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Structure Geotechnical Report

F.A.I. Route 74
Section 81-1HB
Rock Island County
Job No. P-92-032-01
Contract No. 64C08
PTB No. N/A
I-74 & Ramp 7th-A Over 19th St. Bridges
Structure Nos. 081-0179, 081-0180, and 081-0181

June 2012

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1. Project Description

This report provides geotechnical data and recommendations for the proposed I-74 Over 19th Street and Ramp 7th-A Over 19th Street Bridges, which are part of the Central Section of the I-74 over the Mississippi River Project. The project includes reconstruction of I-74 between 14th Avenue in Moline, Illinois and Lincoln Road in Bettendorf, Iowa. The bridges covered by this structure geotechnical report will be replacements for existing structures carrying I-74 over 19th Avenue.

Nearby project features that have an impact on the design or construction of the proposed retaining wall include the north abutment retaining wall (IL-RW06, S.N. 081-6015), the south abutment retaining wall (IL-RW07, S.N. 081-6016), the I-74 roadway, and the 19th Street roadway. Geotechnical recommendations for Retaining Walls IL-RW06 and IL-RW07 are presented in separate structure geotechnical reports prepared by Hanson Professional Services Inc. (Hanson). Geotechnical recommendations for the interstate and street will be contained in a soil survey report prepared by Hanson.

This report supersedes the structure geotechnical report prepared by Jacobs Civil Inc. in June 2008.

2. Location

The proposed I-74 and Ramp 7th-A Over 19th Street Bridges are located in the north central portion of Rock Island County, within Sections 32 and 33 of Township 18 North, Range 1 West. They are located at I-74 Sta. 59+67.00. Structure Number 081-0179 carries Westbound (Northbound) I-74, Structure Number 081-0180 carries Eastbound (Southbound) I-74, and Structure Number 081-0181 carries Ramp 7th-A over 19th Street.

3. Existing Structures

The existing structures, S.N. 081-0099 (EB I-74), S.N. 081-0100 (WB I-74), S.N. 081-0115 (Ramp 7-S onto EB I-74) and S.N. 081-0116 (Ramp S-7 off WB I-74), were constructed in 1975. They are six and seven-span plate girder bridges with total lengths of 455 to 666 feet. Span lengths range from 60 feet to 127 feet. All piers are single cylindrical steel columns with welded box cross-girders that frame into the web plates of the longitudinal girders. All four bridges have separate stub abutments on the north end. The eastbound mainline and ramp bridge and the westbound mainline and ramp bridge each share a stub abutment on the south end. Portions of the existing structure plans are included in the Appendix for reference.

Due to the structures' location at the edge of the bluffs, the profile grades are relatively steep and the clearance above 19th Street is unusually high. Minimum clearance is 14'-7" at the north end of Ramp 7-S. Ramp S-7 and the two mainline structures have at least 27'-1" clearance.

The structures are supported on battered 10BP42 piles. The existing structure plans indicate that the piles were to be driven to refusal but do not indicate a design capacity. Based on the estimated lengths shown on the plans, the pile tips are located on bedrock or in very stiff to hard clay (glacial till).

4. Proposed Structures

The general structure widths and span arrangements were determined during the previous Phase I design completed by another consultant. After further geotechnical analyses and a detailed study of the project staging, the previously proposed full-height MSE abutment configurations were determined to be unfeasible. The south spans were lengthened to move the abutment away from existing piers and a large storm sewer. The abutments were changed to a conventional, closed configuration.

The proposed grade separation consists of three separate two-span bridges supported on individual columns and combined abutments. Total width of the each mainline bridge is 63'-2", while the Ramp 7th-A bridge is 45'-2" wide. The skew and span lengths of the three structures are variable due to the curvature of 19th Street. Skew of the substructure units range from 60° to 65°. Span lengths are 160'-3" to 168'-6¼".

Similar to the existing structures, the proposed structures are unusually tall. Clearance is approximately 24'-10" at the north side of 19th Street and increasing significantly to the south. Due to the variable set back from 19th Street, the steep grade of 19th Street, and the superelevation on the bridge decks, the height from the top of end slope to the pavement surface is variable. The total exposed height of the abutments ranges from approximately 9 to 15 feet along the north abutment and 16 to 24 feet along the south abutment.

Both abutments will be founded on slopes several feet above 19th Street. The western portion of the north abutment will be constructed on the existing end slope. New fill will be needed to bring the eastern portion up to a similar level. The toe of the north end slope will be cut down in front of a new soldier pile retaining wall, IL-RW07 (S.N. 081-6016), to be constructed concurrently with the bridge. The wall is located 15 to 30 feet in front of the abutment. New fill will be placed on the existing south end slope to minimize the height of the south abutment. A 168 feet long wingwall will be located at the west end of the north abutment and a 64 feet long wingwall will be located at the east end of the south abutment. These wingwalls will be about 4 feet in front of the existing bridge wings. An MSE retaining wall, IL-RW06 (S.N. 081-6015) will meet up to the west end of the south abutment. This wall retains fill for the gore area between EB I-74 and Ramp 7th-B. The top of IL-RW06 matches the exterior bridge seat. The abutment will have a conventional wingwall above the top of the retaining wall.

Based on information provided by the structure designer, the approximate factored superstructure loads on the abutment bearings are 1,975 kips and 1,475 kips at each mainline and ramp bridge, respectively. Factored substructure loads will be dependent on the width of the footing. Factored vertical substructure loads of 10 to 25 kips/ft at the north abutment and 25 to 55 kips/ft at the south abutment are anticipated. Factored lateral earth pressures are expected to be 5 to 30 kips/ft, depending on the abutment height and rigidity. Lateral loads are expected to control the abutment foundation design. Total factored pier loads are 6,700 kips and 4,850 kips at each of the two mainline bridges and the ramp bridge, respectively.

The proposed bridges will be constructed in stages in order to allow traffic on I-74 and 19th Street throughout the construction period. Maintenance of traffic was a major factor in the type selection for the currently proposed structures.

The middle portion of the two mainline bridges, located in the current I-74 median, will be constructed first, followed by the east side (WB I-74 and Ramp 7th-A), then the west side (EB I-74). Ramp 7th-B, located to the west of the proposed bridges, will be constructed in the same stage as east side of the bridges. The south abutment of the EB I-74 bridge will be constructed between structure completed in earlier stages.

The proposed pier lies within the current alignment of NB 19th Street. Traffic will be diverted onto temporary pavement located to the north of the current alignment. This will require partial excavation of the existing bridges' end slopes.

Temporary retaining structures will be required behind the proposed abutments along the stage lines. Temporary shoring of the existing pier caps may be needed to support eccentric loads that will result from removal of the inside portions of the existing mainline bridge decks.

5. Site Investigation

The project site is located in the steeply sloping terrain of the bluffs along the Mississippi River. 19th Street is situated in a natural ravine. There was extensive grading of the proposed bridge site during construction of the existing I-74 alignment. Along the current I-74 centerline, the base of the ravine once was between approximately Sta. 58+00 and Sta. 63+50. 19th Street was in the area where the current bridges' north abutment end slopes are located today. The existing bridges' north abutments generally were constructed on the existing hillside at or near the natural grade. The existing bridges' south abutments were constructed on more than 40 feet of fill placed when the highway was constructed.

South of 19th Street, the profile of existing I-74 is split, with the eastbound lanes being approximately 5 feet higher than the westbound lanes. The EB and WB profiles come together just to the north of the existing bridges. The height from the toe of the bridge end slopes to the roadway grade is approximately 25 feet on the north side of 19th Street and 45 feet on the south side. The end slope of the existing EB I-74 and Ramp 7-S bridges' shared south abutment is split into two roughly equal height tiers. Many of the existing bridge piers are located on the end slopes. Presently, 19th Street slopes down to the northwest at approximately 3% grade, while I-74 slopes down to the north at approximately 3% to 6% grade.

Test boring data was shown on the existing structure plans. It is presumed that these borings were drilled in the early 1970's. Fifteen borings were drilled to depths between 30 and 79 feet below grade. Standard penetration tests were generally performed at 2.5-feet intervals until bedrock was encountered. Boring Numbers S-33, S-37, and S-38 were drilled near the north abutments of the proposed bridges. Although the soil strata logged in the upper part of these borings were disturbed by the original I-74 roadway and bridge construction, the data for the lower strata are useful for design of the new bridges.

The field exploration that was completed specifically for the proposed structures was accomplished in three phases. The first two phases were completed in December 2005 and October 2007 to March 2008 by other consultants. IDOT provided the data collected from those two phases. The third phase was completed in June 2010 by Hanson. The primary purpose of the third phase was to collect additional samples of the shallow, softer soils for strength and consolidation testing. A representative from Hanson logged the boring and performed a general site reconnaissance during the third phase.

Ten borings were drilled in the first two phases and one boring was drilled in the third phase. Locations of the borings were selected to avoid the numerous obstructions currently occupying the site. The maximum spacing between borings was approximately 125 feet. Standard Penetration Test samples were collected at 2.5 to 5.0 feet intervals in all borings. Several Shelby tube samples were collected at representative locations in cohesive strata. The boring depths ranged from 25.0 to 90.0 feet.

The boring locations are shown on the Boring Location Plan included in the Appendix. Boring logs are included in the Appendix.

6. Laboratory Investigation

Soil samples from the first and second phase borings were tested by others. Unconfined strength and moisture content tests were completed on split-spoon samples from approximately two-thirds of the borings. Index testing was completed on representative samples. Unconfined strength tests were performed on several representative samples collected with Shelby tubes.

The soil samples obtained from the third phase borings were delivered to Hanson's soils laboratory and subjected to a testing program. Natural moisture content and visual classification tests were competed on all samples.

Unconfined compressive strength tests, using a Rimac spring tester, were also completed when possible. One triaxial strength test and one consolidation test were performed on Shelby tube samples.

The locations of the index tests, triaxial tests, and consolidation tests are indicated on the subsurface data profile.

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. Borings that were drilled prior to the construction of the existing structures are also included in areas where more recent subsurface data is not available.

The subsurface profile consists of deposits of fill material, alluvial soils, and glacial till overlying bedrock. The fill is generally located in the approach embankments on both sides of the existing structures. Alluvial soils are found at shallow depths beneath 19th Street and to the southwest. Glacial till and bedrock are present at depth over the entire site. Strata elevations and depth were quite variable due to the site's location at the base of the bluff and the significant grading completed during construction of the existing structures.

Bedrock was encountered in all of the deeper borings. The bedrock surface is erratic, varying between Elev. 559.8 and Elev. 587.8, but generally sloping down to the northwest. Hard (for soil), greenish gray to black clay shale was encountered in the northwestern portion of the site, while hard (for rock), fractured, gray limestone was encountered to the southeast. In the two borings where both strata were present, the clay shale overlies the limestone. The clay shale has an average unconfined strength of 5.6 tsf with very good rock mass quality. The limestone has an average unconfined strength of 500 tsf with fair to good rock mass quality.

Glacial till was encountered in all of the borings except ILR0804, which did not penetrate the existing fill. The top of this stratum was encountered between Elev. 617.3 and Elev. 589.8. It is typically brown to gray, very stiff to hard, silty clay with sand and gravel. Unconfined strengths generally were between 2.5 and 3.5 tsf, although softer, weathered zones were occasionally encountered near the top. Standard Penetration Test (SPT) values were typically between 12 and 20 blows per foot. Natural moisture contents ranged from 11 to 22 percent and averaged approximately 14 percent. Thin sand seams were encountered in a few locations within the otherwise clayey till.

Alluvial soils were encountered between Elev. 592.0 and Elev. 611.0. These soils were typically brown to gray, medium stiff to stiff, silty clays or loose sands. Unconfined strengths were 0.4 to 1.5 tsf, with an average of 0.8 tsf. SPT values were typically 3 to 5 blows per foot. Natural moisture contents ranged from 17 to 27 percent. The alluvial soils were encountered in the older borings drilled under the current south approach embankment, but these softer soils were not readily apparent in the more recent borings drilled in the same area. It is possible that the alluvial soils were removed during construction of the existing embankments. It is more likely that they have been compressed by the more than 30 feet of existing fill.

An 8 to 44 feet thick layer of fill was encountered in the borings drilled through the existing embankments. It extended from the ground surface to the top of the till or alluvium. The fill material was typically brown to gray, stiff to very stiff, sandy clay or silty clay with very small quantities of random debris.

The groundwater conditions encountered in the borings were not consistent across the site. The groundwater elevations recorded on the boring logs are summarized in Table 7.1. Stabilized readings were not taken in any of the borings. The groundwater, where it was encountered, was typically located near the top of the till stratum or in a sand layer within the till, which could indicate localized, perched conditions. For comparison, the water level in the Mississippi River, approximately 0.7 miles to the north of the site, is usually about Elev. 561.0.

Table 7.1 Groundwater Elevations

Boring No.	During Drilling	At End of Boring	24-hour Reading
19BR-104	Dry	-	-
19BR-105	580.3	-	-
19BR-106	Dry	-	-
19BR-107	-	-	-
19BR-108	Dry	-	-
19BR-109	595.8	-	-
ILR0701	581.3	-	-
ILR0801	-	-	-
ILR0804	-	-	-
RW1007	-	-	-
S-33	-	-	-
S-37	595.8	-	-
S-38	-	-	-

The Illinois State Geological Survey Directory of Coal Mines does not list any mines immediately beneath the site; however, the directory does indicate that past mining has occurred in the general vicinity. Shafts for the Zeigler, Poston, and Highland Mines were located approximately 1.5 miles to the southeast of the site. These room and pillar mines were operated in the early 1900's.

8. Geotechnical Evaluations

Further analysis of the previously proposed full-height MSE abutments found that configuration to be impracticable at this site. Ground improvement or removal and replacement of the softer alluvial soils would be required to meet overall stability and bearing capacity criteria. An existing 20 feet deep, 72-inch diameter storm sewer would need to be abandoned and relocated away from the influence of the new construction. Very tall temporary shoring would be needed to excavate for the reinforced soil mass of the first phase construction. Temporary MSE walls would be needed to retain the first phase reinforced soil mass during excavation for the second and third phases. Two of these temporary MSE walls would have an internally reinforced bin wall configuration due to the severe skew of the structure. The cost of the ground improvement, sewer relocation, and temporary structures eliminate the typical economic advantage of the MSE abutments.

It was determined that constructing shorter height, conventional, closed abutments on existing or new end slopes was a better alternative. Sloping the ground in front of the abutments and supporting the abutment walls on deep foundations eliminate the overall stability and bearing capacity issues. This configuration results in a significant reduction in permanent and temporary wall quantities.

Equalizing the bridge spans by moving the south abutment back approximately 25 feet was found to provide additional benefits. This moves the abutment further onto the existing end slopes and away from the softer alluvial soils found under 19th Street. It reduces the overall height of the abutment wall and eliminates conflicts with the existing storm sewer and some of the existing bridge piers.

Slope stability analyses were completed at a critical section through each abutment. The analyzed cross-sections were located through the westbound north abutment and eastbound south abutment. Results of these analyses are included in the Appendix. Under the Service I Load Combination, the calculated factors of safety for large slides

under the abutments are 2.97 for the north abutment and 1.46 for the south abutment. A smaller slide of the end slope in front of the south abutment has a 4.44 factor of safety. The south abutment's calculated factor of safety is slightly less than the 1.5 value required; however, the analysis did not include the stabilizing effects of the bridge piles or the strength gain of the soft layer under the proposed fill. If either of these factors is considered, the slope would meet the required factor of safety. The calculated factors of safety for the Extreme Event I Load Combination are 2.78 and 1.35 for the north and south abutments, respectively. Both abutments meet AASHTO requirements for slope stability.

