey, stiff, dry, SILTY CLAY			3		
		-5	4 5	4.0 B	21
			3		
			5 7	3.5 B	15
			4		
		-10	4 6	3.7 B	18
	750.10				
Brown, stiff, dry, SILTY CLAY LOAM, trace gravel					
- Dry Unit Weight: 113 pcf					21
			4		
		-15	5 10	3.2 B	15
	745.10				
Grey, medium stiff to stiff, dry, SILTY CLAY			3		
			4 6	5.3 B	15
- brown and grey above 17.5 ft.					
			3		
		-20	4 5	2.8 B	18

LITHOLOGY	ELEV (ft)	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Grey, medium stiff to stiff, dry, SILTY CLAY *(continued)*			2		
			3 5	3.8 B	25
			2		
		-25	3 4	2.7 B	26
	735.10				
Brown to reddish brown, very stiff, dry, SILTY CLAY LOAM			5		
			10 11	9.6 S	13
- reddish brown below 28.5 ft.			5		
		-30	7 11	4.5 B	13
	728.85				
Grey, stiff to very stiff, dry, SILTY CLAY			6		
		-35	7 9	7.2 B	11
- trace gravel above 35.0 ft.					
			5		
		-40	6 7	2.3 B	14

The Unconfined Compressive Strength (UCS) Qu column represents either the IDOT Rimac or AASHTO T 208 Test Procedure. The Qu failure mode is indicated by B for Bulge or S for Shear. P is a Pocket Penetrometer test. The Standard Penetration Test (SPT) N value is the sum of the second and third Blows /6 in. values in each sample using AASHTO T 206.

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WB-1
SOIL BORING LOG

Sheet 2 of 3

COUNTY: Champaign
SECTION: (10-33HB-2)BR
ROUTE: IL-72 and W Kirby over I-57
JOB NO.: MG22080
DATE: 12/14/2022

DESCRIPTION	PTB 195-042, WO #3	DISTRICT	5
LOCATION	Champaign, Illinois	CONSULTANT	Millennia Professional Services
DRILLED BY	MET	LOGGED BY	L. Williams
DRILLING METHOD	Hollow Stem Auger, Mud-Rotary	HAMMER TYPE	Automatic
RIG TYPE	Diedrich D50	EFFICIENCY	N/A

BORING NO. WB-1
Note I-72
Offset 17 ft Left
Stationing 1958+80 (I-72)
Ground Surface Elev. 760.6 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft
Groundwater Elev.:
First Encounter 707.6 ft ▼
Upon Completion N/A ft
After N/A Hrs. N/A ft

LITHOLOGY	ELEV (ft)	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Grey, stiff to very stiff, dry, SILTY CLAY *(continued)*			3		
		-45	5 6	2.9 B	13
			4		
		-50	5 7	2.8 B	14
	708.85				
Grey, soft, moist, SILTY CLAY LOAM ▼			3		
		-55	5 6	0.2 S	19
-switched to mud-rotary @ 55-feet					
	703.85				
Grey, medium dense, saturated, SAND, fine-grained			11		
		-60	14 16		
Grey, medium dense, saturated, SAND, fine-grained *(continued)*					
	698.85				
Grey, stiff to very stiff, moist, SILTY CLAY			7		
		-65	11 13	4.9 S	17
-no recovery			5		
		-70	7 9		
-no recovery			4		
		-75	6 9		
	683.85				
Grey, hard, moist, SILTY CLAY LOAM			13		
		-80	21 30	8.7 S	16

The Unconfined Compressive Strength (UCS) Qu column represents either the IDOT Rimac or AASHTO T 208 Test Procedure. The Qu failure mode is indicated by B for Bulge or S for Shear. P is a Pocket Penetrometer test. The Standard Penetration Test (SPT) N value is the sum of the second and third Blows /6 in. values in each sample using AASHTO T 206.

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WB-1
SOIL BORING LOG

Sheet 3 of 3

COUNTY Champaign
SECTION (10-33HB-2)BR
ROUTE IL-72 and W Kirby over I-57
JOB NO. MG22080
DATE 12/14/2022

DESCRIPTION	PTB 195-042, WO #3	**DISTRICT**	5		
LOCATION	Champaign, Illinois	**CONSULTANT**	Millennia Professional Services		
DRILLED BY	MET	**LOGGED BY**	L. Williams	**RIG TYPE**	Diedrich D50
DRILLING METHOD	Hollow Stem Auger, Mud-Rotary	**HAMMER TYPE**	Automatic	**EFFICIENCY**	N/A

BORING NO. WB-1
Note I-72
Offset 17 ft Left
Stationing 1958+80 (I-72)
Ground Surface Elev. 760.6 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft
Groundwater Elev.:
First Encounter 707.6 ft ▼
Upon Completion N/A ft
After N/A **Hrs.** N/A ft

LITHOLOGY	ELEV (ft)	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Grey, hard, moist, SILTY CLAY LOAM *(continued)*					
	678.85				
Grey, hard, moist, SILTY CLAY			13		
			23	10.9	12
		-85	41	S	
			21		
			22	12.1	11
		-90	31	S	
			13		
			20	12.1	11
		-95	33	B	
			33		
	661.14		50/5.5"	9.3	18
End of Boring		-100		S	

LITHOLOGY

The Unconfined Compressive Strength (UCS) Qu column represents either the IDOT Rimac or AASHTO T 208 Test Procedure. The Qu failure mode is indicated by B for Bulge or S for Shear. P is a Pocket Penetrometer test. The Standard Penetration Test (SPT) N value is the sum of the second and third Blows /6 in. values in each sample using AASHTO T 206.

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WB-2
SOIL BORING LOG

Sheet 1 of 3

COUNTY Champaign
SECTION (10-33HB-2)BR
ROUTE IL-72 and W Kirby over I-57
JOB NO. MG22080
DATE 1/6/2023

DESCRIPTION PTB 195-042, WO #3
LOCATION Champaign, Illinois
DRILLED BY MET
DRILLING METHOD Hollow Stem Auger, Mud-Rotary
DISTRICT 5
CONSULTANT Millennia Professional Services
LOGGED BY L. Williams
HAMMER TYPE Automatic
RIG TYPE Diedrich D50
EFFICIENCY N/A

BORING NO. WB-2
Note I-57
Offset 74 ft Left
Stationing 482+40 (I-57)
Ground Surface Elev. 740.1 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft
Groundwater Elev.:
First Encounter 714.1 ft ▼
Upon Completion N/A ft
After N/A Hrs. N/A ft

LITHOLOGY	ELEV (ft)	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
ASPHALT (8.0")	739.35				
FILL: Crushed limestone aggregate (6.0")	738.90		4		
Brown and grey, stiff, dry, SILT LOAM			6 6		19
	737.10				
Brown to grey, stiff to very stiff, dry, SILTY CLAY			3		
		-5	4 6	3.4 B	16
			5		
			7 8	5.5 B	14
			3		
		-10	5 7	3.6 B	14
- trace gravel below 11.0 ft.					
-Dry Unit Weight: 127 pcf					11
			5		
		-15	8 11	7.0 B	11
			5		
			7 10	3.3 B	13
			4		
		-20	8 9	3.4 B	13

LITHOLOGY	ELEV (ft)	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Brown to grey, stiff to very stiff, dry, SILTY CLAY *(continued)*			4		
			8 10	4.6 B	13
			4		
		-25	8 9	4.7 B	12
	714.60				
Grey, very stiff, moist, SANDY LOAM, with fine-grained sand ▼			7		
			8 9		11
	712.10				
Grey, very stiff, moist, SILTY CLAY, trace gravel			8		
- gravel seam at 29.0 ft.		-30	9 11	6.6 B	13
-switched to mud-rotary 30-feet					
			4		
		-35	8 10	0.6 B	15
	703.35				
Grey, very stiff, dry, SILT			11		
		-40	14 16		18

The Unconfined Compressive Strength (UCS) Qu column represents either the IDOT Rimac or AASHTO T 208 Test Procedure. The Qu failure mode is indicated by B for Bulge or S for Shear. P is a Pocket Penetrometer test. The Standard Penetration Test (SPT) N value is the sum of the second and third Blows /6 in. values in each sample using AASHTO T 206.

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WB-2
SOIL BORING LOG

Sheet 2 of 3

COUNTY Champaign
SECTION (10-33HB-2)BR
ROUTE IL-72 and W Kirby over I-57
JOB NO. MG22080
DATE 1/6/2023

DESCRIPTION PTB 195-042, WO #3
LOCATION Champaign, Illinois
DRILLED BY MET
DRILLING METHOD Hollow Stem Auger, Mud-Rotary
DISTRICT 5
CONSULTANT Millennia Professional Services
LOGGED BY L. Williams
HAMMER TYPE Automatic
RIG TYPE Diedrich D50
EFFICIENCY N/A

BORING NO. WB-2
Note I-57
Offset 74 ft Left
Stationing 482+40 (I-57)
Ground Surface Elev. 740.1 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft
Groundwater Elev.:
First Encounter 714.1 ft ▼
Upon Completion N/A ft
After N/A Hrs. N/A ft

LITHOLOGY	ELEV (ft)	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Grey, very stiff, dry, SILT *(continued)*					
	698.35				
Grey, very stiff to hard, moist, SILTY CLAY			8		
			11	4.5	18
		-45	14	S	
- trace gravel below 48.5 ft.			8		
			10	5.1	12
		-50	16	B	
			7		
			9	5.0	18
		-55	14	S	
- hard below 58.5 ft.			10		
			22	10.1	10
		-60	40	B	

LITHOLOGY	ELEV (ft)	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Grey, very stiff to hard, moist, SILTY CLAY *(continued)*					
			25		
			36	12.1	8
		-65	50/5"	S	
			16		
			23	12.1	10
		-70	48	S	
			19		
			21	7.7	14
		-75	29	B	
	663.35				
Grey, very dense, dry, SAND, fine-grained			50/4"		
		-80			

The Unconfined Compressive Strength (UCS) Qu column represents either the IDOT Rimac or AASHTO T 208 Test Procedure. The Qu failure mode is indicated by B for Bulge or S for Shear. P is a Pocket Penetrometer test. The Standard Penetration Test (SPT) N value is the sum of the second and third Blows /6 in. values in each sample using AASHTO T 206.

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WB-2
SOIL BORING LOG

Sheet 3 of 3

COUNTY Champaign
SECTION (10-33HB-2)BR
ROUTE IL-72 and W Kirby over I-57
JOB NO. MG22080
DATE 1/6/2023

DESCRIPTION	PTB 195-042, WO #3	**DISTRICT**	5		
LOCATION	Champaign, Illinois	**CONSULTANT**	Millennia Professional Services		
DRILLED BY	MET	**LOGGED BY**	L. Williams	**RIG TYPE**	Diedrich D50
DRILLING METHOD	Hollow Stem Auger, Mud-Rotary	**HAMMER TYPE**	Automatic	**EFFICIENCY**	N/A

BORING NO. WB-2
Note I-57
Offset 74 ft Left
Stationing 482+40 (I-57)
Ground Surface Elev. 740.1 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft
Groundwater Elev.:
First Encounter 714.1 ft ▼
Upon Completion N/A ft
After N/A **Hrs.** N/A ft

LITHOLOGY	ELEV (ft)	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Grey, very dense, dry, SAND, fine-grained *(continued)*					
	658.35				
Grey, hard, dry, SILT			21		
			21	2.8	20
		-85	23	S	
			16		
			25	5.5	21
		-90	50/5.5"	S	
			25		
			39	1.4	21
		-95	50/4"	S	
	641.20		50/5.5"		23
End of Boring		-100			

LITHOLOGY

The Unconfined Compressive Strength (UCS) Qu column represents either the IDOT Rimac or AASHTO T 208 Test Procedure. The Qu failure mode is indicated by B for Bulge or S for Shear. P is a Pocket Penetrometer test. The Standard Penetration Test (SPT) N value is the sum of the second and third Blows /6 in. values in each sample using AASHTO T 206.

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WB-3
SOIL BORING LOG

Sheet 1 of 3

COUNTY Champaign
SECTION (10-33HB-2)BR
ROUTE IL-72 and W Kirby over I-57
JOB NO. MG22080
DATE 12/7/2022

DESCRIPTION PTB 195-042, WO #3
LOCATION Champaign, Illinois
DRILLED BY MET
DRILLING METHOD Hollow Stem Auger, Mud-Rotary
DISTRICT 5
CONSULTANT Millennia Professional Services
LOGGED BY L. Williams
HAMMER TYPE Automatic
RIG TYPE Diedrich D50
EFFICIENCY N/A

BORING NO. WB-3
Note I-57
Offset 3 ft Left
Stationing 481+45 (I-57)
Ground Surface Elev. 739.9 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft
Groundwater Elev.:
First Encounter 700.9 ft ▼
Upon Completion N/A ft
After N/A Hrs. N/A ft

LITHOLOGY	ELEV (ft)	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Brown, stiff, dry, SANDY CLAY			3		
			5 9	2.4 S	16
	736.90				
Brown, medium dense, unsaturated, SAND, fine-grained			9		
		-5	10 11		14
	734.40				
Brown to grey, medium stiff to stiff, dry, SILTY CLAY			2		
			4 4	2.6 B	14
			4		
		-10	5 7	2.5 B	13
- Dry Unit Weight: 128 pcf					12
- grey, trace gravel below 13.5 ft.			3		
		-15	5 8	5.5 B	11
			4		
			5 7	6.2 B	11
			3		
		-20	4 4	6.0 B	11
Brown to grey, medium stiff to stiff, dry, SILTY CLAY *(continued)*			3		
			5 7	6.5 B	11
			7		
		-25	7 7	>4.5 P	11
			3		
			5 7	2.8 B	14
			2		
		-30	4 8	3.3 B	13
			2		
		-35	4 7	5.9 B	13
	703.15				
Grey, medium dense, saturated, SAND, fine-grained		▼	3		
		-40	5 7		14

The Unconfined Compressive Strength (UCS) Qu column represents either the IDOT Rimac or AASHTO T 208 Test Procedure. The Qu failure mode is indicated by B for Bulge or S for Shear. P is a Pocket Penetrometer test. The Standard Penetration Test (SPT) N value is the sum of the second and third Blows /6 in. values in each sample using AASHTO T 206.

