STRUCTURE GEOTECHNICAL REPORT
RIVER ROAD OVER INTERSTATE 80 BRIDGE
EX SN 099-0177, PR SN 099-8304
WILL COUNTY, ILLINOIS

For
Stantec

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Submitted by

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11. Abstract

A new, two-span bridge will replace the existing four-span bridge carrying River Road over Interstate 80 in Will County, Illinois. The proposed structure will have a back-to-back of abutments length of 233.7 feet and an out-to-out width of 43.8 feet. The proposed north and south abutment cap base elevations are 586.99 and 587.16 feet, respectively, whereas the proposed pier cap base elevation is 571.18 feet. The portion of River Road extending about 300 and 350 feet, north and south of the bridge, respectively, will be reconstructed. Additionally, two new retaining walls are proposed along the northeast and southeast sides of the bridge. This report provides geotechnical recommendations for the design and construction of the proposed approach embankments, approach slabs, and bridge foundations.

The pavement structure along River Road consists of 4 to 11 inches of asphalt pavement over 1 to 22 inches of aggregate base. Beneath the pavement or at the surface, the general lithologic profile includes up to 20.0 feet of existing embankment materials consisting of stiff to hard silty clay to silty clay loam fill followed by 2.5 to 4.0 feet of stiff to very stiff silty clay and silty clay loam overlying medium dense sandy gravel overlying medium dense silty loam to loam and very dense sandy gravel. Dolostone bedrock was encountered at elevations of about 563 to 560 feet. The groundwater level was measured at elevations ranging from 568 to 563 feet.

The approach embankments behind the north and south abutments will undergo an estimated 0.3 inches of total long-term settlement. Global stability analyses at the embankments show FOS meeting the IDOT minimum requirement of 1.5. The maximum factored bearing resistance for the approach footings is 2,500 psf.

The bridge abutments could be supported on driven H-piles. To support the integral abutments, driven HP12x53, HP 12x74, HP 14x73, and HP14x89 steel piles will provide 230 to 388 kips of factored resistance at total lengths of 28 to 31 feet. We do not anticipate the need for downdrag allowances on the piles. The pier could be supported on either rock-socketed drilled shafts or spread footings. Rock-socketed shafts would have factored resistances of about 900 to 2,450 kips for 3.0- to 5.0-foot diameter sockets. Spread footings at the pier can be designed based on a maximum factored bearing resistance of 40 ksf.

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TABLE OF CONTENTS

List of Tables

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1.0 INTRODUCTION

This report presents the results of our subsurface investigation, laboratory testing, geotechnical evaluations, and recommendations in support of the design and reconstruction of the existing bridge (EX SN 099-0177) carrying River Road over Interstate 80 (I-80) in Troy Township, Illinois. The project area is located in west central Will County, along I-80, about 2.0 miles northeast of the Village of Minooka. On the USGS *Channahon Quadrangle 7.5 Minute Series* map, the project is located along the separation line between Section 28 and Section 29, Tier 35 N, Range 9 E of the Third Principal Meridian (Exhibit 1).

Wang Engineering, Inc. (Wang) understands the proposed work will include the reconstruction of about 300 and 350 feet of the approach roadway north and south of the bridge replacement, respectively. Additionally, two new retaining walls are proposed along the northeast and southeast sides of the bridge. The bridge replacement, retaining walls, and roadway reconstruction are part of the proposed widening and reconstruction of I-80 from east of Ridge Road to west of Houbolt Road in Will County, Illinois. The River Road Bridge, retaining walls, and roadway will be reconstructed as part of Advanced Contract CR-2.

The purpose of this investigation was to characterize the site soil and groundwater conditions, perform geotechnical analyses, and provide recommendations for the design and construction of the proposed bridge foundations and approach slabs. Recommendations pertaining to the River Road roadway reconstruction will be included in the Roadway Geotechnical Report that will be prepared for the I-80 mainline (Contract ML-1) whereas recommendations pertaining to the construction of the retaining walls proposed along River Road will be provided in separate Structure Geotechnical Reports (SGRs).

1.1 Existing Structure and Ground Conditions

Based on the *Bridge Condition Report (BCR)*, dated April 2015 and provided by Stantec, and the *General Plan and Elevation (GPE)* drawing prepared and provided by HBM Engineering Group, LLC (HBM) and dated December 17, 2021, we understand the existing bridge (SN 099-0177) was originally built in 1959 as a four-span, PPC I-beam structure supported by concrete multi-bent piers and concrete stub abutments. The piers are supported on spread footings founded on bedrock, whereas the abutments are supported on steel piles. The existing bridge has a length of 219.6 feet from back-to-back of abutments and an out-to-out width of 30.0 feet. Reinforced concrete slope walls are located at the ends of the structure.

The site surface elevation slopes gently east toward the DuPage River, from as high as 575.0 feet to as low as 565.0 feet near the River. DuPage River runs south about 0.25 miles east of the bridge. Surface elevations are about 593.0 feet along River Road near the abutments and about 571.0 feet along I-80 near the piers. Along River Road, the roadway elevation varies from 593.0 to 573.0 feet.

In the project area (see Exhibit 2), about 15-foot thick overburden made up of low to moderate plasticity, medium to high strength, and low to moderate moisture content silty clayey diamicton resting over granular, very dense, low compressibility sand and gravel outwash unconformably covers the bedrock (Bauer et al. 1991, Hansel and Johnson 1996, Leighton et al. 1948, Willman et al. 1971). The bedrock is made up of shale and dolostone. Top of bedrock is mapped at about 565.0 feet elevation. The site is located within the inactive Sandwich Fault Zone (Kolata 2005). The shallow bedrock is highly weathered and may show the presence of cavities more likely filled with fine sediment. Records of mining activity in the vicinity of the bridge are missing. Neither the overburden nor the upper bedrock is known to include significant sources of water supply (Woller and Sanderson 1983).

1.2 Proposed Structure

Based on the *GPE* drawing prepared by HBM and dated December 17, 2021, Wang understands the existing four-span bridge will be removed and replaced with a new two-span bridge with integral abutments. The design drawings indicate the north and south abutments will be constructed about 7.9 to 6.9 feet behind the existing abutments, whereas the pier will be constructed in the same location as the existing center pier. The new bridge will have a back-to-back of abutments length of 233.7 feet with equal span lengths of 115.0 feet. The bridge will have an out-to-out width of 43.8 feet to accommodate two 11-foot wide lanes, two 4-foot wide shoulders, two 1.4-foot wide parapets, and a 10.0-foot wide multi-use path proposed along the east side of River Road.

Based on the *Plan and Profile* drawings and *Cross-Sections*, prepared by Stantec and dated November 12, 2021, we understand the profile grade along River Road will be raised by up to 2.0 feet. The GPE shows concrete end slopes graded at 1:2 (V: H) on the north and south ends. The *Cross-Sections* show the side slopes on the west side of River Road will be graded at a slope of 1:3 (V: H), whereas the east side will be supported by new retaining walls. The GPE drawing is included as Appendix E, whereas the *Plan and Profile* drawing and *Cross-Sections are* included as Appendix F.

The north and south approaches will be widened by up to 16.0 and 3.0 feet on the east and west sides of the bridge, respectively. We estimate this widening will require the placement of up to 4.0 to 6.0 feet of new fill along the existing west side embankment slopes and behind the abutments.

2.0 METHODS OF INVESTIGATION

The following sections outline the subsurface and laboratory investigations performed by Wang.

2.1 Field Investigation

The subsurface investigation consisted of three bridge borings, designated as RIV-BSB-01 to RIV-BSB-03, and two subgrade/stability borings, designated as RIV-SGB-02 and RIV-SGB-03, drilled by Wang in November of 2021. The borings were drilled from elevations of 593.3 to 571.4 feet and were advanced to depths of 25.0 to 44.5 feet bgs. The as-drilled northings, eastings, and elevations were acquired with a mapping-grade GPS unit. Stations, offsets, and elevations were provided by Stantec. Boring location data are presented in the *Boring Logs* (Appendix A) and the as-drilled boring locations are shown in the *Boring Location Plan* (Exhibit 3).

Truck-mounted drilling rigs, equipped with hollow stem augers, were used to advance and maintain open boreholes. Soil sampling was performed according to AASHTO T206, *"Penetration Test and Split Barrel Sampling of Soils."* The soil in the bridge borings was sampled at 2.5-foot intervals to 30.0 feet bgs and at 5.0-foot intervals thereafter to the boring termination depth whereas the soil in the stability borings was sampled continuously to 10.0 feet bgs and at 2.5-foot intervals thereafter to the boring termination depth. Bedrock cores were obtained from Borings RIV-BSB-01 and RIV-BSB-03 in 3 to 10-foot runs with an NWD4-sized core barrel. Soil samples collected from each sampling interval were placed in sealed jars, and rock cores were placed into boxes, and transported to the laboratory for further examination and testing.

Field boring logs, prepared and maintained by a Wang field engineer, included lithological descriptions, visual-manual soil (IDH Textural) classifications, results of Rimac and pocket penetrometer unconfined compressive strength tests, and results of Standard Penetration Tests (SPT) recorded as blows per 6 inches of penetration.

Groundwater levels were measured while drilling and at completion of each of the borings. Each borehole location was backfilled upon completion with lean grout, soil cuttings, and/or bentonite chips and, where necessary, the pavement surface was restored as much as possible to its original condition.

2.2 Laboratory Testing

The soil samples were tested in the laboratory for moisture content (AASHTO T265). Atterberg limits (AASHTO T89 and T90) and particle size (AASHTO T88) analyses were performed on selected samples. Unconfined compressive strength tests were performed on selected bedrock cores. Field visual descriptions of the soil samples were verified in the laboratory and index tested soils were classified according to the IDH Soil Classification System. The laboratory test results are shown in the *Boring Logs* (Appendix A) and in the *Laboratory Test Results* (Appendix B).

3.0 INVESTIGATION RESULTS

Detailed descriptions of the soil conditions encountered during the subsurface investigation are presented in the attached *Boring Logs* (Appendix A) and in the *Soil Profile* (Exhibit 4). Please note that strata contact lines represent approximate boundaries between soil types. The actual transition between soil types in the field may be gradual in horizontal and vertical directions.

Our subsurface investigation results fit into the local geologic context. The borings drilled in the project area revealed the native sediments consists of silty clay to silty clay loam diamicton (unit 2) with occasional lenses of silt and sand, over sand and gravel outwash (unit 3) resting over weathered bedrock. Unit 3 is water-bearing with seasonal fluctuation. Top of dolostone bedrock was encountered at elevations of 563.1 to 560.0 feet (30.0 to 33.0 feet bgs) as predicted based on geologic data.

3.1 Lithological Profile

Borings RIV-BSB-01, RIV-BSB-03, RIV-SGB-02, and RIV-SGB-03 were drilled along River Road and encountered 4 to 11 inches of asphalt pavement overlying 1 to 22 inches of sandy gravel aggregate base. Boring RIV-BSB-02 was drilled within the grassy median at the I-80 elevation and encountered 12 inches of silty loam fill at the surface. In descending order, the general lithologic succession encountered beneath the pavement or at the surface includes: 1) man-made ground (fill); 2) stiff to very stiff silty clay and silty loam; 3) medium dense silty loam to loam; 4) very dense sandy gravel; and 5) strong, very poor to poor quality dolostone.

1) Man-made ground (fill)

Beneath the pavement, the borings drilled from the River Road elevation encountered up to 19.5 feet of cohesive fill. The cohesive fill consists of stiff to hard, brown and gray silty clay to silty clay loam with unconfined compressive strength (Q_u) values of 1.0 to more than 4.5 tsf and moisture content values of 14 to 21%. Laboratory index testing on a sample from the fill layer showed liquid limit (LL) and plastic limit (PL) values of 35 and 19%, respectively.

A 10- to 43-inch thick layer of buried, black silty clay to silty clay loam topsoil with moisture content values of 26 to 46% was sampled beneath the fill in Borings RIV-SGB-02, RIV-BSB-01, and RIV-BSB-03. A sample of the buried topsoil from Boring RIV-SGB-02 revealed an organic content of 13.8%. The presence of this layer most likely indicates the boundary between fill and natural soils.

2) Stiff to very stiff silty clay and silty loam

Beneath the fill, at elevations of 572 to 564 feet, the borings advanced through 2.5 to 4.0 feet of stiff to very stiff, brown to gray silty clay. The silty clay is characterized by Q_u values of 1.5 to 1.8 tsf and moisture content values of 21 to 25%. This layer was encountered to the termination depth in Boring RIV-SGB-02. Rig chatter indicating the presence of cobbles was noted within this layer at a depth of 16.0 feet (elevation 577 feet) in Boring RIV-BSB-03.

3) Medium dense silty loam to loam

At depths of 23.0 to 25.5 feet bgs, or elevations of about 570 to 569 feet, Borings RIV-BSB-01 and RIV-BSB-03 encountered 1.0 to 2.5 feet of medium dense, brown to gray, moist silty loam to loam. This soil unit has an N-value of 12 blows per foot and a moisture content value of 12%. Rig chatter indicating the presence of cobbles was noted within this layer at a depth of 25.5 feet (elevation 568 feet) in Boring RIV-BSB-03.

4) Very dense sandy gravel

At elevations of 568 to 564 feet, the borings advanced through 2.0 feet of very dense, brown, damp to wet sandy gravel with N-values of 60 blows per foot to more than 50 blows per inch and moisture content values of 11 to 12%.

At elevations of 566 to 564 feet, Borings RIV-BSB-01 and RIV-BSB-03 advanced through up to 4.5 feet of very dense, brown, damp to saturated weathered dolostone bedrock. This soil unit has N-values of 50 blows per 3 inches to 50 blows per inch and moisture content values of 4 to 6%.

5) Dolostone bedrock

At elevations of 563 to 560 feet (30.0 to 33.0 feet bgs), the borings encountered strong, very poor to poor quality, highly weathered dolostone bedrock. The rock quality designation (RQD) ranges from 0 to 26% and uniaxial compressive strength tests revealed Q_u values of 5,994 to 6,081 psi. The bedrock core data are shown in the *Bedrock Core Photographs* (Appendix C).

3.2 Groundwater Conditions

Groundwater was encountered while drilling at elevations of 568 to 563 feet (24.0 to 30.0 feet bgs) within the medium dense sandy gravel and weathered bedrock layers. For the purpose of analysis, the design groundwater elevation is considered at elevation 568 feet. It should be noted that groundwater levels might change with seasonal rainfall patterns and long-term climate fluctuations or may be influenced by local site conditions.

4.0 FOUNDATION ANALYSIS AND RECOMMENDATIONS

Geotechnical evaluations and recommendations for the approach embankments, approach slabs, and substructure foundations are included in the following sections. The north and south approach embankments will be widened by up to 16.0 and 3.0 feet on the east and west sides of the bridge, respectively. The widening along the west side will require the placement of up to 4.0 to 6.0 feet of new fill along the existing west embankment slopes and behind the abutments. Along the east side, where the retaining walls are proposed, the widening for the multi-use path will require the placement of up to 7.0 feet of new fill along the existing embankment slopes. As per the *Cross-Sections*, the side slopes on the west side of River Road will be graded at a slope of 1:3 (V: H), whereas the east side will be supported by new retaining walls. Recommendations pertaining to the construction of the retaining walls proposed along River Road will be provided in separate reports.

Wang has evaluated the possible foundation types that could be considered for support of the proposed bridge structure and we recommend supporting the abutments on driven deep foundations and supporting the pier on either rock-socketed drilled shafts or shallow foundations on bedrock. Drilled shaft foundations are not approved for use with integral abutments (IDOT 2020a).

4.1 Seismic Design Considerations

The seismic site class was determined in accordance with the IDOT *Geotechnical Manual* (IDOT 2020a). The soils within the top 100 feet have a weighted average N value of 94 blows/foot (Method C controlling), and the results classify the site in the Seismic Site Class C.

The project location belongs to the Seismic Performance Zone 1 (IDOT 2020a). The seismic spectral acceleration parameters recommended for design in accordance with the AASHTO *LRFD Bridge Design Specifications* (AASHTO 2018) are summarized in Table 1. According to the IDOT *Bridge Manual* (IDOT 2012), liquefaction analysis is not required for sites located in Seismic Performance Zone 1.

Table 1: Recommended Seismic Design Parameters

Spectral Acceleration Period (sec)	Spectral Acceleration Coefficient[1)] (% g)	Site Factors	Design Spectrum for Site Class C[2)] (% g)
0.0	PGA= 4.9	F_{pga}= 1.2	**A_s= 5.9**
0.2	S_s= 10.6	F_a= 1.2	**S_{DS}= 12.7**
1.0	S_1= 4.0	F_v= 1.7	**S_{D1}= 6.8**

1) Spectral acceleration coefficients based on Site Class C
2) Site Class C Spectrum to be included on plans; A_s = PGA*F_{pga}; S_{DS}= S_s*F_a; S_{D1}= S_1*F_v

4.2 Approach Embankments and Slabs

Wang has performed evaluations of the settlement and global stability of the widened approach embankments. The drawings show the proposed grade along River Road will be raised by up to 2.0 feet to approximate pavement elevations of 595.6 and 595.7 feet at the north and south abutments, respectively.

The north and south approach embankments will be widened by up to 16.0 and 3.0 feet on the east and west sides of the bridge, respectively. The drawings indicated the widened approach embankments will have side slopes graded at 1:3 (V: H) along the west side of River Road whereas the east side will be supported by new retaining walls. Additionally, the GPE (Appendix E) shows concrete end slopes graded at 1:2 (V: H) on the north and south ends.

4.2.1 Settlement

The widening of the approach embankments on the west and east side will require the placement of up to 6.0 and 7.0 feet of new fill along the existing embankment slopes and behind the abutments, respectively. Settlement estimates have been made based on correlations to measured index properties obtained from the laboratory tests (Appendix B). Based on the soil conditions, we estimate the foundation soils at the approaches will undergo up to 0.3 inch of long-term consolidation settlement under the applied load of the new approach embankment fill material. Therefore, we do not anticipate downdrag allowances for the proposed abutment piles.