Estimated settlements vary significantly because of the variable subsurface conditions, the wide range of fill heights, and the extreme length of the abutments. Generally, the more compressible soils and taller fill heights are found beneath the south abutment. The estimated maximum settlement at the north abutment is 1.1 inches at the east end. This settlement is expected to take 80 months to be 90 percent complete. Insignificant settlement is anticipated in areas where the proposed grade matches the top of the existing embankment. The estimated maximum settlement at the south abutment is 2.0 inches at the west end, while the estimated minimum settlement is 0.7 inches at the east end. These settlements are expected to take up to 88 months to be 90 percent complete. If the lower part of the fill is placed 12 months prior to abutment construction, the settlement relative to the bridge structure is expected to be 0.7 to 1.7 inches.

9. Design Recommendations

The proposed substructures may be supported on piles driven into the very stiff to hard glacial till or into limestone or shale bedrock. Table 9.1 lists design parameters for several pile types. Estimated pile lengths as indicated in the table for each substructure unit were calculated at the location of the nearest boring. The assumed cutoff elevation at that same location is also indicated in the table. Pile tip elevations are expected to vary by more than 20 feet between the west and east edges of the three structures. Estimated lengths for the final bridge plans may require adjustment based on the actual cutoff elevations for the stepped footings.

H-piles are generally expected to drive to limestone bedrock under the ramp, WB pier, and WB abutment. All other H-piles are expected to bear in soft shale or glacial till. Metal shell piles are expected to reach maximum nominal bearing in the glacial till. Precast piles are not recommended because they may reach maximum nominal bearing in the softer strata above the till.

Table 9.1 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)
081-0180 (EB) North Abutment S-33	615.0	HP 10x42	184	0	335	51
		HP 12x53	230	0	419	51
		HP 12x63	273	0	497	53
		HP 14x73	318	0	578	52
		HP 14x89	388	0	705	54
		12″φ x 0.25″ MS	195	0	355	46
		14″φ x 0.31″ MS	284	0	516	47

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)
081-0179 (WB) North Abutment S-37	623.0	HP 10x42	184	0	335	53
		HP 12x53	230	0	419	53
		HP 12x63	273	0	497	55
		HP 14x73	318	0	578	54
		HP 14x89	388	0	705	56
		12″φ x 0.25″ MS	195	0	355	45
		14″φ x 0.31″ MS	284	0	516	52
081-0181 (7th-A) North Abutment S-41	630.0	HP 10x42	184	0	335	51
		HP 12x53	230	0	419	51
		HP 12x63	273	0	497	51
		HP 14x73	318	0	578	51
		HP 14x89	388	0	705	52
		12″φ x 0.25″ MS	195	0	355	45
		14″φ x 0.31″ MS	284	0	516	45
081-0180 (EB) Pier 19BR-104	599.0	HP 10x42	184	0	335	42
		HP 12x53	230	0	419	42
		HP 12x63	273	0	497	43
		HP 14x73	318	0	578	43
		HP 14x89	388	0	705	45
		12″φ x 0.25″ MS	195	0	355	28
		14″φ x 0.31″ MS	284	0	516	30
081-0179 (WB) Pier 19BR-105	601.0	HP 10x42	184	0	335	29
		HP 12x53	230	0	419	29
		HP 12x63	273	0	497	30
		HP 14x73	318	0	578	29
		HP 14x89	388	0	705	30
		12″φ x 0.25″ MS	195	0	355	24
		14″φ x 0.31″ MS	284	0	516	24
081-0181 (7th-A) Pier 19BR-106	607.0	HP 10x42	184	0	335	23
		HP 12x53	230	0	419	23
		HP 12x63	273	0	497	24
		HP 14x73	318	0	578	24
		HP 14x89	388	0	705	24
		12″φ x 0.25″ MS	195	0	355	19
		14″φ x 0.31″ MS	284	0	516	19
081-0180 (EB) South Abutment 19BR-107	617.0	HP 10x42	184	0	335	53
		HP 12x53	230	0	419	53
		HP 12x63	273	0	497	55
		HP 14x73	318	0	578	54
		HP 14x89	388	0	705	56
		12″φ x 0.25″ MS	195	0	355	43
		14″φ x 0.31″ MS	284	0	516	46

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)
081-0179 (WB) South Abutment 19BR-108	623.0	HP 10x42	184	0	335	50
		HP 12x53	230	0	419	50
		HP 12x63	273	0	497	50
		HP 14x73	318	0	578	50
		HP 14x89	388	0	705	51
		12″φ x 0.25″ MS	195	0	355	41
		14″φ x 0.31″ MS	284	0	516	41
081-0181 (7th-A) South Abutment 19BR-109	633.0	HP 10x42	184	0	335	51
		HP 12x53	230	0	419	52
		HP 12x63	273	0	497	52
		HP 14x73	318	0	578	52
		HP 14x89	388	0	705	53
		12″φ x 0.25″ MS	195	0	355	43
		14″φ x 0.31″ MS	284	0	516	43

A test pile should be driven at the pier and both abutments under each bridge. Nine test piles are recommended if all substructures will be supported by piles. Pile shoes are recommended for all piles. If the fill under the ramp bridge cannot be completed to the base of the north abutment at least four months prior to pile driving, precoring to Elev. 606 should be required at that location.

A drilled shaft foundation is a viable alternative at the piers, because of the required construction staging. Table 9.2 and Table 9.3 list design parameters for axial resistance of drilled shafts. For axial resistance, the shafts should extend at least 2 feet into the clay shale or limestone bedrock. Shafts bearing on clay shale should include the side resistance of the glacial till, the side resistance of the clay shale, and the tip resistance of the clay shale. Shafts bearing on limestone should be sized based only on the tip resistance of the limestone.

It is recommended that the drilled shaft diameter be kept constant through the glacial till and clay shale strata. A 6-inch smaller rock socket should be used only where limestone is encountered. The reinforcement should be designed for the reduced diameter rock socket, even though the limestone bedrock will not be present at all drilled shaft locations. This will simplify adjustments in shaft length based on the actual conditions encountered during construction. A significant socket length in glacial till and clay shale will be required to provide a factored nominal resistance similar to a shallow socket in limestone. The criteria to be used for construction should be a specified minimum embedment in glacial till and clay shale or a minimum 2 feet socket in limestone, whichever occurs first.

Table 9.2 Factored Unit Resistances for Drilled Shafts

Stratum	Side $\phi_{qs}q_s$ (ksf)	Tip $\phi_{qp}q_p$ (ksf)
Glacial Till	1.5	-
Clay Shale	2.5	50
Limestone	-	150

Note: Shafts bearing on limestone should be sized based on tip resistance only.
ϕ_{qs}=0.45, ϕ_{qp}=0.40 in clay shale, ϕ_{qp}=0.50 in limestone

Table 9.3 Top of Strata Elevations for Foundation Design

Boring No.	Glacial Till	Clay Shale	Limestone
ILR0701	605.8	-	-
S-33	601.3	565.8	-
S-37	617.3	569.8	-
ILR0801	615.0	-	-
S-38	606.8	576.8	
S-34	593.1	566.3	-
19BR-104	589.8	568.3	-
S-39	591.8	581.3	-
19BR-105	590.8	-	574.0
S-42	599.8	589.8	-
19BR-106	599.4	-	585.9
19BR-107	598.1	570.6	-
S-40	597.0	572.0	-
19BR-108	595.6	578.1	573.9
S-43	597.3	-	572.8
S-45	601.8	-	577.3
19BR-109	593.3	587.8	582.1
S-46	601.3	-	573.8
RW1007	605.9	-	559.8

If a single drilled shaft supports each pier column, these recommendations are expected to result in approximately 72 inch diameter shafts with 66 inch limestone rock sockets. Both the length and bearing elevation are expected to vary substantially along the pier. The total shaft length is expected to range from 25 to 50 feet, while the bottom may range from Elev. 584 to Elev. 562. The shallower and shorter drilled shafts will be towards the east side of the proposed structures, where the limestone stratum is present.

It is anticipated that a large portion of the required lateral resistance for the bridges will be provided by battered piles. Additional lateral resistance can 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 9.4. The top elevations of the glacial till, clay shale, and limestone strata are provided in Table 9.3. At the pier, all existing soils above the glacial till should be assumed to be alluvium. At the abutments, all existing soils above the glacial till should be assumed to be existing fill. The layer of alluvium that is present under the existing fill in some locations may be ignored at the abutments. The analysis 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 9.4 LPILE Parameters

Location	Stratum	LPILE Soil Type	Soil Parameters			
Pier	Alluvium	soft clay	c=5.9 psi	k=100 pci	γ'=0.069 pci	ε_{50}=0.010
Abutments	New Fill	stiff clay w/o water	c=6.9 psi	k=100 pci	γ'=0.072 pci	ε_{50}=0.007
Abutments	Exist. Fill	stiff clay w/o water	c=12.5 psi	k=500 pci	γ'=0.072 pci	ε_{50}=0.005
All Substructures	Glacial Till	stiff clay w/o water	c=19.4 psi	k=500 pci	γ'=0.072 pci	ε_{50}=0.005
All Substructures	Clay Shale	stiff clay w/o water	c=38.9 psi	k=2000 pci	γ'=0.078 pci	ε_{50}=0.004
All Substructures	Limestone	strong rock	q_u=6900 psi		γ'=0.048 pci	

Fill needed below the proposed abutments preferably should be placed several months before the abutments are constructed. This reduces the settlement experienced by the structure and provides additional stability of the slopes. It is recommended that the fill on the south end slope be placed from existing bridge Pier 40 to the east end of the abutment during the first stage of construction. Fill on the south end slope between Pier 40 and Retaining Wall IL-RW06 must be placed no later than the second stage when the retaining wall is constructed. The conditions at the east end of the north end slope will make it difficult to place any significant fill prior to removal of the existing bridge. Because of the more favorable subsurface conditions at the north abutment, it is acceptable to place the fill between Retaining Wall IL-RW07 and existing bridge during the third stage. The embankment in this location should be precored to mitigate drag loads on the piles.

The design earth pressure to be applied to the back of the abutments is dependent on the allowable relative movement and the backfill material. A relative rotation of 0.002 to 0.010 is needed to develop full active pressures. The larger end of this range, applicable to fine-grained backfills, would result in more than 1 inch movement at the bridge joint. The abutments should be designed for at-rest earth pressure if unclassified embankment fill is used for backfill. They may be designed for active at-rest pressure if granular backfill is used within a zone extending at 1V:1H behind the back of the footing. An equivalent fluid pressure of 60 pcf is recommended for the at-rest pressure of embankment material. An equivalent fluid pressure of 40 pcf is recommended for active earth pressure of granular backfill. Drainage through the use of weepholes or underdrains must be provided.

The wingwalls will be less sensitive to movement and may be designed for active earth pressure for any type of backfill. An equivalent fluid pressure of 40 pcf is recommended for design of conventional wingwalls. For soldier pile wingwalls, the recommended design earth pressure coefficients are 0.33 for active conditions and 2.20 for passive conditions. These coefficients assume a level condition behind the wall and a 1V:2H slope in front of the wall. Buoyant unit weights should be used for soils more than five feet below the 19th Street grade. Live load surcharges should be included in the design and drainage must be provided.

If the existing wingwalls will be left in place behind the new wingwalls, the outlets for the existing wall drainage should be preserved. The space between the two walls should be backfilled with granular material.

The bridge is located in a region of relatively low seismic loading. The subsurface profile to a depth of 100 feet consists of up to 40 feet of soft to stiff clay, overlying very stiff to hard clay and shale bedrock. This profile is indicative of Site Class C. Seismic design parameters for a 1,000-year return period earthquake are listed in Table 9.5. Based on these seismic parameters, the bridge should be assigned to Seismic Performance Zone 1. The soils found at the site are not liquefaction-susceptible for the design earthquake.

Table 9.5 Seismic Design Parameters

PGA =	0.034	F_{pga} =	1.20	A_S =	0.041
S_S =	0.079	F_a =	1.20	S_{DS} =	0.095
S_1 =	0.036	F_v =	1.70	S_{D1} =	0.061

The approach slab support should be according to the current IDOT standard. The approach footing will bear on compacted embankment material. No special subgrade treatment is required.

10. Construction Considerations

The construction area for the pier will be very congested, especially during the first stage. A foundation consisting of a single drilled shaft under each column could be constructed in a smaller space than a foundation with a pile cap and driven piles. Drilling rigs capable of excavating shafts under the existing bridge deck are readily available. These rigs are typically mounted on a large track excavator chassis. Interference with the existing bridge foundations and the length of the reinforcing cage are the primary concerns with installing all of the pier foundations while the existing bridges are still in use. Allowing an optional mechanical splice of the reinforcement would provide the contractor additional flexibility in the staging.

The first stage of abutment construction will require a small depth of excavation into the existing end slopes. If sloped cuts are not possible due to conflicts with the existing structures, temporary sheet piling is feasible. The Bridge Manual's Design Guide 3.13.1 – Temporary Sheet Piling Design should be used for design. Guide Bridge Special Provision No. 32, Temporary Sheet Piling (Revised: January 1, 2012), should be included in the construction documents if temporary sheet piling is required.

The edges of the backfill placed behind the first stage of abutment construction must be supported until the second and third stages are completed. The north abutment will require an approximately 10 feet high temporary wall, while the south abutment would be approximately 20 feet high. A temporary geotextile wall is usually preferred for this situation. A temporary MSE wall is another suitable alternative, because of the other MSE walls that will be included in the overall construction contract. The temporary walls will be founded on existing fill or new fill with an allowable bearing pressure of 3,700 psf. The ground in front of each temporary wall should be relatively flat for at least 10 feet in front of the wall. Fill for the adjacent stages should be placed up to the base of the proposed abutment as needed to satisfy this requirement. Guide Bridge Special Provision No. 46, Temporary Geotextile Walls (Revised: October 9, 2009) or Guide Bridge Special Provision No. 57, Temporary Mechanically Stabilized Earth Retaining Walls (Revised: January 31, 2012), as applicable, should be included in the construction documents.

Phased removal of the existing superstructure may require temporary bracing to support unbalanced loads on the single-column piers. Small axial loads can be supported by cribbing or footings placed on the existing 19th Street pavement or a prepared earth subgrade. A nominal bearing resistance of 4,000 psf should be used for design. If large axial or lateral loads are anticipated a drilled shaft foundation should be used. Design of drilled shafts should be according to the recommendations provided in Section 9 of this report.