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WB-3
SOIL BORING LOG

Sheet 2 of 3

COUNTY Champaign
SECTION (10-33HB-2)BR
ROUTE IL-72 and W Kirby over I-57
JOB NO. MG22080
DATE 12/7/2022

DESCRIPTION PTB 195-042, WO #3
LOCATION Champaign, Illinois
DRILLED BY MET
DRILLING METHOD Hollow Stem Auger, Mud-Rotary
DISTRICT 5
CONSULTANT Millennia Professional Services
LOGGED BY L. Williams
HAMMER TYPE Automatic
RIG TYPE Diedrich D50
EFFICIENCY N/A

BORING NO. WB-3
Note I-57
Offset 3 ft Left
Stationing 481+45 (I-57)
Ground Surface Elev. 739.9 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft
Groundwater Elev.:
First Encounter 700.9 ft ▼
Upon Completion N/A ft
After N/A Hrs. N/A ft

LITHOLOGY	ELEV (ft)	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Grey, medium dense, saturated, SAND, fine-grained *(continued)*					
698.15					
Grey, stiff to hard, moist, SILTY CLAY			4		
			6	3.0	12
		-45	8	B	
			3		
			7	4.3	11
		-50	10	B	
			2		
			4	4.0	12
		-55	6	B	
- hard below 58.5 ft.			17		
			27	8.0	9
		-60	50	S	

LITHOLOGY	ELEV (ft)	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Grey, stiff to hard, moist, SILTY CLAY *(continued)*			32		
			38	6.7	8
		-65	52	S	
-switched to mud-rotary @ 65 feet			19		
			27	11.1	11
		-70	36	S	
- trace gravel at 73.5-75.5 ft.			50/1.5"	>4.5	12
		-75		P	
			27		
			39	8.0	20
		-80	50/3"	S	

The Unconfined Compressive Strength (UCS) Qu column represents either the IDOT Rimac or AASHTO T 208 Test Procedure. The Qu failure mode is indicated by B for Bulge or S for Shear. P is a Pocket Penetrometer test. The Standard Penetration Test (SPT) N value is the sum of the second and third Blows /6 in. values in each sample using AASHTO T 206.

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WB-3
SOIL BORING LOG

Sheet 3 of 3

COUNTY Champaign
SECTION (10-33HB-2)BR
ROUTE IL-72 and W Kirby over I-57
JOB NO. MG22080
DATE 12/7/2022

DESCRIPTION	PTB 195-042, WO #3	**DISTRICT**	5
LOCATION	Champaign, Illinois	**CONSULTANT**	Millennia Professional Services
DRILLED BY	MET	**LOGGED BY**	L. Williams
DRILLING METHOD	Hollow Stem Auger, Mud-Rotary	**HAMMER TYPE**	Automatic

RIG TYPE Diedrich D50
EFFICIENCY N/A

BORING NO. WB-3
Note I-57
Offset 3 ft Left
Stationing 481+45 (I-57)
Ground Surface Elev. 739.9 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft
Groundwater Elev.:
First Encounter 700.9 ft ▼
Upon Completion N/A ft
After N/A **Hrs.** N/A ft

LITHOLOGY	ELEV (ft)	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Grey, stiff to hard, moist, SILTY CLAY *(continued)*			21		
			29	6.5	18
		-85	39	S	
			29		
			50	3.3	18
		-90	50/2"	S	
	648.15				
Grey, hard, moist, SILT			29		
			50		22
		-95	50/4"		
	643.15				
Grey, very dense, moist, SAND, fine-grained			48		
	640.60		50/3.5"		
End of Boring		-100			

LITHOLOGY

The Unconfined Compressive Strength (UCS) Qu column represents either the IDOT Rimac or AASHTO T 208 Test Procedure. The Qu failure mode is indicated by B for Bulge or S for Shear. P is a Pocket Penetrometer test. The Standard Penetration Test (SPT) N value is the sum of the second and third Blows /6 in. values in each sample using AASHTO T 206.

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WB-4
SOIL BORING LOG

Sheet 1 of 3

COUNTY Champaign
SECTION (10-33HB-2)BR
ROUTE IL-72 and W Kirby over I-57
JOB NO. MG22080
DATE 1/11/2023

DESCRIPTION PTB 195-042, WO #3
LOCATION Champaign, Illinois
DRILLED BY MET
DRILLING METHOD Hollow Stem Auger, Mud-Rotary
DISTRICT 5
CONSULTANT Millennia Professional Services
LOGGED BY L. Williams
HAMMER TYPE Automatic
RIG TYPE Diedrich D50
EFFICIENCY N/A

BORING NO. WB-4
Note I-57
Offset 75 ft Right
Stationing 482+30 (I-57)
Ground Surface Elev. 740.0 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft
Groundwater Elev.:
First Encounter N/E ft
Upon Completion N/A ft
After N/A **Hrs.** N/A ft

LITHOLOGY	ELEV (ft)	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
ASPHALT (11.0")	739.10				
FILL: Crushed limestone aggregate (4.0")	738.70		4		
Brown and grey, medium stiff to very stiff, dry, SILTY CLAY			4 6	3.4 B	24
			2		
		-5	3 4	1.5 B	26
			2		
			3 4	1.2 B	16
- brown below 8.5 ft.			3		
		-10	4 6	3.5 B	14
- grey, trace gravel below 11.0 ft. -Dry Unit Weight: 120 pcf					15
			1		
		-15	4 8	4.0 B	13
			5		
			7 8	4.6 B	10
			4		
		-20	7 10	4.6 B	12

LITHOLOGY	ELEV (ft)	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Brown and grey, medium stiff to very stiff, dry, SILTY CLAY *(continued)*			6		
			7 8	3.7 S	12
			3		
		-25	4 8	2.9 B	12
			3		
			6 9	3.6 B	12
			4		
		-30	7 9	2.5 B	14
			5		
		-35	6 8	3.9 B	13
			6		
		-40	8 9	5.1 B	13

The Unconfined Compressive Strength (UCS) Qu column represents either the IDOT Rimac or AASHTO T 208 Test Procedure. The Qu failure mode is indicated by B for Bulge or S for Shear. P is a Pocket Penetrometer test. The Standard Penetration Test (SPT) N value is the sum of the second and third Blows /6 in. values in each sample using AASHTO T 206.

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WB-4
SOIL BORING LOG

Sheet 2 of 3

COUNTY Champaign
SECTION (10-33HB-2)BR
ROUTE IL-72 and W Kirby over I-57
JOB NO. MG22080
DATE 1/11/2023

DESCRIPTION PTB 195-042, WO #3
LOCATION Champaign, Illinois
DRILLED BY MET
DRILLING METHOD Hollow Stem Auger, Mud-Rotary
DISTRICT 5
CONSULTANT Millennia Professional Services
LOGGED BY L. Williams
HAMMER TYPE Automatic
RIG TYPE Diedrich D50
EFFICIENCY N/A

BORING NO. WB-4
Note I-57
Offset 75 ft Right
Northing 482+30
Ground Surface Elev. 740.0 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft
Groundwater Elev.:
First Encounter N/E ft
Upon Completion N/A ft
After N/A Hrs. N/A ft

LITHOLOGY	ELEV (ft)	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Brown and grey, medium stiff to very stiff, dry, SILTY CLAY *(continued)*					
	698.25				
Grey, medium dense, unsaturated, SAND, fine-grained			9		
			8		
		-45	5		
	693.25				
Grey, very stiff to hard, dry, SILT			10		
			11	4.7	14
		-50	13	S	
			10		
			16	3.5	16
		-55	19	S	
	683.25				
Grey, hard, dry, SILTY CLAY, trace gravel			15		
			29	11.0	10
		-60	46	B	

LITHOLOGY	ELEV (ft)	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Grey, hard, dry, SILTY CLAY, trace gravel *(continued)*			29		
			38	12.1	11
		-65	50/3.5"	S	
			20		
			40	12.1	11
		-70	50/5"	S	
			15		
			29	10.3	12
		-75	42	B	
	663.25				
Grey, very dense, dry, SAND, fine-grained			50/2.5"		
		-80			

The Unconfined Compressive Strength (UCS) Qu column represents either the IDOT Rimac or AASHTO T 208 Test Procedure. The Qu failure mode is indicated by B for Bulge or S for Shear. P is a Pocket Penetrometer test. The Standard Penetration Test (SPT) N value is the sum of the second and third Blows /6 in. values in each sample using AASHTO T 206.

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WB-4
SOIL BORING LOG

Sheet 3 of 3

COUNTY: Champaign
SECTION: (10-33HB-2)BR
ROUTE: IL-72 and W Kirby over I-57
JOB NO.: MG22080
DATE: 1/11/2023

DESCRIPTION	PTB 195-042, WO #3	**DISTRICT**	5
LOCATION	Champaign, Illinois	**CONSULTANT**	Millennia Professional Services
DRILLED BY	MET	**LOGGED BY**	L. Williams
DRILLING METHOD	Hollow Stem Auger, Mud-Rotary	**HAMMER TYPE**	Automatic
RIG TYPE	Diedrich D50	**EFFICIENCY**	N/A

BORING NO. WB-4
Note I-57
Offset 75 ft Right
Stationing 482+30 (I-57)
740.0 ft **Ground Surface Elev.**

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft
Groundwater Elev.:
First Encounter N/E ft
Upon Completion N/A ft
After N/A **Hrs.** N/A ft

LITHOLOGY	ELEV (ft)	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Grey, very dense, dry, SAND, fine-grained *(continued)*			50/4"		
		-85	32		
			50/5"		
		-90			
	648.25				
Grey, hard, dry, SILT			29		
			39	4.2	19
		-95	50/5"	S	
	643.25				
Grey, hard, dry, SILTY CLAY			29		
			40	4.6	19
	640.00	-100	50/6"	S	

End of Boring

The Unconfined Compressive Strength (UCS) Qu column represents either the IDOT Rimac or AASHTO T 208 Test Procedure. The Qu failure mode is indicated by B for Bulge or S for Shear. P is a Pocket Penetrometer test. The Standard Penetration Test (SPT) N value is the sum of the second and third Blows /6 in. values in each sample using AASHTO T 206.

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WB-5
SOIL BORING LOG

Sheet 1 of 3

COUNTY Champaign
SECTION (10-33HB-2)BR
ROUTE IL-72 and W Kirby over I-57
JOB NO. MG22080
DATE 12/12/2022

DESCRIPTION	PTB 195-042, WO #3	**DISTRICT**	5
LOCATION	Champaign, Illinois	**CONSULTANT**	Millennia Professional Services
DRILLED BY	MET	**LOGGED BY**	L. Williams
DRILLING METHOD	Hollow Stem Auger, Mud-Rotary	**HAMMER TYPE**	Automatic

RIG TYPE Diedrich D50
EFFICIENCY N/A

BORING NO. WB-5
Note I-72
Offset 18 ft Left
Stationing 1962+50 (I-72)
Ground Surface Elev. 760.1 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft
Groundwater Elev.:
First Encounter 734.1 ft ▼
Upon Completion N/A ft
After N/A **Hrs.** N/A ft

LITHOLOGY	ELEV (ft)	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Brown, stiff, dry, SILTY CLAY			3		
			5 10	1.4 B	14
			4		
		-5	4 8	2.8 B	37
	754.60				
Grey, stiff, dry, SANDY CLAY LOAM			4		
			6 7	4.1 S	11
	752.10				
Brown and grey, medium stiff to stiff, dry to moist, SILTY CLAY			5		
		-10	6 10	5.2 B	15
- grey, trace gravel below 11.0 ft.			5		
			5 7	5.0 S	13
			5		
		-15	7 10	2.1 S	13
- brown below 16.0 ft. -Dry Unit Weight: 130 pcf					12
			5		
		-20	5 8	3.1 B	12

LITHOLOGY	ELEV (ft)	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Brown and grey, medium stiff to stiff, dry to moist, SILTY CLAY *(continued)*			3		
			4 5	3.0 B	27
			2		
		-25	3 4	2.3 B	18
		▼	4		
			3 4	1.9 B	15
			2		
- 2" sand seam at 29.0 ft.		-30	4 6	2.3 B	14
			5		
- very stiff below 33.5 ft.		-35	9 11	5.8 B	11
			6		
		-40	7 9	5.2 B	12

The Unconfined Compressive Strength (UCS) Qu column represents either the IDOT Rimac or AASHTO T 208 Test Procedure. The Qu failure mode is indicated by B for Bulge or S for Shear. P is a Pocket Penetrometer test. The Standard Penetration Test (SPT) N value is the sum of the second and third Blows /6 in. values in each sample using AASHTO T 206.