4.2.2 Global Stability

The global stability of the approach embankment side slopes along the west side of River Road was analyzed based on the soil profile described in Section 3.1 and the information provided in the plans. The stability of the east side will be addressed in the retaining wall reports. The minimum required FOS for both short (undrained) and long-term (drained) conditions is 1.5 (IDOT 2012). *Slide v6.0* evaluation exhibits employing the Bishop Simplified method of analysis are shown in Appendix D. The FOS values meet the minimum requirement.

4.2.3 Approach Slabs

We understand the approach slabs will be supported on approach footings which act as spread footing foundations (IDOT 2012). Based on the soil conditions revealed in Borings RIV-BSB-01 and RIV-BSB-03, the approach footings will be supported mainly on the new embankment fill resulting from the estimated 2.0-foot high raise in grade along River Road and the existing stiff to hard silty clay to silty clay loam fill. We estimate the fill has a maximum factored bearing resistance of 2,500 psf calculated for a geotechnical resistance factor (Φ_b) of 0.45 (AASHTO 2017). Settlement of the approach footing is not anticipated.

4.3 Structure Foundations

The soil conditions along the structure show stiff to hard clayey soils followed by medium dense silty loam and very dense sandy gravel overlying dolostone bedrock. Wang recommends supporting the integral abutments on driven steel H-piles. Considering the presence of shallow bedrock at Boring RIV-BSB-02, the pier could be supported on either rock-socketed drilled shafts or shallow foundations.

The preliminary loading information provided by HBM on November 19, 2021 is summarized in Table 2. The proposed north and south abutment cap base elevations, as shown in the GPE, are 586.99 and 587.16 feet, respectively, whereas the proposed pier cap base elevation shown on the GPE is 571.18 feet.

Table 2: Preliminary Factored Loads

Substructure	Total Factored Load (kips)
North Abutment	1379
Pier	3277
South Abutment	1379

4.3.1 Driven Piles

IDOT specifies the maximum nominal required bearing (R_{NMAX}) for each pile and states the factored resistance available (R_F) for steel H-piles and MSP should be based on a geotechnical resistance factor (Φ_G) of 0.55 (IDOT 2012). Nominal tip and side resistance were estimated using the methods and empirical equations presented in the latest *IDOT Geotechnical Pile Design Guide* (IDOT 2020). Based on the loads provided by HBM and the proposed width of the substructure, the load per pile at the abutments will range between 94 and 252 kips for a single row of piles spaced at 3- to 8-feet.

Based on IDOT standards, piles with greater than 0.4-inch of relative settlement along the sides require allowances for downdrag loads. We estimate that less than 0.4 inch of settlement will remain following the construction of the embankment and subsequent pile driving. We estimate that downdrag allowances will not be required for the abutment piles.

The foundation soils within 10.0 feet below the abutment pile cap elevations consist of very stiff to hard silty clay to silty clay loams with Q_u values of 3.3 to 4.5 tsf. In accordance with the *All Bridge Designers Memo 19.8* (IDOT 2019), when the average soil strengths at an integral abutment exceed 3.0 tsf, the piles at the abutments should be precored for a depth of 10.0 feet below the abutment cap elevation and backfilled with bentonite having a Q_u value of 1.0 tsf to increase pile flexibility (IDOT 2019). The pile capacity evaluations have been performed assuming pile driving begins about 10.0 feet below the proposed abutment pile cap elevations.

The R_F, R_N, estimated pile tip elevations, and pile lengths for HP12x53, HP12x74, HP14x73, and HP14x89 steel H-piles for the abutments are summarized in Table 3. The pile lengths shown in Table 3 assume a 2-foot pile embedment into the abutment pile cap elevations as shown on the GPE (Appendix E).

High blow counts, sampler refusal, and difficult drilling were noted within the borings below an approximate elevation of 568.0 feet indicating the presence of cobbles. As such, pile shoes should be used for piles driven below an elevation of 568.0 feet to avoid damage to the piles. Additionally, to achieve the maximum nominal required bearing at the abutments, the analysis shows the H-piles would need to be driven about 1.0 to 2.0 feet into the weathered and/or very poor bedrock. In these instances, the piles should be considered end bearing and designed for the maximum capacity of the pile. However, IDOT generally recommends that H-piles be driven to their maximum nominal required bearing. Table 3 provides estimated pile tip elevations and pile lengths for HP 12x53, HP12x74, HP 14x73, and HP14x89 steel H-piles driven to maximum nominal bearing.

Table 3: Estimated Pile Lengths and Tip Elevations for Steel H-Piles Driven to R_{NMAX}

Structure Unit (Reference Boring)	Pile Cap Base Elevations (feet)	Pile Size	Maximum Nominal Bearing, R_N (kips)	Factored Geotechnical Loss (kips)	Factored Geotechnical Load Loss (kips)	Factored Resistance Available, R_F (kips)	Total Estimated Pile Length (feet)	Estimated Pile Tip Elevation (feet)
North Abutment (RIV-BSB-01)	586.99	HP 12x53	418	0	0	230	30	559
		HP 12x74	589	0	0	324	31	558
		HP 14x73	578	0	0	318	30	559
		HP 14x89	705	0	0	388	31	558
South Abutment (RIV-BSB-03)	587.16	HP 12x53	418	0	0	230	28	561
		HP 12x74	589	0	0	324	29	560
		HP 14x73	578	0	0	318	28	561
		HP 14x89	705	0	0	388	29	560

4.3.2 Drilled Shafts

The pier could be supported on drilled shafts socketed 5.0-feet into the bedrock. As per 2012 IDOT Bridge Manual drilled shafts extending into rock, in most cases, should be designed utilizing only end bearing or side resistance in rock, whichever is larger. For shafts socketed into the bedrock less than 10-foot long, we estimate the end bearing will give more capacity than the side resistance. Therefore, we recommend considering only the end bearing resistance. The shafts should be designed for end bearing with a tip resistance factor (ϕ_{stat}) of 0.50 (AASHTO 2020). Above the bedrock, the shafts should have diameters 6 inches larger than the sockets.

The bedrock resistance was evaluated in accordance with the Geologic Strength Index (GSI) method provided by AASHTO (2020). The R_F, R_N, and estimated base elevations for rock-socketed shafts are summarized in Table 4. For the anticipated loads (Table 2), we estimate shaft settlements of less than 0.5 inch.

Due to the presence of groundwater within the silt and sandy gravel soil and the presence of granular soils above the bedrock, the recommended construction method for shafts socketed into bedrock is to install casing to the top of the rock to maintain clean, open shafts during excavation. Loss of water circulation was not noted while coring, however, cavities are known to be present in this area, as discussed in Section 1.1, the quality of bedrock at the pier should be verified during construction.

Table 4: Estimated Drilled Shaft Resistances and Base Elevations (Rock-Socketed Shafts)

Structure Unit (Reference Boring)	Shaft Cap Base Elevations (feet)	Top of Bedrock Elevation (feet)	Socket Diameter (feet)	Nominal Unit Resistance (ksf)	Nominal Resistance, R_N (kips)	Factored Resistance Available, R_F (kips)	Total Socket Length (feet)	Estimated Total Shaft Length (feet)
Pier (RIV-BSB-02)	571.18	560.4	3.0	250	1800	900	5.0	16.0
			4.0		3100	1550		
			5.0		4900	2450		

4.3.3 Spread Footings

A spread footing supported on bedrock could be considered at the pier location. The top of the bedrock elevation at the pier, as noted in Boring RIV-BSB-02, is at elevation 560.4 feet or about 11.0 feet below the proposed pile cap elevation of 571.18 feet. We recommend the bottom of the pier spread footing be placed a minimum of one foot below the top of the bedrock, at approximate elevation 559.4 feet and the quality of bedrock at the pier should be verified during construction.

Construction of a spread footing supported on bedrock at the pier location will require excavations of up to 12.0 feet. Due to the dense soils and shallow bedrock at the pier location, we anticipate *Temporary Soil Retention Systems* will be needed for the removal and replacement of the pier. Additionally, the pier excavation will encounter groundwater and will require dewatering efforts. As such, drilled shafts socketed into the bedrock may be more economical at the pier location. A value engineering analysis is recommended to select the most suitable type of foundation system at the pier.

According to Section 10.6.3.2.2 of the AASTHO LRFD *Bridge Design Specifications* (AASHTO 2020), the recommended bearing resistance for spread footings should be determined using empirical correlations with the Geomechanics RMR system. Based on our analysis, we estimate a factored bearing resistance of 40.0 ksf, considering a resistance factor of 0.45 (AASHTO 2020). The factored bearing resistance shall not be taken to be greater than the factored compressive resistance of the footing concrete (AASHTO 2020). Based on the results of the rock unconfined compressive strength and the information on the nominal resistance of the concrete as provided on the GPE of 3.5 ksi, it appears that neither of the two values is smaller than the recommended bearing resistance of 40 ksf.

As per Section 10.6.2.4.4, for footings bearing on fair to very good rock, elastic settlements may be assumed to be less than 0.5 inches (AASHTO 2020). However, since the RQD value at the pier location is about 8% and the rock within the top 5.0 feet does not meet the fair to very good criteria, a settlement analysis was conducted. For our settlement evaluations, we assumed a footing width of 13.0 feet similar to the existing bridge, a length of 43.8 feet, and no eccentric loads. Based on the proposed factored load and assumed dimensions, we estimate a settlement of less than 0.5 inches. The recommended friction coefficient between concrete and bedrock materials is 0.7 (AASHTO 2020).

4.3.4 Lateral Loading

Lateral loads on the piles and shafts should be analyzed for maximum moments and lateral deflections. Recommended lateral soil modulus and strain parameters required for analysis via the p-y curve method are included in Tables 5 to 8.

Table 5: Recommended Soil Parameters for Lateral Load Analysis at North Abutment Reference Boring RIV-BSB-01

Elevation Range (feet) Soil Type (Layer)	Unit Weight, γ (pcf)	Undrained Shear Strength, c_u (psf)	Estimated Friction Angle, Φ (°)	Estimated Lateral Soil Modulus Parameter, k (pci)	Estimated Soil Strain Parameter, ε_{50} (%)
586.99(1) to 577(2) New FILL (Bentonite)	120	1000	0	500	0.7
577 to 571 Very Stiff to Hard SILTY CLAY to SILTY CLAY LOAM FILL	120	3500	0	1000	0.5
571 to 568 Stiff SILTY LOAM to SILTY CLAY LOAM	120	1800	0	500	0.7
568 to 565 Very Dense SANDY GRAVEL	120	0	34	125	--

Elevation Range (feet) Soil Type (Layer)	Unit Weight, γ (pcf)	Undrained Shear Strength, c_u (psf)	Estimated Friction Angle, Φ (°)	Estimated Lateral Soil Modulus Parameter, k (pci)	Estimated Soil Strain Parameter, ε_{50} (%)
565 to 560(4) Very Dense WEATHERED BEDROCK	58(3)	0	36	125	--

(1) Pile cap base elevation; (2) Approximate bottom of precoring elevation; (3) Submerged unit weight; (4) Approximate top of bedrock

Table 6: Recommended Soil Parameters for Lateral Load Analysis at Pier Reference Boring RIV-BSB-02

Elevation Range (feet) Soil Type (Layer)	Unit Weight, γ (pcf)	Undrained Shear Strength, c_u (psf)	Estimated Friction Angle, Φ (°)	Estimated Lateral Soil Modulus Parameter, k (pci)	Estimated Soil Strain Parameter, ε_{50} (%)
571.18(1) to 568 Very Stiff CLAY LOAM FILL	120	2500	0	1000	0.5
568 to 566 Medium Dense LOAM FILL	115	0	30	60	--
566 to 564 Very Dense SILT FILL	58(2)	0	34	125	--
564 to 560(3) Very Dense WEATHERED BEDROCK	58(2)	0	36	125	--

(1) Pier cap base elevation; (2) Submerged unit weight; (3) Approximate top of bedrock

Table 7: Recommended Soil Parameters for Lateral Load Analysis at South Abutment Reference Boring RIV-BSB-03

Elevation Range (feet) Soil Type (Layer)	Unit Weight, γ (pcf)	Undrained Shear Strength, c_u (psf)	Estimated Friction Angle, Φ (°)	Estimated Lateral Soil Modulus Parameter, k (pci)	Estimated Soil Strain Parameter, ε_{50} (%)
587.16(1) to 577(2) New FILL (Bentonite)	120	1000	0	500	0.7
577 to 570 Very Stiff SILTY CLAY to SILTY CLAY LOAM	120	2500	0	1000	0.5
570 to 568 Medium Dense SILTY LOAM	115	0	30	60	--

Elevation Range (feet) Soil Type (Layer)	Unit Weight, γ (pcf)	Undrained Shear Strength, c_u (psf)	Estimated Friction Angle, Φ (°)	Estimated Lateral Soil Modulus Parameter, k (pci)	Estimated Soil Strain Parameter, ε_{50} (%)
568 to 566 Very Dense SANDY GRAVEL	58(2)	0	34	125	--
566 to 563(3) Very Dense WEATHERED BEDROCK	58(2)	0	36	125	--

(1) Pile cap base elevation; (2) Approximate bottom of precoring elevation; (3) Submerged unit weight; (4) Approximate top of bedrock

Table 8: Recommended Bedrock Parameters for Lateral Load Analysis
Reference Boring RIV-BSB-01 to RIV-BSB-03

Bedrock	Total Unit Weight, γ (pcf)	Modulus of Rock Mass (ksi)	Uniaxial Compressive Strength (psi)	RQD (%)	Strain Factor
Dolostone	140	280	5,994 and 6,081	0 to 8	0.0005
Dolostone	140	520	6,000 (Estimated)	26 to 58	0.0005

5.0 CONSTRUCTION CONSIDERATIONS

5.1 Site Preparation

Vegetation, surface topsoil, and debris should be cleared and stripped where the structure will be placed. If unstable or unsuitable materials are exposed during excavation, they should be removed and replaced with compacted structural fill as described in Section 5.4.

5.2 Excavation, Dewatering, and Utilities

Excavations should be performed in accordance with local, state, and federal regulations. The potential effect of ground movements upon nearby utilities should be considered during construction. In accordance with IDOT Section 205, *Embankment*, the embankments proposed for widening should be properly benched or deeply plowed prior to placement of new fill along the slopes (IDOT 2016). Any slope that cannot be graded at 1:2 (V:H) should be properly shored in accordance with the temporary sheet piling charts provided in *IDOT Design Guide-Simplified Temporary Sheet Piling Design Charts* (IDOT 2020).

During the subsurface investigation, the groundwater was encountered at elevations ranging from 568 to 563 feet, as discussed in Section 4.2. At the abutments, the groundwater will be about 20.0 to 24.0 feet below the pile cap base elevations; therefore, we do not anticipate the need for dewatering. The pier excavation to bedrock will encounter groundwater and the Contractor should be prepared for dewatering. Additionally, perched or temporary water may be encountered during times of heavy precipitation while excavating within the upper fill soils and will require dewatering efforts. Water that does accumulate in open excavations by seepage or runoff should be immediately removed by sump pump.

5.3 Stage Construction

Based on the GPE, Wang understands that the bridge replacement will be performed under a road closure and detour of River Road; therefore, stage construction will not be required.

5.4 Temporary Soil Retention System

Excavations of up to 6.0 feet below the existing grade along River Road will be required for the construction of the abutments. In addition, the removal and replacement of the pier in the median of I-80 will require up to 2.0 feet of excavation. However, the installation of a spread footing supported on bedrock at the pier location will require up to 12.0 feet of excavation. Temporary support systems will be required if the ground cannot be sloped at 1:2 (V: H). We estimate temporary steel sheet piling, designed using the charts included in the *IDOT Design Guide-Simplified Temporary Sheet Piling Design Charts* is feasible at the abutments; however, due to the dense soils at the pier location and shallow bedrock, it will not be feasible at the pier location (IDOT 2020a). We anticipate *Temporary Soil Retention Systems* will be needed for the removal and replacement of the pier and/or the installation of spread footing supported on bedrock.

5.5 Filling and Backfilling

Fill material used to attain final design elevations should be pre-approved, compacted, cohesive or granular soil conforming to Section 204, *Borrow and Furnished Excavation* (IDOT 2016). The fill material should be free of organic matter and debris and should be placed in lifts and compacted according to Section 205, *Embankment* (IDOT 2016).

Backfill materials for the abutments and piers must be pre-approved by the Resident Engineer. To backfill the abutments, we recommend porous granular material conforming to the requirements specified in the IDOT Supplemental Special and Recurring Special Provisions, *Granular Backfill for Structures* (IDOT 2020b).

5.6 Earthwork Operations

The required earthwork can be accomplished with conventional construction equipment. Moisture and traffic will cause deterioration of exposed subgrade soils. Precautions should be taken by the Contractor to prevent water erosion of the exposed subgrade. A compacted subgrade will minimize water runoff erosion.

Earth moving operations should be scheduled to not coincide with excessive cold or wet weather (early spring, late fall or winter). Any soil allowed to freeze or soften due to the standing water should be removed. Wet weather can cause problems with subgrade compaction.

It is recommended that an experienced geotechnical engineer be retained to inspect the exposed subgrade, monitor earthwork operations, and provide material inspection services during the construction phase of this project.

5.7 Pile Installation

The driven piles shall be furnished and installed according to the requirements of IDOT Section 512, *Piling* (IDOT 2016). Wang recommends performing one test pile at each substructure location. Since hard driving is expected below an elevation of 568 feet, pile shoes are required as indicated in Section 5.3.1.

The foundation soils within 10.0 feet below the abutment pile cap elevations consist of very stiff to hard silty clay to silty clay loams with Q_u values of 3.3 to 4.5 tsf. In accordance with the *All Bridge Designers Memo 19.8* (IDOT 2019), when the average soil strengths at an integral abutment exceed 3.0 tsf, the piles at the abutments should be precored for a depth of 10.0 feet below the abutment cap elevation and backfilled with bentonite having a Q_u value of 1.0 tsf to increase pile flexibility (IDOT 2019).