References

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Appendix

Boring Location Plan
Subsurface Data Profile
Boring Logs
Soils Laboratory Test Results
Summary of Slope Stability Analyses
Existing Structure Plans

RETAINING WALL IL-RW04
S.N. 081-6013

RETAINING WALL IL-RW05
S.N. 081-6014

RETAINING WALL IL-RW07
S.N. 081-6016

ILR0801

S-38

19BR-109

19BR-106

ILR0804

RW1007

1925+00

1630+00

RAMP 7TH-A

S-37

S.N. 081-0181

RET WALL

I-74 WB

S.N. 081-0179

19BR-108

19BR-105

RW06-1

1760+00

S.N. 081-0180

I-74 EB

S-35

ILR0701

19BR-107

19BR-104

19TH ST SB

19TH ST NB

1920+00

RAMP 7TH-B

1530+00

RETAINING WALL IL-RW06
S.N. 081-6015

N

LEGEND

RW600 BORING LOCATION

0 50 100
SCALE IN FEET

HANSON

BORING LOCATION PLAN

I-74 & RAMP 7TH-A OVER 19TH STREET
S.N. 081-0179, 081-0180 & 081-0181
ROCK ISLAND COUNTY, ILLINOIS

08H0120E 5/30/12

madau00223
05\31\2012
08I0179-A0326-000-Subsurface Datadgn

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

ILR0701
Sta. 56+20, 50' RT

	N	Qu	w%	
629.30				
628.70				7" Thick ACC followed by gravel subbase to 1.0'
	12			Silty Sandy Clay with Gravel, greenish brown, moist, low plasticity, stiff, with subangular to subrounded gravel embedded throughout, fill/subbase
625.30				
	9			Sandy Clay Trace Gravel, dark gray, frozen, stiff, with subangular to subrounded fine to coarse gravel embedded throughout, fill
		3.0P to		
621.30	12	4.0P		
	6	2.0P	15.5	Silty Clay with gravel, gray, moist, soft to medium stiff, high plasticity, trace gravel, possible fill (LL=38 PI=14)
		1.5P		(LL=32 PI=14)
615.80				
	5	2.0P	16.0	Sandy Lean Clay Trace Gravel, gray, moist, stiff, medium plasticity, fill or disturbed till (LL=30 PI=14)
610.80				
	11			Same As Above, turning grayish brown at bottom 3", piece of wood embedded, possible fill
605.80				
	12	3.0P		Sandy Lean Clay Trace Gravel, brown, moist, stiff, low plasticity, possible weathered till
600.80				
		2.5P to		
	15	3.5P	15.0	Same As Above, gray, then brown, split in almost vertical with reddish brown surface, weathered till
595.80				
		2.5P to		
	12	3.0P		Sandy Lean Clay Trace Gravel, gray, moist, stiff, low plasticity, unweathered till
	15	2.5P		
	DD			
581.30	▽			
580.80				Top 3" is same as above; Bottom 12" is Poorly Graded Sand, gray, wet, medium dense, fine to medium sand seam followed by 3" of gray sandy lean clay, trace gravel, till
579.30	28			
				Bottom of hole = 50.0 feet

S-33
Sta. 57+25, 36' RT

	N	Qu	w%	
601.3				Silty Clay Loam with Gravel (Till), brown to gray, very stiff
	14	2.9B	14	
	13	2.75B	14	
	14	2.5B	15	
	16	2.4B	14	
	16	2.80B	15	
	15	2.75B	15	
	15	2.7	14	
			14	
	18	2.3B	14	
574.3				
	23	2.4B	15	Clay with Gravel (Till), gray, hard
		4.5B		
	31	5.8B	17	
568.8	25	5.0E		Silty Sand
565.8	14			
	100+	7.5E	11	
	100+	7.6S	10	
	100+	7.5S	9	
556.3	100+		8	
				Bottom of hole = 45.0 feet

S-37
Sta. 58+69, 72' LT

	N	Qu	w%	
621.8				Clay Loam, brown
617.3				
		2.9S	11	Clay Loam, brown, very stiff
	14	2.8B	12	
	16	3.5S	15	
	13	2.7B	11	
	13	2.9B	14	
	13	2.8B	14	
	11	2.6B	14	
	9	2.3B	13	
597.3				
595.8	DD ▽	23		Sandy Loam, brown, medium
594.8				
	13	1.8B	11	Clay Loam, gray, stiff
592.3				
	10	2.3B	14	Clay Till, gray, very stiff
	10	2.6B	14	
	14	2.9B	13	
584.8				
	14	4.4B	15	Clay Till, gray, hard
	18	4.3B	15	
	18	4.4B	19	
	23	5.9B	11	
574.8				
	16	3.3B	16	Clay, brown-gray, very stiff
	18	4.6B	12	
569.8				
	50	6.5B	10	Clayey Shale, gray, hard
	56	6.1S	11	
	66	6.0S	10	
560.3	150	6.5S	9	
				Bottom of hole = 61.5 feet

LEGEND

N	Standard Penetration Test N (blows/ft)
Qu	Unconfined Strength (tsf)
w%	Natural Moisture Content (%)
Q	Unconsolidated Undrained Triaxial Test
R	Consolidated Undrained Triaxial Test
C	Consolidation Test
DD ▽ 558.10	Water Surface Elevation Encountered in Boring DD = during drilling 24h = 24 hours after completion

Note: Borings S-33 and S-37 were drilled prior to construction of the existing bridge. Elevations have been adjusted to current datum.

SUBSURFACE DATA PROFILE
STRUCTURE NO. 081-0179 (WB)
STRUCTURE NO. 081-0180 (EB)
STRUCTURE NO. 081-0181 (7TH-A)

PROFESSIONAL DESIGN FIRM LICENSE #184-001084

HANSON
Hanson Professional Services Inc.

JOB NO.	SHEET NO. 1	F.A.I RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
08H0120E		74	81-1-1HB	ROCK ISLAND	_	
DATE 5/30/12	5 SHEETS			CONTRACT NO. 64C08		
		FED. ROAD DIST. NO. _	ILLINOIS	FED. AID PROJECT		

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

ILR0801
Sta. 631+07, 16' RT

	N	Qu	w%	
623.02				Grass Matter - followed by silty clay with sands and topsoil
622.02	9			Silty Clay With Sand (CL-ML) - dark brown with brown, dry to moist, non plastic, little to few coarse to fine sands, strong cementation, occasional reddish brick fragements, possible fill
620.02	6			Lean Clay With Sand (CL) - medium brown, dry to moist, low plasticity, medium stiff, little to few coarse to fine sands, dark brown silty pocket at top of sample, possible fill
617.02	8	3.75-4.0P		Sandy Lean Clay (CL) - olive gray with medium brown and gray, dry to moist, medium stiff, few coarse to fine sands, trace fine subangular to subrounded gravels, dark gray with occasional root matter at bottom of sample
615.02	9	1.3		Sandy Lean Clay With Gravel (CL) - medium brown with gray, dry, strongly cemented, stiff, crumbly, few coarse to fine sands, little to trace of medium to fine gravels, occasional medium to fine sand seams scattered throughout, dark gray with heavy _____ matter
	8	4.3P		at top 2" of sample, possible old topsoil followed by native soil; Rimac: Pu = 68 lbs
	9	4.5P		same as above, medium brown, dry to moist, stiff, strongly cemented, glacial till
				same as above, medium brown to brown, stiff, strongly cemented, dry, glacial till
605.02	12	4.0-4.5P		Sandy lean Clay (CL) - medium brown with orange brown, dry, non plastic, stiff, few coarse to fine sands, frequent sand seams, approxomately 1/8"-1/4" thick at center and bottom of sample, sand seams of medium to fine sands, oxidized, possible weathered till with scattered sand seams
	12	1.9B		medium brown with gray, mottled with orange brown, dry, stiff, few coarse to fine sands, very oxidized, small pockets of dark gray to black coal like deposits in middle of sample, possible weathered glacial till; Rimac: Pu = 100 lbs
	11	3.8P		olive gray with light brown, dry to moist, slightly oxidized at top, stiff, possible unweathered glacial till
590.02	12	1.3		Lean Clay With Sand (CL) - uniform gray, dry to moist, stiff, little to few coarse to fine sands, scattered sand pockets, possible unweathered glacial till; Rimac: Pu = 70 lbs
				uniform gray, dry to moist, stiff, little to few coarse to fine sands, scattered sand pockets, possible unweathered glacial till
583.52	12			
583.02				Clayey Sand With Silt (SC) - gray, moist to wet, medium dense, clay with medium to fine sands, possible residual soil
				Bottom of hole = 40.0 feet

S-38
Sta. 630+85, 19' RT

	N	Qu	w%	
621.8				Silty Clay, black
619.8				Clay Till, brown, soft
	4	0.7B	23	
614.8	4	1.3B	13	Silty Clay, brown, soft
	5	1.0S	18	
609.8	4	0.6B	20	Silty Clay, brown, stiff
606.8				Clay Till, gray, stiff
	5	1.2B	22	
	4	2.0B	19	
	13	2.3B	16	
	20	1.6B	16	
	16	2.6B	13	
	19	2.7B	15	
590.8	26	3.4B	15	Fine Sand, gray, medium
	17			
	17			
584.8	7	1.5B	22	Clay, gray, stiff
	19	3.9S	20	
	16	3.3S	18	
576.8	29	4.0S	21	Clay Shale, dark gray, hard
	41	4.9S	20	
	62	5.5S	17	
	58	6.0S	18	
	58	4.9S	15	
	58	5.2S	18	
	100+	7.3S	14	
542.8				Bottom of hole = 79.0 feet

19BR-104
Sta. 58+65, 70' RT

	N	Qu	w%	
605.80				
605.40				CONCRETE - 3" to 4" thick
	9	0.7B	17.2	SILT - reddish brown, little to some clay, crumbly, medium plastic, medium stiff to stiff, moist.
602.30	9	1.7S	22.2	SILT - dark brown to gray with rust color, little to some clay, crumbly, medium plastic, stiff, moist.
599.80	2	0.7B	19.6	SILT - dark brown, and clay to silty CLAY, medium plastic, soft, moist.
597.30	5	0.9B	19.2	CLAY TILL - brown, sandy, little to some fine to coarse sand, trace gravel, crumbly, medium stiff, slightly moist (FILL)
594.80	6	0.5B	17.4	SILT - brown to dark gray, little to some clay, slightly to medium plastc, medium stiff, moist.
592.30	16		2.2	SILT - brown, some fine to coarse sand, and fine gravel, trace clay, moist. [Note: attempted to take Shelby tube at 13.5'; hit gravel; followed up with SPT]
589.80	7		14.8	CLAY TILL - greenish gray to bluish gray, silty, trace to little medium to coarse sand, trace fine gravel, medium plastic, stiff to very stiff, moist (GLACIAL TILL).
		1.3	17.5	-[Dry unit weight = 114.5 pcf]
	13	2.1B	13.5	
	14	3.5B	14.7	(LL=32, PI=17)
	15	3.1B	14.2	
	21	2.8S	16.0	- bluish gray sandy clay till.
	21	4.0B	14.2	- bluish gray sandy clay till.
568.30	55	4.2S	13.6	CLAY SHALE - black to dark gray, no laminations above 48.5 ft, thin laminations and partial rock-like shale chips below 48.5 ft depth, hard (for clay), slightly moist to dry.
	104/9"	>4.5P	10.6	
	50/1"		8.4	- black flaky shale, thinly laminated (start of rock-like shale properties).
	60/1"			
				[Groundwater level not observed in soils or shale during drilling]
547.22	50/1"		6.0	
				Bottom of hole = 58.58 feet

LEGEND

N	Standard Penetration Test N (blows/ft)
Qu	Unconfined Strength (tsf)
w%	Natural Moisture Content (%)
Q	Unconsolidated Undrained Triaxial Test
R	Consolidated Undrained Triaxial Test
C	Consolidation Test
DD	Water Surface Elevation Encountered in Boring DD = during drilling 24h = 24 hours after completion
558.10 ▽	

Note: Boring S-38 was drilled prior to construction of the existing bridge. Elevations have been adjusted to current datum.

SUBSURFACE DATA PROFILE
STRUCTURE NO. 081-0179 (WB)
STRUCTURE NO. 081-0180 (EB)
STRUCTURE NO. 081-0181 (7TH-A)

PROFESSIONAL DESIGN FIRM LICENSE #184-001084

HANSON
Hanson Professional Services Inc.

JOB NO.	SHEET NO. 2	F.A.I RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
08H0120E		74	81-1-1HB	ROCK ISLAND	-	
DATE 5/30/12	5 SHEETS			CONTRACT NO. 64C08		
		FED. ROAD DIST. NO. -	ILLINOIS	FED. AID PROJECT		

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

19BR-105
Sta. 60+26, 14' LT

	N	Qu	w%	
609.30				
608.80				CONCRETE - 3" thick concrete plus base course.
	10	1.5P	12.8	SILT - light brown and dark brown, some clay, trace to little gravel, medium plastic, stiff, moist (FILL).
604.80				
	17	0.8S	12.6	SILT - light brown and gray mottled, little clay, crumbly, slightly to medium plastic, medium stiff, slightly moist to dry.
	4	0.6B	27.4	
600.80				
	5	0.6S	18.2	SILT - dark brown, little to some clay, crumbly, slightly to medium plastic, medium stiff, moist.
598.30				
	4	0.4S	16.2	SILT - dark brown, trace to little clay, little fine sand, slight binder, slightly plastic, soft to medium stiff, moist.
595.30				
	19		4.3	SAND - brown, fine to coarse, clayey, and gravel, loose, moist.
	4		5.5	
590.80				
	6	1.4B	14.4	CLAY TILL - greenish gray, sandy to silty, trace medium to coarse sand, trace fine gravel, slightly to medium plastic, hard, moist (GLACIAL TILL).
		1.9B	14.3	-[Dry unit weight = 118 pcf]
	12	3.1B	13.8	
DD	20	3.3B	12.9	
580.30 ▽				- contains thin layers of wet/saturated fine sand.
	14	3.3B	15.4	
	50/1"		23.9	- greenish gray to bluish gray with limestone fragments, hard.
574.00				
	Rec. = 46% RQD = 8%			LIMESTONE - gray, fine grained, hard, dense, very thin to thin bedded, closely to very closely fractured with possible shale and/or clay seams which were not recovered between 35.3' and 40.7', occasional iron-stains at fractures, slightly weathered, poor quality rock but hard where recovered.
	Rec. = 81% RQD = 0%			[Note: driller repeatedly lifted the core barrel while drilling to keep it from jamming. Observation of core pieces suggest numerous near-vertical fractures were encountered, causing core pieces to get stuck in the core catcher and possibly grinding up subsequent rock encountered while drilling.]
	Rec. = 43% RQD = 0%			
	Rec. = 77% RQD = 35%			- 11" thick layer of very soft green-gray, sandy, gravelly clay at 45.8' to 46.7'.
				- 13" layer of medium gray "birdseye" texture limestone with vertical fractures at 47.5' to 48.6'.
558.50				

Bottom of hole = 50.8 feet

19BR-106
Sta. 628+71, 13' RT

	N	Qu	w%	
612.90				
612.40				Concrete - 4" thick plus base course.
	5	1.2B	15.4	CLAY - yellowish brown, little to some silt, medium plastic, medium stiff, moist
609.40				
	4	1.0S	12.9	SILT - brown, tan, orange, and dark brown, mottled, some clay, to CLAY, some silt, medium plastic, medium stiff, moist.
	5	1.1B	18.6	
	3	0.8B	18.1	
		0.9B	16.4	- [Dry unit weight = 116.3 pcf] (LL=32, PI=18) - gray and tan silt, little to some clay at 13'.
599.40				
	13	3.0B	14.8	CLAY TILL - brown to gray and greenish gray, silty to sandy, trace to some fine to coarse sand, trace fine gravel, hard, dry to slightly moist (GLACIAL TILL).
	14	2.7B	15.6	
	29	4.5S	11.2	
	44	6.2B	10.9	
	23		13.1	[Groundwater not noted in soils during drilling operations.]
585.90	50/2"			
	Rec. = 91% RQD = 46%			LIMESTONE - gray, fine grained, hard, dense, thin bedded, horizontal to subhorizontal bedding fractures with several near-vertical to high angle fractures, slightly rough, frequently brown-stained fracture surfaces, slightly to very slightly weathered.
	Rec. = 100% RQD = 63%			- slightly to moderately weathered at 27.0'-27.8'; very weathered below 27.8'.
	Rec. = 100% RQD = 75%			- high angle (60° to 90°) fractures at 27.5'-27.7', 33.8', 35.4' 35.8'-36.0', 36.7', and 37.3'. Mid angle (30° to 60°) at 29.2', 34.0', and 34.5'.
575.60				

Bottom of hole = 37.3 feet

19BR-107
Sta. 59+82, 60' RT

	N	Qu	w%	
609.10				
608.60				CONCRETE SIDEWALK - concrete (4-1/2" thick) + base course.
	7	1.4B	13.5	CLAY - brown to yellowish brown, some silt, trace gravel, medium plastic, stiff, slightly moist.
605.60				
	10	1.5B	15.9	SILT - dark brown, little to some clay, trace gravel, crumbly, slight to medium plastic, stiff, moist.
	10	1.3B	15.6	
		1.8P	24.3	- little clay. (LL=28, PI=7)
598.10				
	5	0.5P	14.4	CLAY TILL - dark brown (to 12.5 ft) to brown, to gray and tan, trace medium to coarse sand, trace fine gravel, stiff, moist (GLACIAL TILL).
	9	2.0B	14.1	- sandy till at 11.0'-12.5'.
		3.3B	14.4	-[Dry unit weight = 119.8 pcf]
590.60				
	14	2.3B	14.1	CLAY TILL - greenish brown to gray, trace medium to coarse sand, trace fine gravel, hard, moist to dry (GLACIAL TILL).
	20	2.6B	13.8	
	18	2.8B	14.5	
	16	2.7B	13.1	
	14	3.2B	13.9	
	14	3.0P	12.7	
570.60				
	45	>4.5P	14.9	CLAY SHALE - greenish gray to brown, clayey, hard, slightly to moderately weathered, slightly moist to dry.
565.60				
	86	>4.5P	13.5	CLAY SHALE - black to dark gray, feint to no laminations, hard, slightly moist to dry.
	113/9"	>4.5P	10.9	
	50/5"	>4.5P	10.3	
				- [Note: driller added water to hole to be able to turn augers below 50' depth]
	50/2"	>4.5P	12.8	- soft, laminated, clayey, sticky; falls apart and readily crumbles when moist; becomes sticky clay when wet.
	50/5"		7.9	- light and dark gray shale cuttings.
550.50				

Bottom of hole = 58.6 feet

LEGEND

N	Standard Penetration Test N (blows/ft)
Qu	Unconfined Strength (tsf)
w%	Natural Moisture Content (%)
Q	Unconsolidated Undrained Triaxial Test
R	Consolidated Undrained Triaxial Test
C	Consolidation Test
DD	Water Surface Elevation Encountered in Boring
558.10 ▽	DD = during drilling 24h = 24 hours after completion

SUBSURFACE DATA PROFILE
STRUCTURE NO. 081-0179 (WB)
STRUCTURE NO. 081-0180 (EB)
STRUCTURE NO. 081-0181 (7TH-A)

PROFESSIONAL DESIGN FIRM LICENSE #184-001084

HANSON
Hanson Professional Services Inc.

