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## Structure Geotechnical Report

F.A.P. Route 317 (US 150)  
Section (15B) BR  
Peoria County / Tazewell County  
Job No. P-94-018-13  
Contract No. 68B46  
PTB No. 169-028  
US 150 E.B. Over Illinois River  
Structure No. 090-0180

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## 1. Project Description

This report provides geotechnical data and recommendations for the proposed US 150 EB Over Illinois River Bridge, which is part of the McClugage Bridge Project. The project includes the replacement of two existing US 150 EB bridges, replacement of a double box culvert, and related mainline and ramp reconstruction in Peoria and Tazewell Counties. The bridge covered by this structure geotechnical report will replace an existing Illinois River structure.

Nearby project features that have an impact on the design or construction of the proposed bridge include the US 150 (EB) over IL 29 (Adams Street) Bridge (S.N. 072-0250), the US 150 EB roadway, and the Ramp E roadway. Geotechnical recommendations for S.N. 072-0250 are presented in a separate structure geotechnical report prepared by Hanson Professional Services Inc. (Hanson). Geotechnical recommendations for the roadway are contained in a roadway geotechnical report prepared by Hanson.

## 2. Location

The proposed US 150 EB Over Illinois River Bridge is located in the east central portion of Peoria County and the northwest portion of Tazewell County, within Section 35 of Township 9 North, Range 8 East (4th Principle Meridian) and Sections 10, 11, and 14 of Township 26 North, Range 4 West (3rd Principle Meridian). It is located at US 150 EB Sta. 2134+06.00. The north edge of the new bridge is located approximately 40 ft downstream (south) of the existing EB bridge and 100 ft downstream of the existing WB bridge.

## 3. Existing Structure

The existing structure, S.N. 090-0070 (US 150 EB), was constructed in the 1940's. The original structure had 28 spans carrying two traffic lanes across the Illinois River. In 1977, a 4-span curved section was added and 4 spans of the original structure were widened to accommodate a new entrance ramp (Ramp E) at the southwest corner. The superstructure consists of 52'-6" to 203'-9"± plate girder spans, 156'-0" to 260'-0" deck truss spans, and 469'-0" to 536'-0" through truss spans. The substructure has solid wall piers on pile supported footings, two-column piers on pile-supported footings and stub abutments.

The bridge is supported on battered HP 10x42, HP 12x53, HP 14x73, 12" precast concrete and 12" concrete (metal shell) piles. Based on the estimated lengths shown in the construction plans, the HP piles were driven to refusal on bedrock. The concrete piles, which are all located on the west side of the river, were driven to dense sand. Plans indicate that precast concrete piles were driven to 25 ton capacity at the west abutment and metal shell piles were driven to 45 ton capacity along Ramp E.

## 4. Proposed Structure

The proposed bridge will have 23 mainline spans and 3 spans along Ramp E. The 652'-0" navigation span will be a tied arch superstructure. The remainder of the bridge will be composed of composite plate girder units. Span lengths are 125'-0" to 222'-3<sup>3</sup>/<sub>4</sub>" along the mainline and 98'-0" to 160'-6" along Ramp E. The bridge carries 3 or 4 traffic lanes and a 14'-0" shared-use path. Total width of the mainline bridge will vary from 59'-4" to 113'-2<sup>1</sup>/<sub>2</sub>". The Ramp E spans carry one lane of traffic and the shared use path. Total width of Ramp E will be 54'-8".

The West Abutment and South Abutment will be placed on an existing embankment that runs parallel to the river between IL 29 and the Tazewell and Peoria Railroad. The West Abutment will be a vaulted abutment with the front face of the abutment located approximately 10 ft from the toe of the embankment and the approach bent

located at the top. The South Abutment will be a stub abutment located on the berm in front of the existing Ramp E abutment.

The East Abutment will be a stub abutment constructed on new fill. The existing US 150 EB embankment will be widened approximately 80 ft to the south and raised approximately 5 ft above the existing eastbound approach.

Piers 2 through 8 will be three-column piers with a lower diaphragm extending above the river and an upper diaphragm supporting the superstructure. Piers 9 through 22 are similar, but will have only two columns. Piers for Ramp E will have a hammerhead configuration with a single rectangular column. Most piers will have pile-supported footings. Piers in locations with extreme scour and high lateral loads will have drilled shaft supported footings.

Based on information provided by the structure designer, the approximate factored axial foundation loads are 1,600 kips at the South Abutment, 5,000 kips at the Ramp E piers, 2,000 kips at the West Abutment, 9,500 kips at Pier 1, 15,500 to 20,500 kips at Piers 2 through 8, 13,000 to 16,000 kips at Piers 9 through 11, 36,500 kips at Piers 12 and 13, 17,500 kips at Pier 14, 12,000 to 15,000 kips at Piers 15 through 22, and 3,000 kips at the East Abutment. These loads were calculated with the assumption of relatively shallow footings. At piers where the footings have been lowered for scour concerns, the total foundation load could increase by as much as 40% due to the additional weight of substructure and earth.

Significant lateral loads are expected due to vessel collision forces on the river piers. These extreme event loadings will be determined during final design, but are expected to be approximately 4,000 kips on the ends or 2,000 kips on the sides of the main span piers. The vessel collision forces will decrease with distance from the navigation channel.

The proposed bridge conflicts with the existing structure west of Pier 3. That portion of the new bridge must be constructed after all of the existing Ramp E spans and small portions of the existing mainline substructure are demolished. Traffic will be maintained on the existing mainline US 150 EB bridge during the construction period. Ramp E will be closed while the westernmost spans of the new bridge are constructed. Traffic will switch over to the new structure after the entire structure is completed.

## 5. Site Investigation

The project is located in the Illinois River Valley at a widened section of the river known as Peoria Lake. The river abruptly widens from 1,200 ft to 3,800 ft at a former bridge crossing approximately 0.3 miles upstream of the current crossing. The Peoria Lock and Dam, located 8.1 miles downstream, maintains a normal pool at Elev. 439.7 within Peoria Lake. Piers 6 through 22 of the proposed bridge are within the river at normal pool. Piers 2 through 5 and the East Abutment are also within the river at a 500-year discharge (Elev. 462.4).

The proposed bridge crosses gently sloping terrain of the river bottom and flood plain. The existing bridges' abutments are set on embankments constructed for the existing US 150 alignment. The embankment on the west side of the river is approximately 35 ft above natural ground. This embankment, which runs perpendicular to the bridge, originally supported ramps from Adams Street onto the bridge. The ramps' pavement was removed when the interchange was reconfigured. The embankment on the east side of the river is approximately 27 ft above natural ground. Embankment slopes are 1V:2H. Natural grades are generally 5% or flatter. The low point in the river's navigation channel is at approximately Elev. 417. The river bottom outside of the approximately 1,000 ft wide main channel is at Elev. 437±. The November 2014 bathymetric survey indicated that the navigation channel under the WB bridge was approximately 4 ft deeper than at a point 800 ft downstream. The survey also found local scour holes at several of the existing piers with the most severe scour at the pier on the east side of the navigation channel.

The December 1939 structure plans show a soil profile at each pier and the east abutment of the existing US 150 EB Bridge. The soil profiles indicate the basic classification of the soils that were encountered in borings drilled prior to the preparation of the plans. There are no SPT's or other field or laboratory test data for these borings. Boring depths are indicated only at Piers 3 and 4, which were terminated before reaching bedrock. All other borings were advanced into bedrock. A single boring was drilled at all piers except for Pier 7, near the west river bank, where 5 borings were drilled. At Pier 7, the borings penetrated a shale stratum and encountered hard clay and gravel before reaching shale again. It is assumed that additional borings were drilled because of these unusual conditions.

The WB structure plans include logs of borings drilled at the piers for the existing WB bridge as well as borings drilled at the new piers and pier extensions for the Ramp E entrance to the existing EB bridge. These borings were drilled in 1974 and included SPT's, unconfined strength tests, and moisture content tests, similar to the current practice. The borings at Pier 2 and Pier 2E were terminated in dense sand at 80 ft depth. All other borings were advanced into bedrock.

The soil borings for the proposed structure were completed in August through September 2016 and November 2016 by Wang Engineering (Wang). A total of 37 borings, SB-08 through SB-43, were drilled with at least one boring at every substructure location. Two borings were drilled at the wider piers on the west side of the river and at the piers supporting the navigation span. Borings within the river were drilled using a truck rig on a barge. Land borings were advanced using an ATV drill rig. A representative from Wang logged the borings and prepared the final boring logs included in this report.

All borings except SB-08 were terminated in bedrock. The boring depths ranged from 64.5 to 125.0 feet. Standard Penetration Test samples were collected at 2.5 ft intervals to 30 ft depth, then at 5.0 ft intervals. Shelby Tube samples were collected at representative locations in cohesive strata found at the East Abutment. Rock samples were collected either by coring or by split spoon sample. Split spoon samples in rock were taken using the Modified SPT (MSPT) procedure described in FHWA-ICT-13-017.

Boring locations are shown on the Boring Location Plan included in the Appendix. Boring logs and photographs of the rock cores are also included in the Appendix.

## 6. Laboratory Investigation

The soil samples obtained from the borings were delivered to Wang's soils laboratory and subjected to a testing program. Natural moisture content tests were completed on all SPT, MSPT, and Shelby Tube samples. Grain size distribution tests were performed on representative samples of the river bed soils. Grain size distribution and Atterberg Limits tests were performed on samples selected for strength testing and/or consolidation testing. Unconfined compressive strength tests, UU triaxial, CU triaxial, and consolidation tests were performed on Shelby tube samples.

The locations of the index tests, triaxial tests, and consolidation tests are indicated on the subsurface data profile. Test reports are included in the Appendix.

## 7. Subsurface Profile

A subsurface data profile is presented in the Appendix for use by the structure designer. The data profile includes all of the borings that were recently drilled near the proposed structure.

The subsurface profile consists of deposits of fill material and alluvial soils overlying bedrock. The fill is generally located in the existing approach embankments and near the surface on the west shore. Alluvial soils and

bedrock are present at depth over the entire site. Strata elevations and depth are variable due to the site's location in a river valley.

Shale and/or mudstone bedrock was encountered over the entire site. The bedrock surface is erratic, varying between Elev. 364.6 and Elev. 397.4, but generally sloping down to a low point near Pier 14. A layer of very stiff to hard silty clay with shale clasts was encountered in many of the borings west of Pier 7. This layer was up to 24 ft thick and is believed to be either weathered shale or shale modified by glaciation. Based on MSPT results, three distinct shale layers were identified. These layers were relatively consistent across the site. A weak shale layer with an average estimated unconfined strength of 14 tsf was found above Elev. 374. A strong shale layer with an average strength of 73 tsf was found between Elev. 374 and Elev. 364. Another weak layer (22 tsf average) was found below Elev. 364.

Alluvial soils were encountered above the bedrock to the ground surface or river bed, except where the fill layer was present. The deeper deposits, immediately above bedrock, were medium dense to very dense sands to sandy gravels interspersed with occasional thin layers of clay. These granular soils were up to 87 ft thick at the west end of the site, but thinned to just 3 ft thick east of the navigation channel. The shallow deposits were very soft to medium stiff silty clay to silty clay loam. These cohesive soils were encountered only in the river and at the East Abutment. Thickness of this layer ranged from 15 ft to 65 ft, where it was present.

Fill was encountered in the borings drilled on the west side of the river. At the South Abutment and West Abutment, 23 to 26 ft of stiff to very stiff silty clay loam to clay loam and dense to very dense sand to sandy loam was encountered. Up to 6 ft of various random fill materials were encountered in borings between the abutments and the river bank. The boring at the East Abutment was drilled at the toe of the existing embankment. Roadway borings drilled about 300 ft to the east indicate that the existing east approach embankment contains stiff to hard clay loam.

The groundwater elevations recorded on the boring logs are summarized in Table 7.1. Stabilized (24-hour) readings were not taken in any of the borings. Groundwater elevations in the borings on the east side of the river generally corresponded to the river water surface elevation. The groundwater in borings west of the river were generally at least ten feet lower than the river level. The river water surface elevation is shown for the borings that were drilled within the river. The river level was fluctuating and up to several feet above normal pool during the period when the borings were drilled. It is anticipated that groundwater levels across the site will rise and fall with the river level.

**Table 7.1 Groundwater Elevations**

<b>Boring No.</b>	<b>Date Completed</b>	<b>River Elevation†</b>	<b>During Drilling‡</b>	<b>At End of Boring</b>	<b>24-hour Reading</b>
SB-08	9/01/16	446.3	430.9	427.9	-
SB-09	11/10/16	440.1	425.2	425.2	-
SB-10	8/30/16	444.5	431.0	431.0	-
SB-11	9/08/16	443.2	433.4	414.4	-
SB-12	11/09/16	439.7	426.4	425.9	-
SB-13	11/08/16	439.9	425.8	424.3	-
SB-14	8/29/16	443.9	427.9	427.4	-
SB-15	8/25/16	442.7	427.2	419.2	-
SB-16	8/25/16	442.7	429.5	423.5	-
SB-17	8/24/16	442.3	429.5	423.0	-
SB-18	8/22/16	441.5	432.1	419.1	-
SB-19	8/10/16	440.2	424.0	426.0	-
SB-20	8/19/16	440.6	428.1	429.1	-
SB-21	8/10/16	440.2	423.9	404.2	-
SB-22	8/11/16	440.1	426.4	430.4	-
SB-23	8/22/16	441.5	<i>441.7</i>		-
SB-24	8/23/16	442.1	<i>442.0</i>		-
SB-25	8/18/16	440.9	<i>440.6</i>		-
SB-26	9/12/16	444.3	<i>444.2</i>		-
SB-27	9/13/16	444.5	<i>444.2</i>		-
SB-28	9/14/16	444.5	<i>444.2</i>		-
SB-29	9/14/16	444.5	<i>444.2</i>		-
SB-30	9/19/16	442.8	<i>443.5</i>		-
SB-31	9/15/16	444.3	<i>444.0</i>		-
SB-32	9/20/16	442.4	<i>442.5</i>		-
SB-33	8/11/16	440.1	<i>440.1</i>		-
SB-34	8/08/16	440.3	<i>439.5</i>		-
SB-35	8/10/16	440.2	<i>440.1</i>		-
SB-36	9/07/16	443.5	<i>443.3</i>		-
SB-37	9/02/16	446.3	<i>446.0</i>		-
SB-38	9/01/16	446.3	<i>445.5</i>		-
SB-39	9/06/16	444.2	<i>443.8</i>		-
SB-40	8/31/16	445.6	<i>442.5</i>		-
SB-41	8/25/16	442.7	<i>442.3</i>		-
SB-42	8/24/16	442.3	<i>442.3</i>		-
SB-43	9/27/16	440.0	437.1	443.1	-
SB-43ST	11/16/16	440.7	435.2	441.2	-

† US Army Corps of Engineers’ Illinois River at Peoria, IL daily gage reading  
<http://rivergages.mvr.usace.army.mil/WaterControl/stationinfo2.cfm?sid=PIAI2&fid=PIAI2&dt>

‡ Measured Illinois River water surface elevation at time of drilling is shown in *italics*.

The Illinois State Geological Survey Directory of Coal Mines does not list any mines immediately beneath the site.

## 8. Geotechnical Evaluations

The South Abutment and West Abutment will be constructed at grade with minimal changes to the existing embankment. Soils within and below the existing embankment are stiff to very stiff clays and medium dense to dense sands. Slope stability of the abutments on the west side of the river are considered to meet AASHTO and IDOT requirements without analyses.

Slope stability analyses were completed at a critical section through the east approach embankment. The analyzed cross-section was located through the 1V:2H right side slope at the back of the proposed abutment. Results of these analyses are included in the Appendix. Under the Service I Load Combination, the calculated factors of safety are 1.17 for the circular failure and 0.92 for a wedge failure. The east approach embankment will not meet AASHTO or IDOT requirements for slope stability without special treatments.

Several treatment options were considered. There is not enough right-of-way to bench or flatten the side slopes and meet the minimum factor of safety. The soft soils are too deep and too close to the existing embankment to allow removal and replacement. Ground improvement with aggregate columns is feasible at this site. Stage construction is also feasible due to the anticipated three-year construction schedule for the bridge.

No consolidation-type settlement is expected at the South Abutment and West Abutment.

Significant settlement of the east approach embankment is expected due to the thick deposits of highly compressible soils and 29 ft height of new fill. The estimated maximum settlement at the East Abutment, based on data from consolidation tests, is 13 in. Estimated settlement at the south edge of the existing bridge's abutment is 0.8 in. Settlement is expected to take 27 months to be approximately 95 percent complete and avoid drag losses on the proposed abutment piles.

The installation of aggregate columns would strengthen the weak soils, reduce total settlement, and increase the settlement rate, allowing the construction of the entire embankment without staging. This type of ground improvement is designed by the contractor subject to specific performance requirements defined in the contract documents. Reasonable performance criteria for this project would include meeting IDOT slope stability requirements, total settlement of less than 6 inches, and total remaining settlement less than 0.4 inch within 180 days of embankment completion. Defined limits of treatment would be the new embankment footprint from the East Abutment to approximately Sta. 2161+50. Estimated construction cost of the aggregate column ground improvement is \$600,000. Due to the relatively high cost, this type of treatment would only be used if other alternatives are not feasible.

Placing the lower portion (Stage 1) of the embankment up to Elev. 460.0 ft and then waiting for approximately 70% consolidation of the weakest soil layer to occur, will result in sufficient strength gain to complete the embankment. Based on analyses using consolidation and triaxial test data from Shelby tube samples, a shear strength of 650 psf will be reached after 270 days of consolidation and 7 inches total settlement under the Stage 1 embankment. Assuming no strength gain, the Stage 1 embankment slope will have a 1.36 factor of safety. With the Stage 1 strength gain, the Stage 2 embankment slope will have a 1.33 factor of safety immediately after completion. Results of these slope stability analyses are included in the Appendix. Remaining total settlement will be less than 1.0 inch approximately 270 days after the completion of Stage 2.

If reduced waiting time between embankment construction stages is desired, then the consolidation time may be decreased by installing wick drains. The waiting period after each stage would be reduced from 270 days to 90 days if 25 ft long wick drains are installed on a 10 ft grid. Estimated construction cost of installing wick drains within the new embankment footprint from the East Abutment to approximately Sta. 2161+50 is \$50,000.



The proposed embankment will cause a small amount of settlement under the south edge of the existing bridge's East Abutment. This may induce a drag load on 2 of the 10 existing HP 12x53 piles. Plans indicate that the piles were driven to refusal on shale. Using IDOT's current pile design method, the estimated allowable stress design drag loss on the affected piles is 131 kips, which is approximately 31% of the ultimate geotechnical resistance. This will reduce the theoretical factor of safety on those two piles, but is not expected to cause any significant distress to the existing abutment. The existing structure will be removed after traffic is diverted to the new structure.

An abbreviated foundation type study was undertaken to evaluate alternative foundation configurations. Preliminary foundation designs were completed for four different piers that were considered representative of the loadings and subsurface conditions of all river piers. Foundation types investigated included H-piles, open-ended pipe piles, and drilled shafts. Two different footing elevations were checked at piers with either deep deposits of soft soils or large scour depths. A summary table of the various alternatives studied and their estimated costs is included in the Appendix. The results of the study indicated that H-piles generally were the most cost-effective foundations. At Piers 12 through 15, high lateral loadings and extreme scour depths resulted in infeasibly large H-pile supported footings. At those piers, drilled shafts, socketed into bedrock were necessary. The study indicated that the higher footing elevations were more cost-effective at all locations. Vertical piles were used for all analyses in the foundation type study.

## 9. Design Recommendations

The Hydraulic Report provides theoretical scour depths for all piers within the river. These depth estimates assume that all soils are easily scoured. As part of the geotechnical design, the scour resistance of the soils within the scour depth has been evaluated in accordance with the procedure in the Bridge Manual. Medium stiff to hard cohesive soils and bedrock are assumed to be scour resistant to varying degrees. At this bridge, the soils within the scour depth are predominately soft silts, soft clays, and sands. A reduction to the theoretical, predicted scour depths is appropriate only at Pier 15. Table 9.1 provides the scour design data for inclusion on the TSL drawing. Note that although current IDOT policy (ABD Memo 14.2) specifies that the Q200 flood be used as the Extreme Event II Check Flood for routine bridges, the Q500 flood is used here to be consistent with the Hydraulic Report.

**Table 9.1 Scour Design Data**

	<b>Pier 2</b>	<b>Pier 3</b>	<b>Pier 4</b>	<b>Pier 5</b>	<b>Pier 6</b>	<b>Pier 7</b>	<b>Pier 8</b>
Ground Elevation	460.0	452.5	445.5	442.5	438.0	437.0	437.0
Bottom of Footing	450.5	443.0	436.0	433.0	428.5	427.5	427.5
100-year Scour Depth	-	12.7	12.7	12.7	12.7	11.9	11.9
500-year Scour Depth	0.0	15.0	15.0	15.0	15.0	14.0	14.0
Geot. Adj. 100-year scour	-	12.7	12.7	12.7	12.7	11.9	11.9
Geot. Adj. 500-year scour	0.0	15.0	15.0	15.0	15.0	14.0	14.0
Q100 Scour Elevation	-	439.8	432.8	429.8	425.3	425.1	425.1
Q500 Scour Elevation	460.0	437.5	430.5	427.5	423.0	423.0	423.0
Design Elevation	450.5	439.8	432.8	429.8	425.3	425.1	425.1
Check Elevation	450.5	437.5	430.5	427.5	423.0	423.0	423.0

	<b>Pier 9</b>	<b>Pier 10</b>	<b>Pier 11</b>	<b>Pier 12</b>	<b>Pier 13</b>	<b>Pier 14</b>	<b>Pier 15</b>
Ground Elevation	437.5	437.5	437.5	436.0	427.5	429.0	436.0
Bottom of Footing	428.0	428.0	428.0	437.5	437.5	437.5	437.5
100-year Scour Depth	12.4	12.4	18.4	54.8	46.3	47.8	54.8
500-year Scour Depth	14.5	14.5	21.6	56.7	48.2	49.7	56.7
Geot. Adj. 100-year scour	12.4	12.4	18.4	54.8	46.3	47.8	51.2
Geot. Adj. 500-year scour	14.5	14.5	21.6	56.7	48.2	49.7	53.1
Q100 Scour Elevation	425.1	425.1	419.1	381.2	381.2	381.2	384.8
Q500 Scour Elevation	423.0	423.0	415.9	379.3	379.3	379.3	382.9
Design Elevation	425.1	425.1	419.1	381.2	381.2	381.2	384.8
Check Elevation	423.0	423.0	415.9	379.3	379.3	379.3	382.9

	<b>Pier 16</b>	<b>Pier 17</b>	<b>Pier 18</b>	<b>Pier 19</b>	<b>Pier 20</b>	<b>Pier 21</b>	<b>Pier 22</b>	<b>E. Abut.</b>
Ground Elevation	437.0	437.0	437.0	437.0	437.5	437.5	438.0	442.0
Bottom of Footing	427.5	427.5	427.5	427.5	428.0	428.0	428.5	460.2
100-year Scour Depth	27.4	27.4	13.5	13.5	14.0	14.0	14.5	30.2
500-year Scour Depth	27.4	27.4	13.9	13.9	14.4	14.4	14.9	34.6
Geot. Adj. 100-year scour	27.4	27.4	13.5	13.5	14.0	14.0	14.5	30.2
Geot. Adj. 500-year scour	27.4	27.4	13.9	13.9	14.4	14.4	14.9	34.6
Q100 Scour Elevation	409.6	409.6	423.5	423.5	423.5	423.5	423.5	460.2
Q500 Scour Elevation	409.6	409.6	423.1	423.1	423.1	423.1	423.1	460.2
Design Elevation	409.6	409.6	423.5	423.5	423.5	423.5	423.5	460.2
Check Elevation	409.6	409.6	423.1	423.1	423.1	423.1	423.1	460.2

The proposed substructures may be supported on metal shell piles driven into the dense gravelly sands or H-piles driven to bear on the weak shale bedrock. Metal shell piles should not be used at substructures that are subject to scour. At locations where metal shell piles are permissible, the metal shell piles will be much shorter than similar capacity H-piles. Table 9.2 lists design parameters for several different piles at each substructure location. Pile lengths were estimated based on the borings, assumed ground elevations and cutoff elevations indicated in the table. The ground elevation during driving, which is determined from the seal coat thickness, does not have a strong influence on the pile length, geotechnical losses, or factored resistance available. No adjustment to the parameters provided in the table is necessary if the final bottom of seal elevation is within several feet of the

assumed ground elevation. Estimated pile lengths for the bridge plans should be adjusted based on final cutoff elevations.

**Table 9.2 Pile Design Parameters**

Location	Cutoff Elevation (ft)	Pile Type	Factored Resistance Available, $R_F$ (kips)	Geotechnical Losses, $R_{Sdd}$ (kips)	Nominal Required Bearing, $R_N$ (kips)	Estimated Pile Length (ft)
South Abutment SB-08	489.3	MS 12"φ w/.179" wall	140	0	254	13
		MS 12"φ w/.25" wall	141	0	257	21
			194	0	353	30
		MS 14"φ w/.25" wall	173	0	315	21
			227	0	413	27
		MS 14"φ w/.312" wall	173	0	315	21
			282	0	513	42
		HP 10x42	64	0	116	52
			91	0	165	87
			148	0	268	97
			184	0	335	99
		HP 12x53	80	0	146	52
			85	0	155	62
			98	0	178	72
			111	0	202	87
			185	0	336	97
			230	0	418	99
		HP 12x63	78	0	142	47
			86	0	156	62
			112	0	204	87
			189	0	343	97
			273	0	497	101
		HP 14x73	101	0	183	52
			105	0	191	62
			119	0	217	67
			134	0	245	87
			224	0	407	97
			318	0	578	100
		HP 14x89	102	0	186	52
			107	0	194	62
	121	0	220	67		
	136	0	247	87		
	228	0	414	97		
	388	0	705	102		

Location	Cutoff Elevation (ft)	Pile Type	Factored Resistance Available, $R_F$ (kips)	Geotechnical Losses, $R_{Sdd}$ (kips)	Nominal Required Bearing, $R_N$ (kips)	Estimated Pile Length (ft)
Pier 1 (Ramp E) SB-09	471.0	MS 12"φ w/.179" wall	107	0	195	15
			140	0	254	27
		MS 12"φ w/.25" wall	107	0	195	15
			194	0	353	40
		MS 14"φ w/.25" wall	135	0	246	15
			227	0	413	39
		MS 14"φ w/.312" wall	135	0	246	15
			282	0	513	48
		HP 10x42	78	0	141	57
			150	0	273	79
			184	0	335	81
		HP 12x53	93	0	169	57
			189	0	344	79
			230	0	418	81
		HP 12x63	96	0	174	57
			193	0	351	79
			273	0	497	82
		HP 14x73	113	0	206	57
			229	0	416	79
			318	0	578	82
HP 14x89	116	0	211	57		
	233	0	423	79		
	388	0	705	84		

Location	Cutoff Elevation (ft)	Pile Type	Factored Resistance Available, $R_F$ (kips)	Geotechnical Losses, $R_{Sdd}$ (kips)	Nominal Required Bearing, $R_N$ (kips)	Estimated Pile Length (ft)
Pier 2 (Ramp E) SB-10	460.5	MS 12"φ w/.25" wall	154	0	280	15
			194	0	353	22
		MS 14"φ w/.25" wall	186	0	337	15
			227	0	413	21
		MS 14"φ w/.312" wall	186	0	337	15
			216	0	392	20
			282	0	513	26
		HP 10x42	99	0	181	48
			129	0	235	53
			134	0	243	61
			184	0	335	66
		HP 12x53	119	0	216	48
			155	0	281	53
			164	0	298	61
			230	0	418	66
		HP 12x63	122	0	222	48
			159	0	289	53
			165	0	301	61
			273	0	497	67
		HP 14x73	144	0	262	48
			188	0	342	53
			198	0	360	61
			318	0	578	67
		HP 14x89	147	0	268	48
193	0		350	53		
200	0		365	61		
388	0		705	69		

Location	Cutoff Elevation (ft)	Pile Type	Factored Resistance Available, $R_F$ (kips)	Geotechnical Losses, $R_{Sdd}$ (kips)	Nominal Required Bearing, $R_N$ (kips)	Estimated Pile Length (ft)
West Abutment Approach Bent SB-11	499.7	MS 12"φ w/.179" wall	100	0	182	23
			140	0	254	29
		MS 12"φ w/.25" wall	100	0	182	23
			194	0	353	42
		MS 14"φ w/.25" wall	125	0	227	23
			227	0	413	40
		MS 14"φ w/.312" wall	125	0	227	23
			282	0	513	47
		HP 10x42	58	0	105	37
			132	0	241	72
			162	0	295	94
			184	0	335	97
		HP 12x53	73	0	133	37
			165	0	300	72
			202	0	367	94
			230	0	418	97
		HP 12x63	74	0	134	37
			167	0	303	72
			204	0	371	94
			273	0	497	101
		HP 14x73	112	0	204	47
			203	0	370	72
			248	0	451	94
			318	0	578	100
HP 14x89	115	0	208	47		
	206	0	374	72		
	251	0	457	94		
	340	0	618	101		
	388	0	705	109		

Location	Cutoff Elevation (ft)	Pile Type	Factored Resistance Available, $R_F$ (kips)	Geotechnical Losses, $R_{Sdd}$ (kips)	Nominal Required Bearing, $R_N$ (kips)	Estimated Pile Length (ft)
West Abutment SB-12	470.0	MS 12"φ w/.179" wall	102	0	186	21
			140	0	254	25
		MS 12"φ w/.25" wall	102	0	186	21
			194	0	353	30
		MS 14"φ w/.25" wall	127	0	230	21
			227	0	413	29
		MS 14"φ w/.312" wall	127	0	230	21
			282	0	513	32
		HP 10x42	90	0	163	62
			115	0	209	67
			184	0	335	71
		HP 12x53	114	0	207	62
			138	0	251	67
			230	0	418	72
		HP 12x63	115	0	210	62
			142	0	259	67
			273	0	497	73
		HP 14x73	110	0	200	52
			140	0	255	62
			168	0	306	67
318	0		578	72		
HP 14x89	112	0	204	52		
	142	0	259	62		
	174	0	316	67		
	388	0	705	76		

Location	Cutoff Elevation (ft)	Pile Type	Factored Resistance Available, $R_F$ (kips)	Geotechnical Losses, $R_{Sdd}$ (kips)	Nominal Required Bearing, $R_N$ (kips)	Estimated Pile Length (ft)
Pier 1 SB-13	462.5	MS 12"φ w/.179" wall	140	0	254	11
		MS 12"φ w/.25" wall	156	0	284	15
			170	0	310	22
			194	0	353	23
		MS 14"φ w/.25" wall	192	0	349	15
			206	0	375	22
			227	0	413	23
		MS 14"φ w/.312" wall	192	0	349	15
			206	0	375	22
			282	0	513	25
		HP 10x42	86	0	156	45
			100	0	182	50
			124	0	225	55
			163	0	297	60
			184	0	335	62
		HP 12x53	82	0	149	35
			120	0	218	50
			148	0	269	55
			195	0	355	60
			230	0	418	62
		HP 12x63	83	0	150	35
			123	0	223	50
			152	0	276	55
			201	0	365	60
			273	0	497	63
		HP 14x73	102	0	185	35
			145	0	264	50
			180	0	326	55
	238	0	432	60		
	318	0	578	63		
HP 14x89	103	0	188	35		
	149	0	270	50		
	183	0	333	55		
	244	0	444	60		
	388	0	705	65		
Pier 2 SB-14	452.5	HP 12x53	230	0	418	65
		HP 12x63	273	0	497	66
		HP 14x73	318	0	578	66
		HP 14x89	388	0	705	68
		HP 14x102	445	0	810	69
		HP 14x117	511	0	929	71



Location	Cutoff Elevation (ft)	Pile Type	Factored Resistance Available, $R_F$ (kips)	Geotechnical Losses, $R_{Sdd}$ (kips)	Nominal Required Bearing, $R_N$ (kips)	Estimated Pile Length (ft)
Pier 3 SB-17	445.0	HP 12x53	227	3	418	55
		HP 12x63	270	3	497	57
		HP 14x73	314	4	578	56
		HP 14x89	384	4	705	58
		HP 14x102	442	4	810	60
		HP 14x117	507	4	929	62
Pier 4 SB-19	438.0	HP 12x53	224	6	418	46
		HP 12x63	267	6	497	48
		HP 14x73	311	7	578	47
		HP 14x89	380	7	705	49
		HP 14x102	438	7	810	51
		HP 14x117	503	7	929	53
Pier 5 SB-22	435.0 (429.0)	HP 12x53	230	0	418	50
		HP 12x63	273	0	497	52
		HP 14x73	318	0	578	51
		HP 14x89	388	0	705	53
		HP 14x102	445	0	810	55
		HP 14x117	511	0	929	57
Pier 6 SB-24	430.5 (423.5)	HP 12x53	230	0	418	47
		HP 12x63	273	0	497	48
		HP 14x73	318	0	578	48
		HP 14x89	388	0	705	50
		HP 14x102	445	0	810	51
		HP 14x117	511	0	929	53
Pier 7 SB-25	429.5 (422.5)	HP 12x53	230	0	418	54
		HP 12x63	273	0	497	55
		HP 14x73	318	0	578	55
		HP 14x89	388	0	705	57
		HP 14x102	445	0	810	58
		HP 14x117	511	0	929	60
Pier 8 SB-26	429.5 (422.5)	HP 12x53	230	0	418	57
		HP 12x63	273	0	497	58
		HP 14x73	318	0	578	58
		HP 14x89	388	0	705	60
		HP 14x102	445	0	810	61
		HP 14x117	511	0	929	63
Pier 9 SB-27	430.0 (423.0)	HP 12x53	230	0	418	50
		HP 12x63	273	0	497	52
		HP 14x73	318	0	578	51
		HP 14x89	388	0	705	53
		HP 14x102	445	0	810	55
		HP 14x117	511	0	929	57

Location	Cutoff Elevation (ft)	Pile Type	Factored Resistance Available, $R_F$ (kips)	Geotechnical Losses, $R_{Sdd}$ (kips)	Nominal Required Bearing, $R_N$ (kips)	Estimated Pile Length (ft)
Pier 10 SB-28	430.0 (423.0)	HP 12x53	230	0	418	50
		HP 12x63	273	0	497	52
		HP 14x73	318	0	578	51
		HP 14x89	388	0	705	53
		HP 14x102	445	0	810	55
		HP 14x117	511	0	929	57
Pier 11 SB-29	430.0 (423.0)	HP 12x53	229	1	418	53
		HP 12x63	272	1	497	54
		HP 14x73	317	1	578	54
		HP 14x89	387	1	705	56
		HP 14x102	444	1	810	58
		HP 14x117	510	1	929	60
Pier 12 SB-31	411.5 (394.5)	HP 14x89	377	11	705	47
		HP 14x102	434	11	810	48
		HP 14x117	500	11	929	50
		HP 18x157	672	14	1247	52
		HP 18x181	776	14	1436	53
		HP 18x204	877	14	1620	55
Pier 13 SB-32	411.5 (396.5)	HP 14x89	384	4	705	52
		HP 14x102	441	4	810	53
		HP 14x117	507	4	929	55
		HP 18x157	681	2	1247	56
		HP 18x181	785	2	1436	58
		HP 18x204	886	2	1620	60
Pier 14 SB-34	421.5 (412.5)	HP 12x53	219	11	418	60
		HP 12x63	263	11	497	62
		HP 14x73	305	11	578	61
		HP 14x89	375	13	705	63
		HP 14x102	433	13	810	65
		HP 14x117	498	13	929	67
Pier 15 SB-35	428.5 (421.5)	HP 12x53	169	61	418	62
		HP 12x63	211	62	497	64
		HP 14x73	245	73	578	63
		HP 14x89	314	74	705	65
		HP 14x102	371	74	810	67
		HP 14x117	436	75	929	69
Pier 16 SB-36	429.5 (423.5)	HP 12x53	226	4	418	60
		HP 12x63	269	4	497	62
		HP 14x73	313	5	578	61
		HP 14x89	383	5	705	63
		HP 14x102	440	5	810	64
		HP 14x117	506	5	929	67

Location	Cutoff Elevation (ft)	Pile Type	Factored Resistance Available, $R_F$ (kips)	Geotechnical Losses, $R_{Sdd}$ (kips)	Nominal Required Bearing, $R_N$ (kips)	Estimated Pile Length (ft)
Pier 17 SB-37	429.5 (422.5)	HP 12x53	224	6	418	63
		HP 12x63	267	6	497	65
		HP 14x73	310	7	578	64
		HP 14x89	380	8	705	66
		HP 14x102	438	8	810	68
		HP 14x117	503	8	929	69
Pier 18 SB-38	429.5 (422.5)	HP 12x53	230	0	418	54
		HP 12x63	273	0	497	56
		HP 14x73	318	0	578	55
		HP 14x89	388	0	705	57
		HP 14x102	445	0	810	59
		HP 14x117	511	0	929	61
Pier 19 SB-39	429.5 (422.5)	HP 12x53	230	0	418	50
		HP 12x63	273	0	497	51
		HP 14x73	318	0	578	51
		HP 14x89	388	0	705	53
		HP 14x102	445	0	810	55
		HP 14x117	511	0	929	56
Pier 20 SB-40	430.0 (423.0)	HP 12x53	230	0	418	46
		HP 12x63	273	0	497	47
		HP 14x73	318	0	578	47
		HP 14x89	388	0	705	49
		HP 14x102	445	0	810	50
		HP 14x117	511	0	929	52
Pier 21 SB-41	430.0 (423.0)	HP 12x53	230	0	418	48
		HP 12x63	273	0	497	50
		HP 14x73	318	0	578	49
		HP 14x89	388	0	705	51
		HP 14x102	445	0	810	53
		HP 14x117	511	4	929	54
Pier 22 SB-42	430.5 (423.5)	HP 12x53	230	4	418	49
		HP 12x63	273	4	497	50
		HP 14x73	318	4	578	50
		HP 14x89	388	5	705	52
		HP 14x102	445	5	810	53
		HP 14x117	511	5	929	55
East Abutment SB-43 No losses	461.2	HP 12x53	230	0	418	77
		HP 12x63	273	0	497	79
		HP 14x73	318	0	578	78
		HP 14x89	388	0	705	80
		HP 14x102	445	0	810	82
		HP 14x117	511	0	929	84

Location	Cutoff Elevation (ft)	Pile Type	Factored Resistance Available, $R_F$ (kips)	Geotechnical Losses, $R_{Sdd}$ (kips)	Nominal Required Bearing, $R_N$ (kips)	Estimated Pile Length (ft)
East Abutment SB-43 Precored to Elev. 442.60	461.2	HP 12x53	176	54	418	78
		HP 12x63	219	54	497	79
		HP 14x73	255	63	578	79
		HP 14x89	324	64	705	81
		HP 14x102	380	65	810	82
		HP 14x117	445	66	929	84

Note: Where a range of values is shown, pile lengths and capacities may be interpolated between the values given. (422.5) = assumed ground elevation when piles are driven (bottom of seal coat)

The pile design table provides two options for pile driving at the East Abutment due to the large magnitude and long duration of settlement expected. If the piles are driven through the new embankment after allowing most of the settlement to occur, there will be no geotechnical losses. This will require monitoring of the embankment settlement during a waiting period of up to 27 months. The piles also may be driven in 18-inch diameter (24-inch diameter for HP14 piles) holes precored through the new embankment without any waiting period. The geotechnical losses provided in the table will develop as the soil below the embankment settles around the piles. Driving piles without precoring and without a waiting period is not recommend due to the severe geotechnical losses that would occur.

At least one test pile should be driven at each pier and at each of the three abutments. Two test piles are recommended at Pier 12 and Pier 13 due to the large number of piles anticipated. Two test piles are recommend at the West Abutment because of the elevation difference between the abutment footing and the approach span support. Thirty test piles are recommended if all substructures will be supported by piles. Pile shoes are not required.

Drilled shafts are a viable foundation alternative at the river piers and may be economical if lateral loads control design of the foundation. Considering only axial loads, drilled shafts are not cost-effective compared to driven piles. Shafts drilled in the river will require permanent casing set into bedrock and a rock socket diameter 6 in smaller than the shaft diameter. For axial resistance, the shafts should extend at least 2 ft into the shale bedrock and have a center-to-center spacing not less than two times the rock socket diameter. Table 9.3 lists preliminary design parameters for axial resistance of 6 ft to 12 ft diameter drilled shafts. Table 9.4 lists the top of bedrock elevation for each pier. Unit tip resistance is influenced by the rock socket diameter and the rock strata that are present below the bearing elevation. The tip resistances provided in the table are conservative values considering a range of likely shaft sizes. If drilled shafts are used, the axial capacities should be determined during final design using the actual shaft size, bearing elevation, and loadings.

**Table 9.3 Drilled Shaft Axial Design Parameters, Piers 7 - 22**

Elevation	Factored Unit Side Resistance (ksf)	Factored Unit Tip Resistance (ksf)
- 383.0	4.2	40
383.0 - 374.0	4.2	80
374.0 - 364.0	15.0	80
364.0 -	6.6	80

**Table 9.4 Bedrock Elevation**

	Pier 7	Pier 8	Pier 9	Pier 10	Pier 11	Pier 12	Pier 13	Pier 14
Bedrock Elevation	372.1	374.7	384.2	384.8	382.3	373.0	368.5	364.6

	Pier 15	Pier 16	Pier 17	Pier 18	Pier 19	Pier 20	Pier 21	Pier 22
Bedrock Elevation	368.3	374.1	369.5	378.3	384.3	388.8	387.3	386.8

It is anticipated that at least some of the required lateral resistance for the bridge will be provided by soil-structure interaction. The structure designer should evaluate lateral resistance based on both soil and structure properties. Soil parameters for generating P-y curves with the LPILE computer program are given in Table 9.5. The LPILE analyses should consider factored axial and factored lateral loads on the foundations. The P-multipliers in AASHTO Table 10.7.2.4-1 should be used in the analyses.

