



Illinois Department of Transportation

Office of Highways Project Implementation / Bureau of Bridges & Structures
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To: OATES ASSOC., INC.

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Date: January 10, 2024	Job No.: P-93-024-20
SN: 050-0260	Contract No.:
Route: FAP 623	
Section: (E-1)ES	
County: LaSalle	
Other: US Route 6 over Fox River	

Attention: Bruce Schopp, PE, SE

Subject: Structure Geotechnical Report (SGR) Review

We are Sending:

- Approval Comments Foundation/Wall Design Details For Your Use

These Are:

- Approved As Submitted Approved Subject To Returned for Revisions and Re-submittal

Remarks:

We received the SGR dated November 7, 2023 for the above noted structure on November 9, 2023 and approve the report as submitted for use in completing the final design plans and specifications.

If you have any questions or need further assistance, please contact Doris Gonzalez at doris.gonzalez@illinois.gov or Bradly Hessing at bradly.hessing@illinois.gov of our Foundations and Geotechnical Unit.

**STRUCTURE GEOTECHNICAL REPORT
US ROUTE 6 BRIDGE OVER FOX RIVER
EX SN 050-0033, PR SN 050-0260
LASALLE COUNTY, ILLINOIS**

**For
IDOT District 3
700 E Norris Drive
Ottawa, IL 61350**

**Submitted by
Wang Engineering, Inc.
1145 North Main Street
Lombard, IL 60148**

**Original Report: December 2, 2022
Revised Report: January 9, 2023, October 25, 2023, and November 7, 2023**

Technical Report Documentation Page

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11. Abstract A new, three-span bridge will replace the existing six-span bridge carrying US Route 6 over the Fox River in LaSalle County, Illinois. The proposed structure will have back-to-back of abutment length of 407'-11½" and out-to-out width of 89'-1". The proposed west and east abutment cap base elevations are 472.8 and 472.3 feet, respectively. The top of shaft elevations at the new piers are proposed at 461.5 feet. The west abutment will have short retaining walls. This report provides geotechnical recommendations for the design and construction of the proposed bridge foundations and retaining walls. Beneath pavement, the general lithologic profile below the abutments includes up to 9 feet of medium stiff to stiff clay to silty clay. Below the proposed piers, the borings revealed 12 feet very soft to soft silty clay to silty clay loam. The deeper foundation soils include 3 to 5 feet of stiff to very stiff sandy clay loam to sandy loam or weathered bedrock extending to sandstone bedrock. Extremely weak to medium strong, very poor to good quality sandstone was encountered at elevations of 443.7 to 469.4 feet. The sandstone has very poor to good rock quality designation (RQD) values ranging from 0 to 80%. The proposed semi-integral west abutment and piers could be supported on drilled shafts socketed into sandstone bedrock and the proposed integral east abutment could be supported on driven H-piles. Rock-socketed shafts have factored resistances of about 245 to 1,178 kips for 2.5- to 5.0-foot diameter and 5-to 10-foot length sockets. To support the integral east abutment, driven HP12x53, HP12x63, HP12x74, HP14x73, and HP14x89 steel piles will provide 230 to 388 kips of factored resistance at total lengths of 21 to 22 feet. The west abutment retaining walls will likely be supported by hard clay over bedrock. We recommend considering the factored resistance of 10 ksf for the wall design.		
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**STRUCTURE GEOTECHNICAL REPORT
US ROUTE 6 BRIDGE OVER FOX RIVER
EX SN 050-0033, PR SN 050-0260
LASALLE COUNTY, ILLINOIS
FOR
IDOT DISTRICT 3**

1.0 INTRODUCTION

This report presents the results of our subsurface investigation, laboratory testing, geotechnical evaluations, and recommendations to support Phase II design of the proposed replacement of the bridge carrying US Route 6 (US 6) over the Fox River in LaSalle County, Illinois. A *Site Location Map* is presented as Exhibit 1.

Wang Engineering, Inc. (Wang) prepared and submitted a Structure Geotechnical Report (SGR) dated January 9, 2023 for this structure. As per IDOT Foundation and Geotechnical Unit review Memorandum dated July 17, 2023, this SGR has been revised with a supplemental boring at the north end of the west abutment and as per IDOT comments on the SGR.

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 retaining walls.

1.1 Existing Structure

Based on the *Bridge Condition Report* dated November 2020, we understand the existing structure (SN 050-0033) was constructed in 1928 as a two-lane six-span reinforced concrete slab bridge. In 1973, the bridge superstructure was replaced, and the substructures were widened for a four-lane continuous steel beam structure with a 14' wide center median and sidewalks on both sides. The bridge has back-to-back abutments length of 377'-11½" and out-to-out widths of 80'-0". The closed west abutment and piers are supported by spread footings on rock. The original closed east abutment is supported by spread footing on rock whereas the widened stub east abutment on the north side is supported on steel H-piles.

1.2 Proposed Structure

General Plan and Elevation Drawings (Appendix D) were prepared by Oates Associates, Inc., Wang understands the existing six-span bridge will be removed and replaced with a three-span bridge with a semi-integral west abutment, two column-web wall drilled shaft bent piers, and an integral east abutment. The proposed bridge will have back-to-back abutments length of 407'-11½" with span lengths of 123'-0", 158'-0", and 123'-0", and out-to-out width of 89'-1".

2.0 GEOLOGICAL SETTING

The project area is located in central LaSalle County, in the City of Ottawa. On the USGS *Ottawa Quadrangle 7.5 Minute Series* map, the bridge spans through S ½ of Section 1, Tier 33 N, Range 3 E of the Third Principal Meridian.

The following review of published geologic data, with emphasis on factors that might influence the design and construction of the proposed engineering works, is meant to place the project area within a geological framework and, thus, to confirm the dependability and consistency of the present subsurface investigation results. For the study of the regional geologic framework, Wang considered northeastern Illinois area in general and LaSalle County in particular. Exhibit 2 illustrates the *Site and Regional Geology*.

2.1 Physiography

The site is situated within the northern part of the Bloomington Ridged Plain of the Till Plains Section (Leighton 1948). Repeating advances and retreats of icesheets shaped the ground surface. The Bloomington Ridged Plain is characterized by low, broad, moraines ridges of Woodfordian-age separated by wide and flat lacustrine plains. Meltwater dug its way through the uneven glacial topography leaving behind deep valleys. The Fox River runs through one of the valleys and in the project area cuts through the Norway and Ransom End Moraines down to the bedrock.

The bridge crosses the Fox River in LaSalle County. The Fox River flows southwest into the Illinois River about one mile south of this project area. The Fox River has about a 250-foot wide channel at the bridge location. The surface topography has a high elevation along the embankments of about 485 feet, and slopes to a low elevation along the river edges of about 462 feet. Within the river, the surface elevation ranges from 447 to 460 feet.

2.2 Surficial Cover

Within the project area, a less than 25-foot thick veneer of Wisconsinan-age glacial deposits covers the bedrock. Silt, sand, and gravel of the Cahokia Formation forms terraces within the flood plains of the Illinois River and Fox River valleys (Hart, 2002). The glacial cover is made up of sand and gravel of the Henry Formation of the Mason Group and diamictons of the Lemont Formation of the Wedron Group (Hansel and Johnson 1996). The Henry Formation is made up of stratified sand and gravel with lenses and/or thin beds of silt. The Lemont Formation consists of relatively homogenous, massive, gray till with silty clay to sandy loam matrix, with dolostone and shale clasts and occasional lenses of sorted and stratified silt. In general, within the project proximity, Woodfordian-age units overlie Pennsylvanian-age bedrock. However, at the bridge site, situated over the Fox River, the Cahokia Alluvium overlies the bedrock. Upper terraces made up of the Henry Formation and Lemont Formation unconformably rest over Pennsylvanian- and Ordovician-age bedrock.

2.3 Bedrock

The bedrock is made up of the Ordovician-age St. Peter Sandstone Formation and Pennsylvanian-age Carbondale Formation (Kolata, 2005; Thomason and Malone, 1970). The whitish-yellowish, quartz-rich, medium- to fine-grained, massive, commonly cross-bedded St. Peter Sandstone has a remarkable geographical extent and is characterized by uniform mineralogical composition and strength properties (Willman et al., 1975). In areas where the sandstone does come at or near the surface, and there are no landslide occurrences, the rock is considered an excellent foundation and construction material. The sandstone has a silica content of about 99% on average; although it appears relatively friable on weathered outcrop surfaces, the sandstone possesses high friction angles even at low confinement pressures (Dittes and Labuz, 2002).

The succession between the St. Peter Sandstone and the overlying Carbondale Formation may be observed. Here, from top to bottom, the Carbondale Formation includes a thin section of the Francis Creek Shale and the Colchester Coal and its underclay; the latter rests unconformably on top of the St. Peter Sandstone (Nelson et al., 1997).

The top of bedrock is encountered at depths ranging from 0 to 25 feet bgs and elevations between 440 and 470 feet. The bedrock consists of mainly sandstone, with occasional thin occurrences of a shale/siltstone resting unconformably above the sandstone. No faults are known within a 10 miles radius of the site (Leetaru et al. 2004).

Our subsurface investigation results fit into the local geologic context. The borings drilled in the project area encountered native sediments consisting of silty clay, silty clay loam, to sandy clay loam lacustrine deposits resting over shale to siltstone bedrock and/or sandstone bedrock.

3.0 METHODS OF INVESTIGATION

3.1 Field Investigation

The subsurface investigation consisted of eleven bridge borings, designated as B-01 through B-06, 1 (SE Quad), 1 (RockCore), 2 (NE Quad), 3 (West Abut.), and 3 (RockCore). Borings B-01 through B-06, 1 (RockCore) and 3 (RockCore) were drilled by Wang in April and June of 2022. Borings 1 (SE Quad), 2 (NE Quad) and 3 (West Abut.) were drilled by IDOT District 3 in January and February 2022. The borings were drilled from elevations of 481.6 to 483.7 feet and were advanced to depths of 14.3 to 59.0 feet bgs. One supplemental rock coring boring, designated as SB-01 was advanced by others on August 31, 2023, from elevation 459.2 to 444.2 feet.

The as-drilled latitude, longitude, elevations, station, and offsets were provided by IDOT. 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 was sampled at 2.5-foot intervals to the top of bedrock. Bedrock cores were obtained in a 1.5-to-10-foot runs using an NWD4-sized core barrel. Soil samples collected from each sampling interval were placed in sealed jars and rock cores were placed into marked core boxes and transported to the laboratory for further examination and laboratory testing.

Field boring logs, prepared and maintained by Wang geologists, include 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. The bedrock cores were described and measured for recovery and Rock Quality Designation (RQD).

When possible, groundwater levels were measured during and at the completion of drilling. The boreholes were backfilled upon completion with bentonite chips and the surface was restored as close to its original condition.

3.2 Laboratory Testing

The soil samples were tested in the laboratory for moisture content (AASHTO T265). Unconfined compressive strength tests were performed on selected bedrock cores. Field visual descriptions of the soil samples were verified in the laboratory. Laboratory test results are shown in the *Boring Logs* (Appendix A) and in the *Laboratory Test Results* (Appendix B).

4.0 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.

4.1 Lithological Profile

Borings were drilled through various types of existing roadway and bridge deck pavements consisting of 2.3 to 3.3 inches of asphalt over 7.3 to 9.8 inches of concrete, 12 inches of asphalt, or 14.3 to 14.5 inches of concrete. Boring 1(SE Quad) was drilled off pavement in the right-of-way. In descending order, the general lithologic succession encountered beneath the pavement structure includes: 1) man-made ground (fill); 2) very soft to medium stiff silty clay loam; 3) medium stiff to hard silty clay, silty clay loam to sandy clay loam; and 4) sandstone bedrock.

1) Man-made ground (fill)

Borings drilled from the roadway bridge approaches encountered 7.5 to 16.5 feet of cohesive fill. The fill consists of stiff to hard, brown, black, and gray silty clay to silty clay loam with unconfined compressive strength (Q_u) values of 1.5 to 4.0 tsf and moisture content values of 19 to 36%.

2) Very soft to medium stiff silty clay loam

Borings B-03 and B-04 drilled through the bridge deck and the river water encountered up to 12.3 feet of very soft to medium stiff, brown, black, and gray silty clay loam with Q_u values of less than 0.2 to 0.8 tsf, averaging 0.3 tsf, and moisture content values of 27 to 66%.