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WB-5
SOIL BORING LOG

Sheet 2 of 3

COUNTY Champaign
SECTION (10-33HB-2)BR
ROUTE IL-72 and W Kirby over I-57
JOB NO. MG22080
DATE 12/12/2022

DESCRIPTION PTB 195-042, WO #3
LOCATION Champaign, Illinois
DRILLED BY MET
DRILLING METHOD Hollow Stem Auger, Mud-Rotary
DISTRICT 5
CONSULTANT Millennia Professional Services
LOGGED BY L. Williams
HAMMER TYPE Automatic
RIG TYPE Diedrich D50
EFFICIENCY N/A

BORING NO. WB-5
Note I-72
Offset 18 ft Left
Stationing 1962+50 (I-72)
Ground Surface Elev. 760.1 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft
Groundwater Elev.:
First Encounter 734.1 ft ▼
Upon Completion N/A ft
After N/A Hrs. N/A ft

LITHOLOGY	ELEV (ft)	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Brown and grey, medium stiff to stiff, dry to moist, SILTY CLAY *(continued)*			4		
		-45	5 8	4.1 B	12
			5		
		-50	8 10		11
- no recovery			5		
		-55	7 11		
- no recovery			7		
		-60	9 13		
Brown and grey, medium stiff to stiff, dry to moist, SILTY CLAY *(continued)*			5		
		-65	7 13	4.1 B	11
- very stiff to hard below 68.5 ft.			9		
		-70	20 29		7
			3		
		-75	7 9	3.8 B	12
- with gravel from 78.5-80.0 ft. - sand seam at 79.0 ft.			29		
		-80	42 50	>4.5 P	9

The Unconfined Compressive Strength (UCS) Qu column represents either the IDOT Rimac or AASHTO T 208 Test Procedure. The Qu failure mode is indicated by B for Bulge or S for Shear. P is a Pocket Penetrometer test. The Standard Penetration Test (SPT) N value is the sum of the second and third Blows /6 in. values in each sample using AASHTO T 206.

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WB-5
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Sheet 3 of 3

COUNTY Champaign
SECTION (10-33HB-2)BR
ROUTE IL-72 and W Kirby over I-57
JOB NO. MG22080
DATE 12/12/2022

DESCRIPTION	PTB 195-042, WO #3	**DISTRICT**	5
LOCATION	Champaign, Illinois	**CONSULTANT**	Millennia Professional Services
DRILLED BY	MET	**LOGGED BY**	L. Williams
DRILLING METHOD	Hollow Stem Auger, Mud-Rotary	**HAMMER TYPE**	Automatic

RIG TYPE Diedrich D50
EFFICIENCY N/A

BORING NO. WB-5
Note I-72
Offset 18 ft Left
Staionining 1962+50 (I-72)
Ground Surface Elev. 760.1 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft
Groundwater Elev.:
First Encounter 734.1 ft ▼
Upon Completion N/A ft
After N/A **Hrs.** N/A ft

LITHOLOGY	ELEV (ft)	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Brown and grey, medium stiff to stiff, dry to moist, SILTY CLAY *(continued)*					
-switched to mud-rotary @ 80 feet	678.35				
Grey, hard, moist, SILT LOAM			45		
			50/5"		11
		-85			
	673.35				
Grey, hard, moist, SILTY CLAY			15		
			24	11.5	11
		-90	36	B	
			17		
			50/5.5"	12.1	10
		-95		B	
- trace gravel below 98.5 ft.	661.30		50/3.5"		13
End of Boring		-100			

LITHOLOGY

The Unconfined Compressive Strength (UCS) Qu column represents either the IDOT Rimac or AASHTO T 208 Test Procedure. The Qu failure mode is indicated by B for Bulge or S for Shear. P is a Pocket Penetrometer test. The Standard Penetration Test (SPT) N value is the sum of the second and third Blows /6 in. values in each sample using AASHTO T 206.

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Appendix E

Seismic Site Class Determination

Illinois Department of Transportation

SEISMIC SITE CLASS DETERMINATION

PROJECT TITLE=====I-72 over I-57 (SN 010-0034)

Substructure 1

Base of Substruct. Elev. (or ground surf for bents	753.81	ft.
Pile or Shaft Dia.	12	inches
Boring Number	0034-EB-1	
Top of Boring Elev.	761	ft.
Approximate Fixity Elev.	747.81	ft.

Individual Site Class Definition:

N (bar): 22 (Blows/ft.) Soil Site Class D
N_{ch} (bar): 100 (Blows/ft.) Soil Site Class C
s_u (bar): 2.97 (ksf) Soil Site Class C <----Controls

Seismic Soil Column Depth (ft)	Bot. Of Sample Elevation	Sample Thick. (ft.)	N	Qu (tsf)	Layer Description Boundary
	758.0	3.00	20	2.90	
	755.5	2.50	13	1.20	
	753.0	2.50	11	4.00	
	750.5	2.50	12	4.00	B
	748.0	2.50	13	2.30	
2.3	745.5	2.50	11	4.10	
7.3	740.5	5.00	11	3.60	B
9.8	738.0	2.50	5	2.70	
12.3	735.5	2.50	5	1.70	B
14.8	733.0	2.50	13	5.20	
17.3	730.5	2.50	14	4.80	
22.3	725.5	5.00	24	2.10	B
27.3	720.5	5.00	9	2.90	
32.3	715.5	5.00	8	3.20	
37.3	710.5	5.00	24		
42.3	705.5	5.00	21	1.70	
47.3	700.5	5.00	13	3.40	
52.3	695.5	5.00	10	3.40	
57.3	690.5	5.00	27		
62.3	685.5	5.00	33	1.90	
67.3	680.5	5.00	18	0.60	
72.3	675.5	5.00	100	1.50	B
77.3	670.5	5.00	100	12.10	
82.3	665.5	5.00	81	12.10	B
87.3	660.5	5.00	100		
92.3	655.5	5.00	100		
97.3	650.5	5.00	100		
100.5	647.3	3.20	100		B

Substructure 2

Base of Substruct. Elev. (or ground surf for bents	731.47	ft.
Pile or Shaft Dia.		inches
Boring Number	0034-EB-2	
Top of Boring Elev.	739.8	ft.
Approximate Fixity Elev.	731.47	ft.

Individual Site Class Definition:

N (bar): 32 (Blows/ft.) Soil Site Class D
N_{ch} (bar): 100 (Blows/ft.) Soil Site Class C
s_u (bar): 4.4 (ksf) Soil Site Class C <----Controls

Seismic Soil Column Depth (ft)	Bot. Of Sample Elevation	Sample Thick. (ft.)	N	Qu (tsf)	Layer Description Boundary
	737.3	2.50	15	2.50	B
	734.8	2.50	7	1.30	
	732.3	2.50	14	6.10	
1.7	729.8	2.50	9	6.20	
6.7	724.8	5.00	20	8.10	
9.2	722.3	2.50	17	5.30	
11.7	719.8	2.50	17	4.90	B
14.2	717.3	2.50	15	4.80	
16.7	714.8	2.50	17	5.10	
19.2	712.3	2.50	16	3.40	
21.7	709.8	2.50	23	7.70	
26.7	704.8	5.00	20	5.00	
31.7	699.8	5.00	17	2.00	
36.7	694.8	5.00	16	1.90	
41.7	689.8	5.00	20	5.30	
46.7	684.8	5.00	25		B
51.7	679.8	5.00	93	10.90	
55.7	675.8	4.00	100	3.50	
61.7	669.8	6.00	73	9.70	
66.7	664.8	5.00	100	10.10	B
70.2	661.3	3.50	100		
75.7	655.8	5.50	100		B
80.7	650.8	5.00	100		B
85.7	645.8	5.00	100		
90.7	640.8	5.00	100		
95.7	635.8	5.00	100		
100.0	631.5	4.30	100		B

Substructure 3

Base of Substruct. Elev. (or ground surf for bents	731.51	ft.
Pile or Shaft Dia.		inches
Boring Number	0034-EB-3	
Top of Boring Elev.	737.7	ft.
Approximate Fixity Elev.	731.51	ft.

Individual Site Class Definition:

N (bar): 31 (Blows/ft.) Soil Site Class D
N_{ch} (bar): (Blows/ft.) NA
s_u (bar): 3.82 (ksf) Soil Site Class C <----Controls

Seismic Soil Column Depth (ft)	Bot. Of Sample Elevation	Sample Thick. (ft.)	N	Qu (tsf)	Layer Description Boundary
	734.7	3.00	17		B
	732.7	2.00	9	3.30	
1.3	730.2	2.50	10	4.10	
3.8	727.7	2.50	12	6.10	
8.8	722.7	5.00	11	4.90	
11.3	720.2	2.50	16	2.90	
13.8	717.7	2.50	16	4.20	
16.3	715.2	2.50	13	5.10	
18.8	712.7	2.50	12	1.80	
21.3	710.2	2.50	9	3.10	
23.8	707.7	2.50	11	3.60	
28.8	702.7	5.00	4	0.50	
33.8	697.7	5.00	10	0.90	
38.8	692.7	5.00	17	1.50	
43.8	687.7	5.00	21	2.90	
48.8	682.7	5.00	26	1.80	
53.8	677.7	5.00	86		
58.8	672.7	5.00	53	8.20	
63.8	667.7	5.00	43	7.60	B
67.8	663.7	4.00	100		B
72.8	658.7	5.00	100		
77.8	653.7	5.00	100		
82.8	648.7	5.00	100		
87.8	643.7	5.00	100		
92.8	638.7	5.00	100		
97.8	633.7	5.00	100		
100.0	631.5	2.20	100		B

Substructure 4

Base of Substruct. Elev. (or ground surf for bents	731.51	ft.
Pile or Shaft Dia.		inches
Boring Number	0034-EB-4	
Top of Boring Elev.	739.8	ft.
Approximate Fixity Elev.	731.51	ft.

Individual Site Class Definition:

N (bar): 42 (Blows/ft.) Soil Site Class D
N_{ch} (bar): 100 (Blows/ft.) Soil Site Class C
s_u (bar): 3.32 (ksf) Soil Site Class C <----Controls

Seismic Soil Column Depth (ft)	Bot. Of Sample Elevation	Sample Thick. (ft.)	N	Qu (tsf)	Layer Description Boundary
	737.3	2.50	12	4.60	
	734.8	2.50	9	2.90	
	732.3	2.50	12	3.10	
1.7	729.8	2.50	10	2.90	B
6.7	724.8	5.00	12	3.90	
9.2	722.3	2.50	11	2.90	
11.7	719.8	2.50	11	2.40	
14.2	717.3	2.50	9	1.80	
16.7	714.8	2.50	8	1.70	
19.2	712.3	2.50	9	1.90	
21.7	709.8	2.50	7	1.40	
25.7	705.8	4.00	100		
31.7	699.8	6.00	17	4.00	
36.7	694.8	5.00	25	1.90	
41.7	689.8	5.00	26	6.10	
46.7	684.8	5.00	17	2.50	
51.7	679.8	5.00	73	7.30	
56.7	674.8	5.00	62	9.40	
61.7	669.8	5.00	66	11.30	
66.7	664.8	5.00	100	8.50	B
70.7	660.8	4.00	100		
75.7	655.8	5.00	100		
80.7	650.8	5.00	100		B
85.7	645.8	5.00	100		
90.7	640.8	5.00	100		
95.7	635.8	5.00	100		
100.0	631.5	4.30	100		B

Global Site Class Definition: Substructures 1 through 5

N (bar): 29 (Blows/ft.) Soil Site Class D
N_{ch} (bar): 84 (Blows/ft.) Soil Site Class C
s_u (bar): 3.63 (ksf) Soil Site Class C <----Controls

Illinois Department of Transportation

SEISMIC SITE CLASS DETERMINATION

PROJECT TITLE=====

Substructure 5

Base of Substruct. Elev. (or ground surf for bents)	753.56	ft.
Pile or Shaft Dia.	12	inches
Boring Number	0034-EB-5	
Top of Boring Elev.	760.3	ft.
Approximate Fixity Elev.	747.56	ft.