JOB NO.	SHEET NO. 3	F.A.I RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
08H0120E		74	81-1-1HB	ROCK ISLAND	_	
DATE 5/30/12	5 SHEETS			CONTRACT NO. 64C08		
		FED. ROAD DIST. NO. _	ILLINOIS	FED. AID PROJECT		

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

RW06-1
Sta. 61+02, 7' LT

	N	Qu	w%	
611.30				
610.80		2.50P	14 R	CONCRETE
			14 R	FILL - Light gray, slightly moist, SILT
			17 C	
608.30		1.80P	13	FILL - Very dark brown, moist, clayey SILT with trace gravel
605.30	17	2.00P	15	FILL - Gray, moist, medium dense, silty, medium-grained SAND with trace gravel, wood, brick and rock fragments
	50/4"		12	
600.30			20	
		1.65S	17	Dark brown, moist, stiff, sandy SILT with trace gravel
	8		16	
596.30				
595.30		0.50P	12	Dark brown, moist, sandy, clayey SILT with trace gravel
593.80 ▽ DD				Dark brown, wet, dense, silty SAND with trace gravel
593.30	8	0.54B	18	Gray and brown, moist, medium stiff, silty CLAY with sand and trace gravel
588.80				Gray and brown, moist, very stiff, silty CLAY with sand and gravel
586.30	21	2.61B	14	
				Bottom of hole = 25.0 feet

19BR-108
Sta. 61+26, 22' LT

	N	Qu	w%	
611.60				
611.00				CONCRETE SIDEWALK - 4.5" thick concrete plus base course.
	6	1.6B	13.8	CLAY - olive brown and gray, some to and silt, trace to little medium to coarse sand, trace fine gravel, very stiff, moist (GLACIAL TILL-FILL).
	12	3.0B	18.2	
605.60	10	0.8B	18.4	SILT - dark brown, little to some clay, trace gravel, trace organics, slightly to medium plastic, medium stiff to stiff, moist
	5	0.9B	24.2	
600.60	5	0.7B	24.1	CLAY - brown, little silt, trace sand, with gravel, to SILT and clay, with gravel or cobble, slightly to medium plastic, medium stiff, moist (LL=21, PI=5)
	17		13.9	- cobble at 14.5'-15.0'.
595.60		2.5B	14.2	CLAY TILL - greenish brown to gray, trace to little medium to coarse sand, trace fine gravel, hard, moist to dry (GLACIAL TILL).
	13	3.4B	13.9	-[Dry unit weight = 116.7 pcf]
	16	3.1B	14.4	
		2.8P		
	14	2.9B	14.8	
581.80	50/3"	2.5P	17.3	- greenish gray and red silty clay till, crumbly, moist.
				CLAY - red, silty, shaly, crumbly, dry to slightly moist (TILL or CLAY SHALE).
578.10				
	91	3.5P	14.8	CLAY SHALE - greenish gray, clayey, hard, laminated, slightly to moderately weathered, slightly moist to dry.
				-[Groundwater not observed in soils and shale during drilling operations]
573.90				
	Rec. = 77% RQD = 0%			LIMESTONE - gray, fine grained, dense, hard, very thin to thin bedded, horizontal to subhorizontal slightly rough fractures with some high angle (60° to 90°) fractures, slightly weathered with faint iron stains on some fractures, occasional stylolites.
	Rec. = 93% RQD = 23%			
	Rec. = 100% RQD = 45%			
563.70				
				Bottom of hole = 47.9 feet

19BR-109
Sta. 627+68, 32' RT

	N	Qu	w%	
614.30				
614.10				TOPSOIL - (roots) 1" to 2" thick.
	9	2.3S	12.8	SILT - brown, tan and orange mottled, little clay, slightly to medium plastic, stiff to crumbly, moist
610.80				
	11	1.9B	20.4	CLAY - greenish gray and brown, little silt, waxy, medium plastic, stiff, moist.
608.30				
	4	0.8B	16.0	CLAY - brown and tan, some to and silt, trace sand, medium plastic, medium stiff, moist.
605.80	7	0.8S	16.7	SILT - dark brown to brown, little to some clay, trace fine sand, slightly to medium plastic, medium stiff to stiff, moist.
602.30				
	6	1.0B	16.6	CLAY - gray and brown mottled, some silt, medium plastic, stiff, moist.
600.80	10	0.7B	14.2	CLAY - brown and red brown, sandy, grading from clayey silt with fine to coarse sand, trace gravel to very soft wet sandy clay.
DD	4	0.5B	18.4	
595.80 ▽				
	8		13.9	GRAVEL - brown to reddish brown, clayey, angular, saturated.
593.30				
	11	3.2B	9.7	CLAY - greenish gray, little to some silt, medium to highly plastic, stiff to very stiff, moist.
		2.9B	14.9	- [Dry unit weight = 120.7 pcf]
				- trace sand at bottom of shelby tube.
587.80	98/10"		15.4	CLAY SHALE - bluish to greenish gray, clayey, hard, no laminations, slightly weathered, slightly moist to dry.
583.80	55/3"	>4.5P	10.7	
	Rec. = 86% RQD = 60%			CLAY SHALE - bluish to greenish gray, clayey, hard, no laminations, slightly weathered. Intermixed sandy shale and limestone at 30.5'-32.2'.
582.10				
				LIMESTONE - gray with yellowish brown and iron-staining along fractures in the upper 6 ft, fine grained, occasional stylolites, dense, hard, sound, thin bedded, primarily uneven horizontal to subhorizontal fractures with occasional high angle fractures, slightly weathered to fresh.
	Rec. = 91% RQD = 74%			- iron stained fractures at 32.8', 36.0', 36.2', 36.5', 36.8', 38.2'.
				- vertical fracture at 35.4'-35.6', 80° to 60° curvilinear fracture at 36.6'-36.8', 60° jagged brown-stained fracture at 36.4'.
				- fresh rock below 38.2'.
				- [Note: RQD shown for Run 1 is based on length of recovered rock, not on length of run. RQD=40% for entire length of run (including material washed away from augers and ground up during the drilling operations).]
572.00				
				Bottom of hole = 42.3 feet

LEGEND

N	Standard Penetration Test N (blows/ft)
Qu	Unconfined Strength (tsf)
w%	Natural Moisture Content (%)
Q	Unconsolidated Undrained Triaxial Test
R	Consolidated Undrained Triaxial Test
C	Consolidation Test
DD ▽ 558.10	Water Surface Elevation Encountered in Boring DD = during drilling 24h = 24 hours after completion

SUBSURFACE DATA PROFILE
STRUCTURE NO. 081-0179 (WB)
STRUCTURE NO. 081-0180 (EB)
STRUCTURE NO. 081-0181 (7TH-A)

PROFESSIONAL DESIGN FIRM LICENSE #184-001084

HANSON
Hanson Professional Services Inc.

JOB NO. 08H0120E
DATE 5/30/12
SHEET NO. 4
5 SHEETS

F.A.I RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
74	81-1-1HB	ROCK ISLAND	_	
		CONTRACT NO. 64C08		
FED. ROAD DIST. NO. _	ILLINOIS	FED. AID PROJECT		

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

ILR0804
Sta. 626+96, 7' RT

	N	Qu	w%	
641.39				Clay (CL) - gray, moist, very stiff to hard, trace sand and fine angular gravel
	7	4.1S		
	16	2.5P		
635.39				
	4			Clay (CL) - gray to greenish gray, moist, trace fine to coarse grained sand, stiff to hard
	6	1.9B		RIMAC: Pu = 31 lbs (Bulging)
	10	4.1B		RIMAC: Pu = 68 lbs (Bulging)
	13	3.0P		
	14	4.5P		
	36	4.5P		shale in tip
606.39				Bottom of hole = 35.0 feet

RW1007
Sta. 626+45, 9' RT

	N	Qu	w%	
649.91				
648.91				Fill Asphalt Concrete - 2" thick asphalt overlaying 1' thick reinforced concrete slab; Hole offset 5' north
	9			Fill Silty Clay (CL-ML) - Gray brown, moist, hard, trace to little gravel
644.91	8	4.0P		
	9	3.75-2.0P		Fill Sandy Lean Clay Trace Gravel (CL) - Reddish to grayish brown, moist, very stiff, trace fine to medium
640.91	8	2.5P		
	10	1.5P		Fill Silty Clay (CL) - Gray brown, moist, stiff to very stiff, with fine to coarse gravel, and some wood pieces and brick pieces throughout, fill
	9	2.0P		
	11	2.0P		
	17	3.0P		
	23	2.0P		
	19	4.5P		
	13	4.5P		
	12	3.0P		
605.91				
	18	3.0P		Sandy Lean Clay Trace Gravel (CL) - Gray brown with gray vertical seams, moist, low to medium plasticity, very stiff, fossilized rootlets, trace fine to coarse, weathered till or gumbotil
600.00				
				Continued at Right

				Continued
600.00				
	14	2.5P		
	16	2.5P		
	21	2.5P		
574.91				
572.91	62			Fine to Medium Sand With Silt (SP-SM) - Gray, wet, very dense, estimated 5%-12% fines
				Sandy Lean Clay (CL) - Gray, moist, stiff, trace fine to coarse gravel, till
	35	4.0P		
559.81	50/0"			No recovery, possibly boulder or rock; Gravel/cobbles at 90° auger and spoon refusal
				Bottom of hole = 90.1 feet

LEGEND

N	Standard Penetration Test N (blows/ft)
Qu	Unconfined Strength (tsf)
w%	Natural Moisture Content (%)
[U]	Unconsolidated Undrained Triaxial Test
[R]	Consolidated Undrained Triaxial Test
[C]	Consolidation Test
DD	Water Surface Elevation Encountered in Boring DD = during drilling 24h = 24 hours after completion
558.10 ▽	

SUBSURFACE DATA PROFILE
STRUCTURE NO. 081-0179 (WB)
STRUCTURE NO. 081-0180 (EB)
STRUCTURE NO. 081-0181 (7TH-A)

PROFESSIONAL DESIGN FIRM LICENSE #184-001084

HANSON
Hanson Professional Services Inc.

JOB NO. 08H0120E
DATE 5/30/12

SHEET NO. 5
5 SHEETS

F.A.I RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
74	81-1-1HB	ROCK ISLAND	-	
		CONTRACT NO. 64C08		
FED. ROAD DIST. NO. -	ILLINOIS	FED. AID PROJECT		

Illinois Department of Transportation
Division of Highways
JCI

SOIL BORING LOG

Date 9/14/07

ROUTE I-74 **DESCRIPTION** New I-74 Bridge Over Mississippi River - Illinois Approach **LOGGED BY** KJB

SECTION _____ **LOCATION** (N=561990.925, E=2459643.925), **SEC.** 32, **TWP.** 18N, **RNG.** 1W, 4th **PM**

COUNTY Rock Island **DRILLING METHOD** HSA, CME 55 **HAMMER TYPE** CME AUTOMATIC

STRUCT. NO. _____
Station _____

BORING NO. 19BR-104
Station _____
Offset _____
Ground Surface Elev. 605.80 ft

Surface Water Elev. _____ ft
Stream Bed Elev. _____ ft

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

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				CONCRETE - 3" to 4" thick 605.40
	2			SILT - reddish brown, little to some clay, crumbly, medium plastic, medium stiff to stiff, moist.
	4	0.7	17.2	
	5	B		
				602.30
	4			SILT - dark brown to gray with rust color, little to some clay, crumbly, medium plastic, stiff, moist.
	5	1.7	22.2	
-5	4	S		
				599.80
	2			SILT - dark brown, and clay to silty CLAY, medium plastic, soft, moist.
	1	0.7	19.6	
	1	B		
				597.30
	1			CLAY TILL - brown, sandy, little to some fine to coarse sand, trace gravel, crumbly, medium stiff, slightly moist (FILL?)
	2	0.9	19.2	
-10	3	B		
				594.80
	WOH			SILT - brown to dark gray, little to some clay, slightly to medium plastic, medium stiff, moist.
	2	0.5	17.4	
	4	B		
				592.30
	7			SILT - brown, some fine to coarse sand, and fine gravel, trace clay, moist.
	8		2.2	
-15	8			
				[Note: attempted to take Shelby tube at 13.5'; hit gravel; followed up with SPT] 589.80
	6			CLAY TILL - greenish gray to bluish gray, silty, trace to little medium to coarse sand, trace fine gravel, medium plastic, stiff to very stiff, moist (GLACIAL TILL). **-[Dry unit weight = 114.5 pcf]**
	5		14.8	
	2			
		1.3		
-20		P		

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				CLAY TILL - greenish gray to bluish gray, silty, trace to little medium to coarse sand, trace fine gravel, medium plastic, stiff to very stiff, moist (GLACIAL TILL). *(continued)*
	3			
	5	2.1	13.5	
	8	B		
	3			
	6	3.5		
-25	8	B		
	4			
	7	3.1	14.2	
	8	B		
	5			- bluish gray sandy clay till.
	9	2.8	16.0	
-30	12	S		
	7			- bluish gray sandy clay till.
	9	4.0	14.2	
-35	12	B		
				568.30
	14			CLAY SHALE - black to dark gray, no laminations above 48.5 ft, thin laminations and partial rock-like shale chips below 48.5 ft depth, hard (for clay), slightly moist to dry.
	22	4.2	13.6	
-40	33	S		

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

Illinois Department of Transportation
Division of Highways
JCI

SOIL BORING LOG

Date 9/14/07

ROUTE I-74 **DESCRIPTION** New I-74 Bridge Over Mississippi River - Illinois Approach **LOGGED BY** KJB

SECTION _____ **LOCATION** (N=561990.925, E=2459643.925), **SEC.** 32, **TWP.** 18N, **RNG.** 1W, 4th **PM**

COUNTY Rock Island **DRILLING METHOD** HSA, CME 55 **HAMMER TYPE** CME AUTOMATIC

STRUCT. NO. _____
Station _____

BORING NO. 19BR-104
Station _____
Offset _____
Ground Surface Elev. 605.80 **ft**

Surface Water Elev. _____ **ft**
Stream Bed Elev. _____ **ft**

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

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	
				CLAY SHALE - black to dark gray, no laminations above 48.5 ft, thin laminations and partial rock-like shale chips below 48.5 ft depth, hard (for clay), slightly moist to dry. *(continued)*
	24			
	54	>4.5	10.6	
-45	50/3"	P		
	48			- black flaky shale, thinly laminated (start of rock-like shale properties).
	50/1"		8.4	
-50				
	60/1"			
-55				[Groundwater level not observed in soils or shale during drilling]
547.22	48			
	50/1"		6.0	End of Boring
-60				