5.8 Drilled Shafts

Due to the presence of groundwater within the silt and sandy gravel soil and the presence of granular soils above the bedrock, the recommended construction method for shafts socketed into bedrock is to install casing to the top of the rock to maintain clean, open shafts during excavation. Loss of water circulation was not noted while coring, however, cavities are known to be present in this area, as discussed in Section 1.1, the quality of bedrock at the pier should be verified during construction.

6.0 QUALIFICATIONS

The analysis and recommendations submitted in this report are based upon the data obtained from the borings drilled at the locations shown on the boring logs and in Exhibit 3. This report does not reflect any variations that may occur between the borings or elsewhere on the site, variations whose nature and extent may not become evident until the course of construction. In the event that any changes in the design and/or location of the structure are planned, we should be timely informed so that our recommendations can be adjusted accordingly.

It has been a pleasure to assist Stantec, HBM Engineering Group, LLC, and the Illinois Department of Transportation on this project. Please call if there are any questions, or if we can be of further service.

Respectfully Submitted,

WANG ENGINEERING, INC.

Azza Hamad, P.E.	Nesam Balakumaran, P.Eng.
Senior Geotechnical Engineer	Project Geotechnical Engineer

Corina T. Farez, P.E., P.G.
QC/QA Reviewer

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AMERICAN ASSOCIATION OF STATE HIGHWAY TRANSPORTATION OFFICIALS (2020) "*AASHTO LRFD Bridge Design Specifications*" United States Depart of Transportation, Washington, D.C.

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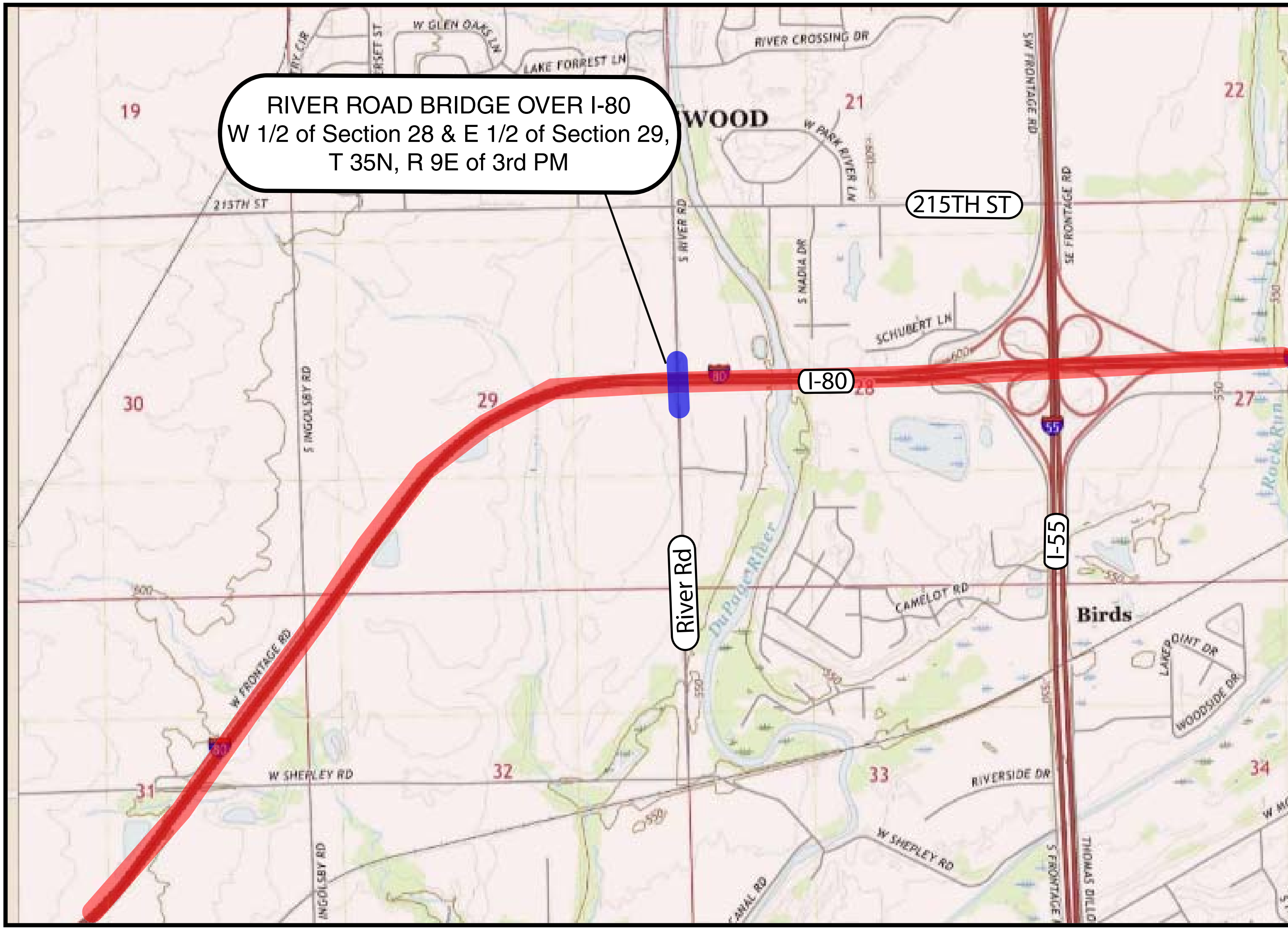
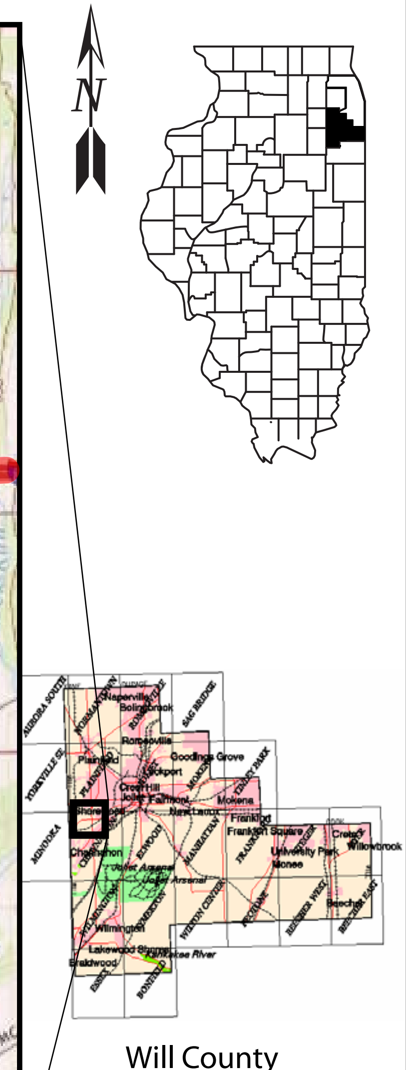
EXHIBITS





0 0.5 1.0 Mile

SITE LOCATION MAP: RIVER ROAD BRIDGE OVER I-80; I-80 RECONSTRUCTION FROM EAST OF RIDGE RD TO HOUBOLT RD, WILL COUNTY, ILLINOIS

SCALE: GRAPHICAL	EXHIBIT 1	DRAWN BY: J. Bensen CHECKED BY: A. Hamad

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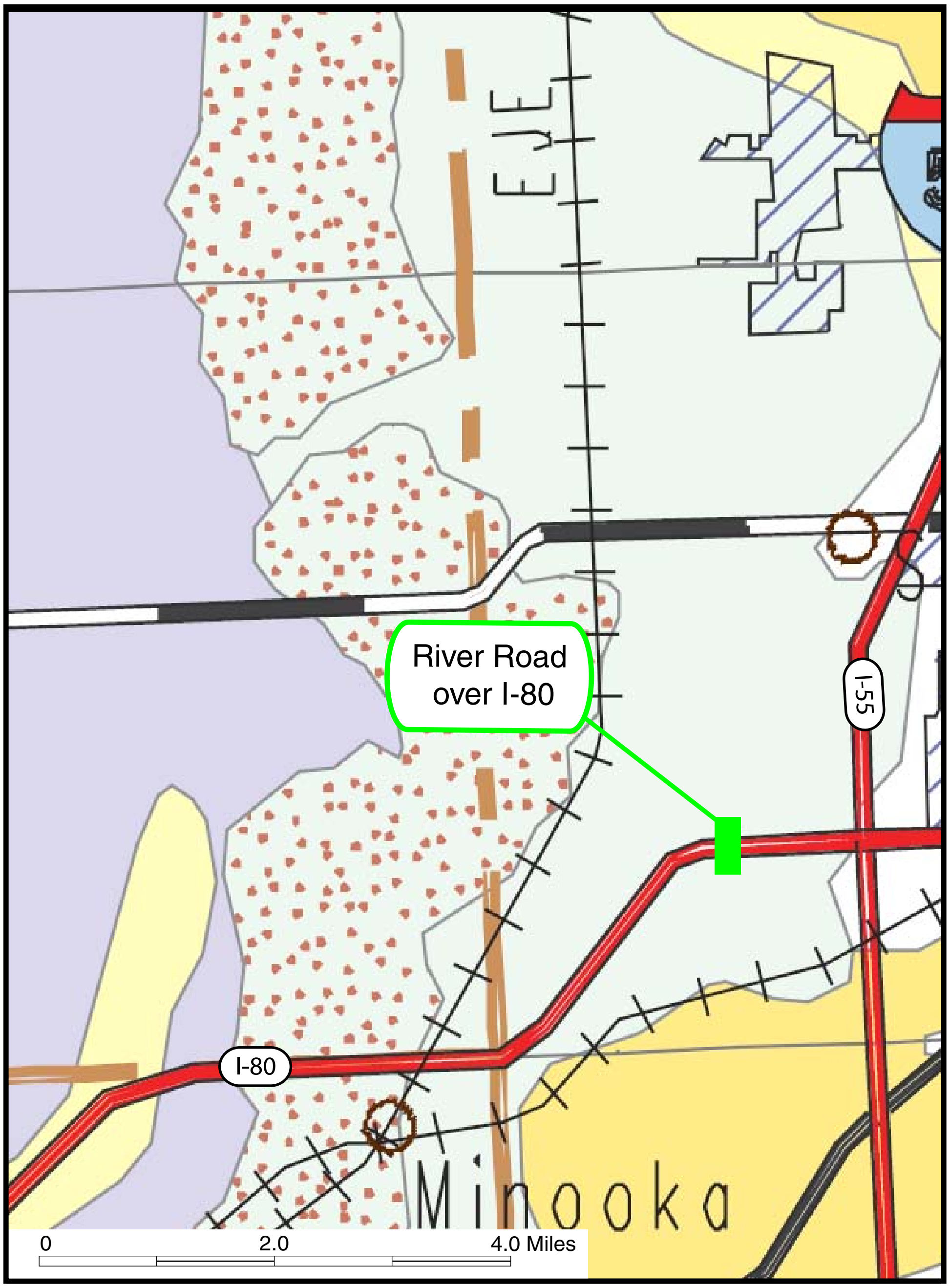
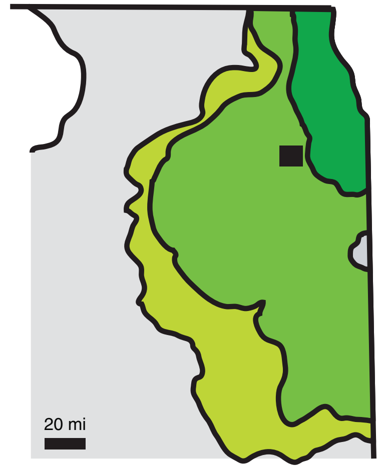
FOR STANTEC	255-39-01



Modified after William W. Shilts (2000)

REGIONAL GEOLOGY



Wedron Group

- Wadsworth Formation
- Lemont Formation
- Tiskilwa Formation

Modified after Hansel and Johnson (1996)

Legend

Cahokia Formation
Bedded silts, clays and sand and gravel deposited in floodplains and channels of modern rivers and streams

Equality Formation
Laminated silt, clay, or fine sand deposited in slackwater, glacial, and postglacial lakes; massive to bedded, calcareous

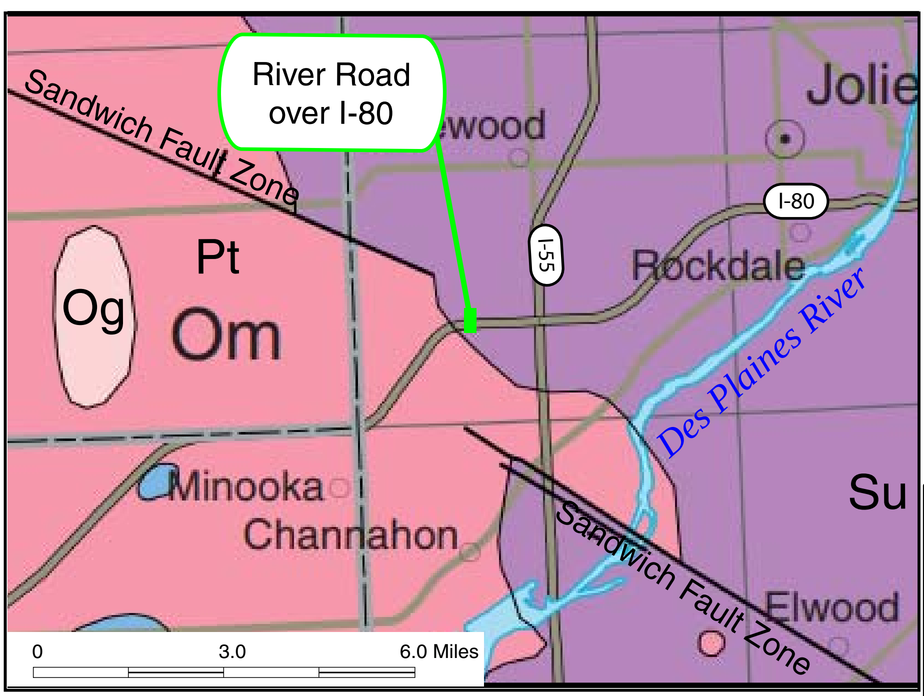
Henry Formation
Predominantly stratified sand and gravel; locally occurring silt, clay, organic debris, wood, shell lenses; outwash on floodplains

Lemont Formation
Diamicton; silty clay loam to silty clay; fine grained matrix; unsorted, unstratified mixture of gravel, sand, silt, and clay; containing lenses of sand, gravel and/or silt.

Bedrock near or at the surface

Major metropolitan area

Modified after William W. Shilts (2000)



Modified after Dennis R. Kolata (2005)

Legend

- Pt — **Pennsylvanian Shale**
  Tadewater Formation
- Su — **Silurian Dolomitic Limestone**
- Om — **Ordovician Formation**
  Maquoketa Group
- Og — **Ordovician Formation**
  Galena Group

SITE AND REGIONAL GEOLOGY: RIVER ROAD BRIDGE OVER I-80 RECONSTRUCTION, FROM EAST OF RIDGE ROAD TO HOUBOLT ROAD, WILL COUNTY, ILLINOIS

SCALE: GRAPHICAL	EXHIBIT 2	DRAWN BY: C. Marin CHECKED BY: L. Iordache

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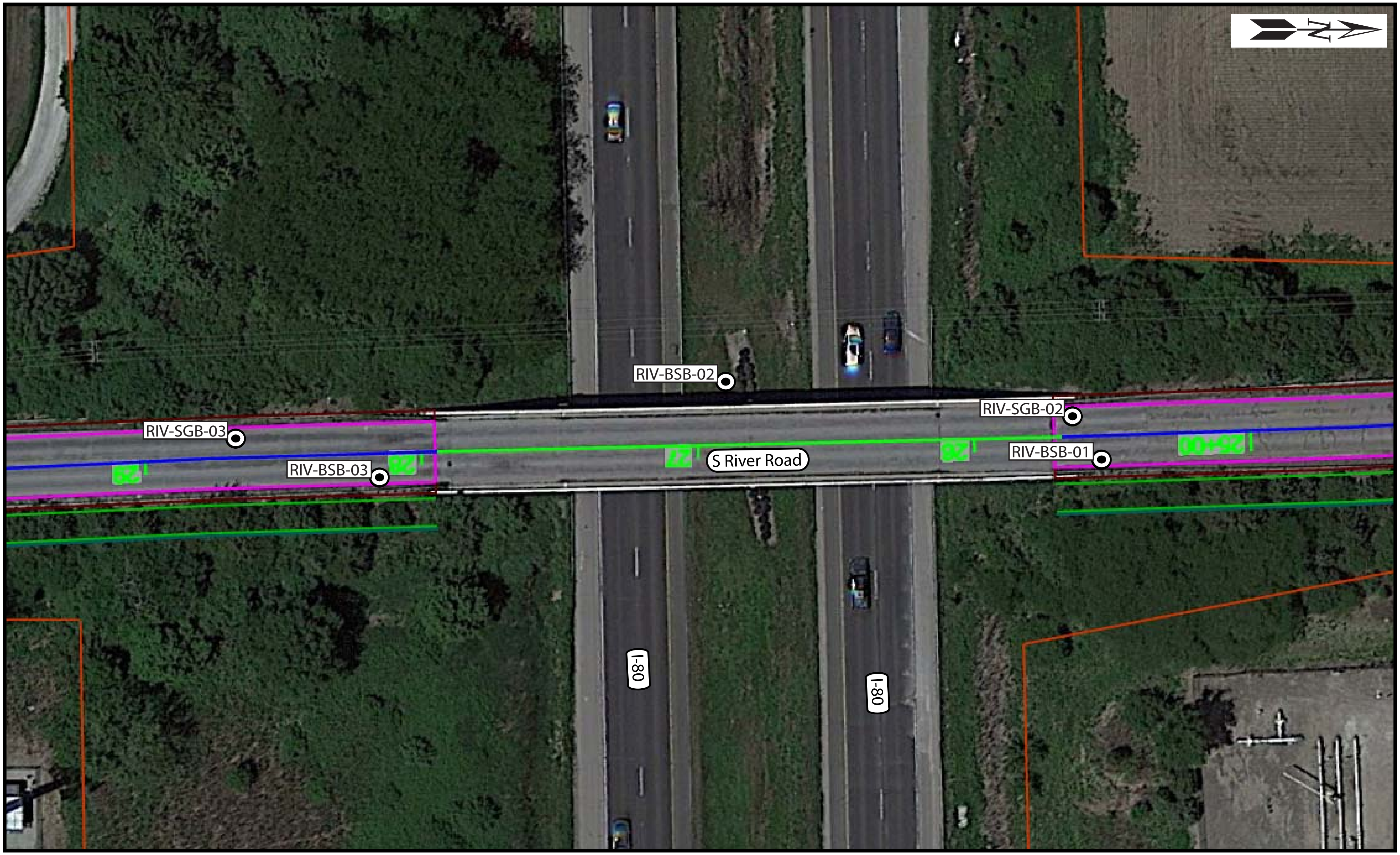
255-39-01