Individual Site Class Definition:

N (bar):	18 (Blows/ft.)	Soil Site Class D	
N_{ch} (bar):	36 (Blows/ft.)	Soil Site Class D	<----Controls
s_u (bar):	3.77 (ksf)	Soil Site Class C	

Seismic Soil Column Depth (ft)	Bot. Of Sample Elevation (ft)	Sample Thick. (ft.)	N	Qu (tsf)	Layer Description Boundary
	757.8	2.50	16	4.90	
	755.3	2.50	12	5.70	
	752.8	2.50	10	3.40	
	747.8	5.00	13	6.60	
2.3	745.3	2.50	17	4.60	
4.8	742.8	2.50	14	4.00	
7.3	740.3	2.50	12	4.70	B
9.8	737.8	2.50	10	2.90	
12.3	735.3	2.50	8	3.50	
14.8	732.8	2.50	10	2.40	
17.3	730.3	2.50	11	3.90	
22.3	725.3	5.00	11	2.50	B
27.3	720.3	5.00	11		B
32.3	715.3	5.00	11	4.40	
37.3	710.3	5.00	10	4.60	
42.3	705.3	5.00	12	4.80	
47.3	700.3	5.00	13	5.80	
52.3	695.3	5.00	17	6.00	
57.3	690.3	5.00	21	6.80	
62.3	685.3	5.00	17	5.50	B
67.3	680.3	5.00	79		B
72.3	675.3	5.00	59	12.10	B
77.3	670.3	5.00	66	10.90	B
80.8	666.8	3.50	100	4.50	B
85.8	661.8	5.00	100		
90.8	656.8	5.00	100		
94.0	653.6	3.20	100		B

Substructure 6

Base of Substruct. Elev. (or ground surf for bents)		ft.
Pile or Shaft Dia.		inches
Boring Number		
Top of Boring Elev.		ft.
Approximate Fixity Elev.		ft.

Individual Site Class Definition:

N (bar):	(Blows/ft.)	NA
N_{ch} (bar):	(Blows/ft.)	NA
s_u (bar):	(ksf)	NA

Seismic Soil Column Depth (ft)	Bot. Of Sample Elevation (ft)	Sample Thick. (ft.)	N	Qu (tsf)	Layer Description Boundary

Substructure 7

Base of Substruct. Elev. (or ground surf for bents)		ft.
Pile or Shaft Dia.		inches
Boring Number		
Top of Boring Elev.		ft.
Approximate Fixity Elev.		ft.

Individual Site Class Definition:

N (bar):	(Blows/ft.)	NA
N_{ch} (bar):	(Blows/ft.)	NA
s_u (bar):	(ksf)	NA

Seismic Soil Column Depth (ft)	Bot. Of Sample Elevation (ft)	Sample Thick. (ft.)	N	Qu (tsf)	Layer Description Boundary

Substructure 8

Base of Substruct. Elev. (or ground surf for bents)		ft.
Pile or Shaft Dia.		inches
Boring Number		
Top of Boring Elev.		ft.
Approximate Fixity Elev.		ft.

Individual Site Class Definition:

N (bar):	(Blows/ft.)	NA
N_{ch} (bar):	(Blows/ft.)	NA
s_u (bar):	(ksf)	NA

Seismic Soil Column Depth (ft)	Bot. Of Sample Elevation (ft)	Sample Thick. (ft.)	N	Qu (tsf)	Layer Description Boundary

Illinois Department of Transportation

SEISMIC SITE CLASS DETERMINATION

PROJECT TITLE=====I-72 over I-57 (SN 010-0035)

Substructure 1

Base of Substruct. Elev. (or ground surf for bents	753.87	ft.
Pile or Shaft Dia.	12	inches
Boring Number	0035-WB-1	
Top of Boring Elev.	760.6	ft.
Approximate Fixity Elev.	747.87	ft.

Individual Site Class Definition:

N (bar): 20 (Blows/ft.) Soil Site Class D
N_{ch} (bar): (Blows/ft.) NA
s_u (bar): 2.11 (ksf) Soil Site Class C <----Controls

Seismic Soil Column Depth (ft)	Bot. Of Sample Elevation	Sample Thick. (ft.)	N	Qu (tsf)	Layer Description Boundary
	758.1	2.50	10	2.10	B
	755.6	2.50	9	4.00	
	753.1	2.50	12	3.50	
	750.6	2.50	10	3.70	B
2.3	745.6	5.00	15	3.20	B
4.8	743.1	2.50	10	5.30	
7.3	740.6	2.50	9	2.80	
9.8	738.1	2.50	8	3.80	
12.3	735.6	2.50	7	2.70	B
14.8	733.1	2.50	21	9.60	
17.3	730.6	2.50	18	4.50	B
22.3	725.6	5.00	16	7.20	
27.3	720.6	5.00	13	2.30	
32.3	715.6	5.00	11	2.90	
37.3	710.6	5.00	12	2.80	B
42.3	705.6	5.00	11	0.20	B
47.3	700.6	5.00	30		B
52.3	695.6	5.00	24	4.90	
57.3	690.6	5.00	16		
62.3	685.6	5.00	15		B
67.3	680.6	5.00	51	8.70	B
72.3	675.6	5.00	64	10.90	
77.3	670.6	5.00	53	12.10	
82.3	665.6	5.00	53	12.10	
86.8	661.1	4.50	100	9.30	
91.8	656.1	5.00	100		
96.8	651.1	5.00	100		
100.0	647.9	3.20			B

Substructure 2

Base of Substruct. Elev. (or ground surf for bents	731.67	ft.
Pile or Shaft Dia.		inches
Boring Number	0035-WB-2	
Top of Boring Elev.	740.1	ft.
Approximate Fixity Elev.	731.67	ft.

Individual Site Class Definition:

N (bar): 32 (Blows/ft.) Soil Site Class D
N_{ch} (bar): NA (Blows/ft.) NA
s_u (bar): 3.85 (ksf) Soil Site Class C <----Controls

Seismic Soil Column Depth (ft)	Bot. Of Sample Elevation	Sample Thick. (ft.)	N	Qu (tsf)	Layer Description Boundary
	737.6	2.50	12		B
	735.1	2.50	10	3.40	
0	732.6	2.50	15	5.50	
1.6	730.1	2.50	12	3.60	
6.6	725.1	5.00	19	7.00	
9.1	722.6	2.50	17	3.30	
11.6	720.1	2.50	17	3.40	
14.1	717.6	2.50	18	4.60	
16.6	715.1	2.50	17	4.70	B
19.1	712.6	2.50	17		B
21.6	710.1	2.50	20	6.60	
26.6	705.1	5.00	18	0.60	B
31.6	700.1	5.00	30		B
36.6	695.1	5.00	25	4.50	
41.6	690.1	5.00	26	5.10	
46.6	685.1	5.00	23	5.00	
51.6	680.1	5.00	62	10.10	
56.6	675.1	5.00	100	12.10	
61.6	670.1	5.00	71	12.10	
66.6	665.1	5.00	50	7.70	B
70.6	661.1	4.00	10		B
76.6	655.1	6.00	44	2.80	
81.6	650.1	5.00	100	5.50	
86.6	645.1	5.00	100	1.40	
90.6	641.1	4.00	100		
95.6	636.1	5.00	100		
100.0	631.7	4.40	100		B

Substructure 3

Base of Substruct. Elev. (or ground surf for bents	731.51	ft.
Pile or Shaft Dia.		inches
Boring Number	0035-WB-3	
Top of Boring Elev.	739.9	ft.
Approximate Fixity Elev.	731.51	ft.

Individual Site Class Definition:

N (bar): 28 (Blows/ft.) Soil Site Class D
N_{ch} (bar): 100 (Blows/ft.) Soil Site Class C
s_u (bar): 4.38 (ksf) Soil Site Class C <----Controls

Seismic Soil Column Depth (ft)	Bot. Of Sample Elevation	Sample Thick. (ft.)	N	Qu (tsf)	Layer Description Boundary
	737.4	2.50	14	2.40	B
	734.9	2.50	21		B
	732.4	2.50	8	2.60	
1.6	729.9	2.50	12	2.50	
6.6	724.9	5.00	13	5.50	
9.1	722.4	2.50	12	6.20	
11.6	719.9	2.50	8	6.00	
14.1	717.4	2.50	12	6.50	
16.6	714.9	2.50	14	4.50	
19.1	712.4	2.50	12	2.80	
21.6	709.9	2.50	12	3.30	
26.6	704.9	5.00	11	5.90	B
31.6	699.9	5.00	12		B
36.6	694.9	5.00	14	3.00	
41.6	689.9	5.00	17	4.30	
46.6	684.9	5.00	10	4.00	
51.6	679.9	5.00	77	8.00	
56.6	674.9	5.00	90	6.70	
61.6	669.9	5.00	63	11.10	
65.1	666.4	3.50	100	4.50	
71.6	659.9	6.50	100	8.00	
76.6	654.9	5.00	68	6.50	
81.6	649.9	5.00	100	3.30	B
86.6	644.9	5.00	100		B
90.6	640.9	4.00	100		
95.6	635.9	5.00	100		
100.0	631.5	4.40	100		B

Substructure 4

Base of Substruct. Elev. (or ground surf for bents	731.3	ft.
Pile or Shaft Dia.		inches
Boring Number	0035-WB-4	
Top of Boring Elev.	740	ft.
Approximate Fixity Elev.	731.3	ft.

Individual Site Class Definition:

N (bar): 28 (Blows/ft.) Soil Site Class D
N_{ch} (bar): (Blows/ft.) NA
s_u (bar): 3.96 (ksf) Soil Site Class C <----Controls

Seismic Soil Column Depth (ft)	Bot. Of Sample Elevation	Sample Thick. (ft.)	N	Qu (tsf)	Layer Description Boundary
	737.5	2.50	10	3.40	
	735.0	2.50	7	1.50	
	732.5	2.50	7	1.20	
1.3	730.0	2.50	10	3.50	
6.3	725.0	5.00	12	4.00	
8.8	722.5	2.50	15	4.60	
11.3	720.0	2.50	17	4.60	
13.8	717.5	2.50	15	3.70	
16.3	715.0	2.50	12	2.90	
18.8	712.5	2.50	15	3.60	
21.3	710.0	2.50	16	2.50	
26.3	705.0	5.00	14	3.90	
31.3	700.0	5.00	17	5.10	B
36.3	695.0	5.00	13		B
41.3	690.0	5.00	24	4.70	
46.3	685.0	5.00	35	3.50	B
51.3	680.0	5.00	75	11.00	
56.3	675.0	5.00	100	12.10	
61.3	670.0	5.00	100	12.10	
66.3	665.0	5.00	71	10.30	B
69.8	661.5	3.50	100		
74.8	656.5	5.00	100		
80.3	651.0	5.50	100		B
85.8	645.5	5.50	100	4.20	B
90.8	640.5	5.00	100	4.60	
95.8	635.5	5.00	100		
100.0	631.3	4.20	100		B

Global Site Class Definition: Substructures 1 through 5

N (bar): 27 (Blows/ft.) Soil Site Class D
N_{ch} (bar): (Blows/ft.) NA, H < 0.1*H (Total)
s_u (bar): 3.5 (ksf) Soil Site Class C <----Controls

Illinois Department of Transportation

SEISMIC SITE CLASS DETERMINATION

PROJECT TITLE=====

Substructure 5

Base of Substruct. Elev. (or ground surf for bents)	753.52	ft.
Pile or Shaft Dia.	12	inches
Boring Number	0035-WB-5	
Top of Boring Elev.	760.1	ft.
Approximate Fixity Elev.	747.52	ft.

Individual Site Class Definition:

N (bar): 29 (Blows/ft.) Soil Site Class D
N_{ch} (bar): NA (Blows/ft.) NA
s_u (bar): 3.35 (ksf) Soil Site Class C <----Controls

Seismic Soil Column Depth (ft)	Bot. Of Sample Elevation	Sample Thick. (ft.)	N	Qu (tsf)	Layer Description Boundary
	757.6	2.50	15	1.40	
	755.1	2.50	12	2.80	B
	752.6	2.50	13	4.10	B
	750.1	2.50	16	5.20	
	747.6	2.50	12	5.00	
2.4	745.1	2.50	17	2.10	
7.4	740.1	5.00	13	3.10	
9.9	737.6	2.50	9	3.00	
12.4	735.1	2.50	7	2.30	
14.9	732.6	2.50	7	1.90	
17.4	730.1	2.50	10	2.30	
22.4	725.1	5.00	20	5.80	
27.4	720.1	5.00	16	5.20	
32.4	715.1	5.00	13	4.10	
37.4	710.1	5.00	18		
42.4	705.1	5.00	18		
47.4	700.1	5.00	22		
52.4	695.1	5.00	20	4.10	
57.4	690.1	5.00	49		
62.4	685.1	5.00	16	3.80	
67.4	680.1	5.00	92	4.50	B
71.9	675.6	4.50	100		B
77.4	670.1	5.50	60	11.50	
81.9	665.6	4.50	100	12.10	
85.9	661.6	4.00	100		
90.9	656.6	5.00	100		
95.9	651.6	5.00	100		
100.0	647.5	4.10			B

Substructure 6

Base of Substruct. Elev. (or ground surf for bents)		ft.
Pile or Shaft Dia.		inches
Boring Number		
Top of Boring Elev.		ft.
Approximate Fixity Elev.		ft.

Individual Site Class Definition:

N (bar): (Blows/ft.) NA
N_{ch} (bar): (Blows/ft.) NA
s_u (bar): (ksf) NA

Seismic Soil Column Depth (ft)	Bot. Of Sample Elevation	Sample Thick. (ft.)	N	Qu (tsf)	Layer Description Boundary

Substructure 7

Base of Substruct. Elev. (or ground surf for bents)		ft.
Pile or Shaft Dia.		inches
Boring Number		
Top of Boring Elev.		ft.
Approximate Fixity Elev.		ft.