**Table 9.5 LPILE Parameters**

<b>South Abutment (Boring SB-08)</b>									
Elevation	LPILE Soil Type	$\gamma'$ (pcf)	c (psf)	$\phi$ (°)	$q_u$ (psi)	RQD	$E_{mass}$ (psi)	$k_{rm}$	
- 488.4	Sand (Reese)	120		30					
488.4 - 480.9	Sand (Reese)	125		34					
480.9 - 470.9	Sand (Reese)	125		37					
470.9 - 459.5	Sand (Reese)	120		30					
459.5 - 405.0	Sand (Reese)	58		30					
405.0 - 397.1	Stiff Clay w/o Free Water	58	2,000						
397.1 - 392.2	Sand (Reese)	58		30					
392.2 -	Weak Rock (Reese)	78			180	100	50,000	0.0001	

<b>Pier 1 Ramp E (Boring SB-09)</b>									
Elevation	LPILE Soil Type	$\gamma'$ (pcf)	c (psf)	$\phi$ (°)	$q_u$ (psi)	RQD	$E_{mass}$ (psi)	$k_{rm}$	
- 459.5	Sand (Reese)	122		32					
459.5 - 419.4	Sand (Reese)	60		32					
419.4 - 399.4	Sand (Reese)	63		35					
399.4 - 393.7	Stiff Clay w/o Free Water	63	3,500						
393.7 -	Weak Rock (Reese)	78			180	100	50,000	0.0001	

<b>Pier 2 Ramp E (Boring SB-10)</b>									
Elevation	LPILE Soil Type	$\gamma'$ (pcf)	c (psf)	$\phi$ (°)	$q_u$ (psi)	RQD	$E_{mass}$ (psi)	$k_{rm}$	
- 459.5	Sand (Reese)	122		32					
459.5 - 432.2	Sand (Reese)	60		32					
432.2 - 417.2	Sand (Reese)	62		34					
417.2 - 415.2	Stiff Clay w/o Free Water	63	3,500						
415.2 - 400.0	Sand (Reese)	63		39					
400.0 - 396.0	Stiff Clay w/o Free Water	63	2,400						
396.0 -	Weak Rock (Reese)	78			180	13	50,000	0.0001	

**West Abutment (Boring SB-11)**

Elevation	LPILE Soil Type	$\gamma'$ (pcf)	c (psf)	$\phi$ (°)	$q_u$ (psi)	RQD	$E_{mass}$ (psi)	$k_{rm}$
- 496.4	Sand (Reese)	120		30				
496.4 - 493.9	Stiff Clay w/o Free Water	120	2,500					
493.9 - 488.9	Sand (Reese)	121		31				
488.9 - 478.9	Stiff Clay w/o Free Water	115	1,600					
478.9 - 462.7	Sand (Reese)	122		32				
462.7 - 437.7	Sand (Reese)	60		32				
437.7 - 405.4	Sand (Reese)	60		30				
405.4 - 402.7	Stiff Clay w/o Free Water	63	5,400					
402.7 - 398.7	Sand (Reese)	60		32				
398.7 - 392.2	Sand (Reese)	63		38				
392.2 -	Weak Rock (Reese)	78			180	97	50,000	0.0001

**West Abutment (Boring SB-12)**

Elevation	LPILE Soil Type	$\gamma'$ (pcf)	c (psf)	$\phi$ (°)	$q_u$ (psi)	RQD	$E_{mass}$ (psi)	$k_{rm}$
- 459.5	Sand (Reese)	125		34				
459.5 - 454.4	Sand (Reese)	60		32				
454.4 - 438.1	Sand (Reese)	62		34				
438.1 - 418.1	Sand (Reese)	62		34				
418.1 - 403.1	Sand (Reese)	60		32				
403.1 - 392.9	Sand (Reese)	63		40				
392.9 - 389.9	Stiff Clay w/o Free Water	63	3,500					
389.9 -	Weak Rock (Reese)	78			180	83	50,000	0.0001

**Pier 1 (Boring SB-13)**

Elevation	LPILE Soil Type	$\gamma'$ (pcf)	c (psf)	$\phi$ (°)	$q_u$ (psi)	RQD	$E_{mass}$ (psi)	$k_{rm}$
- 457.8	Sand (Reese)	125		40				
457.8 - 437.8	Sand (Reese)	60		32				
437.8 - 407.8	Sand (Reese)	63		36				
407.8 - 390.8	Sand (Reese)	63		40				
390.8 -	Weak Rock (Reese)	78			180	65	50,000	0.0001

**Pier 2 (Borings SB-14, SB-15 & SB-16)**

Elevation	LPILE Soil Type	$\gamma'$ (pcf)	c (psf)	$\phi$ (°)	$q_u$ (psi)	RQD	$E_{mass}$ (psi)	$k_{rm}$
- 448.7	Sand (Reese)	63		38				
448.7 - 436.2	Sand (Reese)	60		32				
436.2 - 431.2	Sand (Reese)	63		36				
431.2 - 413.7	Sand (Reese)	58		30				
413.7 - 402.5	Sand (Reese)	63		37				
402.5 - 392.7	Stiff Clay w/o Free Water	63	4,000					
392.7 -	Weak Rock (Reese)	78			180	100	50,000	0.0001

**Pier 3 (Borings SB-17 & SB-18)**

Elevation	LPILE Soil Type	$\gamma'$ (pcf)	c (psf)	$\phi$ (°)	$q_u$ (psi)	RQD	$E_{mass}$ (psi)	$k_{rm}$
- 416.3	Sand (Reese)	59		31				
416.3 - 399.0	Sand (Reese)	60		32				
399.0 - 394.3	Stiff Clay w/o Free Water	63	3,000					
394.3 -	Weak Rock (Reese)	78			180	90	50,000	0.0001

**Pier 4 (Borings SB-19 & SB-20)**

Elevation	LPILE Soil Type	$\gamma'$ (pcf)	c (psf)	$\phi$ (°)	$q_u$ (psi)	RQD	$E_{mass}$ (psi)	$k_{rm}$
- 429.6	Stiff Clay w/o Free Water	48	1,000					
429.6 - 403.4	Sand (Reese)	58		30				
403.4 - 398.1	Sand (Reese)	62		34				
398.1 - 393.1	Stiff Clay w/o Free Water	62	4,500					
393.1 -	Weak Rock (Reese)	78			180	90	50,000	0.0001

**Pier 5 (Borings SB-21 & SB-22)**

Elevation	LPILE Soil Type	$\gamma'$ (pcf)	c (psf)	$\phi$ (°)	$q_u$ (psi)	RQD	$E_{mass}$ (psi)	$k_{rm}$
- 431.2	Soft Clay (Matlock)	48	600					
431.2 - 425.0	Sand (Reese)	53		27				
425.0 - 423.7	Sand (Reese)	60		32				
423.7 - 418.7	Stiff Clay w/o Free Water	58	2,500					
418.7 - 407.5	Sand (Reese)	58		30				
407.5 - 391.2	Sand (Reese)	63		36				
388.4 -	Weak Rock (Reese)	78			180	90	50,000	0.0001

**Pier 6 (Borings SB-23 & SB-24)**

Elevation	LPILE Soil Type	$\gamma'$ (pcf)	c (psf)	$\phi$ (°)	$q_u$ (psi)	RQD	$E_{mass}$ (psi)	$k_{rm}$
- 424.3	Soft Clay (Matlock)	48	400					
424.3 - 411.5	Sand (Reese)	63		36				
411.5 - 387.3	Stiff Clay w/o Free Water	58	2,700					
387.3 -	Weak Rock (Reese)	78			180	60	50,000	0.0001

**Pier 7 (Boring SB-25)**

Elevation	LPILE Soil Type	$\gamma'$ (pcf)	c (psf)	$\phi$ (°)	$q_u$ (psi)	RQD	$E_{mass}$ (psi)	$k_{rm}$
- 423.5	Soft Clay (Matlock)	53	600					
423.5 - 414.5	Sand (Reese)	61		33				
414.5 - 410.2	Sand (Reese)	63		36				
410.2 - 407.5	Sand (Reese)	58		30				
407.5 - 393.2	Sand (Reese)	63		39				
393.2 - 377.0	Stiff Clay w/o Free Water	68	4,500					
377.0 -	Weak Rock (Reese)	78			180	90	50,000	0.0001

**Pier 8 (Boring SB-26)**

Elevation	LPILE Soil Type	$\gamma'$ (pcf)	c (psf)	$\phi$ (°)	$q_u$ (psi)	RQD	$E_{mass}$ (psi)	$k_{rm}$
- 421.2	Soft Clay (Matlock)	53	400					
421.2 - 411.2	Sand (Reese)	63		38				
411.2 - 399.9	Sand (Reese)	63		40				
399.9 - 374.7	Sand (Reese)	63		37				
374.7 -	Strong Rock	78			1,400			

**Pier 9 (Boring SB-27)**

Elevation	LPILE Soil Type	$\gamma'$ (pcf)	c (psf)	$\phi$ (°)	$q_u$ (psi)	RQD	$E_{mass}$ (psi)	$k_{rm}$
- 404.7	Soft Clay (Matlock)	53	500					
404.7 - 399.9	Sand (Reese)	63		40				
399.9 - 384.2	Sand (Reese)	63		36				
384.2 -	Weak Rock (Reese)	78			180	87	50,000	0.0001

**Pier 10 (Boring SB-28)**

Elevation	LPILE Soil Type	$\gamma'$ (pcf)	c (psf)	$\phi$ (°)	$q_u$ (psi)	RQD	$E_{mass}$ (psi)	$k_{rm}$
- 423.8	Soft Clay (Matlock)	48	200					
423.8 - 396.8	Soft Clay (Matlock)	53	500					
396.8 - 384.8	Sand (Reese)	60		32				
384.8 -	Weak Rock (Reese)	78			180	90	50,000	0.0001

**Pier 11 (Boring SB-29)**

Elevation	LPILE Soil Type	$\gamma'$ (pcf)	c (psf)	$\phi$ (°)	$q_u$ (psi)	RQD	$E_{mass}$ (psi)	$k_{rm}$
- 411.3	Soft Clay (Matlock)	48	200					
411.3 - 408.8	Sand (Reese)	54		28				
408.8 - 405.0	Sand (Reese)	58		30				
405.0 - 385.0	Soft Clay (Matlock)	48	200					
385.0 - 382.3	Sand (Reese)	62		34				
382.3 -	Weak Rock (Reese)	78			180	90	50,000	0.0001

**Pier 12 (Borings SB-30 & SB-31)**

Elevation	LPILE Soil Type	$\gamma'$ (pcf)	c (psf)	$\phi$ (°)	$q_u$ (psi)	RQD	$E_{mass}$ (psi)	$k_{rm}$
- 404.8	Soft Clay (Matlock)	48	200					
404.8 - 399.8	Sand (Reese)	58		29				
399.8 - 376.8	Soft Clay (Matlock)	50	500					
376.8 - 373.0	Sand (Reese)	63		38				
373.0 -	Strong Rock	78			1,400			

**Pier 13 (Borings SB-32 & SB-33)**

Elevation	LPILE Soil Type	$\gamma'$ (pcf)	c (psf)	$\phi$ (°)	$q_u$ (psi)	RQD	$E_{mass}$ (psi)	$k_{rm}$
- 407.1	Sand (Reese)	54		28				
407.1 - 373.3	Soft Clay (Matlock)	48	200					
373.3 - 368.1	Sand (Reese)	63		38				
368.1 -	Strong Rock	78			1,400			



**Pier 14 (Boring SB-34)**

Elevation	LPILE Soil Type	$\gamma'$ (pcf)	c (psf)	$\phi$ (°)	$q_u$ (psi)	RQD	$E_{mass}$ (psi)	$k_{rm}$
- 405.3	Sand (Reese)	53		27				
405.3 - 382.8	Soft Clay (Matlock)	48	200					
382.8 - 363.5	Sand (Reese)	63		39				
363.5 -	Strong Rock	78			1,400			

**Pier 15 (Boring SB-35)**

Elevation	LPILE Soil Type	$\gamma'$ (pcf)	c (psf)	$\phi$ (°)	$q_u$ (psi)	RQD	$E_{mass}$ (psi)	$k_{rm}$
- 420.6	Soft Clay (Matlock)	48	200					
420.6 - 412.1	Sand (Reese)	53		27				
412.1 - 407.1	Soft Clay (Matlock)	48	200					
407.1 - 402.6	Stiff Clay w/o Free Water	52	1,000					
402.6 - 393.1	Sand (Reese)	63		39				
393.1 - 372.1	Soft Clay (Matlock)	48	200					
372.1 - 366.6	Sand (Reese)	63		40				
366.6 -	Strong Rock	78			1,400			

**Pier 16 (Boring SB-36)**

Elevation	LPILE Soil Type	$\gamma'$ (pcf)	c (psf)	$\phi$ (°)	$q_u$ (psi)	RQD	$E_{mass}$ (psi)	$k_{rm}$
430.0 - 410.3	Soft Clay (Matlock)	48	200					
410.3 - 407.8	Sand (Reese)	53		27				
407.8 - 404.3	Soft Clay (Matlock)	48	200					
404.3 - 398.3	Sand (Reese)	63		38				
398.3 - 376.8	Soft Clay (Matlock)	48	300					
376.8 - 374.1	Sand (Reese)	62		34				
374.1 -	Strong Rock	78			1,400			

**Pier 17 (Boring SB-37)**

Elevation	LPILE Soil Type	$\gamma'$ (pcf)	c (psf)	$\phi$ (°)	$q_u$ (psi)	RQD	$E_{mass}$ (psi)	$k_{rm}$
- 404.3	Soft Clay (Matlock)	48	300					
404.3 - 399.3	Sand (Reese)	62		34				
399.3 - 376.0	Soft Clay (Matlock)	48	400					
376.0 - 369.5	Sand (Reese)	63		39				
369.5 -	Strong Rock	78			1,400			

**Pier 18 (Boring SB-38)**

Elevation	LPILE Soil Type	$\gamma'$ (pcf)	c (psf)	$\phi$ (°)	$q_u$ (psi)	RQD	$E_{mass}$ (psi)	$k_{rm}$
- 417.5	Soft Clay (Matlock)	48	200					
417.5 - 410.0	Sand (Reese)	58		30				
410.0 - 405.0	Soft Clay (Matlock)	48	100					
405.0 - 378.3	Sand (Reese)	63		38				
378.3 -	Strong Rock	78			1,400			

**Pier 19 (Boring SB-39)**

Elevation	LPILE Soil Type	$\gamma'$ (pcf)	c (psf)	$\phi$ (°)	$q_u$ (psi)	RQD	$E_{mass}$ (psi)	$k_{rm}$
- 423.3	Sand (Reese)	53		27				
423.3 - 418.3	Soft Clay (Matlock)	48	200					
418.3 - 410.0	Sand (Reese)	58		30				
410.0 - 402.0	Soft Clay (Matlock)	48	200					
402.0 - 384.3	Sand (Reese)	63		38				
384.3 -	Weak Rock (Reese)	78			180	81	50,000	0.0001

**Pier 20 (Boring SB-40)**

Elevation	LPILE Soil Type	$\gamma'$ (pcf)	c (psf)	$\phi$ (°)	$q_u$ (psi)	RQD	$E_{mass}$ (psi)	$k_{rm}$
- 430.4	Soft Clay (Matlock)	48	200					
430.4 - 425.0	Sand (Reese)	53		27				
425.0 - 414.5	Sand (Reese)	56		29				
414.5 - 412.0	Sand (Reese)	53		27				
412.0 - 398.3	Soft Clay (Matlock)	48	200					
398.3 - 388.8	Sand (Reese)	62		36				
388.8 -	Weak Rock (Reese)	78			180	90	50,000	0.0001

**Pier 21 (Boring SB-41)**

Elevation	LPILE Soil Type	$\gamma'$ (pcf)	c (psf)	$\phi$ (°)	$q_u$ (psi)	RQD	$E_{mass}$ (psi)	$k_{rm}$
- 419.3	Soft Clay (Matlock)	84	200					
419.3 - 409.3	Sand (Reese)	53		27				
409.3 - 393.1	Soft Clay (Matlock)	48	300					
393.1 - 387.3	Sand (Reese)	63		36				
387.3 -	Weak Rock (Reese)	78			180	90	50,000	0.0001

**Pier 22 (Boring SB-42)**

Elevation	LPILE Soil Type	$\gamma'$ (pcf)	c (psf)	$\phi$ (°)	$q_u$ (psi)	RQD	$E_{mass}$ (psi)	$k_{rm}$
- 424.3	Soft Clay (Matlock)	48	200					
424.3 - 421.8	Sand (Reese)	58		30				
421.8 - 406.8	Soft Clay (Matlock)	48	400					
406.8 - 398.1	Sand (Reese)	58		30				
398.1 - 391.8	Soft Clay (Matlock)	48	200					
391.8 - 386.8	Sand (Reese)	63		36				
386.8 -	Weak Rock (Reese)	78			180	90	50,000	0.0001

**East Abutment (Boring SB-43)**

Elevation	LPILE Soil Type	$\gamma'$ (pcf)	c (psf)	$\phi$ (°)	$q_u$ (psi)	RQD	$E_{mass}$ (psi)	$k_{rm}$
460.2 - 443.1	Stiff Clay w/o Free Water	120	1,000					
443.1 - 427.6	Soft Clay (Matlock)	50	500					
427.6 - 421.3	Sand (Reese)	53		27				
421.3 - 417.6	Soft Clay (Matlock)	48	400					
417.6 - 415.1	Sand (Reese)	54		28				
415.1 - 411.4	Soft Clay (Matlock)	48	300					
411.4 - 388.6	Sand (Reese)	58		30				
388.6 -	Weak Rock (Reese)	78			180	68	50,000	0.0001

The bridge is located in a region of relatively low seismic loading. The soil column to a depth of 100 feet was evaluated at every substructure in accordance with the LRFD Soil Site Class Definition Design Guide. The soil column varies significantly along the structure. Near the main river channel, the profile is indicative of Site Class E due to the thick deposits of soft sediment. Conditions improve to Site Class D or C within the shallower parts of the river and on the river banks. In accordance with IDOT policy for long bridges, this structure should either be designed for the softest site class determined or the site class within each unit. After discussions with the bridge designer and IDOT BBS Foundations and Geotechnical Unit, it was decided that design would be based on the site class within each unit. The site class was determined by the procedure in the design guide, assuming that each unit is an independent structure. The site class for each of the nine units is indicated in Table 9.6.

Due to the importance of this bridge, seismic design will be based on a 2,500-year return period earthquake instead of the 1,000-year return period specified in the AASHTO LRFD Bridge Design Specifications. The design response spectrum was determined from the risk-targeted maximum considered earthquake (MCE<sub>R</sub>) ground motion in the 2009 NEHRP Recommend Seismic Provisions. Seismic design parameters are listed in Table 9.6. Based on these seismic parameters, the bridge should be assigned to Seismic Performance Zone 2. IDOT policy does not require liquefaction analyses for bridges in Seismic Performance Zone 2 with A<sub>S</sub> less than 0.15g.

**Table 9.6 Seismic Design Parameters**

Site Class C – Unit 3			Site Class D – Units E, 1, 2, 4 & 8			Site Class E – Units 5, 6 & 7		
PGA = 0.067		A <sub>S</sub> = 0.069		A <sub>S</sub> = 0.092		A <sub>S</sub> = 0.14		
S <sub>S</sub> = 0.143	F <sub>a</sub> = 1.2	S <sub>DS</sub> = 0.17	F <sub>a</sub> = 1.6	S <sub>DS</sub> = 0.23		F <sub>a</sub> = 2.5	S <sub>DS</sub> = 0.36	
S <sub>1</sub> = 0.079	F <sub>v</sub> = 1.7	S <sub>D1</sub> = 0.13	F <sub>v</sub> = 2.4	S <sub>D1</sub> = 0.19		F <sub>v</sub> = 3.5	S <sub>D1</sub> = 0.28	

It is recommended that the embankment fill at the East Abutment be placed in stages to mitigate the risk of a slope failure. A minimum of two settlement platforms should be installed in the embankment subgrade. Estimated total settlement at the tallest point of embankment is 13 inches. Fill should be placed up to Elev. 460.0 while monitoring the settlement. The subgrade should be allowed to consolidate for 270 days with an estimated settlement of 7 inches before placing additional fill. The second and final stage may then be placed. Settlement monitoring should continue until the bridge abutment and pavement can be constructed. If the piles are designed for the geotechnical losses and driven through precored holes, no waiting period is required before driving piles and constructing the abutment. After another 270 day waiting period with an additional estimated settlement of 5 inches, the final shaping and placement of the pavement may be completed.

In order for the embankment height to be stable, a minimum shear strength of 650 psf is required in the subsurface soils. A boring may be drilled after the required consolidation time has passed in order to determine if Stage 2 can be constructed with an adequate factor of safety against slope failure.

Wick drains may be installed at an estimated cost of \$50,000 to reduce the stage settlement times from 270 days to 90 days each. With the currently proposed construction schedule, accelerated embankment construction is not necessary, so the use of wick drains is not recommended due to their cost. If the schedule changes and accelerated construction is required, a final wick drain design should be completed in Phase II.

Settlement due to the widened embankment will induce drag loading on two of the existing bridge’s piles. The existing H-piles were driven to bedrock, so they will have excess geotechnical capacity and are unlikely to settle. It is recommended that settlement monitoring points be installed on the south edge of the existing abutment and

the south edge of the existing approach slab. These points should be monitored on the same frequency as the settlement platforms. Cracking or differential movement of the existing approach slab may occur.

The approach slab support at the South Abutment and East Abutment will be according to the current IDOT standard. The approach slab support for the West Abutment will be a special design that will also support the approach slab of SN 072-0250. The approach footings will bear on compacted embankment material with an assumed factored bearing resistance of 2.5 ksf. No special subgrade treatment is required.

## 10. Construction Considerations

Piers within the Illinois River will need cofferdams in order to construct the pier footings and pier walls. IDOT policy requires that Type 1 Cofferdams be specified at any location where the ground elevation is below the Estimated Water Surface Elevation (EWSE) or reasonable pumping efforts cannot be assumed to keep the excavation dry. Type 2 Cofferdams, which require a contractor design submittal and typically include a seal coat, are specified at any location where the bottom of footing is more than six feet below the EWSE. The EWSE for this bridge is Elev. 443.50, so a Cofferdam (Type 2) is required at any pier where the bottom of footing is lower than Elev. 437.50. The Cofferdam Design Water Elevation (CDWE) should be Elev. 446.50 as per IDOT policy.

With the current estimated bottom of footing elevations, Cofferdam (Type 2), in accordance with the 2017 Supplemental Specifications, should be specified at Piers 4 through 11 and 16 through 22. Cofferdam (Type 1) should be specified at Pier 3 because the footing is below the EWSE and the bearing stratum is highly permeable sandy gravel to gravelly sand. The final plans should include an estimated seal coat thickness and volume for each Type 2 Cofferdam. For final plans and contract quantities, Type 1 Cofferdams may be assumed to have no seal coat. Piers 12 through 15 cannot utilize conventional cofferdams because the footings are elevated above the riverbed.

Temporary excavations to construct footings for the West Abutment and Pier 1 (Ramp E) will be very close to the Tazewell and Peoria Railroad's right-of-way. With the currently estimated footing elevation and size, it appears that temporary laid back slopes are feasible within the highway right-of-way. Temporary excavation support still may be required if the nearest track is active during construction. This temporary support, if required, should be a Temporary Soil Retention System in accordance with Article 522.07 of the Standard Specifications.

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## Appendix

Bridge General Plan and Elevation Drawings

Boring Location Plan

Subsurface Data Profile

Boring Logs

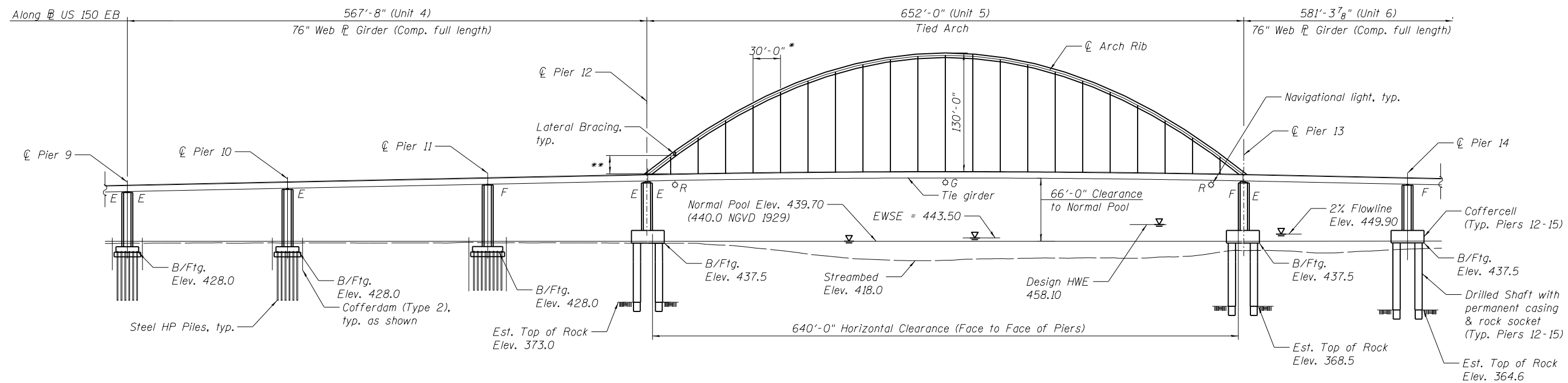
Rock Core Photographs

Soils Laboratory Test Results

Summary of Slope Stability Analyses

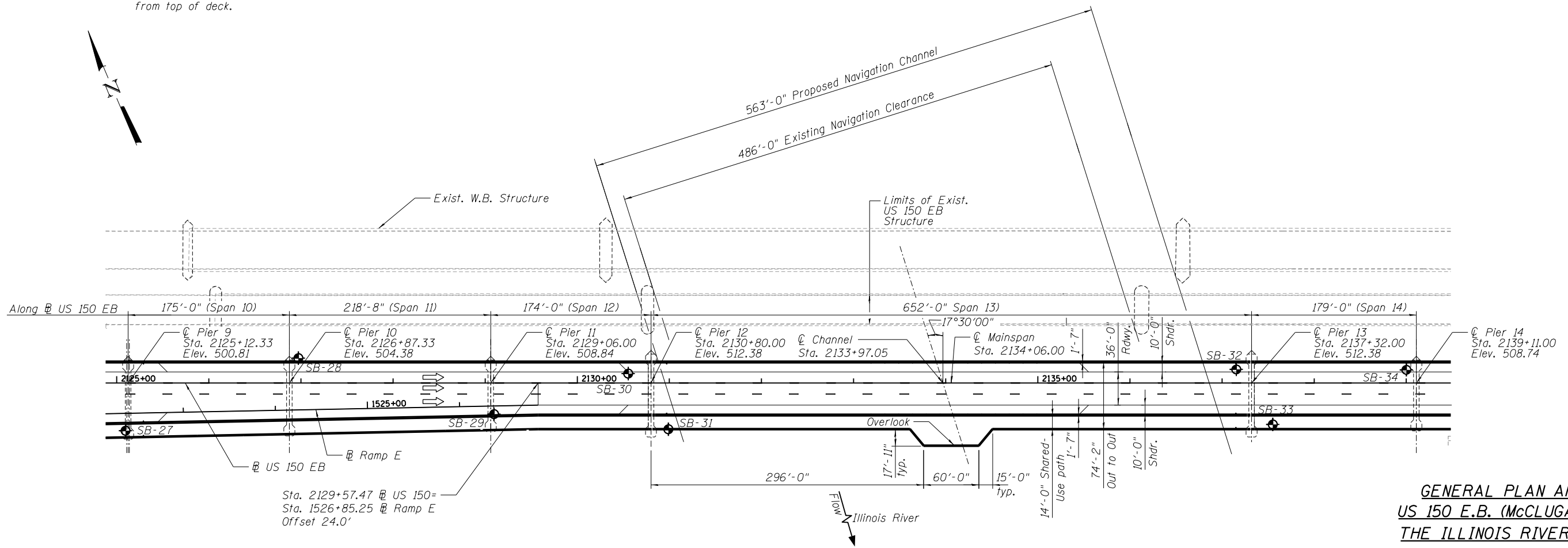
Summary of Foundation Type Study





**ELEVATION**

\* Hanger spacing, subject to refinement during design  
 \*\* 17'-3" min. Vertical Clearance to lateral bracing from top of deck.



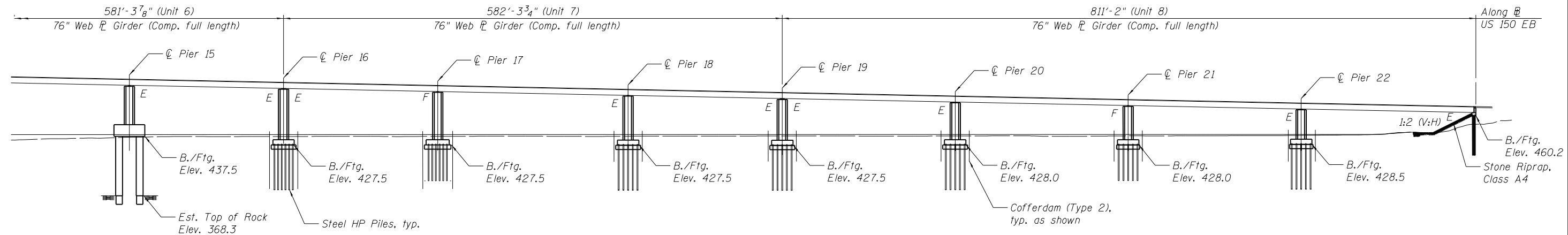
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**GENERAL PLAN AND ELEVATION-2  
 US 150 E.B. (McCLUGAGE BRIDGE) OVER  
 THE ILLINOIS RIVER (PUBLIC WATERS)  
 F.A.P. 317 - SECTION (15B) BR  
 PEORIA/TAZEWELL COUNTIES  
 STATION 2134+06.00  
 STRUCTURE NO. 090-0180**

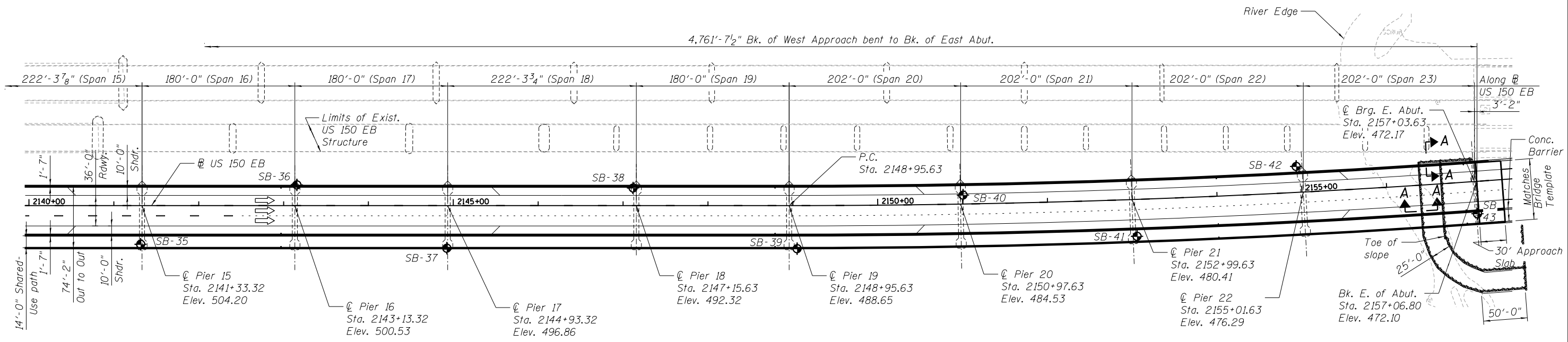
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**ELEVATION**



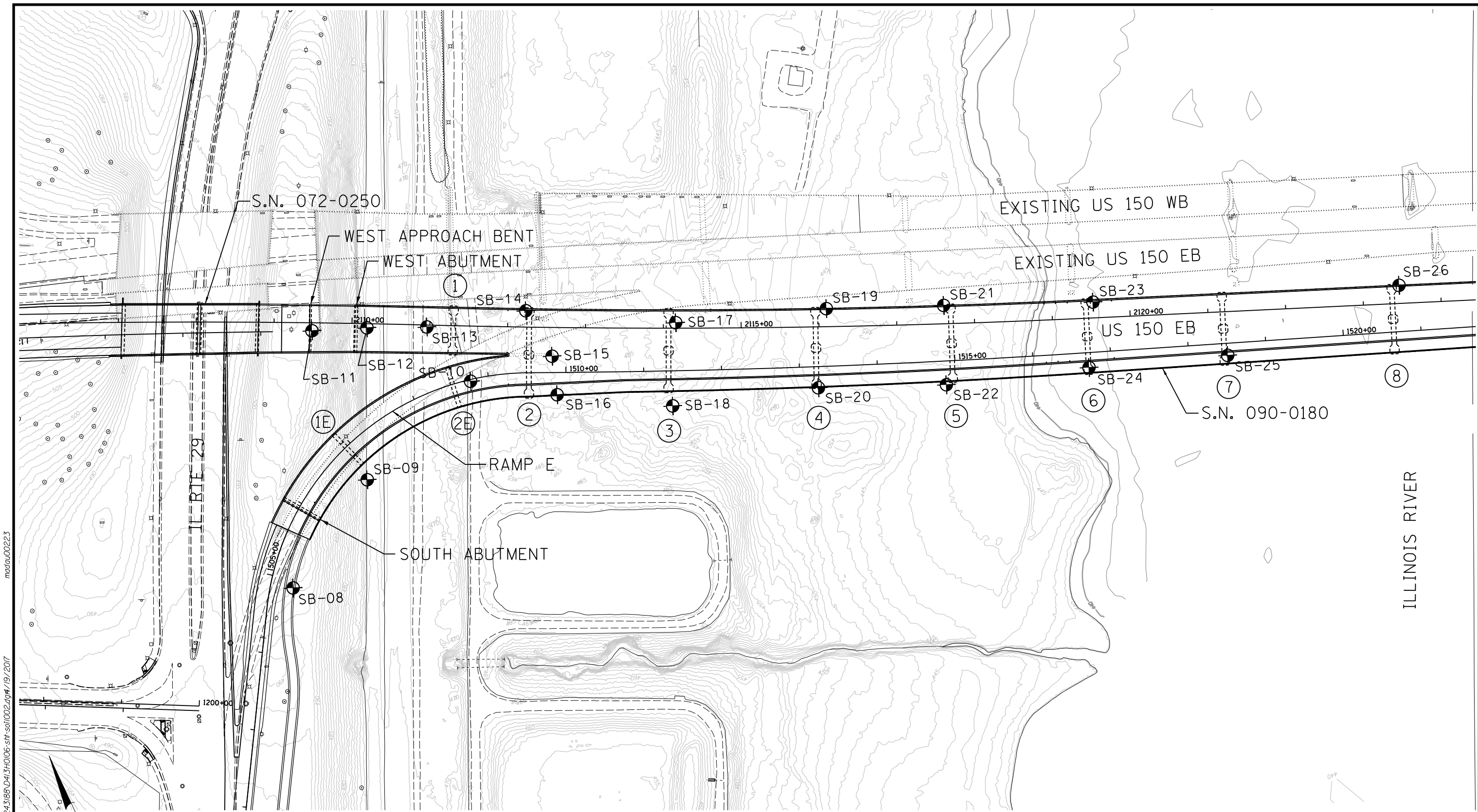
**PLAN**

**GENERAL PLAN AND ELEVATION-3  
 US 150 E.B. (McCLUGAGE BRIDGE) OVER  
 THE ILLINOIS RIVER (PUBLIC WATERS)  
 F.A.P. 317 - SECTION (15B) BR  
 PEORIA/TAZEWELL COUNTIES  
 STATION 2134+06.00  
 STRUCTURE NO. 090-0180**

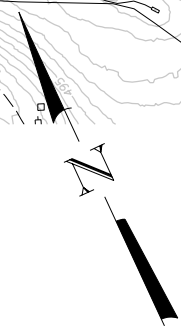
Note:  
 For Sections A-A, see sheet 11 of 11.

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	CHECKED - PDF DATE - 1/2/18	REVISED - REVISED -			317      15B(BR)      PEORIA/TAZEWELL      11      4
	CONTRACT NO. TBD				ILLINOIS FED. AID PROJECT



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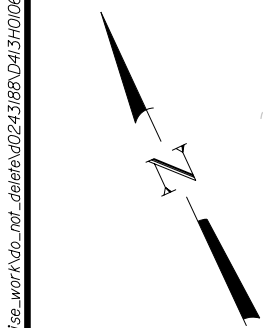
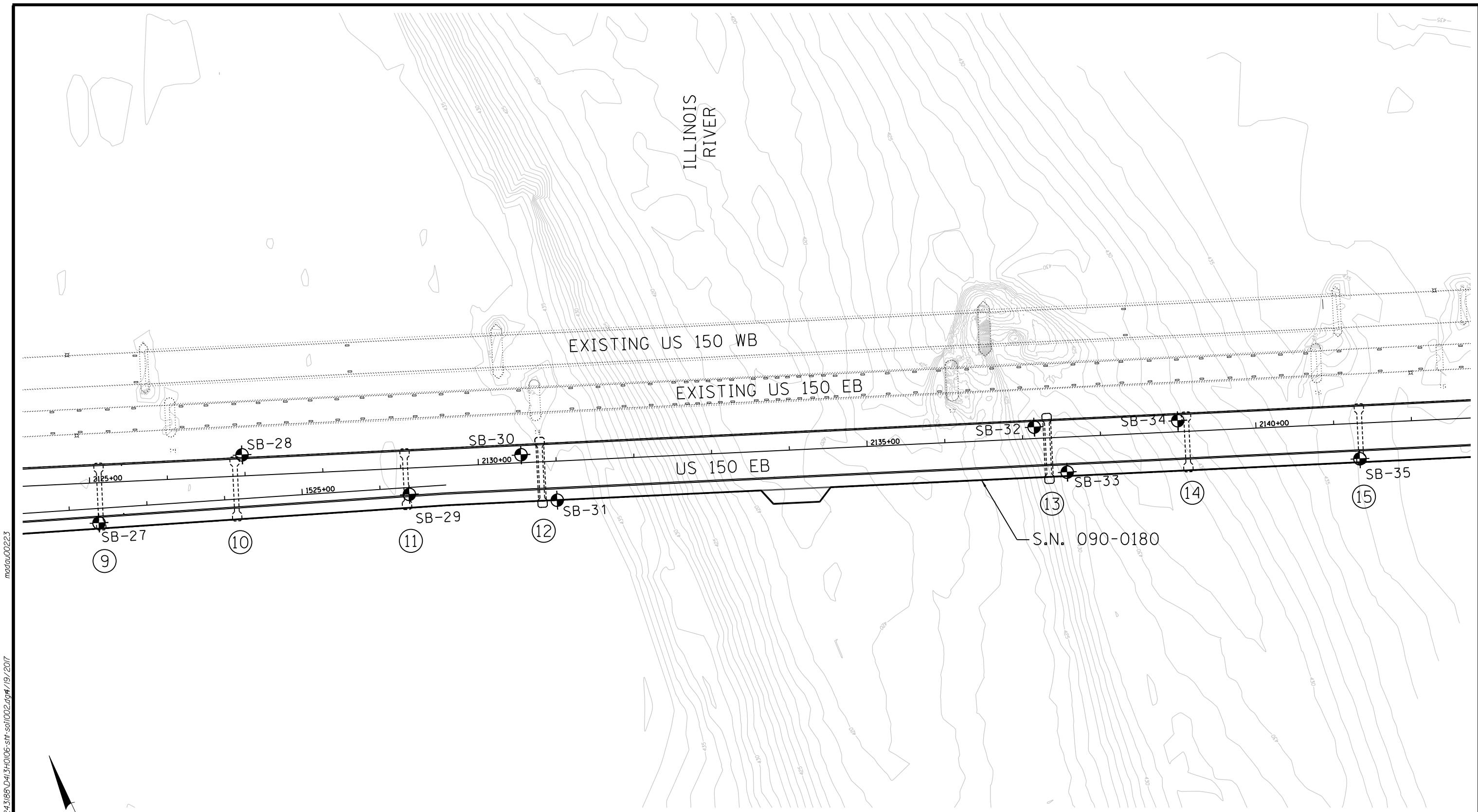
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- SB-09 SOIL BORING LOCATION
  - ② PIER NUMBER



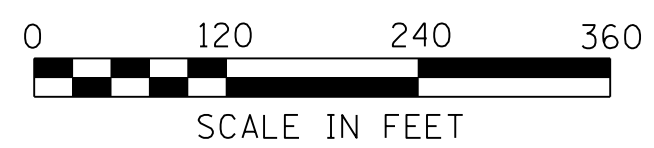
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<b>BORING LOCATION PLAN</b>	
U.S. 150 OVER ILLINOIS RIVER S.N. 090-0180 TAZEWELL COUNTY, ILLINOIS	
13H0106	04/19/17

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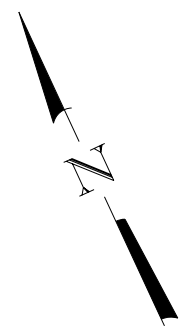
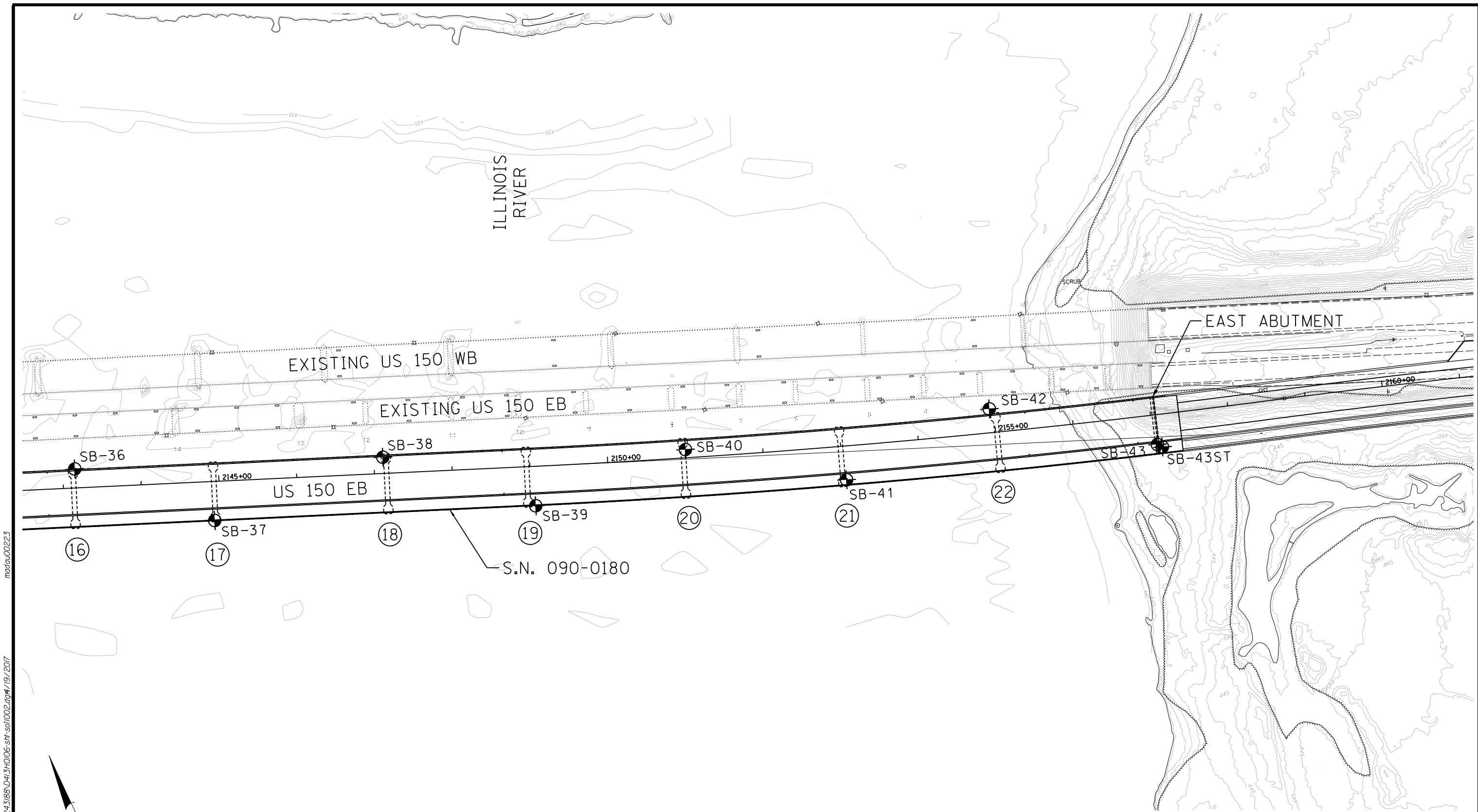
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<b>BORING LOCATION PLAN</b>	
U.S. 150 OVER ILLINOIS RIVER S.N. 090-0180 TAZEWELL COUNTY, ILLINOIS	
13H0106	04/19/17

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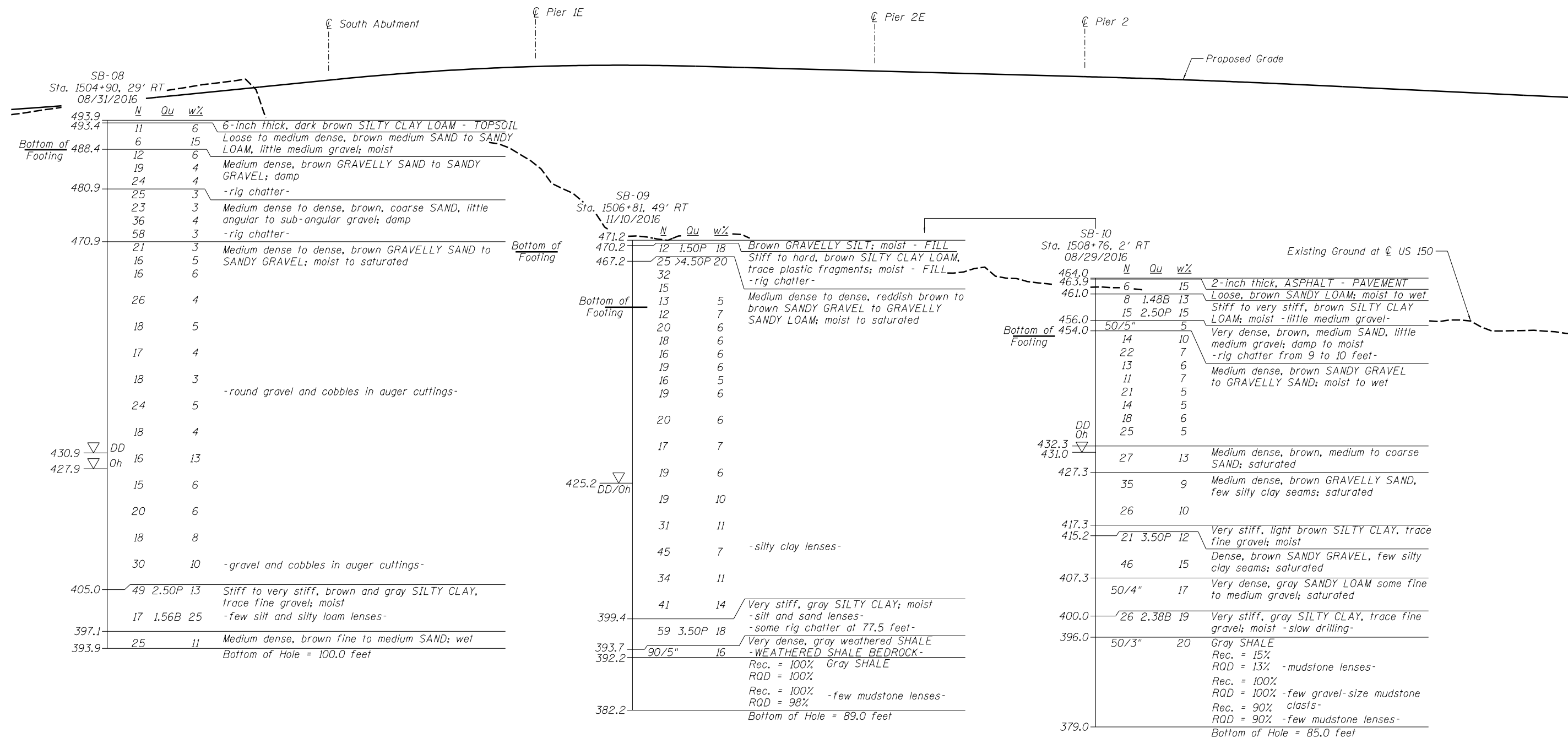


**LEGEND**  
 ● SB-36 SOIL BORING LOCATION  
 (17) PIER NUMBER



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<b>BORING LOCATION PLAN</b>	
U.S. 150 OVER ILLINOIS RIVER S.N. 090-0180 TAZEVELL COUNTY, ILLINOIS	
13H0106	04/19/17



**LEGEND**

N Standard Penetration Test N (blows/ft)

Qu Unconfined Strength (tsf)

w% Natural Moisture Content (%)

DD Water Surface Elevation Encountered in Boring

432.28 DD = during drilling

Oh = at completion

24h = 24 hours after completion

233M Modified SPT

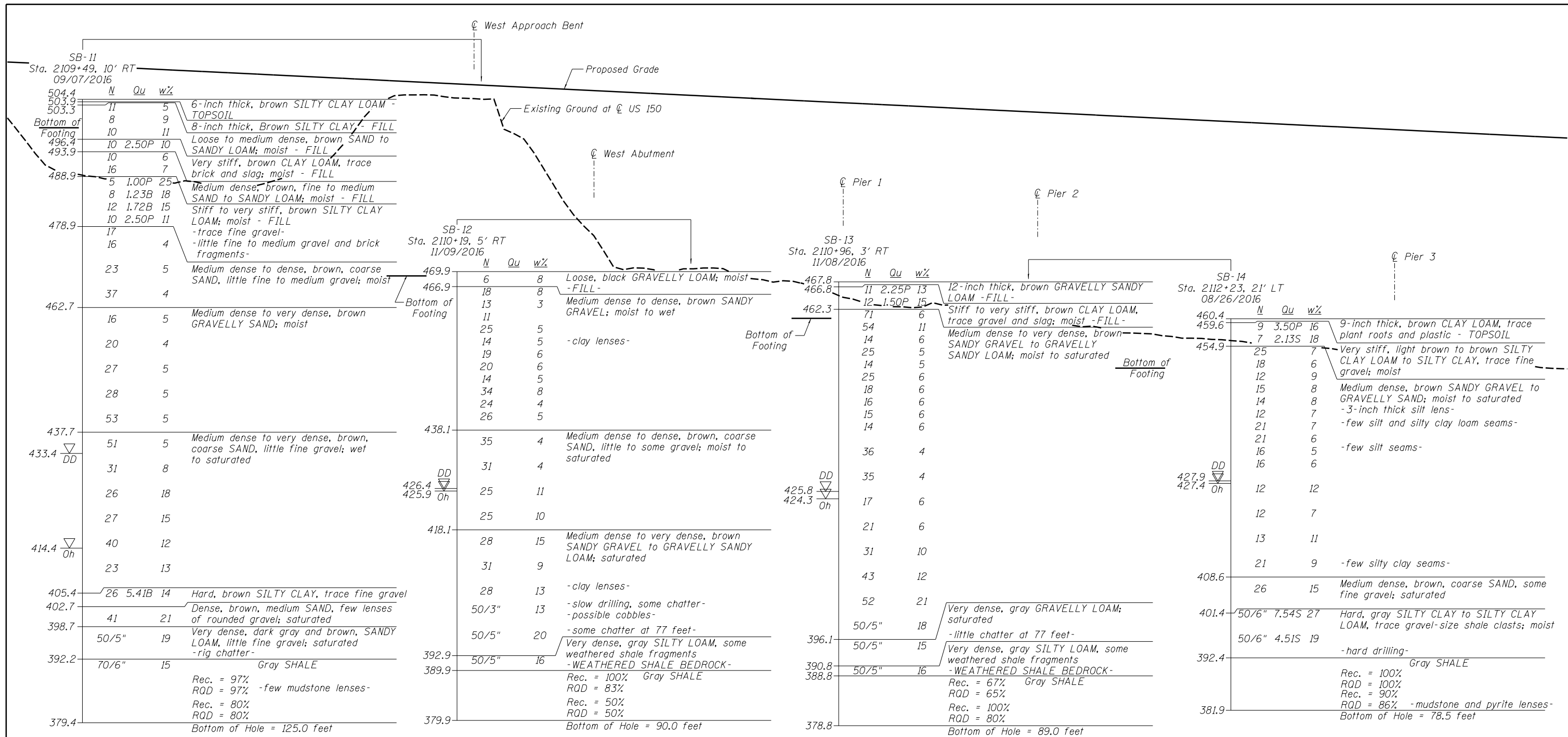


USER NAME =	DESIGNED - EJM	REVISED -
	CHECKED - RGC	REVISED -
PLOT SCALE =	DRAWN - EJM	REVISED -
PLOT DATE = 4/21/2017	CHECKED - RGC	REVISED -