3) *Medium stiff to hard silty clay, silty clay loam, to sandy clay loam*

Beneath the fill at elevations of 463.1 to 476.2 feet, the borings encountered up to 9.0 feet of medium stiff to hard, brown and gray silty clay, silty clay loam to sandy clay loam with coal clasts. This soil has Q_u values of 0.5 to greater than 4.5 tsf, averaging 2.0 tsf, and moisture content values of 11 to 19%.

On the east side of the Fox River, Boring 2 (NE Quad) encountered 3.0 feet of stiff, orange silty loam, loam to silt with limestone gravel and sand beneath the sandy clay loam at an elevation of 459.8 feet (22.0 feet bgs). The silty loam, loam to silt has a Q_u value of 1.0 tsf, a SPT N-value of 5 blows per foot, and a moisture content value of 25%.

4) *Sandstone bedrock*

At elevations of 445.2 to 447.7 feet (0 to 12.2 feet bgs), the borings encountered up to 2.3 feet of very dense, brown, gray, white and organish brown sand, gravelly sand, and sandy gravel weathered bedrock. The weathered bedrock has SPT N-values of greater than 50 blows per 1 and 4 inches.

On the west side of Fox River, Boring 3 (West Abut.) encountered 1.5 feet of very dense, white calcified shale to siltstone resting on top of sandstone. The shale to siltstone has a SPT N-value of greater than 50 blows per 11 inches and a moisture content value of 3%.

At elevations of 443.7 to 469.7 feet, the borings advanced through extremely weak to moderately strong, orangish brown, yellowish brown, yellowish white, light gray, to white, very poor to good quality sandstone. The sandstone has a rock quality designation (RQD) of 0 to 88% and unconfined compressive strength tests revealed Q_u values of 894 to 7,150 psi. The bedrock core data is shown in Table 1 and in the *Bedrock Core Photographs* (Appendix C).

Table 1: Summary of Bedrock Data

Boring ID	Top of Bedrock Elevation (feet)	Rock Core Elevation (feet)	Core Length (feet)	Recovery (%)	RQD (%)	Lab Q_u / Test Elevation (psi) / (feet)
1(SE Quad)	456.8	NA	NA	NA	NA	NA
2(NE Quad)	456.8	NA	NA	NA	NA	NA

Boring ID	Top of Bedrock Elevation (feet)	Rock Core Elevation (feet)	Core Length (feet)	Recovery (%)	RQD (%)	Lab Q _u / Test Elevation (psi) / (feet)
3 (W Abut)	469.4	NA	NA	NA	NA	NA
1 (RockCore)	458.2	457.6-453.6	4.0	23	0	NA
		453.6 – 447.6	6	0	0	NA
		447.6 – 437.6	10	75	23	2232 / 443.6
3 (RockCore)	469.7	469.7 – 464.7	5	98	73	2232 / 469.2
		464.7 – 459.7	5	98	88	3395 / 463.2
		459.7 – 449.7	10	98	53	894 / 459.2 1129 / 457.2 1096 / 452.7
		445.7 – 435.7	10	85	0	NA
B-01	445.7	435.7 – 425.7	10	66	0	NA
		445.9 – 440.9	8	0	0	NA
B-02	445.9	440.9 – 439.4	1.5	0	0	NA
		439.4 – 431.4	8	0	0	NA
		443.7 – 438.7	5	75	8	NA
B-03	443.7	438.7 – 433.7	5	97	80	NA
		433.7 – 423.7	10	55	17	NA
B-04	445.1	445.1 – 435.1	10	68	22	NA
		435.1 – 425.1	10	38	4	NA
B-05	448.0	447.5 – 437.5	10	60	0	NA
		437.5 – 432.5	5	85	36	1957 / 437.0
		432.5 – 427.5	5	0	0	NA

Boring ID	Top of Bedrock Elevation (feet)	Rock Core Elevation (feet)	Core Length (feet)	Recovery (%)	RQD (%)	Lab Q _u / Test Elevation (psi) / (feet)
B-06	444.6 ⁽¹⁾	433.6 – 429.1	4.5	67	0	NA
		459.2 – 454.2	5	100	83	7150 / 458.2 4230 / 457.2
SB-01 ⁽²⁾	459.2	454.2 - 449.2	5	43	0	NA
		449.2 – 444.2	5	8	8	NA

⁽¹⁾Possible top of bedrock; ⁽²⁾Supplemental boring drilled in August, 2023.

4.2 Groundwater Conditions

Groundwater was encountered while drilling at elevations of 457.8 and 459.3 feet (22.5 and 24.0 feet bgs) primarily within the silty loam to silty clay loam soils (**Layer 3**). At the completion of drilling groundwater was observed at elevations of 456.6 and 457.8 feet (24.0 and 25.0 feet bgs). The Fox River water level was observed at about elevation of 461 feet (21.0 to 22.0 feet below the bridge level) during and upon completion of drilling. The Estimated Water Surface Elevation (EWSE) as shown in the GPE is 463.0 feet. It should be noted that groundwater levels might change with seasonal rainfall patterns and long-term climate fluctuations.

5.0 ANALYSIS AND RECOMMENDATIONS

Geotechnical evaluations and recommendations for the substructure foundations and retaining walls are included in the following sections.

5.1 Seismic Design Considerations

The seismic site class was determined in accordance with the IDOT *Geotechnical Manual* (IDOT 2020). The soils within the top 100 feet have a weighted average N value of 85 blows per 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 2020). The seismic spectral acceleration parameters recommended for design in accordance with the AASHTO *LRFD Bridge Design Specifications* (AASHTO 2020) are summarized in Table 2. According to the IDOT *Bridge*

Manual (IDOT 2012), liquefaction analysis is not required for sites located in Seismic Performance Zone 1.

Table 2: 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= 4.8	$F_{pga}= 1.2$	$A_s= 5.7$
0.2	$S_s= 10.5$	$F_a= 1.2$	$S_{DS}= 12.5$
1.0	$S_1= 4.1$	$F_v= 1.7$	$S_{D1}= 7.0$

1) Spectral acceleration coefficients based on Site Class C

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

5.2 Scour Considerations

A hydraulic report was prepared for the Department by Lin Engineering, Ltd. on December 13, 2021, and provided by IDOT D3 to Wang. The report provides 100- and 200-year contraction and pier scour results for existing and proposed structures piers. The scour depth estimates along proposed piers are uniform, with the 100 and 200-year values of 10.36 and 23.83 feet. These scour depths would extend into sandstone bedrock. Therefore, design scour elevations include 90% reduction of the predicted value extended into the sandstone bedrock. The abutment end slopes will be armored with rip rap; therefore, the scour elevations are placed at the proposed abutment base elevations.

The scour data are summarized in Table 3. The Q100, Q200, Design, and Check scour elevations, as provided by IDOT and as required in accordance with IDOT *All Bridge Designers Memo 14.2*, are summarized in Table 4. The design high water elevation (DHWE) is 474.4 feet and the Estimated Water Surface Elevation (EWSE) within the channel is 460.5 feet. The streambed elevation is 446.0 feet.

Table 3: Project Scour Data

	West Abutment	Pier 1	Pier 2	East Abutment
Streambed Elevation (feet)	NA	446.0	446.0	NA
Foundation Base Elevation (feet)	472.8	461.5	461.5	472.3
100-year Combined Scour Estimate (feet)	NA	10.36	10.36	NA
200-year Combined Scour Estimate (feet)	NA	23.83	23.83	NA

Table 4: Project Design Scour Elevations

	West Abutment	Pier 1	Pier 2	East Abutment	Item 113
Q100 Elevation (feet)	472.8	443.2	444.1	472.3	
Q200 Elevation (feet)	472.8	442.1	443.0	472.3	
Design Elevation (feet)	472.8	443.2	444.1	472.3	5
Check Elevation (feet)	472.8	442.1	443.0	472.3	

5.3 Bridge Foundations

Wang understands drilled shafts are anticipated for the proposed west abutment and both piers. Steel H-piles are anticipated at the east abutment. Drilled piles could also be considered for the abutments. We do not recommend supporting the piers on shallow foundations due to the very poor to poor quality shallow sandstone bedrock and the scour potential.

The preliminary loading and pile cap base or top of pier web wall elevations information provided by Oates Associates, Inc. on October 27, 2022 are summarized in Table 5.

Table 5: Preliminary Factored Loads and Proposed Pile Cap Elevations

Substructure	Pile Cap Base or Top of Pier Web Wall Elevations (feet)	Total Factored Load (Service I) (kips)	Total Factored Load (Strength I) (kips)
West Abutment	472.8	2000	3000
Pier 1	464.0	5000	7000
Pier 2	464.0	5000	7000
East Abutment	472.3	2000	3000

5.3.1 Driven Piles

Driven piles could be considered at the east abutment. IDOT specifies the maximum nominal required bearing (R_{NMAX}) for each pile and states the factored resistance available (R_F) for steel H-piles 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 Oates Associates and the proposed width of the substructure, the load per pile at the east abutment will range between about 102 and 272 kips for a single row of piles spaced at 3- to 8-feet.

The R_F , R_N , estimated pile tip elevations, and pile lengths for HP12x53, HP12x63, HP12x74, HP14x73, and HP14x89 steel H-piles for the east abutment are summarized in Table 6. The driving elevation was taken from the proposed cap elevations as shown on the GPE (Appendix D). The estimated pile lengths shown in Table 5 assume a 2-foot pile embedment into the east abutment pile cap.

To achieve the maximum nominal required bearing at the east abutment, the analysis shows the H-piles would need to be driven about 1.0 to 3.0 feet into the cemented sandstone. In these instances, the piles should be considered end bearing and designed for the maximum factored resistance of the pile.

Table 6: Estimated Pile Lengths and Tip Elevations for Steel H-Piles Driven to R_{NMAX} at East Abutment

Structure Unit (Reference Boring)	Pile Cap Base Elevations (feet)	Pile Size	Maximum Nominal Bearing, R_N (kips)	Factored Geotechnical Loss/ Load Loss (kips)	Factored Resistance Available, R_F (kips)	Total Estimated Pile Length (feet)	Estimated Pile Tip Elevation (feet)
East Abutment 1(SEQuad), 2(NEQuad) and 1(Rock Core)	472.3	HP 12x53	418	0	230	21	453
		HP 12x63	497	0	273	21	453
		HP 12x74	589	0	324	22	452
		HP 14x73	578	0	319	22	452
		HP 14x89	705	0	388	22	452

5.3.2 Drilled Shafts

The west abutment and both piers could be supported on drilled shafts socketed 5.0- to 10.0-feet into the bedrock. Based on the encountered sandstone, 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 7.

Table 7: Estimated Drilled Shaft Resistances and Base Elevations (Rock-Socketed Shafts)

Structure Unit (Reference Boring)	Shaft Cap Base/ Top of Pier Web wall Elevations (feet)	Approximate Top of Bedrock Elevation (feet)	Socket Diameter (feet)	Nominal Unit Base Resistance (ksf)	Nominal Resistance, R_N (kips)	Factored Resistance Available, R_F (kips)	Total Socket Length (feet)	Estimated Total Shaft Length (feet)
West Abutment 3, 3(RockCore), and SB-01	472.8	459.2 (North Side) and 469.7 (South Side)	2.5	100	491	245	5.0	8.0 (South side) to 19.0 (North side)
			3.0		707	353		
			3.5		962	481		

Structure Unit (Reference Boring)	Shaft Cap Base/ Top of Pier Web wall Elevations (feet)	Approximate Top of Bedrock Elevation (feet)	Socket Diameter (feet)	Nominal Unit Base Resistance (ksf)	Nominal Resistance , R _N (kips)	Factored Resistance Available, R _F (kips)	Total Socket Length (feet)	Estimated Total Shaft Length (feet)
Pier 1 B-01, B-02, and B-03	461.5	443.7 to 445.9	2.5	120	589	295	10.0	13.0 (South Side) to
			3.0		848	424		24.0 (North Side)
			3.5		1155	577		
			4.0	100	1256	628	5.0	23.0
			4.5		1590	795		
			5.0		1963	982		
4.0	1508	754						
4.5	1908	954	10.0		28.0			
5.0	2356	1178						
Pier 2 B-04, B-05, and B-06	461.5	445.1 to 448.0	4.0	100	1256	628	5.0	21.0
			4.5		1590	795		
			5.0		1963	982		
			4.0	1508	754	10.0	26.0	
			4.5	1908	954			
			5.0	2356	1178			

5.3.3 Lateral Loading

Lateral loads on the driven piles and drilled 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 8 to 11 and rock parameters are in Table 12.