0 100 200 Feet

Legend

◉ Boring Location

BORING LOCATION PLAN: RIVER ROAD BRIDGE OVER I-80; I-80 RECONSTRUCTION FROM EAST OF RIDGE ROAD TO HOUBOLT ROAD, WILL COUNTY, ILLINOIS

SCALE: GRAPHICAL	EXHIBIT 3	DRAWN BY: J. Bensen CHECKED BY: A. Hamad

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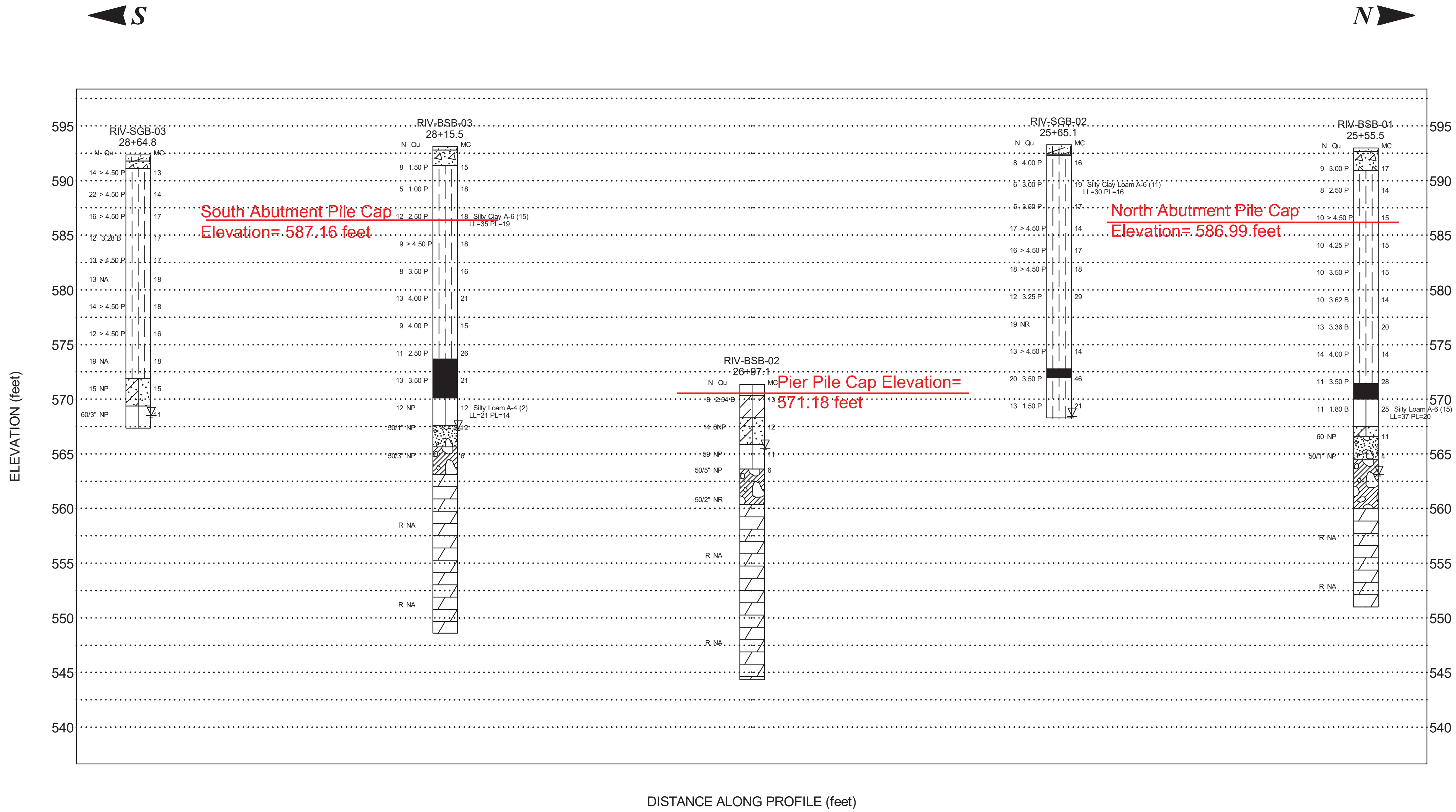
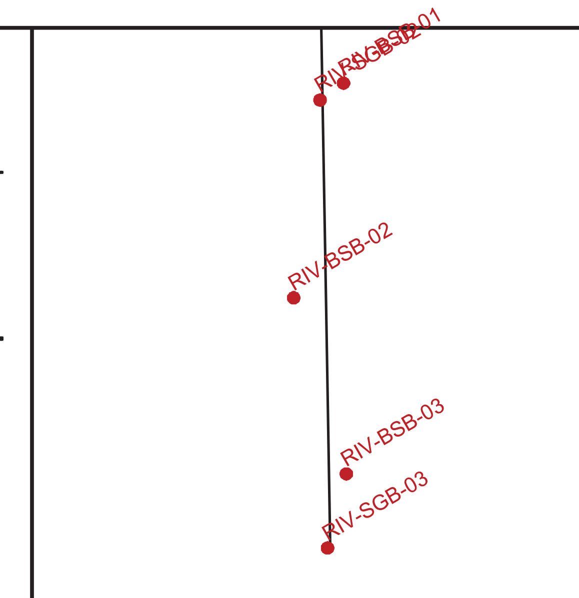
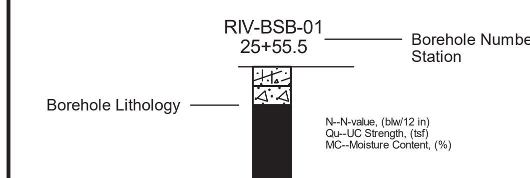




Site Map Scale 1 inch equals 130 feet

Explanation:



Water Level Reading at time of drilling.

Water Level Reading 24-hr after drilling or at end of drilling

Horizontal Scale (feet)

Vertical Exaggeration: 3x

Lithology Graphics

- Pavement
- Crushed stone
- IDH Silty Clay, Silty Clay Loam
- Topsoil
- IDH Silt, Silty Loam
- IDH Loam
- Gravelly sand, sandy gravel
- Weathered bedrock
- Dolomite or Dolomitic Limestone
- IDH Clay Loam

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Soil Profile
River Road Bridge Over I-80

WEI SINCE 1982

I-80 Reconstruction, Ridge Road to Houbolt Road
Will County, Illinois

JOB NUMBER	PLATE NUMBER
255-39-01	EXHIBIT 4

WEI 11X17 2553901.GPJ WANGENG.GDT 12/16/21

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APPENDIX A

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BORING LOG RIV-BSB-01

WEI Job No.: 255-39-01

Client: **Stantec**
Project: **I-80 Reconstruction, Ridge Road to Houbolt Road**
Location: **Will County, Illinois**

Datum: NAVD88
Elevation: 592.99 ft
North: 1755364.55 ft
East: 1016267.85 ft
Station: 25+55.5
Offset: 9.0 LT

SOIL AND ROCK DESCRIPTION

592.7 — 4-inch thick ASPHALT
--PAVEMENT--

White and gray SANDY GRAVEL; damp
590.9 — --AGGREGATE BASE--

Very stiff to hard, brown and gray SILTY CLAY to SILTY CLAY LOAM, trace gravel; damp
--FILL-- (5)
--RDR 2--

--brown, black and gray--

571.4 — Very stiff, black SILTY CLAY; damp
570.0 — --Buried TOPSOIL--

Stiff, gray SILTY LOAM to SILTY CLAY LOAM, trace gravel; damp
--L_L(%)=37, P_L(%)=20--
--%Gravel=0.4--
--%Sand=9.6--
--%Silt=71.3--
--%Clay=18.7--
--A-6 (15)--
--RDR 2-- (25)
567.5

566.6 — Brown SILTY LOAM to LOAM, little gravel; moist

564.5 — Very dense, brown SANDY GRAVEL; damp
--RDR 2--

Very dense, brown weathered dolostone fragments; damp to saturated
--Weathered BEDROCK--
560.0 — --slow hard drilling; possible bedrock at 30 feet--

Strong, light bluish gray, very poor quality, DOLOSTONE; Very closely to closely spaced, highly weathered, horizontal and vertical JOINTS, with <0.05 inch opening, slicken to slightly rough walls, and <0.2 inch thick clay infill.
--RUN 1: 33.0 to 39.0 feet--
--Recovery: 76%--
--RQD: 0%--
--RUN 2: 39.0 to 42.0 feet--
--Recovery: 51%--
--RQD: 0%--
551.0

Boring terminated at 42.00 ft

Water level while drilling: 30 ft (∇)

Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
1	8, 4, 5	3.00 P	17
2	3, 4, 4	2.50 P	14
3	2, 3, 7	> 4.50 P	15
4	3, 4, 6	4.25 P	15
5	3, 4, 6	3.50 P	15
6	3, 6, 4	3.62 B	14
7	4, 7, 6	3.36 B	20
8	3, 7, 7	4.00 P	14
9	4, 4, 7	3.50 P	28
10	4, 4, 7	1.80 B	25
11	6, 27, 33	NP	11
12	50/1"	NP	4
13	CORE		
14	CORE		

GENERAL NOTES

Begin Drilling: **11-17-2021** Complete Drilling: **11-17-2021**
Drilling Contractor: **Wang Testing Services** Drill Rig: **20D50T [80%]**
Driller: **RH&JD** Logger: **M. Rojo** Checked by: **C. Marin**
Drilling Method: **3.25" ID HSA; boring backfilled upon completion**

WATER LEVEL DATA

While Drilling: **30.00 ft**
At Completion of Drilling: **core wash 3ft**
Time After Drilling: **NA**
Depth to Water: **NA**

The stratification lines represent the approximate boundary between soil types; the actual transition may be gradual.

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BORING LOG RIV-BSB-02

WEI Job No.: 255-39-01

Client **Stantec**
Project **I-80 Reconstruction, Ridge Road to Houbolt Road**
Location **Will County, Illinois**

Datum: NAVD 88
Elevation: 571.35 ft
North: 1755220.91 ft
East: 1016234.58 ft
Station: 26+97.1
Offset: 24.8 RT

Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
570.4	12-inch thick, brown SILTY LOAM, little gravel; damp --FILL--					
568.4	Very stiff, brown CLAY LOAM, trace gravel; damp to moist --FILL-- --RDR 2--		1	3 3 5	2.54 B	13
565.9	Medium dense, brown LOAM; damp --FILL-- --RDR 2--	5	2	4 7 7	0NP	12
563.6	--wet spoon recovery-- Very dense, light brown to white SILT, trace gravel; dry to damp --FILL-- --RDR 2--		3	22 15 44	NP	11
560.4	Very dense, gray GRAVEL --Weathered BEDROCK-- --RDR 4-- --slow hard drilling--	10	4	50/5"	NP	6
	Strong, light grayish gray, very poor to fair quality, DOLOSTONE; closely spaced, highly to slightly weathered, horizontal and oblique joints, with <0.05 inch opening, slightly rough walls, and 0 - 0.2 inch thick clay and sand infill. --RUN 1: 11.0 to 21.0 feet-- --Recovery: 84%-- --RQD: 8%-- --Qu=5,994 psi--	15, 20	5	50/2"	NR	
			6	CORE		
544.4	--RUN 2: 21.0 to 27.0 feet-- --Recovery: 100%-- --RQD: 58%--	25	7	CORE		
	Boring terminated at 27.00 ft	30, 35, 40, 45, 50				

GENERAL NOTES

Begin Drilling **11-22-2021** Complete Drilling **11-22-2021**
Drilling Contractor **Wang Testing Services** Drill Rig **21GeoA[96%]**
Driller **JS&MG** Logger **A. Scifers** Checked by **C. Marin**
Drilling Method **2.25" ID HSA; boring backfilled upon completion**

WATER LEVEL DATA

While Drilling ▽ **6.00 ft**
At Completion of Drilling ▼ **mud in borehole**
Time After Drilling **NA**
Depth to Water ▼ **NA**

The stratification lines represent the approximate boundary between soil types; the actual transition may be gradual.

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BORING LOG RIV-BSB-03

WEI Job No.: 255-39-01

Client: **Stantec**
Project: **I-80 Reconstruction, Ridge Road to Houbolt Road**
Location: **Will County, Illinois**

Datum: NAVD 88
Elevation: 593.11 ft
North: 1755103.18 ft
East: 1016269.75 ft
Station: 28+15.5
Offset: 8.3 LT

Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
592.8	4-inch thick ASPHALT --PAVEMENT--					
591.4	White and gray SANDY GRAVEL; damp --AGGREGATE BASE--		1	5, 4, 4	1.50 P	15
	Stiff to hard, brown and gray SILTY CLAY to SILTY CLAY LOAM, trace gravel; damp --FILL-- --RDR 2-3--	5	2	2, 2, 3	1.00 P	18
	--L_L(%)=35, P_L(%)=19-- --%Gravel=0.8-- --%Sand=5.6-- --%Silt=59.9-- --%Clay=33.7-- --A-6 (15)--		3	2, 3, 9	2.50 P	18
		10	4	4, 4, 5	> 4.50 P	18
			5	3, 4, 4	3.50 P	16
		15	6	4, 6, 7	4.00 P	21
	--rig chatter; possible cobbles--		7	4, 4, 5	4.00 P	15
573.7	Very stiff, black and gray SILTY CLAY to SILTY CLAY LOAM, trace gravel; damp --Buried TOPSOIL-- --RDR 2--	20	8	3, 5, 6	2.50 P	26
			9	3, 6, 7	3.50 P	21
570.1	Medium dense, brown and gray SILTY LOAM, trace gravel --RDR 2-- --L_L(%)=21, P_L(%)=14--	25	10	9, 6, 6	NP	12
567.6	--%Gravel=11.2-- --%Sand=25.4-- --%Silt=55.9-- --%Clay=7.5-- --A-4 (2)--		11	50/1"	NP	12
565.6	--rig chatter; possible cobbles-- Very dense, brown and reddish brown SANDY GRAVEL; wet --RDR 3--		12	50/3"	NP	6
563.1	--rig chatter, 27.5 ft; possible cobbles-- Very dense, brown and reddish brown, weathered dolostone fragments; saturated --Weathered BEDROCK--	30				
	Strong, light greenish gray, very poor to poor quality, DOLOSTONE; Moderately to closely spaced, highly weathered, horizontal and vertical JOINTS, with <0.05 inch opening, slicken to slightly rough walls, and <0.2 inch thick clay infill. --RUN 1: 30.0 to 40.0 feet-- --Recovery: 90%-- --RQD: 8%-- --Qu=6,081 psi--	35	13	CORE		
	--RUN 2: 40.0 to 44.5 feet-- --Recovery: 81%-- --RQD: 26%--	40	14	CORE		
548.6	Boring terminated at 44.50 ft	45				
		50				

GENERAL NOTES

Begin Drilling: 11-16-2021
Complete Drilling: 11-16-2021
Drilling Contractor: Wang Testing Services
Drill Rig: 20D50T [80%]
Driller: RH&JD
Logger: M. Rojo
Checked by: C. Marin
Drilling Method: 2.25" ID HSA; boring backfilled upon completion

WATER LEVEL DATA

While Drilling: 26.00 ft
At Completion of Drilling: core wash 2.5ft
Time After Drilling: NA
Depth to Water: NA

The stratification lines represent the approximate boundary between soil types; the actual transition may be gradual.

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1145 N MAin Street
Lombard, IL 60148
Telephone: (630) 953-9928
Fax: (630) 953-9938

BORING LOG RIV-SGB-02

WEI Job No.: 255-39-01

Client **Stantec**
Project **I-80 Reconstruction, Ridge Road to Houbolt Road**
Location **Will County, Illinois**

Datum: NAVD 88
Elevation: 593.27 ft
North: 1755353.25 ft
East: 1016252.19 ft
Station: 25+65.1
Offset: 4.9 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type *recovery*	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	592.3	11-inch thick ASPHALT --PAVEMENT--						
	592.3	1-inch, gray and white SANDY GRAVEL --AGGREGATE BASE--			1	5 4 4 3	4.00 P	16
		Very stiff to hard, brown and gray SILTY CLAY to CLAY LOAM, trace gravel; damp --FILL-- --RDR 2--	5		2	3 3 3 4	3.00 P	19
					3	2 2 3 3	3.50 P	17
					4	4 5 12 10	> 4.50 P	14
			10		5	10 7 9 9	> 4.50 P	17
					6	7 8 10	> 4.50 P	18
		--black; trace organic matter-- --FILL--	15		7	6 7 5	3.25 P	29
					8	9 9 10	NR	
	572.8		20		9	6 6 7	> 4.50 P	14
	571.9	Very stiff, black SILTY CLAY, trace organic matter; damp --Buried TOPSOIL--			10	8 11 9	3.50 P	46
	568.3	Stiff to very stiff, brown and gray SILTY CLAY, trace gravel; damp to moist --RDR 2--	25		11	8 6 7	1.50 P	21
		Boring terminated at 25.00 ft						

GENERAL NOTES

Begin Drilling **11-19-2021** Complete Drilling **11-19-2021**
Drilling Contractor **Wang Testing Services** Drill Rig **20CME55T[81%]**
Driller **RR&AG** Logger **M. Rojo** Checked by **C. Marin**
Drilling Method **3.25" ID HSA; boring backfilled upon completion**

WATER LEVEL DATA

While Drilling **25.00 ft**
At Completion of Drilling **DRY**
Time After Drilling **NA**
Depth to Water **NA**

The stratification lines represent the approximate boundary between soil types; the actual transition may be gradual.