**STATE OF ILLINOIS  
DEPARTMENT OF TRANSPORTATION**

**SUBSURFACE DATA PROFILE  
STRUCTURE NO. 090-0180**

F.A.U. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
317	(15B) BR	PEORIA/TAZEWELL		
<b>CONTRACT NO. 68B46</b>				
ILLINOIS FED. AID PROJECT				



**LEGEND**

- N Standard Penetration Test N (blows/ft)
- Qu Unconfined Strength (tsf)
- w% Natural Moisture Content (%)
- DD Water Surface Elevation Encountered in Boring
- 432.28 DD = during drilling
- Oh = at completion
- 24h = 24 hours after completion
- 233M Modified SPT



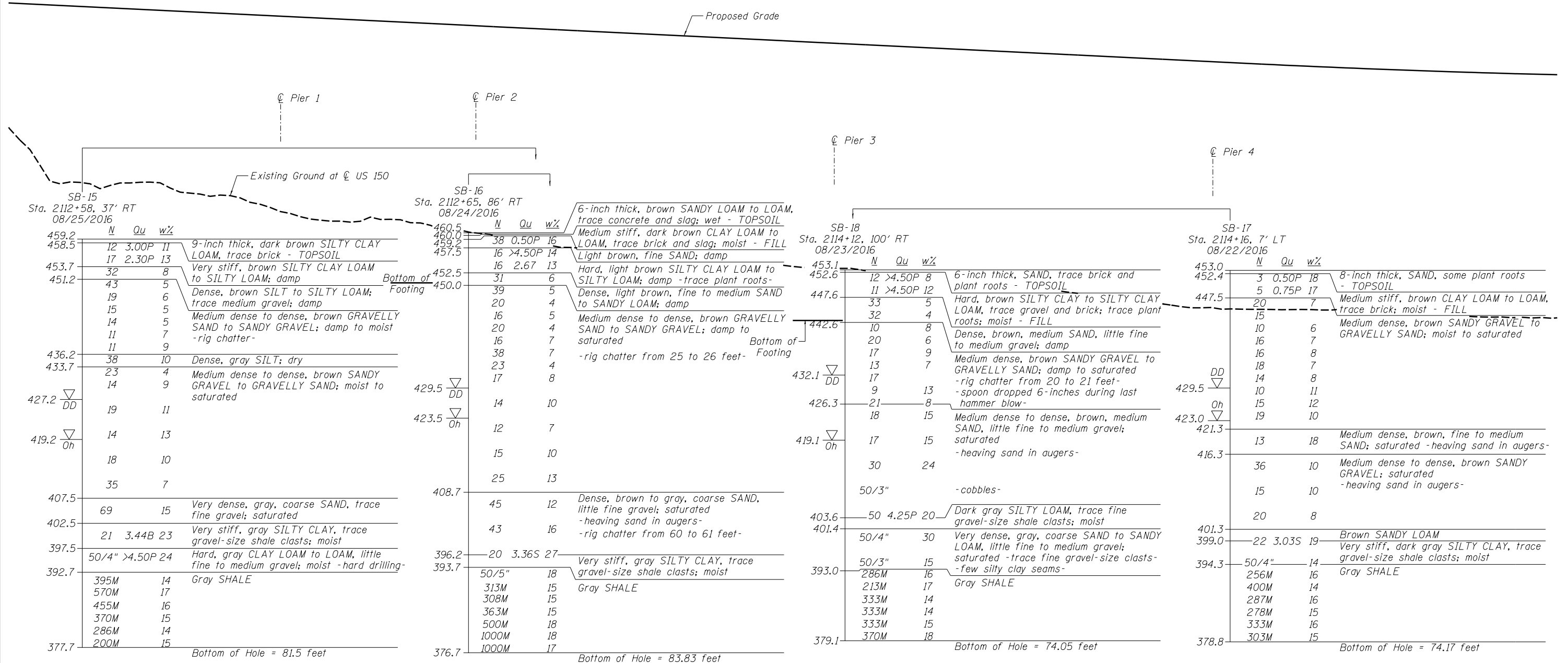
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PLOT SCALE =	DRAWN - EJM	REVISED -
PLOT DATE = 4/21/2017	CHECKED - RGC	REVISED -

**STATE OF ILLINOIS  
DEPARTMENT OF TRANSPORTATION**

**SUBSURFACE DATA PROFILE  
STRUCTURE NO. 090-0180**

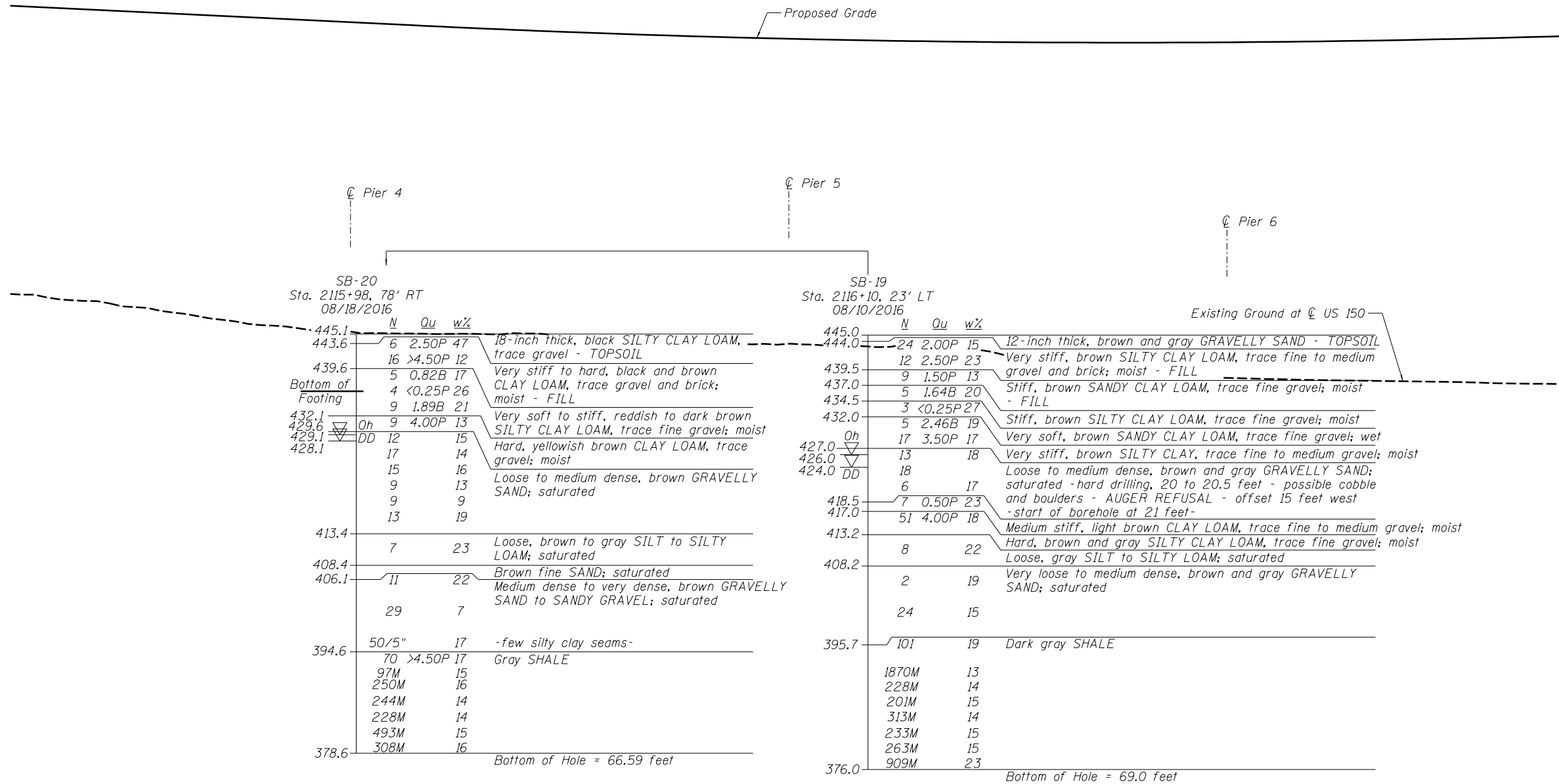
SHEET NO. 2 OF 11

F.A.U. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
317	(15B) BR	PEORIA/TAZEWELL		
<b>CONTRACT NO. 68B46</b>				
ILLINOIS FED. AID PROJECT				



**LEGEND**

N Standard Penetration Test N (blows/ft)  
 Qu Unconfined Strength (tsf)  
 w% Natural Moisture Content (%)  
 DD Water Surface Elevation Encountered in Boring  
 DD = during drilling  
 Oh = at completion  
 24h = 24 hours after completion  
 233M Modified SPT



**LEGEND**

- N Standard Penetration Test N (blows/ft)
- Qu Unconfined Strength (tsf)
- w% Natural Moisture Content (%)
- DD Water Surface Elevation Encountered in Boring
- 432.28 DD = during drilling
- Oh = at completion
- 24h = 24 hours after completion
- 233M Modified SPT



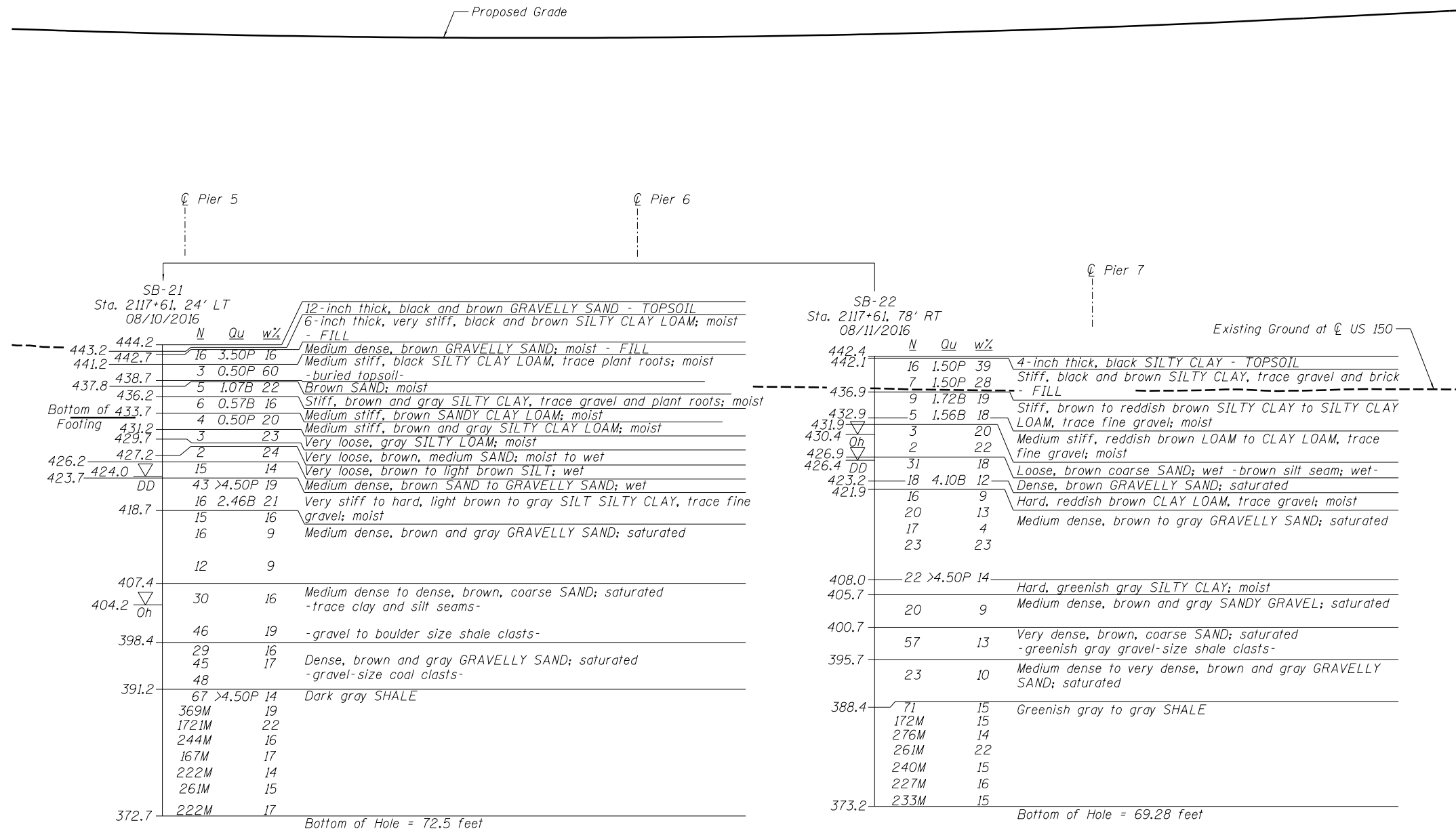
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PLOT SCALE =	DRAWN - EJM	REVISED -
PLOT DATE = 4/21/2017	CHECKED - RGC	REVISED -

**STATE OF ILLINOIS  
DEPARTMENT OF TRANSPORTATION**

**SUBSURFACE DATA PROFILE  
STRUCTURE NO. 090-0180**

F.A.U. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
317	(15B) BR	PEORIA/TAZEWELL		
<b>CONTRACT NO. 68B46</b>				
ILLINOIS FED. AID PROJECT				





**LEGEND**

- N Standard Penetration Test N (blows/ft)
- Qu Unconfined Strength (tsf)
- w% Natural Moisture Content (%)
- DD Water Surface Elevation Encountered in Boring
- 432.28 DD = during drilling
- Oh = at completion
- 24h = 24 hours after completion
- 233M Modified SPT



USER NAME =	DESIGNED - EJM	REVISED -
	CHECKED - RGC	REVISED -
PLOT SCALE =	DRAWN - EJM	REVISED -
PLOT DATE = 4/21/2017	CHECKED - RGC	REVISED -

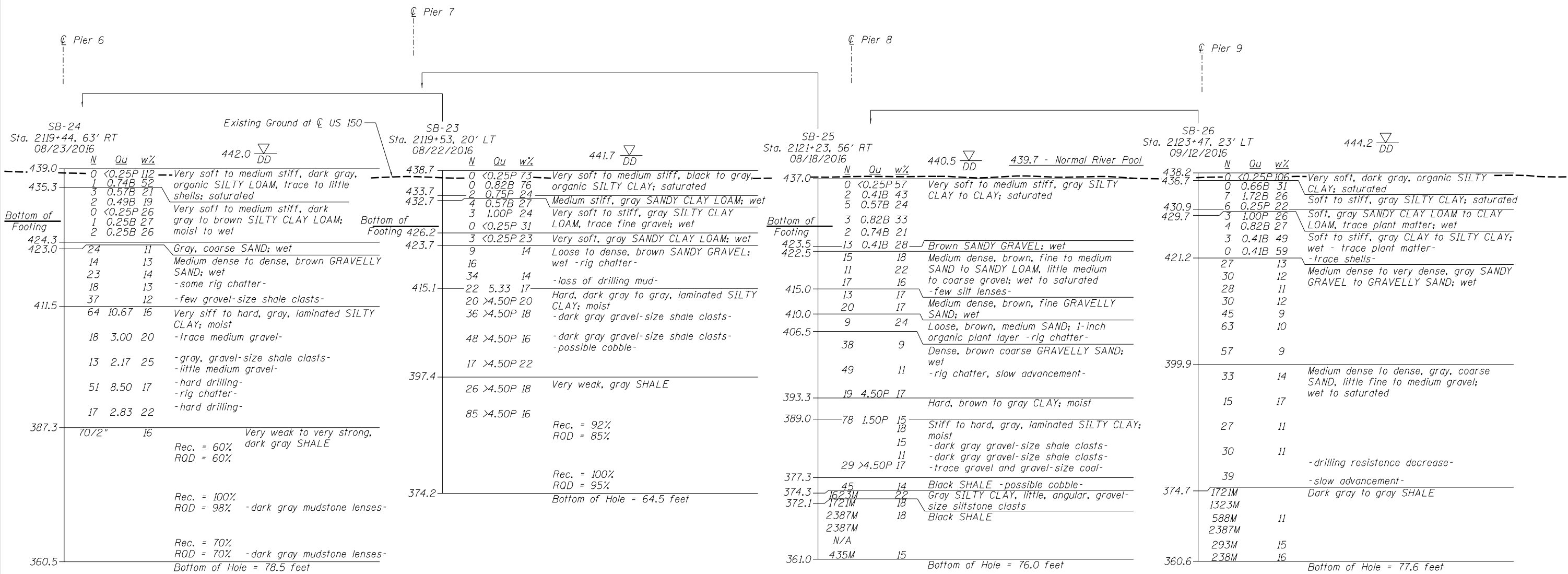
**STATE OF ILLINOIS  
DEPARTMENT OF TRANSPORTATION**

**SUBSURFACE DATA PROFILE  
STRUCTURE NO. 090-0180**

SHEET NO. 5 OF 11

F.A.U. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
317	(15B) BR	PEORIA/TAZEWELL		
<b>CONTRACT NO. 68B46</b>				
ILLINOIS FED. AID PROJECT				

Proposed Grade



LEGEND

- N Standard Penetration Test N (blows/ft)
- Qu Unconfined Strength (tsf)
- w% Natural Moisture Content (%)
- DD Water Surface Elevation Encountered in Boring
- 432.28  $\nabla$  DD = during drilling
- Oh = at completion
- 24h = 24 hours after completion
- 233M Modified SPT



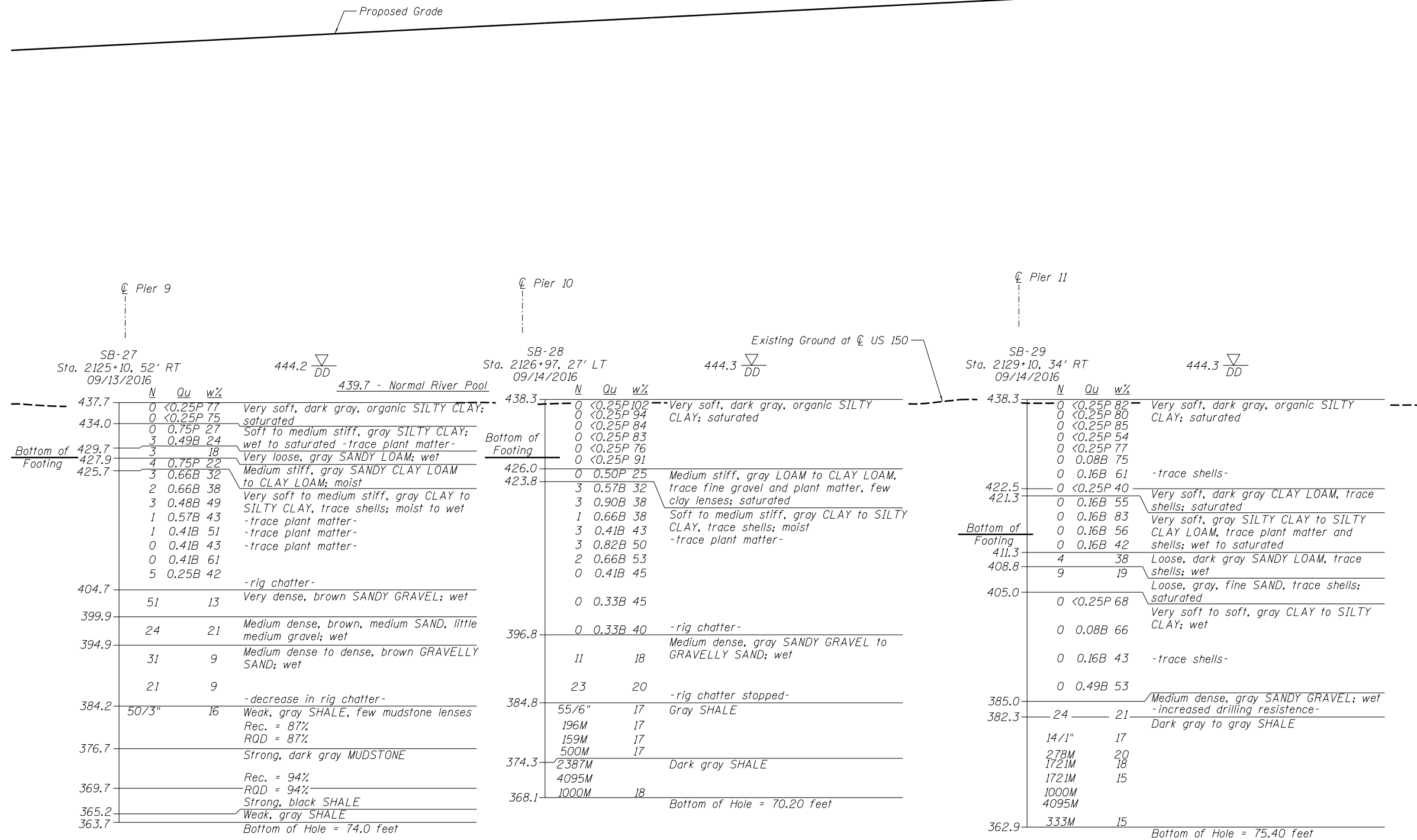
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PLOT SCALE =	DRAWN - EJM	REVISED -
PLOT DATE = 4/21/2017	CHECKED - RGC	REVISED -

STATE OF ILLINOIS  
DEPARTMENT OF TRANSPORTATION

SUBSURFACE DATA PROFILE  
STRUCTURE NO. 090-0180

SHEET NO. 6 OF 11

F.A.U. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
317	(15B) BR	PEORIA/TAZEWELL		
CONTRACT NO. 68B46				
ILLINOIS FED. AID PROJECT				



**LEGEND**

- N Standard Penetration Test N (blows/ft)
- Qu Unconfined Strength (tsf)
- w% Natural Moisture Content (%)
- DD Water Surface Elevation Encountered in Boring
- 432.28 DD = during drilling
- Oh = at completion
- 24h = 24 hours after completion
- 233M Modified SPT



USER NAME =	DESIGNED - EJM	REVISED -
	CHECKED - RGC	REVISED -
PLOT SCALE =	DRAWN - EJM	REVISED -
PLOT DATE = 4/21/2017	CHECKED - RGC	REVISED -

**STATE OF ILLINOIS  
DEPARTMENT OF TRANSPORTATION**

**SUBSURFACE DATA PROFILE  
STRUCTURE NO. 090-0180**

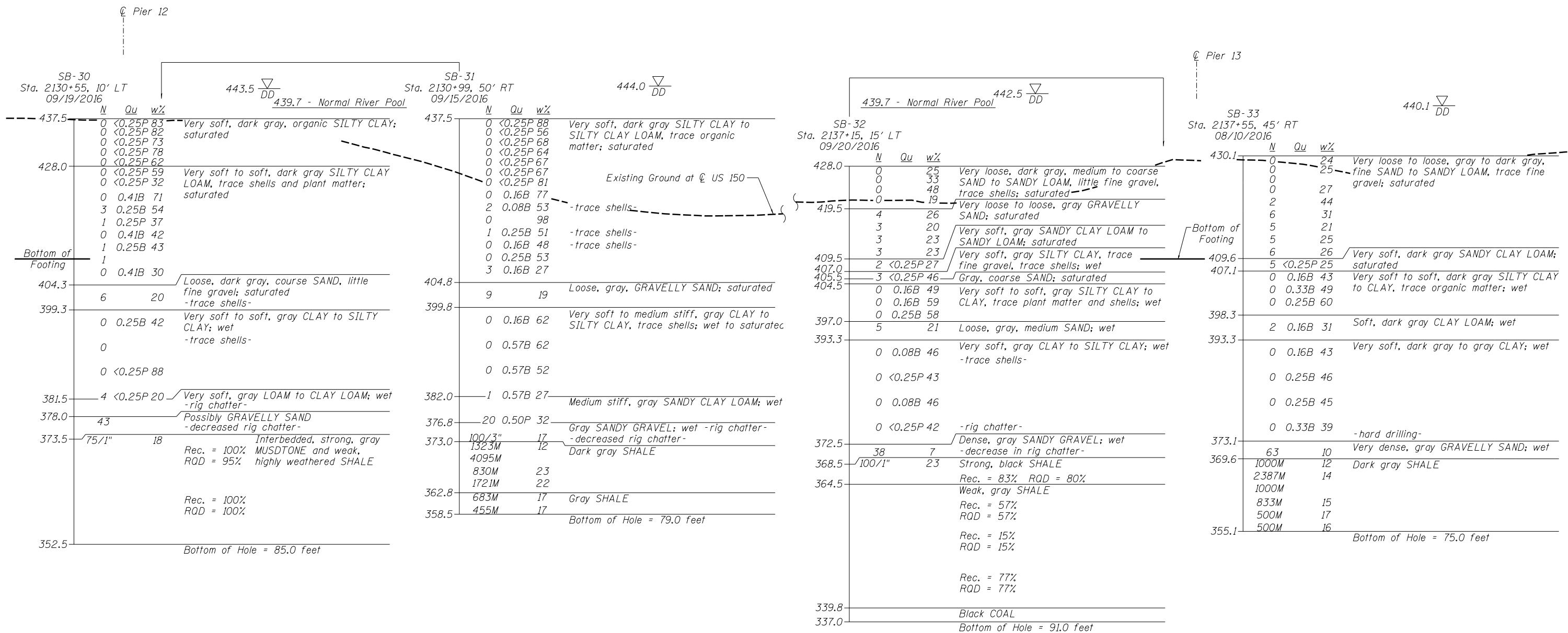
SHEET NO. 7 OF 11

F.A.U. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
317	(15B) BR	PEORIA/TAZEWELL		
<b>CONTRACT NO. 68B46</b>				
ILLINOIS FED. AID PROJECT				

Proposed Grade

**LEGEND**

- N Standard Penetration Test N (blows/ft)
- Qu Unconfined Strength (tsf)
- w% Natural Moisture Content (%)
- DD Water Surface Elevation Encountered in Boring
- 432.28 ▽ DD = during drilling
- Oh = at completion
- 24h = 24 hours after completion
- 233M Modified SPT



USER NAME =	DESIGNED - EJM	REVISED -
	CHECKED - RGC	REVISED -
PLOT SCALE =	DRAWN - EJM	REVISED -
PLOT DATE = 4/21/2017	CHECKED - RGC	REVISED -

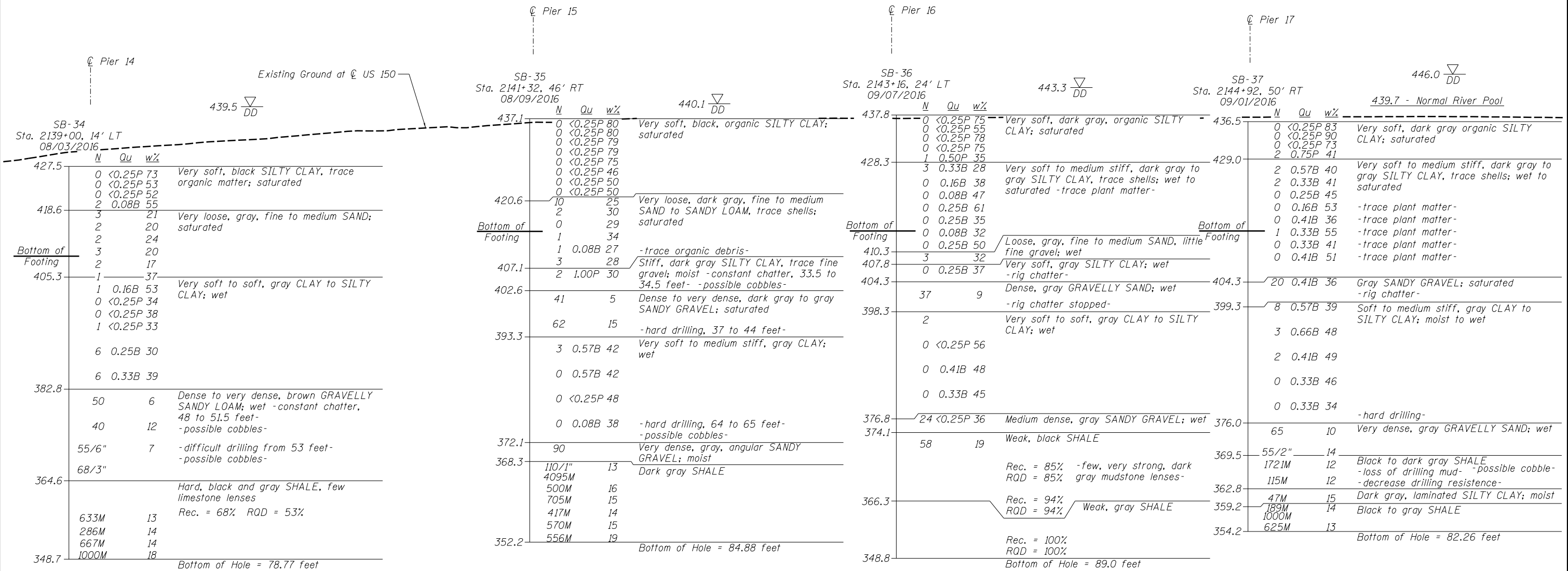
**STATE OF ILLINOIS  
DEPARTMENT OF TRANSPORTATION**

**SUBSURFACE DATA PROFILE  
STRUCTURE NO. 090-0180**

SHEET NO. 8 OF 11

F.A.U. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
317	(15B) BR	PEORIA/TAZEWELL		
<b>CONTRACT NO. 68B46</b>				
ILLINOIS FED. AID PROJECT				

Proposed Grade



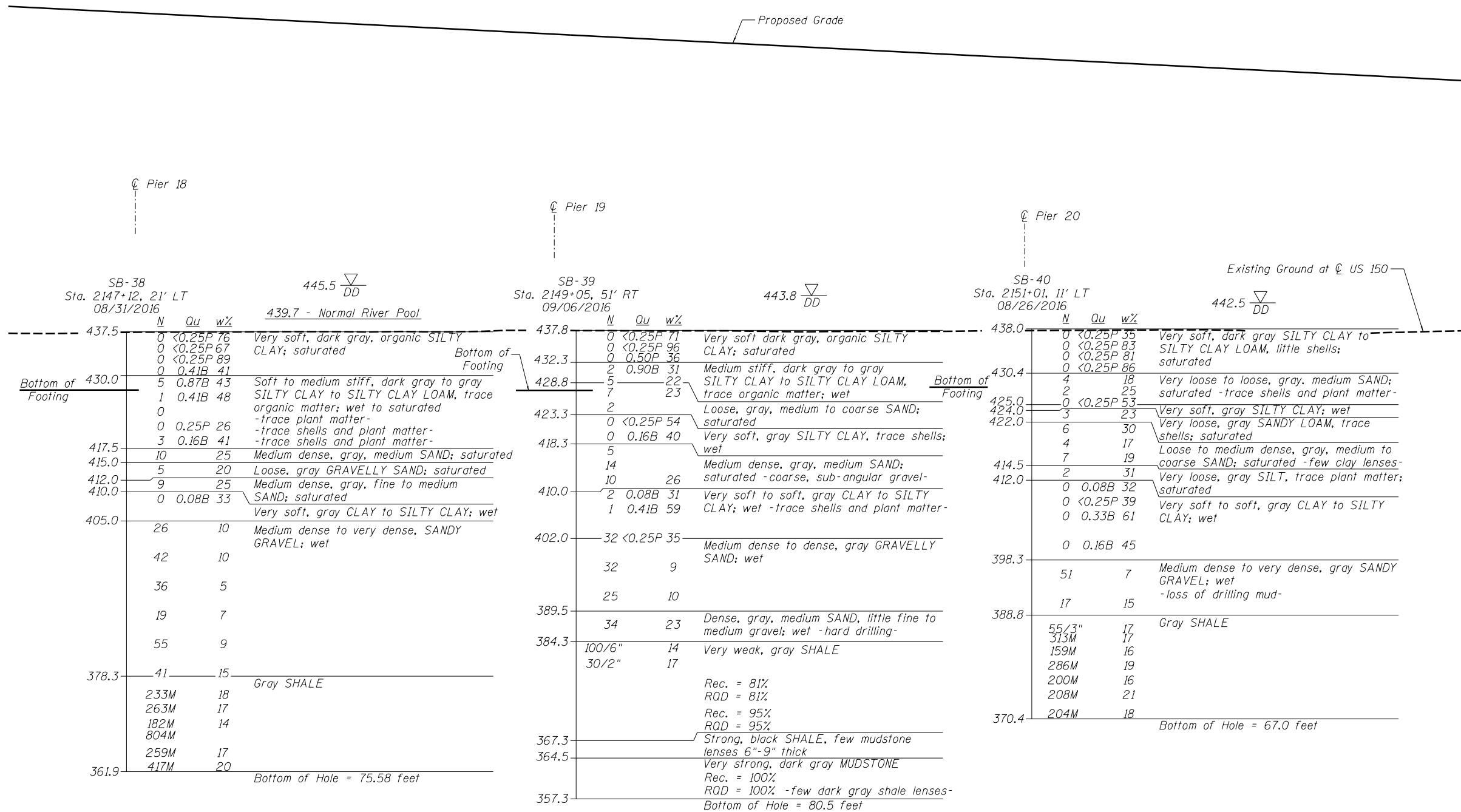
**LEGEND**

N Standard Penetration Test N (blows/ft)  
 Qu Unconfined Strength (tsf)  
 w% Natural Moisture Content (%)

DD Water Surface Elevation Encountered in Boring  
 DD = during drilling  
 Oh = at completion  
 24h = 24 hours after completion

233M Modified SPT

	USER NAME =	DESIGNED - EJM	REVISED -	<b>STATE OF ILLINOIS</b> <b>DEPARTMENT OF TRANSPORTATION</b>	<b>SUBSURFACE DATA PROFILE</b> <b>STRUCTURE NO. 090-0180</b>	F.A.U. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
	PLOT SCALE =	CHECKED - RGC	REVISED -			317	(15B) BR	PEORIA/TAZEWELL		
	PLOT DATE = 4/21/2017	DRAWN - EJM	REVISED -							CONTRACT NO. 68B46
		CHECKED - RGC	REVISED -							ILLINOIS FED. AID PROJECT



**LEGEND**

N Standard Penetration Test N (blows/ft)

Qu Unconfined Strength (tsf)

w% Natural Moisture Content (%)

DD Water Surface Elevation Encountered in Boring

432.28 DD = during drilling

Oh = at completion

24h = 24 hours after completion

233M Modified SPT



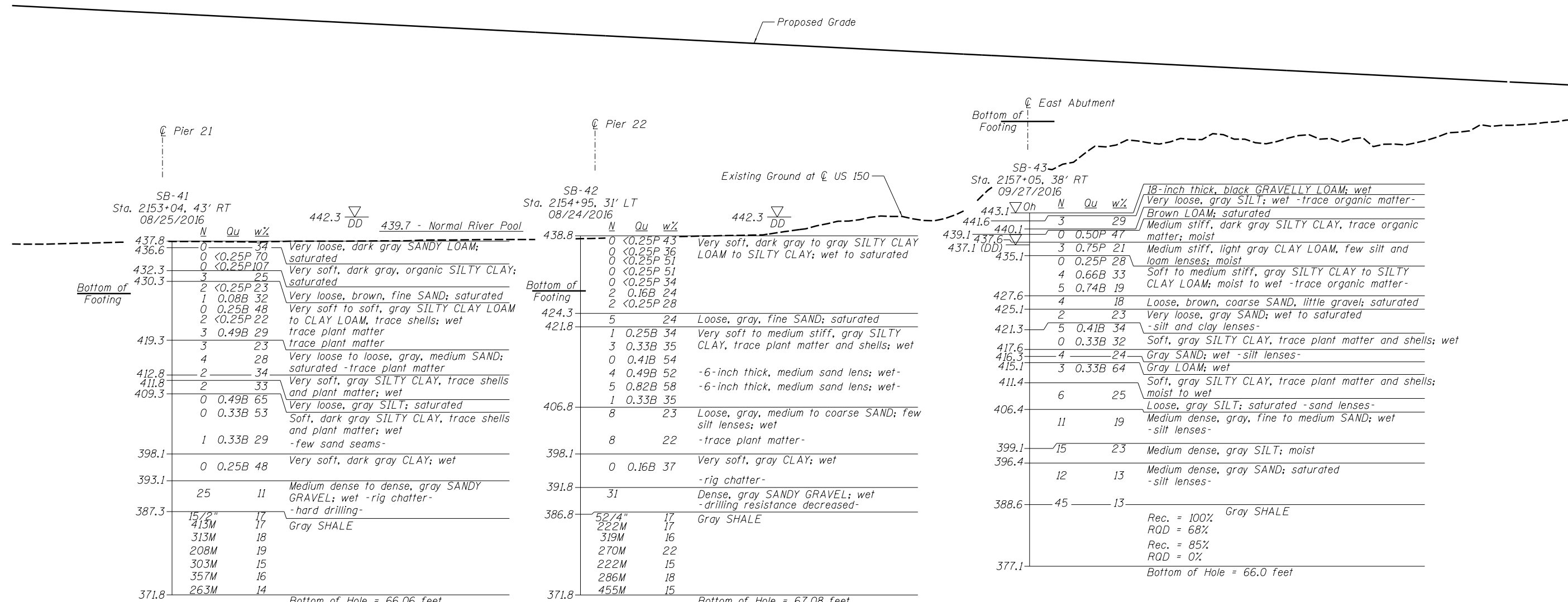
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PLOT SCALE =	DRAWN - EJM	REVISED -
PLOT DATE = 4/21/2017	CHECKED - RGC	REVISED -

**STATE OF ILLINOIS  
DEPARTMENT OF TRANSPORTATION**

**SUBSURFACE DATA PROFILE  
STRUCTURE NO. 090-0180**

SHEET NO. 10 OF 11

F.A.U. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
317	(15B) BR	PEORIA/TAZEWELL		
<b>CONTRACT NO. 68B46</b>				
ILLINOIS FED. AID PROJECT				



**LEGEND**

N Standard Penetration Test N (blows/ft)  
 Qu Unconfined Strength (tsf)  
 w% Natural Moisture Content (%)

DD Water Surface Elevation Encountered in Boring  
 DD = during drilling  
 Oh = at completion  
 24h = 24 hours after completion

233M Modified SPT  
 [C] Consolidation Test  
 [U] Unconsolidated Undrained Triaxial Test



# BORING LOG SB-08

wangeng@wangeng.com  
 1145 N Main Street  
 Lombard, IL 60148  
 Telephone: 630 953-9928  
 Fax: 630 953-9938

WEI Job No.: 414-09-01

Client: **TYLin/Hanson**  
 Project: **US 150 over Illinois River - McClugage**  
 Location: **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 493.85 ft  
 North: 1477516.53 ft  
 East: 2466060.92 ft  
 Station: 1504+90  
 Offset: 29.0 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 (%)
	493.4	6-inch thick, dark brown SILTY CLAY LOAM --TOPSOIL-- Loose to medium dense, brown, medium SAND to SANDY LOAM, little medium gravel; moist --RDR 2--			1	3 4 7	NP	6			--rig chatter--			9	12 19 39	NP	3
			5		2	3 2 4	NP	15		470.9	Medium dense to dense, brown GRAVELLY SAND to SANDY GRAVEL; moist to saturated --RDR 3 to 4--	25		10	13 12 9	NP	3
	488.4	Medium dense, brown GRAVELLY SAND to SANDY GRAVEL; damp --RDR 3 to 4--			3	7 7 5	NP	6						11	9 8 8	NP	5
			10		4	6 9 10	NP	4				30		12	8 7 9	NP	6
					5	18 12 12	NP	4			--rig chatter--						
	480.9	Medium dense to dense, brown, coarse SAND, little angular to sub-angular gravel; damp --RDR 3 to 4--			6	9 11 14	NP	3				35		13	11 13 13	NP	4
					7	10 11 12	NP	3									
					8	10 14 22	NP	4				40		14	8 8 10	NP	5

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling: **08-31-2016** Complete Drilling: **09-01-2016**  
 Drilling Contractor: **Wang Testing Service** Drill Rig: **D50 ATV [88%]**  
 Driller: **K&N** Logger: **J. Foote** Checked by: **C. Marin**  
 Drilling Method: **3.25" IDA HSA; boring backfilled upon completion**

While Drilling: **63.00 ft**  
 At Completion of Drilling: **66.00 ft**  
 Time After Drilling: **NA**  
 Depth to Water: **NA**

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

WANGENGINC 4140901.GPJ WANGENG.GDT 4/3/17





# BORING LOG SB-08

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 1145 N Main Street  
 Lombard, IL 60148  
 Telephone: 630 953-9928  
 Fax: 630 953-9938

WEI Job No.: 414-09-01

Client **TYLin/Hanson**  
 Project **US 150 over Illinois River - McClugage**  
 Location **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 493.85 ft  
 North: 1477516.53 ft  
 East: 2466060.92 ft  
 Station: 1504+90  
 Offset: 29.0 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 (%)
		--round gravel and cobbles in auger cuttings--	45		15	9 7 10	NP	4				65		19	4 6 10	NP	13
			50		16	9 9 9	NP	3				70		20	5 8 7	NP	6
			55		17	10 13 11	NP	5				75		21	9 11 9	NP	6
			60		18	9 9 9	NP	4				80		22	7 7 11	NP	8

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **08-31-2016** Complete Drilling **09-01-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **D50 ATV [88%]**  
 Driller **K&N** Logger **J. Foote** Checked by **C. Marin**  
 Drilling Method **3.25" IDA HSA; boring backfilled upon completion**

While Drilling **63.00 ft**  
 At Completion of Drilling **66.00 ft**  
 Time After Drilling **NA**  
 Depth to Water **NA**

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

WANGENGINC 4140901.GPJ WANGENG.GDT 4/3/17



# BORING LOG SB-08

wangeng@wangeng.com  
 1145 N Main Street  
 Lombard, IL 60148  
 Telephone: 630 953-9928  
 Fax: 630 953-9938

WEI Job No.: 414-09-01

Client TYLin/Hanson  
 Project US 150 over Illinois River - McClugage  
 Location Peoria and Tazewell Counties, IL

Datum: NAVD 88  
 Elevation: 493.85 ft  
 North: 1477516.53 ft  
 East: 2466060.92 ft  
 Station: 1504+90  
 Offset: 29.0 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 (%)
			85		23	20 17 13	NP	10									
		--gravel and cobbles in auger cuttings--															
	405.0	Stiff to very stiff, brown and gray SILTY CLAY, trace fine gravel; moist	90		24	19 28 21	2.50 P	13									
		--RDR 3 to 4--															
		--few silt and silty loam lenses--															
			95		25	4 8 9	1.56 B	25									
	397.1	Medium dense, brown, fine to medium SAND; wet															
		--RDR 3--															
	393.9		100		26	4 8 17	NP	11									
		Boring terminated at 100.00 ft															

WANGENG 4140901.GPJ WANGENG.GDT 4/3/17

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **08-31-2016** Complete Drilling **09-01-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **D50 ATV [88%]**  
 Driller **K&N** Logger **J. Foote** Checked by **C. Marin**  
 Drilling Method **3.25" IDA HSA; boring backfilled upon completion**

While Drilling  $\nabla$  **63.00 ft**  
 At Completion of Drilling  $\nabla$  **66.00 ft**  
 Time After Drilling **NA**  
 Depth to Water  $\nabla$  **NA**

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



# BORING LOG SB-09

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 Lombard, IL 60148  
 Telephone: 630 953-9928  
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WEI Job No.: 414-09-01

Client: **TYLin/Hanson**  
 Project: **US 150 over Illinois River - McClugage**  
 Location: **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 471.17 ft  
 North: 1477602.68 ft  
 East: 2466205.80 ft  
 Station: 1506+81  
 Offset: 49.0 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 (%)
	470.2	Brown GRAVELLY SILT; moist --FILL-- --RDR 3--															
		Stiff to hard, brown SILTY CLAY LOAM, trace plastic fragments; moist			1	5 6 6	1.50 P	18						9	6 8 8	NP	6
	467.2	--FILL-- --RDR 3-- --rig chatter--															
		Medium dense to dense, reddish brown to brown SANDY GRAVEL to GRAVELLY SANDY LOAM; moist to saturated			2	9 12 13	4.50 P	20						10	10 11 8	NP	6
		--RDR 3--															
					3	11 15 17	NR							11	7 7 9	NP	5
					4	6 8 7	NR							12	9 10 9	NP	6
					5	9 7 6	NP	5						13	12 10 10	NP	6
					6	6 6 6	NP	7						14	8 8 9	NP	7
					7	13 10 10	NP	6									
					8	9 8 10	NP	6									

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **11-10-2016** Complete Drilling **11-10-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **D50 ATV [88%]**  
 Driller **K&J** Logger **J. Foote** Checked by **C. Marin**  
 Drilling Method **3.25" IDA HSA; boring backfilled upon completion**