Table 8: Recommended Soil Parameters for Lateral Load Analysis at West Abutment

Reference Borings: 3, 3 (RockCore), and SB-01

Soil Type (Layer) Elevation Range (feet)	Unit Weight, γ (pcf)	Undrained Shear Strength, c_u (psf)	Estimated Friction Angle, Φ ($^\circ$)	Estimated Lateral Soil Modulus Parameter, k (pci)	Estimated Soil Strain Parameter, ϵ_{50} (%)
Hard CLAY/SILTY CLAY Pile cap base to 471 feet	125	4000	0	2000	0.4
Dense SHALE/SILTSTONE 471 to 459 (North Side)/469 (South Side) feet (BEDROCK)	130	0	35	125	--

Table 9: Recommended Soil Parameters for Lateral Load Analysis at Pier 1

Reference Borings: B-01, B-02, and B-03

Soil Type (Layer) Elevation Range (feet)	Unit Weight, γ (pcf)	Undrained Shear Strength, c_u (psf)	Estimated Friction Angle, Φ ($^\circ$)	Estimated Lateral Soil Modulus Parameter, k (pci)	Estimated Soil Strain Parameter, ϵ_{50} (%)
RIVER WATER Pier web wall to 447 feet	--	--	--	--	--
V Dense WEATHERED BEDROCK 447 to 444 feet (BEDROCK)	130	0	35	125	--

Table 10: Recommended Soil Parameters for Lateral Load Analysis at Pier 2

Reference Borings: B-04, B-05, and B-06

Soil Type (Layer) Elevation Range (feet)	Unit Weight, γ (pcf)	Undrained Shear Strength, c_u (psf)	Estimated Friction Angle, Φ ($^\circ$)	Estimated Lateral Soil Modulus Parameter, k (pci)	Estimated Soil Strain Parameter, ϵ_{50} (%)
V Soft to M Stiff SILTY CLAY to SILTY CLAY LOAM Pier Web Wall to 447 feet	115	500	0	30	1.0
V Dense WEATHERED BEDROCK 447 to 445 (BEDROCK)	130	0	35	125	--

Table 11: Recommended Soil Parameters for Lateral Load Analysis at East Abutment
 Reference Borings: 1(SE Quad), 2 (NE Quad), and 1(RockCore)

Soil Type (Layer) Elevation Range (feet)	Unit Weight, γ (pcf)	Undrained Shear Strength, c_u (psf)	Estimated Friction Angle, Φ ($^\circ$)	Estimated Lateral Soil Modulus Parameter, k (pci)	Estimated Soil Strain Parameter, ϵ_{50} (%)
V Stiff SILTY CLAY to SILTY CLAY LOAM FILL Pile cap base to 465 feet	120	3000	0	1000	0.4
Stiff to V Stiff SANDY CLAY LOAM to SANDY LOAM 465 to 460 feet	120	1500	0	500	0.7
Stiff to V Stiff SILTY LOAM, LOAM, SILT 460 to 457 feet	120	1500	0	500	0.7
V Dense WEATHERED BEDROCK 457 to 456 (BEDROCK)	130	0	35	125	--

Table 12: Bedrock Parameters for Lateral Load Analysis

Bedrock Elevation (feet)	Total Unit Weight, γ (pcf)	Modulus of Rock Mass (ksi)	Uniaxial Compressive Strength (psi)	RQD (%)	Strain Factor
Sandstone	140	60	894	0	0.0005

5.4 Retaining Walls

At the west abutment, short retaining walls are anticipated. Gravity walls such as Reinforced Concrete Cantilever (RCC) could be considered. The RCC walls should be placed 4.0 feet below the finished grade at front face of the wall. We understand the bottom of footings of the walls is proposed at 473 feet elevation. Based on the soil information from Boring 3(West Abut), the footing of the wall will be supported by 3 feet of hard clay and shale over bedrock. We recommend considering factored resistance of 10 ksf based on a resistance factor of 0.55 (AASHTO 2020) for the design for RCC wall footing. The estimated friction angle between the base and the underlying silty clay is 19° , and the corresponding nominal friction is 0.34. The nominal coefficient can be taken as 0.50 if a

one-foot layer crushed stone is provided below footing. RCC walls are designed based on a geotechnical sliding resistance factor of 1.0 (AASHTO 2020).

We recommend linearly increasing the lateral earth pressures of 40 psf per foot depth below grade behind the walls with drainable backfill. We recommend adding a traffic surcharge of 240 psf for the retaining wall design. We recommend providing a Geocomposite Wall Drain in accordance with IDOT Bridge Manual.

6.0 CONSTRUCTION CONSIDERATIONS

6.1 Site Preparation

Vegetation, surface topsoil, debris, and pavements should be cleared and stripped where the new improvements will be placed. If unstable or unsuitable materials are exposed during excavation, they should be removed and replaced with compacted fill as described in filling and backfilling section below.

6.2 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, existing tracks, and buildings should be considered during construction. Excavations for the construction of the wall should be sloped at no steeper than 1:1.5 (V:H). for the staged construction and for RCC walls construction at the west abutment, an open cut excavation may not be feasible. Since the hard cohesive soils ($Q_u > 4.5$ tsf) encountered at embedment depths, temporary sheet piling using *IDOT Design Guide 3.13.1* may not be feasible. Therefore, the temporary soil retention system (TSRS) will be required. We recommend including TSRS as a *Pay Item* at the west abutment. At the east abutment, we estimated temporary sheet piling using IDOT Design Guide 3.13.1 is feasible.

During the subsurface investigation, the groundwater was encountered at elevations 458 to 459 feet at the east abutment and up to 13 feet below pile cap base elevation. Groundwater was not encountered at the west abutment. As such, we do not anticipate the need for dewatering at the abutments or for retaining wall construction. Water that does accumulate in open excavations by seepage or runoff should be immediately removed by sump pump. For the proposed pier drilled shaft construction, a Type II Cofferdam with seal coat will be required.

6.3 Filling and Backfilling

Fill material used to attain final design elevations should be pre-approved, compacted granular soil conforming to IDOT Section 204, *Borrow and Furnished Excavation* (IDOT 2022). 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 2022). In accordance with IDOT Section 205, *Embankment*, any embankments proposed for widening should be properly benched or deeply plowed prior to placement of new fill along the slopes (IDOT 2022).

Backfill materials for the abutments 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).

6.4 Pile Installation

The driven piles shall be furnished and installed according to the requirements of IDOT Section 512, *Piling* (IDOT 2022). Wang recommends performing one test pile at east abutment location. Since the piles will be driven to bedrock, pile shoes are required.

6.5 Drilled Shaft Construction

Drilled shafts should be installed as per Section 516, *Drilled Shafts* (IDOT 2022). Due to the presence of groundwater and soft 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. Additionally, the encountered extremely weak to medium strong cemented sandstone will pose additional challenges for installing rock-socketed drilled shafts. We recommend considering an experienced contractor for the drilled shaft installations.


7.0 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 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 structures and roadways are planned, we should be timely informed so that our recommendations can be adjusted accordingly. Wang is not responsible for any claims, damages, and liabilities arise from the interpretations by any other party of the subsurface data included in this report.

It has been a pleasure to assist Illinois Department of Transportation District 3 on this project. Please call if there are any questions, or if we can be of further service.

Respectfully Submitted,

WANG ENGINEERING, INC.



062-067551
LICENSED
PROFESSIONAL
ENGINEER
STATE OF ILLINOIS
11/30/2023

Andri
Andri A. Kurnia, P.E.
Senior Geotechnical Engineer

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

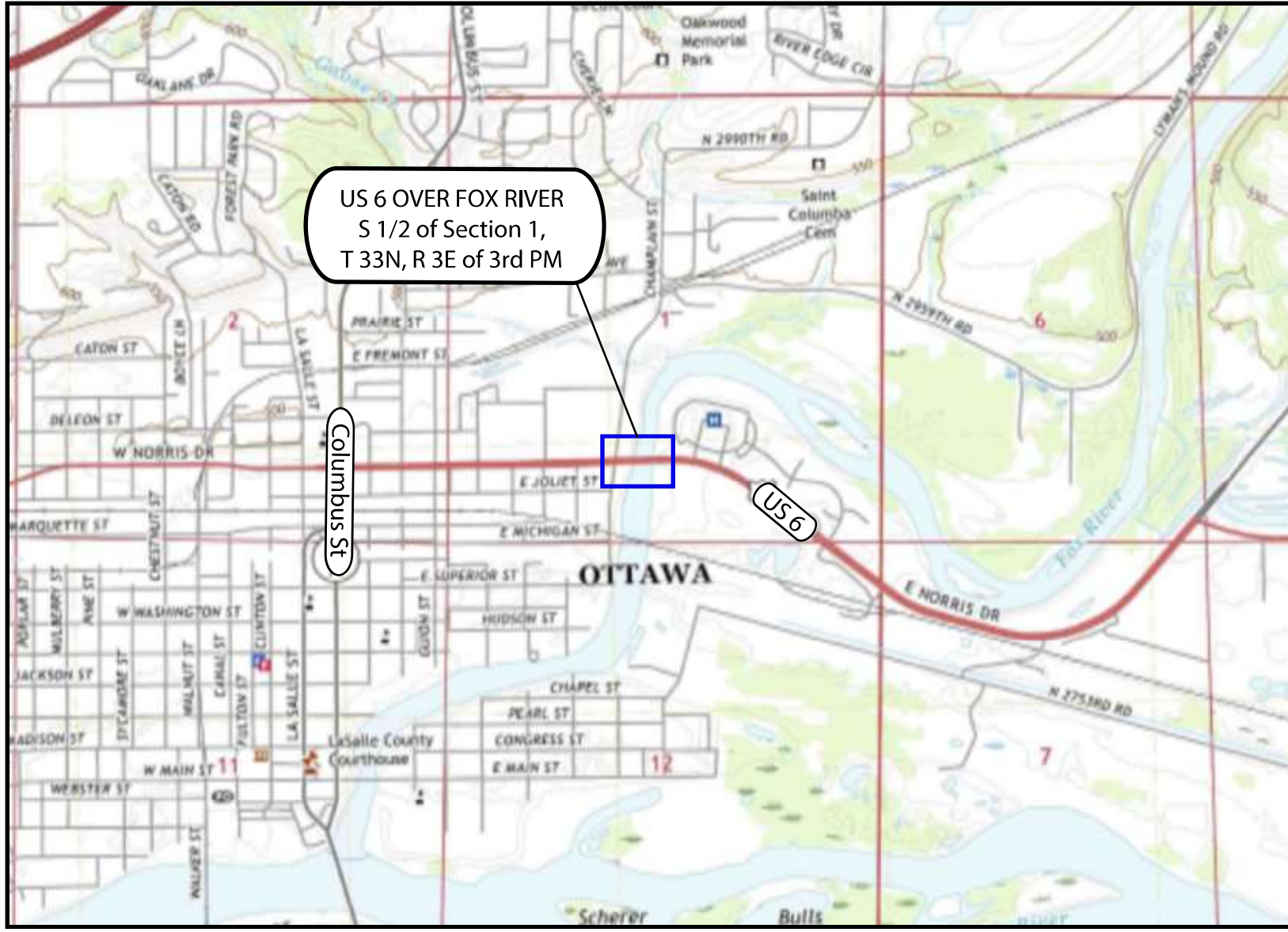


Nesam S Balakumaran, P.E, P.Eng.
Project Geotechnical Engineer

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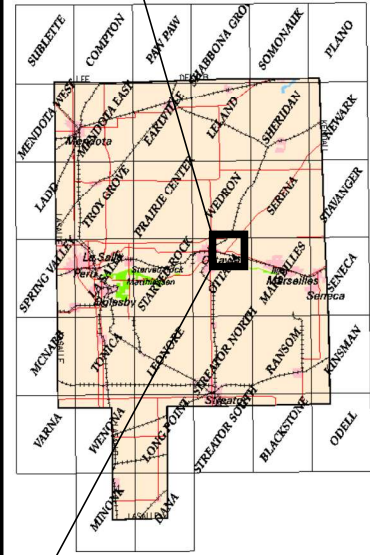
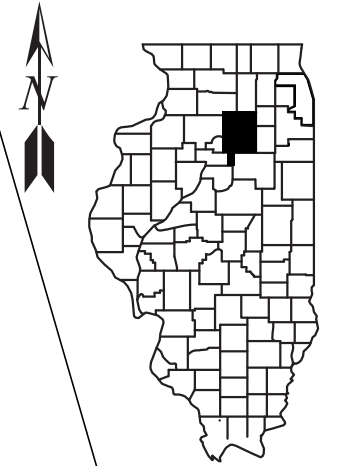
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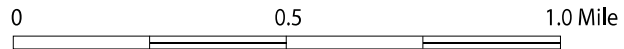
US 6 OVER FOX RIVER
S 1/2 of Section 1,
T 33N, R 3E of 3rd PM