Individual Site Class Definition:

N (bar): (Blows/ft.) NA
N_{ch} (bar): (Blows/ft.) NA
s_u (bar): (ksf) NA

Seismic Soil Column Depth (ft)	Bot. Of Sample Elevation	Sample Thick. (ft.)	N	Qu (tsf)	Layer Description Boundary

Substructure 8

Base of Substruct. Elev. (or ground surf for bents)		ft.
Pile or Shaft Dia.		inches
Boring Number		
Top of Boring Elev.		ft.
Approximate Fixity Elev.		ft.

Individual Site Class Definition:

N (bar): (Blows/ft.) NA
N_{ch} (bar): (Blows/ft.) NA
s_u (bar): (ksf) NA

Seismic Soil Column Depth (ft)	Bot. Of Sample Elevation	Sample Thick. (ft.)	N	Qu (tsf)	Layer Description Boundary

Appendix F

Integral Abutment Feasibility Analysis

In Situ

Illinois Department of Transportation

INTEGRAL ABUTMENT FEASIBILITY ANALYSIS

Modified 10/30/17

GENERAL DATA

STRUCTURE NUMBER	010-0296 (EB)		TOTAL STRUCTURE LENGTH	272.33	FT
STRUCTURE TYPE	MULTI-SPAN		NUMBER OF SPANS	4	
STRUCTURE SKEW	0	DEGREES	END SPAN LENGTH	51.83	FT
SUPER. DATA IN REFERENCE TO SUB. DATA	ABUT 1		ADJACENT INTERIOR SPAN LENGTH	84.33	FT

SUPERSTRUCTURE POSITIVE MOMENT REGION DATA (END OR MAIN SPAN)

BEAM TYPE	WIDE FLANGE	
WIDE FLANGE	W33X130	
BEAM SPACING PERP. TO CL	7.08	FT
SLAB THICKNESS	8.00	IN
SLAB F'C	4.00	KSI

SUPERSTRUCTURE POSITIVE MOMENT REGION DATA (ADJACENT SPAN)

WIDE FLANGE	W33X130	
BEAM SPACING PERP. TO CL	7.08	FT
SLAB THICKNESS	8.00	IN
SLAB F'C	4.00	KSI

ABUTMENT #1 DATA

ABUTMENT NAME	West	
ABUTMENT REFERENCE BORING	EB-1	
BOTTOM OF ABUTMENT ELEVATION	753.81	FT
ESTIMATED NUMBER OF PILES AT ABUT.	9	
PILE SPACING PERP. TO CL	7.08	FT

ABUTMENT #2 DATA

ABUTMENT NAME	East	
ABUTMENT REFERENCE BORING	EB-5	
BOTTOM OF ABUTMENT ELEVATION	753.56	FT
ESTIMATED NUMBER OF PILES AT ABUT.	9	
PILE SPACING PERP. TO CL	7.08	FT

SOIL DATA FOR 10 FT BENEATH BOTTOM OF ABUTMENT #1

BOT. OF LAYER ELEV. (FT)	*LAYER THICKNESS (FT)*	*UNCONFINED COMPRESSIVE STRENGTH (TSF)*	*N S.P.T. VALUE (BLOWS/12 IN.)*	*Qu EQUIV. FOR N VALUE (TSF)*
752.00	1.81	4.0		
750.50	1.50	4.0		
748.00	2.50	2.3		
745.50	2.50	4.1		
743.81	1.69	4.1		

10.00 FT = TOTAL DEPTH ENTERED

SOIL DATA FOR 10 FT BENEATH BOTTOM OF ABUTMENT #2

BOT. OF LAYER ELEV. (FT)	*LAYER THICKNESS (FT)*	*UNCONFINED COMPRESSIVE STRENGTH (TSF)*	*N S.P.T. VALUE (BLOWS/12 IN.)*	*Qu EQUIV. FOR N VALUE (TSF)*
751.06	2.50	4.9		
748.56	2.50	5.7		
746.06	2.50	3.4		
743.56	2.50	3.40		

10.00 FT = TOTAL DEPTH ENTERED

WEIGHTED AVERAGE Qu FOR ABUTMENT #1 = 3.62 TSF

PILE STIFFNESS MODIFIER FOR ABUTMENT #1
= 1/(1.45-[0.3*3.62]) = 2.74

WEIGHTED AVERAGE Qu FOR ABUTMENT #2 = 4.35 TSF

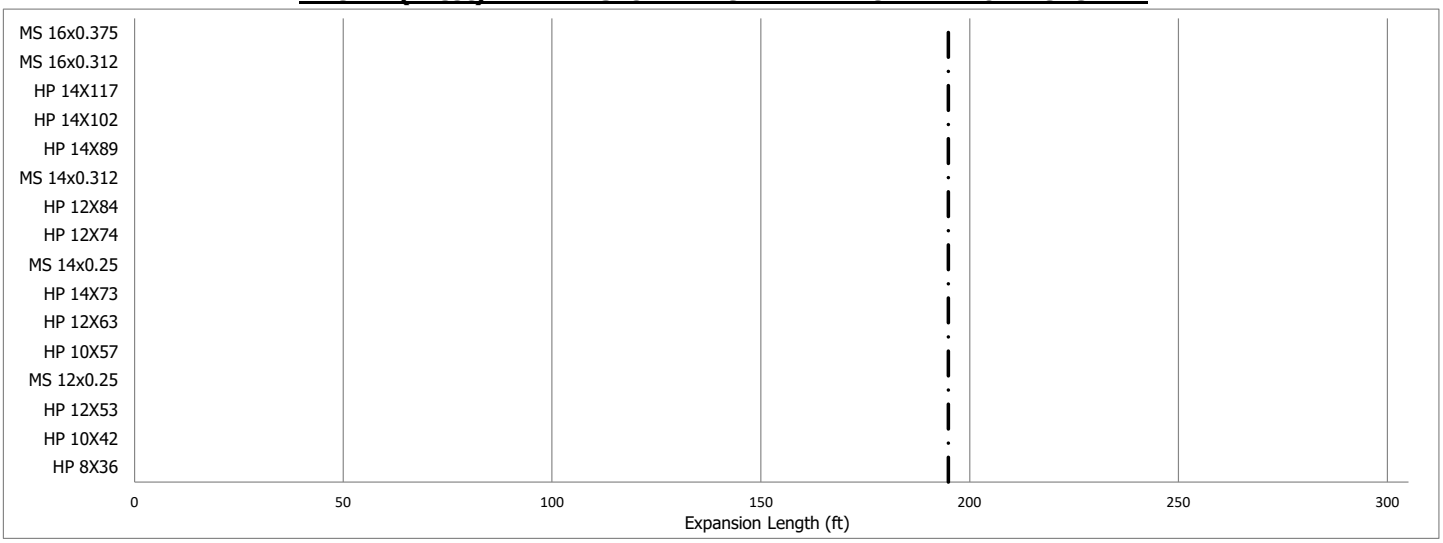
PILE STIFFNESS MODIFIER FOR ABUTMENT #2
= 1/(1.45-[0.3*4.35]) = 6.90

WEIGHTED AVG. Qu > 3.0 TSF WITH TRIB. LENGTH > 20%, INTEGRAL ABUTMENT STRUCTURE NOT ALLOWED

DISTANCE TO CENTROID OF STIFFNESS FROM ABUTMENT #1 = [2.74*9*0+6.9*9*272.33]/[2.74*9+6.9*9] = ~~194.89~~ FT

DISTANCE TO CENTROID OF STIFFNESS FROM ABUTMENT #2 = [6.9*9*0+2.74*9*272.33]/[6.9*9+2.74*9] = ~~77.44~~ FT

ABUT 1 (West) - EXPANSION LENGTH LIMIT CHART - 0 DEG. SKEW



= Estimated expansion length for the indicated abutment. Piles with an expansion length greater than this are suitable for consideration.
(Note: The same size pile should be used at both abutments.)

In Situ

Illinois Department of Transportation

INTEGRAL ABUTMENT FEASIBILITY ANALYSIS

Modified 10/30/17

GENERAL DATA

STRUCTURE NUMBER	010-0297 (WB)		TOTAL STRUCTURE LENGTH	272.33	FT
STRUCTURE TYPE	MULTI-SPAN		NUMBER OF SPANS	4	
STRUCTURE SKEW	0	DEGREES	END SPAN LENGTH	51.83	FT
SUPER. DATA IN REFERENCE TO SUB. DATA	ABUT 1		ADJACENT INTERIOR SPAN LENGTH	84.33	FT

SUPERSTRUCTURE POSITIVE MOMENT REGION DATA (END OR MAIN SPAN)

BEAM TYPE	WIDE FLANGE	
WIDE FLANGE	W33X130	
BEAM SPACING PERP. TO CL	7.08	FT
SLAB THICKNESS	8.00	IN
SLAB F'C	4.00	KSI

SUPERSTRUCTURE POSITIVE MOMENT REGION DATA (ADJACENT SPAN)

WIDE FLANGE	W33X130	
BEAM SPACING PERP. TO CL	7.08	FT
SLAB THICKNESS	8.00	IN
SLAB F'C	4.00	KSI

ABUTMENT #1 DATA

ABUTMENT NAME	West	
ABUTMENT REFERENCE BORING	WB-1	
BOTTOM OF ABUTMENT ELEVATION	753.87	FT
ESTIMATED NUMBER OF PILES AT ABUT.	9	
PILE SPACING PERP. TO CL	7.08	FT

ABUTMENT #2 DATA

ABUTMENT NAME	East	
ABUTMENT REFERENCE BORING	WB-5	
BOTTOM OF ABUTMENT ELEVATION	753.52	FT
ESTIMATED NUMBER OF PILES AT ABUT.	9	
PILE SPACING PERP. TO CL	7.08	FT

SOIL DATA FOR 10 FT BENEATH BOTTOM OF ABUTMENT #1

BOT. OF LAYER ELEV. (FT)	*LAYER THICKNESS (FT)*	*UNCONFINED COMPRESSIVE STRENGTH (TSF)*	*N S.P.T. VALUE (BLOWS/12 IN.)*	*Qu EQUIV. FOR N VALUE (TSF)*
752.00	1.87	3.5		
750.50	1.50	3.7		
748.00	2.50	3.2		
745.50	2.50	3.2		
743.87	1.63	5.3		

10.00 FT = TOTAL DEPTH ENTERED

SOIL DATA FOR 10 FT BENEATH BOTTOM OF ABUTMENT #2

BOT. OF LAYER ELEV. (FT)	*LAYER THICKNESS (FT)*	*UNCONFINED COMPRESSIVE STRENGTH (TSF)*	*N S.P.T. VALUE (BLOWS/12 IN.)*	*Qu EQUIV. FOR N VALUE (TSF)*
752.00	1.52	1.4		
750.50	1.50	2.8		
748.00	2.50	4.1		
745.50	2.50	5.20		
743.52	1.98	5.00		

10.00 FT = TOTAL DEPTH ENTERED

WEIGHTED AVERAGE Qu FOR ABUTMENT #1 = 3.67 TSF

PILE STIFFNESS MODIFIER FOR ABUTMENT #1
= 1/(1.45-[0.3*3.67]) = 2.87

WEIGHTED AVERAGE Qu FOR ABUTMENT #2 = 3.95 TSF

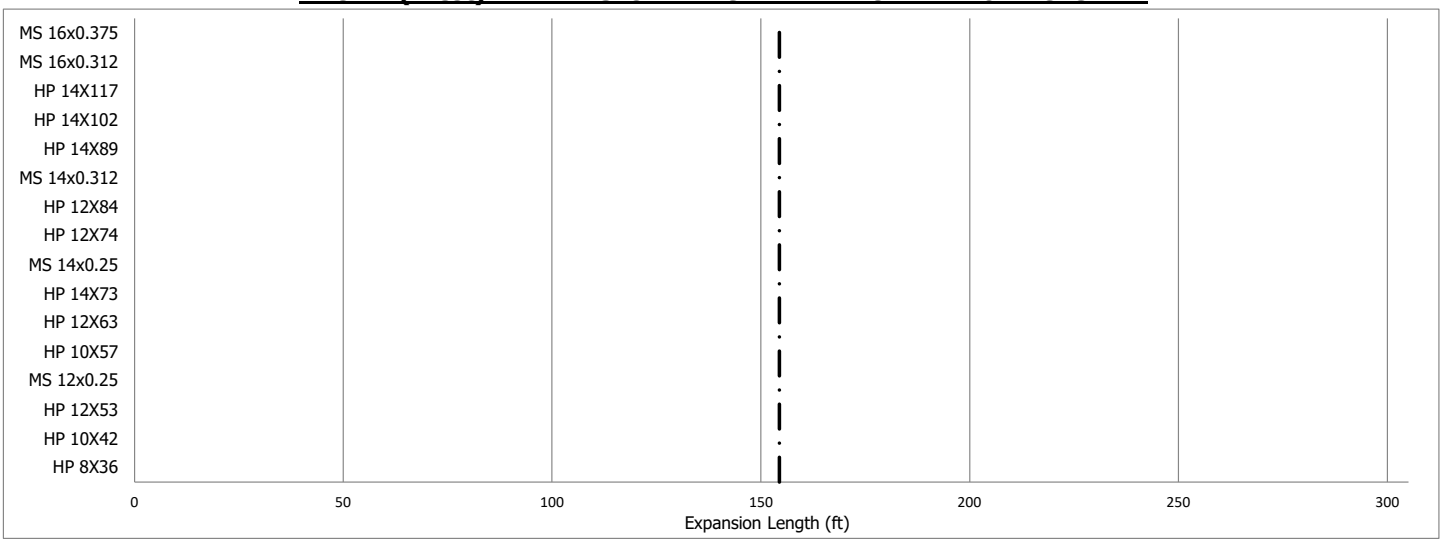
PILE STIFFNESS MODIFIER FOR ABUTMENT #2
= 1/(1.45-[0.3*3.95]) = 3.76

WEIGHTED AVG. Qu > 3.0 TSF WITH TRIB. LENGTH > 20%, INTEGRAL ABUTMENT STRUCTURE NOT ALLOWED

DISTANCE TO CENTROID OF STIFFNESS FROM ABUTMENT #1 = [2.87*9*0+3.76*9*272.33]/[2.87*9+3.76*9] = ~~154.43~~ FT

DISTANCE TO CENTROID OF STIFFNESS FROM ABUTMENT #2 = [3.76*9*0+2.87*9*272.33]/[3.76*9+2.87*9] = ~~117.90~~ FT

ABUT 1 (West) - EXPANSION LENGTH LIMIT CHART - 0 DEG. SKEW



= *Estimated expansion length for the indicated abutment. Piles with an expansion length greater than this are suitable for consideration.*
(Note: The same size pile should be used at both abutments.)