While Drilling  $\nabla$  **46.00 ft**  
 At Completion of Drilling  $\nabla$  **46.00 ft**  
 Time After Drilling **NA**  
 Depth to Water  $\nabla$  **NA**

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

WANGENGINC 4140901.GPJ WANGENG.GDT 4/3/17



# BORING LOG SB-09

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 1145 N Main Street  
 Lombard, IL 60148  
 Telephone: 630 953-9928  
 Fax: 630 953-9938

WEI Job No.: 414-09-01

Client: **TYLin/Hanson**  
 Project: **US 150 over Illinois River - McClugage**  
 Location: **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 471.17 ft  
 North: 1477602.68 ft  
 East: 2466205.80 ft  
 Station: 1506+81  
 Offset: 49.0 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 (%)
			45		15	9 9 10	NP	6				65		19	4 10 24	NP	11
			50		16	7 9 10	NP	10				70		20	8 16 25	NP	14
		--RDR 3--	55		17	10 15 16	NP	11		399.4	Very stiff, gray SILTY CLAY; moist	75		21	14 26 33	3.50 P	18
		--silty clay lenses--	60		18	8 16 29	NP	7		393.7	--some chatter at 77.5 feet-- Very dense, gray weathered SHALE	80		22	90/5" C O	NP	16
										392.2	--WEATHERED SHALE BEDROCK-- Gray SHALE						

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling: **11-10-2016** Complete Drilling: **11-10-2016**  
 Drilling Contractor: **Wang Testing Service** Drill Rig: **D50 ATV [88%]**  
 Driller: **K&J** Logger: **J. Foote** Checked by: **C. Marin**  
 Drilling Method: **3.25" IDA HSA; boring backfilled upon completion**

While Drilling:  $\nabla$  **46.00 ft**  
 At Completion of Drilling:  $\blacktriangledown$  **46.00 ft**  
 Time After Drilling: **NA**  
 Depth to Water:  $\nabla$  **NA**

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

WANGENGINC 4140901.GPJ WANGENG.GDT 4/3/17



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# BORING LOG SB-09

WEI Job No.: 414-09-01

Client: **TYLin/Hanson**  
 Project: **US 150 over Illinois River - McClugage**  
 Location: **Peoria and Tazewell Counties, IL**

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 Elevation: 471.17 ft  
 North: 1477602.68 ft  
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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 (%)
		--RDR 3-- Run 1: 79.0 to 84.0 feet RECOVERY= 100% RQD = 100%			23												
		Run 2: 84.0 to 89.0 feet RECOVERY= 100% RQD = 98%	85														
		--few mudstone lenses--			24												
	382.2	Boring terminated at 89.00 ft	90														
			95														
			100														

### GENERAL NOTES

Begin Drilling **11-10-2016** Complete Drilling **11-10-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **D50 ATV [88%]**  
 Driller **K&J** Logger **J. Foote** Checked by **C. Marin**  
 Drilling Method **3.25" IDA HSA; boring backfilled upon completion**

### WATER LEVEL DATA

While Drilling  $\nabla$  **46.00 ft**  
 At Completion of Drilling  $\blacktriangledown$  **46.00 ft**  
 Time After Drilling **NA**  
 Depth to Water  $\nabla$  **NA**

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



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# BORING LOG SB-10

WEI Job No.: 414-09-01

Client: **TYLin/Hanson**  
 Project: **US 150 over Illinois River - McClugage**  
 Location: **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 464.01 ft  
 North: 1477661.71 ft  
 East: 2466379.50 ft  
 Station: 1508+76  
 Offset: 2.0 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 (%)
	463.92	2-inch thick, ASPHALT --PAVEMENT--															
		Loose, brown SANDY LOAM; moist to wet			1	2 3 3	NP	15						9	6 9 12	NP	5
	461.0	Stiff to very stiff, brown SILTY CLAY LOAM; moist			2	2 3 5	1.48 B	13						10	6 7 7	NP	5
		--little medium gravel--			3	3 7 8	2.50 P	15						11	4 8 10	NP	6
	456.0	Very dense, brown, medium SAND, little medium gravel; damp to moist			4	8 43	NP	5						12	15 11 14	NP	5
	454.0	--rig chatter from 9 to 10 feet--			5	50/5"											
		Medium dense, brown SANDY GRAVEL to GRAVELLY SAND; moist to wet			6	6 7 7	NP	10		432.3	Medium dense, brown, medium to coarse SAND; saturated						
					7	10 10 12	NP	7			--RDR 3--			13	10 11 16	NP	13
					8	6 6 7	NP	6		427.3	Medium dense, brown GRAVELLY SAND, few silty clay seams; saturated						
					8	7 6 5	NP	7			--RDR 3--			14	8 17 18	NP	9

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling: **08-29-2016** Complete Drilling: **08-30-2016**  
 Drilling Contractor: **Wang Testing Service** Drill Rig: **D50 ATV [88%]**  
 Driller: **K&N** Logger: **J. Foote** Checked by: **C. Marin**  
 Drilling Method: **3.25" IDA HSA; boring backfilled upon completion**

While Drilling:  $\nabla$  **33.00 ft**  
 At Completion of Drilling:  $\blacktriangledown$  **33.00 ft**  
 Time After Drilling: **NA**  
 Depth to Water:  $\nabla$  **NA**

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

WANGENG 4140901.GPJ WANGENG.GDT 4/3/17



# BORING LOG SB-10

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WEI Job No.: 414-09-01

Client: **TYLin/Hanson**  
 Project: **US 150 over Illinois River - McClugage**  
 Location: **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 464.01 ft  
 North: 1477661.71 ft  
 East: 2466379.50 ft  
 Station: 1508+76  
 Offset: 2.0 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 (%)
	417.3	Very stiff, light brown SILTY CLAY, trace fine gravel; moist	45	X	15	10 13 13	NP	10		400.0	Very stiff, gray SILTY CLAY, trace fine gravel; moist	65	X	19	9 10 16	2.38 B	19
	415.2	Dense, brown SANDY GRAVEL, few silty clay seams; saturated	50	X	16	5 8 13	3.50 P	12		396.0	Gray SHALE	70	X	20	15 39 50/3"	NP	20
	407.3	Very dense, gray SANDY LOAM, little fine to medium gravel; saturated	60	X	18	25 39 50/4"	NP	17			Run 1: 70.0 to 75.0 feet RECOVERY= 15% RQD = 13% --mudstone lenses--	75	X	21			
											Run 2: 75.0 to 80.0 feet RECOVERY= 100% RQD = 100% --few gravel-size mudstone clasts--	80	X	22			

### GENERAL NOTES

Begin Drilling **08-29-2016** Complete Drilling **08-30-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **D50 ATV [88%]**  
 Driller **K&N** Logger **J. Foote** Checked by **C. Marin**  
 Drilling Method **3.25" IDA HSA; boring backfilled upon completion**

### WATER LEVEL DATA

While Drilling  $\nabla$  **33.00 ft**  
 At Completion of Drilling  $\blacktriangledown$  **33.00 ft**  
 Time After Drilling **NA**  
 Depth to Water  $\nabla$  **NA**

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

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# BORING LOG SB-10

WEI Job No.: 414-09-01

Client: **TYLin/Hanson**  
 Project: **US 150 over Illinois River - McClugage**  
 Location: **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 464.01 ft  
 North: 1477661.71 ft  
 East: 2466379.50 ft  
 Station: 1508+76  
 Offset: 2.0 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 (%)
	379.0	Run 3: 80.0 to 85.0 feet RECOVERY= 90% RQD = 90% --few mudstone lenses--	85		23	C O R M											
		Boring terminated at 85.00 ft															
			90														
			95														
			100														

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **08-29-2016** Complete Drilling **08-30-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **D50 ATV [88%]**  
 Driller **K&N** Logger **J. Foote** Checked by **C. Marin**  
 Drilling Method **3.25" IDA HSA; boring backfilled upon completion**

While Drilling  $\nabla$  **33.00 ft**  
 At Completion of Drilling  $\blacktriangledown$  **33.00 ft**  
 Time After Drilling **NA**  
 Depth to Water  $\nabla$  **NA**

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





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WEI Job No.: 414-09-01

Client **TYLin/Hanson**  
 Project **US 150 over Illinois River - McClugage**  
 Location **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 504.41 ft  
 North: 1477806.31 ft  
 East: 2466221.86 ft  
 Station: 2109+49  
 Offset: 10.0 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 (%)
	503.9	6-inch thick, brown SILTY CLAY LOAM															
	503.3	--TOPSOIL--															
		8-inch thick, brown SILTY CLAY --FILL--			1	6 5 6	NP	5			--trace fine gravel--			9	5 6 6	1.72 B	15
		Loose to medium dense, brown SAND to SANDY LOAM; moist --FILL-- --RDR 2 to 3--			2	4 4 4	NP	9			--little fine to medium gravel and brick fragments--			10	6 5 5	2.50 P	11
					3	3 5 5	NP	11			Medium dense to dense, brown, coarse SAND, little fine to medium gravel; moist --RDR 3--			11	8 8 9	NR	
	496.4	Very stiff, brown CLAY LOAM, trace brick and slag; moist --FILL-- --RDR 3--			4	6 5 5	2.50 P	10						12	8 9 7	NP	4
	493.9	Medium dense, brown, fine to medium SAND to SANDY LOAM; moist --FILL-- --RDR 3--			5	7 5 5	NP	6									
					6	10 8 8	NP	7						13	10 9 14	NP	5
	488.9	Stiff to very stiff, brown SILTY CLAY LOAM; moist --FILL-- --RDR 3--			7	2 2 3	1.00 P	25									
					8	2 4 4	1.23 B	18						14	12 15 22	NP	4

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **09-07-2016** Complete Drilling **09-08-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **D50 ATV [88%]**  
 Driller **K&N** Logger **J. Foote** Checked by **C. Marin**  
 Drilling Method **3.25" IDA HSA; boring backfilled upon completion**

While Drilling  $\nabla$  **71.00 ft**  
 At Completion of Drilling  $\nabla$  **90.00 ft**  
 Time After Drilling **NA**  
 Depth to Water  $\nabla$  **NA**

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

WANGENGINC 4140901.GPJ WANGENG.GDT 4/3/17



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WEI Job No.: 414-09-01

Client TYLin/Hanson  
 Project US 150 over Illinois River - McClugage  
 Location Peoria and Tazewell Counties, IL

Datum: NAVD 88  
 Elevation: 504.41 ft  
 North: 1477806.31 ft  
 East: 2466221.86 ft  
 Station: 2109+49  
 Offset: 10.0 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 (%)
	462.7	Medium dense to very dense, brown GRAVELLY SAND; moist --RDR 3--															
			45		15	7 7 9	NP	5				65		19	16 32 21	NP	5
			50		16	9 10 10	NP	4				70		20	21 24 27	NP	5
			55		17	12 13 14	NP	5				75		21	8 12 19	NP	8
			60		18	13 16 12	NP	5				80		22	8 12 14	NP	18
										437.7	Medium dense to very dense, brown, coarse SAND, little fine gravel; wet to saturated --RDR 3--						

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling 09-07-2016 Complete Drilling 09-08-2016  
 Drilling Contractor Wang Testing Service Drill Rig D50 ATV [88%]  
 Driller K&N Logger J. Foote Checked by C. Marin  
 Drilling Method 3.25" IDA HSA; boring backfilled upon completion

While Drilling 71.00 ft  
 At Completion of Drilling 90.00 ft  
 Time After Drilling NA  
 Depth to Water NA

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

WANGENGINC 4140901.GPJ WANGENG.GDT 4/3/17



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WEI Job No.: 414-09-01

Client: **TYLin/Hanson**  
 Project: **US 150 over Illinois River - McClugage**  
 Location: **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 504.41 ft  
 North: 1477806.31 ft  
 East: 2466221.86 ft  
 Station: 2109+49  
 Offset: 10.0 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 (%)
											--RDR 3--						
	402.7	Dense, brown, medium SAND, few lenses of rounded gravel; saturated															
			85	X	23	8 12 15	NP	15			--RDR 3--	105	X	27	13 21 20	NP	21
	398.7	Very dense, dark gray and brown SANDY LOAM, little fine gravel; saturated															
			90	X	24	12 18 22	NP	12			--RDR 3--	110	X	28	50/5"	NP	19
											--rig chatter--						
	392.2	Gray SHALE															
			95	X	25	9 11 12	NP	13			--RDR 3--	115	X	29	70/6"	NP	15
											Run 1: 115.0 to 120.0 feet RECOVERY= 97% RQD = 97%						
											--mudstone lenses--						
	405.4	Hard, brown SILTY CLAY, trace fine gravel															
			100	X	26	12 11 15	5.41 B	14				120	X	30			

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **09-07-2016** Complete Drilling **09-08-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **D50 ATV [88%]**  
 Driller **K&N** Logger **J. Foote** Checked by **C. Marin**  
 Drilling Method **3.25" IDA HSA; boring backfilled upon completion**

While Drilling  $\nabla$  **71.00 ft**  
 At Completion of Drilling  $\nabla$  **90.00 ft**  
 Time After Drilling **NA**  
 Depth to Water  $\nabla$  **NA**

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

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# BORING LOG SB-11

WEI Job No.: 414-09-01

Client: **TYLin/Hanson**  
 Project: **US 150 over Illinois River - McClugage**  
 Location: **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 504.41 ft  
 North: 1477806.31 ft  
 East: 2466221.86 ft  
 Station: 2109+49  
 Offset: 10.0 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 (%)
	379.4	Run 2: 120.0 to 125.0 feet RECOVERY= 80% RQD = 80%	125		31	C O R E											
		Boring terminated at 125.00 ft															
			130														
			135														
			140														

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **09-07-2016** Complete Drilling **09-08-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **D50 ATV [88%]**  
 Driller **K&N** Logger **J. Foote** Checked by **C. Marin**  
 Drilling Method **3.25" IDA HSA; boring backfilled upon completion**

While Drilling  $\nabla$  **71.00 ft**  
 At Completion of Drilling  $\blacktriangledown$  **90.00 ft**  
 Time After Drilling **NA**  
 Depth to Water  $\nabla$  **NA**

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



# BORING LOG SB-12

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WEI Job No.: 414-09-01

Client **TYLin/Hanson**  
 Project **US 150 over Illinois River - McClugage**  
 Location **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 469.87 ft  
 North: 1477780.09 ft  
 East: 2466287.53 ft  
 Station: 2110+19  
 Offset: 5.0 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
		Loose, black GRAVELLY LOAM; moist --FILL-- --RDR 3 to 4--			1	2 3 3	NP	8									
	466.9	Medium dense to dense, brown SANDY GRAVEL; moist to wet --RDR 3--	5		2	2 7 11	NP	8							9 9 5	NP	5
					3	4 5 8	NP	3							16 17 17	NP	8
					4	8 5 6	NP								9 8 16	NP	4
					5	13 15 10	NP	5		438.1	Medium dense to dense, brown, coarse SAND, little to some gravel; moist to saturated --RDR 3--				10 13 13	NP	5
					6	6 6 8	NP	5							10 16 19	NP	4
					7	7 10 9	NP	6									
					8	8 10 10	NP	6							10 11 20	NP	4

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **11-09-2016** Complete Drilling **11-09-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **D50 ATV [88%]**  
 Driller **K&J** Logger **J. Foote** Checked by **C. Marin**  
 Drilling Method **3.25" IDA HSA; boring backfilled upon completion**

While Drilling  $\nabla$  **43.50 ft**  
 At Completion of Drilling  $\nabla$  **44.00 ft**  
 Time After Drilling **NA**  
 Depth to Water  $\nabla$  **NA**

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

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# BORING LOG SB-12

WEI Job No.: 414-09-01

Client: **TYLin/Hanson**  
 Project: **US 150 over Illinois River - McClugage**  
 Location: **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 469.87 ft  
 North: 1477780.09 ft  
 East: 2466287.53 ft  
 Station: 2110+19  
 Offset: 5.0 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 (%)
			45		15	7 12 13	NP	11				65		19	10 11 17	NP	13
			50		16	16 13 12	NP	10				70		20	50/3"	NP	13
	418.1	Medium dense to very dense, brown SANDY GRAVEL to GRAVELLY SANDY LOAM; saturated	55		17	8 12 16	NP	15				75		21	50/5"	NP	20
			60		18	12 16 15	NP	9				80		22	50/5"	NP	16
										392.9							
										389.9							

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling: **11-09-2016** Complete Drilling: **11-09-2016**  
 Drilling Contractor: **Wang Testing Service** Drill Rig: **D50 ATV [88%]**  
 Driller: **K&J** Logger: **J. Foote** Checked by: **C. Marin**  
 Drilling Method: **3.25" IDA HSA; boring backfilled upon completion**

While Drilling: **43.50 ft**  
 At Completion of Drilling: **44.00 ft**  
 Time After Drilling: **NA**  
 Depth to Water: **NA**

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

WANGENGINC 4140901.GPJ WANGENG.GDT 4/3/17



# BORING LOG SB-12

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WEI Job No.: 414-09-01

Client: **TYLin/Hanson**  
 Project: **US 150 over Illinois River - McClugage**  
 Location: **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 469.87 ft  
 North: 1477780.09 ft  
 East: 2466287.53 ft  
 Station: 2110+19  
 Offset: 5.0 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 (%)
		Gray SHALE															
		--RDR 3--															
		Run 1: 80.0 to 85.0 feet RECOVERY= 100% RQD = 83%	80		23												
		Run 2: 85.0 to 90.0 feet RECOVERY= 50% RQD = 50%	85		24												
	379.9	Boring terminated at 90.00 ft	90														
			95														
			100														

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **11-09-2016** Complete Drilling **11-09-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **D50 ATV [88%]**  
 Driller **K&J** Logger **J. Foote** Checked by **C. Marin**  
 Drilling Method **3.25" IDA HSA; boring backfilled upon completion**

While Drilling  $\nabla$  **43.50 ft**  
 At Completion of Drilling  $\blacktriangledown$  **44.00 ft**  
 Time After Drilling **NA**  
 Depth to Water  $\nabla$  **NA**

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



# BORING LOG SB-13

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WEI Job No.: 414-09-01

Client **TYLin/Hanson**  
 Project **US 150 over Illinois River - McClugage**  
 Location **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 467.80 ft  
 North: 1477748.69 ft  
 East: 2466357.82 ft  
 Station: 2110+96  
 Offset: 3.0 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 (%)	
	466.8	12-inch thick, brown GRAVELLY SANDY LOAM																
		--FILL-- --RDR 3--			1	5 6 5	2.25 P	13						9	8 7 11		NP	6
		--FILL-- --RDR 3--			2	5 5 7	1.50 P	15				25		10	11 8 8		NP	6
	462.3	Medium dense to very dense, brown SANDY GRAVEL to GRAVELLY SANDY LOAM; moist to saturated			3	17 29 42	NP	6						11	10 8 7		NP	6
		--RDR 3 to 4--			4	10 26 28	NP	11				30		12	5 7 7		NP	6
					5	6 6 8	NP	6										
					6	7 11 14	NP	5				35		13	12 17 19		NP	4
					7	9 8 6	NP	5										
					8	17 14 11	NP	6				40		14	14 17 18		NP	4

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **11-07-2016** Complete Drilling **11-08-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **D50 ATV [88%]**  
 Driller **K&J** Logger **J. Foote** Checked by **C. Marin**  
 Drilling Method **3.25" IDA HSA; boring backfilled upon completion**

While Drilling  $\nabla$  **42.00 ft**  
 At Completion of Drilling  $\nabla$  **43.50 ft**  
 Time After Drilling **NA**  
 Depth to Water  $\nabla$  **NA**

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

WANGENG 4140901.GPJ WANGENG.GDT 4/3/17









# BORING LOG SB-14

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WEI Job No.: 414-09-01

Client **TYLin/Hanson**  
 Project **US 150 over Illinois River - McClugage**  
 Location **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 460.35 ft  
 North: 1477714.20 ft  
 East: 2466482.02 ft  
 Station: 2112+23  
 Offset: 21.0 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 (%)
	459.6	9-inch thick, brown CLAY LOAM, trace plant roots and plastic --TOPSOIL--			1	5 5 4	3.50 P	16						9	12 10 11		
		Very stiff, light brown to brown SILTY CLAY LOAM to SILTY CLAY, trace fine gravel; moist --RDR 3--	5		2	3 4 3	2.13 S	18			--few silt seams--	25		10	8 9 12		
	454.9	Medium dense, brown SANDY GRAVEL to GRAVELLY SAND; moist to saturated --RDR 3--			3	10 13 12	NP	7						11	8 9 7		
		--3-inch thick, silt lens--	10		4	9 9 9	NP	6				30		12	8 8 8		
					5	5 7 5	NP	9									
			15		6	5 7 8	NP	8				35		13	7 6 6		
		--few silt and silty clay loam seams--			7	7 6 8	NP	8									
			20		8	8 5 7	NP	7				40		14	6 5 7		

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **08-26-2016** Complete Drilling **08-29-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **D50 ATV [88%]**  
 Driller **K&N** Logger **J. Foote** Checked by **C. Marin**  
 Drilling Method **3.25" IDA HSA; boring backfilled upon completion**

While Drilling  $\nabla$  **32.50 ft**  
 At Completion of Drilling  $\blacktriangledown$  **33.00 ft**  
 Time After Drilling **NA**  
 Depth to Water  $\nabla$  **NA**

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

WANGENG 4140901.GPJ WANGENG.GDT 4/3/17



# BORING LOG SB-14

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WEI Job No.: 414-09-01

Client: **TYLin/Hanson**  
 Project: **US 150 over Illinois River - McClugage**  
 Location: **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 460.35 ft  
 North: 1477714.20 ft  
 East: 2466482.02 ft  
 Station: 2112+23  
 Offset: 21.0 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 (%)
											shale clasts; moist --RDR 3 to 4--						
			45		15	6 7 6	NP	11				65		19	14 24 50/6"	4.51 S	19
		--few silty clay seams--															
			50		16	8 8 13	NP	9		392.4	Gray SHALE Run 1: 68.5 to 73.5 feet RECOVERY= 100% RQD = 100%						
	408.6	Medium dense, brown, coarse SAND, little fine gravel; saturated --RDR 3--									--hard drilling--						
			55		17	11 11 15	NP	15			Run 2: 73.5 to 78.5 feet RECOVERY= 90% RQD = 86% --mudstone and pyrite lenses--						
	401.4	Hard, gray SILTY CLAY to SILTY CLAY LOAM, trace gravel-size	60		18	16 22 50/6"	7.54 S	27		381.9	Boring terminated at 78.50 ft						

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **08-26-2016** Complete Drilling **08-29-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **D50 ATV [88%]**  
 Driller **K&N** Logger **J. Foote** Checked by **C. Marin**  
 Drilling Method **3.25" IDA HSA; boring backfilled upon completion**

While Drilling  $\nabla$  **32.50 ft**  
 At Completion of Drilling  $\nabla$  **33.00 ft**  
 Time After Drilling **NA**  
 Depth to Water  $\nabla$  **NA**

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

WANGENGINC 4140901.GPJ WANGENG.GDT 4/3/17



# BORING LOG SB-15

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WEI Job No.: 414-09-01

Client: **TYLin/Hanson**  
 Project: **US 150 over Illinois River - McClugage**  
 Location: **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 459.23 ft  
 North: 1477646.91 ft  
 East: 2466488.04 ft  
 Station: 2112+58  
 Offset: 37.0 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 (%)
	458.5	9-inch thick, dark brown SILTY CLAY LOAM, trace brick --TOPSOIL-- Very stiff, brown SILTY CLAY LOAM to SILTY LOAM; damp --RDR 3--	0-5	X	1	7 6 6	3.00 P	11		436.2	Dense, gray SILT; damp --RDR 3 to 4--	0-25	X	9	5 5 6	NP	9
	453.7	Dense, brown SILT to SILTY LOAM, trace medium gravel; damp --RDR 3--	5-10	X	2	5 8 9	2.30 P	13		433.7	Medium dense to dense, brown SANDY GRAVEL to GRAVELLY SAND; moist to saturated --RDR 3--	25-30	X	10	13 12 26	NP	10
	451.2	Medium dense to dense, brown GRAVELLY SAND to SANDY GRAVEL; damp to moist --RDR 3 to 4--  --rig chatter--	10-15	X	3	4 11 21	NP	8				30-35	X	11	9 12 11	NP	4
			15-20	X	4	13 22 21	NP	5				35-40	X	12	5 7 7	NP	9
				X	5	14 9 10	NP	6					X	13	8 9 10	NP	11
				X	6	8 7 8	NP	5					X	14	7 7 7	NP	13
				X	7	8 7 7	NP	5					X				
				X	8	5 5 6	NP	7					X				

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **08-25-2016** Complete Drilling **08-25-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **D50 ATV [88%]**  
 Driller **K&Z** Logger **J. Foote** Checked by **C. Marin**  
 Drilling Method **3.25" IDA HSA; boring backfilled upon completion**

While Drilling  $\nabla$  **32.00 ft**  
 At Completion of Drilling  $\blacktriangledown$  **40.00 ft**  
 Time After Drilling **NA**  
 Depth to Water  $\nabla$  **NA**

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

WANGENGINC 4140901.GPJ WANGENG.GDT 4/3/17



# BORING LOG SB-15

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WEI Job No.: 414-09-01

Client: **TYLin/Hanson**  
 Project: **US 150 over Illinois River - McClugage**  
 Location: **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 459.23 ft  
 North: 1477646.91 ft  
 East: 2466488.04 ft  
 Station: 2112+58  
 Offset: 37.0 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 (%)
										397.5	Hard, gray CLAY LOAM to LOAM, little fine to medium gravel; moist						
			45		15	7 9 9	NP	10			--RDR 3--	65		19	38 50/4"	4.50 P	24
										392.7	Gray SHALE						
											--hard drilling--						
											--RDR 4--						
											-- N̄ = 395 blows/foot--			20	M SPT		14
											-- N̄ = 570 blows/foot--			21	M SPT		17
	407.5	Very dense, gray, coarse SAND, trace fine gravel; saturated									--RDR 3--						
											-- N̄ = 455 blows/foot--			22	M SPT		16
											-- N̄ = 370 blows/foot--			23	M SPT		15
	402.5	Very stiff, gray SILTY CLAY, trace gravel-size shale clasts; moist									--RDR 3--						
											-- N̄ = 286 blows/foot--			24	M SPT		14
			60		18	7 9 12	3.44 B	23				80					

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling: **08-25-2016** Complete Drilling: **08-25-2016**  
 Drilling Contractor: **Wang Testing Service** Drill Rig: **D50 ATV [88%]**  
 Driller: **K&Z** Logger: **J. Foote** Checked by: **C. Marin**  
 Drilling Method: **3.25" IDA HSA; boring backfilled upon completion**

While Drilling: **32.00 ft**  
 At Completion of Drilling: **40.00 ft**  
 Time After Drilling: **NA**  
 Depth to Water: **NA**

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

WANGENGINC 4140901.GPJ WANGENG.GDT 4/3/17



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# BORING LOG SB-15

WEI Job No.: 414-09-01

Client: **TYLin/Hanson**  
 Project: **US 150 over Illinois River - McClugage**  
 Location: **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 459.23 ft  
 North: 1477646.91 ft  
 East: 2466488.04 ft  
 Station: 2112+58  
 Offset: 37.0 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 (%)
	377.7	-- N̄ = 200 blows/foot-- Boring terminated at 81.50 ft		X	25	M SPT		15									
			85														
			90														
			95														
			100														

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **08-25-2016** Complete Drilling **08-25-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **D50 ATV [88%]**  
 Driller **K&Z** Logger **J. Foote** Checked by **C. Marin**  
 Drilling Method **3.25" IDA HSA; boring backfilled upon completion**

While Drilling  $\nabla$  **32.00 ft**  
 At Completion of Drilling  $\blacktriangledown$  **40.00 ft**  
 Time After Drilling **NA**  
 Depth to Water  $\nabla$  **NA**

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



# BORING LOG SB-16

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WEI Job No.: 414-09-01

Client: **TYLin/Hanson**  
 Project: **US 150 over Illinois River - McClugage**  
 Location: **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 460.49 ft  
 North: 1477599.29 ft  
 East: 2466473.11 ft  
 Station: 2112+65  
 Offset: 86.0 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 (%)
	460.0	6-inch thick, brown SANDY LOAM to LOAM, trace concrete and slag; wet															
	459.2	--TOPSOIL-- Medium stiff, dark brown CLAY LOAM, trace brick and slag; moist			1	11 17 21	0.50 P	16						9	7 8 8	NP	7
	457.5	--FILL-- Light brown, fine SAND; damp Hard, light brown SILTY CLAY LOAM to SILTY LOAM; damp			2	4 8 8	> 4.50 P	14						10	9 15 23	NP	7
		--RDR 3--  --trace plant roots--			3	6 7 9	2.67 N/6	13						11	12 11 12	NP	4
	452.5	Dense, light brown, fine to medium SAND to SANDY LOAM; damp			4	7 10 21	NP	6						12	8 8 9	NP	8
	450.0	Medium dense to dense, brown GRAVELLY SAND to SANDY GRAVEL; damp to saturated			5	16 21 18	NP	5									
		--RDR 3--			6	10 11 9	NP	4						13	8 7 7	NP	10
					7	8 7 9	NP	5									
					8	11 11 9	NP	4						14	5 5 7	NP	7

### GENERAL NOTES

Begin Drilling **08-24-2016** Complete Drilling **08-24-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **D50 ATV [88%]**  
 Driller **K&Z** Logger **J. Foote** Checked by **C. Marin**  
 Drilling Method **3.25" IDA HSA; boring backfilled upon completion**

### WATER LEVEL DATA

While Drilling  $\nabla$  **31.00 ft**  
 At Completion of Drilling  $\blacktriangledown$  **37.00 ft**  
 Time After Drilling **NA**  
 Depth to Water  $\nabla$  **NA**

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

WANGENGINC 4140901.GPJ WANGENG.GDT 4/3/17





# BORING LOG SB-16

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WEI Job No.: 414-09-01

Client: **TYLin/Hanson**  
 Project: **US 150 over Illinois River - McClugage**  
 Location: **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 460.49 ft  
 North: 1477599.29 ft  
 East: 2466473.11 ft  
 Station: 2112+65  
 Offset: 86.0 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 (%)
											--rig chatter from 60 to 61 feet--						
			45		15	6 7 8	NP	10		396.2	Very stiff, gray SILTY CLAY, trace gravel-size shale clasts; moist	65		19	6 8 12	3.36 S	27
											--RDR 3--						
										393.7	Gray SHALE						
											--RDR 3 to 4--						
			50		16	16 12 13	NP	13				70		20	50/5"	NP	18
	408.7	Dense, brown to gray, coarse SAND, little fine gravel; saturated --RDR 3--															
			55		17	18 20 25	NP	12			--Ñ = 313 blows/foot--			21	M SPT		15
		--heaving sand in augers--															
											--Ñ = 308 blows/foot--						
											--Ñ = 363 blows/foot--						
											--Ñ = 500 blows/foot--						
			60		18	13 21 22	NP	16				80		24	M SPT		18

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling: **08-24-2016** Complete Drilling: **08-24-2016**  
 Drilling Contractor: **Wang Testing Service** Drill Rig: **D50 ATV [88%]**  
 Driller: **K&Z** Logger: **J. Foote** Checked by: **C. Marin**  
 Drilling Method: **3.25" IDA HSA; boring backfilled upon completion**

While Drilling: **31.00 ft**  
 At Completion of Drilling: **37.00 ft**  
 Time After Drilling: **NA**  
 Depth to Water: **NA**

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

WANGENGINC 4140901.GPJ WANGENG.GDT 4/3/17



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# BORING LOG SB-16

WEI Job No.: 414-09-01

Client: **TYLin/Hanson**  
 Project: **US 150 over Illinois River - McClugage**  
 Location: **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 460.49 ft  
 North: 1477599.29 ft  
 East: 2466473.11 ft  
 Station: 2112+65  
 Offset: 86.0 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 (%)
		-- Ñ = 1,000 blows/foot--		⊗	25	M SPT		18									
	376.7	-- Ñ = 1,000 blows/foot--		⊗	26	M SPT		17									
		Boring terminated at 83.83 ft															
			85														
			90														
			95														
			100														

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **08-24-2016** Complete Drilling **08-24-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **D50 ATV [88%]**  
 Driller **K&Z** Logger **J. Foote** Checked by **C. Marin**  
 Drilling Method **3.25" IDA HSA; boring backfilled upon completion**

While Drilling  $\nabla$  **31.00 ft**  
 At Completion of Drilling  $\blacktriangledown$  **37.00 ft**  
 Time After Drilling **NA**  
 Depth to Water  $\nabla$  **NA**

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





# BORING LOG SB-17

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WEI Job No.: 414-09-01

Client: **TYLin/Hanson**  
 Project: **US 150 over Illinois River - McClugage**  
 Location: **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 453.00 ft  
 North: 1477619.27 ft  
 East: 2466650.23 ft  
 Station: 2114+16  
 Offset: 7.0 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 (%)
		--heaving sand in augers--									-- Ñ = 256 blows/foot--			19	M SPT		16
			45		15	11 6 9	NP	10			-- Ñ = 400 blows/foot--			20	M SPT		14
											-- Ñ = 287 blows/foot--			21	M SPT		16
			50		16	7 10 10	NP	8			-- Ñ = 278 blows/foot--			22	M SPT		15
	401.3	Brown SANDY LOAM --RDR 3--									-- Ñ = 333 blows/foot--			23	M SPT		16
	399.0	Very stiff, dark gray SILTY CLAY, trace gravel-size shale clasts; moist --RDR 3--	55		17	9 8 14	3.03 S	19		378.8	Boring terminated at 74.17 ft			24	M SPT		15
	394.3	Gray SHALE --RDR 4--	60		18	18	NP	14									

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **08-22-2016** Complete Drilling **08-22-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **D50 ATV [88%]**  
 Driller **K&Z** Logger **J. Foote** Checked by **C. Marin**  
 Drilling Method **3.25" IDA HSA; boring backfilled upon completion**

While Drilling  $\nabla$  **23.50 ft**  
 At Completion of Drilling  $\blacktriangledown$  **30.00 ft**  
 Time After Drilling **NA**  
 Depth to Water  $\nabla$  **NA**

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

WANGENGINC 4140901.GPJ WANGENG.GDT 4/3/17



# BORING LOG SB-18

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WEI Job No.: 414-09-01

Client: **TYLin/Hanson**  
 Project: **US 150 over Illinois River - McClugage**  
 Location: **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 453.10 ft  
 North: 1477523.75 ft  
 East: 2466601.74 ft  
 Station: 2114+12  
 Offset: 100.0 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 (%)	
	452.6	6-inch thick, SAND, trace brick and plant roots --TOPSOIL-- Hard, brown SILTY CLAY to SILTY CLAY LOAM, trace gravel and brick; trace plant roots; moist --FILL-- --RDR 2--			1	6 5 7	> 4.50 P	8			--rig chatter from 20 to 21 feet--			9	8 10 7		NP	
			5		2	4 6 5	> 4.50 P	12			--spoon dropped 6-inches during last hammer blow--	25		10	9 5 4		NP	13
	447.6	Dense, brown, medium SAND, little fine to medium gravel; damp --RDR 3--			3	6 13 20	NP	5		426.3	Medium dense to dense, brown, medium SAND, little fine to medium gravel; saturated --RDR 3--			11	13 9 12		NP	8
			10		4	5 12 20	NP	4				30		12	16 9 9		NP	15
	442.6	Medium dense, brown SANDY GRAVEL to GRAVELLY SAND; damp to saturated --RDR 3 to 4--			5	6 6 4	NP	8			--heaving sand in augers--							
			15		6	4 9 11	NP	6				35		13	4 6 11		NP	15
					7	7 7 10	NP	9										
			20		8	6 6 7	NP	7				40		14	5 12 18		NP	24

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **08-23-2016** Complete Drilling **08-23-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **D50 ATV [88%]**  
 Driller **K&Z** Logger **J. Foote** Checked by **C. Marin**  
 Drilling Method **3.25" IDA HSA; boring backfilled upon completion**

While Drilling  $\nabla$  **21.00 ft**  
 At Completion of Drilling  $\blacktriangledown$  **34.00 ft**  
 Time After Drilling **NA**  
 Depth to Water  $\nabla$  **NA**

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

WANGENGINC 4140901.GPJ WANGENG.GDT 4/3/17





# BORING LOG SB-19

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WEI Job No.: 414-09-01

Client: **TYLin/Hanson**  
 Project: **US 150 over Illinois River - McClugage**  
 Location: **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 444.97 ft  
 North: 1477554.27 ft  
 East: 2466833.36 ft  
 Station: 2116+10  
 Offset: 23.0 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 (%)	
	444.0	12-inch thick, brown and gray GRAVELLY SAND									--Hard drilling, 20 to 20.5 feet-- --Possible cobble and boulders-- --AUGER REFUSAL-- --offset 15 feet west-- --start of new borehole at 21 feet-- --RDR 1 to 2--							
		--TOPSOIL-- Very stiff, brown SILTY CLAY LOAM, trace fine to medium gravel and brick; moist			1	10 12 12	2.00 P	15						9	10 10 8			NR
		--FILL-- --RDR 2 to 3--																
			5		2	8 6 6	2.50 P	23				25		10	3 2 4			NP 17
	439.5	Stiff, brown SANDY CLAY LOAM, trace fine gravel; moist			3	3 4 5	1.50 P	13		418.5	Medium stiff, light brown CLAY LOAM, trace fine to medium gravel; moist			11	4 2 5			0.50 P 23
		--FILL-- --RDR 2--																
	437.0	Stiff, brown SILTY CLAY LOAM, trace fine gravel; moist			4	4 2 3	1.64 B	20		417.0	Hard, brown and gray SILTY CLAY LOAM, trace fine gravel; moist			12	5 21 30			4.00 P 18
		--RDR 2--	10															
	434.5	Very soft, brown SANDY CLAY LOAM, trace fine gravel; wet			5	2 1 2	< 0.25 P	27		413.2	Loose, gray SILT to SILTY LOAM; saturated							
		--RDR 1 to 2--																
	432.0	Very stiff, brown SILTY CLAY, trace fine to medium gravel; moist			6	3 2 3	2.46 B	19						13	4 4 4			NP 22
		--RDR 3--	15															
					7	11 10 7	3.50 P	17		408.2	Very loose to medium dense, brown and gray GRAVELLY SAND; saturated							
		--RDR 4--																
	427.0	Loose to medium dense, brown and gray GRAVELLY SAND; saturated			8	5 7 6	NP	18						14	4 1 1			NP 19
		--RDR 4--	20															

WANGENGINC 4140901.GPJ WANGENG.GDT 4/3/17

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **08-10-2016** Complete Drilling **08-10-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **D50 ATV [88%]**  
 Driller **K&Z** Logger **R. KC** Checked by **C. Marin**  
 Drilling Method **2.25" HSA to 20 feet; boring backfilled upon completion**

While Drilling **21.00 ft**  
 At Completion of Drilling **19.00 ft**  
 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 SB-20

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WEI Job No.: 414-09-01

Client: **TYLin/Hanson**  
 Project: **US 150 over Illinois River - McClugage**  
 Location: **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 445.14 ft  
 North: 1477466.19 ft  
 East: 2466781.42 ft  
 Station: 2115+98  
 Offset: 78.0 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	
	443.6	18-inch thick, black SILTY CLAY LOAM, trace gravel --TOPSOIL--																
		Very stiff to hard, black and brown CLAY LOAM, trace gravel and brick; moist --FILL-- --RDR 1 to 2--	1		1	3 3 3	2.50 P	47						9	18 6 9		NP	16
	439.6	Very soft to stiff, reddish to dark brown SILTY CLAY LOAM, trace fine gravel; moist --RDR 1 to 2--	5		2	4 8 8	4.50 P	12				25		10	3 5 4		NP	13
					3	4 3 2	0.82 B	17						11	3 4 5		NP	9
			10		4	1 1 3	< 0.25 P	26				30		12	3 5 8		NP	19
					5	3 4 5	1.89 B	21		413.4	Loose, brown to gray SILT to SILTY LOAM; saturated --RDR 2--							
	432.1	Hard, yellowish brown CLAY LOAM, trace gravel; moist --RDR 2--	15		6	5 5 4	4.00 P	13				35		13	3 3 4		NP	23
	429.6	Loose to medium dense, brown GRAVELLY SAND; saturated --RDR 2 to 4--			7	3 5 7	NP	15		408.4	Brown, fine SAND; saturated							
					8	7 7 10	NP	14		406.1	Medium dense to very dense, brown GRAVELLY SAND to			14	5 5 6		NP	22

WANGENG 4140901.GPJ WANGENG.GDT 4/3/17

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **08-18-2016** Complete Drilling **08-19-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **D50 ATV [88%]**  
 Driller **K&Z** Logger **R. KC** Checked by **C. Marin**  
 Drilling Method **3.25" IDA HSA; boring backfilled upon completion**

While Drilling  $\nabla$  **17.00 ft**  
 At Completion of Drilling  $\nabla$  **16.00 ft**  
 Time After Drilling **NA**  
 Depth to Water  $\nabla$  **NA**

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



# BORING LOG SB-20

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WEI Job No.: 414-09-01

Client: **TYLin/Hanson**  
 Project: **US 150 over Illinois River - McClugage**  
 Location: **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 445.14 ft  
 North: 1477466.19 ft  
 East: 2466781.42 ft  
 Station: 2115+98  
 Offset: 78.0 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 (%)
		SANDY GRAVEL; saturated --RDR 3--															
					15	24 11 18	NP	7			-- Ñ = 228 blows/foot--			21	M SPT		14
			45								-- Ñ = 493 blows/foot--			22	M SPT		15
										378.6	-- Ñ = 308 blows/foot--			23	M SPT		16
											Boring terminated at 66.59 ft						
		--few silty clay seams--			16	32 42 50/5"	NP	17									
	394.6	Gray SHALE --RDR 3 to 4--			17	26 20 50	> 4.50 P	17									
		-- Ñ = 97 blows/foot--			18			15									
		-- Ñ = 250 blows/foot--			19			16									
		-- Ñ = 244 blows/foot--			20			14									
			60														

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **08-18-2016** Complete Drilling **08-19-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **D50 ATV [88%]**  
 Driller **K&Z** Logger **R. KC** Checked by **C. Marin**  
 Drilling Method **3.25" IDA HSA; boring backfilled upon completion**

While Drilling  $\nabla$  **17.00 ft**  
 At Completion of Drilling  $\nabla$  **16.00 ft**  
 Time After Drilling **NA**  
 Depth to Water  $\nabla$  **NA**

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

WANGENGINC 4140901.GPJ WANGENG.GDT 4/3/17



# BORING LOG SB-21

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WEI Job No.: 414-09-01

Client: **TYLin/Hanson**  
 Project: **US 150 over Illinois River - McClugage**  
 Location: **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 444.19 ft  
 North: 1477494.62 ft  
 East: 2466971.87 ft  
 Station: 2117+61  
 Offset: 24.0 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 (%)
	443.2	12-inch thick, black and brown GRAVELLY SAND								423.7	Very stiff to hard, light brown to gray SILTY CLAY, trace fine gravel; moist						
	442.7	--TOPSOIL-- 6-inch thick, very stiff, black and brown SILTY CLAY LOAM; moist			1	5 9 7	3.50 P	16			--RDR 2 to 3--			9	12 20 23	4.50 P	19
	441.2	--FILL-- Medium dense, brown GRAVELLY SAND; moist															
		Medium stiff, black SILTY CLAY LOAM, trace plant roots; moist			2	4 2 1	0.50 P	60						10	6 8 8	2.46 B	21
	438.7	--buried topsoil--															
	437.8	--RDR 2-- Brown SAND; moist								418.7	Medium dense, brown and gray GRAVELLY SAND; saturated						
		Stiff, brown and gray SILTY CLAY, trace gravel and plant roots; moist			3	3 2 3	1.07 B	22			--RDR 2--			11	7 7 8	NP	16
	436.2	Medium stiff, brown SANDY CLAY LOAM; moist															
		--RDR 2--			4	2 3 3	0.57 B	16						12	5 7 9	NP	9
	433.7	Medium stiff, brown and gray SILTY CLAY LOAM; moist															
		--RDR 2--			5	2 2 2	0.50 P	20									
	431.2	Very loose, gray SILTY LOAM; moist															
		--RDR 2--			6	1 1 2	NP	23						13	8 9 3	NP	9
	429.7	Very loose, brown, medium SAND; moist to wet															
		--RDR 2--															
	427.2	Very loose, brown to light brown SILT; wet															
	426.2	Medium dense, brown SAND to GRAVELLY SAND; wet								407.4	Medium dense to dense, brown, coarse SAND; saturated						
		--RDR 2--			7	1 1 1	NP	24			--RDR 2 to 3--						
					8	7 8 7	NP	14			--few clay and silt seams--			14	20 12 18	NP	16

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **08-10-2016** Complete Drilling **08-11-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **D50 ATV [88%]**  
 Driller **K&Z** Logger **R. KC** Checked by **C. Marin**  
 Drilling Method **3.25" IDA HSA; boring backfilled upon completion**

While Drilling  $\nabla$  **20.25 ft**  
 At Completion of Drilling  $\nabla$  **40.00 ft**  
 Time After Drilling **NA**  
 Depth to Water  $\nabla$  **NA**

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

WANGENGINC 4140901.GPJ WANGENG.GDT 4/3/17



# BORING LOG SB-21

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WEI Job No.: 414-09-01

Client: **TYLin/Hanson**  
 Project: **US 150 over Illinois River - McClugage**  
 Location: **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 444.19 ft  
 North: 1477494.62 ft  
 East: 2466971.87 ft  
 Station: 2117+61  
 Offset: 24.0 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 (%)
		--gravel to boulder size shale clasts--	45		15	9 14 32	NP	19			-- Ñ = 244 blows/foot--	65		22	M SPT		16
	398.4	Dense, brown and gray GRAVELLY SAND; saturated --RDR 3-- --gravel-size coal clasts			16	18 17 12	NP	16			-- Ñ = 222 blows/foot--			24	M SPT		14
			50		17	14 17 28	NP	17			-- Ñ = 261 blows/foot--	70		25	M SPT		15
					18	25 20 28	NR			372.7	-- Ñ = 222 blows/foot-- Boring terminated at 71.46 ft			26	M SPT		17
	391.2	Dark gray SHALE --RDR 3 to 4--	55		19	11 14 53	> 4.50 P	14				75					
					20			19			-- Ñ = 369 blows/foot--						
					21			22			-- Ñ = 1,721 blows/foot--	80					

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **08-10-2016** Complete Drilling **08-11-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **D50 ATV [88%]**  
 Driller **K&Z** Logger **R. KC** Checked by **C. Marin**  
 Drilling Method **3.25" IDA HSA; boring backfilled upon completion**