Columbus St

US 6



LaSalle County

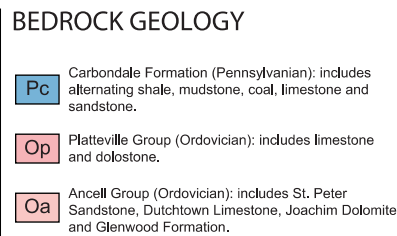
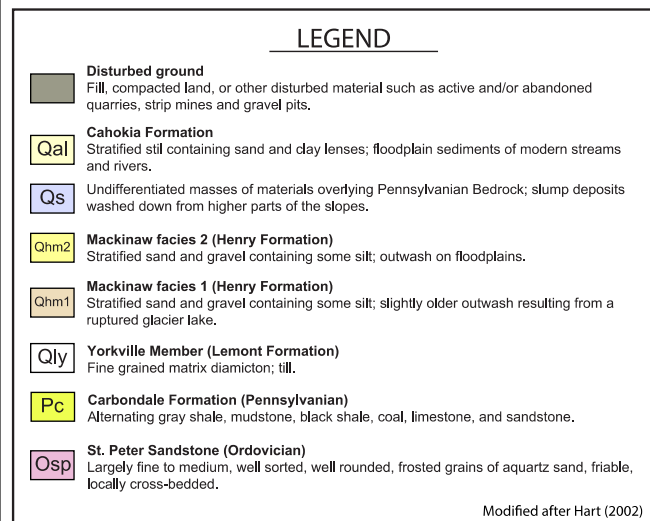
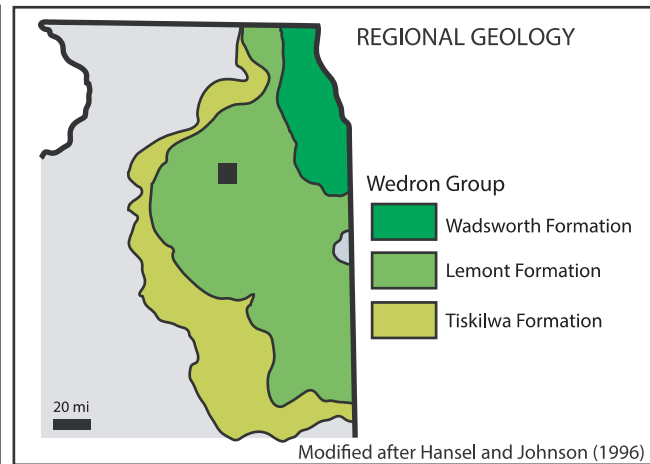
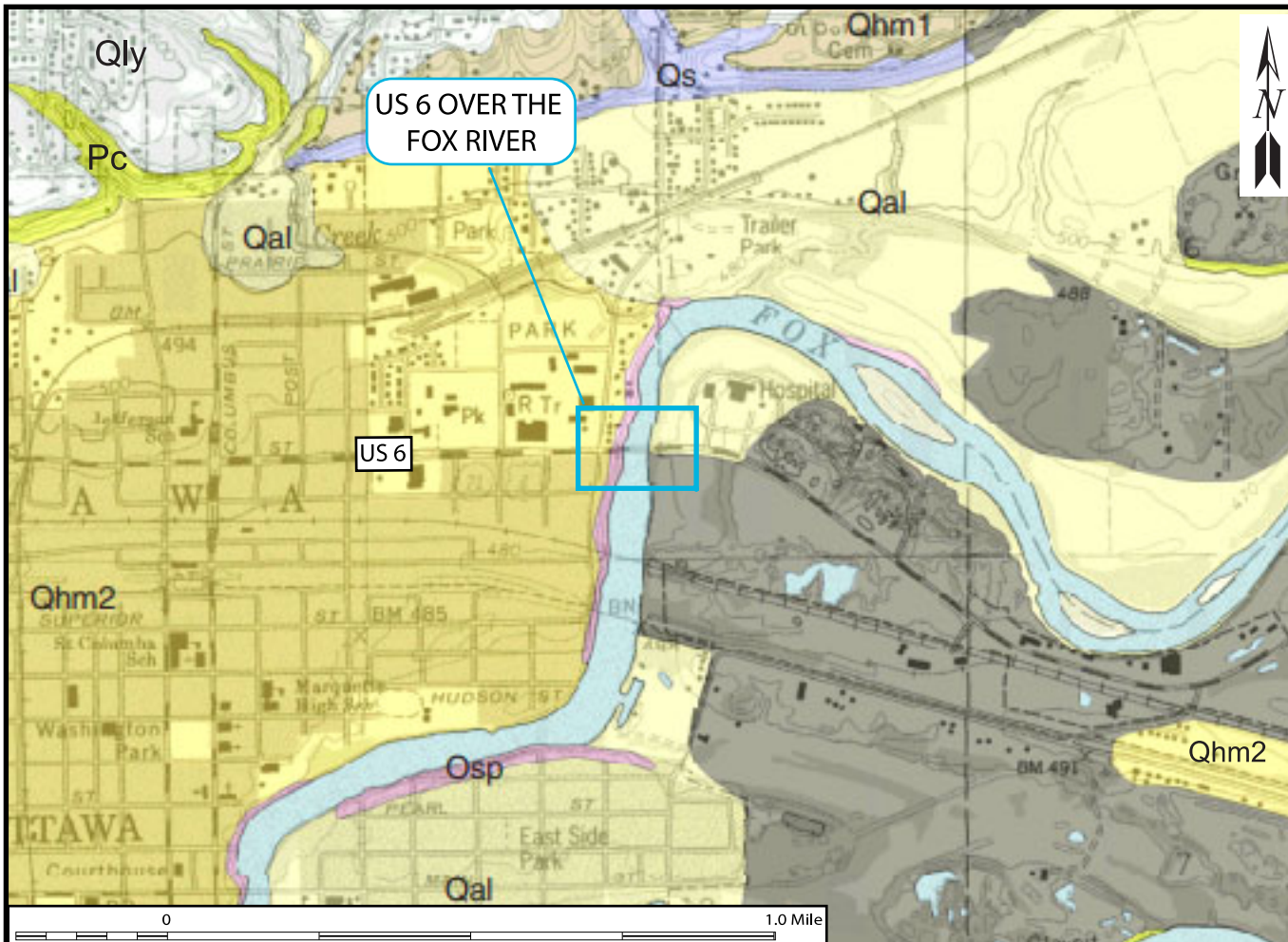


SITE LOCATION MAP: US 6 OVER FOX RIVER, SN 050-0033, PTB 201/26;
LASALLE COUNTY, ILLINOIS

SCALE: GRAPHICAL	EXHIBIT 1	DRAWN BY: J. Bensen CHECKED BY: A. Kurnia
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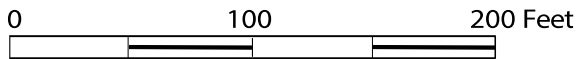
 Wang Engineering A Terracon Company	1145 N. Main Street Lombard, IL 60148 www.wangeng.com
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FOR IDOT DISTRICT 3	KE225071A
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SITE AND REGIONAL GEOLOGY: US 6 OVER FOX RIVER, SN 050-0033, PTB 201/26; LASALLE COUNTY, ILLINOIS

SCALE: GRAPHICAL	EXHIBIT 2	DRAWN BY: J. Bensen CHECKED BY: A. Kurnia
 Wang Engineering A Terracon Company		1145 N. Main Street Lombard, IL 60148 www.wangeng.com
		FOR IDOT DISTRICT 3



Legend

- Wang Boring Location
- IDOT Boring Location
- ◇ Supplement Boring Location

BORING LOCATION PLAN: US 6 OVER FOX RIVER, SN 050-0033, PTB 201/26;
LASALLE COUNTY, ILLINOIS

SCALE: GRAPHICAL

EXHIBIT 3

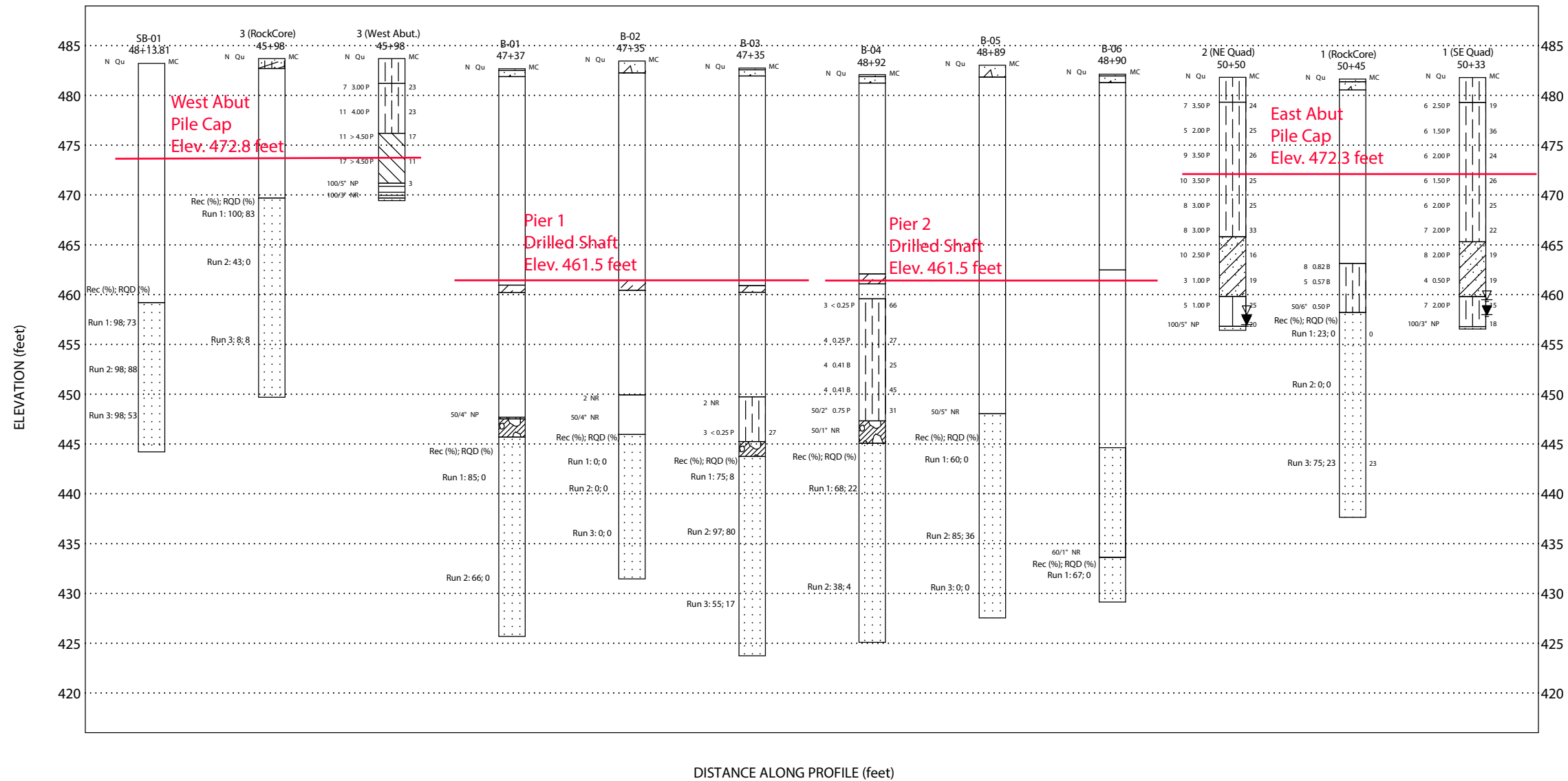
DRAWN BY: J. Bensen
CHECKED BY: A. Kurmia



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FOR IDOT DISTRICT 3

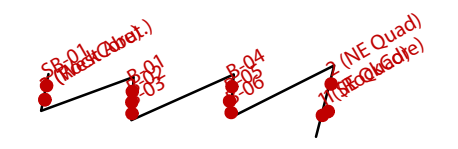
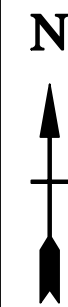
KE225071A



DISTANCE ALONG PROFILE (feet)