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BORING LOG RIV-SGB-03

WEI Job No.: 255-39-01

Client **Stantec**
Project **I-80 Reconstruction, Ridge Road to Houbolt Road**
Location **Will County, Illinois**

Datum: NAVD 88
Elevation: 592.36 ft
North: 1755053.60 ft
East: 1016257.18 ft
Station: 28+64.8
Offset: 5.4 RT

Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
591.8	7-inch thick ASPHALT --PAVEMENT--					
591.1	Gray and white SANDY GRAVEL; damp --AGGREGATE BASE--		1	8 7 7 8	> 4.50 P	13
	Very stiff to hard, brown and gray SILTY CLAY to SILTY CLAY LOAM, trace gravel; damp --FILL-- --RDR 2--		2	10 11 11 11	> 4.50 P	14
		5	3	6 7 9 7	> 4.50 P	17
			4	7 6 6 5	3.28 B	17
		10	5	5 7 6 7	> 4.50 P	17
			6	3 5 8	NA	18
		15	7	5 6 8	> 4.50 P	18
			8	4 5 7	> 4.50 P	16
		20	9	9 10 9	NA	18
571.9	Medium dense, brown and gray LOAM, trace gravel; moist --FILL-- --RDR 2--		10	4 7 8	NP	15
569.4	Very dense, brown SILTY LOAM, trace gravel; wet to saturated --RDR 2--		11	7 9 60/3"	NP	11
567.4	Boring terminated at 24.75 ft	25				

GENERAL NOTES

Begin Drilling **11-22-2021** Complete Drilling **11-22-2021**
Drilling Contractor **Wang Testing Services** Drill Rig **20CME55T[81%]**
Driller **RR&AG** Logger **M. Rojo** Checked by **C. Marin**
Drilling Method **2.25" ID HSA; boring backfilled upon completion**

WATER LEVEL DATA

While Drilling **24.00 ft**
At Completion of Drilling **DRY**
Time After Drilling **NA**
Depth to Water **NA**

The stratification lines represent the approximate boundary between soil types; the actual transition may be gradual.

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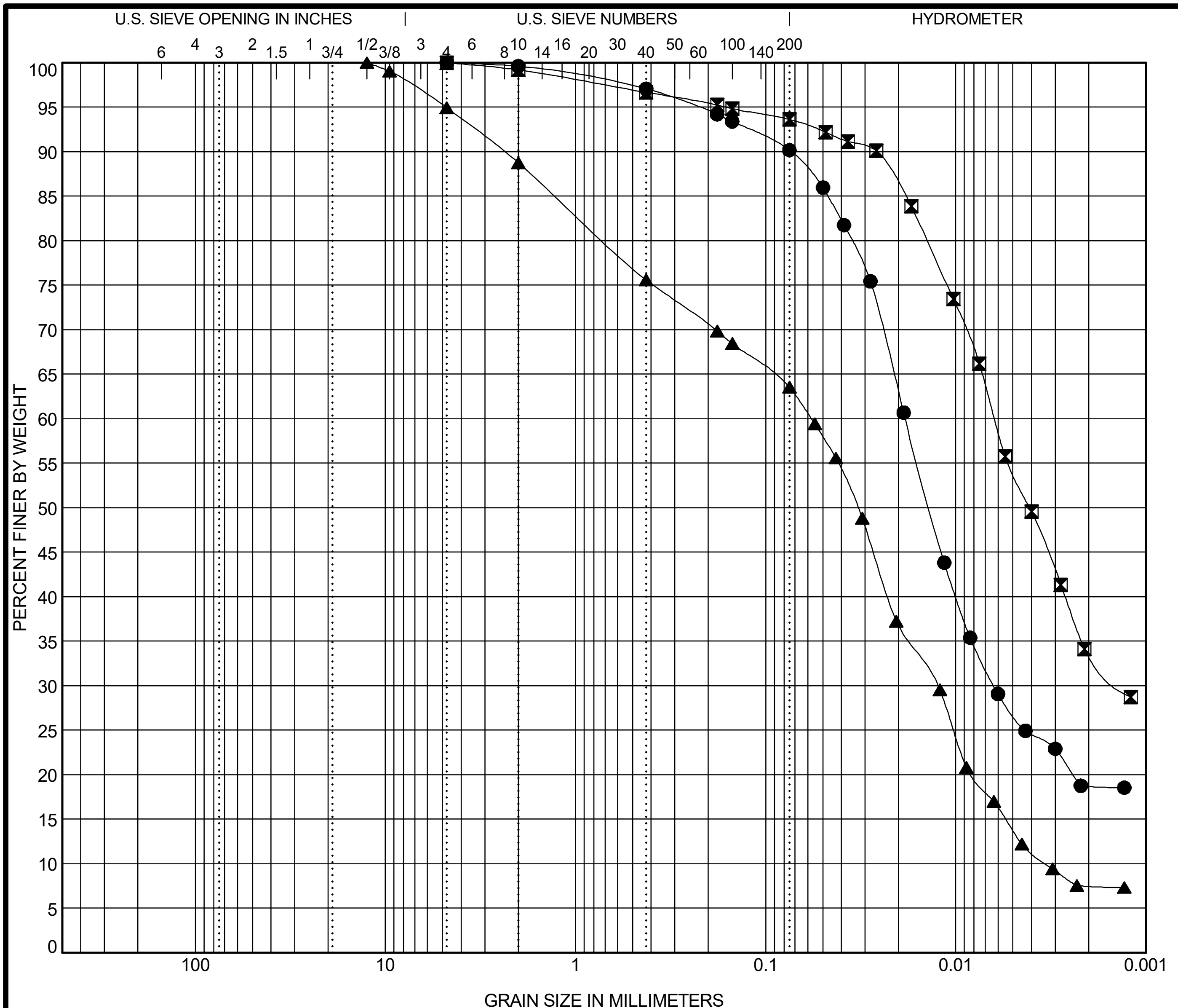
APPENDIX B



Specimen Identification			IDH Classification	LL	PL	PI	Cc	Cu
●	RIV-BSB-01#10	23.5 ft	**Silty Loam**	37	20	17		
⧗	RIV-BSB-03#3	6.0 ft	**Silty Clay**	35	19	16		
▲	RIV-BSB-03#10	23.5 ft	**Silty Loam**	21	14	7	0.81	17.16

Specimen Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	RIV-BSB-01#10	23.5 ft	4.75	0.018	0.006		0.4	9.6	71.3	18.7
⧗	RIV-BSB-03#3	6.0 ft	4.75	0.006	0.001		0.8	5.6	59.9	33.7
▲	RIV-BSB-03#10	23.5 ft	12.5	0.058	0.012	0.003	11.2	25.4	55.9	7.5

WEI GRAIN SIZE IDH 2553901.GPJ US LAB.GDT 11/24/21

WEI SINCE 1982
Wang Engineering, Inc.
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Lombard, IL 60148
Telephone: (630) 953-9928
Fax: (630) 953-9938

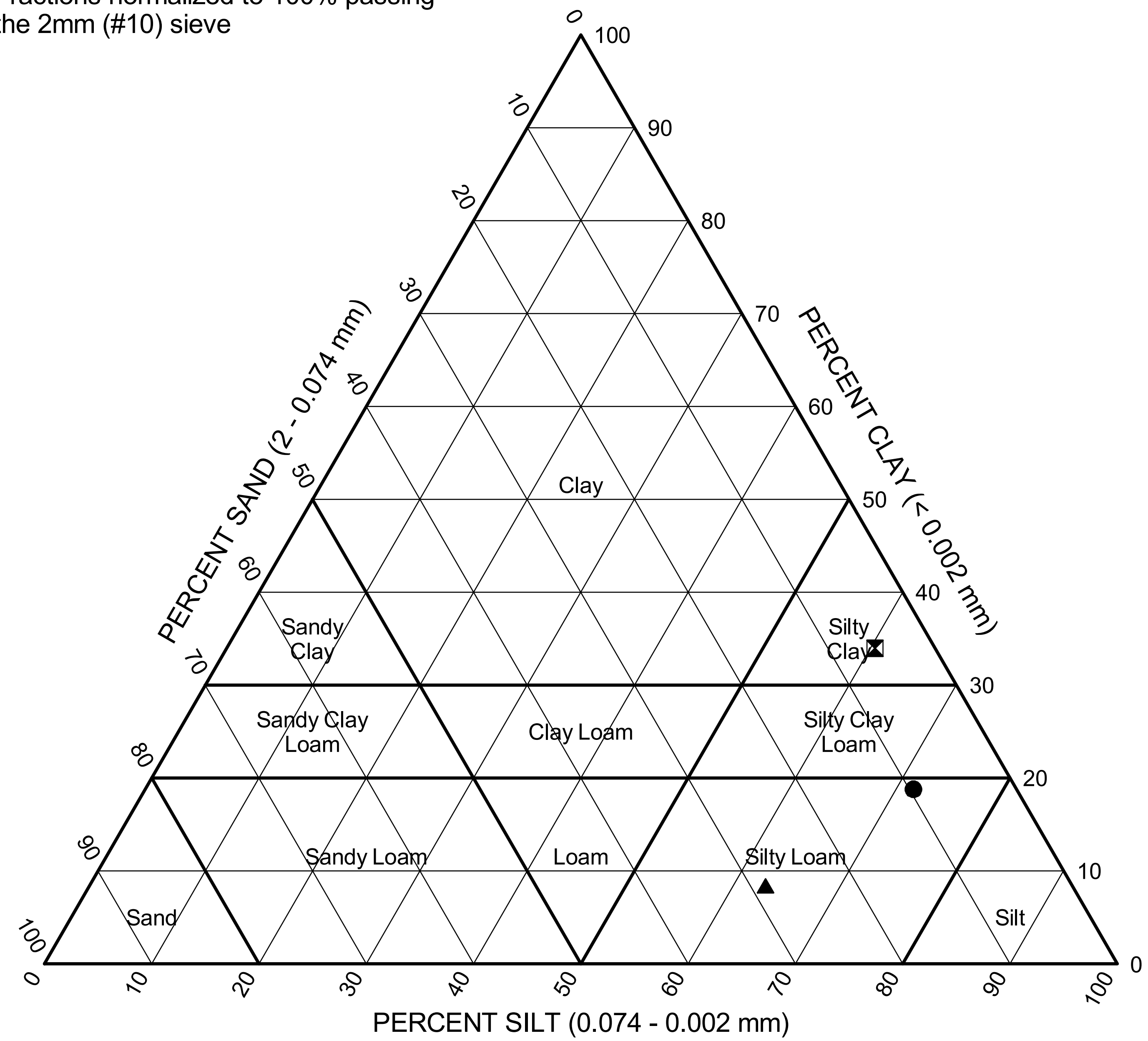
GRAIN SIZE DISTRIBUTION

Project: I-80 Reconstruction, Ridge Road to Houbolt Road

Location: Will County, Illinois

Number: 255-39-01

Fractions normalized to 100% passing the 2mm (#10) sieve



	Sample	Depth (ft)	Sand (%)	Silt (%)	Clay (%)	Classification		
						IL DOT	AASHTO	ASTM
●	RIV-BSB-01#10	23.5	**9.6**	**71.6**	**18.8**	**Silty Loam**	**A-6 (15)**	**CL**
⧗	RIV-BSB-03#3	6.0	**5.6**	**60.4**	**34.0**	**Silty Clay**	**A-6 (15)**	**CL**
▲	RIV-BSB-03#10	23.5	**28.6**	**63.0**	**8.4**	**Silty Loam**	**A-4 (2)**	**CL-ML**

WEI IDH 2553901.GPJ WANGENG.GDT 11/24/21

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IDH Textural Classification Chart

Project: I-80 Reconstruction, Ridge Road to Houbolt Road

Location: Will County, Illinois

Number: 255-39-01

Unconfined Compressive Strength of Intact Rock Core Specimens

Project: I-80 Reconstruction

Client: Stantec

WEI Job No.: 255-39-01

Field Sample ID	Run #	Depth (ft)	Location	Sample Description	Length (in) Before Capping	Length (in) After Capping	Diameter (in)	Total Load (lbs)	Total Pressure (psi)	Fracture Type*	Break Date	Tested By	Area (in^2)
RIV-BSB-03	1	39.0	South Abutment	Dolostone	4.27	NA	2.05	20110	6081	3	11/18/21	MAC	3.31

*** Fracture Types:**

Type 1 - Reasonably well-formed cones on both ends, less than 1 in. [25 mm] of cracking through caps;
Type 2 - Well-formed cone on one end, vertical cracks running through caps, no well defined cone on other end;
Type 3 - Columnar vertical cracking through both ends, no well-formed cones;
Type 4 - Diagonal fracture with no cracking through ends; tap with hammer to distinguish from Type 1;
Type 5 - Side fractures at top or bottom (occur commonly with unbonded caps);
Type 6 - Similar to Type 5 but end of cylinder is pointed.

Prepared by:______________________________

Checked by: ______________________________

WANG ENGINEERING, INC.
1145 N. Main Street, Lombard. IL 60148

Unconfined Compressive Strength of Intact Rock Core Specimens

Project: I-80 Reconstruction

Client: Stantec

WEI Job No.: 255-39-01

Field Sample ID	Run #	Depth (ft)	Location	Sample Description	Length (in) Before Capping	Length (in) After Capping	Diameter (in)	Total Load (lbs)	Total Pressure (psi)	Fracture Type*	Break Date	Tested By	Area (in^2)
RIV-BSB-02	1	17.0	Pier	Dolostone	4.02	NA	2.06	19900	5994	3	11/23/21	MAC	3.32

*** Fracture Types:**

Type 1 - Reasonably well-formed cones on both ends, less than 1 in. [25 mm] of cracking through caps;
Type 2 - Well-formed cone on one end, vertical cracks running through caps, no well defined cone on other end;
Type 3 - Columnar vertical cracking through both ends, no well-formed cones;
Type 4 - Diagonal fracture with no cracking through ends; tap with hammer to distinguish from Type 1;
Type 5 - Side fractures at top or bottom (occur commonly with unbonded caps);
Type 6 - Similar to Type 5 but end of cylinder is pointed.

Prepared by:______________________________

Checked by: ______________________________

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ORGANIC CONTENT in SOILS by LOSS on IGNITION

ASTM D 2974, Method C

Client: Stantec
Project: I-80
WEI Job: 255-39-01
Type/Condition: SS
Testing Furnace Temp °C.: 440

Analyst Name: M> Ciapas
Date Received: 11/192021
Date Tested: 12/6/2021
Soil Sample ID: RIV-SGB-02,S#10(21-22.5 ft)
Sample Description: Dark Brown Loam

Moisture Content	Wet soil + tare (g)	Dry Soil + tare (g)	Tare mass (g)	w (%)
oven-dry method	82.39	71.87	41.61	35

Ash Content	Dry Soil + tare (g)	Ash + tare (g)	Tare mass (g)	Ash Content (%)
Loss On Ignition	71.87	68.21	41.61	14

Organic Content (%)= **13.8**

Prepeared By:____

Reviwed By:____

AASHTO R18

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APPENDIX C

Run #1

0 6 inches

Run #2

0 6 inches

Boring RIV-BSB-01:
Run #1, 33.0 to 39.0 feet, RECOVERY=76%, RQD=0%
Run #2, 39.0 to 42.0 feet, RECOVERY=51%, RQD=0%

BEDROCK CORE: SOUTH RIVER ROAD BRIDGE OVER I-80; I-80 RECONSTRUCTION FROM EAST OF RIDGE RD TO HOUBOLT RD, WILL COUNTY, ILLINOIS		
SCALE: GRAPHICAL	APPENDIX C-1	DRAWN BY: J. Bensen CHECKED BY: A. Hamad
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FOR STANTEC		255-39-01

Run #1

Boring RIV-BSB-02:
Run #1, 11.0 to 21.0 feet, RECOVERY=84%, RQD=8%

BEDROCK CORE: SOUTH RIVER ROAD BRIDGE OVER I-80; I-80 RECONSTRUCTION FROM EAST OF RIDGE RD TO HOUBOLT RD, WILL COUNTY, ILLINOIS		
SCALE: GRAPHICAL	APPENDIX C-2	DRAWN BY: J. Bensen CHECKED BY: A. Hamad
Wang Engineering		1145 N. Main Street Lombard, IL 60148 www.wangeng.com
FOR STANTEC		255-39-01

Run #2

0 6 inches

Boring RIV-BSB-02:
Run #2, 21.0 to 27.0 feet, RECOVERY=100%, RQD=53%

BEDROCK CORE: SOUTH RIVER ROAD BRIDGE OVER I-80; I-80 RECONSTRUCTION FROM EAST OF RIDGE RD TO HOUBOLT RD, WILL COUNTY, ILLINOIS		
SCALE: GRAPHICAL	APPENDIX C-3	DRAWN BY: J. Bensen CHECKED BY: A. Hamad
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FOR STANTEC		255-39-01

Run #1

0 6 inches

Boring RIV-BSB-03:
Run #1, 30.0 to 40.0 feet, RECOVERY=90%, RQD=8%

BEDROCK CORE: SOUTH RIVER ROAD BRIDGE OVER I-80; I-80 RECONSTRUCTION FROM EAST OF RIDGE RD TO HOUBOLT RD, WILL COUNTY, ILLINOIS		
SCALE: GRAPHICAL	APPENDIX C-4	DRAWN BY: J. Bensen CHECKED BY: A. Hamad
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FOR STANTEC		255-39-01