While Drilling  $\nabla$  **20.25 ft**  
 At Completion of Drilling  $\blacktriangledown$  **40.00 ft**  
 Time After Drilling **NA**  
 Depth to Water  $\nabla$  **NA**

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

WANGENGINC 4140901.GPJ WANGENG.GDT 4/3/17



# BORING LOG SB-22

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WEI Job No.: 414-09-01

Client: **TYLin/Hanson**  
 Project: **US 150 over Illinois River - McClugage**  
 Location: **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 442.44 ft  
 North: 1477400.68 ft  
 East: 2466932.20 ft  
 Station: 2117+61  
 Offset: 78.0 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 (%)	
	442.14	14-inch thick, black SILTY CLAY --TOPSOIL-- Stiff, black and brown SILTY CLAY, trace gravel and brick; moist --FILL-- --RDR 2--			1	6 8 8	1.50 P	39		421.9	LOAM, trace fine gravel; moist Medium dense, brown to gray GRAVELLY SAND; saturated --RDR 2--			9	6 7 9		NP	9
			5		2	4 3 4	1.50 P	28		25				10	4 9 11		NP	13
	436.9	Stiff, brown to reddish brown SILTY CLAY to SILTY CLAY LOAM, trace fine gravel; moist --RDR 1 to 3--			3	3 4 5	1.72 B	19						11	5 8 9		NP	4
	432.9	Medium stiff, reddish brown LOAM to CLAY LOAM, trace fine gravel; moist	10		4	3 2 3	1.56 B	18		30				12	8 12 11		NP	23
	431.9	Loose, brown, coarse SAND; wet --RDR 1--			5	2 2 1	NP	20										
					6	1 1 1	NP	22		408.0	--gray silt seam--			13	16 13 9	> 4.50 P		14
	426.9	Dense, brown GRAVELLY SAND; saturated --RDR 3--			7	24 15 16	NP	18		405.7	Hard, greenish gray SILTY CLAY; moist Medium dense, brown and gray SANDY GRAVEL; saturated --RDR 2--							
	423.2	Hard, reddish brown CLAY	20		8	12 8 10	4.10 B	12		40				14	8 9 11		NP	9

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **08-11-2016** Complete Drilling **08-18-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **D50 ATV [88%]**  
 Driller **K&Z** Logger **R. KC** Checked by **C. Marin**  
 Drilling Method **3.25" IDA HSA; boring backfilled upon completion**

While Drilling  $\nabla$  **16.00 ft**  
 At Completion of Drilling  $\nabla$  **12.00 ft**  
 Time After Drilling **NA**  
 Depth to Water  $\nabla$  **NA**

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

WANGENGINC 4140901.GPJ WANGENG.GDT 4/3/17



# BORING LOG SB-22

Datum: NAVD 88  
 Elevation: 442.44 ft  
 North: 1477400.68 ft  
 East: 2466932.20 ft  
 Station: 2117+61  
 Offset: 78.0 RT

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WEI Job No.: 414-09-01

Client: **TYLin/Hanson**  
 Project: **US 150 over Illinois River - McClugage**  
 Location: **Peoria and Tazewell Counties, IL**

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 (%)
	400.7	Very dense, brown, coarse SAND; saturated --RDR 3--									-- N̄ = 261 blows/foot--			20			22
					15	13 32 25	NP	13			-- N̄ = 240 blows/foot--			21			15
		--greenish gray gravel-size shale clasts--	45														
	395.7	Medium dense to very dense, brown and gray GRAVELLY SAND; saturated --RDR 2--			16	12 13 10	NP	10			-- N̄ = 227 blows/foot--			22			16
			50								-- N̄ = 233 blows/foot--			23			15
										373.2	Boring terminated at 69.28 ft	70					
	388.4	Greenish gray to gray SHALE --RDR 3--			17	6 23 48	NP	15									
			55								-- N̄ = 172 blows/foot--			18	M SPT		15
											-- N̄ = 276 blows/foot--			19	M SPT		14
			60														

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **08-11-2016** Complete Drilling **08-18-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **D50 ATV [88%]**  
 Driller **K&Z** Logger **R. KC** Checked by **C. Marin**  
 Drilling Method **3.25" IDA HSA; boring backfilled upon completion**

While Drilling  $\nabla$  **16.00 ft**  
 At Completion of Drilling  $\nabla$  **12.00 ft**  
 Time After Drilling **NA**  
 Depth to Water  $\nabla$  **NA**

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

WANGENGINC 4140901.GPJ WANGENG.GDT 4/3/17



# BORING LOG SB-23

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WEI Job No.: 414-09-01

Client: **TYLin/Hanson**  
 Project: **US 150 over Illinois River - McClugage**  
 Location: **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 438.67 ft  
 North: 1477417.83 ft  
 East: 2467147.71 ft  
 Station: 2119+53  
 Offset: 20.0 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 (%)	
		Very soft to medium stiff, black to gray, organic SILTY CLAY; saturated --RDR 1--			1	0 0 0 0	< 0.25 P	73						10	13 20 14		NP	14
					2	0 0 0 0	0.82 B	76		415.1				11	10 11 11	5.33 N/6		17
	433.7	Medium stiff, gray SANDY CLAY LOAM; wet	5		3	1 1 1 1	0.75 P	24						12	10 9 11	> 4.50 P		20
	432.7	Very soft to stiff, gray SILTY CLAY LOAM, trace fine gravel; wet --RDR 1--			4	1 2 2 1	0.57 B	27						13	15 20 16	> 4.50 P		18
			10		5	2 2 1 1	1.00 P	24						14	9 21 27	> 4.50 P		16
					6	0 0 0	< 0.25 P	31						15	9 8 9	> 4.50 P		22
	426.2	Very soft, gray SANDY CLAY LOAM; wet --RDR 1--			7	2 1 2	< 0.25 P	23						8	8 5 4		NP	14
	423.7	Loose to dense, brown SANDY GRAVEL; wet --RDR 2 to 3-- --rig chatter--	15		8	8 5 4								9	10 9 7		NP	
		--loss of drilling mud--	20		9	10 9 7								10				

### GENERAL NOTES

Begin Drilling **08-22-2016** Complete Drilling **08-22-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **B57 TMR [100%]**  
 Driller **R&J** Logger **M. Schmelzel** Checked by **C. Marin**  
 Drilling Method **4" casing to 26.5 feet, mud rotary from 10.5 feet;**  
**boring backfilled upon completion**

### WATER LEVEL DATA

While Drilling  **River water depth 3'**  
 At Completion of Drilling   
 Time After Drilling **NA**  
 Depth to Water  **NA**

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

WANGENGINC 4140901.GPJ WANGENG.GDT 4/3/17



# BORING LOG SB-23

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WEI Job No.: 414-09-01

Client **TYLin/Hanson**  
 Project **US 150 over Illinois River - McClugage**  
 Location **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 438.67 ft  
 North: 1477417.83 ft  
 East: 2467147.71 ft  
 Station: 2119+53  
 Offset: 20.0 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 (%)
	397.4	Very weak, gray SHALE --RDR 3 to 4--									RECOVERY= 100% RQD = 95%						
			45		16	8 12 14	> 4.50 P	18		374.2		65		19			
											Boring terminated at 64.50 ft						
		Run 1: 49.5 to 59.5 feet RECOVERY= 92% RQD = 85%	50		17	20 25 60	> 4.50 P	16									
		Run 2: 59.5 to 64.5 feet	60		18												

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **08-22-2016** Complete Drilling **08-22-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **B57 TMR [100%]**  
 Driller **R&J** Logger **M. Schmelzel** Checked by **C. Marin**  
 Drilling Method **4" casing to 26.5 feet, mud rotary from 10.5 feet;**  
**boring backfilled upon completion**

While Drilling  **River water depth 3'**  
 At Completion of Drilling   
 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 4140901.GPJ WANGENG.GDT 4/3/17





# BORING LOG SB-24

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WEI Job No.: 414-09-01

Client: **TYLin/Hanson**  
 Project: **US 150 over Illinois River - McClugage**  
 Location: **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 439.00 ft  
 North: 1477343.68 ft  
 East: 2467107.74 ft  
 Station: 2119+44  
 Offset: 63.0 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 (%)	
		Very soft to medium stiff, dark gray, organic SILTY LOAM, trace to little shells; saturated --RDR 1--			1	0 0 0 0	< 0.25 P	112			--some rig chatter--			10	20 11 12			14
	435.3	Very soft to medium stiff, dark gray to brown SILTY CLAY LOAM; moist to wet --RDR 1--			2	0 0 1 2	0.74 B	52						11	10 10 8			13
			5		3	1 1 2 2	0.57 B	21				25			8 9 28			12
					4	0 1 1 2	0.49 B	19			--few gravel-size shale clasts--			12				
					5	0 0 0 0	< 0.25 P	26		411.5	Very stiff to hard, gray, laminated SILTY CLAY; moist --RDR 4 to 5--			13	20 30 34		10.67 N/6	16
		--L <sub>L</sub> (%)=NA, P <sub>L</sub> (%)=NA-- --%Gravel=0.0-- --%Sand=9.9-- --%Silt=75.0-- --%Clay=15.1--	10		6	0 0 1 1	0.25 B	27				30			11 8 10		3.00 N/6	20
	424.3	Gray, coarse SAND; wet	15		7	0 1 1 2	0.25 B	26			--trace medium gravel--			14				
	423.0	Medium dense to dense, brown GRAVELLY SAND; wet --RDR 2 to 3--			8	5 11 13		11				35						
					9	10 8 6		13			--gray, gravel-size shale clasts-- --little medium gravel--			15	8 6 7		2.17 N/6	25

### GENERAL NOTES

Begin Drilling **08-23-2016** Complete Drilling **08-23-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **B57 TMR [100%]**  
 Driller **R&J** Logger **M. Schmelzel** Checked by **C. Marin**  
 Drilling Method **4" casing to 26.5 feet and 3" casing to 54.5 feet, mud rotary from 15.5 feet; boring backfilled upon completion**

### WATER LEVEL DATA

While Drilling  $\nabla$  **River water depth 3'**  
 At Completion of Drilling  $\nabla$   
 Time After Drilling **NA**  
 Depth to Water  $\nabla$  **NA**

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

WANGENGINC 4140901.GPJ WANGENG.GDT 4/3/17



# BORING LOG SB-24

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WEI Job No.: 414-09-01

Client: **TYLin/Hanson**  
 Project: **US 150 over Illinois River - McClugage**  
 Location: **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 439.00 ft  
 North: 1477343.68 ft  
 East: 2467107.74 ft  
 Station: 2119+44  
 Offset: 63.0 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 (%)
		--hard drilling-- --rig chatter--															
			45		16	9 18 33	8.50 N/6	17				65					
		--hard drilling--									Run 2: 64.5 to 73.5 feet RECOVERY= 100% RQD = 98% --dark gray mudstone lenses--						
			50		17	10 8 9	2.83 N/6	22				70		20			
	387.3	Very weak to very strong, dark gray SHALE															
		Run 1: 54.5 to 64.5 feet RECOVERY= 60% RQD = 60%	55		18	55 70/2"	NP	16			Run 3: 73.5 to 78.5 feet RECOVERY= 70% RQD = 70% --dark gray mudstone lenses--	75		21			
			60		19						Boring terminated at 78.50 ft	80					

WANGENGINC 4140901.GPJ WANGENG.GDT 4/3/17

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **08-23-2016** Complete Drilling **08-23-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **B57 TMR [100%]**  
 Driller **R&J** Logger **M. Schmelzel** Checked by **C. Marin**  
 Drilling Method **4" casing to 26.5 feet and 3" casing to 54.5 feet, mud rotary from 15.5 feet; boring backfilled upon completion**

While Drilling  **River water depth 3'**  
 At Completion of Drilling   
 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 SB-25

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WEI Job No.: 414-09-01

Client: **TYLin/Hanson**  
 Project: **US 150 over Illinois River - McClugage**  
 Location: **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 437.00 ft  
 North: 1477282.90 ft  
 East: 2467275.95 ft  
 Station: 2121+23  
 Offset: 56.0 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	
		Very soft to medium stiff, gray SILTY CLAY to CLAY; saturated --RDR 1 to 2--			1	0 0 0 0	< 0.25 P	57							9	10 9 8	NP	16
					2	0 0 2 3	0.41 B	43		415.0	Medium dense, brown, fine GRAVELLY SAND; wet --RDR 2--			10	7 6 7	NP	17	
			5		3	2 2 3 2	0.57 B	24				25		11	6 8 12	NP	17	
					4	0 1 2	0.82 B	33		410.0	Loose, brown, medium SAND; 1-inch organic plant layer --RDR 2--			12	7 6 3	NP	24	
			10		5	1 1 1	0.74 B	21		406.5	--rig chatter--			30				
					6	1 10 3	0.41 B	28			Dense, brown, coarse GRAVELLY SAND; wet --RDR 3 to 4--			13	25 22 16	NP	9	
	423.5	Brown SANDY GRAVEL; wet			7	3 9 6	NP	18				35		14	12 18 31	NP	11	
	422.5	Medium dense, brown, fine to medium SAND to SANDY LOAM, little medium to coarse gravel; wet to saturated --RDR 1 to 2-- --few silt lenses--	15		8	5 5 6	NP	22			--rig chatter, slow advancement--			14				
			20									40						

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **08-18-2016** Complete Drilling **08-19-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **B57 TMR [100%]**  
 Driller **R&J** Logger **M. Schmelzel** Checked by **C. Marin**  
 Drilling Method **4" casing to 8 feet, mud rotary thereafter; boring backfilled upon completion**

While Drilling  **River water depth 3.5'**  
 At Completion of Drilling   
 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 4140901.GPJ WANGENG.GDT 4/3/17



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WEI Job No.: 414-09-01

Client: **TYLin/Hanson**  
 Project: **US 150 over Illinois River - McClugage**  
 Location: **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 437.00 ft  
 North: 1477282.90 ft  
 East: 2467275.95 ft  
 Station: 2121+23  
 Offset: 56.0 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 (%)	
	393.3	Hard, brown to gray CLAY; moist --RDR 3 to 4--	45		15	11 9 10	4.50 P	17			Black SHALE --RDR 4--							
										374.3	--possible cobble--			21	24 20 25		NP	14
											Gray SILTY CLAY; little, angular, gravel-size siltstone clasts -- Ñ = 1,623 blows/foot--			22	M SPT			22
										372.1	Black SHALE --RDR 5-- -- Ñ = 1,721 blows/foot--	65		23	M SPT			18
	389.0	Stiff to hard, gray, laminated SILTY CLAY; moist --RDR 3 to 4-- -- Ñ = 250 blows/foot--	50		16	10 15 63	1.50 P	15			-- Ñ = 2,387 blows/foot--			24	M SPT			18
														25	M SPT			
											-- Ñ = 33 blows/foot--			26	M SPT			
											--dark gray, gravel-size shale clasts--			27	M SPT			
											-- Ñ = 51 blows/foot--							
											--dark gray, gravel-size shale clasts--							
											-- Ñ = 435 blows/foot--							
										361.0	Boring terminated at 76.00 ft			27	M SPT			15
											--trace gravel and gravel-size coal--							
	377.3		60		20	14 14 15	> 4.50 P	17										

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **08-18-2016** Complete Drilling **08-19-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **B57 TMR [100%]**  
 Driller **R&J** Logger **M. Schmelzel** Checked by **C. Marin**  
 Drilling Method **4" casing to 8 feet, mud rotary thereafter; boring backfilled upon completion**

While Drilling  **River water depth 3.5'**  
 At Completion of Drilling   
 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 4140901.GPJ WANGENG.GDT 4/3/17



# BORING LOG SB-26

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WEI Job No.: 414-09-01

Client **TYLin/Hanson**  
 Project **US 150 over Illinois River - McClugage**  
 Location **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 438.17 ft  
 North: 1477272.12 ft  
 East: 2467513.49 ft  
 Station: 2123+47  
 Offset: 23.0 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 (%)	
	436.7	Very soft, dark gray, organic SILTY CLAY; saturated --RDR 1--			1	0 0 0 0	< 0.25 P	106						10	18 18 12			NP 12
		Soft to stiff, gray SILTY CLAY; saturated --RDR 1--			2	0 0 0 0	0.66 B	31						11	20 15 13			NP 11
			5		3	3 3 4 5	1.72 B	26				25		12	20 18 12			NP 12
	430.9	Soft, gray SANDY CLAY LOAM to CLAY LOAM, trace plant matter; wet --RDR 1--			4	4 3 3 2	0.25 P	22						13	16 22 23			NP 9
	429.7	Soft to stiff, gray CLAY to SILTY CLAY; wet --RDR 1--			5	0 0 3 2	1.00 P	26						14	33 31 32			NP 10
		--trace plant matter--	10		6	2 2 2 2	0.82 B	27						15	24 30 27			NP 9
		--trace shells--	15		7	0 1 2	0.41 B	49						15				
	421.2	Medium dense to very dense, gray SANDY GRAVEL to GRAVELLY SAND; wet --RDR 3--			8	0 0 0	0.41 B	59						15				
			20		9	13 15 12	NP	13		399.9	Medium dense to dense, gray, coarse SAND, little fine to medium gravel; wet to saturated --RDR 3--			40				

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### GENERAL NOTES

Begin Drilling **09-12-2016** Complete Drilling **09-12-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **B57 TMR [100%]**  
 Driller **R&J** Logger **M. Schmelzel** Checked by **C. Marin**  
 Drilling Method **4" casing to 48.5 feet, mud rotary after 12.5 feet;**  
**boring backfilled upon completion**

### WATER LEVEL DATA

While Drilling  **River water depth 6'**  
 At Completion of Drilling   
 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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WEI Job No.: 414-09-01

Client: **TYLin/Hanson**  
 Project: **US 150 over Illinois River - McClugage**  
 Location: **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 437.67 ft  
 North: 1477141.22 ft  
 East: 2467635.93 ft  
 Station: 2125+10  
 Offset: 52.0 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 (%)
	434.0	Very soft, dark gray, organic SILTY CLAY; saturated --RDR 1-	1		1	0 0 0 0	< 0.25 P	77						10	0 0 1	0.57 B	43
					2	0 0 0 0	< 0.25 P	75			--trace plant matter--			11	0 0 1	0.41 B	51
		Soft to medium stiff, gray SILTY CLAY; wet to saturated --RDR 1-	5		3	0 0 0 0	0.75 P	27			--trace plant matter--	25		12	0 0 0	0.41 B	43
	429.7				4	3 2 1 1	0.49 B	24						13	0 0 0	0.41 B	61
	427.9	Very loose, gray SANDY LOAM; wet --RDR 1-			5	3 2 1 2	NP	18									
		Medium stiff, gray SANDY CLAY LOAM to CLAY LOAM; moist --RDR 1-	10		6	1 2 2 3	0.75 P	22						14	0 0 5	0.25 B	42
	425.7	Very soft to medium stiff, gray CLAY to SILTY CLAY, trace shells; moist to wet --RDR 1-			7	0 1 2	0.66 B	32			--rig chatter--						
			15		8	0 1 1	0.66 B	38		404.7	Very dense, brown SANDY GRAVEL; wet --RDR 3 to 4--			15	47 25 26	NP	13
					9	0 2 1	0.48 B	49		399.9	Medium dense, brown, medium SAND, little medium gravel; wet --RDR 4--						
		--trace plant matter--	20											40			

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **09-13-2016** Complete Drilling **09-13-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **B57 TMR [100%]**  
 Driller **R&J** Logger **M. Schmelzel** Checked by **C. Marin**  
 Drilling Method **4" casing to 56 feet, mud rotary after 12 feet; boring backfilled upon completion**

While Drilling  **River water depth 6.5'**  
 At Completion of Drilling   
 Time After Drilling **NA**  
 Depth to Water  **NA**

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

WANGENGINC 4140901.GPJ WANGENG.GDT 4/3/17



# BORING LOG SB-27

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WEI Job No.: 414-09-01

Client **TYLin/Hanson**  
 Project **US 150 over Illinois River - McClugage**  
 Location **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 437.67 ft  
 North: 1477141.22 ft  
 East: 2467635.93 ft  
 Station: 2125+10  
 Offset: 52.0 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 (%)
	394.9	Medium dense to dense, brown GRAVELLY SAND; wet --RDR 4--	45	X	17	25 15 16	NP	9		376.7	Strong, dark gray MUDSTONE	65		20			
	384.2	Weak, gray SHALE, few mudstone lenses --decrease in rig chatter--	50	X	18	14 11 10	NP	9		369.7	Strong, black SHALE	70		21			
		Run 1: 56.0 to 65.0 feet RECOVERY= 87% RQD = 87%	55	X	19	50 50/3"	NP	16		365.2	Weak, gray SHALE	75					
		Boring terminated at 74.00 ft	60							363.7		80					

WANGENG 4140901.GPJ WANGENG.GDT 4/3/17

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **09-13-2016** Complete Drilling **09-13-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **B57 TMR [100%]**  
 Driller **R&J** Logger **M. Schmelzel** Checked by **C. Marin**  
 Drilling Method **4" casing to 56 feet, mud rotary after 12 feet; boring backfilled upon completion**

While Drilling  **River water depth 6.5'**  
 At Completion of Drilling   
 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 SB-28

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WEI Job No.: 414-09-01

Client **TYLin/Hanson**  
 Project **US 150 over Illinois River - McClugage**  
 Location **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 438.25 ft  
 North: 1477143.29 ft  
 East: 2467839.40 ft  
 Station: 2126+97  
 Offset: 27.0 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 (%)
Hatched	426.0	Very soft, dark gray, organic SILTY CLAY; saturated --RDR 1--	10	10	1	0 0 0 0	< 0.25 P	102	Hatched	426.0	Very soft, dark gray, organic SILTY CLAY; saturated --RDR 1--	10	10	10	0 0 1	0.66 B	38
			15	15	2	0 0 0 0	< 0.25 P	94				15	15	11	1 1 2	0.41 B	43
			20	20	3	0 0 0 0	< 0.25 P	84				25	25	12	0 2 1	0.82 B	50
			25	25	4	0 0 0 0	< 0.25 P	83				30	30	13	0 1 1	0.66 B	53
			30	30	5	0 0 0 0	< 0.25 P	76				35	35	14	0 0 0	0.41 B	45
			35	35	6	0 0 0 0	< 0.25 P	91				40	40	15	0 0 0	0.33 B	45
Hatched	423.8	Medium stiff, gray LOAM to CLAY LOAM, trace fine gravel and plant matter; few clay lenses; saturated --RDR 1--	15	15	7	0 0 0	0.50 P	25	Hatched	423.8	Medium stiff, gray LOAM to CLAY LOAM, trace fine gravel and plant matter; few clay lenses; saturated --RDR 1--	35	35	15	0 0 0	0.33 B	45
			20	20	8	0 2 1	0.57 B	32				40	40	15	0 0 0	0.33 B	45
Hatched	423.8	Soft to medium stiff, gray CLAY to SILTY CLAY, trace shells; moist --RDR 1-- --trace plant matter--	20	20	9	1 1 2	0.90 B	38	Hatched	423.8	Soft to medium stiff, gray CLAY to SILTY CLAY, trace shells; moist --RDR 1-- --trace plant matter--	40	40	15	0 0 0	0.33 B	45
			25	25	9	1 1 2	0.90 B	38				45	45	15	0 0 0	0.33 B	45

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **09-14-2016** Complete Drilling **09-14-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **B57 TMR [100%]**  
 Driller **R&J** Logger **M. Schmelzel** Checked by **C. Marin**  
 Drilling Method **4" casing to 50.5 feet, mud rotary after 12.5 feet;**  
**boring backfilled upon completion**

While Drilling  **River water depth 6'**  
 At Completion of Drilling   
 Time After Drilling **NA**  
 Depth to Water  **NA**

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

WANGENGINC 4140901.GPJ WANGENG.GDT 4/3/17



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# BORING LOG SB-28

WEI Job No.: 414-09-01

Client: **TYLin/Hanson**  
 Project: **US 150 over Illinois River - McClugage**  
 Location: **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 438.25 ft  
 North: 1477143.29 ft  
 East: 2467839.40 ft  
 Station: 2126+97  
 Offset: 27.0 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 (%)
	396.8	--rig chatter--		X	16	0 0 0	0.33 B	40			-- N̄ = 159 blows/foot--		X	21	M SPT		17
		Medium dense, gray SANDY GRAVEL to GRAVELLY SAND; wet									--RDR 4--		X	22	M SPT		17
			45	X	17	9 5 6	NP	18		374.3	Dark gray SHALE	65		23	M SPT		
											--RDR 4--			24	M SPT		
											-- N̄ = 2,387 blows/foot--						
														25	M SPT		
			50	X	18	7 9 14	NP	20		368.1	-- N̄ = 4,095 blows/foot--						
											-- N̄ = 1,000 blows/foot--						18
											Boring terminated at 70.20 ft						
	384.8	--rig chatter stopped--		X	19	55/6"	NP	17									
		Gray SHALE									--RDR 4--						
			55	X													
											-- N̄ = 196 blows/foot--						
			60	X	20			17									

### GENERAL NOTES

Begin Drilling **09-14-2016** Complete Drilling **09-14-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **B57 TMR [100%]**  
 Driller **R&J** Logger **M. Schmelzel** Checked by **C. Marin**  
 Drilling Method **4" casing to 50.5 feet, mud rotary after 12.5 feet;**  
**boring backfilled upon completion**

### WATER LEVEL DATA

While Drilling  **River water depth 6'**  
 At Completion of Drilling   
 Time After Drilling **NA**  
 Depth to Water  **NA**

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

WANGENGINC 4140901.GPJ WANGENG.GDT 4/3/17



# BORING LOG SB-29

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WEI Job No.: 414-09-01

Client **TYLin/Hanson**  
 Project **US 150 over Illinois River - McClugage**  
 Location **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 438.25 ft  
 North: 1477006.86 ft  
 East: 2468013.08 ft  
 Station: 2129+10  
 Offset: 34.0 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 (%)	
	422.5	Very soft, dark gray, organic SILTY CLAY; saturated --RDR 1--	10	0	1	0 0 0	< 0.25 P	82		411.3	Loose, dark gray SANDY LOAM, trace shells; wet --RDR 1--	10	0	10	0 0 0	0.16 B	83	
			20	0	2	0 0 0	< 0.25 P	80				11	0	11	0 0 0	0.16 B	56	
			5	0	3	0 0 0	< 0.25 P	85				25	0	12	0 0 0	0.16 B	42	
			10	0	4	0 0 0	< 0.25 P	54				30	0	13	0 3 1	NP	38	
			15	0	5	0 0 0	< 0.25 P	77				408.8	0	14	0 7 2	NP	19	
			10	0	6	0 0 0	0.08 B	75				405.0	0	15	0 0 0	< 0.25 P	68	
			15	0	7	0 0 0	0.16 B	61					Very soft to soft, gray CLAY to SILTY CLAY; wet --RDR 1--		35	0	0	0
			15	0	8	0 0 0	< 0.25 P	40				421.3	0	15	0 0 0	< 0.25 P	68	
			20	0	9	0 0 0	0.16 B	55					Very soft, gray SILTY CLAY to SILTY CLAY LOAM, trace plant matter and shells; wet to saturated --RDR 1--		40	0	0	0

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### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **09-14-2016** Complete Drilling **09-14-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **B57 TMR [100%]**  
 Driller **R&J** Logger **M. Schmelzel** Checked by **C. Marin**  
 Drilling Method **4" casing to 13.5 feet, mud rotary thereafter; boring backfilled upon completion**

While Drilling **River water depth 6'**  
 At Completion of Drilling   
 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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WEI Job No.: 414-09-01

Client: **TYLin/Hanson**  
 Project: **US 150 over Illinois River - McClugage**  
 Location: **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 438.25 ft  
 North: 1477006.86 ft  
 East: 2468013.08 ft  
 Station: 2129+10  
 Offset: 34.0 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 (%)
					16	0 0 0	0.08 B	66						20	60 14.1"	NP	17
											-- Ñ = 278 blows/foot--			21	M SPT		20
		--trace shells--	45		17	0 0 0	0.16 B	43			-- Ñ = 1,721 blows/foot--			22	M SPT		18
											-- Ñ = 1,721 blows/foot--			23	M SPT		15
			50		18	0 0 0	0.49 B	53			-- Ñ = 1,000 blows/foot--			24	M SPT		
	385.0	Medium dense, gray SANDY GRAVEL; wet --RDR 1 to 4--									-- Ñ = 4,095 blows/foot--			25	M SPT		
	382.3	--increased drilling resistance-- Dark gray to gray SHALE --RDR 4--	55		19	18 13 11	NP	21		362.9	-- Ñ = 333 blows/foot-- Boring terminated at 75.40 ft			26	M SPT		15
			60														

### GENERAL NOTES

Begin Drilling **09-14-2016** Complete Drilling **09-14-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **B57 TMR [100%]**  
 Driller **R&J** Logger **M. Schmelzel** Checked by **C. Marin**  
 Drilling Method **4" casing to 13.5 feet, mud rotary thereafter; boring backfilled upon completion**

### WATER LEVEL DATA

While Drilling  **River water depth 6'**  
 At Completion of Drilling   
 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 4140901.GPJ WANGENG.GDT 4/3/17



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WEI Job No.: 414-09-01

Client: **TYLin/Hanson**  
 Project: **US 150 over Illinois River - McClugage**  
 Location: **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 437.50 ft  
 North: 1476992.65 ft  
 East: 2468164.66 ft  
 Station: 2130+55  
 Offset: 10.0 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 (%)
Profile 1 (Hatched)	428.0	Very soft, dark gray, organic SILTY CLAY; saturated --RDR 1--	10	0	1	0 0 0 0 0	< 0.25 P	83	Profile 2 (Dotted)	404.3	Loose, dark gray, coarse SAND, little fine gravel; saturated --RDR 1--  --trace shells	30	0	10	0 0 1	0.25 P	37
			15	0	2	0 0 0 0 0	0.41 B	71				35	0	11	0 0 0	0.41 B	42
			20	0	3	0 0 0 0 0	< 0.25 P	73				40	0	12	0 0 1	0.25 B	43
			25	0	4	0 0 0 0 0	< 0.25 P	78				45	0	13	0 0 1	NA	
			30	0	5	0 0 0 0 0	< 0.25 P	62				50	0	14	0 0 0	0.41 B	30
			35	0	6	0 0 0 0 0	< 0.25 P	59				55	0	15	2 4 2	NP	20
			40	0	7	0 0 0 0 0	< 0.25 P	32				60	0	16			
			45	0	8	0 0 0 0 0	< 0.25 P	32				65	0	17			
			50	0	9	0 2 1	0.25 B	54				70	0	18			
55	399.3	Very soft to soft, gray CLAY to SILTY CLAY; wet --RDR 1--	20					55	399.3	Very soft to soft, gray CLAY to SILTY CLAY; wet --RDR 1--	40						

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **09-16-2016** Complete Drilling **09-19-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **B57 TMR [100%]**  
 Driller **R&J** Logger **M. Schmelzel** Checked by **C. Marin**  
 Drilling Method **4" casing to 63.5 feet, mud rotary after 14 feet;**  
**boring backfilled upon completion**

While Drilling  **River water depth 6'**  
 At Completion of Drilling   
 Time After Drilling **NA**  
 Depth to Water  **NA**

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

WANGENGINC 4140901.GPJ WANGENG.GDT 4/3/17



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WEI Job No.: 414-09-01

Client: **TYLin/Hanson**  
 Project: **US 150 over Illinois River - McClugage**  
 Location: **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 437.50 ft  
 North: 1476992.65 ft  
 East: 2468164.66 ft  
 Station: 2130+55  
 Offset: 10.0 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 (%)
		--trace shells			16	0 0 0	0.25 B	42							40 30 13		
			45		17	0 0 0	NR			373.5	--decreased rig chatter-- Interbedded strong, gray MUDSTONE and weak, highly weathered SHALE	65		21	75/1" CORE	NP	18
			50		18	0 0 0	< 0.25 P	88				70		22			
	381.5	Very soft, gray LOAM to CLAY LOAM; wet --RDR 1 to 4--	55		19	0 2 2	< 0.25 P	20				75			CORE		
	378.0	--rig chatter-- Possibly GRAVELLY SAND	60									80					

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **09-16-2016** Complete Drilling **09-19-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **B57 TMR [100%]**  
 Driller **R&J** Logger **M. Schmelzel** Checked by **C. Marin**  
 Drilling Method **4" casing to 63.5 feet, mud rotary after 14 feet;**  
**boring backfilled upon completion**

While Drilling  $\nabla$  **River water depth 6'**  
 At Completion of Drilling  $\blacktriangledown$   
 Time After Drilling **NA**  
 Depth to Water  $\nabla$  **NA**

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

WANGENGINC 4140901.GPJ WANGENG.GDT 4/3/17



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WEI Job No.: 414-09-01

Client: **TYLin/Hanson**  
 Project: **US 150 over Illinois River - McClugage**  
 Location: **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 437.50 ft  
 North: 1476992.65 ft  
 East: 2468164.66 ft  
 Station: 2130+55  
 Offset: 10.0 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 (%)
	352.5	Boring terminated at 85.00 ft	85		23												

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **09-16-2016** Complete Drilling **09-19-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **B57 TMR [100%]**  
 Driller **R&J** Logger **M. Schmelzel** Checked by **C. Marin**  
 Drilling Method **4" casing to 63.5 feet, mud rotary after 14 feet;**  
**boring backfilled upon completion**

While Drilling  **River water depth 6'**  
 At Completion of Drilling   
 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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WEI Job No.: 414-09-01

Client: **TYLin/Hanson**  
 Project: **US 150 over Illinois River - McClugage**  
 Location: **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 437.50 ft  
 North: 1476920.20 ft  
 East: 2468182.27 ft  
 Station: 2130+99  
 Offset: 50.0 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 (%)
		Very soft, dark gray SILTY CLAY to SILTY CLAY LOAM, trace organic matter; saturated --RDR 1--			1	0 0 0 0	< 0.25 P	88						10	0 0 0	N/A	98
					2	0 0 0 0	< 0.25 P	56			--trace shells--			11	0 0 1	0.25 B	51
			5		3	0 0 0 0	< 0.25 P	68			--trace shells--	25		12	0 0 0	0.16 B	48
					4	0 0 0 0	< 0.25 P	64						13	0 0 0	0.25 B	53
					5	0 0 0 0	< 0.25 P	67									
			10		6	0 0 0 0	< 0.25 P	67				30		14	0 2 1	0.16 B	27
					7	0 0 0	< 0.25 P	81		404.8	Loose, gray GRAVELLY SAND; saturated --RDR 1--						
			15		8	0 0 0	0.16 B	77			--%Gravel=33.2-- --%Sand=63.6-- --%Silt=1.7-- --%Clay=1.6-- --A-1-b (0)--			15	4 4 5	NP	19
		--trace shells--			9	0 0 2	0.08 B	53		399.8	Very soft to medium stiff, gray CLAY to SILTY CLAY, trace shells; wet to saturated --RDR 1--						
			20											40			

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### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **09-15-2016** Complete Drilling **09-15-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **B57 TMR [100%]**  
 Driller **R&J** Logger **M. Schmelzel** Checked by **C. Marin**  
 Drilling Method **4" casing to 13 feet, mud rotary thereafter; boring backfilled upon completion**

While Drilling  **River water depth 6.5'**  
 At Completion of Drilling   
 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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WEI Job No.: 414-09-01

Client: **TYLin/Hanson**  
 Project: **US 150 over Illinois River - McClugage**  
 Location: **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 437.50 ft  
 North: 1476920.20 ft  
 East: 2468182.27 ft  
 Station: 2130+99  
 Offset: 50.0 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 (%)	
					16	0 0 0	0.16 B	62		376.8	Gray SANDY GRAVEL; wet --RDR 4-- --rig chatter--			20	2 2 18	0.50 P	32	
			45		17	0 0 0	0.57 B	62		373.0	--decreased rig chatter-- Dark gray SHALE --RDR 4--	65		21	100/3"		NP	17
											-- Ñ = 1,323 blows/foot--			22				12
											-- Ñ = 4,095 blows/foot--			23				
			50		18	0 0 0	0.57 B	52			-- Ñ = 830 blows/foot--			24				23
											-- Ñ = 1,721 blows/foot--			25				22
			55		19	0 0 1	0.57 B	27		362.8	Gray SHALE --RDR 4--	75		26				17
	382.0	Medium stiff, gray SANDY CLAY LOAM; wet --RDR 1--									-- Ñ = 683 blows/foot--			27				17
			60							358.5	-- Ñ = 455 blows/foot-- Boring terminated at 79.00 ft	80						

### GENERAL NOTES

Begin Drilling **09-15-2016** Complete Drilling **09-15-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **B57 TMR [100%]**  
 Driller **R&J** Logger **M. Schmelzel** Checked by **C. Marin**  
 Drilling Method **4" casing to 13 feet, mud rotary thereafter; boring backfilled upon completion**

### WATER LEVEL DATA

While Drilling  **River water depth 6.5'**  
 At Completion of Drilling   
 Time After Drilling **NA**  
 Depth to Water  **NA**

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

WANGENGINC 4140901.GPJ WANGENG.GDT 4/3/17



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WEI Job No.: 414-09-01

Client: **TYLin/Hanson**  
 Project: **US 150 over Illinois River - McClugage**  
 Location: **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 428.00 ft  
 North: 1476747.80 ft  
 East: 2468777.71 ft  
 Station: 2137+15  
 Offset: 15.0 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 (%)
		Very loose, dark gray, medium to coarse SAND to SANDY LOAM, little fine gravel, trace shells; saturated			1	0 0 0 0	NP	25		407.0	Very soft, gray SILTY CLAY, trace fine gravel, trace shells; wet			1		P	
					2	0 0 0 0	NP	33		405.5	Gray, coarse SAND; saturated			8 2 1	< 0.25	P	46
			5		3	0 0 0 0	NP	48		404.5	Very soft to soft, gray SILTY CLAY to CLAY, trace plant matter and shells; wet			0 0 0	0.16	B	49
					4	0 0 0 0	NP	19						0 0 0	0.16	B	59
	419.5	Very loose to loose, gray GRAVELLY SAND; saturated	10		5	0 2 2	NP	26						0 0 0	0.25	B	58
		--%Gravel=23.9-- --%Sand=67.9-- --%Silt=6.8-- --%Clay=1.4--			6	2 2 1	NP	20		397.0	Loose, gray, medium SAND; wet			3 4 1		NP	21
			15		7	2 1 2	NP	23		393.3	Very soft, gray CLAY to SILTY CLAY; wet						
					8	2 1 2	NP	23						0 0 0	0.08	B	46
	409.5	Very soft, gray SANDY CLAY LOAM to SANDY LOAM; saturated	20		9	1 1		< 0.25									

### GENERAL NOTES

Begin Drilling **09-19-2016** Complete Drilling **09-20-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **B57 TMR [100%]**  
 Driller **R&J** Logger **M. Schmelzel** Checked by **C. Marin**  
 Drilling Method **4" casing to 59 feet, mud rotary after 9 feet; boring backfilled upon completion**

### WATER LEVEL DATA

While Drilling  River water depth 14.5'  
 At Completion of Drilling   
 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 SB-32

WEI Job No.: 414-09-01

Client **TYLin/Hanson**  
 Project **US 150 over Illinois River - McClugage**  
 Location **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 428.00 ft  
 North: 1476747.80 ft  
 East: 2468777.71 ft  
 Station: 2137+15  
 Offset: 15.0 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 (%)
		Run 3: 81.0 to 86.0 feet RECOVERY= 15% RQD = 15%	81.0														
			85.0		23												
		Run 4: 86.0 to 91.0 feet RECOVERY= 77% RQD = 77%	86.0														
			90.0		24												
	339.8	Black COAL															
	337.0	Boring terminated at 91.00 ft	91.0														
			95.0														
			100.0														

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **09-19-2016** Complete Drilling **09-20-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **B57 TMR [100%]**  
 Driller **R&J** Logger **M. Schmelzel** Checked by **C. Marin**  
 Drilling Method **4" casing to 59 feet, mud rotary after 9 feet; boring backfilled upon completion**

While Drilling  $\nabla$  **River water depth 14.5'**  
 At Completion of Drilling  $\nabla$   
 Time After Drilling **NA**  
 Depth to Water  $\nabla$  **NA**

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



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WEI Job No.: 414-09-01

Client: **TYLin/Hanson**  
 Project: **US 150 over Illinois River - McClugage**  
 Location: **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 430.08 ft  
 North: 1476677.44 ft  
 East: 2468791.91 ft  
 Station: 2137+55  
 Offset: 45.0 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 (%)	
		Very loose to loose, gray to dark gray, fine SAND to SANDY LOAM, trace fine gravel; saturated								409.6	Very soft, dark gray SANDY CLAY LOAM; saturated							
		--RDR 1--			1	0 0 0 0	NP	24			--RDR 1--			10	2 1 4	< 0.25 P	25	
					2	1 0 0 0	NP	25		407.1	Very soft to soft, dark gray SILTY CLAY to CLAY, trace organic matter; wet							
				5		3	0 0 0 0	NR			--RDR 1--	25		11	0 0 0	0.16 B	43	
						4	0 0 0 0	NP	27					12	0 0 0	0.33 B	49	
						5	0 1 1	NP	44					13	0 0 0	0.25 B	60	
						6	1 3 3	NP	31		398.3	Soft, dark gray CLAY LOAM; wet						
			--trace shells-- --%Gravel=14.6-- --%Sand=76.5-- --%Silt=4.5-- --%Clay=4.4-- --A-3 (0)-- --trace shells--			7	1 2 3	NP	21			--RDR 1--			14	2 1 1	0.16 B	31
						8	2 2 3	NP	25		393.3	Very soft, dark gray to gray CLAY; wet						
					9	2 3 3	NP	26			--RDR 1--			15	0 0 0	0.16 B	43	

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **08-10-2016** Complete Drilling **08-11-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **B57 TMR [100%]**  
 Driller **R&J** Logger **M. Schmelzel** Checked by **C. Marin**  
 Drilling Method **4" casing to 10 feet, mud rotary thereafter; boring backfilled upon completion**

While Drilling  **River water depth 10'**  
 At Completion of Drilling   
 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 4140901.GPJ WANGENG.GDT 4/3/17





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WEI Job No.: 414-09-01

Client: **TYLin/Hanson**  
 Project: **US 150 over Illinois River - McClugage**  
 Location: **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 427.50 ft  
 North: 1476677.75 ft  
 East: 2468948.58 ft  
 Station: 2139+00  
 Offset: 14.0 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 (%)								
418.6	418.6	Very soft, black SILTY CLAY, trace organic matter; saturated --RDR 1--	0	X	1	0000	< 0.25 P	73	405.3	405.3	Very soft to soft, gray CLAY to SILTY CLAY; wet --RDR 1--	0	X	1	1	< 0.25 P	73								
																		310	NP	37					
																		5	2	0000	< 0.25 P	53	001	0.16 B	53
																		10	3	0000	< 0.25 P	52	000	< 0.25 P	34
																		15	4	0022	0.08 B	55	000	< 0.25 P	38
																		20	5	321	NP	21	001	< 0.25 P	33
																		25	6	211	NP	20	001	< 0.25 P	33
																		30	7	211	NP	24	001	0.25 B	30
																		35	8	121	NP	20	006	0.25 B	30
40	9	21	NP	17																					
		--%Gravel=4.1-- --%Sand=83.7--	20	X	9	21	NP	17																	

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **08-03-2016** Complete Drilling **08-08-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **B57 TMR [100%]**  
 Driller **R&J** Logger **M. Schmelzel** Checked by **C. Marin**  
 Drilling Method **4" casing to 10 feet and 3" casing to 66 feet, mud rotary after 9 feet; boring backfilled upon completion**

While Drilling  **River water depth 12'**  
 At Completion of Drilling   
 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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WEI Job No.: 414-09-01

Client: **TYLin/Hanson**  
 Project: **US 150 over Illinois River - McClugage**  
 Location: **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 427.50 ft  
 North: 1476677.75 ft  
 East: 2468948.58 ft  
 Station: 2139+00  
 Offset: 14.0 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 (%)
	382.8	Dense to very dense, brown GRAVELLY SANDY LOAM; wet --RDR 3 to 5--  --%Gravel=59.9-- --%Sand=29.0-- --%Silt=5.6-- --%Clay=5.5-- --A-1-a (0)--  --constant chatter, 48 to 51.5 feet-- --possible cobbles--	45		16	0 0 6	0.33 B	39		364.6	Hard, black and gray SHALE, few limestone lenses  --RDR 5--  Run 1: 64.0 to 69.0 feet RECOVERY= 68% RQD = 53%	65		20	68/3"	NP	
			50		17	20 32 18	NP	6				70		21			
			55		18	36 27 13	NP	12			-- Ñ = 633 blows/foot--	75		22	M SPT		13
		--difficult drilling from 53 to 54 feet-- --possible cobbles--	55		19	28 55/6"	NP	7			-- Ñ = 286 blows/foot--	75		23	M SPT		14
											-- Ñ = 667 blows/foot--	75		24	M SPT		14
										348.7	-- Ñ = 1,000 blows/foot-- Boring terminated at 78.77 ft	80		25	M SPT		18

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **08-03-2016** Complete Drilling **08-08-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **B57 TMR [100%]**  
 Driller **R&J** Logger **M. Schmelzel** Checked by **C. Marin**  
 Drilling Method **4" casing to 10 feet and 3" casing to 66 feet, mud rotary after 9 feet; boring backfilled upon completion**

While Drilling  **River water depth 12'**  
 At Completion of Drilling   
 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 4140901.GPJ WANGENG.GDT 4/3/17





# BORING LOG SB-35

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WEI Job No.: 414-09-01

Client: **TYLin/Hanson**  
 Project: **US 150 over Illinois River - McClugage**  
 Location: **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 437.08 ft  
 North: 1476534.89 ft  
 East: 2469140.24 ft  
 Station: 2141+32  
 Offset: 46.0 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 (%)
		Very soft, black, organic SILTY CLAY; saturated --RDR 1--			1	0 0 0	< 0.25 P	80						11	0 0 0	NP	29
					2	0 0 0	< 0.25 P	80						12	1 0 1	NP	34
			5		3	0 0 0	< 0.25 P	79			--trace organic debris--	25		13	0 0 1	0.08 B	27
					4	0 0 0	< 0.25 P	79						14	1 1 2	NP	28
			10		5	0 0 0	< 0.25 P	75						14	1 1 2	NP	28
					6	0 0 0	< 0.25 P	46		407.1	Stiff, dark gray SILTY CLAY, trace fine gravel; moist --RDR 1 to 4--	30		15	4 1 1	1.00 P	30
					7	0 0 0	< 0.25 P	50			--constant chatter, 33.5 to 34.5 feet-- --possible cobbles--						
			15		8	0 0 0	< 0.25 P	50		402.6	Dense to very dense, dark gray to gray SANDY GRAVEL; saturated --RDR 4 to 5--	35		16	21 21 20	NP	5
	420.6	Very loose, dark gray, fine to medium SAND to SANDY LOAM, trace shells; saturated --RDR 1--			9	0 4 6 6	NP	25									
					10	2 1 1	NP	30			--hard drilling, 37 to 44 feet--	40					