Bentonite

Illinois Department of Transportation

INTEGRAL ABUTMENT FEASIBILITY ANALYSIS

Modified 10/30/17

GENERAL DATA

STRUCTURE NUMBER	010-0296/0297		TOTAL STRUCTURE LENGTH	272.33	FT
STRUCTURE TYPE	MULTI-SPAN		NUMBER OF SPANS	4	
STRUCTURE SKEW	0	DEGREES	END SPAN LENGTH	51.83	FT
SUPER. DATA IN REFERENCE TO SUB. DATA	ABUT 1		ADJACENT INTERIOR SPAN LENGTH	84.33	FT

SUPERSTRUCTURE POSITIVE MOMENT REGION DATA (END OR MAIN SPAN)

BEAM TYPE	WIDE FLANGE	
WIDE FLANGE	W33X130	
BEAM SPACING PERP. TO CL	7.08	FT
SLAB THICKNESS	8.00	IN
SLAB F'C	4.00	KSI

SUPERSTRUCTURE POSITIVE MOMENT REGION DATA (ADJACENT SPAN)

WIDE FLANGE	W33X130	
BEAM SPACING PERP. TO CL	7.08	FT
SLAB THICKNESS	8.00	IN
SLAB F'C	4.00	KSI

ABUTMENT #1 DATA

ABUTMENT NAME	West	
ABUTMENT REFERENCE BORING	EB-1	
BOTTOM OF ABUTMENT ELEVATION	753.81	FT
ESTIMATED NUMBER OF PILES AT ABUT.	9	
PILE SPACING PERP. TO CL	7.08	FT

ABUTMENT #2 DATA

ABUTMENT NAME	East	
ABUTMENT REFERENCE BORING	EB-5	
BOTTOM OF ABUTMENT ELEVATION	753.56	FT
ESTIMATED NUMBER OF PILES AT ABUT.	9	
PILE SPACING PERP. TO CL	7.08	FT

SOIL DATA FOR 10 FT BENEATH BOTTOM OF ABUTMENT #1

BOT. OF LAYER ELEV. (FT)	*LAYER THICKNESS (FT)*	*UNCONFINED COMPRESSIVE STRENGTH (TSF)*	*N S.P.T. VALUE (BLOWS/12 IN.)*	*Qu EQUIV. FOR N VALUE (TSF)*
751.31	2.50	1.5		
748.81	2.50	1.5		
746.31	2.50	1.5		
743.81	2.50	1.5		

10.00 FT = TOTAL DEPTH ENTERED

SOIL DATA FOR 10 FT BENEATH BOTTOM OF ABUTMENT #2

BOT. OF LAYER ELEV. (FT)	*LAYER THICKNESS (FT)*	*UNCONFINED COMPRESSIVE STRENGTH (TSF)*	*N S.P.T. VALUE (BLOWS/12 IN.)*	*Qu EQUIV. FOR N VALUE (TSF)*
751.06	2.50	1.5		
748.56	2.50	1.5		
746.06	2.50	1.5		
743.56	2.50	1.50		

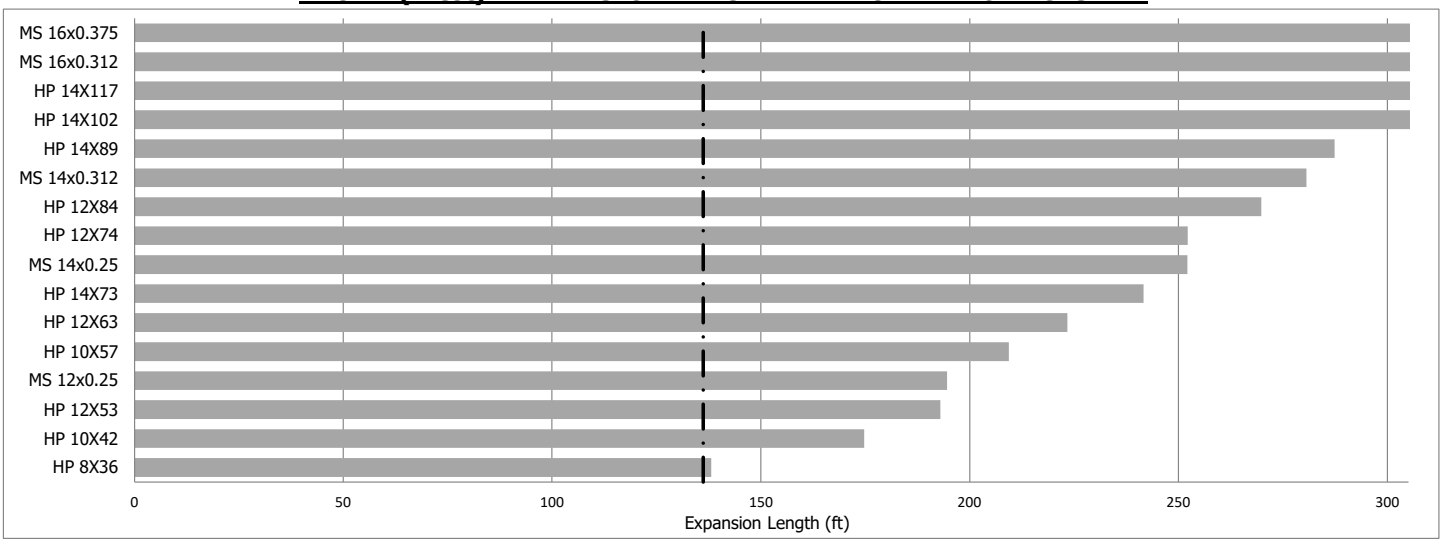
10.00 FT = TOTAL DEPTH ENTERED

WEIGHTED AVERAGE Qu FOR ABUTMENT #1	1.50	TSF	WEIGHTED AVERAGE Qu FOR ABUTMENT #2	1.50	TSF
PILE STIFFNESS MODIFIER FOR ABUTMENT #1 = 1/(1.45-[0.3*1.5])	1.00		PILE STIFFNESS MODIFIER FOR ABUTMENT #2 = 1/(1.45-[0.3*1.5])	1.00	

DISTANCE TO CENTROID OF STIFFNESS FROM ABUTMENT #1 = [1*9*0+1*9*272.33]/[1*9+1*9] = 136.17 FT

DISTANCE TO CENTROID OF STIFFNESS FROM ABUTMENT #2 = [1*9*0+1*9*272.33]/[1*9+1*9] = 136.17 FT

ABUT 1 (West) - EXPANSION LENGTH LIMIT CHART - 0 DEG. SKEW



— · — · — = *Estimated expansion length for the indicated abutment. Piles with an expansion length greater than this are suitable for consideration.*
(Note: The same size pile should be used at both abutments.)

Appendix G

Driven Pile Analysis

Illinois Department of Transportation

IDOT STATIC METHOD OF ESTIMATING PILE LENGTH

SUBSTRUCTURE========== West Abutment - 0296
REFERENCE BORING ========== EB-1
LRFD or ASD or SEISMIC ========== LRFD
PILE CUTOFF ELEV. ========== 755.81 ft
GROUND SURFACE ELEV. AGAINST PILE DURING DRIVING = 743.81 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 ========== 1550 kips
TOTAL LENGTH OF SUBSTRUCTURE (along skew)========== 62.83 ft
NUMBER OF ROWS OF PILES PER SUBSTRUCTURE ======= 1
Approx. Factored Loading Applied per pile at 8 ft. Cts ========== 197.36 KIPS
Approx. Factored Loading Applied per pile at 3 ft. Cts ========== 74.01 KIPS

PILE TYPE AND SIZE ========== Metal Shell 14"Φ w/.25" 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
459 KIPS	**447** KIPS	**246** KIPS	**59** 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.)
742.00	1.81	4.10	11		20.1		***62.3***				62	0	0	34	14
740.50	1.50	3.60	11		15.1	42.2	***66.8***				67	0	0	37	15
738.00	2.50	2.70			20.4	31.7	***75.4***				75	0	0	41	18
735.50	2.50	1.70			15.0	19.9	***131.5***				131	0	0	72	20
732.00	3.50	5.20	13		41.7	61.0	***168.5***				169	0	0	93	24
727.00	5.00	4.80	14		59.6	56.3	***196.5***				197	0	0	108	29
724.25	2.75	2.10			18.9	24.6	***224.8***				225	0	0	124	32
720.50	3.75	2.90			32.1	34.0	***257.0***				257	0	0	141	35
717.00	3.50	2.90			30.0	34.0	***290.5***				290	0	0	160	39
712.00	5.00	3.20	8		46.0	37.5	***318.9***				319	0	0	175	44
707.00	5.00	1.70			30.0	19.9	***348.9***				349	0	0	192	49
702.00	5.00	1.70			30.0	19.9	***398.9***				399	0	0	219	54
697.00	5.00	3.40	13		48.1	39.9	***447.0***				447	0	0	246	59
692.00	5.00	3.40	10		48.1	39.9	***477.5***				~~477~~	~~0~~	~~0~~	~~263~~	~~64~~
687.00	5.00	1.90			32.3	22.3	***509.8***				~~510~~	~~0~~	~~0~~	~~280~~	~~69~~
682.00	5.00	1.90			32.3	22.3	***526.8***				~~527~~	~~0~~	~~0~~	~~290~~	~~74~~
677.00	5.00	0.60			13.2	7.0	***550.6***				~~551~~	~~0~~	~~0~~	~~303~~	~~79~~
674.25	2.75	1.50			15.2	17.6	***1052.9***				~~1053~~	~~0~~	~~0~~	~~579~~	~~82~~
670.75	3.50		100	Hard Till	139.7	504.7	***1192.6***				~~1193~~	~~0~~	~~0~~	~~656~~	~~85~~
667.25	3.50		100	Hard Till	139.7	504.7	***1236.4***				~~1236~~	~~0~~	~~0~~	~~680~~	~~89~~
662.25	5.00		81	Hard Till	134.6	408.8	***1466.9***				~~1467~~	~~0~~	~~0~~	~~807~~	~~94~~
657.25	5.00		100	Hard Till		504.7									

Illinois Department of Transportation

IDOT STATIC METHOD OF ESTIMATING PILE LENGTH

SUBSTRUCTURE========== East Abutment - 0296
REFERENCE BORING ========== EB-5
LRFD or ASD or SEISMIC ========== LRFD
PILE CUTOFF ELEV. ========== 755.56 ft
GROUND SURFACE ELEV. AGAINST PILE DURING DRIVING = 743.56 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 ========== 1550 kips
TOTAL LENGTH OF SUBSTRUCTURE (along skew)========== 58.83 ft
NUMBER OF ROWS OF PILES PER SUBSTRUCTURE ======= 1
Approx. Factored Loading Applied per pile at 8 ft. Cts ========== 210.78 KIPS
Approx. Factored Loading Applied per pile at 3 ft. Cts ========== 79.04 KIPS