Run #2

Boring RIV-BSB-03:
Run #2, 40.0 to 44.5 feet, RECOVERY=81%, RQD=26%

BEDROCK CORE: SOUTH RIVER ROAD BRIDGE OVER I-80; I-80 RECONSTRUCTION FROM EAST OF RIDGE RD TO HOUBOLT RD, WILL COUNTY, ILLINOIS		
SCALE: GRAPHICAL	APPENDIX C-5	DRAWN BY: J. Bensen CHECKED BY: A. Hamad
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FOR STANTEC		255-39-01

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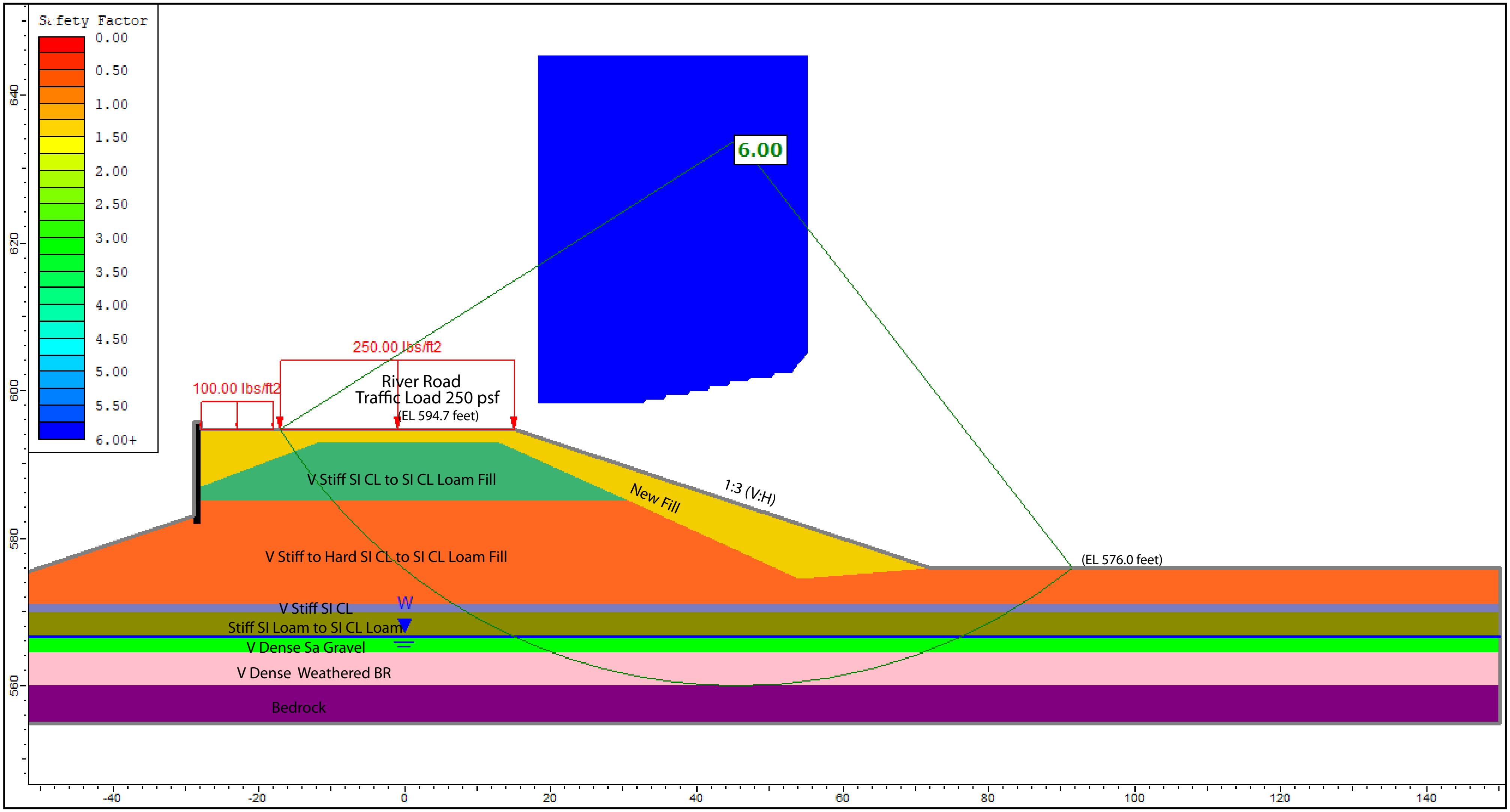
APPENDIX D



Undrained Analysis, North Abutment Side Slope, Ref Boring: RIV-BSB-01

Layer ID	Description	Total Unit Weight (pcf)	Undrained Cohesion (psf)	Undrained Friction Angle (degrees)
1	New Fill	125	1000	0
2	V Stiff SI CL to SI CL Loam Fill	120	2600	0
3	V Stiff to Hard SI CL to SI CL Loam Fill	120	3700	0
4	V Stiff SI CL	120	3500	0
5	Stiff SI Loam to SI CL Loam	120	1800	0
6	V Dense SA Gravel	125	0	33
7	V Dense Sa GRAVEL/Weathered Bedrock	125	0	35

GLOBAL STABILITY: RIVER ROAD BRIDGE OVER I-80; I-80 RECONSTRUCTION FROM EAST OF RIDGE RD TO HOUBOLT ROAD, WILL COUNTY, ILLINOIS

SCALE: GRAPHICAL	APPENDIX D-1	DRAWN BY: N. Balakumaran CHECKED BY: A. Hamad

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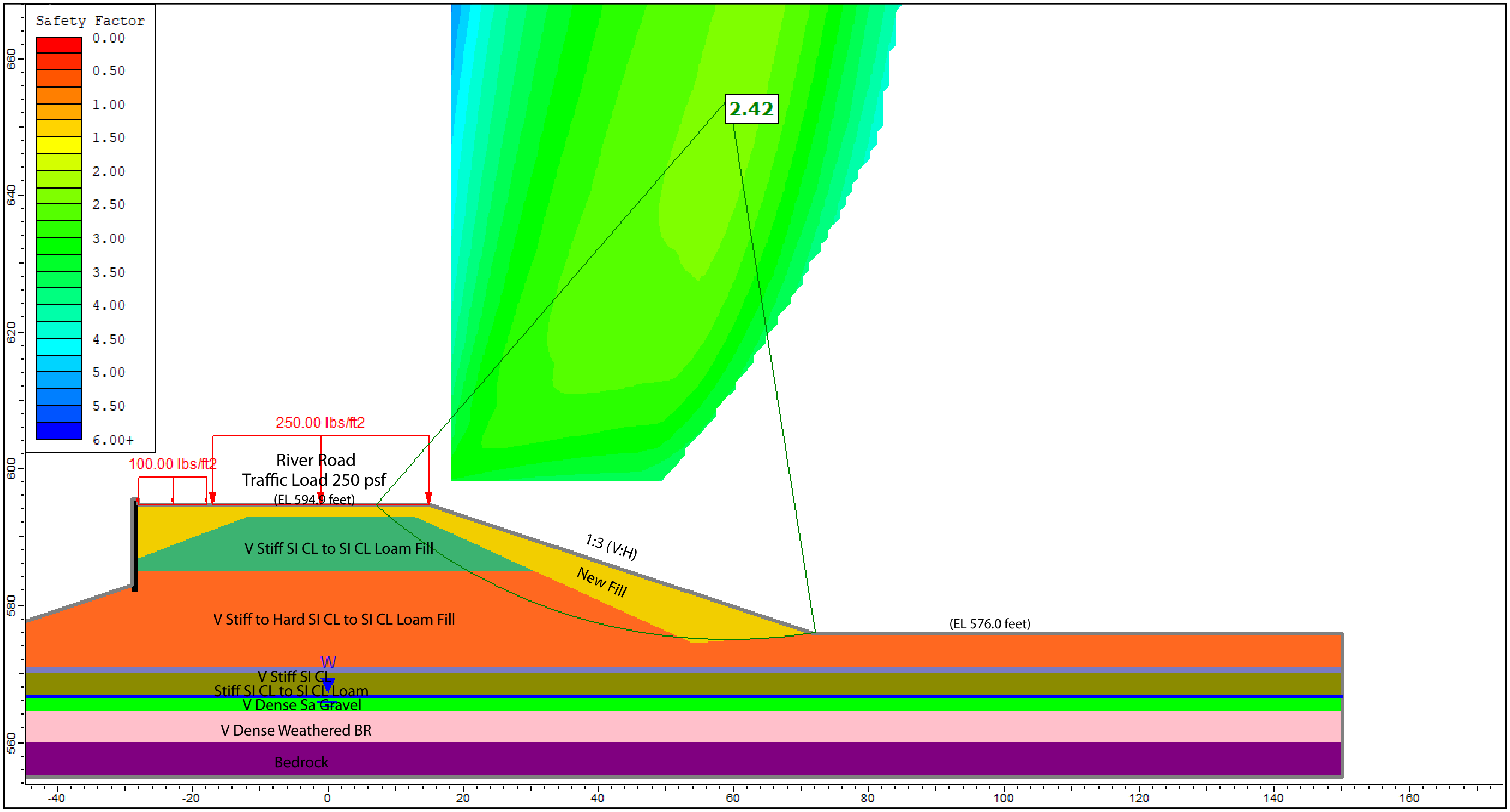
FOR STANTEC | 255-39-01



Drained Analysis, North Abutment Side Slope, Ref Boring: RIV-BSB-01

Layer ID	Description	Total Unit Weight (pcf)	Drained Cohesion (psf)	Drained Friction Angle (degrees)
1	New Fill	125	100	30
2	V Stiff SI CL to SI CL Loam Fill	120	100	30
3	V Stiff to Hard SI CL to SI CL Loam Fill	120	100	30
4	V Stiff SI CL	120	100	30
5	Stiff SI CL to SI CL Loam	120	100	30
6	V Dense Sa Gravel	125	0	33
7	V Dense Weathered Bedrock	125	0	35

GLOBAL STABILITY: RIVER ROAD BRIDGE OVER I-80; I-80 RECONSTRUCTION FROM EAST OF RIDGE RD TO HOUBOLT ROAD, WILL COUNTY, ILLINOIS

SCALE: GRAPHICAL | APPENDIX D-2 | DRAWN BY: N. Balakumaran | CHECKED BY: A. Hamad

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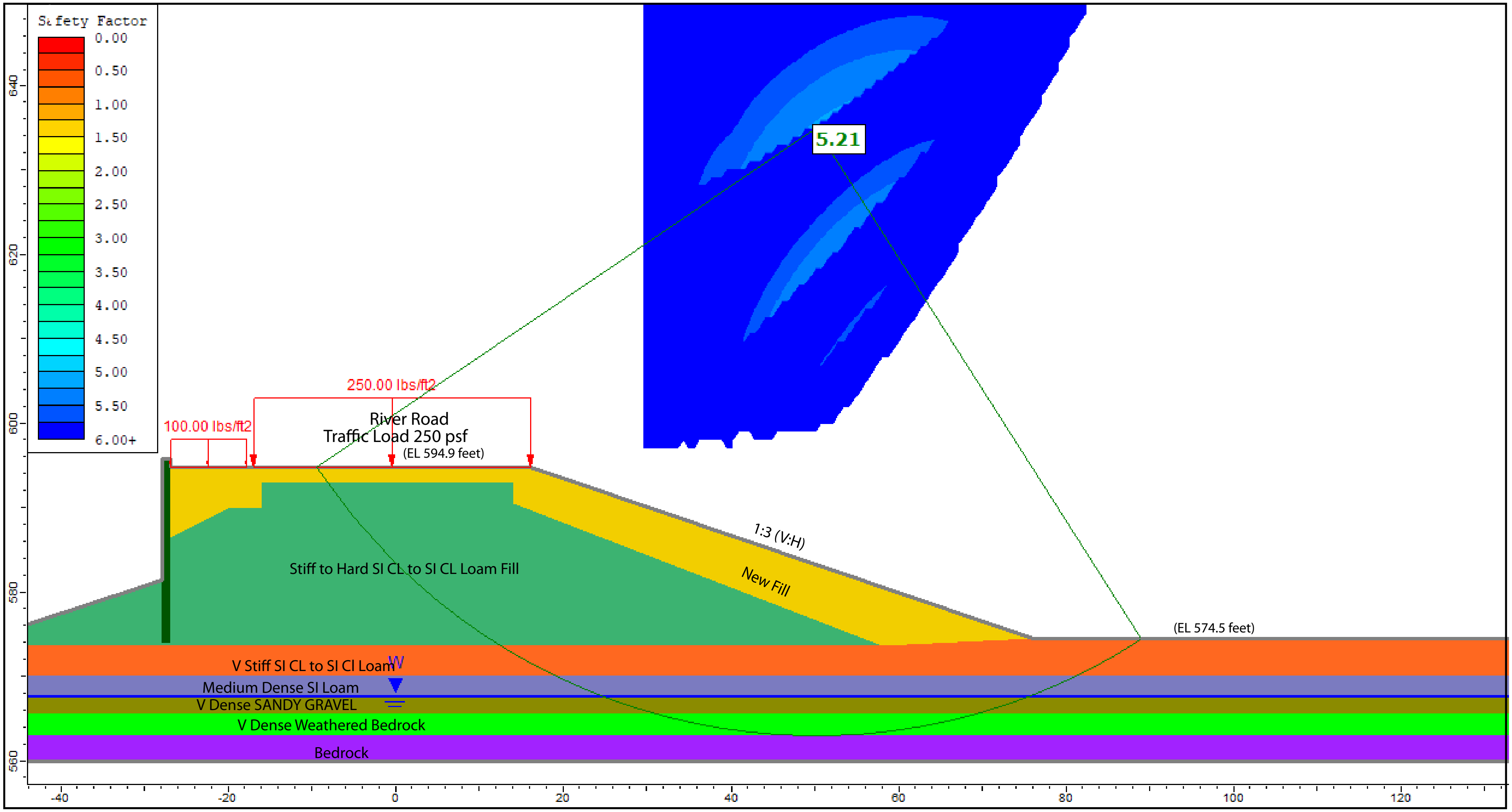
FOR STANTEC | 255-39-01



Undrained Analysis, South Abutment Side Slope, Ref Boring: RIV-BSB-03

Layer ID	Description	Total Unit Weight (pcf)	Undrained Cohesion (psf)	Undrained Friction Angle (degrees)
1	New Fill	125	1000	0
2	Stiff to V Stiff SI CL to SI CL Loam Fill	120	2700	0
3	V Stiff to Hard SI CL to SI CL Loam	120	3500	0
4	M Dense SI Loam	120	0	32
5	V Dense Sa GRAVEL	120	0	35
6	V Dense Weathered Bedrock	125	0	35

GLOBAL STABILITY: RIVER ROAD BRIDGE OVER I-80; I-80 RECONSTRUCTION FROM EAST OF RIDGE RD TO HOUBOLT ROAD, WILL COUNTY, ILLINOIS

SCALE: GRAPHICAL | APPENDIX D-3 | DRAWN BY: N. Balakumaran | CHECKED BY: A. Hamad

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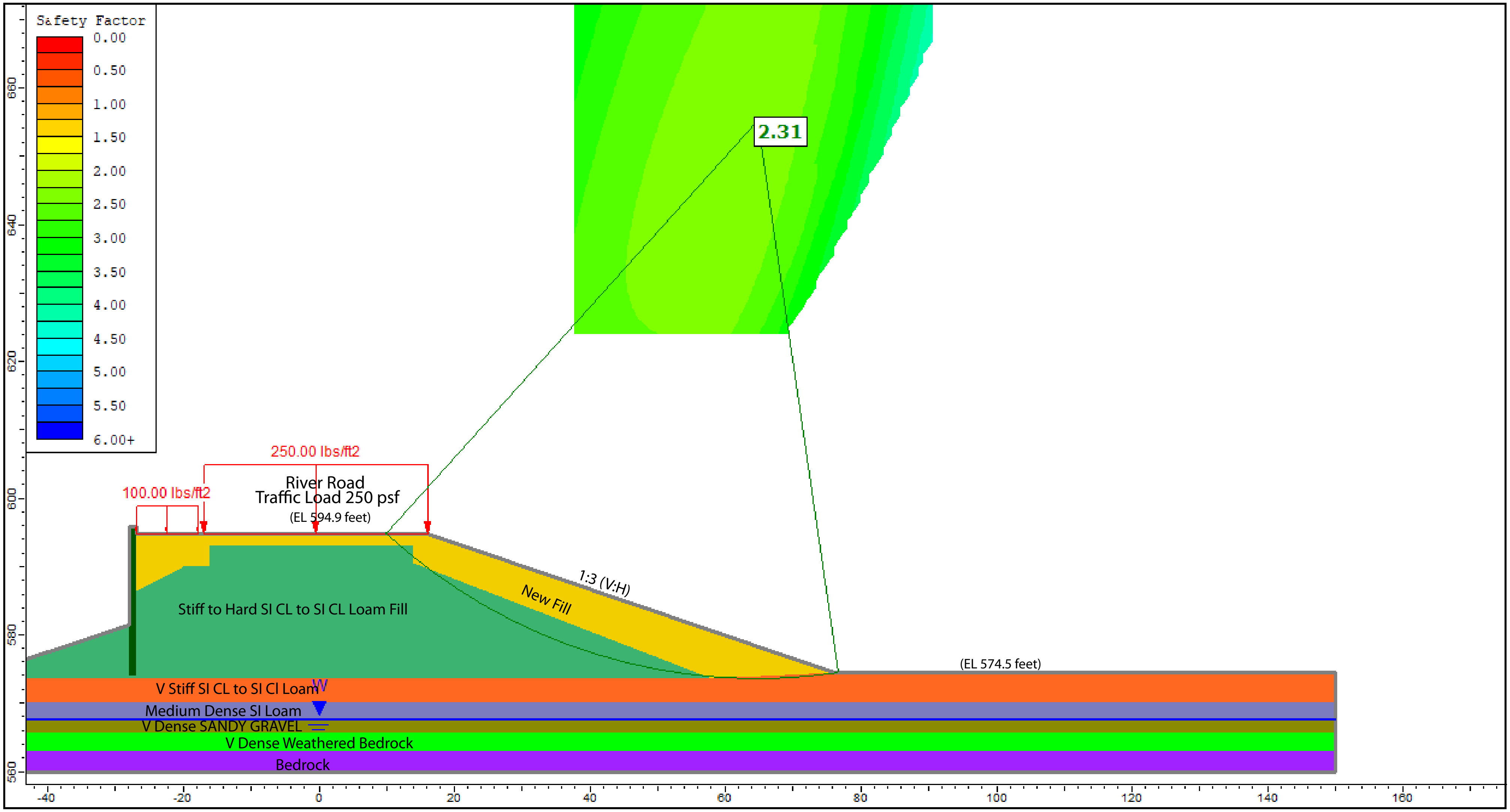
FOR STANTEC | 255-39-01



Drained Analysis, South Abutment Side Slope, Ref Boring: RIV-BSB-03

Layer ID	Description	Total Unit Weight (pcf)	Drained Cohesion (psf)	Drained Friction Angle (degrees)
1	New Fill	125	100	30
2	Stiff to Hard SI CL to SI CL Loam Fill	120	100	30
3	V Stiff to Hard SI CL to SI CL Loam	120	100	30
4	M Dense SI Loam	120	0	32
5	V Dense Sa GRAVEL	125	0	35
6	V Dense Weathered Bedrock	130	0	35

GLOBAL STABILITY: RIVER ROAD BRIDGE OVER I-80; I-80 RECONSTRUCTION FROM EAST OF RIDGE RD TO HOUBOLT ROAD, WILL COUNTY, ILLINOIS

SCALE: GRAPHICAL	APPENDIX D-4	DRAWN BY: N. Balakumaran CHECKED BY: A. Hamad

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FOR STANTEC — 255-39-01

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APPENDIX E

Benchmark: Set 2" CWA aluminum disc in concrete pier seat in southerly pier of River Road bridge on south side of eastbound I-80, Elev. 575.61.