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **08-09-2016** Complete Drilling **08-10-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **B57 TMR [100%]**  
 Driller **R&J** Logger **M. Schmelzel** Checked by **C. Marin**  
 Drilling Method **4" casing to 18 feet, mud rotary thereafter; boring backfilled upon completion**

While Drilling  **River water depth 3'**  
 At Completion of Drilling   
 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 SB-35

WEI Job No.: 414-09-01

Client: **TYLin/Hanson**  
 Project: **US 150 over Illinois River - McClugage**  
 Location: **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 437.08 ft  
 North: 1476534.89 ft  
 East: 2469140.24 ft  
 Station: 2141+32  
 Offset: 46.0 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 (%)
	393.3	Very soft to medium stiff, gray CLAY; wet --RDR 1 to 3--45			17	20 50 12	NP	15									
					18	2 1 2	0.57 B	42			--hard drilling, 64 to 65 feet-- --possible cobbles--	65		21	0 0 0	0.08 B	38
					19	0 0 0	0.57 B	42			Very dense, gray, angular SANDY GRAVEL; moist --RDR 4 to 5--			22	30 40 50	NP	
			50								Dark gray SHALE --RDR 3--	70		23	110/1"	NP	13
					20	0 0 0	< 0.25 P	48			-- Ñ = 4,095 blows/foot--			24	M SPT		
			55								-- Ñ = 500 blows/foot--	75		25	M SPT		16
											-- Ñ = 705 blows/foot--			26	M SPT		15
			60								-- Ñ = 417 blows/foot--	80		27			14

### GENERAL NOTES

Begin Drilling **08-09-2016** Complete Drilling **08-10-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **B57 TMR [100%]**  
 Driller **R&J** Logger **M. Schmelzel** Checked by **C. Marin**  
 Drilling Method **4" casing to 18 feet, mud rotary thereafter; boring backfilled upon completion**

### WATER LEVEL DATA

While Drilling  **River water depth 3'**  
 At Completion of Drilling   
 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 SB-35

WEI Job No.: 414-09-01

Client: **TYLin/Hanson**  
 Project: **US 150 over Illinois River - McClugage**  
 Location: **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 437.08 ft  
 North: 1476534.89 ft  
 East: 2469140.24 ft  
 Station: 2141+32  
 Offset: 46.0 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 (%)
	352.2	-- $\bar{N}$ = 570 blows/foot--	28	M SPT				15									
		-- $\bar{N}$ = 556 blows/foot--	29	M SPT				19									
		Boring terminated at 84.88 ft															

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **08-09-2016** Complete Drilling **08-10-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **B57 TMR [100%]**  
 Driller **R&J** Logger **M. Schmelzel** Checked by **C. Marin**  
 Drilling Method **4" casing to 18 feet, mud rotary thereafter; boring backfilled upon completion**

While Drilling  $\nabla$  **River water depth 3'**  
 At Completion of Drilling  $\blacktriangledown$   
 Time After Drilling **NA**  
 Depth to Water  $\nabla$  **NA**

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



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WEI Job No.: 414-09-01

Client **TYLin/Hanson**  
 Project **US 150 over Illinois River - McClugage**  
 Location **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 437.84 ft  
 North: 1476530.31 ft  
 East: 2469337.21 ft  
 Station: 2143+16  
 Offset: 24.0 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 (%)
428.3		Very soft, dark gray, organic SILTY CLAY; saturated --RDR 1--	1		1	0 0 0 0	< 0.25 P	75	410.3		Loose, gray, fine to medium SAND, little fine gravel; wet --RDR 1--	10		10	0 0 0	0.25 B	35
			2		2	0 0 0 0	< 0.25 P	55				25		11	0 0 0	0.08 B	32
			3	5	3	0 0 0 0	< 0.25 P	78					12	0 0 0	0.25 B	50	
			4		4	0 0 0 0	< 0.25 P	75					13	0 0 3	NP	32	
			5		5	0 0 1 2	0.50 P	35					14	1 0 0	0.25 B	37	
			6	10	6	1 2 1 1	0.33 B	28					15	19 19 18	NP	9	
			7		7	0 0 0	0.16 B	38									
			8	15	8	0 0 0	0.08 B	47									
			9		9	0 0 0	0.25 B	61									
			20					398.3		--rig chatter stopped-- Very soft to soft, gray CLAY to	40						

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **09-07-2016** Complete Drilling **09-07-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **B57 TMR [100%]**  
 Driller **R&J** Logger **M. Schmelzel** Checked by **C. Marin**  
 Drilling Method **4" casing to 12 feet and 3" casing to 67 feet, mud rotary after 12 feet; boring backfilled upon completion**

While Drilling  **River water depth 5.5'**  
 At Completion of Drilling   
 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 4140901.GPJ WANGENG.GDT 4/3/17



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WEI Job No.: 414-09-01

Client: **TYLin/Hanson**  
 Project: **US 150 over Illinois River - McClugage**  
 Location: **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 437.84 ft  
 North: 1476530.31 ft  
 East: 2469337.21 ft  
 Station: 2143+16  
 Offset: 24.0 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 (%)	
		SILTY CLAY; wet --RDR 1 to 2--																
	376.8	Medium dense, gray SANDY GRAVEL; wet --RDR 1--			16	0 1 1	NR			376.8				20	0 13 11	< 0.25 P	36	
	374.1	Weak, black SHALE	45		17	0 0 0	< 0.25 P	56		374.1		65		21	15 25 33	NP	19	
		Run 1: 67.0 to 74.0 feet RECOVERY= 85% RQD = 85%			18	0 0 0	0.41 B	48				70		22				
		--few, very strong, dark gray mudstone lenses	50		19	0 0 0	0.33 B	45				75		23				
	363.3	Run 2: 74.0 to 82.0 feet RECOVERY= 94% RQD = 94%	55							363.3								
		Weak, gray SHALE										80						

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **09-07-2016** Complete Drilling **09-07-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **B57 TMR [100%]**  
 Driller **R&J** Logger **M. Schmelzel** Checked by **C. Marin**  
 Drilling Method **4" casing to 12 feet and 3" casing to 67 feet, mud rotary after 12 feet; boring backfilled upon completion**

While Drilling  **River water depth 5.5'**  
 At Completion of Drilling   
 Time After Drilling **NA**  
 Depth to Water  **NA**

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

WANGENGINC 4140901.GPJ WANGENG.GDT 4/3/17



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WEI Job No.: 414-09-01

Client TYLin/Hanson  
 Project US 150 over Illinois River - McClugage  
 Location Peoria and Tazewell Counties, IL

Datum: NAVD 88  
 Elevation: 437.84 ft  
 North: 1476530.31 ft  
 East: 2469337.21 ft  
 Station: 2143+16  
 Offset: 24.0 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 (%)
	348.8	Run 3: 82.0 to 89.0 feet RECOVERY= 100% RQD = 100%	85		24												
		Boring terminated at 89.00 ft	90														
			95														
			100														

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### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling 09-07-2016 Complete Drilling 09-07-2016  
 Drilling Contractor Wang Testing Service Drill Rig B57 TMR [100%]  
 Driller R&J Logger M. Schmelzel Checked by C. Marin  
 Drilling Method 4" casing to 12 feet and 3" casing to 67 feet, mud rotary after 12 feet; boring backfilled upon completion

While Drilling ∇ River water depth 5.5'  
 At Completion of Drilling ▼  
 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 SB-37

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WEI Job No.: 414-09-01

Client **TYLin/Hanson**  
 Project **US 150 over Illinois River - McClugage**  
 Location **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 436.50 ft  
 North: 1476394.55 ft  
 East: 2469472.56 ft  
 Station: 2144+92  
 Offset: 50.0 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 (%)
	429.0	Very soft, dark gray, organic SILTY CLAY; saturated --RDR 1--			1	0 0 0 0	< 0.25 P	83		404.3	--trace plant matter--				0	B	
					2	0 0 0 0	< 0.25 P	90				0 0 1	0.33 B	55			
			5		3	0 0 0 0	< 0.25 P	73				0 0 0	0.33 B	41			
					4	0 0 2 4	0.75 P	41				0 0 0	0.41 B	51			
			10		5	0 1 1	0.57 B	40									
					6	0 1 1	0.33 B	41				0 10 10	0.41 B	36			
			15		7	0 0 0	0.25 B	45									
					8	0 0 0	0.16 B	53				11 6 2	0.57 B	39			
			20		9	0 0	0.41	36									
									404.3	Gray SANDY GRAVEL; saturated							
											--RDR 4--						
											--rig chatter--						
										399.3	Soft to medium stiff, gray CLAY to SILTY CLAY; moist to wet						
											--RDR 2--						

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **09-01-2016** Complete Drilling **09-02-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **B57 TMR [100%]**  
 Driller **R&J** Logger **M. Schmelzel** Checked by **C. Marin**  
 Drilling Method **4" casing to 8 feet, mud rotary thereafter; boring backfilled upon completion**

While Drilling  **River water depth 9.5'**  
 At Completion of Drilling   
 Time After Drilling **NA**  
 Depth to Water  **NA**

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

WANGENGINC 4140901.GPJ WANGENG.GDT 4/3/17



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WEI Job No.: 414-09-01

Client **TYLin/Hanson**  
 Project **US 150 over Illinois River - McClugage**  
 Location **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 436.50 ft  
 North: 1476394.55 ft  
 East: 2469472.56 ft  
 Station: 2144+92  
 Offset: 50.0 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 (%)
										376.0	--hard drilling-- Very dense, gray GRAVELLY SAND; wet						
					15	2 1 2	0.66 B	48			--RDR 3 to 4--			19	35 35 30	NP	10
			45									65					
					16	1 1 1	0.41 B	49		369.5	Black to dark gray SHALE --RDR 3 to 4-- --possible cobble--			20	20 55/2"	NP	14
			50								-- Ñ = 1,721 blows/foot--			21			12
					17	0 0 0	0.33 B	46			--loss of drilling mud-- --decrease drilling resistance-- -- Ñ = 115 blows/foot--			22		M SPT	12
			55							362.8	Dark gray, laminated SILTY CLAY; moist			23		M SPT	15
					18	0 0 0	0.33 B	34		359.2	Black to gray SHALE			24		M SPT	14
			60								--RDR 5-- -- Ñ = 189 blows/foot--			25			
											-- Ñ = 1,000 blows/foot--						

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **09-01-2016** Complete Drilling **09-02-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **B57 TMR [100%]**  
 Driller **R&J** Logger **M. Schmelzel** Checked by **C. Marin**  
 Drilling Method **4" casing to 8 feet, mud rotary thereafter; boring**  
**backfilled upon completion**

While Drilling  **River water depth 9.5'**  
 At Completion of Drilling   
 Time After Drilling **NA**  
 Depth to Water  **NA**

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

WANGENGINC 4140901.GPJ WANGENG.GDT 4/3/17





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WEI Job No.: 414-09-01

Client TYLin/Hanson  
 Project US 150 over Illinois River - McClugage  
 Location Peoria and Tazewell Counties, IL

Datum: NAVD 88  
 Elevation: 436.50 ft  
 North: 1476394.55 ft  
 East: 2469472.56 ft  
 Station: 2144+92  
 Offset: 50.0 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 (%)
	354.2					M SPT											
		-- $\bar{N}$ = 652 blows/foot--			26	M SPT		13									
		Boring terminated at 82.26 ft															
			85														
			90														
			95														
			100														

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling 09-01-2016 Complete Drilling 09-02-2016  
 Drilling Contractor Wang Testing Service Drill Rig B57 TMR [100%]  
 Driller R&J Logger M. Schmelzel Checked by C. Marin  
 Drilling Method 4" casing to 8 feet, mud rotary thereafter; boring backfilled upon completion

While Drilling  $\nabla$  River water depth 9.5'  
 At Completion of Drilling  $\blacktriangledown$   
 Time After Drilling NA  
 Depth to Water  $\nabla$  NA

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

WANGENGINC 4140901.GPJ WANGENG.GDT 4/3/17



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WEI Job No.: 414-09-01

Client: **TYLin/Hanson**  
 Project: **US 150 over Illinois River - McClugage**  
 Location: **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 437.50 ft  
 North: 1476377.52 ft  
 East: 2469702.73 ft  
 Station: 2147+12  
 Offset: 21.0 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 (%)																			
	430.0	Very soft, dark gray, organic SILTY CLAY; saturated --RDR 1--	0	X	1	0	< 0.25 P	76		415.0	Medium dense, gray, medium SAND; saturated --RDR 1--	0	X	10	6	0.41 B	41																			
						0									5				NP	25																
						0									5																					
						5									0						X	2	0	< 0.25 P	67		410.0	Loose, gray GRAVELLY SAND; saturated --RDR 1--	0	X	11	4	0.87 B	43		
																							0									NP				20
																							0													
						25									0						X	3	0	< 0.25 P	89		412.0	Medium dense, gray, fine to medium SAND; saturated --RDR 1--	0	X	12	5	0.41 B	41		
																							0									NP				25
						0									4																					
430.0	Soft to medium stiff, dark gray to gray SILTY CLAY to SILTY CLAY LOAM, trace organic matter; wet to saturated --RDR 1--	2	X	5	2	0.87 B	43		410.0	Very soft, gray CLAY to SILTY CLAY; wet --RDR 1--	0	X	13	0	0.08 B	33																				
					2									NP				25																		
					3																															
10	2																																			
430.0	--trace plant matter--	1	X	6	0	0.41 B	48		405.0	--rig chatter--	0	X	14	0	NP	10																				
					0																															
417.5	--trace shells and plant matter--	0	X	8	0	0.25 P	26		405.0	Medium dense to very dense, gray SANDY GRAVEL; wet --RDR 4--	0	X	15	15	NP	10																				
					0									NP				10																		
					0																															
15	0																																			
417.5	--trace shells and plant matter--	0	X	9	0	0.16 B	41		405.0	Medium dense to very dense, gray SANDY GRAVEL; wet --RDR 4--	0	X	15	19	NP	10																				
					0									NP				10																		
20	0																																			
417.5	0																																			

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **08-31-2016** Complete Drilling **09-01-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **B57 TMR [100%]**  
 Driller **R&J** Logger **M. Schmelzel** Checked by **C. Marin**  
 Drilling Method **4" casing to 9.5 feet, mud rotary thereafter; boring backfilled upon completion**

While Drilling  **River water depth 8'**  
 At Completion of Drilling   
 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 4140901.GPJ WANGENG.GDT 4/3/17





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# BORING LOG SB-39

WEI Job No.: 414-09-01

Client: **TYLin/Hanson**  
 Project: **US 150 over Illinois River - McClugage**  
 Location: **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 437.75 ft  
 North: 1476238.32 ft  
 East: 2469854.67 ft  
 Station: 2149+05  
 Offset: 51.0 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 (%)	
		Very soft, dark gray, organic SILTY CLAY; saturated --RDR 1--			1	0 0 0 0	< 0.25 P	71			SAND; saturated --RDR 2 to 3--			10	3 3 2			NR
					2	0 0 0 0	< 0.25 P	96			--coarse, sub-angular gravel--			11	2 2 12			NP
	432.3		5		3	0 0 0 0	0.50 P	36				25		12	6 6 4			NP
		Medium stiff, dark gray to gray SILTY CLAY to SILTY CLAY LOAM, trace organic matter; wet --RDR 1--			4	0 1 1 1	0.90 B	31						13	2 1 1			0.08 B
	428.8				5	3 2 3 4	NP	22		410.0	Very soft to soft, gray CLAY to SILTY CLAY; wet --RDR 1--			14	0 0 1			0.41 B
		Loose, gray, medium to coarse SAND; saturated --RDR 1--	10		6	2 3 4 4	NP	23			--trace shells and plant matter--	30		15	0 18 14	< 0.25 P		35
					7	2 1 1	NR							15				
	423.3		15		8	0 0 0	< 0.25 P	54		402.0	Medium dense to dense, gray GRAVELLY SAND; wet --RDR 4--			9	0 0 0			
		Very soft, gray SILTY CLAY, trace shells; wet --RDR 1--			9	0 0 0	0.16 B	40				40						
	418.3		20								Medium dense, gray, medium							

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **09-06-2016** Complete Drilling **09-06-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **B57 TMR [100%]**  
 Driller **R&J** Logger **M. Schmelzel** Checked by **C. Marin**  
 Drilling Method **4" casing to 11.5 feet and 3" casing to 58.5 feet, mud rotary after 11.5 feet; boring backfilled upon completion**

While Drilling  **River water depth 6'**  
 At Completion of Drilling   
 Time After Drilling **NA**  
 Depth to Water  **NA**

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

WANGENGINC 4140901.GPJ WANGENG.GDT 4/3/17



# BORING LOG SB-39

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WEI Job No.: 414-09-01

Client **TYLin/Hanson**  
 Project **US 150 over Illinois River - McClugage**  
 Location **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 437.75 ft  
 North: 1476238.32 ft  
 East: 2469854.67 ft  
 Station: 2149+05  
 Offset: 51.0 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 (%)
	389.5	Dense, gray, medium SAND, little fine to medium gravel; wet	45	X	16	9 12 20	NP	9			Run 2: 65.5 to 73.5 feet RECOVERY= 95% RQD = 95%	65		21			
	384.3	Very weak, gray SHALE --hard drilling-- --RDR 2 to 3--	50	X	17	16 12 13	NP	10			Strong, black SHALE, few mudstone lenses 6"-9" thick	70		22			
		Very strong, dark gray MUDSTONE Run 3: 73.5 to 80.5 feet RECOVERY= 100% RQD = 100%	55	X	18	16 17 17	NP	23			Very strong, dark gray MUDSTONE Run 3: 73.5 to 80.5 feet RECOVERY= 100% RQD = 100%	75		23			
		--few dark gray shale lenses--	60	X	19	70 39/2	NP	14			--few dark gray shale lenses--	80					

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **09-06-2016** Complete Drilling **09-06-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **B57 TMR [100%]**  
 Driller **R&J** Logger **M. Schmelzel** Checked by **C. Marin**  
 Drilling Method **4" casing to 11.5 feet and 3" casing to 58.5 feet, mud rotary after 11.5 feet; boring backfilled upon completion**

While Drilling  **River water depth 6'**  
 At Completion of Drilling   
 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 SB-39

WEI Job No.: 414-09-01

Client: **TYLin/Hanson**  
 Project: **US 150 over Illinois River - McClugage**  
 Location: **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 437.75 ft  
 North: 1476238.32 ft  
 East: 2469854.67 ft  
 Station: 2149+05  
 Offset: 51.0 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 (%)
	357.3	Boring terminated at 80.50 ft															
			85														
			90														
			95														
			100														

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **09-06-2016** Complete Drilling **09-06-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **B57 TMR [100%]**  
 Driller **R&J** Logger **M. Schmelzel** Checked by **C. Marin**  
 Drilling Method **4" casing to 11.5 feet and 3" casing to 58.5 feet, mud rotary after 11.5 feet; boring backfilled upon completion**

While Drilling  $\nabla$  **River water depth 6'**  
 At Completion of Drilling  $\blacktriangledown$   
 Time After Drilling **NA**  
 Depth to Water  $\nabla$  **NA**

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

WANGENGINC 4140901.GPJ WANGENG.GDT 4/3/17



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WEI Job No.: 414-09-01

Client: **TYLin/Hanson**  
 Project: **US 150 over Illinois River - McClugage**  
 Location: **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 438.00 ft  
 North: 1476223.05 ft  
 East: 2470059.48 ft  
 Station: 2151+01  
 Offset: 11.0 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 (%)	
		Very soft, dark gray SILTY CLAY to SILTY CLAY LOAM, little shells; saturated --RDR 1-- --L <sub>L</sub> (%)=NA, P <sub>L</sub> (%)=NA-- --%Gravel=0.0-- --%Sand=4.2-- --%Silt=65.6-- --%Clay=30.2--	0	X	1	0 0 0	< 0.25 P	35		414.5	Very loose, gray SILT, trace plant matter; saturated --RDR 1 to 2--	0	X	3				
			5	X	2	0 0 0	< 0.25 P	83				5	X	11	3 4 3		NP	19
			10	X	3	0 0 0	< 0.25 P	81				10	X	12	2 1 1		NP	31
	430.4	Very loose to loose, gray, medium SAND; saturated --RDR 1--	15	X	4	0 0 0	< 0.25 P	86		412.0	Very soft to soft, gray CLAY to SILTY CLAY; wet --RDR 1--	20	X	13	0 0 0		0.08 B	32
			20	X	5	2 2 2	NP	18				25	X	14	0 0 0	< 0.25 P		39
		--trace shells and plant matter-- --%Gravel=0.2-- --%Sand=91.2-- --%Silt=4.3-- --%Clay=4.2-- --A-3 (0)--	25	X	6	3 1 1	NP	25				30	X	15	0 0 0		0.33 B	61
	425.0	Very soft, gray SILTY CLAY; wet	30	X	7	1 0 0	< 0.25 P	53				35	X	16	0 0 0		0.16 B	45
	424.0	Very loose, gray SANDY LOAM, trace shells; saturated --RDR 1--	35	X	8	2 2 1	NP	23				40	X					
	422.0	Loose to medium dense, gray, medium to coarse SAND; saturated --RDR 1 to 2-- --few clay lenses--	40	X	9	3 3 3	NP	30		398.3		40	X					
			45	X	10	4 1	NP	17					X					

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **08-26-2016** Complete Drilling **08-31-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **B57 TMR [100%]**  
 Driller **R&J** Logger **M. Schmelzel** Checked by **C. Marin**  
 Drilling Method **4" casing to 18 feet, mud rotary after 14 feet; boring backfilled upon completion**

While Drilling  **River water depth 4.5'**  
 At Completion of Drilling   
 Time After Drilling **NA**  
 Depth to Water  **NA**

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

WANGENGINC 4140901.GPJ WANGENG.GDT 4/3/17



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WEI Job No.: 414-09-01

Client: **TYLin/Hanson**  
 Project: **US 150 over Illinois River - McClugage**  
 Location: **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 438.00 ft  
 North: 1476223.05 ft  
 East: 2470059.48 ft  
 Station: 2151+01  
 Offset: 11.0 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 (%)
		Medium dense to very dense, gray SANDY GRAVEL; wet --RDR 3 to 4--															
					17	30 28 23	NP	7			-- Ñ = 200 blows/foot--			23	M SPT		16
											-- Ñ = 208 blows/foot--			24	M SPT		21
		--loss of drilling mud--	45									65					
					18	13 10 7	NP	15			-- Ñ = 204 blows/foot--			25	M SPT		18
	388.8	Gray SHALE --RDR 3--	50							370.4	Boring terminated at 67.00 ft						
					19	35 55/3"	NP	17				70					
		-- Ñ = 313 blows/foot--			20			17				75					
			55														
		-- Ñ = 159 blows/foot--			21			16									
					22			19				80					
		-- Ñ = 286 blows/foot--															

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **08-26-2016** Complete Drilling **08-31-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **B57 TMR [100%]**  
 Driller **R&J** Logger **M. Schmelzel** Checked by **C. Marin**  
 Drilling Method **4" casing to 18 feet, mud rotary after 14 feet; boring backfilled upon completion**

While Drilling  **River water depth 4.5'**  
 At Completion of Drilling   
 Time After Drilling **NA**  
 Depth to Water  **NA**

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

WANGENGINC 4140901.GPJ WANGENG.GDT 4/3/17





# BORING LOG SB-41

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WEI Job No.: 414-09-01

Client **TYLin/Hanson**  
 Project **US 150 over Illinois River - McClugage**  
 Location **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 437.84 ft  
 North: 1476100.72 ft  
 East: 2470231.03 ft  
 Station: 2153+04  
 Offset: 43.0 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 (%)
	436.6	Very loose, dark gray SANDY LOAM; saturated			1	0 0 0	NP	34			--trace plant matter--				1		
		Very soft, dark gray, organic SILTY CLAY; saturated --RDR 1--			2	0 0 0	< 0.25 P	70						11	4 3 1	NP	28
	432.3		5		3	0 0 0	< 0.25 P	107		412.8	Very soft, gray SILTY CLAY, trace shells and plant matter; wet	25		12	1 1 1	NP	34
	430.3	Very loose, brown, fine SAND; saturated --RDR 1--			4	0 1 2 1	NP	25		411.8	Very loose, gray SILT; saturated			13	0 1 1	NP	33
		Very soft to soft, gray SILTY CLAY LOAM to CLAY LOAM, trace shells; wet --RDR 1--	10		5	0 1 1 1	< 0.25 P	23		409.3	Soft, dark gray SILTY CLAY, trace shells and plant matter; wet --RDR 1--	30		14	0 0 0	0.49 B	65
					6	0 1 0 1	0.08 B	32						15	0 0 0	0.33 B	53
		--trace plant matter--	15		8	0 1 1	< 0.25 P	22				35					
		--trace plant matter--			9	1 1 2	0.49 B	29			--few sand seams--			16	1 1 0	0.33 B	29
	419.3	Very loose to loose, gray, medium SAND; saturated --RDR 1--	20		10	3 2	NP	23		398.1		40					

WANGENG 4140901.GPJ WANGENG.GDT 4/3/17

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **08-25-2016** Complete Drilling **08-25-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **B57 TMR [100%]**  
 Driller **R&J** Logger **M. Schmelzel** Checked by **C. Marin**  
 Drilling Method **4" casing to 14 feet, mud rotary thereafter; boring backfilled upon completion**

While Drilling  **River water depth 4.5'**  
 At Completion of Drilling   
 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 SB-41

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WEI Job No.: 414-09-01

Client: **TYLin/Hanson**  
 Project: **US 150 over Illinois River - McClugage**  
 Location: **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 437.84 ft  
 North: 1476100.72 ft  
 East: 2470231.03 ft  
 Station: 2153+04  
 Offset: 43.0 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 (%)
		Very soft, dark gray CLAY; wet --RDR 1--															
					17	0 0 0	0.25 B	48			-- Ñ = 303 blows/foot--		23	M SPT			15
											-- Ñ = 357 blows/foot--		24	M SPT			16
	393.1	Medium dense to dense, gray SANDY GRAVEL; wet --RDR 3 to 4--  --rig chatter--	45		18	14 14 11	NP	11		371.8	-- Ñ = 263 blows/foot--  Boring terminated at 66.06 ft		25	M SPT			14
			50									70					
	387.3	Gray SHALE --RDR 3 to 5--			19	85 15/2"	NP	17									
					20			17			-- Ñ = 413 blows/foot--			M SPT			
			55		21			18			-- Ñ = 313 blows/foot--			M SPT			
					22			19			-- Ñ = 208 blows/foot--			M SPT			
			60									80					

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **08-25-2016** Complete Drilling **08-25-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **B57 TMR [100%]**  
 Driller **R&J** Logger **M. Schmelzel** Checked by **C. Marin**  
 Drilling Method **4" casing to 14 feet, mud rotary thereafter; boring backfilled upon completion**

While Drilling  **River water depth 4.5'**  
 At Completion of Drilling   
 Time After Drilling **NA**  
 Depth to Water  **NA**

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

WANGENGINC 4140901.GPJ WANGENG.GDT 4/3/17



# BORING LOG SB-42

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WEI Job No.: 414-09-01

Client: **TYLin/Hanson**  
 Project: **US 150 over Illinois River - McClugage**  
 Location: **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 438.84 ft  
 North: 1476106.28 ft  
 East: 2470435.68 ft  
 Station: 2154+95  
 Offset: 31.0 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 (%)	
		Very soft, dark gray to gray SILTY CLAY LOAM to SILTY CLAY; wet to saturated			1	0 0 0 0	< 0.25 P	43						10	1 1 2	0.33 B	35	
					2	0 0 0 0	< 0.25 P	36						11	0 0 0	0.41 B	54	
				5		3	0 0 0 0	< 0.25 P	51				25		0 2 2	0.49 B	52	
						4	0 0 0 0	< 0.25 P	51			--6-inch thick, medium sand lens; wet--						
						5	0 0 0 0	< 0.25 P	34			--6-inch thick, medium sand lens; wet--			0 2 3	0.82 B	58	
				10		6	0 1 1 1	0.16 B	24		406.8				14	1 0 1	0.33 B	35
						7	0 1 1 1	< 0.25 P	28			Loose, gray, medium to coarse SAND, few silt lenses; wet --RDR 1--			15	3 5 3	NP	23
	424.3	Loose, gray, fine SAND; saturated	15		8	2 2 3	NP	24				35						
	421.8	Very soft to medium stiff, gray SILTY CLAY, trace plant matter and shells; wet			9	0 0 1	0.25 B	34			--trace plant matter--			16	7 4 4	NP	22	
			20									40						

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **08-24-2016** Complete Drilling **08-24-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **B57 TMR [100%]**  
 Driller **R&J** Logger **M. Schmelzel** Checked by **C. Marin**  
 Drilling Method **4" casing to 15 feet, mud rotary thereafter; boring backfilled upon completion**

While Drilling  **River water depth 3.5'**  
 At Completion of Drilling   
 Time After Drilling **NA**  
 Depth to Water  **NA**

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

WANGENGINC 4140901.GPJ WANGENG.GDT 4/3/17







# BORING LOG SB-43

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WEI Job No.: 414-09-01

Client: **TYLin/Hanson**  
 Project: **US 150 over Illinois River - McClugage**  
 Location: **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 443.13 ft  
 North: 1475973.94 ft  
 East: 2470612.41 ft  
 Station: 2157+05  
 Offset: 38.0 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 (%)
	399.1	Medium dense, gray SILT; moist	45	X	15	3 5 10	NP	23		377.1	Boring terminated at 66.00 ft	65		19			
	396.4	Medium dense, gray SAND; saturated --RDR 3-- --silt lenses--	50	X	16	4 4 8	NP	13				70					
	388.6	Gray SHALE --RDR 3 to 4--	55	X	17	5 6 39	NP	13				75					
		Run 1: 56.0 to 61.0 feet RECOVERY= 100% RQD = 68%	60		18							80					

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **09-27-2016** Complete Drilling **09-27-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **D50 ATV [88%]**  
 Driller **K&S** Logger **J. Foote** Checked by **C. Marin**  
 Drilling Method **3.25" IDA HSA; boring backfilled upon completion**

While Drilling  $\nabla$  **6.00 ft**  
 At Completion of Drilling  $\blacktriangledown$  **0.00 ft**  
 Time After Drilling **NA**  
 Depth to Water  $\nabla$  **NA**

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

WANGENGINC 4140901.GPJ WANGENG.GDT 4/3/17





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WEI Job No.: 414-09-01

Client: **TYLin/Hanson**  
 Project: **US 150 over Illinois River - McClugage**  
 Location: **Peoria and Tazewell Counties, IL**

Datum: NAVD 88  
 Elevation: 443.17 ft  
 North: 1475968.47 ft  
 East: 2470616.90 ft  
 Station: 2157+10  
 Offset: 42.0 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 (%)
	420.2	Brown SAND; wet								412.2	Soft to medium stiff, gray SILTY CLAY LOAM --w <sub>n</sub> (%)=51-- -- Laboratory Q <sub>u</sub> =0.60 tsf-- --w <sub>n</sub> (%)=48, L <sub>L</sub> =57, P <sub>L</sub> =23-- --C <sub>c</sub> =0.321, OCR=1.0-- --Q <sub>u</sub> =0.25 tsf (P)-- Boring terminated at 31.00 ft			8	S H	0.60	29
	419.9	Soft, gray CLAY, trace organic matter; wet --w <sub>n</sub> (%)=32-- --w <sub>n</sub> (%)=36, L <sub>L</sub> =54, P <sub>L</sub> =23-- --Q <sub>u</sub> =0.25 tsf (P)-- --sand lenses; wet-- --Laboratory Q <sub>u</sub> =0.74 tsf-- w <sub>n</sub> (%)=28--			7		0.74	36									
	418.3	Gray, fine SAND; wet															
	418.2																
	414.2	Gray, fine SAND; wet															
	413.9	Gray SILTY LOAM; wet --w <sub>n</sub> (%)=19, L <sub>L</sub> =30, P <sub>L</sub> =19--															
	413.2																

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **11-16-2016** Complete Drilling **11-16-2016**  
 Drilling Contractor **Wang Testing Service** Drill Rig **D50 ATV [88%]**  
 Driller **K&J&B** Logger **J. Foote** Checked by **C. Marin**  
 Drilling Method **3.25" IDA HSA; boring backfilled upon completion**

While Drilling  $\nabla$  **8.00 ft**  
 At Completion of Drilling  $\blacktriangledown$  **2.00 ft**  
 Time After Drilling **NA**  
 Depth to Water  $\nabla$  **NA**

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

WANGENGINC 4140901.GPJ WANGENG.GDT 4/3/17



Run 1  
TOP



0 3 6 9 12 inches

Run 1  
BOTTOM

Boring SB-09  
RUN 1, 79.0 to 84.0 feet;  
RECOVERY = 100%;  
RQD = 100%

BEDROCK CORE: US 150 OVER ILLINOIS RIVER, McCLUGAGE BRIDGE,  
TAZEWELL AND PEORIA COUNTIES, ILLINOIS

SCALE : GRAPHIC

APPENDIX

DRAWN BY: C. Marin  
CHECKED BY: M. Snider



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FOR T.Y. LIN INTERNATIONAL GROUP

414-09-01

Run 2  
TOP



0 3 6 9 12 inches

Run 2  
BOTTOM

Boring SB-09  
RUN 2, 84.0 to 89.0 feet;  
RECOVERY = 100%;  
RQD = 98%

BEDROCK CORE: US 150 OVER ILLINOIS RIVER, McCLUGAGE BRIDGE,  
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Run 1  
TOP



Run 1  
BOTTOM



Boring SB-10  
RUN 1, 70.0 to 75.0 feet;  
RECOVERY = 15%;  
RQD = 13%

BEDROCK CORE: US 150 OVER ILLINOIS RIVER, McCLUGAGE BRIDGE,  
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Run 2  
TOP



Run 2  
BOTTOM

Boring SB-10  
RUN 2, 75.0 to 80.0 feet;  
RECOVERY = 100%;  
RQD = 100%

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Run 3  
TOP



Run 3  
BOTTOM

Boring SB-10  
RUN 3, 80.0 to 85.0 feet;  
RECOVERY = 90%;  
RQD = 90%

BEDROCK CORE: US 150 OVER ILLINOIS RIVER, McCLUGAGE BRIDGE,  
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Run 1  
TOP



0 3 6 9 12 inches

Run 1  
BOTTOM

Boring SB-11  
RUN 1, 115.0 to 120.0 feet;  
RECOVERY = 97%;  
RQD = 97%

BEDROCK CORE: US 150 OVER ILLINOIS RIVER, McCLUGAGE BRIDGE, TAZEWELL AND PEORIA COUNTIES, ILLINOIS		
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Run 2  
TOP



0 3 6 9 12 inches

Run 2  
BOTTOM

Boring SB-11  
RUN 2, 120.0 to 125.0 feet;  
RECOVERY = 80%;  
RQD = 80%

BEDROCK CORE: US 150 OVER ILLINOIS RIVER, McCLUGAGE BRIDGE, TAZEWELL AND PEORIA COUNTIES, ILLINOIS		
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Run 1  
TOP



0 3 6 9 12 inches

Run 1  
BOTTOM

Boring SB-12  
RUN 1, 80.0 to 85.0 feet;  
RECOVERY = 83%;  
RQD = 100%

BEDROCK CORE: US 150 OVER ILLINOIS RIVER, McCLUGAGE BRIDGE,  
TAZEWELL AND PEORIA COUNTIES, ILLINOIS

SCALE : GRAPHIC

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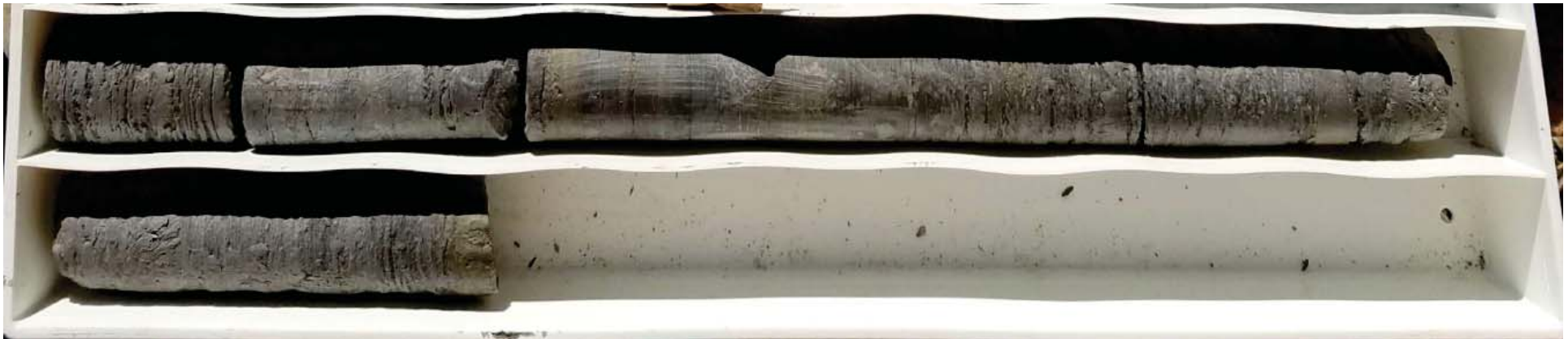
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Run 2  
TOP



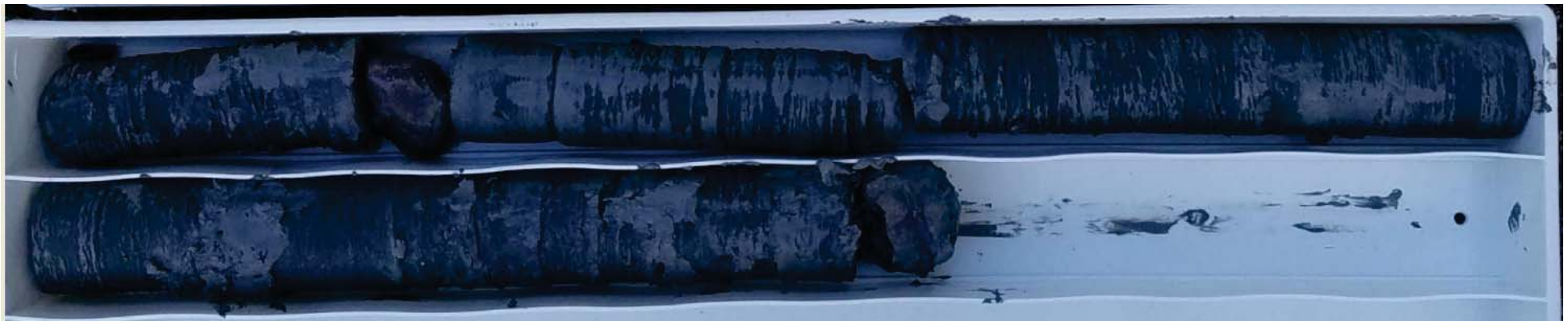
0 3 6 9 12 inches

Run 2  
BOTTOM

Boring SB-12  
RUN 2, 85.0 to 90.0 feet;  
RECOVERY = 50%;  
RQD = 100%

BEDROCK CORE: US 150 OVER ILLINOIS RIVER, McCLUGAGE BRIDGE, TAZEWELL AND PEORIA COUNTIES, ILLINOIS		
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Run 1  
TOP



Run 1  
BOTTOM



Boring SB-13  
RUN 1, 79.0 to 84.0 feet;  
RECOVERY = 67%;  
RQD = 65%

BEDROCK CORE: US 150 OVER ILLINOIS RIVER, McCLUGAGE BRIDGE, TAZEWELL AND PEORIA COUNTIES, ILLINOIS		
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Run 2  
TOP



Run 2  
BOTTOM

0 3 6 9 12 inches

Boring SB-13  
RUN 2, 84.0 to 89.0 feet;  
RECOVERY = 100%;  
RQD = 80%

BEDROCK CORE: US 150 OVER ILLINOIS RIVER, McCLUGAGE BRIDGE,  
TAZEWELL AND PEORIA COUNTIES, ILLINOIS

SCALE : GRAPHIC

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414-09-01

Run 1  
TOP



0 3 6 9 12 inches

Run 1  
BOTTOM

Boring SB-14  
RUN 1, 68.5 to 73.5 feet;  
RECOVERY = 100%;  
RQD = 100%

BEDROCK CORE: US 150 OVER ILLINOIS RIVER, McCLUGAGE BRIDGE,  
TAZEWELL AND PEORIA COUNTIES, ILLINOIS

SCALE : GRAPHIC

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Run 2  
TOP



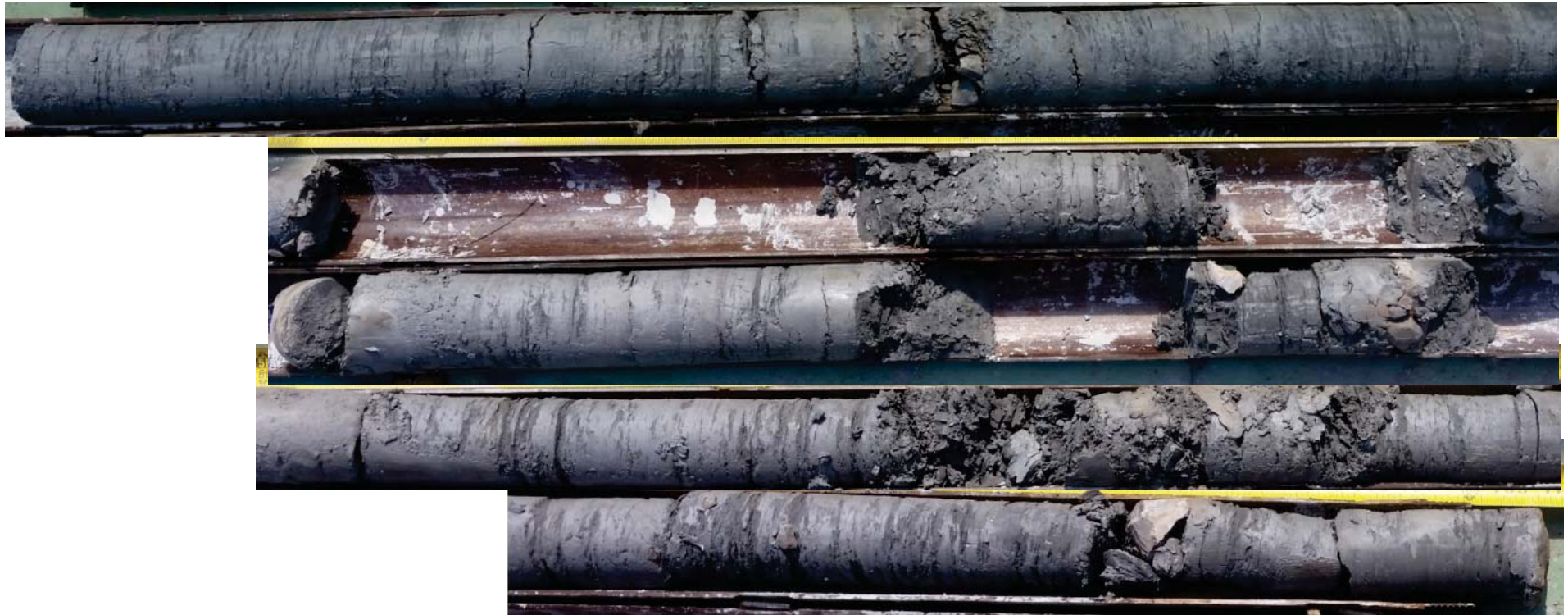
0 3 6 9 12 inches

Run 2  
BOTTOM

Boring SB-14  
RUN 2, 73.5 to 78.5 feet;  
RECOVERY = 90%;  
RQD = 86%

BEDROCK CORE: US 150 OVER ILLINOIS RIVER, McCLUGAGE BRIDGE, TAZEWELL AND PEORIA COUNTIES, ILLINOIS		
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Run 1  
TOP



0 3 6 9 12 inches

Run 1  
BOTTOM

Boring SB-23  
RUN 1, 49.5 to 59.5 feet;  
RECOVERY = 92%;  
RQD = 85%

BEDROCK CORE: US 150 OVER ILLINOIS RIVER, McCLUGAGE BRIDGE,  
TAZEWELL AND PEORIA COUNTIES, ILLINOIS

SCALE : GRAPHIC

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Run 2  
TOP



0 3 6 9 12 inches

Run 2  
BOTTOM

Boring SB-23  
RUN 2, 59.5 to 64.5 feet;  
RECOVERY = 100%;  
RQD = 95%

BEDROCK CORE: US 150 OVER ILLINOIS RIVER, McCLUGAGE BRIDGE,  
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Run 1  
TOP



0 3 6 9 12 inches

Run 1  
BOTTOM

Boring SB-24  
RUN 1, 54.5 to 64.5 feet;  
RECOVERY = 60%;  
RQD = 60%

BEDROCK CORE: US 150 OVER ILLINOIS RIVER, McCLUGAGE BRIDGE,  
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Run 2  
TOP



0 3 6 9 12 inches

Run 2  
BOTTOM

Boring SB-24  
RUN 2, 64.5 to 73.5 feet;  
RECOVERY = 100%;  
RQD = 98%

BEDROCK CORE: US 150 OVER ILLINOIS RIVER, McCLUGAGE BRIDGE,  
TAZEWELL AND PEORIA COUNTIES, ILLINOIS

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Run 3  
TOP



Run 3  
BOTTOM

0 3 6 9 12 inches

Boring SB-24  
RUN 3, 73.5 to 78.5 feet;  
RECOVERY = 70%;  
RQD = 70%

BEDROCK CORE: US 150 OVER ILLINOIS RIVER, McCLUGAGE BRIDGE,  
TAZEWELL AND PEORIA COUNTIES, ILLINOIS

SCALE : GRAPHIC

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CHECKED BY: M. Snider



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Run 1  
TOP



0 3 6 9 12 inches

Run 1  
BOTTOM

Boring SB-27  
RUN 1, 56.0 to 65.0 feet;  
RECOVERY = 87%;  
RQD = 87%

BEDROCK CORE: US 150 OVER ILLINOIS RIVER, McCLUGAGE BRIDGE,  
TAZEWELL AND PEORIA COUNTIES, ILLINOIS

SCALE : GRAPHIC

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Run 2  
TOP



0 3 6 9 12 inches

Run 2  
BOTTOM

Boring SB-27  
RUN 2, 65.0 to 74.0 feet;  
RECOVERY = 94%;  
RQD = 94%

BEDROCK CORE: US 150 OVER ILLINOIS RIVER, McCLUGAGE BRIDGE,  
TAZEWELL AND PEORIA COUNTIES, ILLINOIS

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Run 1  
TOP



Run 1  
BOTTOM

0 3 6 9 12 inches

Boring SB-30  
RUN 1, 65.5 to 75.0 feet;  
RECOVERY = 100%;  
RQD = 95%

BEDROCK CORE: US 150 OVER ILLINOIS RIVER, McCLUGAGE BRIDGE,  
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Run 2  
TOP



0 3 6 9 12 inches

Run 2  
BOTTOM

Boring SB-30  
RUN 2, 75.0 to 85.0 feet;  
RECOVERY = 100%;  
RQD = 100%

BEDROCK CORE: US 150 OVER ILLINOIS RIVER, McCLUGAGE BRIDGE, TAZEWELL AND PEORIA COUNTIES, ILLINOIS		
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Run 1  
TOP



Run 1  
BOTTOM

0 3 6 9 12 inches

A horizontal scale bar with markings at 0, 3, 6, 9, and 12 inches. The bar is divided into segments corresponding to these measurements.