PILE TYPE AND SIZE ========== Metal Shell 14"Φ w/.25" 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
459 KIPS	**451** KIPS	**248** KIPS	**54** 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.)
742.00	1.56	6.60	13		18.6		***72.5***				73	0	0	40	14
739.50	2.50	4.60	17		29.8	53.9	***95.3***				95	0	0	52	16
737.00	2.50	4.00	14		27.2	46.9	***130.7***				131	0	0	72	19
734.50	2.50	4.70	12		29.8	55.1	***139.4***				139	0	0	77	21
731.00	3.50	2.90			30.0	34.0	***176.5***				176	0	0	97	25
728.50	2.50	3.50	8		24.6	41.0	***188.1***				188	0	0	103	27
726.00	2.50	2.40			18.8	28.1	***224.5***				225	0	0	123	30
721.00	5.00	3.90	11		53.3	45.7	***261.4***				261	0	0	144	35
718.25	2.75	2.50			21.3	29.3	***253.4***				253	0	0	139	37
713.25	5.00		11	Fine Sand	0.0	0.0	***305.0***				305	0	0	168	42
709.75	3.50	4.40	11		41.0	51.6	***346.0***				346	0	0	190	46
706.25	3.50	4.40	11		41.0	51.6	***389.3***				389	0	0	214	49
701.25	5.00	4.60	10		59.6	53.9	***451.3***				451	0	0	248	54
696.25	5.00	4.80	12		59.6	56.3	***522.7***				~~523~~	~~0~~	~~0~~	~~287~~	~~59~~
691.25	5.00	5.80	13		59.6	68.0	***584.6***				~~585~~	~~0~~	~~0~~	~~322~~	~~64~~
686.25	5.00	6.00	17		59.6	70.4	***653.6***				~~654~~	~~0~~	~~0~~	~~360~~	~~69~~
681.25	5.00	6.80	21		59.6	79.7	***698.0***				~~698~~	~~0~~	~~0~~	~~384~~	~~74~~
676.25	5.00	5.50	17		59.6	64.5	***693.2***				~~693~~	~~0~~	~~0~~	~~381~~	~~79~~
673.25	3.00		79	Hard Till	0.0	0.0	***693.2***				~~693~~	~~0~~	~~0~~	~~381~~	~~82~~
668.25	5.00		59	Hard Till	0.0	0.0	***1026.3***				~~1026~~	~~0~~	~~0~~	~~564~~	~~87~~
663.25	5.00		66	Hard Till	93.3	333.1	***786.4***				~~786~~	~~0~~	~~0~~	~~433~~	~~92~~
659.75	3.50		100	Hard Till	0.0	0.0	***786.4***				~~786~~	~~0~~	~~0~~	~~433~~	~~96~~
654.75	5.00		100	Fine Sand		0.0									

IDOT STATIC METHOD OF ESTIMATING PILE LENGTH

SUBSTRUCTURE========== West Abutment - 0297
REFERENCE BORING ========== WB-1
LRFD or ASD or SEISMIC ========== LRFD
PILE CUTOFF ELEV. ========== 755.87 ft
GROUND SURFACE ELEV. AGAINST PILE DURING DRIVING = 743.87 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 ========== 1550 kips
TOTAL LENGTH OF SUBSTRUCTURE (along skew)========== 58.83 ft
NUMBER OF ROWS OF PILES PER SUBSTRUCTURE ======= 1
Approx. Factored Loading Applied per pile at 8 ft. Cts ========== 210.78 KIPS
Approx. Factored Loading Applied per pile at 3 ft. Cts ========== 79.04 KIPS

PILE TYPE AND SIZE ========== Metal Shell 14"Φ w/.25" 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
459 KIPS	**335** KIPS	**185** KIPS	**47** 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.)
743.00	0.87	5.30	10		10.4		***43.2***				43	0	0	24	13
740.50	2.50	2.80			20.9	32.8	***75.8***				76	0	0	42	15
738.00	2.50	3.80	8		26.1	44.6	***89.1***				89	0	0	49	18
735.50	2.50	2.70			20.4	31.7	***190.3***				190	0	0	105	20
732.50	3.00	9.60	21		35.8	112.6	***166.3***				166	0	0	91	23
729.25	3.25	4.50	18		38.8	52.8	***236.7***				237	0	0	130	27
724.25	5.00	7.20	16		59.6	84.4	***238.9***				239	0	0	131	32
719.25	5.00	2.30			36.5	27.0	***282.5***				282	0	0	155	37
714.25	5.00	2.90			42.8	34.0	***324.2***				324	0	0	178	42
709.25	5.00	2.80			41.8	32.8	***335.5***				335	0	0	185	47
704.25	5.00	0.20			4.7	2.3	***539.7***				~~540~~	~~0~~	~~0~~	~~297~~	~~52~~
701.75	2.50		30	Fine Sand	24.0	201.9	***563.7***				~~564~~	~~0~~	~~0~~	~~310~~	~~54~~
699.25	2.50		30	Fine Sand	24.0	201.9	***443.2***				443	0	0	244	57
694.25	5.00	4.90	24		59.6	57.5	***502.9***				~~503~~	~~0~~	~~0~~	~~277~~	~~62~~
689.25	5.00	4.90	16		59.6	57.5	***562.5***				~~562~~	~~0~~	~~0~~	~~309~~	~~67~~
684.25	5.00	4.90	15		59.6	57.5	***564.7***				~~565~~	~~0~~	~~0~~	~~311~~	~~72~~
679.25	5.00		51	Hard Till	0.0	0.0	***887.7***				~~888~~	~~0~~	~~0~~	~~488~~	~~77~~
674.25	5.00		64	Hard Till	88.4	323.0	***920.6***				~~921~~	~~0~~	~~0~~	~~506~~	~~82~~
669.25	5.00		53	Hard Till	64.6	267.5	***985.2***				~~985~~	~~0~~	~~0~~	~~542~~	~~87~~
664.25	5.00		53	Hard Till	64.6	267.5	***782.3***				~~782~~	~~0~~	~~0~~	~~430~~	~~92~~
659.25	5.00		100	Hard Till		0.0									

IDOT STATIC METHOD OF ESTIMATING PILE LENGTH

SUBSTRUCTURE========== East Abutment - 0297
REFERENCE BORING ========== WB-5
LRFD or ASD or SEISMIC ========== LRFD
PILE CUTOFF ELEV. ========== 755.52 ft
GROUND SURFACE ELEV. AGAINST PILE DURING DRIVING = 743.52 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 ========== 1550 kips
TOTAL LENGTH OF SUBSTRUCTURE (along skew)========== 62.83 ft
NUMBER OF ROWS OF PILES PER SUBSTRUCTURE ======= 1
Approx. Factored Loading Applied per pile at 8 ft. Cts ========== 197.36 KIPS
Approx. Factored Loading Applied per pile at 3 ft. Cts ========== 74.01 KIPS

PILE TYPE AND SIZE ========== Metal Shell 14"Φ w/.25" 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
459 KIPS	**434** KIPS	**239** KIPS	**53** 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.)
743.00	0.52	5.00	12		6.2		***30.8***				31	0	0	17	13
738.00	5.00	2.10			34.4	24.6	***77.0***				77	0	0	42	18
735.50	2.50	3.10	13		22.5	36.3	***98.3***				98	0	0	54	20
733.00	2.50	3.00	9		21.9	35.2	***112.0***				112	0	0	62	23
730.50	2.50	2.30			18.3	27.0	***125.6***				126	0	0	69	25
728.00	2.50	1.90			16.2	22.3	***146.5***				146	0	0	81	28
723.00	5.00	2.30	10		36.5	27.0	***224.0***				224	0	0	123	33
718.00	5.00	5.80	20		59.6	68.0	***276.6***				277	0	0	152	38
713.00	5.00	5.20	16		59.6	61.0	***323.4***				323	0	0	178	43
708.00	5.00	4.10	13		55.4	48.1	***378.8***				379	0	0	208	48
703.00	5.00	4.10	18		55.4	48.1	***434.2***				434	0	0	239	53
698.00	5.00	4.10	18		55.4	48.1	***489.7***				~~490~~	~~0~~	~~0~~	~~269~~	~~58~~
693.00	5.00	4.10	22		55.4	48.1	***545.1***				~~545~~	~~0~~	~~0~~	~~300~~	~~63~~
688.00	5.00	4.10	20		55.4	48.1	***552.5***				~~552~~	~~0~~	~~0~~	~~304~~	~~68~~
683.00	5.00		49	Hard Till	0.0	0.0	***597.0***				~~597~~	~~0~~	~~0~~	~~328~~	~~73~~
678.00	5.00	3.80	16		52.3	44.6	***604.7***				~~605~~	~~0~~	~~0~~	~~333~~	~~78~~
673.00	5.00		92	Hard Till	0.0	0.0	***604.7***				~~605~~	~~0~~	~~0~~	~~333~~	~~83~~
668.50	4.50		100	Hard Till	0.0	0.0	***907.6***				~~908~~	~~0~~	~~0~~	~~499~~	~~87~~
663.00	5.50		60	Hard Till	87.1	302.8	***691.9***				~~692~~	~~0~~	~~0~~	~~381~~	~~93~~
658.50	4.50		100	Hard Till	0.0	0.0	***691.9***				~~692~~	~~0~~	~~0~~	~~381~~	~~97~~
654.00	4.50		100	Hard Till		0.0									

IDOT STATIC METHOD OF ESTIMATING PILE LENGTH

SUBSTRUCTURE========== Pier 1 - 0296
REFERENCE BORING ========== EB-2
LRFD or ASD or SEISMIC ========== LRFD
PILE CUTOFF ELEV. ========== 732.50 ft
GROUND SURFACE ELEV. AGAINST PILE DURING DRIVING = 731.50 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 ========== 3000 kips
TOTAL LENGTH OF SUBSTRUCTURE (along skew)========== 55.00 ft
NUMBER OF ROWS OF PILES PER SUBSTRUCTURE ======= 2
Approx. Factored Loading Applied per pile at 8 ft. Cts ========== 218.18 KIPS
Approx. Factored Loading Applied per pile at 3 ft. Cts ========== 81.82 KIPS

PILE TYPE AND SIZE ========== Metal Shell 14"Φ w/.25" 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
459 KIPS	**416** KIPS	**229** KIPS	**37** 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.)
730.80	0.70	6.10	14		8.3		***81.0***				81	0	0	45	2
725.80	5.00	6.20	9		59.6	72.7	***163.0***				163	0	0	90	7
723.30	2.50	8.10	20		29.8	95.0	***159.9***				160	0	0	88	9
720.80	2.50	5.30	17		29.8	62.1	***185.1***				185	0	0	102	12
718.30	2.50	4.90	17		29.8	57.5	***213.7***				214	0	0	118	14
715.80	2.50	4.80	15		29.8	56.3	***247.0***				247	0	0	136	17
713.30	2.50	5.10	17		29.8	59.8	***256.9***				257	0	0	141	19
710.80	2.50	3.40	16		24.0	39.9	***331.4***				331	0	0	182	22
705.80	5.00	7.70	23		59.6	90.3	***359.4***				359	0	0	198	27
700.80	5.00	5.00	20		59.6	58.6	***383.8***				384	0	0	211	32
695.80	5.00	2.00			33.4	23.5	***416.0***				416	0	0	229	37
690.80	5.00	1.90			32.3	22.3	***488.2***				~~488~~	~~0~~	~~0~~	~~269~~	~~42~~
685.80	5.00	5.30	20		59.6	62.1	***547.9***				~~548~~	~~0~~	~~0~~	~~301~~	~~47~~
680.80	5.00	5.30	25		59.6	62.1	***1014.7***				~~1015~~	~~0~~	~~0~~	~~558~~	~~52~~
675.80	5.00		93	Hard Till	174.0	469.4	***1224.1***				~~1224~~	~~0~~	~~0~~	~~673~~	~~57~~
670.80	5.00		100	Hard Till	199.6	504.7	***1287.4***				~~1287~~	~~0~~	~~0~~	~~708~~	~~62~~
665.80	5.00		73	Hard Till	111.5	368.4	***1535.1***				~~1535~~	~~0~~	~~0~~	~~844~~	~~67~~
660.80	5.00		100	Hard Till	199.6	504.7	***1734.7***				~~1735~~	~~0~~	~~0~~	~~954~~	~~72~~
655.80	5.00		100	Hard Till		504.7									

IDOT STATIC METHOD OF ESTIMATING PILE LENGTH

SUBSTRUCTURE========== Pier 2 - 0296
REFERENCE BORING ========== EB-3
LRFD or ASD or SEISMIC ========== LRFD
PILE CUTOFF ELEV. ========== 732.50 ft
GROUND SURFACE ELEV. AGAINST PILE DURING DRIVING = 731.50 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 ========== 3400 kips
TOTAL LENGTH OF SUBSTRUCTURE (along skew)========== 55.00 ft
NUMBER OF ROWS OF PILES PER SUBSTRUCTURE ======= 2
Approx. Factored Loading Applied per pile at 8 ft. Cts ========== 247.27 KIPS
Approx. Factored Loading Applied per pile at 3 ft. Cts ========== 92.73 KIPS