Existing Structure: S.N. 099-0177 was originally constructed in 1959 as a four (4) span structure with no skew carrying northbound and southbound River Road over eastbound and westbound I-80 (F.A.I. Route 80; Section 99-1HB-1). The bridge has an overall length of approximately 219'-7" (back-to-back abutments), an overall width of 30'-0" (out-to-out superstructure), and consists of a 7"-thick reinforced concrete deck with no overlay. In Spans 1 and 4, the existing deck is supported by five (5) 42" PPC I-beams spaced at +/- 6'-8" centers, and in Spans 2 and 3, the deck is supported by six (6) 42" PPC I-beams at +/- 5'-4" center-to-center spacing. The substructure consists of reinforced concrete abutments on straight and battered steel piles and reinforced concrete piers with spread footings on rock.

This structure will be removed and replaced. Traffic will be detoured during construction.

Salvage: None.

HIGHWAY CLASSIFICATION

Township Road 056 - River Rd.	F.A.I. Rte. 80 - I-80
Functional Class: Local Road	Functional Class: Interstate
ADT: 1,750 (2019); 2,146 (2032)	ADT: 57,400 (2019); 61,284 (2032)
ADTT: 158 (2019); 194 (2032)	ADTT: 10,906 (2019); 11,644 (2032)
DHV: 236 (2032)	DHV: 6,741 (2032)
Design Speed: 40 mph	Design Speed: 70 m.p.h.
Posted Speed: 30 mph	Posted Speed: 70 m.p.h.
2-Way Traffic	2-Way Traffic
Directional Distribution: 50-50	Directional Distribution: 50-50

DESIGN SPECIFICATIONS

2020 AASHTO LRFD Bridge Design Specifications, 9th Edition

DESIGN STRESSES

FIELD UNITS

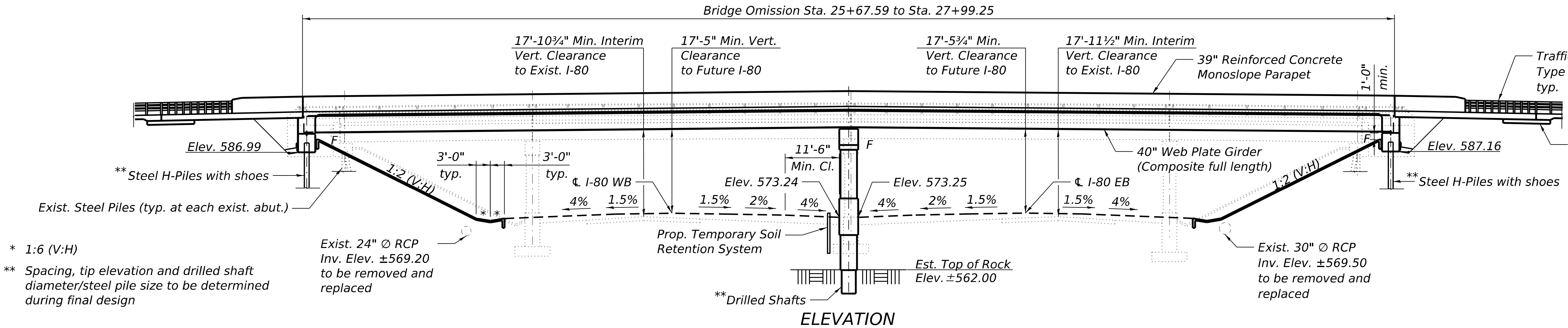
f'c = 4,000 psi (Superstructure)
f'c = 3,500 psi (Substructure)
fy = 60,000 psi (Reinforcement)
fy = 50,000 psi (M270 Grade 50)

LOADING HL-93

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

SEISMIC DATA

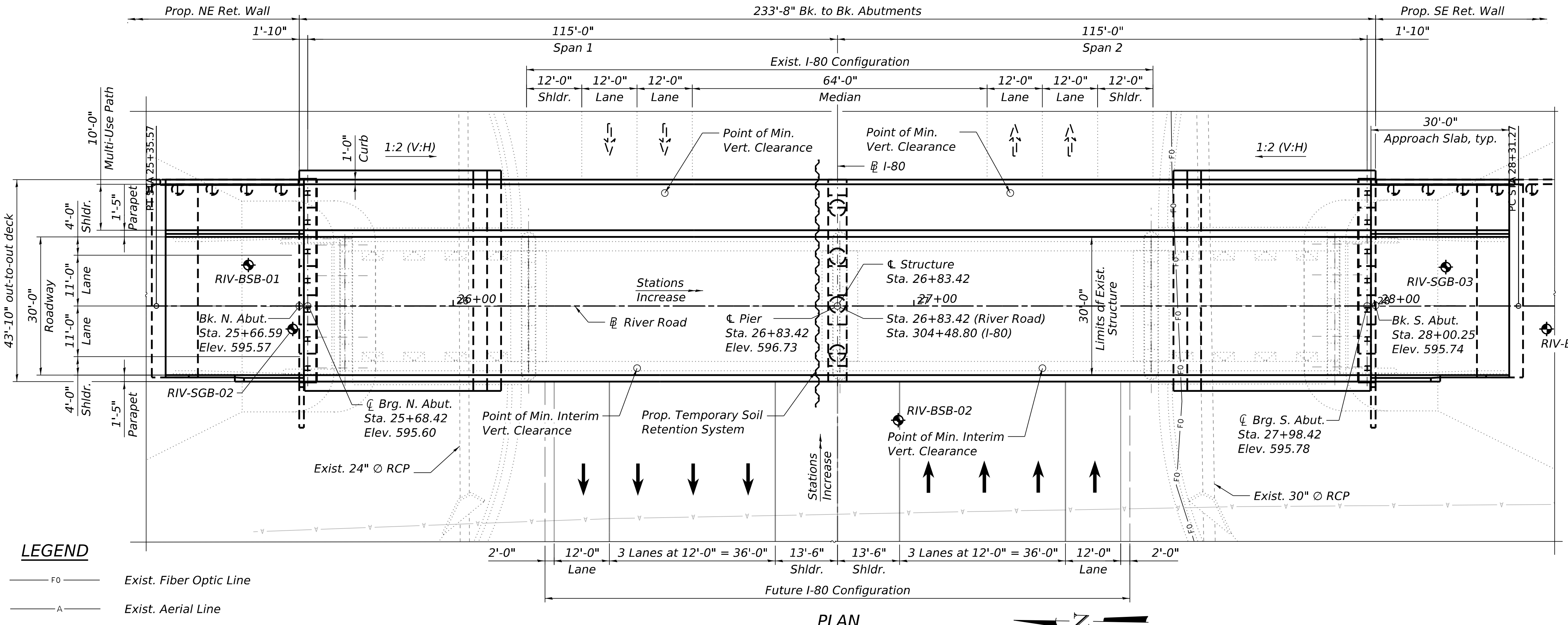
Seismic Performance Zone (SPZ) = 1
Design Spectral Acceleration at 1.0 sec. (SD1) = 0.068g
Design Spectral Acceleration at 0.2 sec. (SDS) = 0.127g
Soil Site Class = C



* 1:6 (V:H)

** Spacing, tip elevation and drilled shaft diameter/steel pile size to be determined during final design

ELEVATION



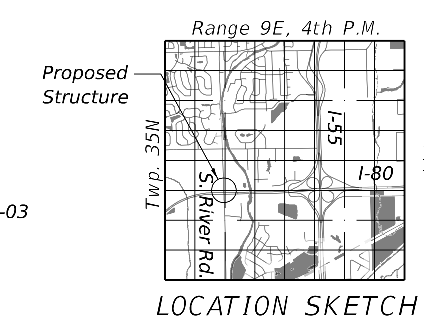
PLAN

LEGEND

—— FO —— Exist. Fiber Optic Line

—— A —— Exist. Aerial Line

Soil Boring



LOCATION SKETCH

GENERAL PLAN AND ELEVATION
RIVER ROAD OVER I-80
F.A.I. RTE. I-80
SEC. 2021-151-B
WILL COUNTY
STA. 26+83.42
STRUCTURE NO. 099-8304

HBM ENGINEERING GROUP, LLC

USER NAME =	DESIGNED - SK	REVISED -
	CHECKED - JJS,MAI	REVISED -
PLOT SCALE =	DRAWN - SK	REVISED -
PLOT DATE =	CHECKED - JJS, MAI	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

STRUCTURE NO. 099-8304

SHEET 1 OF 2 SHEETS

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
80	2021-151-B	WILL	2	1

CONTRACT NO. 62P67

ILLINOIS FED. AID PROJECT

MODEL: Default
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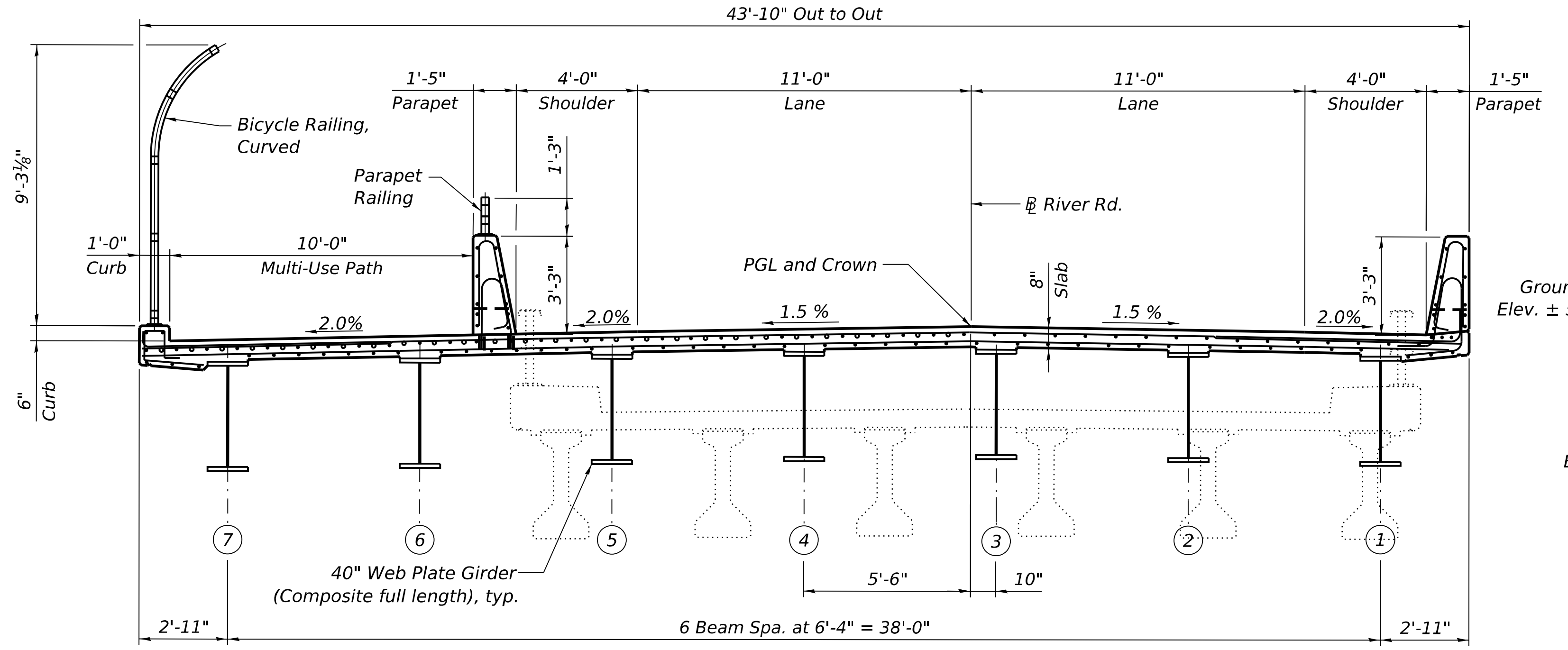
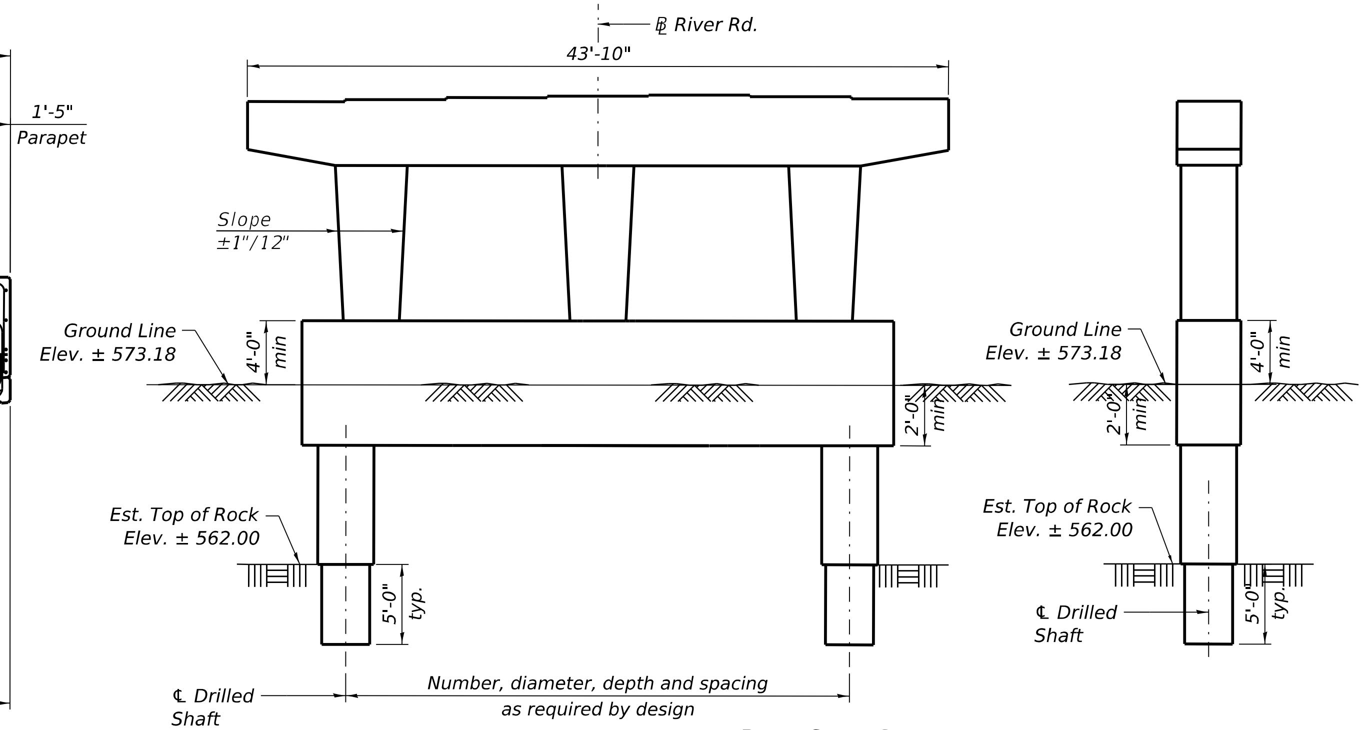
12/17/2021 4:47:22 PM