Boring SB-32  
RUN 1, 61.0 to 71.0 feet;  
RECOVERY = 83%;  
RQD = 80%

BEDROCK CORE: US 150 OVER ILLINOIS RIVER, McCLUGAGE BRIDGE, TAZEWELL AND PEORIA COUNTIES, ILLINOIS		
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Run 2  
TOP



Run 2  
BOTTOM

0 3 6 9 12 inches

Boring SB-32  
RUN 2, 71.0 to 81.0 feet;  
RECOVERY = 57%;  
RQD = 57%

BEDROCK CORE: US 150 OVER ILLINOIS RIVER, McCLUGAGE BRIDGE,  
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Run 3  
TOP



Run 3  
BOTTOM

0 3 6 9 12 inches

Boring SB-32  
RUN 3, 81.0 to 86.0 feet;  
RECOVERY = 15%;  
RQD = 15%

BEDROCK CORE: US 150 OVER ILLINOIS RIVER, McCLUGAGE BRIDGE,  
TAZEWELL AND PEORIA COUNTIES, ILLINOIS

SCALE : GRAPHIC

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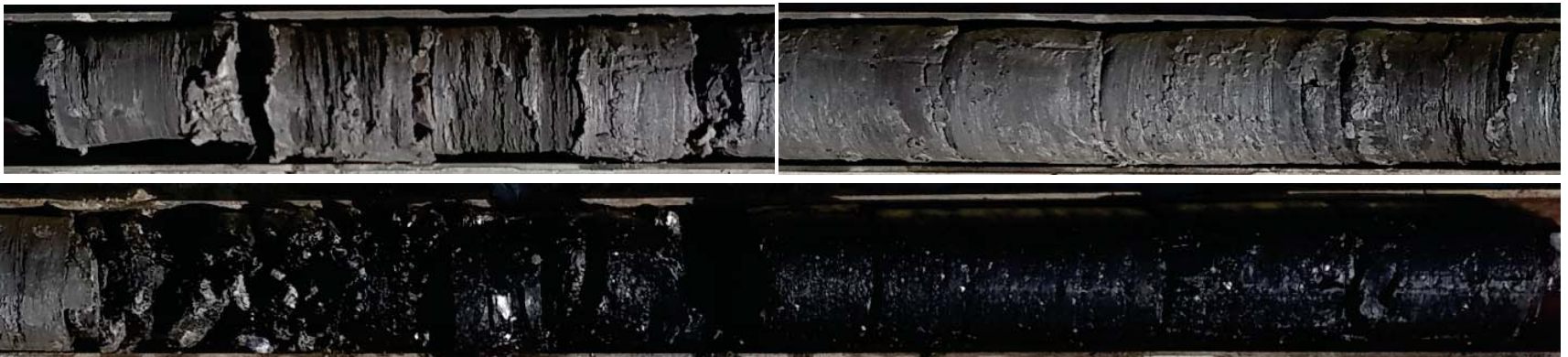


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Run 4  
TOP



Run 4  
BOTTOM



Boring SB-32  
RUN 4, 86.0 to 91.0 feet;  
RECOVERY = 77%;  
RQD = 77%

BEDROCK CORE: US 150 OVER ILLINOIS RIVER, McCLUGAGE BRIDGE, TAZEWELL AND PEORIA COUNTIES, ILLINOIS		
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Run 1  
TOP



Run 1  
BOTTOM

0 3 6 9 12 inches

Boring SB-34  
RUN 1, 64.0 to 69.0 feet;  
RECOVERY = 68%;  
RQD = 68%

BEDROCK CORE: US 150 OVER ILLINOIS RIVER, McCLUGAGE BRIDGE,  
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Run 1  
TOP



0 3 6 9 12 inches

Run 1  
BOTTOM

Boring SB-36  
RUN 1, 67.0 to 74.0 feet;  
RECOVERY = 85%;  
RQD = 85%

BEDROCK CORE: US 150 OVER ILLINOIS RIVER, McCLUGAGE BRIDGE,  
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Run 2  
TOP



0 3 6 9 12 inches

Run 2  
BOTTOM

Boring SB-36  
RUN 2, 74.0 to 82.0 feet;  
RECOVERY = 94%;  
RQD = 94%

BEDROCK CORE: US 150 OVER ILLINOIS RIVER, McCLUGAGE BRIDGE,  
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Run 3  
TOP



Run 3  
BOTTOM

0 3 6 9 12 inches

Boring SB-36  
RUN 3, 82.0 to 89.0 feet;  
RECOVERY = 100%;  
RQD = 100%

BEDROCK CORE: US 150 OVER ILLINOIS RIVER, McCLUGAGE BRIDGE,  
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Run 1  
TOP



0 3 6 9 12 inches

Run 1  
BOTTOM

Boring SB-39  
RUN 1, 58.5 to 65.5 feet;  
RECOVERY = 81%;  
RQD = 81%

BEDROCK CORE: US 150 OVER ILLINOIS RIVER, McCLUGAGE BRIDGE,  
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Run 2  
TOP



0 3 6 9 12 inches

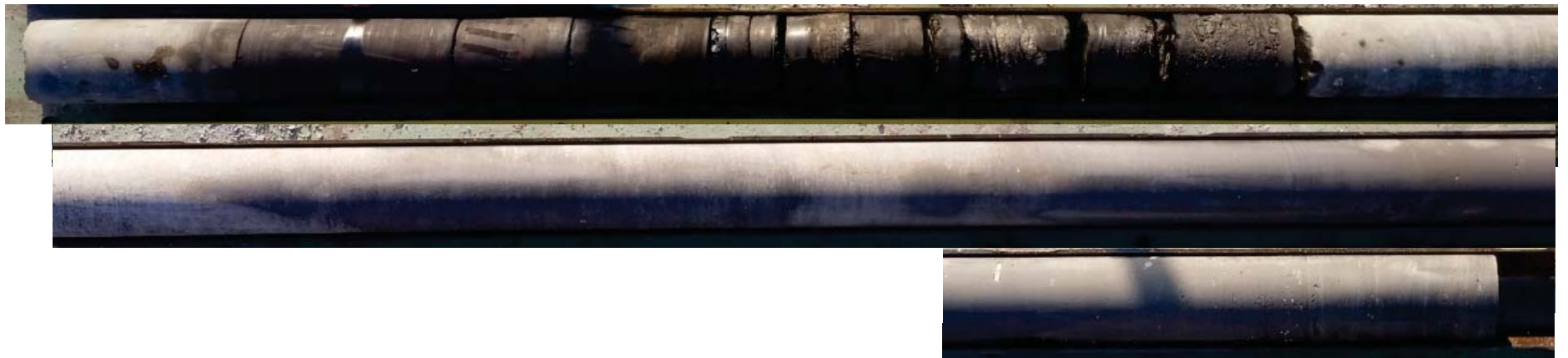
Run 2  
BOTTOM

Boring SB-39  
RUN 2, 65.5 to 73.5 feet;  
RECOVERY = 95%;  
RQD = 95%

BEDROCK CORE: US 150 OVER ILLINOIS RIVER, McCLUGAGE BRIDGE, TAZEWELL AND PEORIA COUNTIES, ILLINOIS		
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Run 3  
TOP



Run 3  
BOTTOM

0 3 6 9 12 inches

Boring SB-39  
RUN 3, 73.5.0 to 80.5 feet;  
RECOVERY = 100%;  
RQD = 100%

BEDROCK CORE: US 150 OVER ILLINOIS RIVER, McCLUGAGE BRIDGE,  
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Run 1  
TOP



Run 1  
BOTTOM

0 3 6 9 12 inches

Boring SB-43  
RUN 1, 56.0 to 61.0 feet;  
RECOVERY = 100%;  
RQD = 68%

BEDROCK CORE: US 150 OVER ILLINOIS RIVER, McCLUGAGE BRIDGE, TAZEWELL AND PEORIA COUNTIES, ILLINOIS		
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Run 2  
TOP



0 3 6 9 12 inches

Run 2  
BOTTOM

Boring SB-43  
RUN 2, 61.0 to 66.0 feet;  
RECOVERY = 85%;  
RQD = 0%

BEDROCK CORE: US 150 OVER ILLINOIS RIVER, McCLUGAGE BRIDGE,  
TAZEWELL AND PEORIA COUNTIES, ILLINOIS

SCALE : GRAPHIC

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414-09-01

**UNCONFINED COMPRESSIVE STRENGTH of COHESIVE SOIL**  
(AASHTO T 208 / ASTM D 2166)

**Project:** US 150 over IL River-McClugage  
**Client:** T.Y.Lin Group  
**WEI Job No.:** 414-09-01  
**Soil Sample ID:** SB-43ST, ST#1, 4.0 to 6.0 feet  
**Type/Condition:** ST/Undisturbed  
Liquid Limit (%): NA  
Plastic Limit (%): NA

**Analyst name:** A. Mohammed  
**Date received:** 11/16/2016  
**Test date:** 12/28/2016  
**Sample description:** Dark Gray SILTY CLAY

Average initial height  $h_0 = 6.19$  in  
Average initial diameter  $d_0 = 2.81$  in  
Height to diameter ratio = 2.21  
Mass of wet sample = 1117.05 g  
Mass of dry sample and tare = 805.18 g  
Mass of tare = 13.94 g  
Specific gravity = 2.76 (estimated)

Sand(%): NA  
Silt(%): NA  
Clay(%): NA  
Initial water content  $w = 41.18\%$  (specimen)  
Initial unit weight  $g = 110.97$  pcf  
Initial dry unit weight  $g_d = 78.61$  pcf  
Initial void ratio  $e_0 = 1.19$   
Initial degree of saturation  $S_r = 95\%$   
Average Rate of Strain = 1%/min  
Unconfined compressive strength  $q_u = 0.31$  tsf  
Shear Strength = 0.15 tsf

Displacement (in)	Force (lbs)	Strain (%)	Stress (tsf)
$\Delta h$	F	e	s
0.00	0.00	0.00	0.00
0.03	4.15	0.48	0.05
0.06	6.22	0.97	0.07
0.09	8.30	1.45	0.10
0.12	10.37	1.94	0.12
0.15	12.44	2.42	0.14
0.18	15.56	2.91	0.18
0.21	16.59	3.39	0.19
0.24	18.67	3.88	0.21
0.27	20.74	4.36	0.23
0.30	21.78	4.84	0.24
0.35	22.81	5.65	0.25
0.40	24.89	6.46	0.27
0.45	25.93	7.27	0.28
0.50	26.96	8.07	0.29
0.55	28.00	8.88	0.30
0.60	29.04	9.69	0.30
0.65	29.04	10.50	0.30
0.70	29.04	11.30	0.30
0.80	30.07	12.92	0.30
0.90	31.11	14.53	0.31
1.00	31.11	16.15	0.30



NOTES:

Prepared by: \_\_\_\_\_ Date: \_\_\_\_\_

Checked by: \_\_\_\_\_ Date: \_\_\_\_\_

**UNCONFINED COMPRESSIVE STRENGTH of COHESIVE SOIL**  
(AASHTO T 208 / ASTM D 2166)

**Project:** US 150 over IL River-McClugage  
**Client:** T.Y.Lin Group  
**WEI Job No.:** 414-09-01  
**Soil Sample ID:** SB-43ST, ST#8, 29.0 to 31.0 feet  
**Type/Condition:** ST/Undisturbed  
Liquid Limit (%): NA  
Plastic Limit (%): NA

**Analyst name:** A. Mohammed  
**Date received:** 11/16/2016  
**Test date:** 12/28/2016  
**Sample description:** Gray SILTY CLAY

Average initial height  $h_0 = 6.25$  in  
Average initial diameter  $d_0 = 2.81$  in  
Height to diameter ratio = 2.23  
Mass of wet sample = 1082.55 g  
Mass of dry sample and tare = 729.38 g  
Mass of tare = 13.40 g  
Specific gravity = 2.76 (estimated)

Sand(%): NA  
Silt(%): NA  
Clay(%): NA  
Initial water content  $w = 51.20\%$  (specimen)  
Initial unit weight  $g = 106.68$  pcf  
Initial dry unit weight  $g_d = 70.56$  pcf  
Initial void ratio  $e_0 = 1.44$   
Initial degree of saturation  $S_r = 98\%$   
Average Rate of Strain = 1%/min  
Unconfined compressive strength  $q_u = 0.60$  tsf  
Shear Strength = 0.30 tsf

Displacement (in)	Force (lbs)	Strain (%)	Stress (tsf)
$\Delta h$	F	e	s
0.00	0.00	0.00	0.00
0.03	5.19	0.48	0.06
0.06	8.30	0.96	0.10
0.09	10.37	1.44	0.12
0.12	12.44	1.92	0.14
0.15	16.59	2.40	0.19
0.18	19.70	2.88	0.22
0.21	23.85	3.36	0.27
0.24	26.96	3.84	0.30
0.27	30.07	4.32	0.33
0.30	33.18	4.80	0.37
0.35	39.41	5.60	0.43
0.40	44.59	6.40	0.49
0.45	48.74	7.20	0.53
0.50	51.85	8.00	0.56
0.55	53.92	8.80	0.57
0.60	56.00	9.60	0.59
0.65	56.00	10.40	0.58
0.70	58.07	11.20	0.60
0.80	58.07	12.80	0.59
0.90	58.07	14.40	0.58
1.00	53.92	16.00	0.53



NOTES:

Prepared by: \_\_\_\_\_ Date: \_\_\_\_\_

Checked by: \_\_\_\_\_ Date: \_\_\_\_\_

**UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST**

AASHTO T 296 / ASTM D 2850-95

**Project:** US Route 150 over the Illinois River  
**Client:** TY Lin International  
**WEI Job No.:** 414-09-01  
**Soil Sample ID:** Boring SB-43ST, ST#3, 8 to 10 feet  
**Type/Condition:** ST/Undisturbed

**Analyst name:** M. Snider  
**Date received:** 11/16/2016  
**Test date:** 12/6/2016  
**Sample description:** M Stiff, gray CLAY LOAM

Initial height $h_0 =$	5.29 in	Initial water content $w =$	25.54%
Initial diameter $d_0 =$	2.82 in	Initial unit weight $\gamma_w =$	128.39 pcf
Initial area $A_0 =$	6.27 in <sup>2</sup>	Initial dry unit weight $\gamma_d =$	102.27 pcf
Mass of wet sample and tare $M_i =$	1129.54 g	Initial void ratio $e_0 =$	0.678
Mass of dry sample and tare $M_d =$	902.47 g	Initial degree of saturation $S_r =$	100%
Mass of tare $M_t =$	13.30 g	Liquid Limit (%):	38
Mass of sample $M_s =$	1116.24 g	Plastic Limit (%):	19
Estimated specific gravity $G_s =$	2.75	Sand(%):	NA
Cell confining pressure $\sigma_3 =$	4.0 psi	Silt(%):	NA
Rate of strain =	1 %/min	Clay(%):	NA
Proving Ring Factor =	1.000		
Height to diameter ratio =	1.87		

**Deviator stress at failure  $\Delta\sigma_f =$  0.60 tsf**  
**Major principal stress at failure  $\sigma_1 =$  0.89 tsf**

Axial Displacement (in)	Axial Force (lbs)	Axial Strain (%)	Deviator Stress (psi)
$\Delta h$	F	e	$\sigma_1 - \sigma_3$
0.00	0.00	0.00	0.00
0.00	4.34	0.06	0.69
0.01	6.77	0.15	1.08
0.01	8.46	0.25	1.35
0.02	9.81	0.34	1.56
0.02	10.99	0.44	1.75
0.03	12.10	0.54	1.92
0.03	13.16	0.64	2.09
0.04	14.21	0.74	2.25
0.04	15.19	0.84	2.40
0.05	16.06	0.94	2.54
0.08	19.59	1.44	3.08
0.10	22.52	1.92	3.52
0.13	25.68	2.42	4.00
0.15	28.67	2.90	4.44
0.18	30.88	3.38	4.76
0.20	33.27	3.86	5.11
0.23	35.72	4.34	5.45
0.26	38.34	4.86	5.82
0.28	40.39	5.36	6.10
0.31	42.56	5.86	6.39
0.34	44.99	6.36	6.73
0.36	46.90	6.85	6.97
0.39	48.47	7.35	7.17
0.41	50.52	7.85	7.43
0.44	51.69	8.37	7.56
0.47	52.70	8.94	7.66
0.50	53.45	9.44	7.73
0.53	54.11	9.94	7.78
0.58	55.33	10.93	7.87
0.63	56.93	11.92	8.00
0.68	57.43	12.92	7.98
0.74	58.44	13.90	8.03
0.79	61.46	14.87	8.35



Prepared by: \_\_\_\_\_ Date: \_\_\_\_\_

Checked by: \_\_\_\_\_ Date: \_\_\_\_\_

**ONE-DIMENSIONAL CONSOLIDATION TEST**  
**AASHTO T 216 / ASTM D 2435**

**Project: US Route 150 over the Illinois River**  
**Client: TY Lin International**  
**Soil Sample ID: Boring SB-43ST, ST#1, 4 to 6 feet**  
**Sample Description: Gray SILTY CLAY**

**Tested by: M. Snider**  
**Prepared by: M. Snider**  
**Test date: 11/23/2016**  
**WEI: 414-09-01**

Initial sample height = 1.010 in  
Initial sample mass = 161.36 g  
Initial water content = 25.67%  
Initial dry unit weight = 98.76 pcf  
Initial void ratio = 0.719  
Initial degree of saturation = 97.16%

Final sample mass = 153.55 g  
Final dry sample mass = 128.40 g  
Final water content = 19.59%  
Final dry unit weight = 112.56 pcf  
Final void ratio = 0.508  
Final degree of saturation = 100.00%  
Estimated specific gravity = 2.72

Ring diameter = 2.499 in  
Ring mass = 109.43 g  
Initial sample and ring mass = 270.79 g  
Tare mass = 69.44 g  
Final ring and sample mass = 263.12 g  
Mass of wet sample and tare = 222.99 g  
Mass of dry sample and tare = 197.84 g  
Initial dial reading = 0.01000 in  
Final dial reading = 0.13385 in  
LL = 42 %  
PL = 19 %  
% Sand = NA  
% Silt = NA  
% Clay = NA  
**In-Situ Vertical Effective Stress = 750 psf**

**Compression and Swelling Indices**

Compression index  $C_c$  = 0.202  
Field corrected  $C_c$  = 0.204  
Swelling index  $C_s$  = 0.047

**Preconsolidation pressure,  $s_c$**

Casagrande Method = 1731 psf

**Over-Consolidation Ratio (OCR) = 2.31**

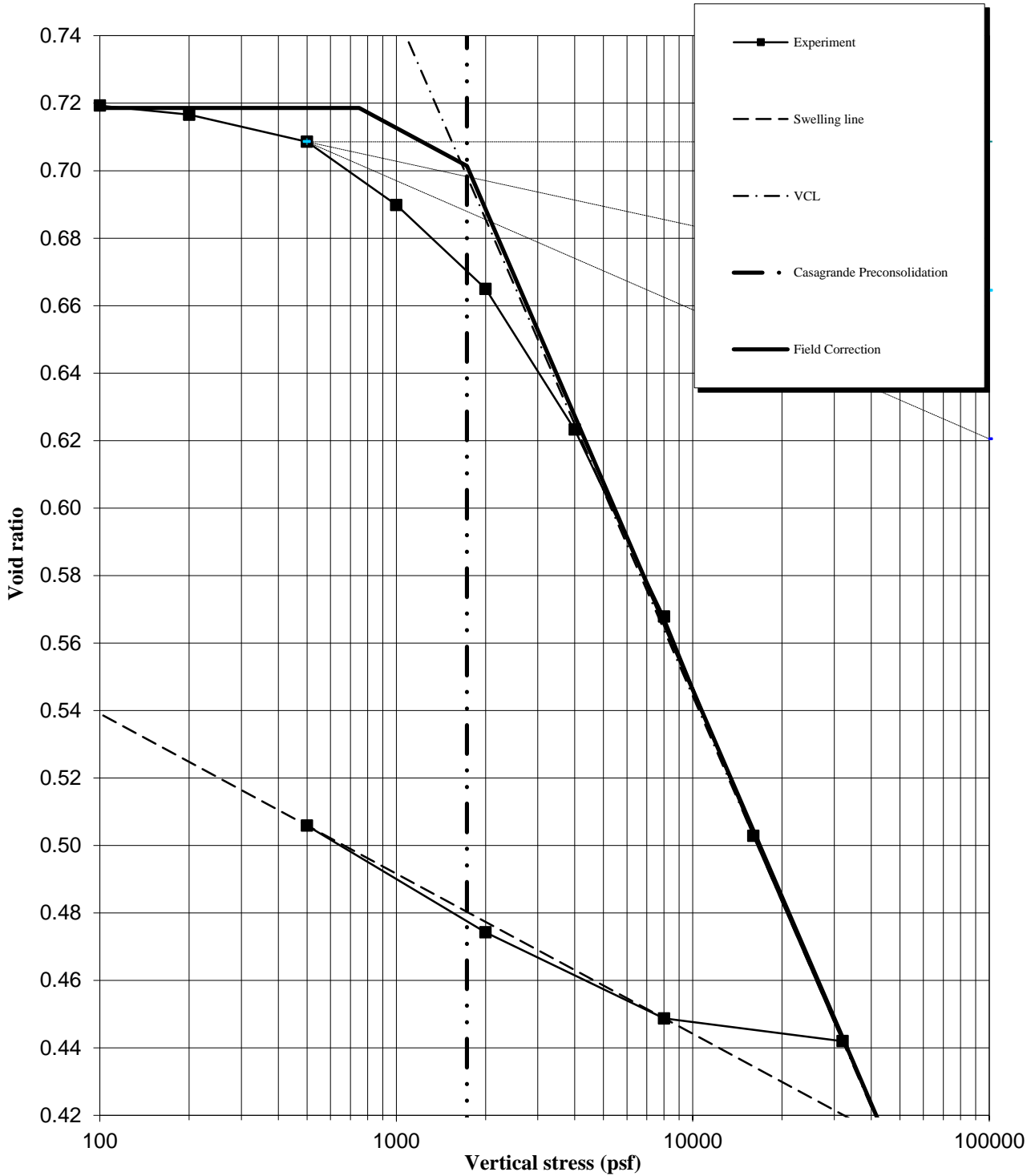
Load number	Vertical stress psf	Dial reading in	System deflection in	Vertical strain %	Void ratio	$C_v$ ft <sup>2</sup> /day	$C_{ae}$ %	Elapsed time min
1	100.0	0.00951	0.00010	-0.04	0.719	N/A	N/A	720
2	200.0	0.01096	0.00023	0.12	0.717	0.1447	0.04	720
3	500.0	0.01533	0.00058	0.58	0.709	0.1439	0.18	720
4	1000.0	0.02601	0.00090	1.67	0.690	0.1021	0.08	720
5	2000.0	0.04017	0.00135	3.12	0.665	0.0742	0.30	720
6	4000.0	0.06412	0.00193	5.55	0.623	0.0527	0.50	720
7	8000.0	0.09608	0.00253	8.77	0.568	0.0366	0.60	720
8	16000.0	0.13356	0.00324	12.55	0.503	0.0351	0.55	720
9	32000.0	0.16846	0.00413	16.10	0.442	0.0327	0.60	720
10	8000.0	0.16566	0.00295	15.70	0.449	N/A	N/A	480
11	2000.0	0.15165	0.00198	14.22	0.474	N/A	N/A	720
11	500.0	0.13381	0.00123	12.38	0.506	N/A	N/A	890

Prepared by: \_\_\_\_\_ Date: \_\_\_\_\_

Checked by: \_\_\_\_\_ Date: \_\_\_\_\_

## CONSOLIDATION CURVE

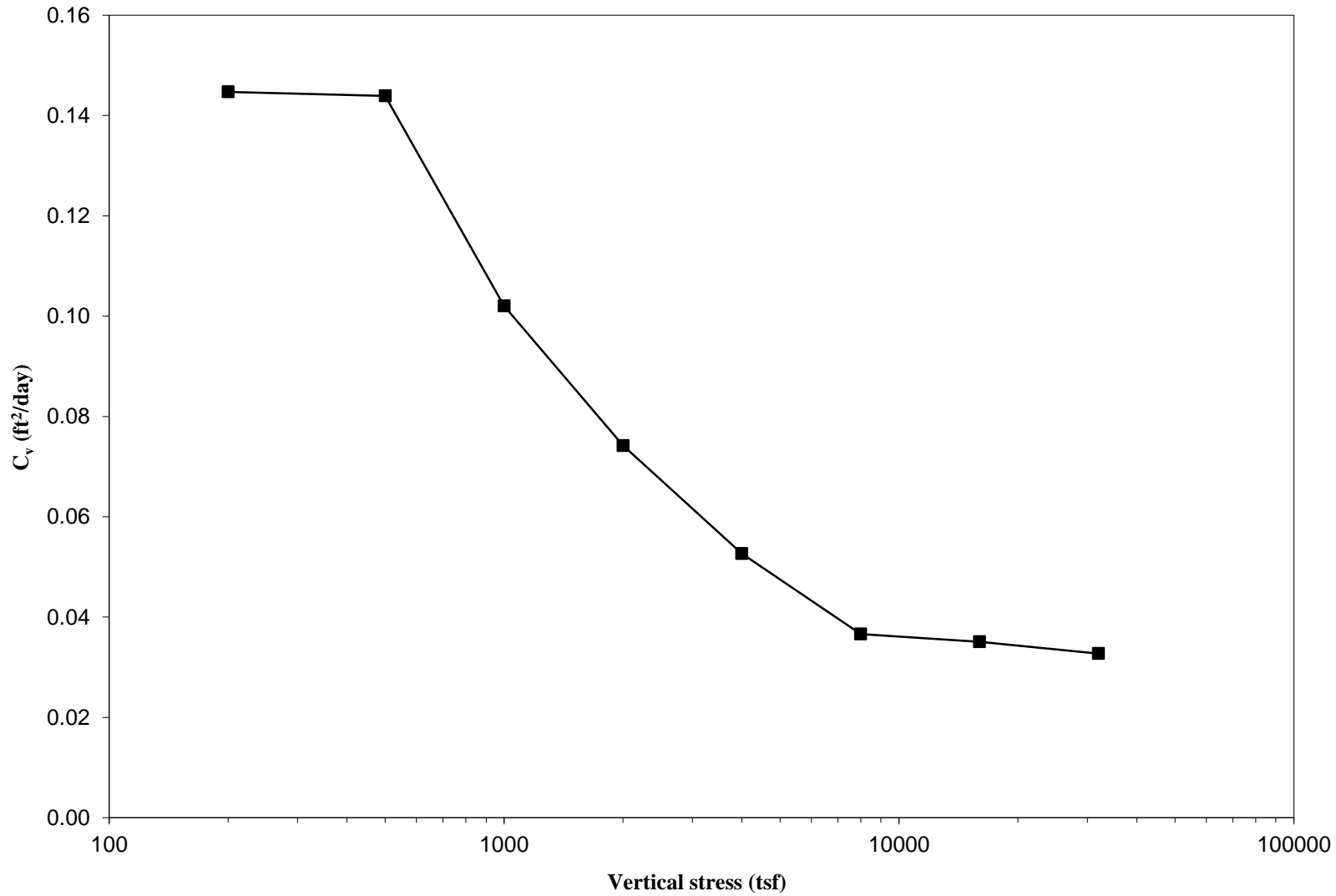
Sample SB-43ST, ST#1, 4' to 6'





## CONSOLIDATION COEFFICIENT ( $C_v$ ) vs. VERTICAL STRESS

Sample SB-43ST, ST#1, 4' to 6'



**ONE-DIMENSIONAL CONSOLIDATION TEST**  
**AASHTO T 216 / ASTM D 2435**

**Project: US Route 150 over the Illinois River**  
**Client: TY Lin International**  
**Soil Sample ID: Boring SB-43ST, ST#4, 10 to 12 feet**  
**Sample Description: Gray SILTY CLAY**

**Tested by: M. Snider**  
**Prepared by: M. Snider**  
**Test date: 11/23/2016**  
**WEI: 414-09-01**

Initial sample height = 1.010 in  
Initial sample mass = 153.74 g  
Initial water content = 30.54%  
Initial dry unit weight = 90.66 pcf  
Initial void ratio = 0.872  
Initial degree of saturation = 95.25%

Final sample mass = 142.53 g  
Final dry sample mass = 117.77 g  
Final water content = 21.02%  
Final dry unit weight = 108.49 pcf  
Final void ratio = 0.564  
Final degree of saturation = 100.00%  
Estimated specific gravity = 2.72

Ring diameter = 2.498 in  
Ring mass = 109.83 g  
Initial sample and ring mass = 263.57 g  
Tare mass = 71.02 g  
Final ring and sample mass = 252.59 g  
Mass of wet sample and tare = 213.55 g  
Mass of dry sample and tare = 188.79 g  
Initial dial reading = 0.01000 in  
Final dial reading = 0.17601 in  
LL= 42 %  
PL= 19 %  
% Sand= NA  
% Silt= NA  
% Clay= NA

**In-Situ Vertical Effective Stress = 1300 psf**

**Compression and Swelling Indices**

Compression index  $C_c$  = 0.270  
Field corrected  $C_c$  = 0.292  
Swelling index  $C_s$  = 0.056

**Preconsolidation pressure,  $s_c$**

Casagrande Method = 1822 psf

**Over-Consolidation Ratio (OCR) = 1.40**

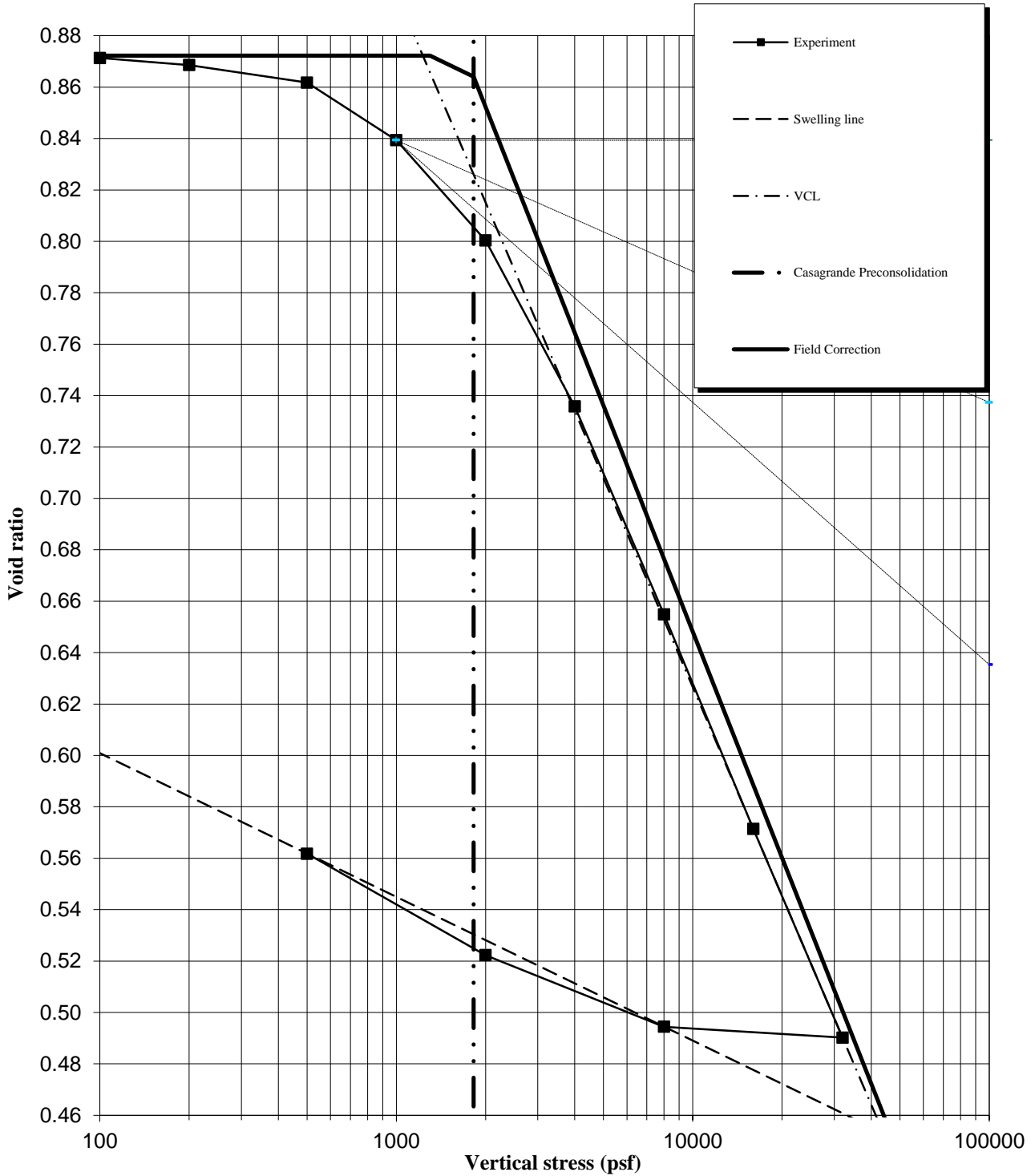
Load number	Vertical stress psf	Dial reading in	System deflection in	Vertical strain %	Void ratio	$C_v$ ft <sup>2</sup> /day	$C_{ae}$ %	Elapsed time min
1	100.0	0.01038	0.00010	0.05	0.871	N/A	N/A	720
2	200.0	0.01173	0.00023	0.19	0.869	0.2169	0.03	720
3	500.0	0.01507	0.00058	0.56	0.862	0.2159	0.14	720
4	1000.0	0.02684	0.00090	1.76	0.839	0.1529	0.11	720
5	2000.0	0.04743	0.00135	3.84	0.800	0.1688	0.35	720
6	4000.0	0.08168	0.00193	7.29	0.736	0.1122	0.58	720
7	8000.0	0.12474	0.00253	11.61	0.655	0.0718	0.71	720
8	16000.0	0.16903	0.00324	16.07	0.571	0.0571	0.65	720
9	32000.0	0.21196	0.00413	20.40	0.490	0.0469	0.64	720
10	8000.0	0.21086	0.00295	20.18	0.494	N/A	N/A	480
11	2000.0	0.19680	0.00198	18.69	0.522	N/A	N/A	720
11	500.0	0.17627	0.00123	16.58	0.562	N/A	N/A	720

Prepared by: \_\_\_\_\_ Date: \_\_\_\_\_

Checked by: \_\_\_\_\_ Date: \_\_\_\_\_

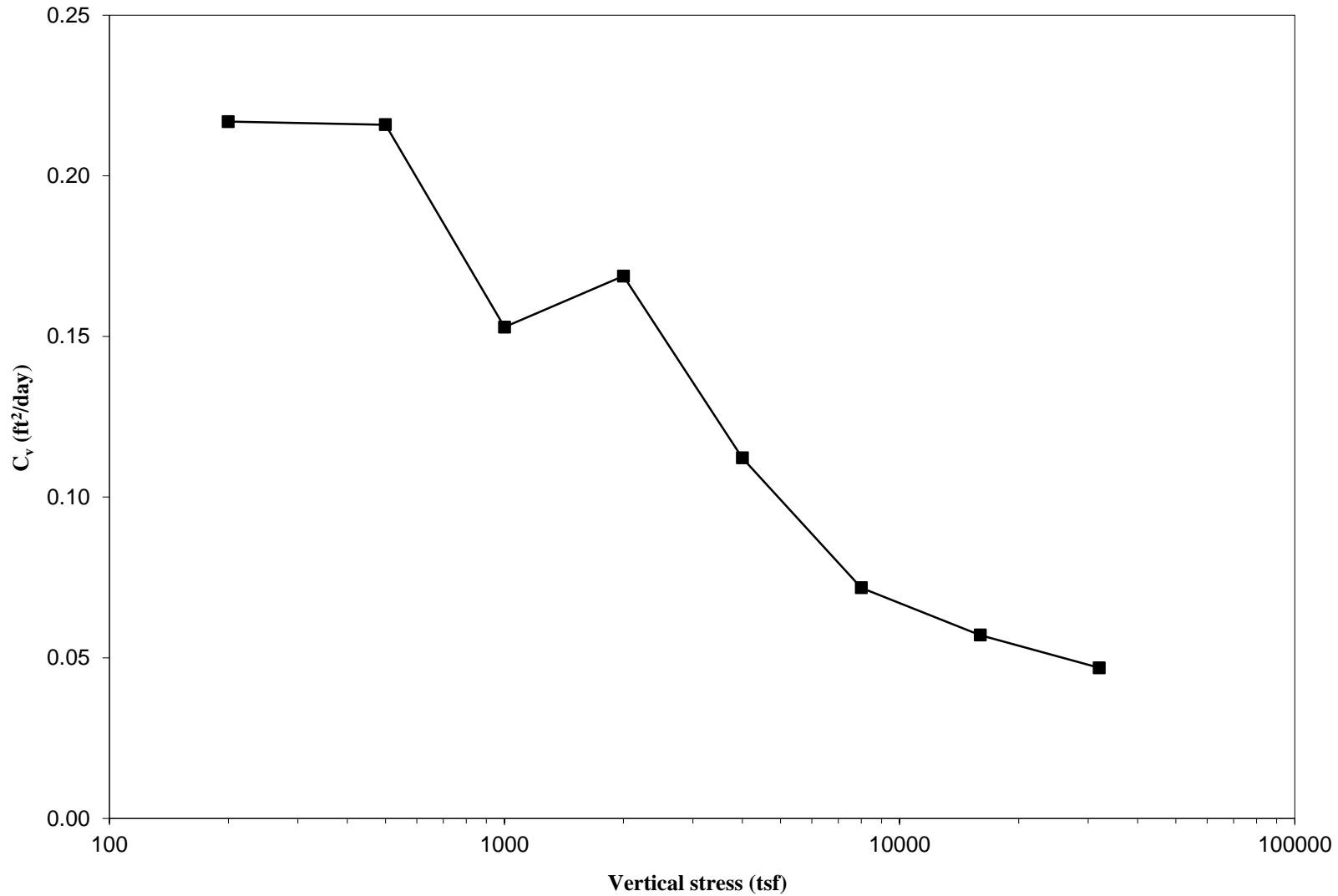
## CONSOLIDATION CURVE

Sample SB-43ST, ST#4, 10' to 12'



## CONSOLIDATION COEFFICIENT ( $C_v$ ) vs. VERTICAL STRESS

Sample SB-43ST, ST#4, 10' to 12'





**ONE-DIMENSIONAL CONSOLIDATION TEST**  
**AASHTO T 216 / ASTM D 2435**

**Project: US Route 150 over the Illinois River**  
**Client: TY Lin International**  
**Soil Sample ID: Boring SB-43ST, ST#8, 29 to 31 feet**  
**Sample Description: Gray SILTY CLAY**

**Tested by: M. Snider**  
**Prepared by: M. Snider**  
**Test date: 11/23/2016**  
**WEI: 414-09-01**

Initial sample height = 0.798 in  
Initial sample mass = 111.16 g  
Initial water content = 47.64%  
Initial dry unit weight = 72.59 pcf  
Initial void ratio = 1.252  
Initial degree of saturation = 99.69%

Final sample mass = 99.71 g  
Final dry sample mass = 75.29 g  
Final water content = 32.43%  
Final dry unit weight = 81.40 pcf  
Final void ratio = 1.008  
Final degree of saturation = 84.27%  
Estimated specific gravity = 2.62

Ring diameter = 2.511 in  
Ring mass = 62.84 g  
Initial sample and ring mass = 174.00 g  
Tare mass = 102.03 g  
Final ring and sample mass = 162.93 g  
Mass of wet sample and tare = 201.74 g  
Mass of dry sample and tare = 177.32 g  
Initial dial reading = 0.01000 in  
Final dial reading = 0.09632 in  
LL= 57 %  
PL= 23 %  
% Sand= NA  
% Silt= NA  
% Clay= NA  
**In-Situ Vertical Effective Stress = 2450 psf**

**Compression and Swelling Indices**

Compression index  $C_c$  = 0.303  
Field corrected  $C_c$  = 0.321  
Swelling index  $C_s$  = 0.087

**Preconsolidation pressure,  $s_c$**

Casagrande Method = 2478 psf

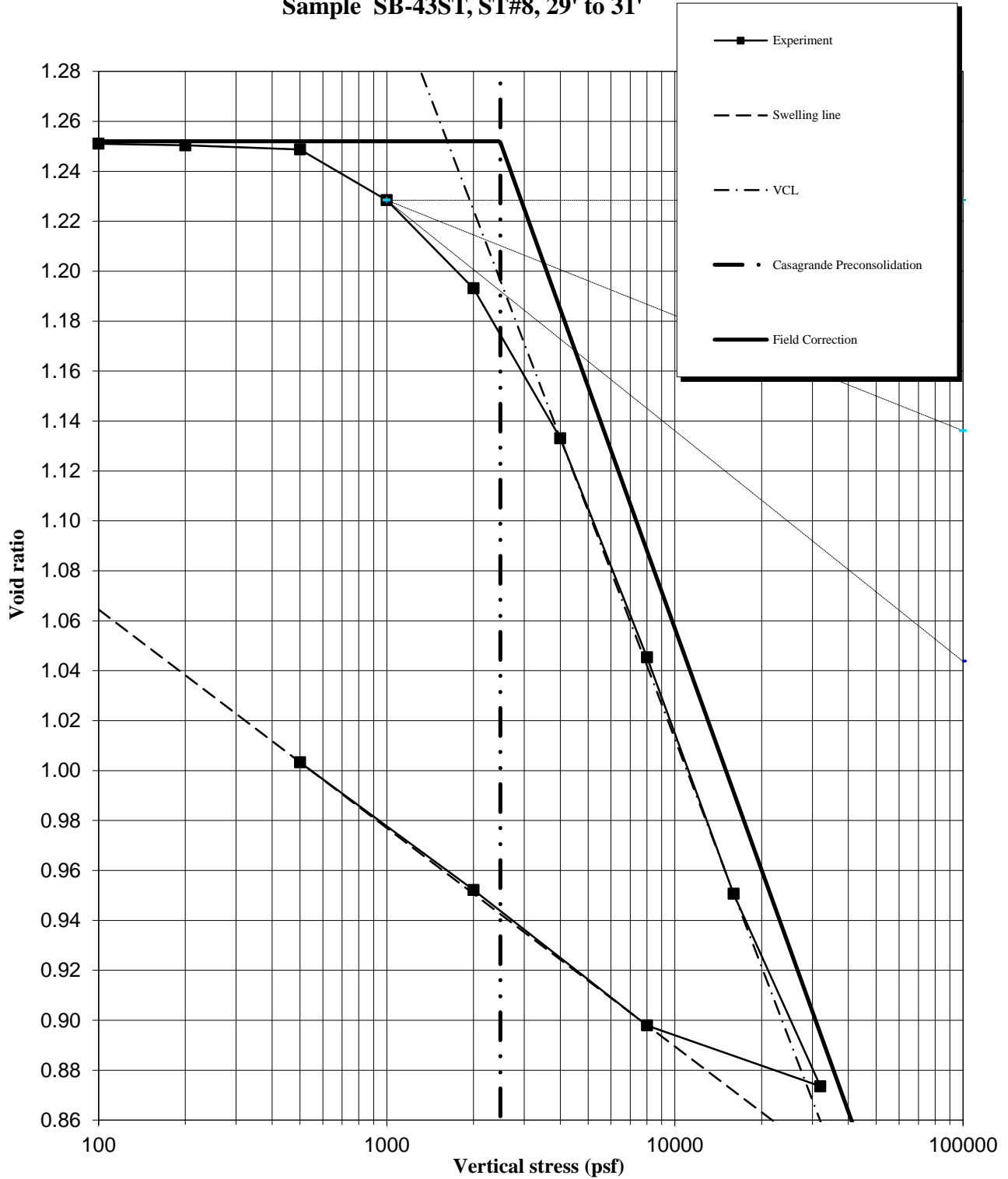
**Over-Consolidation Ratio (OCR) = 1.01**

Load number	Vertical stress psf	Dial reading in	System deflection in	Vertical strain %	Void ratio	$C_v$ ft <sup>2</sup> /day	$C_{ae}$ %	Elapsed time min
1	100.0	0.00989	0.00047	0.05	1.251	N/A	N/A	720
2	200.0	0.00993	0.00066	0.07	1.250	0.1341	0.00	720
3	500.0	0.01030	0.00087	0.15	1.249	0.1340	0.01	720
4	1000.0	0.01700	0.00138	1.05	1.228	0.0368	0.11	720
5	2000.0	0.02889	0.00198	2.62	1.193	0.0296	0.28	720
6	4000.0	0.04790	0.00425	5.28	1.133	0.0260	0.56	720
7	8000.0	0.07674	0.00648	9.18	1.045	0.0176	0.74	720
8	16000.0	0.10777	0.00903	13.38	0.951	0.0190	0.62	720
9	32000.0	0.13349	0.01063	16.81	0.874	0.0188	0.56	720
10	8000.0	0.12739	0.00809	15.72	0.898	N/A	N/A	480
11	2000.0	0.11239	0.00386	13.31	0.952	N/A	N/A	720
11	500.0	0.09632	0.00183	11.05	1.003	N/A	N/A	720