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

Illinois Department of Transportation
Division of Highways
JCI

SOIL BORING LOG

Date 9/14/07

ROUTE I-74 **DESCRIPTION** New I-74 Bridge Over Mississippi River - Illinois Approach **LOGGED BY** KJB

SECTION _____ **LOCATION** (N=561828.313, E=2459724.286), **SEC.** 32, **TWP.** 18N, **RNG.** 1W, 4th **PM**

COUNTY Rock Island **DRILLING METHOD** HSA, CME 55 **HAMMER TYPE** CME AUTOMATIC

STRUCT. NO. _____
Station _____

BORING NO. 19BR-105
Station _____
Offset _____
Ground Surface Elev. 609.30 ft

Surface Water Elev. _____ ft
Stream Bed Elev. _____ ft

Groundwater Elev.:
First Encounter 580.3 ft ▼
Upon Completion _____ ft
After _____ **Hrs.** _____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
608.80				CONCRETE - 3" thick concrete plus base course.
	2			SILT - light brown and dark brown, some clay, trace to little gravel, medium plastic, stiff, moist (FILL?).
	5	1.5	12.8	
	5	P		
	6			
604.80	10	0.8	12.6	
-5	7	S		
	3			SILT - light brown and gray mottled, little clay, crumbly, slightly to medium plastic, medium stiff, slightly moist to dry.
	2	0.6	27.4	
	2	B		
600.80				
	2			SILT - dark brown, little to some clay, crumbly, slight to medium plastic, medium stiff, moist.
	2	0.6	18.2	
-10	3	S		
598.30				
	2			SILT - dark brown, trace to little clay, little fine sand, slight binder, slightly plastic, soft to medium stiff, moist.
	2	0.4	16.2	
	2	S		
595.30	3			
	7		4.3	SAND - brown, fine to coarse, clayey, and gravel, loose, moist.
-15	12			
	5			
	2		5.5	
	2			
590.80				
	1			
	3	1.4	14.4	
-20	3	B		

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				CLAY TILL - greenish gray, sandy to silty, trace medium to coarse sand, trace fine gravel, slightly to medium plastic, hard, moist (GLACIAL TILL). *(continued)*
		1.9	14.3	**-[Dry unit weight = 118 pcf]**
		B		
	4			
-25	5	3.1	13.8	
	7	B		
	6			
	10	3.3	12.9	
	10	B		
	4			
▼				- contains thin layers of wet/saturated fine sand.
	7	3.3	15.4	
-30	7	B		
	21			
	50/1"		23.9	
-35				- greenish gray to bluish gray with limestone fragments, hard.
574.00				Borehole continued with rock coring.
-40				

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

BBS, from 137 (Rev. 8-99)

Illinois Department of Transportation
Division of Highways
JCI

ROCK CORE LOG

Date 9/14/07

ROUTE I-74 **DESCRIPTION** New I-74 Bridge Over Mississippi River - Illinois Approach **LOGGED BY** KJB

SECTION _____ **LOCATION** (N=561828.313, E=2459724.286), **SEC.** 32, **TWP.** 18N, **RNG.** 1W, 4th **PM**

COUNTY Rock Island **CORING METHOD** NQ Core

STRUCT. NO. _____
Station _____

BORING NO. 19BR-105
Station _____
Offset _____
Ground Surface Elev. 609.30 **ft**

CORING BARREL TYPE & SIZE NQ Wireline
Core Diameter 1.8 **in**
Top of Rock Elev. 574.80 **ft**
Begin Core Elev. 574.00 **ft**

	DEPTH (ft)	CORE (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
LIMESTONE - gray, fine grained, hard, dense, very thin to thin bedded, closely to very closely fractured with possible shale and/or clay seams which were not recovered between 35.3' and 40.7', occasional iron-stains at fractures, slightly weathered, poor quality rock but hard where recovered. 574.00		Run 1	46	8	2.8	
	-40					
[Note: driller repeatedly lifted the core barrel while drilling to keep it from jamming. Observation of core pieces suggest numerous near-vertical fractures were encountered, causing core pieces to get stuck in the core catcher and possibly grinding up subsequent rock encountered while drilling.]		Run 2	81	0		
		Run 3	43	0	1.7	488.6
	-45					
- 11" thick layer of very soft green-gray, sandy, gravelly clay at 45.8' to 46.7'.		Run 4	77	35	4.4	
- 13" layer of medium gray "birdseye" texture limestone with vertical fractures at 47.5' to 48.6'.						
	-50					
558.50 End of Boring						
	-55					

Color pictures of the cores Yes
Cores will be stored for examination until _____
The "Strength" column represents the uniaxial compressive strength of the core sample (ASTM D-2938)

Illinois Department of Transportation
Division of Highways
JCI

SOIL BORING LOG

Date 9/13/07

ROUTE I-74 **DESCRIPTION** New I-74 Bridge Over Mississippi River - Illinois Approach **LOGGED BY** KJB

SECTION _____ **LOCATION** (N=561671.671, E=2459820.632), **SEC.** 32, **TWP.** 18N, **RNG.** 1W, 4th **PM**

COUNTY Rock Island **DRILLING METHOD** HSA, CME 55 **HAMMER TYPE** CME AUTOMATIC

STRUCT. NO. _____
Station _____

BORING NO. 19BR-106
Station _____
Offset _____
Ground Surface Elev. 612.90 ft

Surface Water Elev. _____ ft
Stream Bed Elev. _____ ft

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

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Material Description
				CONCRETE - 4" thick plus base course. 612.40
	1			CLAY - yellowish brown, little to some silt, medium plastic, medium stiff, moist.
	2	1.2	15.4	
	3	B		
				609.40
	WOH			SILT - brown, tan, orange, and dark brown, mottled, some clay, to CLAY, some silt, medium plastic, medium stiff, moist.
	1	1.0	12.9	
-5	3	S		
	WOH			
	2	1.1	18.6	
	3	B		
	WOH			
	WOH	0.8	18.1	
-10	3	B		
		0.9	16.4	
		B		**- [Dry unit weight = 116.3 pcf]**
				- gray and tan silt, little to some clay at 13'. 599.40
	5			
	6	3.0	14.8	CLAY TILL - brown to gray and greenish gray, silty to sandy, trace to some fine to coarse sand, trace fine gravel, hard, dry to slightly moist (GLACIAL TILL).
-15	7	B		
	3			
	6	2.7	15.6	
	8	B		
	6			
	11	4.5	11.2	
-20	18	S		

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Material Description
	9			CLAY TILL - brown to gray and greenish gray, silty to sandy, trace to some fine to coarse sand, trace fine gravel, hard, dry to slightly moist (GLACIAL TILL). *(continued)*
	25	6.2	10.9	
	19	B		
	7			
	9		13.1	
-25	14			
				[Groundwater not noted in soils during drilling operations.]
	5			
	50/2"			585.90
				Borehole continued with rock coring.
-30				
-35				
-40				

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

Illinois Department of Transportation
Division of Highways
JCI

ROCK CORE LOG

Date 9/13/07

ROUTE I-74 **DESCRIPTION** New I-74 Bridge Over Mississippi River - Illinois Approach **LOGGED BY** KJB

SECTION _____ **LOCATION** (N=561671.671, E=2459820.632), **SEC.** 32, **TWP.** 18N, **RNG.** 1W, 4th **PM**

COUNTY Rock Island **CORING METHOD** NQ Core

STRUCT. NO. _____
Station _____

BORING NO. 19BR-106
Station _____
Offset _____
Ground Surface Elev. 612.90 **ft**

CORING BARREL TYPE & SIZE NQ Wireline
Core Diameter 1.8 **in**
Top of Rock Elev. 586.20 **ft**
Begin Core Elev. 585.90 **ft**

		DEPTH (ft)	CORE (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
LIMESTONE - gray, fine grained, hard, dense, thin bedded, horizontal to subhorizontal bedding fractures with several near-vertical to high angle fractures, slightly rough, frequently brown-stained fracture surfaces, slightly to very slightly weathered.	585.90		Run 1	91	46	3.2	309.9
		-30					
			Run 2	100	63	3.2	
- slightly to moderately weathered at 27.0'-27.8'; very slightly weathered below 27.8'.							
- high angle (60° to 90°) fractures at 27.5'-27.7', 33.8', 35.4', 35.8'-36.0', 36.7', and 37.3'. Mid angle (30° to 60°) at 29.2', 34.0', and 34.5'.		-35					
			Run 3	100	75	4	
	575.60						
End of Boring		-40					
		-45					

Color pictures of the cores Yes
Cores will be stored for examination until _____
The "Strength" column represents the uniaxial compressive strength of the core sample (ASTM D-2938)

Illinois Department of Transportation
Division of Highways
JCI

SOIL BORING LOG

Date 9/10/07

ROUTE I-74 **DESCRIPTION** New I-74 Bridge Over Mississippi River - Illinois Approach **LOGGED BY** KJB

SECTION _____ **LOCATION** (N=561873.84, E=2459651.753), **SEC.** 32, **TWP.** 18N, **RNG.** 1W, 4th **PM**

COUNTY Rock Island **DRILLING METHOD** HSA, CME 55 **HAMMER TYPE** CME AUTOMATIC

STRUCT. NO. _____
Station _____

BORING NO. 19BR-107
Station _____
Offset _____
Ground Surface Elev. 609.10 ft

Surface Water Elev. _____ ft
Stream Bed Elev. _____ ft

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

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				CONCRETE SIDEWALK - concrete (4-1/2" thick) + base course. 608.60
	3			
	4	1.4	13.5	CLAY - brown to yellowish brown, some silt, trace gravel, medium plastic, stiff, slightly moist.
	3	B		
				605.60
	4			SILT - dark brown, little to some clay, trace gravel, crumbly, slight to medium plastic, stiff, moist.
	5	1.5	15.9	
-5	5	B		
	2			
	4	1.3	15.6	
	6	B		
		1.8	24.3	- little clay.
-10		P		
				598.10
	2			CLAY TILL - dark brown (to 12.5 ft) to brown, to gray and tan, trace medium to coarse sand, trace fine gravel, stiff, moist (GLACIAL TILL).
	2	0.5	14.4	
	3	P		
	3			- sandy till at 11.0'-12.5'.
	4	2.0	14.1	
-15	5	B		
		3.3	14.4	
		B		
				-[Dry unit weight = 119.8 pcf] 590.60
	4			
	6	2.3	14.1	
-20	8	B		

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				CLAY TILL - greenish brown to gray, trace medium to coarse sand, trace fine gravel, hard, moist to dry (GLACIAL TILL). *(continued)*
	5			
	9	2.6	13.8	
	11	B		
	5			
	8	2.8	14.5	
-25	10	B		
	6			
	7	2.7	13.1	
	9	B		
	5			
	5	3.2	13.9	
-30	9	B		
	4			
	5	3.0	12.7	
-35	9	P		
				570.60
	6			CLAY SHALE - greenish gray to brown, clayey, hard, slightly to moderately weathered, slightly
	17	>4.5	14.9	
-40	28	P		

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

Illinois Department of Transportation
Division of Highways
JCI

SOIL BORING LOG

Date 9/10/07

ROUTE I-74 **DESCRIPTION** New I-74 Bridge Over Mississippi River - Illinois Approach **LOGGED BY** KJB

SECTION _____ **LOCATION** (N=561873.84, E=2459651.753), **SEC.** 32, **TWP.** 18N, **RNG.** 1W, 4th **PM**

COUNTY Rock Island **DRILLING METHOD** HSA, CME 55 **HAMMER TYPE** CME AUTOMATIC

STRUCT. NO. _____
Station _____

BORING NO. 19BR-107
Station _____
Offset _____
Ground Surface Elev. 609.10 ft

Surface Water Elev. _____ ft
Stream Bed Elev. _____ ft

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

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				moist to dry.
				CLAY SHALE - greenish gray to brown, clayey, hard, slightly to moderately weathered, slightly moist to dry. *(continued)*
565.60				
	16			CLAY SHALE - black to dark gray, feint to no laminations, hard, slightly moist to dry.
	29	>4.5	13.5	
-45	57	P		
	19			
	58	>4.5	10.9	
	55/3"	P		
	20			
	50/5"	>4.5	10.3	
-50		P		
				- [Note: driller added water to hole to be able to turn augers below 50' depth]
	33			
	50/2"	>4.5	12.8	- soft, laminated, clayey, sticky; falls apart and readily crumbles when moist; becomes sticky clay when wet.
-55		P		
	50/5"		7.9	- light and dark gray shale cuttings.
550.50				End of Boring
-60				

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

Illinois Department of Transportation
Division of Highways
JCI

SOIL BORING LOG

Date 9/11/07

ROUTE I-74 **DESCRIPTION** New I-74 Bridge Over Mississippi River - Illinois Approach **LOGGED BY** KJB

SECTION _____ **LOCATION** (N=561728.148, E=2459730.629), **SEC.** 32, **TWP.** 18N, **RNG.** 1W, 4th **PM**

COUNTY Rock Island **DRILLING METHOD** HSA, CME 55 **HAMMER TYPE** CME AUTOMATIC

STRUCT. NO. _____
Station _____

BORING NO. 19BR-108
Station _____
Offset _____
Ground Surface Elev. 611.60 ft

Surface Water Elev. _____ ft
Stream Bed Elev. _____ ft

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

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				CONCRETE SIDEWALK - 4.5" thick concrete plus base course. 611.00
	4			CLAY - olive brown and gray, some to and silt, trace to little medium to coarse sand, trace fine gravel, very stiff, moist (GLACIAL TILL - FILL?).
	2	1.6	13.8	
	4	B		
	2			
	5	3.0	18.2	
-5	7	B		
				605.60
	4			SILT - dark brown, little to some clay, trace gravel, trace organics, slightly to medium plastic, medium stiff to stiff, moist
	5	0.8	18.4	
	5	B		
	2			
	2	0.9	24.2	
-10	3	B		
				600.60
	WOH			CLAY - brown, little silt, trace sand, with gravel, to SILT and clay, with gravel or cobble, slightly to medium plastic, medium stiff, moist.
	2	0.7	24.1	
	3	B		
	3			
	5		13.9	
-15	12			- cobble at 14.5'-15.0'.
				595.60
				CLAY TILL - greenish brown to gray, trace to little medium to coarse sand, trace fine gravel, hard, moist to dry (GLACIAL TILL). **-[Dry unit weight = 116.7 pcf]**
		2.5	14.2	
		B		
	5			
	5	3.4	13.9	
-20	8	B		

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
	5			CLAY TILL - greenish brown to gray, trace to little medium to coarse sand, trace fine gravel, hard, moist to dry (GLACIAL TILL). *(continued)*
	7	3.1	14.4	
	9	B		
		2.8		
-25		P		
	4			
	6	2.9	14.8	
	8	B		
	30			
	50/3"	2.5	17.3	- greenish gray and red silty clay till, crumbly, moist.
-30		P		581.80
				CLAY - red, silty, shaly, crumbly, dry to slightly moist (TILL or CLAY SHALE?).
				578.10
	18			CLAY SHALE - greenish gray, clayey, hard, laminated, slightly to moderately weathered, slightly moist to dry.
	31	3.5	14.8	
-35	60	P		
				- [Groundwater not observed in soils and shale during drilling operations]
				573.90
				Borehole continued with rock coring.
-40				

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

BBS, from 137 (Rev. 8-99)

Illinois Department of Transportation
Division of Highways
JCI

ROCK CORE LOG

Date 9/11/07

ROUTE I-74 **DESCRIPTION** New I-74 Bridge Over Mississippi River - Illinois Approach **LOGGED BY** KJB

SECTION _____ **LOCATION** (N=561728.148, E=2459730.629), **SEC.** 32, **TWP.** 18N, **RNG.** 1W, 4th **PM**

COUNTY Rock Island **CORING METHOD** NQ Core

STRUCT. NO. _____
Station _____

BORING NO. 19BR-108
Station _____
Offset _____
Ground Surface Elev. 611.60 **ft**