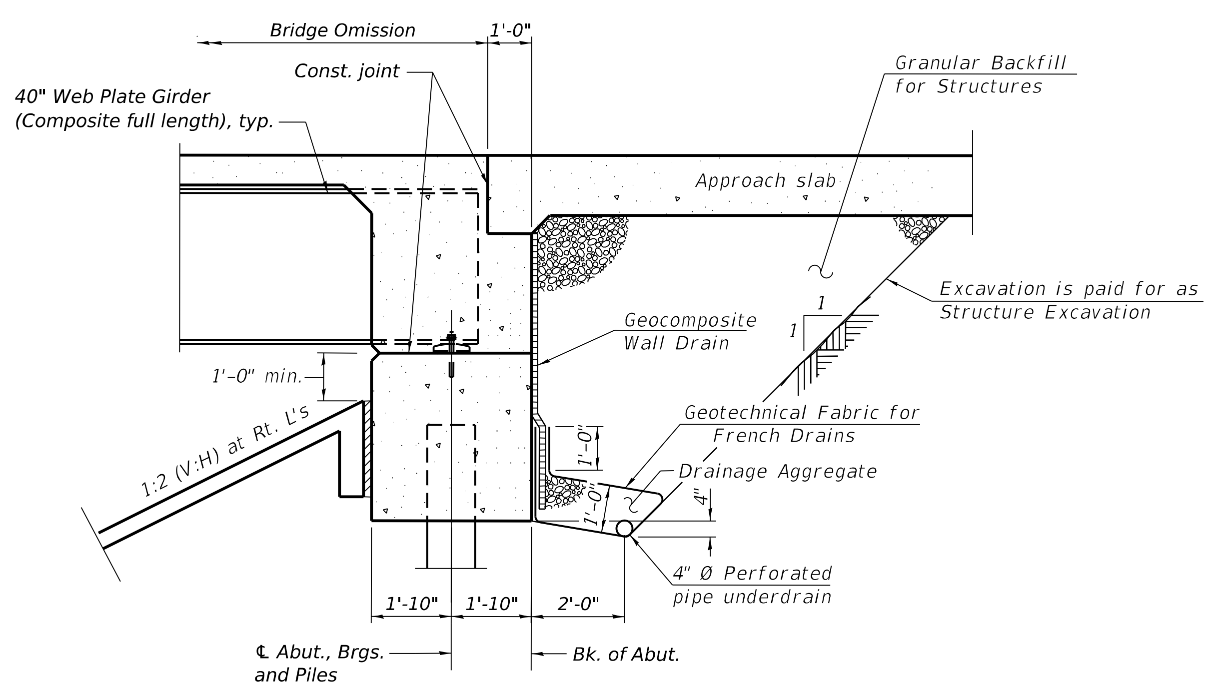
TYPICAL CROSS SECTION

(Looking Upstation)

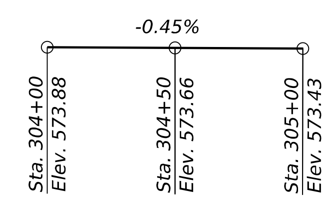


PIER SKETCH

(Looking Upstation)

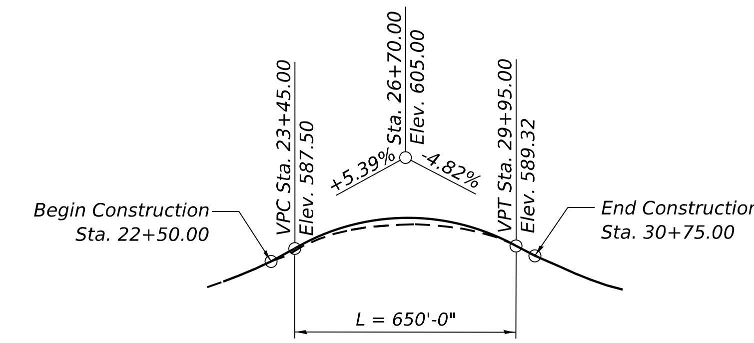


SECTION THRU INTEGRAL ABUTMENT



I-80 PROFILE GRADE

(Along ℞ Roadway)



RIVER RD. PROFILE GRADE

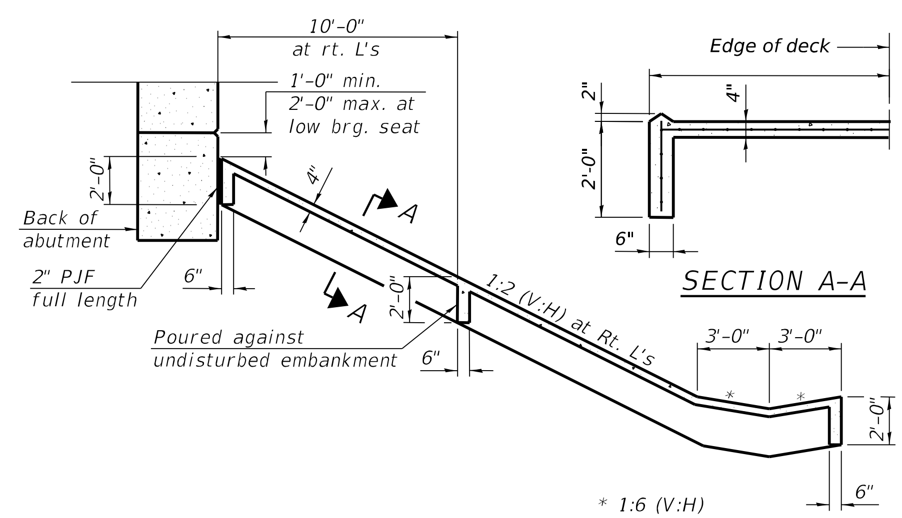
(Along ℞ Roadway)

PR CURVE
RR CURVE 1

P.I. Sta. = 24+63.90
Δ = 02°17'49"
D = 01°05'44"
R = 5,230.00'
T = 104.85'
L = 209.67
E = 1.05'
e = N.C.
T.R. = N/A
S.E. Run = N/A
P.C. Sta. = 23+59.05
P.T. Sta. = 25+68.72

PR CURVE
RR CURVE 2

P.I. Sta. = 29+20.76
Δ = 02°46'04" (LT)
D = 01°05'44"
R = 5,230.00'
T = 126.34'
L = 252.64
E = 1.53'
e = N.C.
T.R. = N/A
S.E. Run = N/A
P.C. Sta. = 27+94.42
P.T. Sta. = 30+47.06



SECTION A-A

SECTION THRU CONCRETE SLOPEWALL

GENERAL DETAILS
RIVER ROAD OVER I-80
F.A.I. RTE. I-80
SEC. 2021-151-B
WILL COUNTY
STA. 26+83.42
STRUCTURE NO. 099-8304

MODEL: Default
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HBM ENGINEERING GROUP, LLC

USER NAME =	DESIGNED - SK	REVISED -	
	CHECKED - JJS, MAI	REVISED -	
PLOT SCALE =	DRAWN - SK	REVISED -	
PLOT DATE =	CHECKED - JJS, MAI	REVISED -	

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

STRUCTURE NO. 099-8304

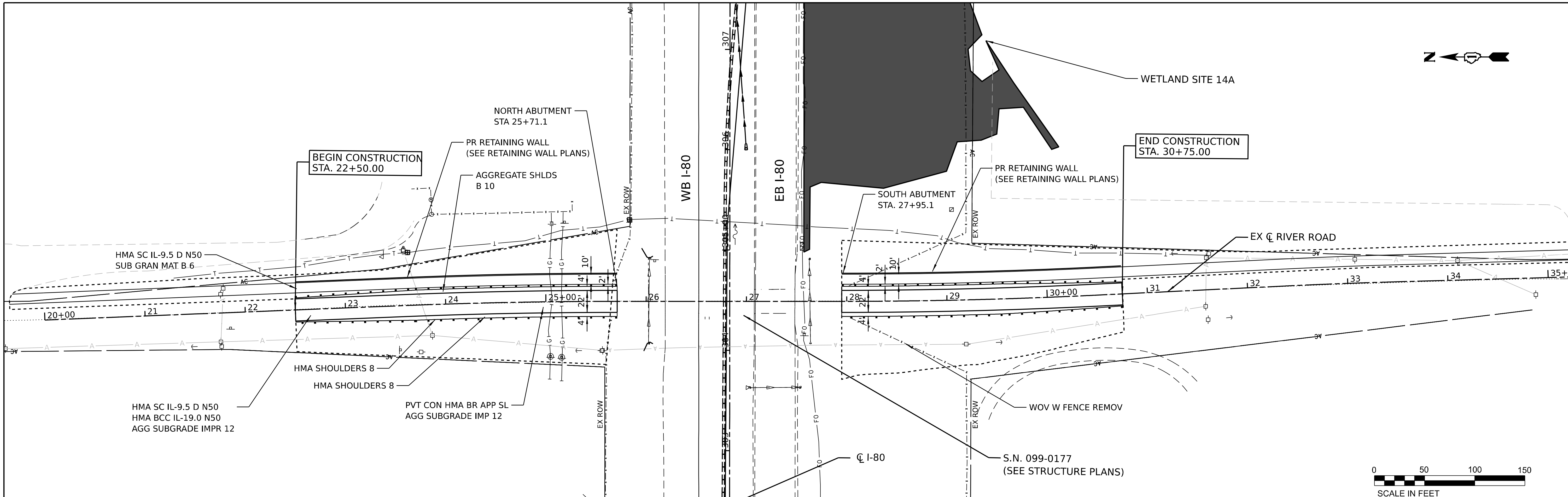
SHEET 2 OF 2 OT SHEETS

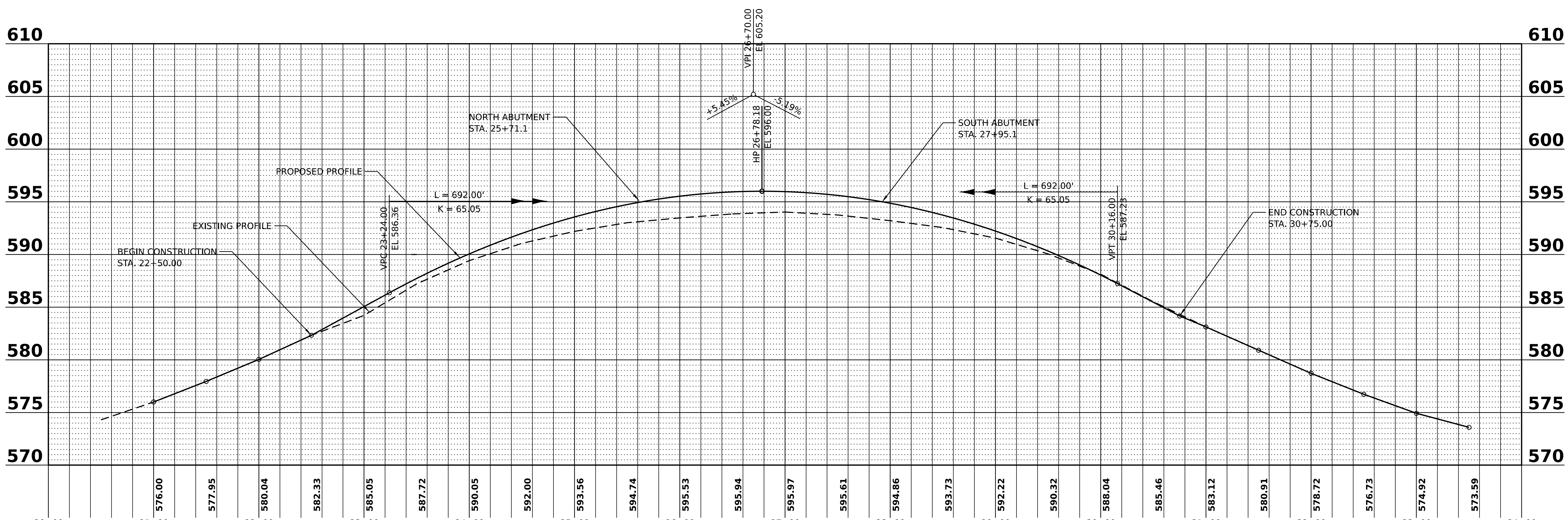
F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
80	2021-151-B	WILL	2	2
		CONTRACT NO. 62P67		
		ILLINOIS	FED. AID PROJECT	

12/17/2021 4:47:31 PM

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

APPENDIX F





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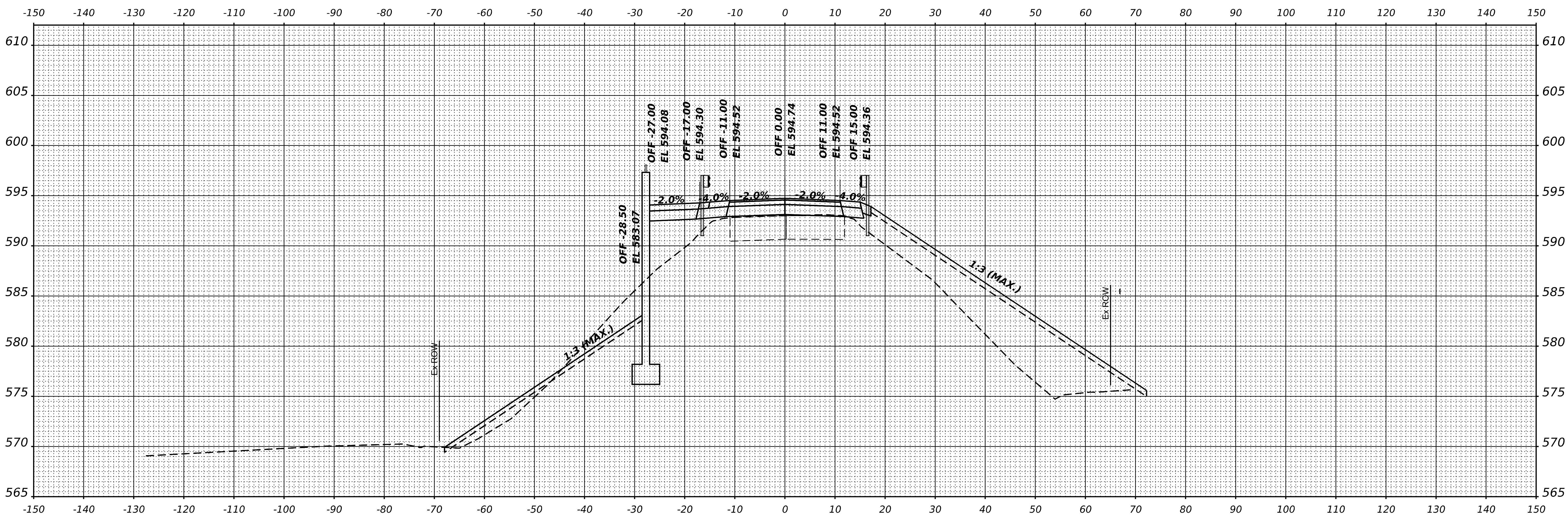
	PLOT DATE = 11/12/2021	DATE -	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

ROADWAY PLAN AND PROFILE

SCALE: SHEET OF SHEETS STA. TO STA.

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
I-80	2021-151-B	WILL	48	15
		CONTRACT NO. 62P67		
		ILLINOIS	FED. AID PROJECT	



STA 25+50.00

FINAL SURVEY / NOTE BOOK / NO.__ SURVEYED / PLOTTED / TEMPLATE / AREAS / AREAS CHECKED / BY / DATE

ORIGINAL SURVEY / NOTE BOOK / NO.__ SURVEYED / PLOTTED / TEMPLATE / AREAS / AREAS CHECKED / BY / DATE

MODEL: PCLRR - 25+50.00
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Stantec

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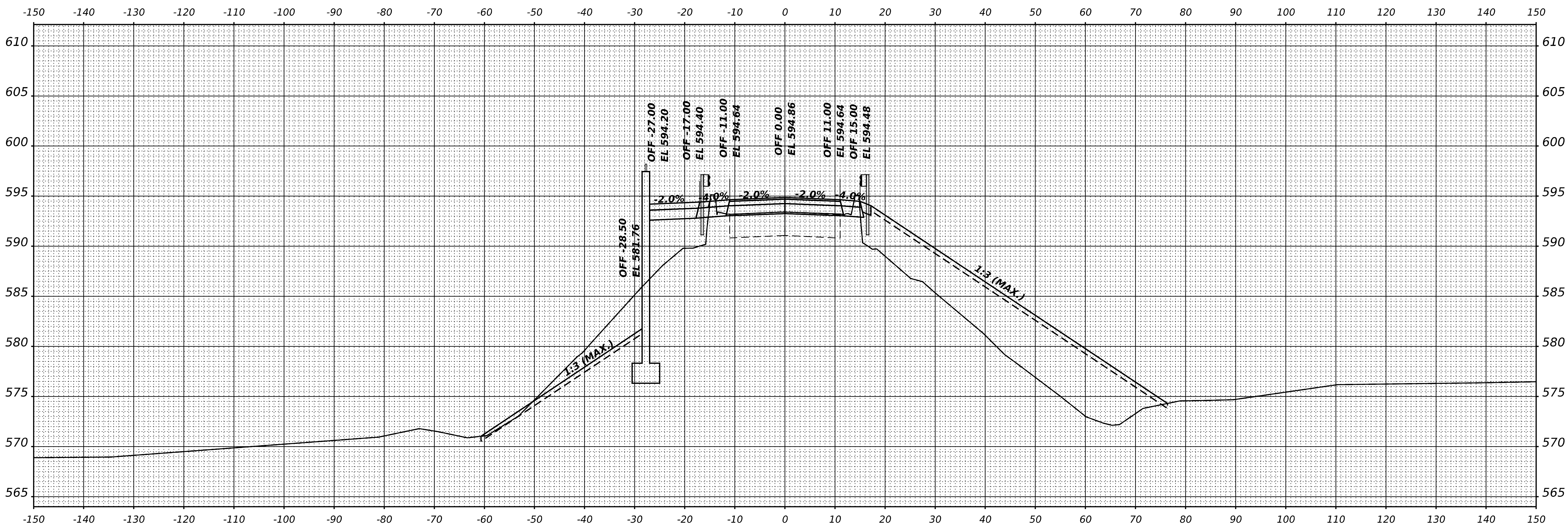
	DRAWN -	REVISED -	
PLOT SCALE = 0.16666667 ' / in.	CHECKED -	REVISED -	
PLOT DATE = 11/12/2021	DATE -	REVISED -	

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

CROSS SECTIONS

SCALE: SHEET OF SHEETS STA.

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
I-80	2021-151-B	WILL	48	53
		CONTRACT NO. 62P67		
		ILLINOIS FED. AID PROJECT		



STA 28+00.00

MODEL: PYCLRR - 28+00.00
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Stantec	USER NAME = jstrouse	DESIGNED -	REVISED -
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	PLOT DATE = 11/12/2021	DATE -	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

CROSS SECTIONS

SCALE: SHEET OF SHEETS STA.

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
I-80	2021-151-B	WILL	48	54
		CONTRACT NO. 62P67		
		ILLINOIS FED. AID PROJECT		