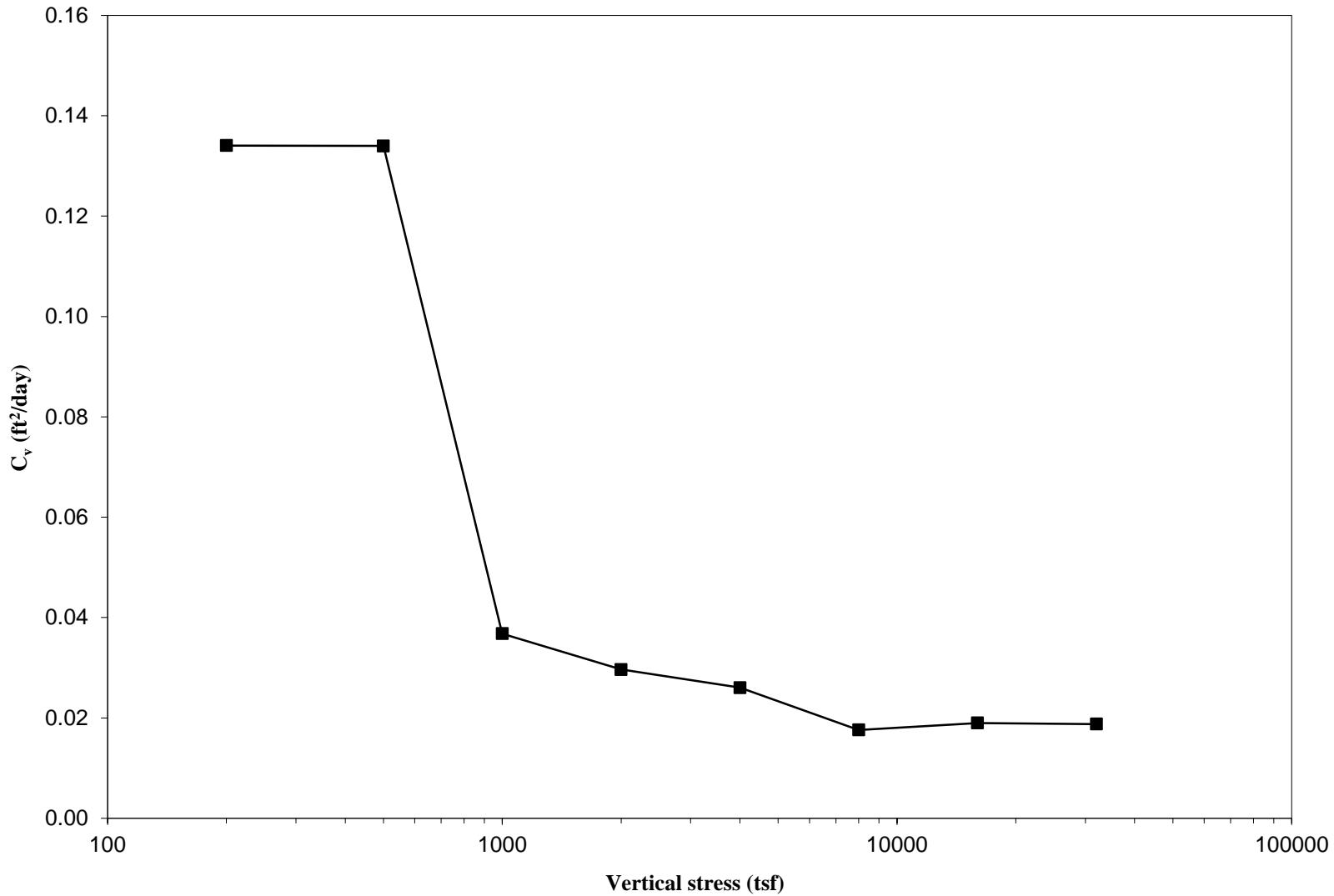
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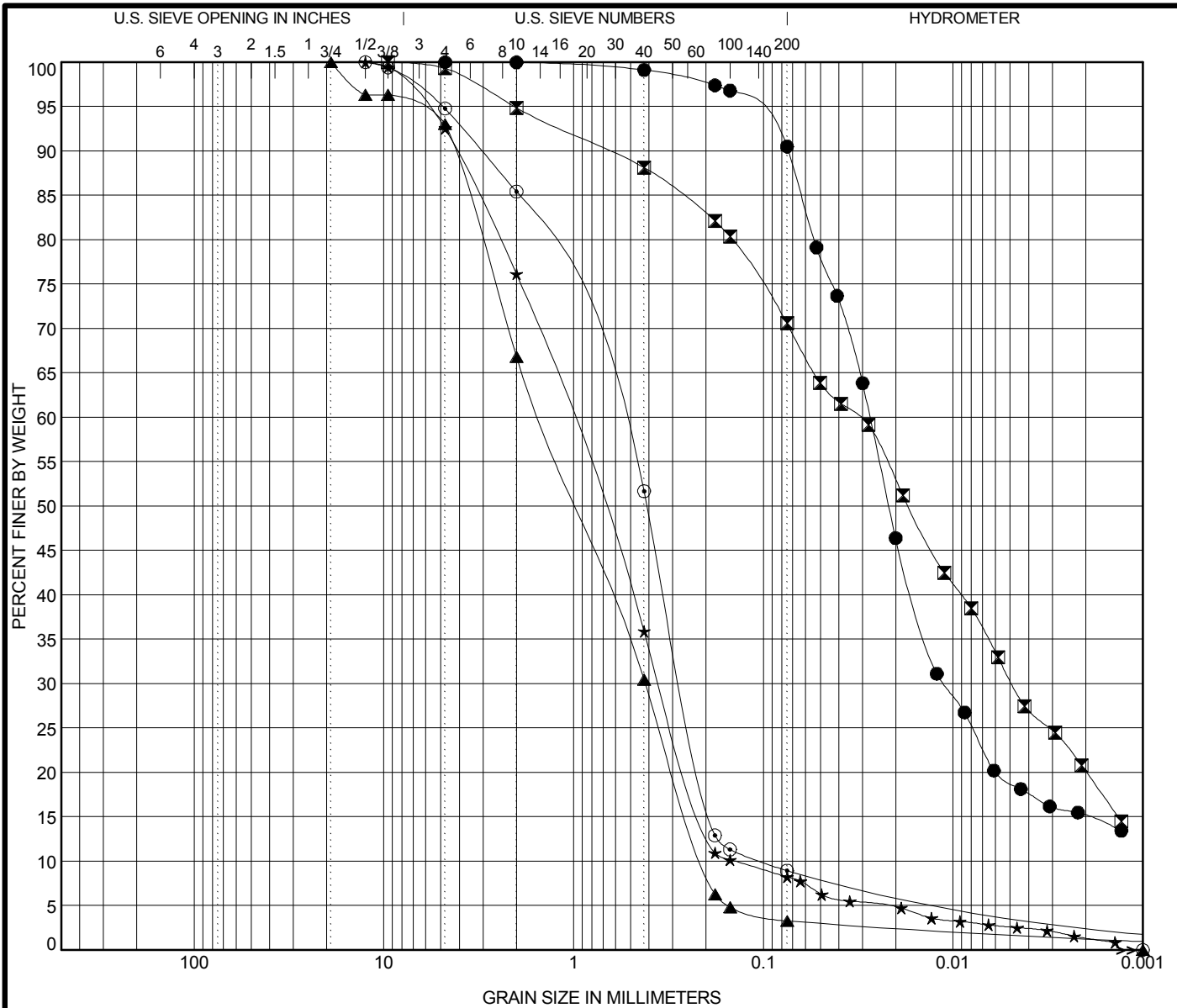
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**CONSOLIDATION CURVE**  
Sample SB-43ST, ST#8, 29' to 31'



**CONSOLIDATION COEFFICIENT ( $C_v$ ) vs. VERTICAL STRESS**  
Sample SB-43ST, ST#8, 29' to 31'





COBBLES	GRAVEL	SAND		SILT AND CLAY
		coarse	fine	

Specimen Identification		IDH Classification				LL	PL	PI	Cc	Cu
●	SB-24#6 10.0 ft	<b>Silty Loam</b>								
☒	SB-30#6 10.0 ft	<b>Silty Clay Loam</b>								
▲	SB-31#15 34.5 ft	<b>Gravelly Sand</b>				NP	NP	NP	0.57	7.28
★	SB-32#6 11.5 ft	<b>Gravelly Sand</b>				NP	NP	NP	0.79	7.55
◎	SB-33#7 13.5 ft	<b>Sand</b>				NP	NP	NP	1.09	6.09
Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay	
●	SB-24#6 10.0 ft	4.75	0.027	0.011		0.0	9.9	75.0	15.1	
☒	SB-30#6 10.0 ft	9.5	0.031	0.005		5.1	24.5	50.2	20.1	
▲	SB-31#15 34.5 ft	19	1.496	0.418	0.205	33.2	63.6	1.7	3.3	1.6
★	SB-32#6 11.5 ft	12.5	1.074	0.347	0.142	23.9	67.9	6.8	1.4	
◎	SB-33#7 13.5 ft	12.5	0.623	0.263	0.102	14.6	76.5	4.5	8.9	4.4

WEI GRAIN SIZE IDH 4140901.GPJ US LAB.GDT 4/5/17

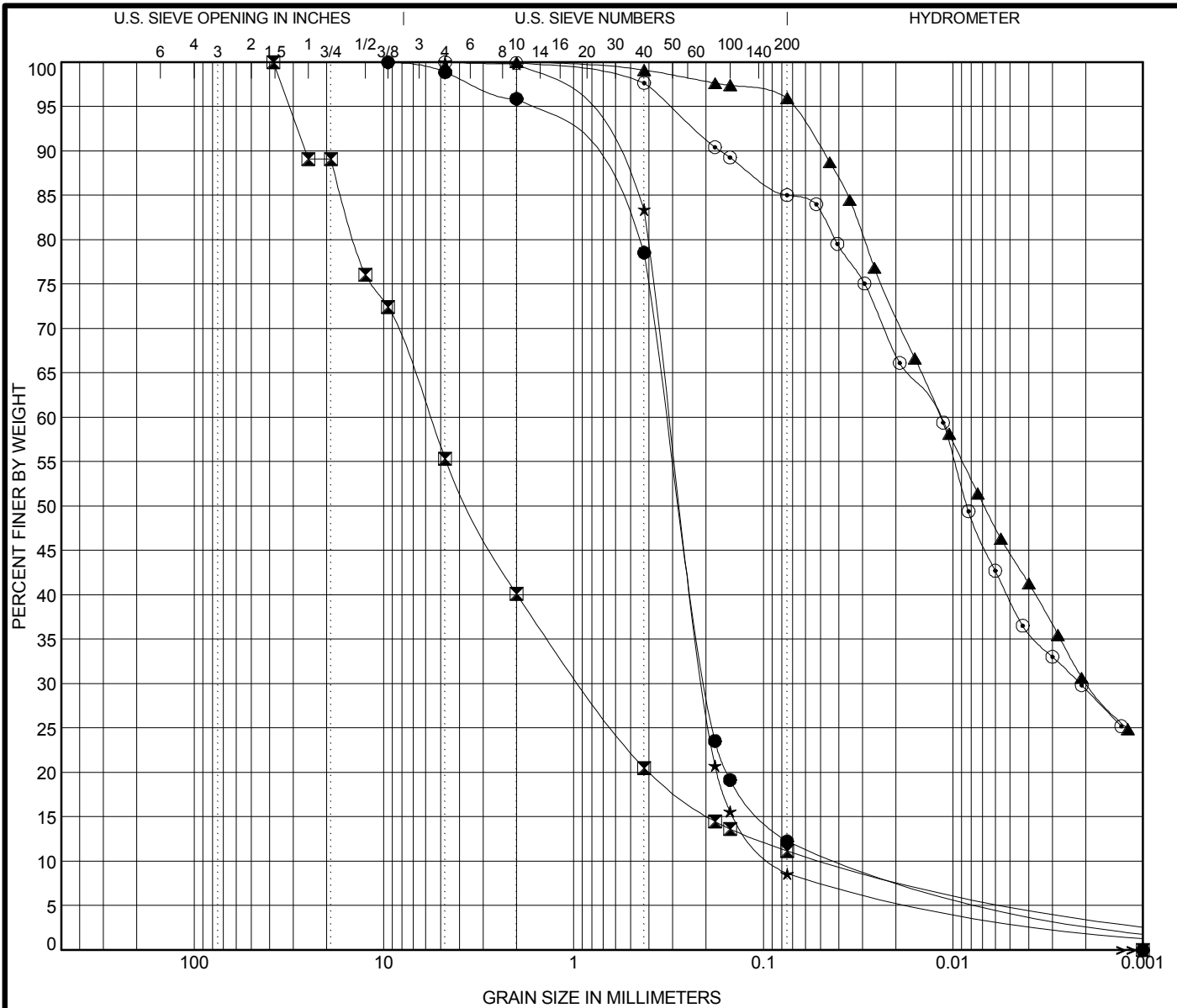


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**GRAIN SIZE DISTRIBUTION**

Project: US 150 over Illinois River - McClugage  
 Location: Peoria and Tazewell Counties, IL  
 Number: 414-09-01





COBBLES	GRAVEL	SAND		SILT AND CLAY
		coarse	fine	

Specimen Identification		IDH Classification					LL	PL	PI	Cc	Cu
●	SB-34#9 19.0 ft	Sand					NP	NP	NP	6.08	15.52
◻	SB-34#17 46.5 ft	Gravelly Sandy Loam					NP	NP	NP	3.92	159.41
▲	SB-40#2 2.0 ft	Silty Clay									
★	SB-40#6 10.0 ft	Sand					NP	NP	NP	1.57	3.57
⊙	SB-43ST# 4.5 ft	Silty Clay Loam					51	22	29		
Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay		
●	SB-34#9 19.0 ft	9.5	0.318	0.199	0.02	4.1	83.7	6.2	12.2	6.0	
◻	SB-34#17 46.5 ft	38.1	5.737	0.899	0.036	59.9	29.0	5.6	11.1	5.5	
▲	SB-40#2 2.0 ft	2	0.011	0.002		0.0	4.2	65.6	30.2		
★	SB-40#6 10.0 ft	4.75	0.308	0.204	0.086	0.2	91.2	4.3	8.6	4.2	
⊙	SB-43ST# 4.5 ft	4.75	0.012	0.002		0.1	14.9	55.6	29.3		

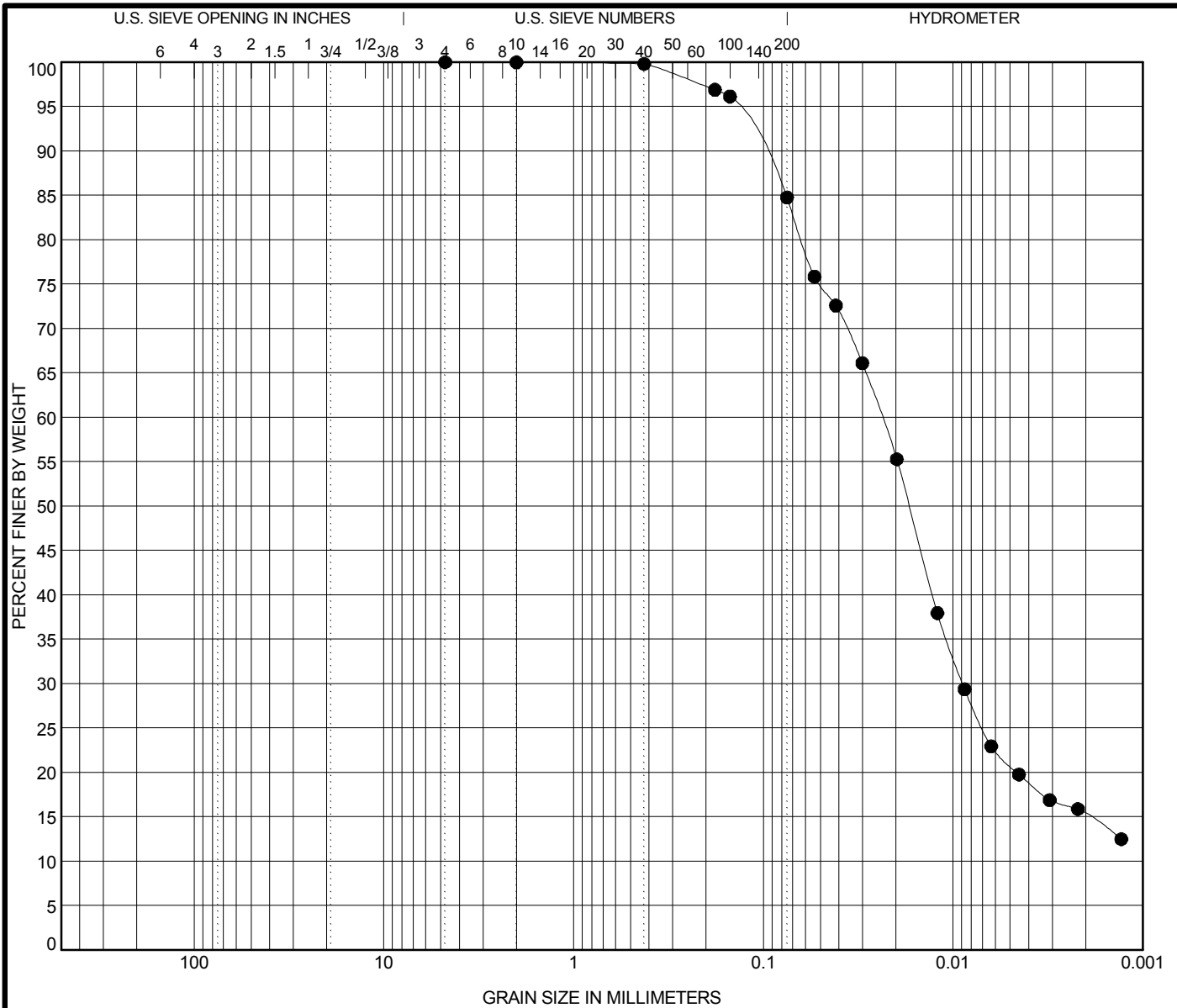
WEI GRAIN SIZE IDH 4140901.GPJ US LAB.GDT 4/5/17



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**GRAIN SIZE DISTRIBUTION**

Project: US 150 over Illinois River - McClugage  
 Location: Peoria and Tazewell Counties, IL  
 Number: 414-09-01



COBBLES	GRAVEL	SAND		SILT AND CLAY
		coarse	fine	

Specimen Identification		IDH Classification					LL	PL	PI	Cc	Cu
● SB-43ST#	29.5 ft	<b>Silty Loam</b>					<b>30</b>	<b>19</b>	<b>11</b>		

Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● SB-43ST#	29.5 ft	<b>4.75</b>	<b>0.024</b>	<b>0.009</b>		<b>0.0</b>	<b>15.6</b>	<b>69.1</b>	<b>15.3</b>

WEI GRAIN SIZE IDH 4140901.GPJ US LAB.GDT 4/5/17

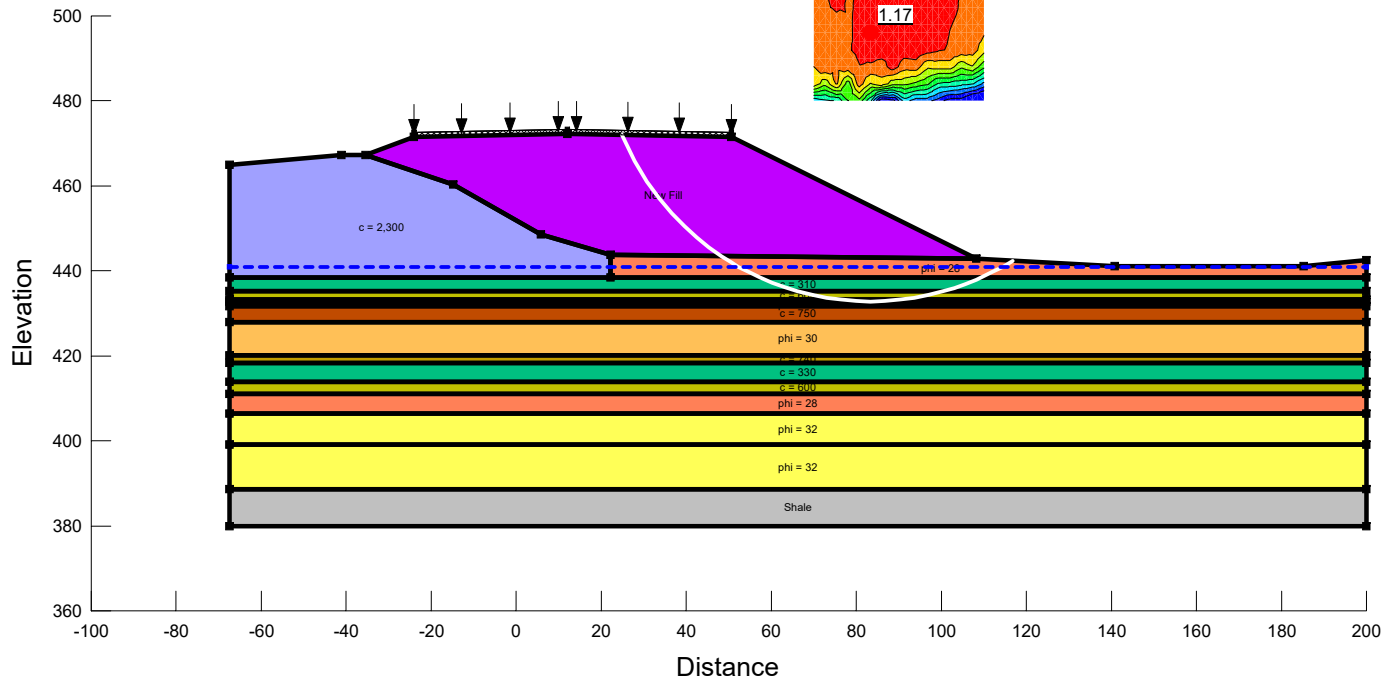
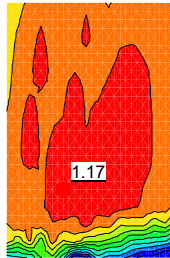


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**GRAIN SIZE DISTRIBUTION**

Project: US 150 over Illinois River - McClugage  
 Location: Peoria and Tazewell Counties, IL  
 Number: 414-09-01

2157+06.8  
Circular failure



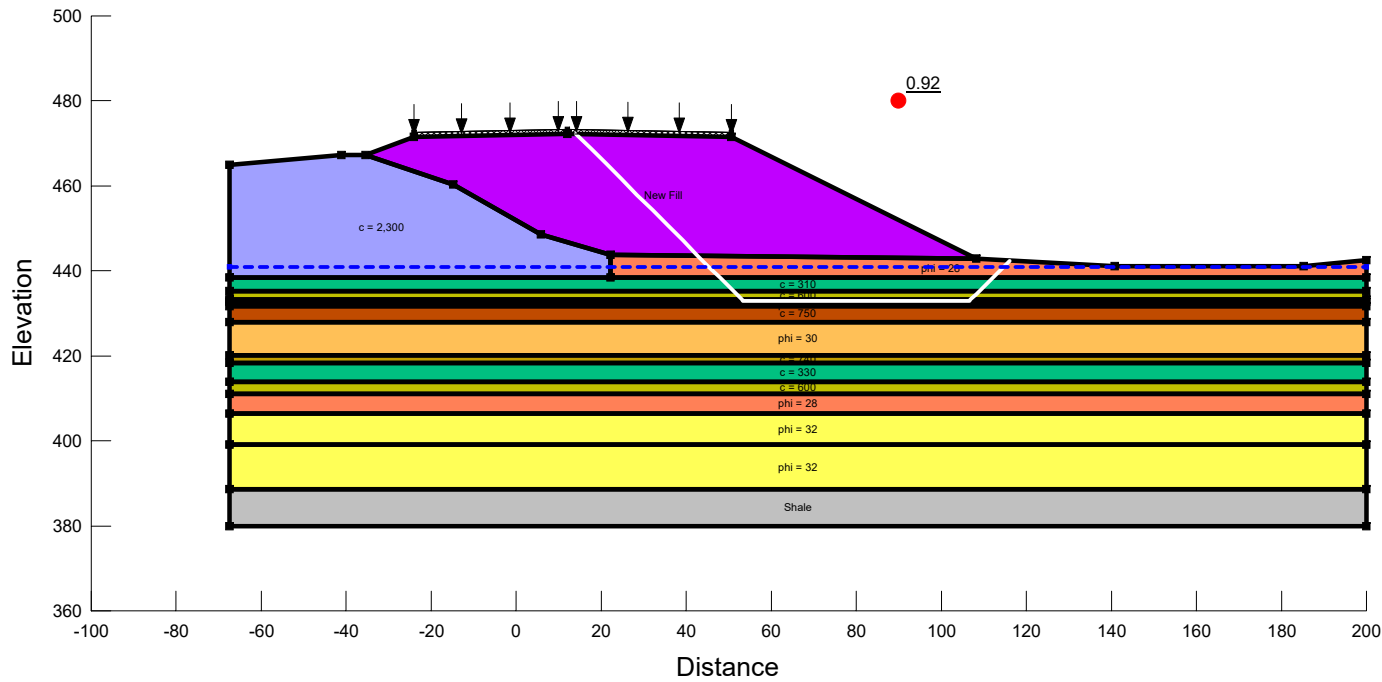
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Last Edited By: James Knutelski  
Date: 4/21/2017 2:51:50 PM

FS = 1.17

Material Properties

Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
Blue	c = 2,300	Mohr-Coulomb	125	2,300	0
Light Green	c = 250	Mohr-Coulomb	120	250	0
Green	c = 310	Mohr-Coulomb	120	310	0
Dark Green	c = 330	Mohr-Coulomb	120	330	0
Yellow-Green	c = 600	Mohr-Coulomb	122.5	600	0
Olive	c = 740	Mohr-Coulomb	122.5	740	0
Brown	c = 750	Mohr-Coulomb	122.5	750	0
Purple	New Fill	Mohr-Coulomb	125	1,000	0
Orange	phi = 28	Mohr-Coulomb	110	0	28
Light Orange	phi = 30	Mohr-Coulomb	110	0	30
Yellow	phi = 32	Mohr-Coulomb	115	0	32
Grey	Shale	Mohr-Coulomb	140	4,000	0

2157+06.8  
Wedge failure



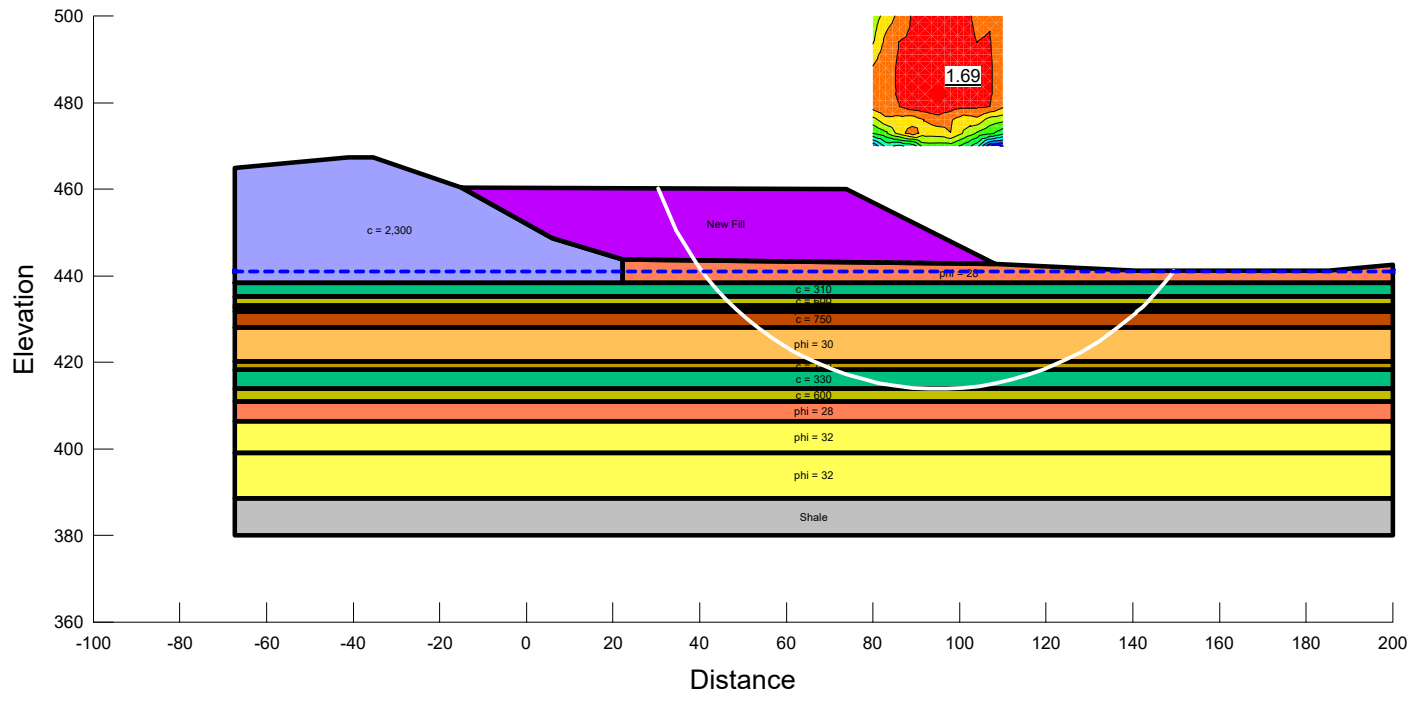
File Name: Section 1.gsz  
Last Edited By: James Knutelski  
Date: 4/21/2017 2:51:50 PM

FS = 0.92

Material Properties

Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
Blue	c = 2,300	Mohr-Coulomb	125	2,300	0
Light Green	c = 250	Mohr-Coulomb	120	250	0
Green	c = 310	Mohr-Coulomb	120	310	0
Teal	c = 330	Mohr-Coulomb	120	330	0
Yellow-Green	c = 600	Mohr-Coulomb	122.5	600	0
Olive	c = 740	Mohr-Coulomb	122.5	740	0
Brown	c = 750	Mohr-Coulomb	122.5	750	0
Purple	New Fill	Mohr-Coulomb	125	1,000	0
Orange	$\phi = 28$	Mohr-Coulomb	110	0	28
Light Orange	$\phi = 30$	Mohr-Coulomb	110	0	30
Yellow	$\phi = 32$	Mohr-Coulomb	115	0	32
Grey	Shale	Mohr-Coulomb	140	4,000	0

2157+06.8  
Stage 1 complete



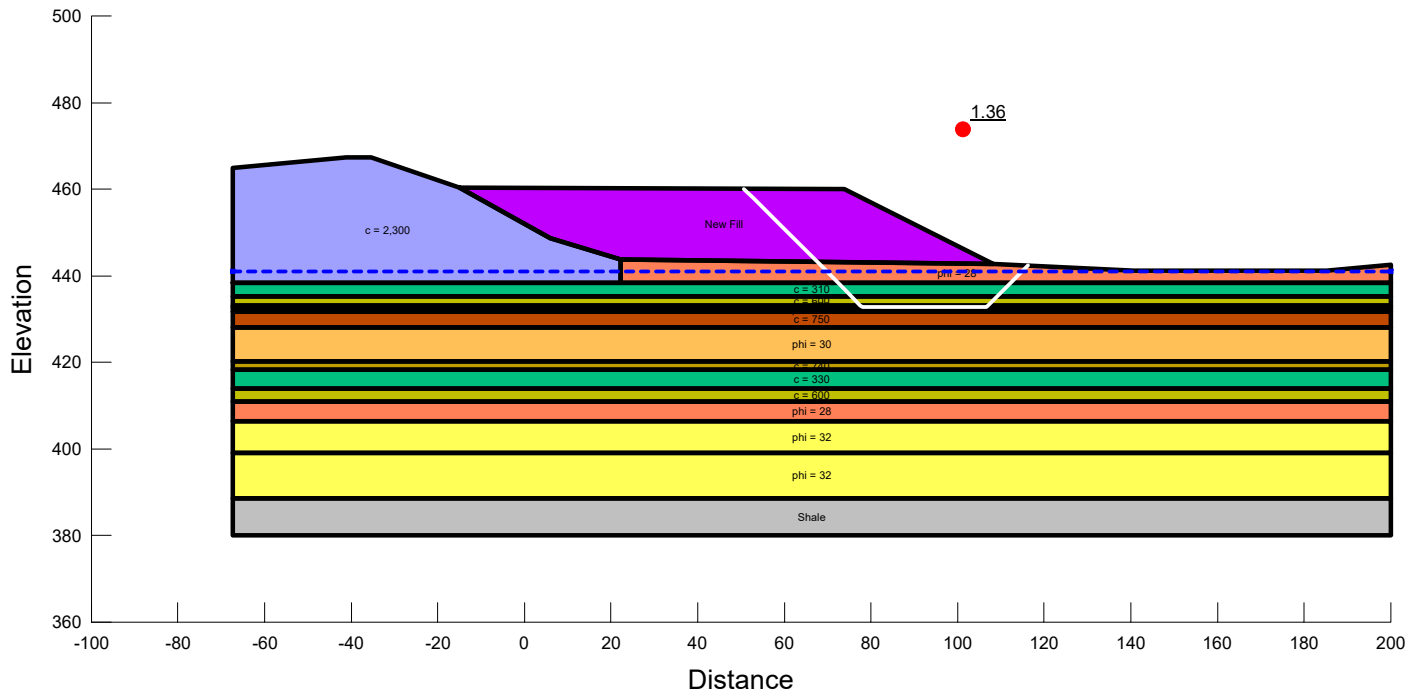
Mclugage Bridge  
Circle Static  
File Name: Section 1 Stage.gsz  
Last Edited By: James Knutelski  
Date: 3/14/2017 9:24:29 AM

FS = 1.69

Material Properties

Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
Blue	c = 2,300	Mohr-Coulomb	125	2,300	0
Light Green	c = 250	Mohr-Coulomb	120	250	0
Light Green	c = 310	Mohr-Coulomb	120	310	0
Dark Green	c = 330	Mohr-Coulomb	120	330	0
Yellow-Green	c = 600	Mohr-Coulomb	122.5	600	0
Orange	c = 740	Mohr-Coulomb	122.5	740	0
Orange	c = 750	Mohr-Coulomb	122.5	750	0
Purple	New Fill	Mohr-Coulomb	125	1,000	0
Light Orange	$\phi = 28$	Mohr-Coulomb	110	0	28
Orange	$\phi = 30$	Mohr-Coulomb	110	0	30
Yellow	$\phi = 32$	Mohr-Coulomb	115	0	32
Grey	Shale	Mohr-Coulomb	140	4,000	0

2157+06.8  
Stage 1 complete



Mclugage Bridge  
Wedge Static  
File Name: Section 1 Stage.gsz  
Last Edited By: James Knutelski  
Date: 3/14/2017 9:24:29 AM

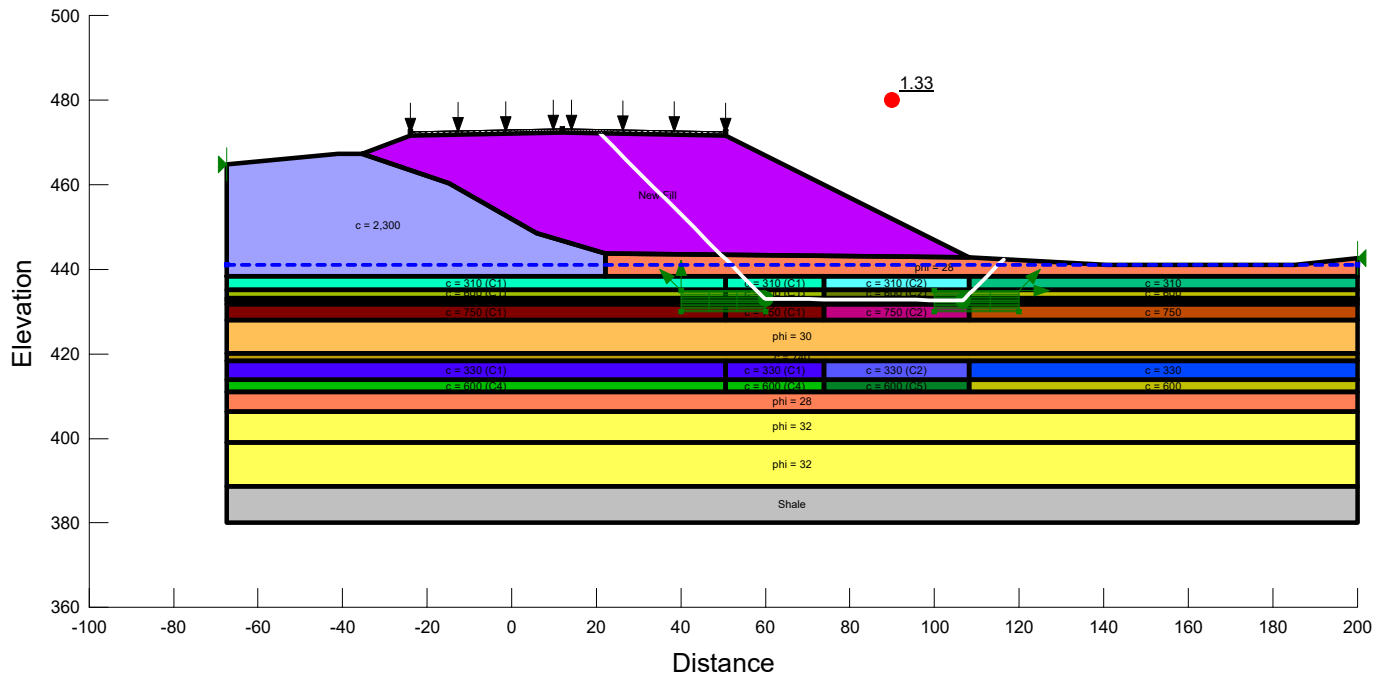
FS = 1.36

Material Properties

Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
Blue	c = 2,300	Mohr-Coulomb	125	2,300	0
Green	c = 250	Mohr-Coulomb	120	250	0
Light Green	c = 310	Mohr-Coulomb	120	310	0
Dark Green	c = 330	Mohr-Coulomb	120	330	0
Yellow-Green	c = 600	Mohr-Coulomb	122.5	600	0
Orange	c = 740	Mohr-Coulomb	122.5	740	0
Light Orange	c = 750	Mohr-Coulomb	122.5	750	0
Light Yellow	New Fill	Mohr-Coulomb	125	1,000	0
Yellow	phi = 28	Mohr-Coulomb	110	0	28
Light Green	phi = 30	Mohr-Coulomb	110	0	30
Yellow-Green	phi = 32	Mohr-Coulomb	115	0	32
Grey	Shale	Mohr-Coulomb	140	4,000	0

2157+06.8  
 Stage 1 Complete +270 days  
 No surcharge for traffic

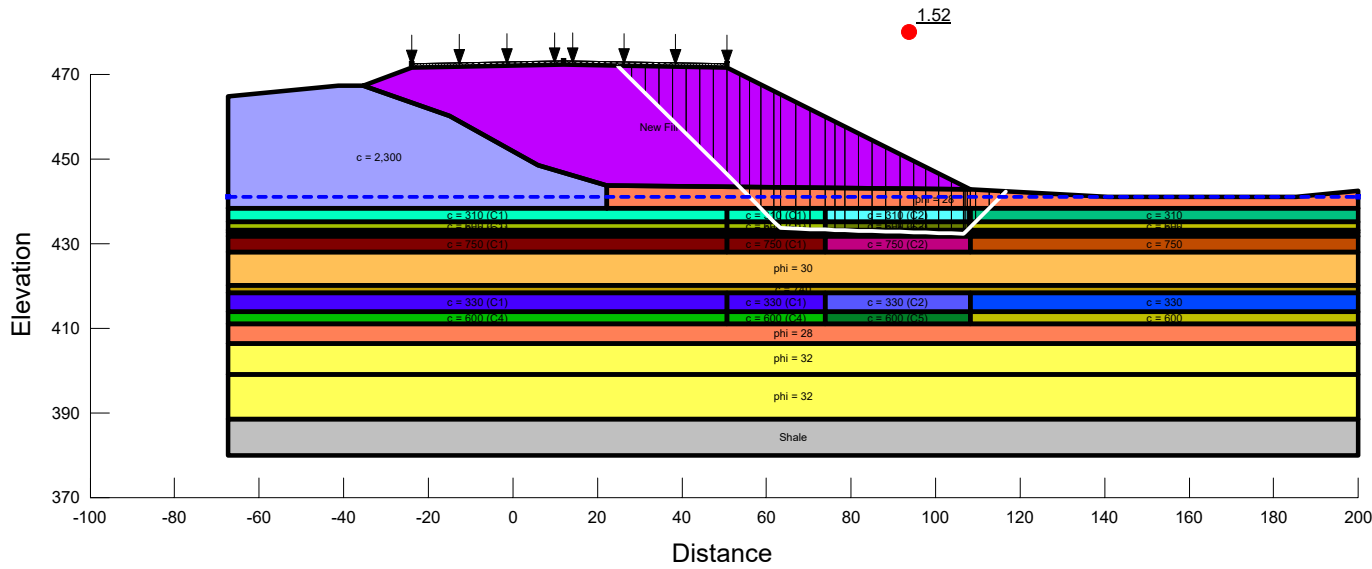
Mclugage Bridge Wedge Static  
 File Name: Section 1 Stage 1 U70.gsz  
 Last Edited By: James Knutelski Date: 12/7/2017 11:02:28 AM  
 FS = 1.33  
 Material Properties



Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
Blue	c = 2,300	Mohr-Coulomb	125	2,300	0
Green	c = 250	Mohr-Coulomb	120	250	0
Light Green	c = 250 (C1)	Mohr-Coulomb	120	775	0
Light Green	c = 250 (C2)	Mohr-Coulomb	120	513	0
Dark Green	c = 310	Mohr-Coulomb	120	310	0
Cyan	c = 310 (C1)	Mohr-Coulomb	120	692	0
Cyan	c = 310 (C2)	Mohr-Coulomb	120	501	0
Blue	c = 330	Mohr-Coulomb	120	330	0
Purple	c = 330 (C1)	Mohr-Coulomb	120	806	0
Blue	c = 330 (C2)	Mohr-Coulomb	120	568	0
Yellow	c = 600	Mohr-Coulomb	122.5	600	0
Light Yellow	c = 600 (C1)	Mohr-Coulomb	122.5	865	0
Dark Yellow	c = 600 (C2)	Mohr-Coulomb	122.5	733	0
Green	c = 600 (C4)	Mohr-Coulomb	122.5	833	0
Dark Green	c = 600 (C5)	Mohr-Coulomb	122.5	716	0
Yellow	c = 740	Mohr-Coulomb	122.5	740	0
Brown	c = 750	Mohr-Coulomb	122.5	750	0
Dark Brown	c = 750 (C1)	Mohr-Coulomb	122.5	1,010	0
Pink	c = 750 (C2)	Mohr-Coulomb	122.5	880	0
Purple	New Fill	Mohr-Coulomb	125	1,000	0
Orange	phi = 28	Mohr-Coulomb	110	0	28
Light Orange	phi = 30	Mohr-Coulomb	110	0	30
Yellow	phi = 32	Mohr-Coulomb	115	0	32
Grey	Shale	Mohr-Coulomb	140	4,000	0

2157+06.8  
Final configuration

File Name: Section 1 Stage 1 U100.gsz  
Last Edited By: James Knutelski Date: 3/31/2017 1:29:23 PM  
FS = 1.52  
Material Properties



Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
Blue	c = 2,300	Mohr-Coulomb	125	2,300	0
Light Green	c = 250	Mohr-Coulomb	120	250	0
Light Green	c = 250 (C1)	Mohr-Coulomb	120	1,054	0
Light Green	c = 250 (C2)	Mohr-Coulomb	120	853	0
Dark Green	c = 310	Mohr-Coulomb	120	310	0
Dark Green	c = 310 (C1)	Mohr-Coulomb	120	1,139	0
Light Blue	c = 310 (C2)	Mohr-Coulomb	120	932	0
Blue	c = 330	Mohr-Coulomb	120	330	0
Blue	c = 330 (C1)	Mohr-Coulomb	120	1,058	0
Blue	c = 330 (C2)	Mohr-Coulomb	120	876	0
Yellow-Green	c = 600	Mohr-Coulomb	122.5	600	0
Yellow-Green	c = 600 (C1)	Mohr-Coulomb	122.5	1,006	0
Yellow-Green	c = 600 (C2)	Mohr-Coulomb	122.5	904	0
Yellow-Green	c = 600 (C4)	Mohr-Coulomb	122.5	956	0
Yellow-Green	c = 600 (C5)	Mohr-Coulomb	122.5	857	0
Yellow	c = 740	Mohr-Coulomb	122.5	740	0
Orange	c = 750	Mohr-Coulomb	122.5	750	0
Orange	c = 750 (C1)	Mohr-Coulomb	122.5	1,148	0
Orange	c = 750 (C2)	Mohr-Coulomb	122.5	949	0
Light Orange	phi = 28	Mohr-Coulomb	110	0	28
Light Orange	phi = 30	Mohr-Coulomb	110	0	30
Yellow	phi = 32	Mohr-Coulomb	115	0	32
Grey	Shale	Mohr-Coulomb	140	4,000	0



**Cost Comparison: Footing Elevation & Pile Type**

US 150 EB (McClugage Bridge) over IL River

Pier 11 (Piers 11)			
Bott. Footing Elevation	414.50	<b>428.00</b>	
Pile Type	HP14x89	<b>HP14x102</b>	
*Foundation Cost	\$ 2,495,133	\$ <b>2,166,218</b>	
Difference	\$ 328,915	\$ -	

Pier 13 (Piers 12-15)			
Bott. Footing Elevation	409.50	437.50	<b>437.50</b>
Pile Type	DS 7ft	DS 7ft	<b>DS 8ft</b>
*Foundation Cost	\$ 8,596,068	\$ 8,106,888	\$ <b>7,116,388</b>
Difference	\$ 1,479,680	\$ 990,500	\$ -

Pier 17 (Piers 16-17)				
Bott. Footing Elevation	414.50	<b>427.50</b>	414.50	427.50
Pile Type	HP14x73	<b>HP14x117</b>	PP24x0.5	PP24x0.625
*Foundation Cost	\$ 2,670,000	\$ <b>2,600,000</b>	\$ 2,780,000	\$ 2,600,000
Difference	\$ 70,000	\$ -	\$ 180,000	\$ -

Pier 21 (Piers 1-10, 18-22)		
Bott. Footing Elevation	<b>428.00</b>	428.00
Pile Type	<b>HP14x89</b>	PP24x0.375
*Foundation Cost	\$ <b>1,880,000</b>	\$ 1,960,000
Difference	\$ -	\$ 80,000

\*Foundation costs include: Footing, additional column/wall height (if applicable), reinforcement bars, piles/shaft, cofferdam or coffercell, cofferdam excavation, seal coat

Bottom of footing elevation show on current TSL

Recommendation - Elevation & Pile Type

HP = H Piles, PP = Pipe Piles, DS = Drilled Shaft