CORING BARREL TYPE & SIZE NQ Wireline
Core Diameter 1.8 **in**
Top of Rock Elev. 573.90 **ft**
Begin Core Elev. 573.90 **ft**

	DEPTH (ft)	CORE (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
LIMESTONE - gray, fine grained, dense, hard, very thin to thin bedded, horizontal to subhorizontal slightly rough fractures with some high angle (60° to 90°) fractures, slightly weathered with faint iron stains on some fractures, occasional stylolites.	573.90	Run 1	77	0	3.4	
	-40	Run 2	93	23	4	503.4
	-45	Run 3	100	45	3.5	
	563.70					
End of Boring	-50					
	-55					

Color pictures of the cores Yes
Cores will be stored for examination until _____
The "Strength" column represents the uniaxial compressive strength of the core sample (ASTM D-2938)

Illinois Department of Transportation
Division of Highways
JCI

SOIL BORING LOG

Date 9/12/07

ROUTE I-74 **DESCRIPTION** New I-74 Bridge Over Mississippi River - Illinois Approach **LOGGED BY** KJB

SECTION _____ **LOCATION** (N=561568.395, E=2459838.396), **SEC.** 32, **TWP.** 18N, **RNG.** 1W, 4th **PM**

COUNTY Rock Island **DRILLING METHOD** HSA, CME 55 **HAMMER TYPE** CME AUTOMATIC

STRUCT. NO. _____
Station _____

BORING NO. 19BR-109
Station _____
Offset _____
Ground Surface Elev. 614.30 ft

Surface Water Elev. _____ ft
Stream Bed Elev. _____ ft

Groundwater Elev.:
First Encounter 595.8 ft ▼
Upon Completion _____ ft
After _____ **Hrs.** _____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				TOPSOIL - (roots) 1" to 2" thick. 614.10
	2			SILT - brown, tan and orange mottled, little clay, slightly to medium plastic, stiff to crumbly, moist.
	4 5	2.3 S	12.8	
				610.80
	3			CLAY - greenish gray and brown, little silt, waxy, medium plastic, stiff, moist.
-5	5 6	1.9 B	20.4	
				608.30
	2			CLAY - brown and tan, some to and silt, trace sand, medium plastic, medium stiff, moist.
	2 2	0.8 B	16.0	
				605.80
	2			SILT - dark brown to brown, little to some clay, trace fine sand, slightly to medium plastic, medium stiff to stiff, moist.
	3	0.8	16.7	
-10	4	S		
	1			
				602.30
	3			CLAY - gray and brown mottled, some silt, medium plastic, stiff, moist.
	3	1.0 B	16.6	
				600.80
	3			CLAY - brown and red brown, sandy, grading from clayey silt with fine to coarse sand, trace gravel to very soft wet sandy clay.
	3	0.7	14.2	
-15	7	B		
	WOH			
	2	0.5	18.4	
	2	B		
				595.80 ▼
	2			GRAVEL - brown to reddish brown, clayey, angular, saturated.
	4		13.9	
-20	4			

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				GRAVEL - brown to reddish brown, clayey, angular, saturated. 593.30 *(continued)*
	2			
	4 7	3.2 B	9.7	CLAY - greenish gray, little to some silt, medium to highly plastic, stiff to very stiff, moist.
				-[Dry unit weight = 120.7 pcf]
-25		2.9 B	14.9	- trace sand at bottom of shelby tube.
	7			587.80
	48 50/4"		15.4	CLAY SHALE - bluish to greenish gray, clayey, hard, no laminations, slightly weathered, slightly moist to dry.
	48			
	55/3"	>4.5 P	10.7	
-30				
				583.80
				Borehole continued with rock coring.
-35				
-40				

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

Illinois Department of Transportation
Division of Highways
JCI

ROCK CORE LOG

Date 9/12/07

ROUTE I-74 **DESCRIPTION** New I-74 Bridge Over Mississippi River - Illinois Approach **LOGGED BY** KJB

SECTION _____ **LOCATION** (N=561568.395, E=2459838.396), **SEC.** 32, **TWP.** 18N, **RNG.** 1W, 4th **PM**

COUNTY Rock Island **CORING METHOD** NQ Core

STRUCT. NO. _____
Station _____

BORING NO. 19BR-109
Station _____
Offset _____
Ground Surface Elev. 614.30 **ft**

CORING BARREL TYPE & SIZE NQ Wireline
Core Diameter 1.8 **in**
Top of Rock Elev. 583.80 **ft**
Begin Core Elev. 583.80 **ft**

		DEPTH (ft)	CORE (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
CLAY SHALE - bluish to greenish gray, clayey, hard, no laminations, slightly weathered.	583.80		Run 1	86	60	3.3	690.7
- intermixed sandy shale and limestone at 30.5'-32.2'.	582.10						
LIMESTONE - gray with yellowish brown and iron-staining along fractures in the upper 6 ft, fine grained, occasional stylolites, dense, hard, sound, thin bedded, primarily uneven horizontal to subhorizontal fractures with occasional high angle fractures, slightly weathered to fresh.							
- iron stained fractures at 32.8', 36.0', 36.2', 36.5', 36.8', 38.2'.		-35					
- vertical fracture at 35.4'-35.6'; 80° to 60° curvilinear fracture at 36.6'-36.8'; 60° jagged brown-stained fracture at 36.4'.			Run 2	91	74	2.8	
- fresh rock below 38.2'.		-40					
- [Note: RQD shown for Run 1 is based on length of recovered rock, not on length of run. RQD= 40% for entire length of run (including material washed away from augers and ground up during the drilling operations).]							
	572.00						
End of Boring		-45					
		-50					

Color pictures of the cores Yes
Cores will be stored for examination until _____
The "Strength" column represents the uniaxial compressive strength of the core sample (ASTM D-2938)

Illinois Department of Transportation
Division of Highways
CH2M HILL

SOIL BORING LOG

Date 3/28/08

ROUTE I-74 **DESCRIPTION** I-74 SB Near 7th Avenue **LOGGED BY** B. Karnik

SECTION I-74 Bridge over Mississippi River **LOCATION** (N=562235.7741, E=2459668.0033), **SEC.** 32, **TWP.** 18N, **RNG.** 1W

COUNTY Rock Island **DRILLING METHOD** HSA, CME 55 **HAMMER TYPE** CME AUTOMATIC

STRUCT. NO. _____
Station _____

BORING NO. ILR0701
Station _____
Offset _____
Ground Surface Elev. 629.30 ft

Surface Water Elev. _____ ft
Stream Bed Elev. _____ ft

Groundwater Elev.:
First Encounter 581.3 ft ▼
Upon Completion _____ ft
After _____ **Hrs.** _____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				7" Thick ACC followed by gravel subbase to 1.0'
628.70				
	2			Silty Sandy Clay with Gravel, greenish brown, moist, low plasticity, stiff, with subangular to subrounded gravel embedded throughout, fill/subbase
	2 10			
625.30	4			
-5	5 4 5 3			Sandy Clay Trace Gravel, dark gray, frozen, stiff, with subangular to subrounded fine to coarse gravel embedded throughout, fill
	5 6 6 2	3.0 to 4.0 P		
621.30				Silty Clay with Gravel, gray, moist, soft to medium stiff, high plasticity, trace gravel, possible fill
	2 3 3	2.0 P	15.5	
-10				
		1.5 P		
615.80	3			Sandy Lean Clay Trace Gravel, gray, moist, stiff, medium plasticity, fill or disturbed till
-15	2 3	2.0 P	16.0	
610.80	3			Same As Above, turning grayish brown at bottom 3", piece of wood embedded, possible fill
-20	4 7			

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				Same As Above, turning grayish brown at bottom 3", piece of wood embedded, possible fill *(continued)*
605.80	5			Sandy Lean Clay Trave Gravel, brown, moist, stiff, low plasticity, possible weathered till
-25	6 6	3.0 P		
600.80	6			Same as Above, gray, then brown, split in almost vertical with reddish brown surface, weathered till
-30	7 8	2.5 to 3.5 P	15.0	
595.80	4			Sandy Lean Clay Trace Gravel, gray, moist, stiff, low plasticity, unweathered till
-35	6 6	2.5 to 3.0 P		
	5			
-40	6 9	2.5 P		

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

Illinois Department of Transportation
Division of Highways
CH2M HILL

SOIL BORING LOG

Date 3/28/08

ROUTE I-74 **DESCRIPTION** I-74 SB Near 7th Avenue **LOGGED BY** B. Karnik

SECTION I-74 Bridge over Mississippi River **LOCATION** (N=562235.7741, E=2459668.0033), **SEC.** 32, **TWP.** 18N, **RNG.** 1W

COUNTY Rock Island **DRILLING METHOD** HSA, CME 55 **HAMMER TYPE** CME AUTOMATIC

STRUCT. NO. _____
Station _____

BORING NO. ILR0701
Station _____
Offset _____
Ground Surface Elev. 629.30 ft

Surface Water Elev. _____ ft
Stream Bed Elev. _____ ft

Groundwater Elev.:
First Encounter 581.3 ft ▼
Upon Completion _____ ft
After _____ **Hrs.** _____ ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Sandy Lean Clay Trace Gravel, gray, moist, stiff, low plasticity, unweathered till *(continued)*	-45			
	580.80 ▼			
Top 3" is same as above Bottom 12" is Poorly Graded Sand, gray, wet, medium dense, fine to medium sand seam followed by 3" of gray sandy lean clay, trace gravel, till	-50	12 16 12		
	579.30			
End of Boring	-55			
	-60			

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
	-65			
	-70			
	-75			
	-80			

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

Illinois Department of Transportation
Division of Highways
CH2M HILL

SOIL BORING LOG

Date 10/5/07

ROUTE I-74 **DESCRIPTION** New I-74 Bridge Over Mississippi River - Illinois Approach **LOGGED BY** F. Abreu

SECTION I-74 Bridge over Mississippi River **LOCATION** (N=561907.847, E=2459825.874), **SEC.** 32, **TWP.** 18N, **RNG.** 1W, 4th **PM**

COUNTY Rock Island **DRILLING METHOD** HSA, CME 55 **HAMMER TYPE** CME AUTOMATIC

STRUCT. NO. _____
Station _____

BORING NO. ILR0801
Station _____
Offset _____
Ground Surface Elev. 623.02 ft

Surface Water Elev. _____ ft
Stream Bed Elev. _____ ft

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

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				Grass Matter
				followed by silty clay with sands and topsoil
622.02				
	4			**Silty Clay With Sand(CL-ML)**
	4			dark brown with brown, dry to
	5			moist, non plastic, little to few
	5			coarse to fine sands, strong
620.02				cementation, occasional reddish
	3			brick fragments, possible fill
	3			**Lean Clay With Sand(CL)**
	3			medium brown, dry to moist, low
-5	3			plasticity, medium stiff, little to few
				coarse to fine sands, dark brown
				silty pocket at top of sample,
617.02				possible fill
	1			
	3	3.75-4.0		**Sandy Lean Clay(CL)**
	5	P		olive gray with medium brown and
	6			gray, dry to moist, medium stiff,
615.02				few coarse to fine sands, trace fine
	3			subangular to subrounded gravels,
	4	1.3		dark gray with occasional root
	5			matter at bottom of sample
-10	6			**Sandy Lean Clay With Gravel (CL)**
				medium brown with gray, dry,
				strongly cemented, stiff, crumbly,
	2			few coarse to fine sands, little to
	3	4.3		trace of medium to fine gravels,
	5	P		occasional medium to fine sand
	7			seams scattered throughout, dark
				gray with heavy _____ matter at
	3			top 2" of sample, possible old
	4	4.5		topsoil followed by native
	5	P		soil Rimac: Pu = 68 lbs
-15	6			same as above, medium brown,
				dry to moist, stiff, strongly
				cemented, glacial till
				same as above, medium brown to
				brown, stiff, strongly cemented,
				dry, glacial till
605.02				
	3			
	5	4.0-4.5		
	7	P		
-20	10			

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				Sandy Lean Clay(CL)
				medium brown with orange brown,
				dry, non plastic, stiff, few coarse to
				fine sands, frequent sand seams,
				approximately 1/8"-1/4" thick at
				center and bottom of sample, sand
				seams of medium to fine sands,
	3			oxidized, possible weathered till
	5	1.9		with scattered sand seams
	7	B		*(continued)*
-25	10			medium brown with gray, mottled
				with orange brown, dry, stiff, few
				coarse to fine sands, very
				oxidized, small pockets of dark
				gray to black coal like deposits in
				middle of sample, possible
				weathered glacial till
				Rimac: Pu = 100 lbs
	3			olive gray with light brown, dry to
	5	3.8		moist, slightly oxidized at top, stiff,
	6	P		possible unweathered glacial till
-30	9			
590.02				
	3			**Lean Clay With Sand(CL)**
	5	1.3		uniform gray, dry to moist, stiff,
	7			little to few coarse to fine sands,
-35	9			scattered sand pockets, possible
				unweathered glacial till Rimac: Pu
				= 70 lbs
	2			uniform gray, dry to moist, stiff,
	4			little to few coarse to fine sands,
	8			scattered sand pockets, possible
583.52				unweathered glacial till
583.02 -40	12			

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

Illinois Department of Transportation
Division of Highways
CH2M HILL

SOIL BORING LOG

Date 10/5/07

ROUTE I-74 **DESCRIPTION** New I-74 Bridge Over Mississippi River - Illinois Approach **LOGGED BY** F. Abreu

SECTION I-74 Bridge over Mississippi River **LOCATION** (N=561907.847, E=2459825.874), **SEC.** 32, **TWP.** 18N, **RNG.** 1W, 4th **PM**

COUNTY Rock Island **DRILLING METHOD** HSA, CME 55 **HAMMER TYPE** CME AUTOMATIC

STRUCT. NO. _____
Station _____

BORING NO. ILR0801
Station _____
Offset _____
Ground Surface Elev. 623.02 **ft**

Surface Water Elev. _____ **ft**
Stream Bed Elev. _____ **ft**

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

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	
				Clayey Sand With Silt(SC) gray, moist to wet, medium dense, clay with medium to fine sands, possible residual soil
				End of Boring
-45				
-50				
-55				
-60				

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

Illinois Department of Transportation
Division of Highways
CH2M HILL

SOIL BORING LOG

Date 10/9/07

ROUTE I-74 **DESCRIPTION** New I-74 Bridge Over Mississippi River - Illinois Approach **LOGGED BY** Yse, Kaustav/SCO

SECTION I-74 Bridge over Mississippi River **LOCATION** (N=561497.653, E=2459812.286), **SEC.** 32, **TWP.** 18N, **RNG.** 1W, 4th **PM**

COUNTY Rock Island **DRILLING METHOD** HSA, CME 55 **HAMMER TYPE** CME AUTOMATIC

STRUCT. NO. _____
Station _____

BORING NO. ILR0804
Station _____
Offset _____
Ground Surface Elev. 641.39 ft

Surface Water Elev. _____ ft
Stream Bed Elev. _____ ft

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

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				Clay (CL) gray, moist, very stiff to hard, trace sand and fine angular gravel
	1			
	2 5	4.1 S		
	2			
-5	7 9	2.5 P		
635.39				
	1			**Clay (CL)** gray to greenish gray, moist, trace fine to coarse grained sand, stiff to hard
	2 2			
-10				
	2			RIMAC: Pu = 31lbs (Bulging)
	2 4	1.9 B		
-15				
	2			RIMAC: Pu = 68lbs (bulging)
	4 6	4.1 B		
-20				
				Clay (CL) gray to greenish gray, moist, trace fine to coarse grained sand, stiff to hard *(continued)*
	3			
	4 9	3.0 P		
-25				
	3			
	6 8	4.5 P		
-30				
	4			shale in tip
	10 26	4.5 P		
606.39 -35				End of Boring
-40				

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

HANSON

SOIL BORING LOG

Date 6/22/10

ROUTE F.A.I. 74 **DESCRIPTION** I-74 Over Mississippi River **LOGGED BY** JMB

SECTION 81-1-2 **LOCATION** SE¼ of SEC. 32, TWP. 18N, RNG. 1W, 4th P.M.