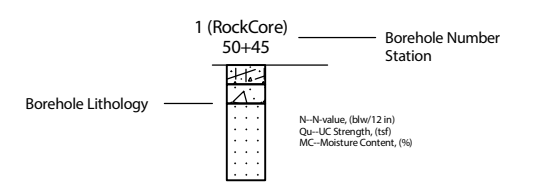
Lithology Graphics

- | | | | |
|---------------------------------|-----------------------------|---------------------------------|-----------|
| Pavement | Concrete | IDH Silty Clay, Silty Clay Loam | Sandstone |
| IDH Sandy Clay, Sandy Clay Loam | IDH Silt, Silty Loam | IDH Clay | Shale |
| Schist and Gneiss | Gravelly sand, sandy gravel | Weathered bedrock | |

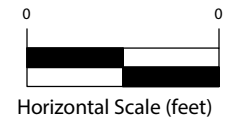


Site Map Scale 1 inch equals 0 feet

Explanation:



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



Vertical Exaggeration: 0x

Wang Engineering, Inc.
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Lombard, IL, 60148

Soil Profile
US 6 over Fox River
PR SN 050-0260



US 6 Over Fox River, Round 2
LaSalle County, Illinois

JOB NUMBER	PLATE NUMBER
KE225071A	EXHIBIT 4

APPENDIX A



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BORING LOG 1 (RockCore)

WEI Job No.: KE225071A

Client IDOT District 3
 Project US 6 Over Fox River, Round 2
 Location LaSalle County, Illinois

Datum: NAVD 88
 Elevation: 481.64 ft
 Latitude: 41.356342403
 Longitude: -88.826586086
 Station: 50+45
 Offset: 28.4 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	437.6	Boring terminated at 44.00 ft	45														
			50														
			55														
			60														

GENERAL NOTES

WATER LEVEL DATA

Begin Drilling 06-01-2022 Complete Drilling 06-01-2022
 Drilling Contractor Wang Testing Services Drill Rig 17B57T [91%]
 Driller R&K Logger F. Bozga Checked by C. Marin
 Drilling Method 2.25" ID.HSA to 23.5 feet, mud rotary afterward;
 backfilled upon completion

While Drilling ▽ NA
 At Completion of Drilling ▼ 20' wash
 Time After Drilling NA
 Depth to Water ▼ NA

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



BORING LOG 3 (RockCore)

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WEI Job No.: KE225071A

Client IDOT District 3
 Project US 6 Over Fox River, Round 2
 Location LaSalle County, Illinois

Datum: NAVD 88
 Elevation: 483.69 ft
 Latitude: 41.35641
 Longitude: -88.82821
 Station: 45+98
 Offset: 3.4 LT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	482.7	ASPHALT --PAVEMENT-- Drilled without sampling to 14 feet									--Run 2: 19.0 to 24.0 feet-- --Recovery: 98%-- --RQD: 88%-- --Q _u =3,395 psi (@20.5 ft)			2			
			5								--Q _u =894 psi (@24.5 ft) --Run 3: 24.0 to 34.0 feet-- --Recovery: 98%-- --RQD: 53%-- --Q _u =1,129 psi (@26.5 ft)						
			10											3			
	469.7	Medium strong, light yellowish brown to light gray, fair to good rock quality, moderately weathered to fresh SANDSTONE; closely spaced to massive, mainly horizontal and rarely oblique joints consistent with the sandstone bedding, moderately to slightly weathered joints, no infill. --Run 1: 14.0 to 19.0 feet-- --Recovery: 98%-- --RQD: 73%-- --Q _u =2,232 psi (@14.5 ft)	15		1						Boring terminated at 34.00 ft	35					
			20									40					

GENERAL NOTES

Begin Drilling 06-03-2022 Complete Drilling 06-03-2022
 Drilling Contractor Wang Testing Services Drill Rig 17B57T [91%]
 Driller R&K Logger F. Bozga Checked by C. Marin
 Drilling Method 2.25" ID.HSA to 14 feet, mud rotary afterward;
 backfilled upon completion

WATER LEVEL DATA

While Drilling ▽ NA
 At Completion of Drilling ▼ wash
 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 B-01

WEI Job No.: KE225071A

Client IDOT District 3
 Project US 6 Over Fox River, Round 2
 Location LaSalle County, Illinois

Datum: NAVD 88
 Elevation: 482.69 ft
 Latitude: 41.356457218
 Longitude: -88.827708634
 Station: 47+37
 Offset: 26.8 LT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
		SANDSTONE; closely spaced, horizontal and rare oblique joints consistent with the sandstone bedding, rough walls, no infill. --Run 1: 37.0 to 47.0 feet-- --Recovery: 85%-- --RQD: 0%--	45		2												
		--Run 2: 47.0 to 57.0 feet-- --Recovery: 66%-- --RQD: 0%--	50														
			55														
	425.7	Boring terminated at 57.00 ft	60														

C
O
R
E

GENERAL NOTES

WATER LEVEL DATA

Begin Drilling 04-06-2022 Complete Drilling 04-06-2022
 Drilling Contractor Wang Testing Services Drill Rig 20D50T [80%]
 Driller RR&JD Logger F. Bozga Checked by C. Marin
 Drilling Method 3.25" ID.HSA. to 35' mud rotary thereafter; boring
 backfilled upon completion

While Drilling ▽ NA
 At Completion of Drilling ▼ NA
 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 B-02

WEI Job No.: KE225071A

Client IDOT District 3
 Project US 6 Over Fox River, Round 2
 Location LaSalle County, Illinois

Datum: NAVD 88
 Elevation: 483.45 ft
 Latitude: 41.356395307
 Longitude: -88.827712046
 Station: 47+35
 Offset: 3.9 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	482.3	14.25-inch thick CONCRETE --PAVEMENT--															
			5							461.4	--Water surface--	25					
										460.4							
			10														
											-- River bed at 33.5 feet--						
										449.9				1	3 1 1		NR
			15								--No recovery--						
														2	50/4"		NR
										445.9	Rock core not retrieved --Top of bedrock at 37.5 feet-- --Run 1: 37.5 to 42.5 feet-- --Recovery: 0%--						C O R E
			20														

GENERAL NOTES

Begin Drilling 04-08-2022 Complete Drilling 04-08-2022
 Drilling Contractor Wang Testing Services Drill Rig 20D50T [80%]
 Driller RR&JD Logger F. Bozga Checked by C. Marin
 Drilling Method 3.25" ID HSA to 33.5', mud rotary thereafter; boring
 backfilled upon completion

WATER LEVEL DATA

While Drilling ▽ NA
 At Completion of Drilling ▼ NA
 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 B-02

WEI Job No.: KE225071A

Client IDOT District 3
 Project US 6 Over Fox River, Round 2
 Location LaSalle County, Illinois

Datum: NAVD 88
 Elevation: 483.45 ft
 Latitude: 41.356395307
 Longitude: -88.827712046
 Station: 47+35
 Offset: 3.9 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	431.4				3		NR										
		--Run 2: 42.5 to 44.0 feet-- --Recovery: 0%-- --core barrel jammed--			4		NR										
		--Run 3: 44.0 to 52.0 feet-- --Recovery: 0%-- --core barrel jammed; unable to retrieve core--	45			C O R E											
					5		NR										
			50														
		Boring terminated at 52.00 ft															
			55														
			60														

GENERAL NOTES

Begin Drilling 04-08-2022 Complete Drilling 04-08-2022
 Drilling Contractor Wang Testing Services Drill Rig 20D50T [80%]
 Driller RR&JD Logger F. Bozga Checked by C. Marin
 Drilling Method 3.25" ID.HSA to 33.5', mud rotary thereafter; boring
 backfilled upon completion

WATER LEVEL DATA

While Drilling ▽ NA
 At Completion of Drilling ▼ NA
 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 B-03

WEI Job No.: KE225071A

Client IDOT District 3
 Project US 6 Over Fox River, Round 2
 Location LaSalle County, Illinois

Datum: NAVD 88
 Elevation: 482.74 ft
 Latitude: 41.356330579
 Longitude: -88.827710611
 Station: 47+35
 Offset: 26.8 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
		white, very poor to good rock quality, SANDSTONE; closely spaced, highly to moderately weathered, horizontal and oblique joints consistent with the sandstone bedding, moderately weathered joints walls, rough walls, no infill. --Run 1: 39.0 to 44.0 feet-- --Recovery: 75%-- --RQD: 8%-- --no water return from 42 feet-- --Run 2: 44.0 to 49.0 feet-- --Recovery: 97%-- --RQD: 80%--	39.0		3												
			45.0		4												
			49.0		5												
	423.7	Boring terminated at 59.00 ft	59.00														

GENERAL NOTES

Begin Drilling 04-05-2022 Complete Drilling 04-05-2022
 Drilling Contractor Wang Testing Services Drill Rig 20D50T [80%]
 Driller RR&JD Logger F. Bozga Checked by C. Marin
 Drilling Method 3.25" ID.HSA. to 33' mud rotary thereafter; boring
 backfilled upon completion

WATER LEVEL DATA

While Drilling ▽ NA
 At Completion of Drilling ▼ NA
 Time After Drilling NA
 Depth to Water ▼ NA

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

WANGENG KE225071A.GPJ WANGENG.GDT 11/30/22



BORING LOG B-04

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WEI Job No.: KE225071A

Client IDOT District 3
 Project US 6 Over Fox River, Round 2
 Location LaSalle County, Illinois

Datum: NAVD 88
 Elevation: 482.08 ft
 Latitude: 41.35648457
 Longitude: -88.827138293
 Station: 48+92
 Offset: 26.9 LT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	481.9	2.5-inch thick ASPHALT									--Water surface--						
	481.2	--PAVEMENT-- 7.5-inch thick CONCRETE								461.1							
		--PAVEMENT--								459.6	--River bed at 22.5 feet--						
			5								Very soft to medium stiff, black, brown and dark gray SILTY CLAY to SILTY CLAY LOAM, trace organic matter; moist to wet --RDR 1-2--			1	0 2 1 1	< 0.25 P	66
											--few sand seams; saturated--	25		2	1 2 2 1	0.25 P	27
												30		3	0 2 2 1	0.41 B	25
														4	1 2 2 1	0.41 B	45
														5	3 7	0.75 P	31
			15							447.3	Very dense, white SAND	35			50/2"		
											--Weathered BEDROCK--						
										445.1					50/1"		
											Weak to moderate rock strength, light brownish gray, very poor rock quality, highly to slightly weathered SANDSTONE; closely spaced, horizontal and oblique joints consistent with the sandstone bedding, highly to	40					
	462.1		20														

GENERAL NOTES

Begin Drilling 04-07-2022 Complete Drilling 04-07-2022
 Drilling Contractor Wang Testing Services Drill Rig 20D50T [80%]
 Driller RR&JD Logger E. Greenwood Checked by C. Marin
 Drilling Method 3.25" ID.HSA to 30.5', mud rotary thereafter; boring
 backfilled upon completion

WATER LEVEL DATA

While Drilling ▽ NA
 At Completion of Drilling ▼ NA
 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 B-04

WEI Job No.: KE225071A

Client IDOT District 3
 Project US 6 Over Fox River, Round 2
 Location LaSalle County, Illinois

Datum: NAVD 88
 Elevation: 482.08 ft
 Latitude: 41.35648457
 Longitude: -88.827138293
 Station: 48+92
 Offset: 26.9 LT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
		moderately weathered joints walls, rough walls, no infill. --Run 1: 37.0 to 47.0 feet-- --Recovery: 68%-- --RQD: 22%--			7												
			45														
		--Run 2: 47.0 to 57.0 feet-- --Recovery: 38%-- --RQD: 4%--															
			50														
			55														
	425.1	Boring terminated at 57.00 ft															
			60														

C
O
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GENERAL NOTES

WATER LEVEL DATA

Begin Drilling 04-07-2022 Complete Drilling 04-07-2022
 Drilling Contractor Wang Testing Services Drill Rig 20D50T [80%]
 Driller RR&JD Logger E. Greenwood Checked by C. Marin
 Drilling Method 3.25" ID.HSA to 30.5', mud rotary thereafter; boring
 backfilled upon completion

While Drilling ▽ NA
 At Completion of Drilling ▼ NA
 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 B-05

WEI Job No.: KE225071A

Client IDOT District 3
 Project US 6 Over Fox River, Round 2
 Location LaSalle County, Illinois

Datum: NAVD 88
 Elevation: 483.04 ft
 Latitude: 41.356401803
 Longitude: -88.827152054
 Station: 48+89
 Offset: 3.8 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	481.8	14.5-inch thick BRIDGE DECK															
			5									25					
			10									30					
			15							448.0		35					
			20								Extremely weak to weak, light grayish white, very poor to poor rock quality, intensely to slightly decomposed, highly to moderately weathered SANDSTONE; very closely spaced, horizontal and oblique joints consistent with the sandstone bedding, rough joint walls, no infill. --Run 1: 35.5 to 45.5 feet-- --Recovery: 60%--	40		1	50/5"	NR	