PILE TYPE AND SIZE ========== Metal Shell 14"Φ w/.25" 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
459 KIPS	**409** KIPS	**225** KIPS	**49** 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.)
731.20	0.30	3.30	9		2.8		***50.9***				51	0	0	28	1
728.70	2.50	4.10	10		27.7	48.1	***102.1***				102	0	0	56	4
726.20	2.50	6.10	12		29.8	71.5	***117.8***				118	0	0	65	6
723.70	2.50	4.90	11		29.8	57.5	***147.6***				148	0	0	81	9
721.20	2.50	4.90	11		29.8	57.5	***154.0***				154	0	0	85	11
718.70	2.50	2.90			21.4	34.0	***190.7***				191	0	0	105	14
716.20	2.50	4.20	16		28.2	49.2	***229.4***				229	0	0	126	16
713.70	2.50	5.10	13		29.8	59.8	***220.6***				221	0	0	121	19
711.20	2.50	1.80			15.6	21.1	***251.4***				251	0	0	138	21
708.70	2.50	3.10	9		22.5	36.3	***279.7***				280	0	0	154	24
703.70	5.00	3.60	11		50.2	42.2	***293.6***				294	0	0	161	29
698.70	5.00	0.50			11.2	5.9	***309.5***				309	0	0	170	34
693.70	5.00	0.90			18.7	10.6	***335.2***				335	0	0	184	39
688.70	5.00	1.50			27.6	17.6	***379.2***				379	0	0	209	44
683.70	5.00	2.90			42.8	34.0	***409.1***				409	0	0	225	49
678.70	5.00	1.80			31.2	21.1	***853.3***				~~853~~	~~0~~	~~0~~	~~469~~	~~54~~
673.70	5.00		86	Hard Till	150.3	434.0	***837.0***				~~837~~	~~0~~	~~0~~	~~460~~	~~59~~
668.70	5.00		53	Hard Till	64.6	267.5	***851.2***				~~851~~	~~0~~	~~0~~	~~468~~	~~64~~
663.70	5.00		43	Hard Till	47.1	217.0	***1185.9***				~~1186~~	~~0~~	~~0~~	~~652~~	~~69~~
658.70	5.00		100	Hard Till	199.6	504.7	***1553.7***				~~1554~~	~~0~~	~~0~~	~~855~~	~~74~~
653.70	5.00		100	Fine Sand		672.9									

Illinois Department of Transportation

IDOT STATIC METHOD OF ESTIMATING PILE LENGTH

SUBSTRUCTURE========== Pier 3 - 0296
REFERENCE BORING ========== EB-4
LRFD or ASD or SEISMIC ========== LRFD
PILE CUTOFF ELEV. ========== 732.50 ft
GROUND SURFACE ELEV. AGAINST PILE DURING DRIVING = 731.50 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 ========== 3000 kips
TOTAL LENGTH OF SUBSTRUCTURE (along skew)========== 55.00 ft
NUMBER OF ROWS OF PILES PER SUBSTRUCTURE ======= 2
Approx. Factored Loading Applied per pile at 8 ft. Cts ========== 218.18 KIPS
Approx. Factored Loading Applied per pile at 3 ft. Cts ========== 81.82 KIPS

PILE TYPE AND SIZE ========== Metal Shell 14"Φ w/.25" 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
459 KIPS	**391** KIPS	**215** KIPS	**47** 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.)
730.80	0.70	3.10	12		6.3		***40.3***				40	0	0	22	2
728.30	2.50	2.90			21.4	34.0	***61.7***				62	0	0	34	4
725.80	2.50	2.90			21.4	34.0	***94.9***				95	0	0	52	7
723.30	2.50	3.90	12		26.7	45.7	***109.8***				110	0	0	60	9
720.80	2.50	2.90			21.4	34.0	***125.4***				125	0	0	69	12
718.30	2.50	2.40			18.8	28.1	***137.1***				137	0	0	75	14
715.80	2.50	1.80			15.6	21.1	***151.5***				152	0	0	83	17
713.30	2.50	1.70			15.0	19.9	***168.9***				169	0	0	93	19
710.80	2.50	1.90			16.2	22.3	***179.2***				179	0	0	99	22
705.80	5.00	1.40			26.3	16.4	***205.5***				206	0	0	113	27
700.80	5.00	1.40			26.3	16.4	***262.3***				262	0	0	144	32
695.80	5.00	4.00	17		54.4	46.9	***292.1***				292	0	0	161	37
690.80	5.00	1.90			32.3	22.3	***373.6***				374	0	0	205	42
685.80	5.00	6.10	26		59.6	71.5	***391.1***				391	0	0	215	47
680.80	5.00	2.50			38.6	29.3	***768.8***				~~769~~	~~0~~	~~0~~	~~423~~	~~52~~
675.80	5.00		73	Hard Till	111.5	368.4	***824.8***				~~825~~	~~0~~	~~0~~	~~454~~	~~57~~
670.80	5.00		62	Hard Till	83.7	312.9	***928.7***				~~929~~	~~0~~	~~0~~	~~511~~	~~62~~
665.80	5.00		66	Hard Till	93.3	333.1	***1133.0***				~~1133~~	~~0~~	~~0~~	~~623~~	~~67~~
660.80	5.00		88	Hard Till		444.1									

Illinois Department of Transportation

IDOT STATIC METHOD OF ESTIMATING PILE LENGTH

SUBSTRUCTURE========== Pier 1 - 0297
REFERENCE BORING ========== WB-2
LRFD or ASD or SEISMIC ========== LRFD
PILE CUTOFF ELEV. ========== 732.50 ft
GROUND SURFACE ELEV. AGAINST PILE DURING DRIVING = 731.50 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 ========== 3000 kips
TOTAL LENGTH OF SUBSTRUCTURE (along skew)========== 55.00 ft
NUMBER OF ROWS OF PILES PER SUBSTRUCTURE ======= 2
Approx. Factored Loading Applied per pile at 8 ft. Cts ========== 218.18 KIPS
Approx. Factored Loading Applied per pile at 3 ft. Cts ========== 81.82 KIPS

PILE TYPE AND SIZE ========== Metal Shell 14"Φ w/.25" 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
459 KIPS	**411** KIPS	**226** KIPS	**41** 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.)
731.10	0.40	5.50	15		4.8		***47.0***				47	0	0	26	1
726.10	5.00	3.60	12		50.2	42.2	***137.0***				137	0	0	75	6
723.60	2.50	7.00	19		29.8	82.1	***123.5***				123	0	0	68	9
721.10	2.50	3.30	17		23.5	38.7	***148.2***				148	0	0	81	11
718.60	2.50	3.40	17		24.0	39.9	***186.3***				186	0	0	102	14
716.10	2.50	4.60	18		29.8	53.9	***217.3***				217	0	0	119	16
714.60	1.50	4.70	17		17.9	55.1	***294.4***				294	0	0	162	18
712.10	2.50		17	Fine Sand	13.5	114.4	***270.9***				271	0	0	149	20
706.10	6.00	6.60	20		71.6	77.4	***272.1***				272	0	0	150	26
701.10	5.00	0.60			13.2	7.0	***285.3***				285	0	0	157	31
696.10	5.00	0.60			13.2	7.0	***344.2***				344	0	0	189	36
691.10	5.00	4.50	25		59.6	52.8	***410.9***				411	0	0	226	41
686.10	5.00	5.10	26		59.6	59.8	***469.3***				~~469~~	~~0~~	~~0~~	~~258~~	~~46~~
681.10	5.00	5.00	23		59.6	58.6	***783.3***				~~783~~	~~0~~	~~0~~	~~431~~	~~51~~
676.10	5.00		62	Hard Till	83.7	312.9	***1038.6***				~~1039~~	~~0~~	~~0~~	~~571~~	~~56~~
671.10	5.00		96	Hard Till	184.7	484.5	***1097.2***				~~1097~~	~~0~~	~~0~~	~~603~~	~~61~~
666.10	5.00		71	Hard Till	106.1	358.3	***1097.2***				~~1097~~	~~0~~	~~0~~	~~603~~	~~66~~
661.10	5.00		50	Hard Till		252.4									

Illinois Department of Transportation

IDOT STATIC METHOD OF ESTIMATING PILE LENGTH

SUBSTRUCTURE========== Pier 2 - 0297
REFERENCE BORING ========== WB-3
LRFD or ASD or SEISMIC ========== LRFD
PILE CUTOFF ELEV. ========== 732.50 ft
GROUND SURFACE ELEV. AGAINST PILE DURING DRIVING = 731.50 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 ========== 3400 kips
TOTAL LENGTH OF SUBSTRUCTURE (along skew)========== 55.00 ft
NUMBER OF ROWS OF PILES PER SUBSTRUCTURE ======= 2
Approx. Factored Loading Applied per pile at 8 ft. Cts ========== 247.27 KIPS
Approx. Factored Loading Applied per pile at 3 ft. Cts ========== 92.73 KIPS

PILE TYPE AND SIZE ========== Metal Shell 14"Φ w/.25" 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
459 KIPS	**425** KIPS	**234** KIPS	**42** 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.)
730.90	0.60	2.60			4.8		***34.1***				34	0	0	19	2
728.40	2.50	2.50			19.3	29.3	***53.4***				53	0	0	29	4
725.90	2.50	2.50			19.3	29.3	***107.9***				108	0	0	59	7
723.40	2.50	5.50	13		29.8	64.5	***145.9***				146	0	0	80	9
720.90	2.50	6.20	12		29.8	72.7	***173.4***				173	0	0	95	12
718.40	2.50	6.00	8		29.8	70.4	***209.1***				209	0	0	115	14
715.90	2.50	6.50	12		29.8	76.2	***215.4***				215	0	0	118	17
713.40	2.50	4.50	14		29.8	52.8	***225.3***				225	0	0	124	19
710.90	2.50	2.80			20.9	32.8	***252.1***				252	0	0	139	22
705.90	5.00	3.30	12		47.0	38.7	***329.6***				330	0	0	181	27
703.15	2.75	5.90	11		32.8	69.2	***374.0***				374	0	0	206	29
698.15	5.00		12	Fine Sand	19.0	80.8	***347.4***				347	0	0	191	34
695.00	3.15	3.00			27.6	35.2	***375.1***				375	0	0	206	38
691.00	4.00	3.00			35.1	35.2	***425.4***				425	0	0	234	42
686.00	5.00	4.30	17		57.5	50.4	***479.4***				~~479~~	~~0~~	~~0~~	~~264~~	~~47~~
681.00	5.00	4.00	10		54.4	46.9	***875.5***				~~876~~	~~0~~	~~0~~	~~482~~	~~52~~
676.00	5.00		77	Hard Till	122.7	388.6	***1063.9***				~~1064~~	~~0~~	~~0~~	~~585~~	~~57~~
671.00	5.00		90	Hard Till	163.6	454.2	***1091.2***				~~1091~~	~~0~~	~~0~~	~~600~~	~~62~~
666.00	5.00		63	Hard Till	86.1	318.0	***1364.0***				~~1364~~	~~0~~	~~0~~	~~750~~	~~67~~
661.00	5.00		100	Hard Till		504.7									

IDOT STATIC METHOD OF ESTIMATING PILE LENGTH

SUBSTRUCTURE========== Pier 3 - 0297
REFERENCE BORING ========== WB-4
LRFD or ASD or SEISMIC ========== LRFD
PILE CUTOFF ELEV. ========== 732.50 ft
GROUND SURFACE ELEV. AGAINST PILE DURING DRIVING = 731.50 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 ========== 3000 kips
TOTAL LENGTH OF SUBSTRUCTURE (along skew)========== 55.00 ft
NUMBER OF ROWS OF PILES PER SUBSTRUCTURE ======= 2
Approx. Factored Loading Applied per pile at 8 ft. Cts ========== 218.18 KIPS
Approx. Factored Loading Applied per pile at 3 ft. Cts ========== 81.82 KIPS

PILE TYPE AND SIZE ========== Metal Shell 14"Φ w/.25" 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
459 KIPS	**459** KIPS	**252** KIPS	**43** 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.)
731.00	0.50	1.20			2.4		***43.4***				43	0	0	24	2
728.50	2.50	3.50	10		24.6	41.0	***68.0***				68	0	0	37	4
726.00	2.50	3.50	10		24.6	41.0	***98.4***				98	0	0	54	7
723.50	2.50	4.00	12		27.2	46.9	***132.6***				133	0	0	73	9
721.00	2.50	4.60	15		29.8	53.9	***162.4***				162	0	0	89	12
718.50	2.50	4.60	17		29.8	53.9	***181.7***				182	0	0	100	14
716.00	2.50	3.70	15		25.6	43.4	***197.9***				198	0	0	109	17
713.50	2.50	2.90			21.4	34.0	***227.6***				228	0	0	125	19
711.00	2.50	3.60	15		25.1	42.2	***239.8***				240	0	0	132	22
706.00	5.00	2.50			38.6	29.3	***294.8***				295	0	0	162	27
701.00	5.00	3.90	14		53.3	45.7	***362.2***				362	0	0	199	32
698.25	2.75	5.10	17		32.8	59.8	***422.7***				423	0	0	232	34
693.25	5.00		13	Fine Sand	20.6	87.5	***410.9***				411	0	0	226	39
689.25	4.00	4.70	24		47.7	55.1	***458.6***				459	0	0	252	43
686.00	3.25	4.70	24		38.8	55.1	***618.9***				~~619~~	~~0~~	~~0~~	~~340~~	~~47~~
681.00	5.00		35	Hard Till	35.8	176.6	***856.7***				~~857~~	~~0~~	~~0~~	~~471~~	~~52~~
676.00	5.00		75	Hard Till	117.0	378.5	***1099.8***				~~1100~~	~~0~~	~~0~~	~~605~~	~~57~~
671.00	5.00		100	Hard Till	199.6	504.7	***1299.4***				~~1299~~	~~0~~	~~0~~	~~715~~	~~62~~
666.00	5.00		100	Hard Till		504.7									