COUNTY Rock Island **DRILLING METHOD** Hollow Stem Auger **HAMMER TYPE** Auto

STRUCT. NO. 081-6015
Station
BORING NO. RW 06-1
Station 61+02
Offset 7' Lt.
Ground Surface Elev. 611.3 ft

Surface Water Elev.
Stream Bed Elev.
Groundwater Elev.:
First Encounter 593.8 ft ▼
Upon Completion ft
After Hrs. ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Material Description
				CONCRETE 610.80
				FILL - Light gray, slightly moist, SILT
		2.50P	14	
2			14	
			17	608.30
				FILL - Very dark brown, moist, clayey SILT with trace gravel
		1.80P	13	
4				605.30
6	5 6 11	2.00P	15	FILL - Gray, moist, medium dense, silty, medium-grained SAND with trace gravel, wood, brick and rock fragments
8				
	11 23 50/4"		12	
10				600.30
			20	Dark brown, moist, stiff, sandy SILT with trace gravel
		1.65S	17	
12				
	11 4 4		16	
14				596.30
				Dark brown, moist, sandy, clayey SILT with trace gravel 595.30
16		0.50P	12	Dark brown, wet, dense, silty SAND with trace gravel
				▼
				593.30
18				Gray and brown, moist, medium stiff, silty CLAY with sand and trace gravel
	3 3 5	0.54B	18	
20				

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Material Description
				Gray and brown, moist, medium stiff, silty CLAY with sand and trace gravel *(continued from previous page)*
22				588.80
				Gray and brown, moist, very stiff, silty CLAY with sand and gravel
24	8 10 11	2.61B	14	586.30
				End of Boring

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

Illinois Department of Transportation
Division of Highways
CH2M HILL

SOIL BORING LOG

Date 12/13/05

ROUTE I-74 **DESCRIPTION** New I-74 Bridge Over Mississippi River - Illinois Approach **LOGGED BY** B. Karnik

SECTION I-74 Bridge over Mississippi River **LOCATION** (N=561446.84, E=2459814.4701), **SEC.** 32, **TWP.** 18N, **RNG.** 1W, 4th **PM**

COUNTY Rock Island **DRILLING METHOD** HSA, CME 55 **HAMMER TYPE** CME AUTOMATIC

STRUCT. NO. _____
Station _____

BORING NO. RW1007
Station _____
Offset _____
Ground Surface Elev. 649.91 ft

Surface Water Elev. _____ ft
Stream Bed Elev. _____ ft

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

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
	Fill Asphalt Concrete		
	2" thick asphalt overlying 1' thick reinforced concrete slab□Hole offset 5' north		
648.91			
	7		
	4		
	Fill Silty Clay (CL-ML)		
	Gray brown, moist, hard, trace to little gravel		
	5		
	6		
	4		
	4	4.0 P	
	4		
644.91 -5	5		
	Fill Sandy Lean Clay Trace Gravel (CL)		
	3		
	Reddish to grayish brown, moist, very stiff, trace fine to medium		
	4	3.75-2.0 P	
	5		
	6		
	4		
	4	2.5 P	
	4		
640.91	5		
	Fill Silty Clay (CL)		
	3		
-10	Gray brown, moist, stiff to very stiff, with fine to coarse gravel, and some wood pieces and brick pieces throughout, fill		
	4	1.5 P	
	6		
	7		
	3		
	4	2.0 P	
	5		
	7		
	5		
	5	2.0 P	
	6		
-15	6		
-20			

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
	Fill Silty Clay (CL)		
	5		
	Gray brown, moist, stiff to very stiff, with fine to coarse gravel, and some wood pieces and brick pieces throughout, fill *(continued)*		
	7	3.0 P	
	10		
	10		
-25			
	4		
	8	2.0 P	
	15		
	13		
-30			
	6		
	7	4.5 P	
	12		
	13		
-35			
	5		
	6	4.5 P	
	7		
	8		
-40			

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

Illinois Department of Transportation
Division of Highways
CH2M HILL

SOIL BORING LOG

Date 12/13/05

ROUTE I-74 **DESCRIPTION** New I-74 Bridge Over Mississippi River - Illinois Approach **LOGGED BY** B. Karnik

SECTION I-74 Bridge over Mississippi River **LOCATION** (N=561446.84, E=2459814.4701), **SEC.** 32, **TWP.** 18N, **RNG.** 1W, 4th **PM**

COUNTY Rock Island **DRILLING METHOD** HSA, CME 55 **HAMMER TYPE** CME AUTOMATIC

STRUCT. NO. _____
Station _____

BORING NO. RW1007
Station _____
Offset _____
Ground Surface Elev. 649.91 ft

Surface Water Elev. _____ ft
Stream Bed Elev. _____ ft

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

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
	5		
	6	3.0	
	6	P	
	6		
Fill Silty Clay (CL) Gray brown, moist, stiff to very stiff, with fine to coarse gravel, and some wood pieces and brick pieces throughout, fill *(continued)*			
605.91			
Sandy Lean Clay Trace Gravel (CL) Gray brown with gray vertical seams, moist, low to medium plasticity, very stiff, fossilized rootlets, trace fine to coarse, weathered till or gumbotil			
-45	5		
	7	3.0	
	11	P	
	13		
-50	4		
	6	2.5	
	8	P	
	10		
-55	5		
	6	2.5	
	10	P	
	13		
-60			

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Sandy Lean Clay Trace Gravel (CL) Gray brown with gray vertical seams, moist, low to medium plasticity, very stiff, fossilized rootlets, trace fine to coarse, weathered till or gumbotil *(continued)*			
-65	5		
	9	2.5	
	12	P	
	14		
-70			
574.91 -75	23		
Fine to Medium Sand With Silt (SP-SM) Gray, wet, very dense, estimated 5%-12% fines	29		
	33		
572.91	34		
Sandy Lean Clay (CL) Gray, moist, stiff, trace fine to coarse gravel, till			
-80			

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

Illinois Department of Transportation
Division of Highways
CH2M HILL

SOIL BORING LOG

Date 12/13/05

ROUTE I-74 **DESCRIPTION** New I-74 Bridge Over Mississippi River - Illinois Approach **LOGGED BY** B. Karnik

SECTION I-74 Bridge over Mississippi River **LOCATION** (N=561446.84, E=2459814.4701), **SEC.** 32, **TWP.** 18N, **RNG.** 1W, 4th **PM**

COUNTY Rock Island **DRILLING METHOD** HSA, CME 55 **HAMMER TYPE** CME AUTOMATIC

STRUCT. NO. _____
Station _____

BORING NO. RW1007
Station _____
Offset _____
Ground Surface Elev. 649.91 **ft**

Surface Water Elev. _____ **ft**
Stream Bed Elev. _____ **ft**

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

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				Sandy Lean Clay (CL) Gray, moist, stiff, trace fine to coarse gravel, till *(continued)*
-85	10			
	15	4.0		
	20	P		
	22			
-90				
559.81	50/0			No recovery, possibly boulder or rock Gravel/cobbles at 90' auger and spoon refusal
				End of Boring
-95				
-100				

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

Boring 19BR-105

Run	Depth (ft)	REC (%)	RQD (%)
1	35.3 – 40.7	46	8
2	40.7 – 42.9	81	0
3	42.9 – 45.8	43	0
4	45.8 – 50.8	77	35

Boring 19BR-106

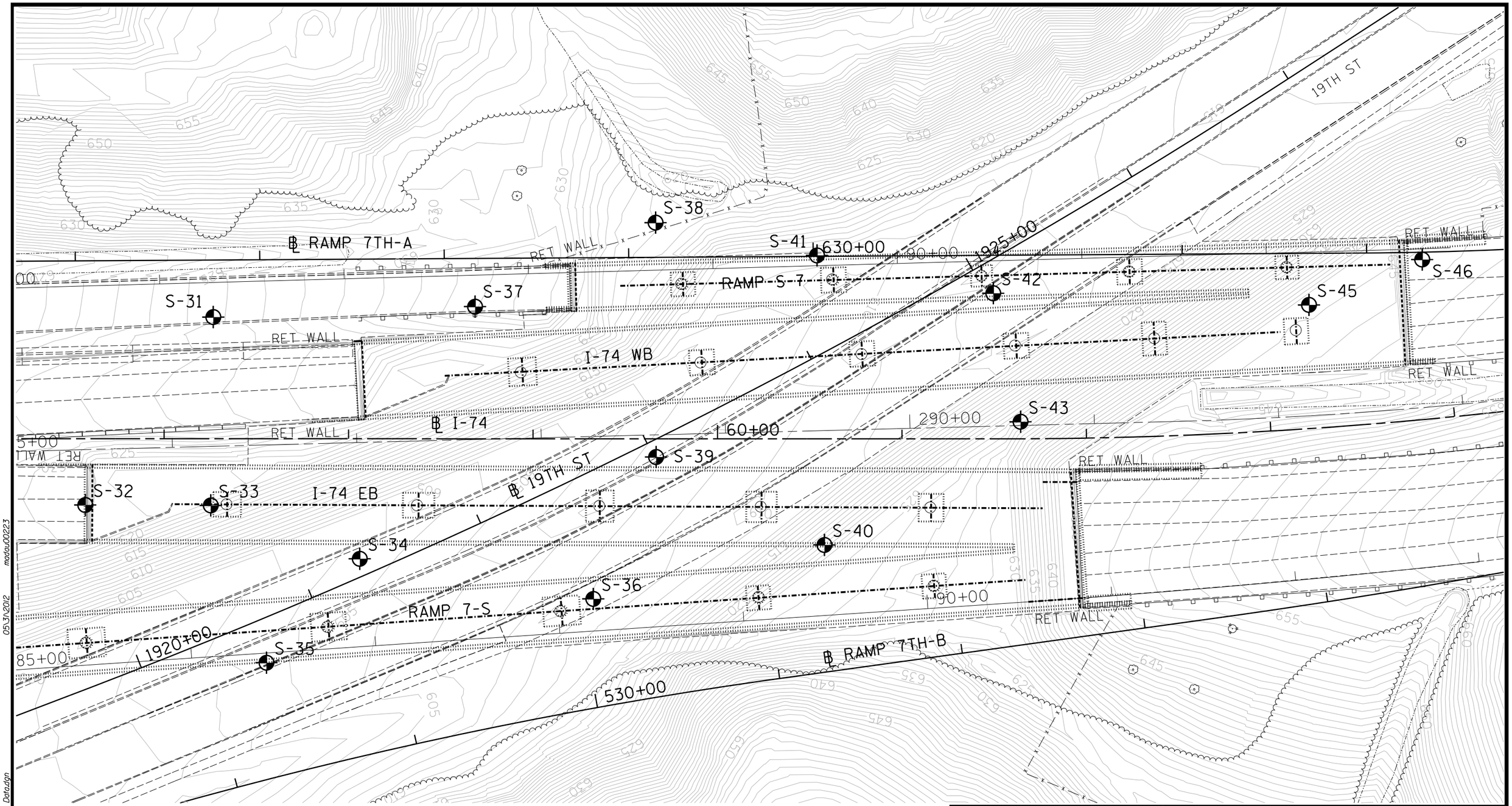
Run	Depth (ft)	REC (%)	RQD (%)
1	27.0 – 30.8	91	46
2	30.8 – 35.8	100	63
3	35.8 – 37.3	100	75

Boring 19BR-108

Run	Depth (ft)	REC (%)	RQD (%)
1	37.7 – 40.9	77	0
2	40.9 – 45.9	93	23
3	45.9 – 47.9	100	45

Boring 19BR-109

Run	Depth (ft)	REC (%)	RQD (%)
1	30.5 – 35.8	86	60
2	35.8 – 42.3	91	74



LEGEND

RW600 BORING LOCATION

0 50 100
SCALE IN FEET

HANSON

BORING LOCATION PLAN

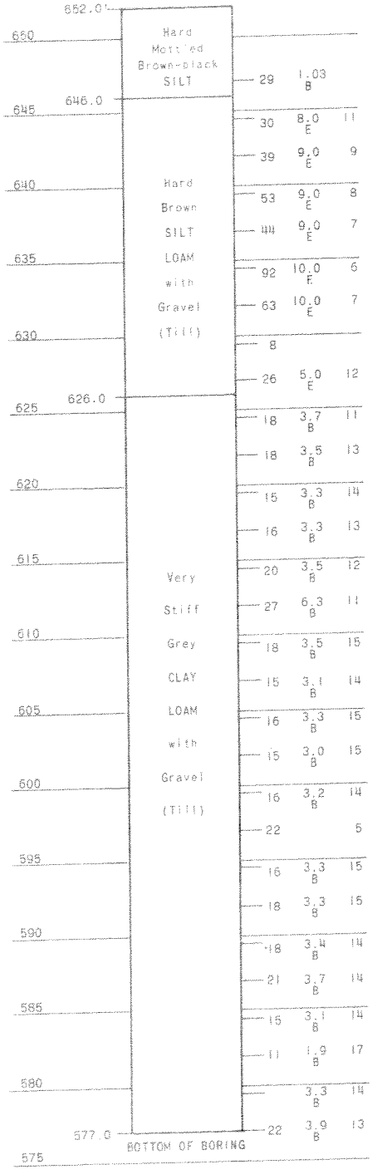
EXISTING I-74, RAMP 7-S, & RAMP S-7
OVER 19TH STREET
ROCK ISLAND COUNTY, ILLINOIS

08H0120E 5/30/12

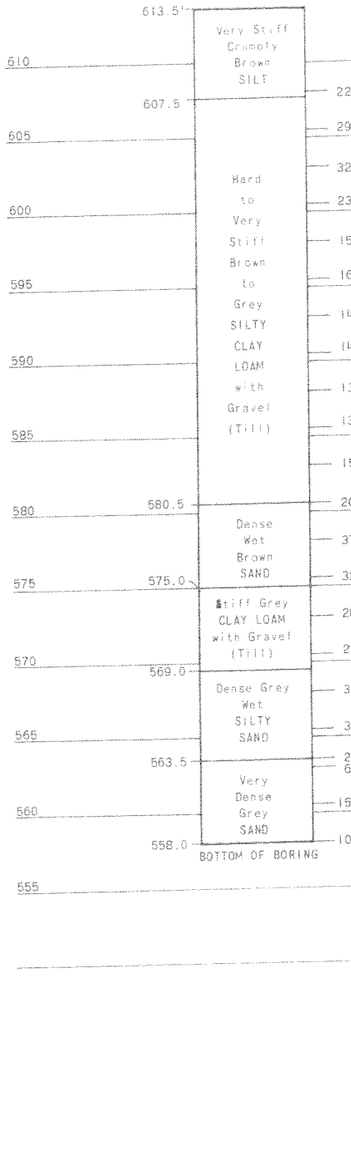
ROUTE NO.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
F.A.I. 74	81-1HB	ROCK ISLAND	389	252
FED. ROAD DIST. NO. 7	ILLINOIS	FED. AID PROJECT I-74		

DWG. NO. B-4

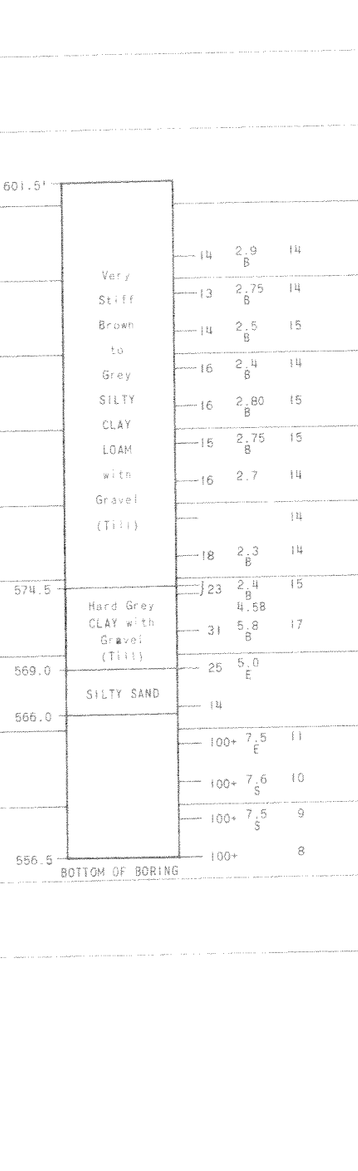
TEST BORING
NO. S-31
STATION 286+24 - 70' LT.