GENERAL NOTES

Begin Drilling 06-02-2022 Complete Drilling 06-02-2022
 Drilling Contractor Wang Testing Services Drill Rig 17B57T [91%]
 Driller R&K Logger F. Bozga Checked by C. Marin
 Drilling Method 2.25" ID.HSA to 21 feet, mud rotary afterward;
 backfilled upon completion

WATER LEVEL DATA

While Drilling ▽ NA
 At Completion of Drilling ▼ wash
 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 B-05

WEI Job No.: KE225071A

Client IDOT District 3
 Project US 6 Over Fox River, Round 2
 Location LaSalle County, Illinois

Datum: NAVD 88
 Elevation: 483.04 ft
 Latitude: 41.356401803
 Longitude: -88.827152054
 Station: 48+89
 Offset: 3.8 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
		--RQD: 0%--			2												
		--Q _u =1,957 psi (@45.5 ft) --Run 2: 45.5 to 50.5 feet-- --Recovery: 85%-- --RQD: 36%--	45														
					3												
		--Run 3: 50.5 to 55.5 feet-- --Recovery: 0%--	50														
					4				NR								
	427.5	Boring terminated at 55.50 ft	55														
			60														

GENERAL NOTES

Begin Drilling 06-02-2022 Complete Drilling 06-02-2022
 Drilling Contractor Wang Testing Services Drill Rig 17B57T [91%]
 Driller R&K Logger F. Bozga Checked by C. Marin
 Drilling Method 2.25" ID.HSA to 21 feet, mud rotary afterward;
 backfilled upon completion

WATER LEVEL DATA

While Drilling ▽ NA
 At Completion of Drilling ▼ wash
 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 B-06

WEI Job No.: KE225071A

Client IDOT District 3
 Project US 6 Over Fox River, Round 2
 Location LaSalle County, Illinois

Datum: NAVD 88
 Elevation: 482.13 ft
 Latitude: 41.356335795
 Longitude: -88.827142873
 Station: 48+90
 Offset: 26.7 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	
	433.6	Very weak to moderate rock strength, light brownish gray, very poor rock quality, intensely to slightly decomposed, moderately to weathered SANDSTONE; closely spaced, horizontal joints consistent with the sandstone bedding, rough joint walls, no infill. --Run 1: 48.5 to 53.0 feet-- --Recovery: 67%-- --RQD: 0%-- Boring terminated at 53.00 ft	45		1				NR									
	429.1		50		2													
			55															
			60															

GENERAL NOTES

Begin Drilling 04-04-2022 Complete Drilling 04-04-2022
 Drilling Contractor Wang Testing Services Drill Rig 20D50T [80%]
 Driller RR&JD Logger F. Bozga Checked by C. Marin
 Drilling Method 3.25" ID.HSA. to 34' mud rotary thereafter; boring
 backfilled upon completion

WATER LEVEL DATA

While Drilling ▽ NA
 At Completion of Drilling ▼ NA
 Time After Drilling NA
 Depth to Water ▼ NA

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



SOIL BORING LOG

ROUTE US 6 (FAP 623) DESCRIPTION US 6 over Fox River, 0.68 mi East of IL 23 LOGGED BY Larry Myers

SECTION (E-1)ES LOCATION SW 1/4, SEC. 1, TWP. 33N, RNG. 3E, 3rd PM,
Latitude 41.3565, Longitude -88.82657

COUNTY LaSalle DRILLING METHOD Hollow Stem Auger HAMMER TYPE CME Automatic

STRUCT. NO.	Station	BORING NO.	Station	Offset	Ground Surface Elev.	D E P T H ft	B L O W S (ft)	U C S Qu (tsf)	M O I S T (%)	Surface Water Elev.	Stream Bed Elev.	Groundwater Elev.:	First Encounter	Upon Completion	After	Hrs.	D E P T H ft	B L O W S (ft)	U C S Qu (tsf)	M O I S T (%)			
050-0260 (Pro.) 050-0033 (Exist)	48+13.81	2 (NE Quad)	50+50	28.7 ft Lt.	481.81								457.8	456.8									
Cored Bituminous/Concrete Pavements. Brown and Gray Silty Clay Loam Fill										Stiff to Very Stiff Brown Sandy Clay Loam Grading to Sandy Loam with Coal Pieces (Alluvial Deposits) (continued)						2							
						479.31										1	1.0	19					
Very Stiff to Stiff Gray and Brown Silty Clay, Silty Clay Loam Fill							2			Stiff Orange Silty Loam, Loam, Silt, Limestone Gravel, and Sand										1			
							3	3.5	24											3	1.0	25	
							4	P												2	P		
						-5										456.81	-25						
							1			Dense Orange Stained Sandstone						456.39		100/5"				20	
							2	2.0	25	End of Boring													
							3	P															
							3																
							3	3.5	26														
							6	P															
						-10																	
							2																
							4	3.5	25														
							6	P															
							3																
							4	3.0	25														
							4	P															
						-15																	
							4																
						465.81																	
Stiff to Very Stiff Brown Sandy Clay Loam Grading to Sandy Loam with Coal Pieces (Alluvial Deposits)							4	3.0	33														
							4	P															
							3																
							4	2.5	16														
							6	P															
						-20																	

SOIL BORING 050-0033.GPJ IL_DOT.GDT 1/10/22

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



US 6 over Fox River Rock Core Photo 8/31/2023

APPENDIX B



Unconfined Compressive Strength of Intact Rock Core Specimens

Project: US RT 6 Over The Fox River

Client: IDOT

WEI Job No.: KE225071A

Field Sample ID	Run #	Depth (feet)	Location	Sample Description	Length (in)		Diameter (in)	Total Load (lbs)	Total Pressure (psi)	Fracture Type*	Break Date	Tested By	Area (in ²)
					Before Capping	After Capping							
1 (Rock Core)	3	38.0	East Abutment	Sandstone	3.90	NA	1.99	6920	2232	3	6/2/22	MAC	3.10

--	--	--	--	--	--	--	--	--	--	--	--	--	--

--	--	--	--	--	--	--	--	--	--	--	--	--	--

*** 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: _____



Unconfined Compressive Strength of Intact Rock Core Specimens

Project: US RT 6 Over The Fox River

Client: IDOT

WEI Job No.: KE225071A

Field Sample ID	Run #	Depth (feet)	Location	Sample Description	Length (in)		Diameter (in)	Total Load (lbs)	Total Pressure (psi)	Fracture Type*	Break Date	Tested By	Area (in ²)
					Before Capping	After Capping							
3 (Rock Core)	1	14.5	West Abutment	Sandstone	4.11	NA	1.99	6920	2232	3	6/7/22	MAC	3.11
3 (Rock Core)	2	20.5	West Abutment	Sandstone	4.20	NA	1.99	10560	3395	3	6/7/22	MAC	3.11
3 (Rock Core)	3	24.5	West Abutment	Sandstone	4.22	NA	1.99	2780	894	3	6/7/22	MAC	3.11
3 (Rock Core)	3	26.5	West Abutment	Sandstone	4.22	NA	1.99	3510	1129	3	6/7/22	MAC	3.11
3 (Rock Core)	3	31.0	West Abutment	Sandstone	4.20	NA	1.99	3410	1096	3	6/6/22	MAC	3.11

*** 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: _____



Unconfined Compressive Strength of Intact Rock Core Specimens

Project: US RT 6 Over The Fox River

Client: IDOT

WEI Job No.: KE225071A

Field Sample ID	Run #	Depth (feet)	Location	Sample Description	Length (in)		Diameter (in)	Total Load (lbs)	Total Pressure (psi)	Fracture Type*	Break Date	Tested By	Area (in ²)
					Before Capping	After Capping							
B-05	2	45.5	Pier 2 Center Line	Sandstone	4.06	NA	1.99	6110	1957	3	6/3/22	MAC	3.12

--	--	--	--	--	--	--	--	--	--	--	--	--	--

--	--	--	--	--	--	--	--	--	--	--	--	--	--

*** 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: _____



Unconfined Compressive Strength of Intact Rock Core Specimens

Project: US 6 over Fox River

Client: Wang Testing Services

WEI Job No.: KE235324

Field Sample ID	Run #	Depth (ft)	Location	Sample Description	Length (in)		Diameter (in)	Total Load (lbs)	Total Pressure (psi)	Fracture Type*	Break Date	Tested By	Area (in ²)
					Before Capping	After Capping							
SB-01	1	25.0	US Route 6	Sandstone	4.07	NA	1.96	7150	2354	3	9/15/23	KJ	3.03
SB-01	1	26.0	US Route 6	Sandstone	4.09	NA	2.00	4230	1349	3	9/15/23	KJ	3.13

*** 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.

9/22/2023

Prepared by: M Ciapas

9/22/2023

Checked by: Mickey Snider

APPENDIX C

Run #1



0 6 inches

Boring B-01:
Run #1, 37.0 to 47.0 feet, RECOVERY=85%, RQD=0%

BEDROCK CORE: US 6 OVER FOX RIVER, SN 050-0033, PTB 201/26;
LASALLE COUNTY, ILLINOIS

SCALE: GRAPHICAL

APPENDIX C-1

DRAWN BY: J. Bensen
CHECKED BY: A. Kurnia

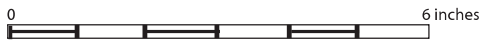


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FOR IDOT DISTRICT 3

KE225071A

Run #2



Boring B-01:
Run #2, 47.0 to 57.0 feet, RECOVERY=66%, RQD=0%

BEDROCK CORE: US 6 OVER FOX RIVER, SN 050-0033, PTB 201/26;
LASALLE COUNTY, ILLINOIS

SCALE: GRAPHICAL

APPENDIX C-2

DRAWN BY: J. Bensen
CHECKED BY: A. Kurnia



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FOR IDOT DISTRICT 3

KE225071A

Run #1



Run #2



Boring B-03:

Run #1, 39.0 to 44.0 feet, RECOVERY=100%, RQD=8%

Run #2, 44.0 to 49.0 feet, RECOVERY=97%, RQD=80%

BEDROCK CORE: US 6 OVER FOX RIVER, SN 050-0033, PTB 201/26;
LASALLE COUNTY, ILLINOIS

SCALE: GRAPHICAL

APPENDIX C-3

DRAWN BY: J. Bensen
CHECKED BY: A. Kurnia



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FOR IDOT DISTRICT 3

KE225071A

Run #3



0 6 inches

Boring B-03:
Run #3, 49.0 to 59.0 feet, RECOVERY=55%, RQD=17%

BEDROCK CORE: US 6 OVER FOX RIVER, SN 050-0033, PTB 201/26; LASALLE COUNTY, ILLINOIS		
SCALE: GRAPHICAL	APPENDIX C-4	DRAWN BY: J. Bensen CHECKED BY: A. Kurnia
 A Terracon Company		1145 N. Main Street Lombard, IL 60148 www.wangeng.com
FOR IDOT DISTRICT 3		KE225071A

Run #1



0 6 inches

Boring B-04:
Run #1, 37.0 to 47.0 feet, RECOVERY=68%, RQD=22%

BEDROCK CORE: US 6 OVER FOX RIVER, SN 050-0033, PTB 201/26; LASALLE COUNTY, ILLINOIS		
SCALE: GRAPHICAL	APPENDIX C-5	DRAWN BY: J. Bensen CHECKED BY: A. Kurnia
 Wang Engineering A Terracon Company		1145 N. Main Street Lombard, IL 60148 www.wangeng.com
FOR IDOT DISTRICT 3		KE225071A

Run #2



0 6 inches

Boring B-04:
Run #2, 47.0 to 57.0 feet, RECOVERY=38%, RQD=4%

BEDROCK CORE: US 6 OVER FOX RIVER, SN 050-0033, PTB 201/26; LASALLE COUNTY, ILLINOIS		
SCALE: GRAPHICAL	APPENDIX C-6	DRAWN BY: J. Bensen CHECKED BY: A. Kurnia
 A Terracon Company		1145 N. Main Street Lombard, IL 60148 www.wangeng.com
FOR IDOT DISTRICT 3		KE225071A

Run #1



0 6 inches

Run #2



0 6 inches

Boring B-05:

Run #1, 35.5 to 45.5 feet, RECOVERY=60%, RQD=0%

Run #2, 45.5 to 50.5 feet, RECOVERY=85%, RQD=36%

Run #3, 50.5 to 55.5 feet, RECOVERY=0%

BEDROCK CORE: US 6 OVER FOX RIVER, ROUND 2, SN 050-0033, PTB 201/26;
LASALLE COUNTY, ILLINOIS

SCALE: GRAPHICAL

APPENDIX C-7

DRAWN BY: J. Bensen
CHECKED BY: A. Kurnia



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FOR IDOT DISTRICT 3

KE225071A

Run #1



0 6 inches

Boring B-06:
Run #1, 48.5 to 53.0 feet, RECOVERY=67%, RQD=0%

BEDROCK CORE: US 6 OVER FOX RIVER, SN 050-0033, PTB 201/26;
LASALLE COUNTY, ILLINOIS

SCALE: GRAPHICAL

APPENDIX C-8

DRAWN BY: J. Bensen
CHECKED BY: A. Kurnia



Wang
Engineering

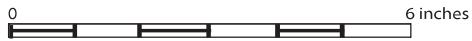
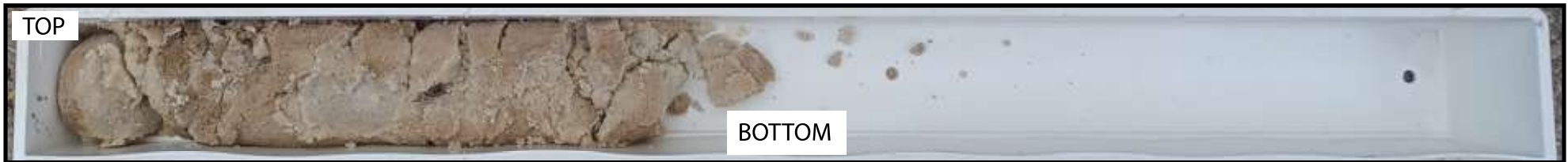
A Terracon Company

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Lombard, IL 60148
www.wangeng.com

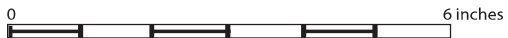
FOR IDOT DISTRICT 3

KE225071A

Run #1



Run #3



Boring 1(RockCore):

Run #1, 24.0 to 28.0 feet, RECOVERY=23%, RQD=0%

Run #2, 28.0 to 34.0 feet, RECOVERY=0%

Run #3, 34.0 to 44.0 feet, RECOVERY=75%, RQD=23%

BEDROCK CORE: US 6 OVER FOX RIVER, ROUND 2, SN 050-0033, PTB 201/26;
LASALLE COUNTY, ILLINOIS

SCALE: GRAPHICAL

APPENDIX C-9

DRAWN BY: J. Bensen
CHECKED BY: A. Kurnia



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Run #1



Boring 3(RockCore):
Run #1, 14.0 to 19.0 feet, RECOVERY=98%, RQD=73%

BEDROCK CORE: US 6 OVER FOX RIVER, ROUND 2, SN 050-0033, PTB 201/26;
LASALLE COUNTY, ILLINOIS

SCALE: GRAPHICAL

APPENDIX C-10

DRAWN BY: J. Bensen
CHECKED BY: A. Kurnia

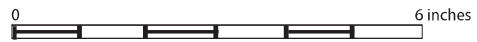


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Run #2



Boring 3(RockCore):
Run #2, 19.0 to 24.0 feet, RECOVERY=98%, RQD=88%

BEDROCK CORE: US 6 OVER FOX RIVER, ROUND 2, SN 050-0033, PTB 201/26;
LASALLE COUNTY, ILLINOIS

SCALE: GRAPHICAL

APPENDIX C-11

DRAWN BY: J. Bensen
CHECKED BY: A. Kurnia



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FOR IDOT DISTRICT 3

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Run #3



0 6 inches

Boring 3(RockCore):
Run #3, 24.0 to 34.0 feet, RECOVERY=98%, RQD=53%

BEDROCK CORE: US 6 OVER FOX RIVER, ROUND 2, SN 050-0033, PTB 201/26;
LASALLE COUNTY, ILLINOIS

SCALE: GRAPHICAL

APPENDIX C-12

DRAWN BY: J. Bensen
CHECKED BY: A. Kurnia



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A Terracon Company

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FOR IDOT DISTRICT 3

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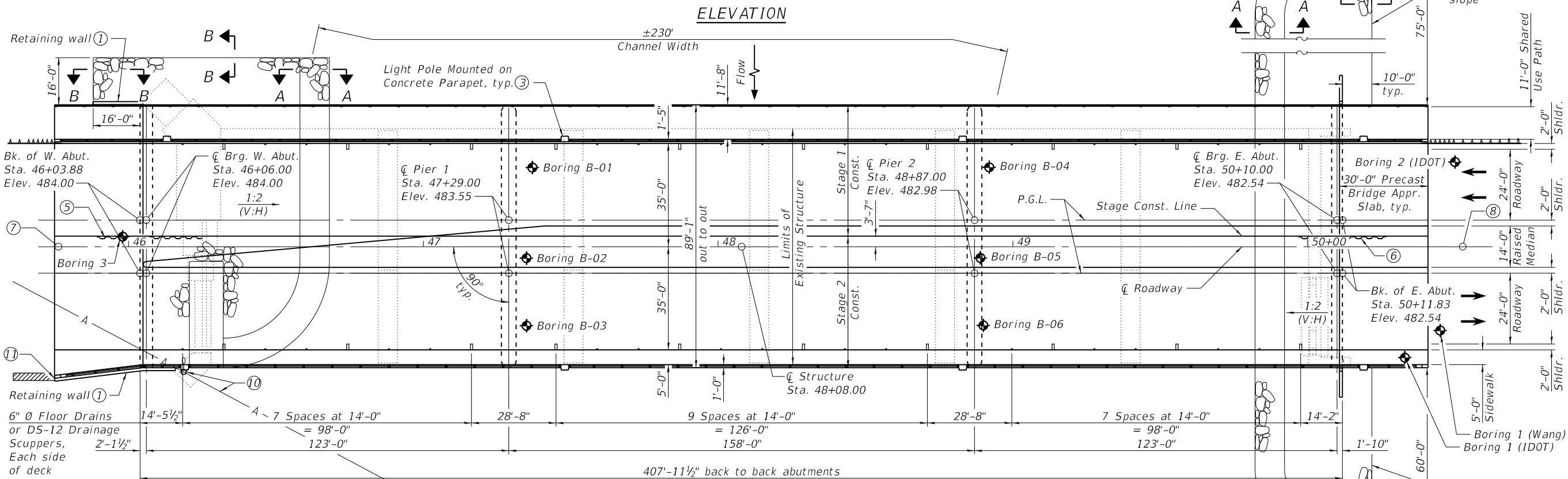
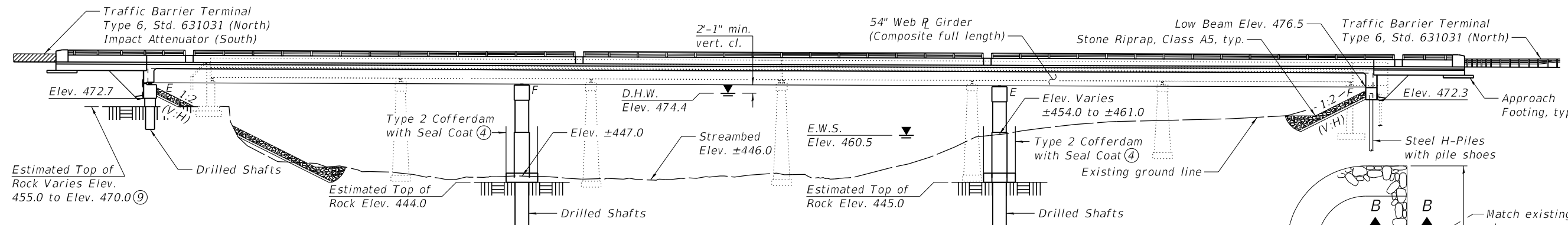
APPENDIX D

Bench Mark: BM 2 - Cut square southwest wing of S.N. 050-0033, Sta. 46+23.92, 40.92' RT., Elev. 483.786.

Existing Structure: S.N. 050-0033 was originally built in 1928 as S.B.I. Route 7, Section E-1. The substructure was widened and superstructure replaced in 1973 as F.A. Route 8, Section (E-1)BR. The back to back abutment length is 377'-11 1/2" and the out to out deck width is 80'-0". The existing structure consists of a six span steel W36 superstructure supported by one concrete closed abutment founded on spread footings on rock, one concrete closed abutment founded on spread footings on rock and widened with a stub abutment founded on steel piles, and concrete solid wall piers founded on spread footings on rock. Structure is to be removed and replaced.

Traffic Control: One lane of traffic in each direction will be maintained by utilizing staged construction.

Salvage: None



- LEGEND**
- ▣ DS-12 Scupper
 - 6" Ø Floor Drain
 - ▨ Impact Attenuator

APPROVED

JULY 19, 2023

AS A BASIS FOR
PREPARATION OF DETAILED PLANS

- Notes:**
- ① Retaining wall type and final layout to be determined during final design.
 - ② For Section A-A, Section B-B, Waterway Information and Design Scour Elevation Table, see Sheet 2 of 2.
 - ③ Light pole locations per lighting plans, to be verified during final design.
 - ④ The use of Type 2 Cofferdam for pier construction to be further evaluated during final design.
 - ⑤ Temporary Soil Retention System
 - ⑥ Temporary Sheet Piling
 - ⑦ Station Equation: 45+76.10 Back = 45+75.00 Ahead
 - ⑧ Station Equation: 50+52.62 Back = 50+53.12 Ahead
 - ⑨ Elevations taken from Boring 3 and estimated from existing bridge plans. To be verified during final design.
 - ⑩ Existing utility pole and aerial lines to be relocated by others.
 - ⑪ Corner of approach slab flare is at Sta. 45+75.98, offset 44.62' Rt.
 - ⑫ All steel within 10' of the piers shall be painted.

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

SHEET 1 OF 2 SHEETS

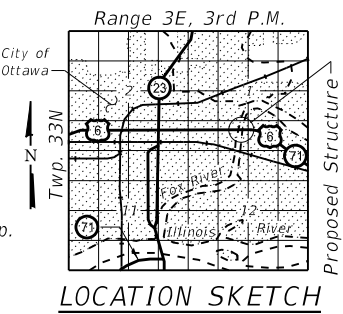
DESIGN SPECIFICATIONS
2020 AASHTO LRFD Bridge Design Specifications, 9th Edition

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 50W)

HIGHWAY CLASSIFICATION
F.A.P. Rte. 623 - U.S. Rte. 6
Functional Class: Other Principal Arterial
ADT: 13,990 (2025); 16,630 (2045)
ADTT: 895 (2025); 1,064 (2045)
DHW: 1,580
Design Speed: 35 m.p.h.
Posted Speed: 35 m.p.h.
Two-Way Traffic
Directional Distribution: 50:50



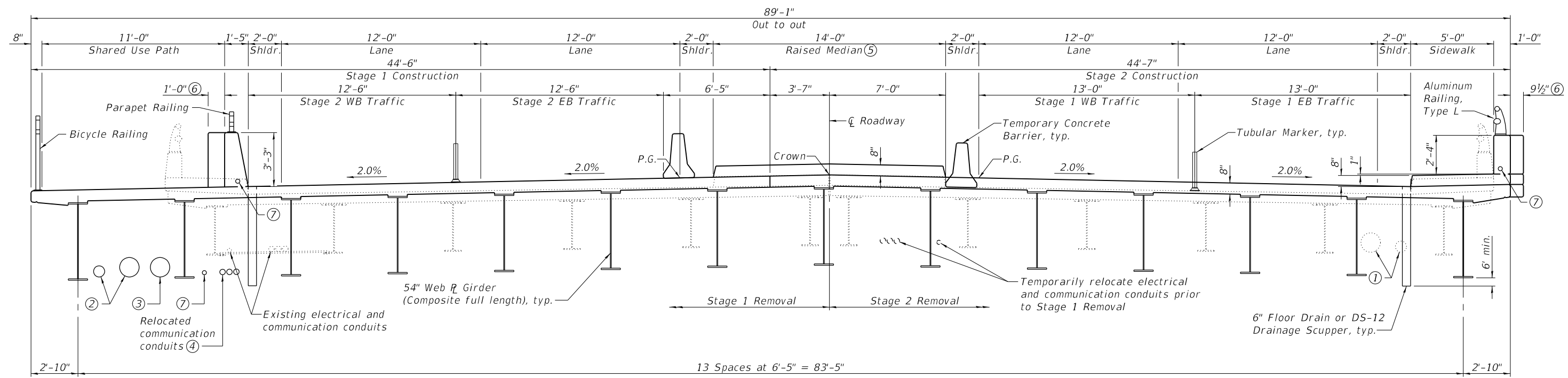
GENERAL PLAN & ELEVATION
U.S. RTE. 6 OVER FOX RIVER
PUBLIC WATER
F.A.P. RTE. 623 - SEC. (E-1)ES
LASALLE COUNTY
STA. 48+08.00
STRUCTURE NO. 050-0260

FILE NAME: H:\P22\1126 - D3 Various Various PTB 201-028\WO 2 - US 6 IL 7\Fox River\Bridges\Microstation\0500260_66k84_TSL.dgn

OATES ASSOCIATES
www.oatesassociates.com
ILLINOIS DESIGN FIRM LICENSE NO.: 184.001115

USER NAME =	DESIGNED - ETH	REVISIONS -
PLOT SCALE =	CHECKED - JAD	REVISIONS -
PLOT DATE = 7/17/2023	DRAWN - ETH	REVISIONS -
	CHECKED - JAD	REVISIONS -

F.A.P. RTE. 623	SECTION (E-1)ES	COUNTY LASALLE	TOTAL SHEETS	SHEET NO.
CONTRACT NO. 66K84			ILLINOIS FED. AID PROJECT	



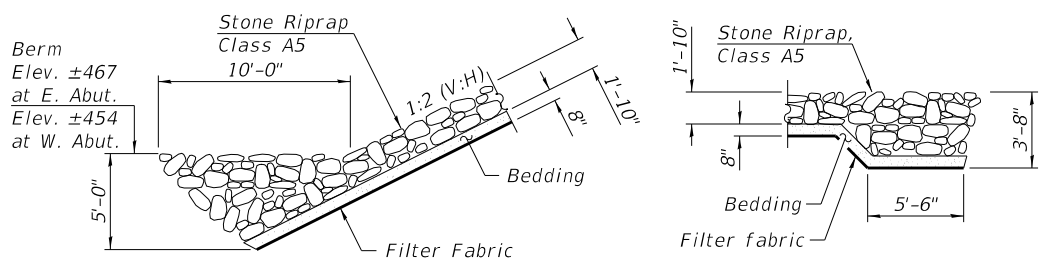
CROSS SECTION
(Looking East)

WATERWAY INFORMATION

Drainage Area = 2,642 sq. mi. Ex. Low Grade Elev. 481.85 @ Sta. 52+64.65
Prop. Low Grade Elev. 481.89 @ Sta. 52+64.65

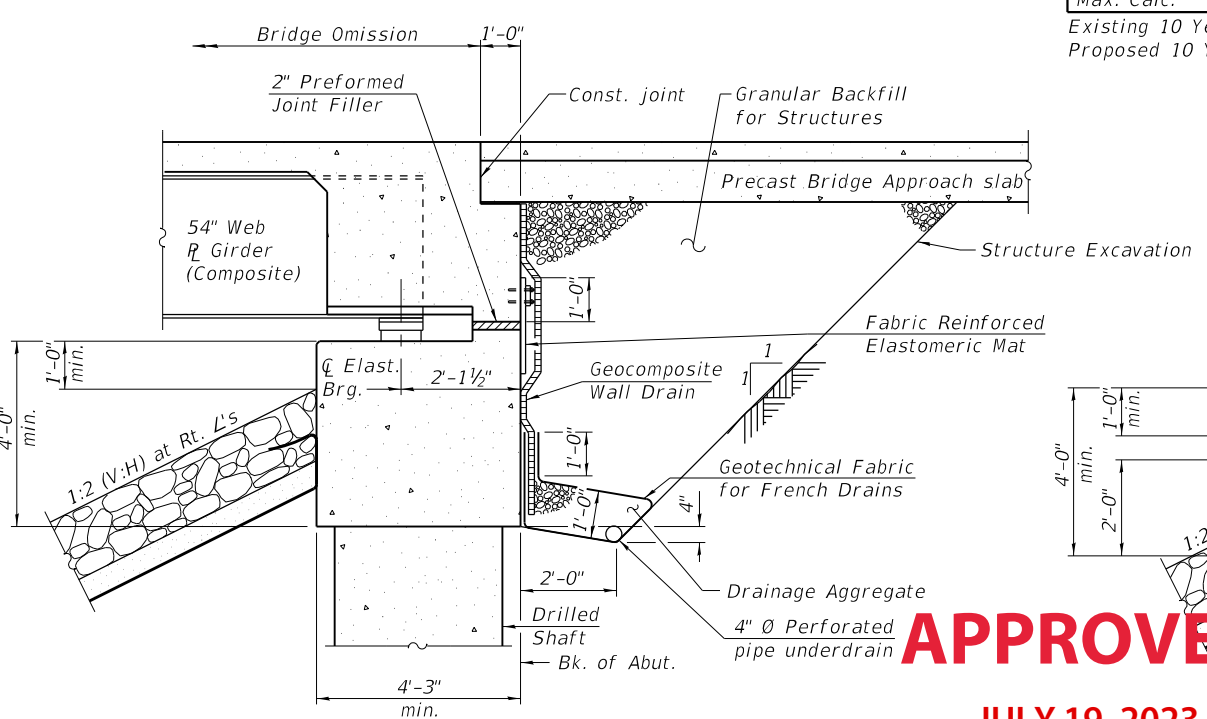
Flood	Freq. Yr.	Q C.F.S.	Opening Ft ²		Nat. H.W.E.		Head - Ft.		Headwater El.	
			Exist.	Prop.	Exist.	Prop.	Exist.	Prop.	Exist.	Prop.
Design	10	24,500	5,764	5,981	472.8	1.3	1.3	474.1	474.1	474.1
Base	50	36,900	6,325	6,569	474.4	1.4	1.4	475.8	475.8	475.8
Check	100	42,600	6,717	6,985	475.5	1.4	1.4	476.9	476.9	476.9
Max. Calc.	200	46,650	7,049	7,341	476.5	1.4	1.4	477.9	477.9	477.9
	500	57,500	7,716	8,237	479.0	0.4	1.5	479.4	480.5	480.5

Existing 10 Year Average Velocity = 4.0 ft/s
Proposed 10 Year Average Velocity = 3.8 ft/s



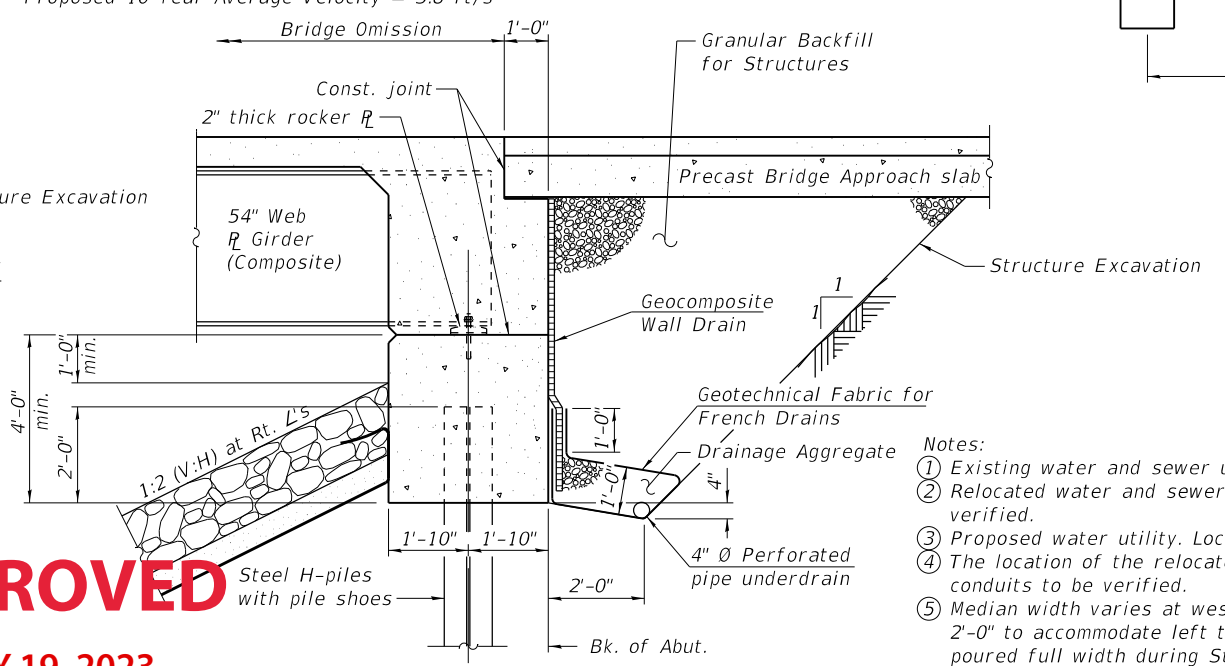
SECTION A-A

SECTION B-B

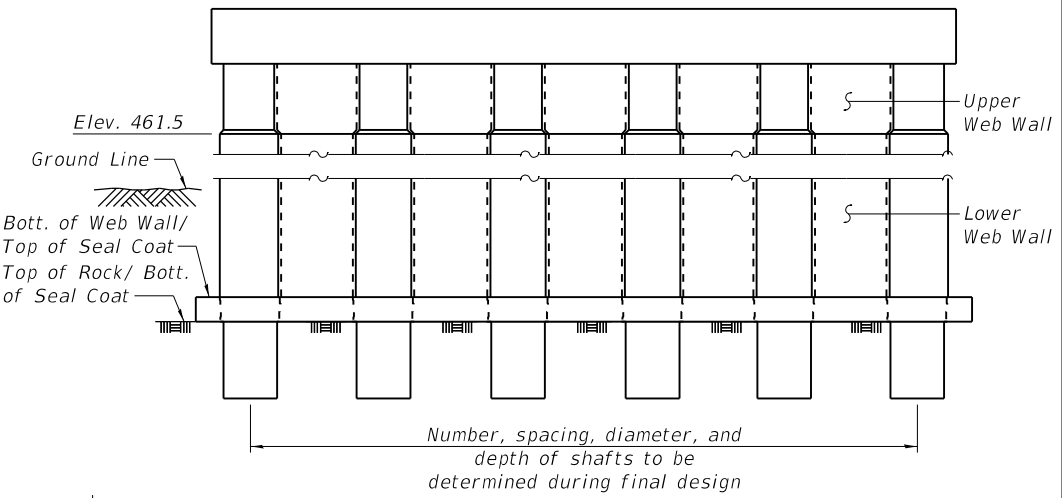


SECTION THRU SEMI-INTEGRAL ABUTMENT

APPROVED
JULY 19, 2023
AS A BASIS FOR
PREPARATION OF DETAILED PLANS



SECTION THRU INTEGRAL ABUTMENT



PIER SKETCH

DESIGN SCOUR ELEVATION TABLE

Event / Limit	Design Scour Elevations (ft.)				Item 113
	W. Abut.	Pier 1	Pier 2	E. Abut.	
Q100	472.7	443.2	444.1	472.3	5
Q200	472.7	442.1	443.0	472.3	
Design	472.7	443.2	444.1	472.3	
Check	472.7	442.1	443.0	472.3	

- Notes:
- Existing water and sewer utilities to be relocated.
 - Relocated water and sewer utilities. Location to be verified.
 - Proposed water utility. Location to be verified.
 - The location of the relocated communication conduits to be verified.
 - Median width varies at west end from 14'-0" to 2'-0" to accommodate left turn lane. Median to be poured full width during Stage 2 Construction.
 - Parapet widening at light pole locations.
 - Relocated electrical conduit. Location to be determined during final design.

DETAILS
U.S. RTE. 6 OVER FOX RIVER
PUBLIC WATER
F.A.P. RTE. 623 - SEC. (E-1)ES
LASALLE COUNTY
STA. 48+08.00
STRUCTURE NO. 050-0260

FILE NAME: H:\P221126 - D3 Various Various PTB 201-028\WO 2 - US 6 IL 7\Fox River\Bridges\Microstation\0500260_66k84_TSL.dgn



USER NAME =	DESIGNED - ETH	REVISIONS -
PLOT SCALE =	CHECKED - JAD	REVISIONS -
PLOT DATE = 7/17/2023	DRAWN - ETH	REVISIONS -
	CHECKED - JAD	REVISIONS -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

F.A.P. RTE. 623	SECTION (E-1)ES	COUNTY LASALLE	TOTAL SHEETS	SHEET NO.
CONTRACT NO. 66K84			ILLINOIS FED. AID PROJECT	