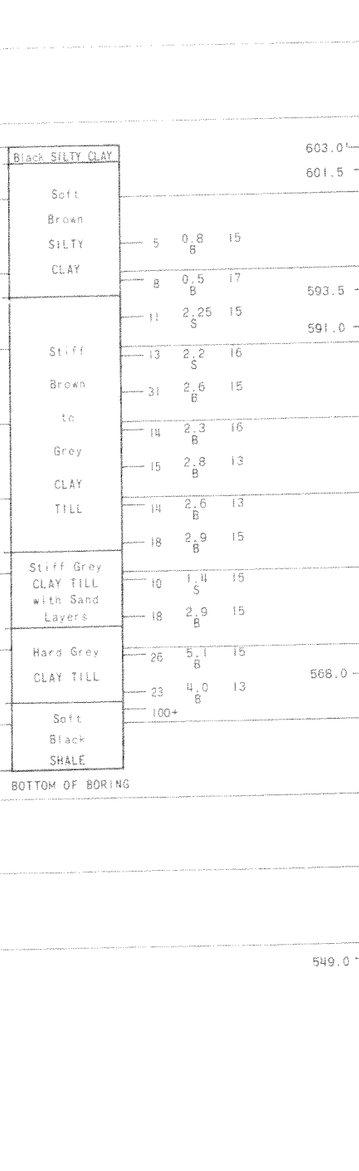
TEST BORING
NO. S-32
STATION 285+52 - 30' RT. ℄



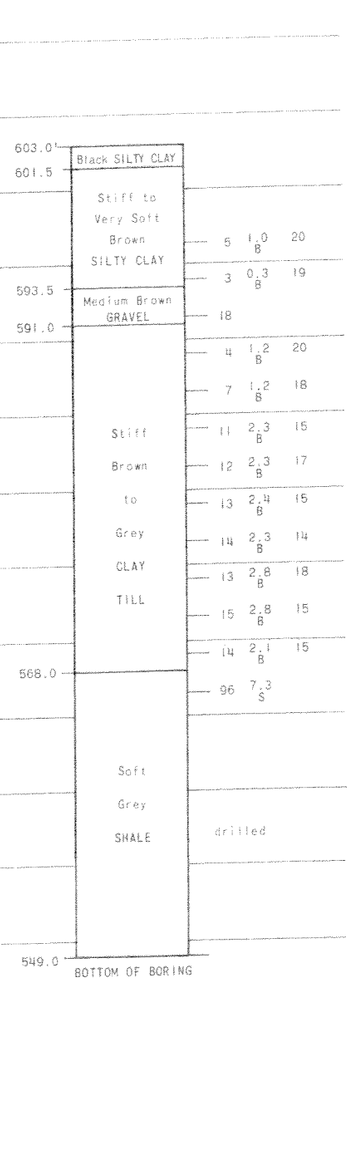
TEST BORING
NO. S-33
STATION 286+20 - 32' RT. ℄



TEST BORING
NO. S-34
STATION 287+00 - 63' RT. ℄



TEST BORING
NO. S-35
STATION 286+48 - 118' RT. ℄



DE LEUW, CATHER & COMPANY ENGINEERS
DESIGNED BY M. VADKERTY
DRAWN BY H. DE PERCZEL
CHECKED G. C. WAY
IN CHARGE E. S. MARTINS
APPROVED W.G. HORN

TEST BORINGS

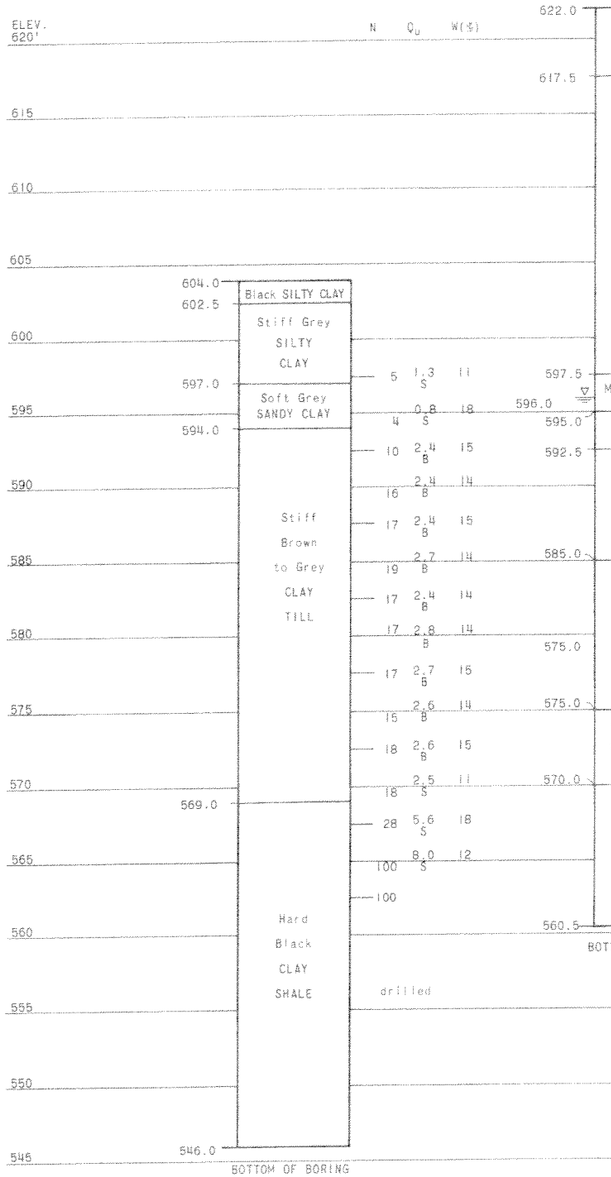
F.A.I. 74 - SECTION 81-1HB
F.A.I. 74 & RAMPS OVER RELOC. 19TH ST.
ROCK ISLAND COUNTY
STATION 289+23.09

SCALE: AS NOTED DATE:

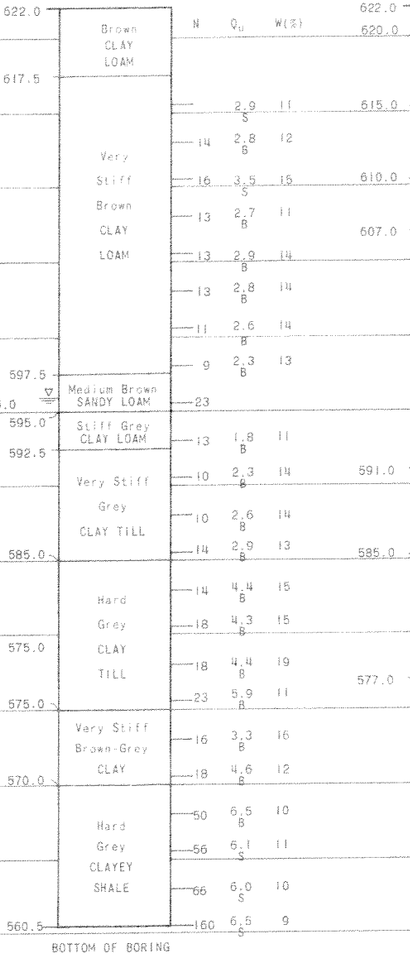
ROUTE NO.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
F.A.I. 74	81-1HB	ROCK ISLAND	389	253
FED. ROAD DIST. NO. 7	ILLINOIS	FED. AID PROJECT I-74		

DWG. NO. B-5

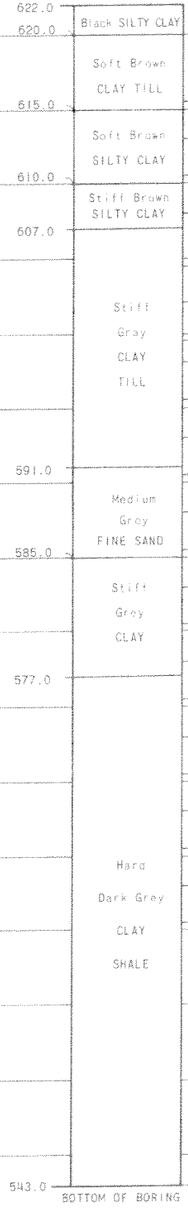
TEST BORING
NO. S-36
STATION 288+26 - 88' RT. ℄



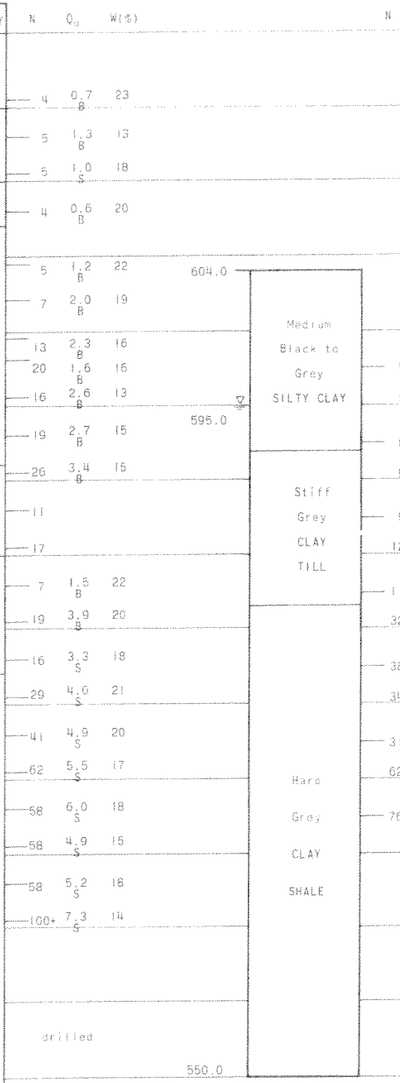
TEST BORING
NO. S-37
STATION 287+66 - 72' LT.



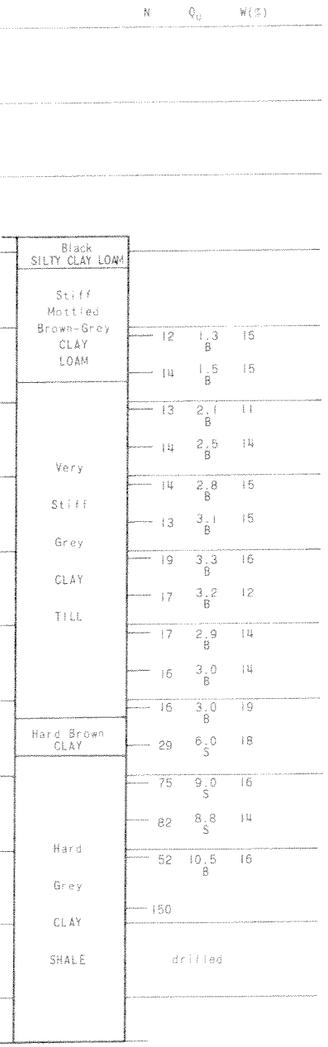
TEST BORING
NO. S-38
STATION 288+65 - 115' LT.



TEST BORING
NO. S-39
STATION 288+62 - 12' RT. ℄



TEST BORING
NO. S-40
STATION 289+52 - 62' RT.



DE LEUW, CATHER & COMPANY ENGINEERS
DESIGNED BY M. VADKERTY
DRAWN BY H. DE PERCZEL
CHECKED G. C. WAY
IN CHARGE E. S. MARTINS
APPROVED W.G. HORN

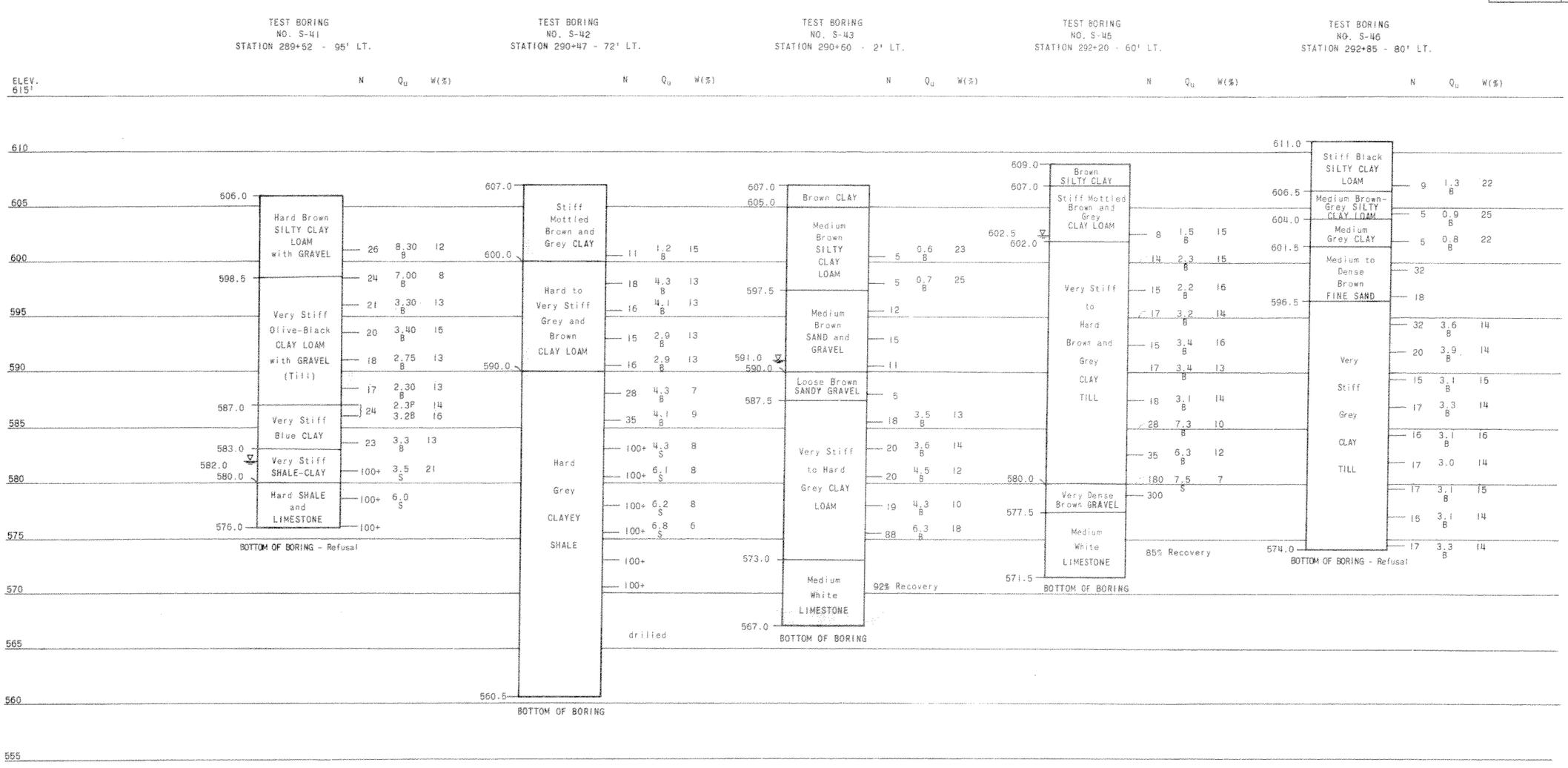
TEST BORINGS

F.A.I. 74 - SECTION 81-1HB
F.A.I. 74 & RAMPS OVER RELOC. 19TH ST.
ROCK ISLAND COUNTY
STATION 289+23.09

SCALE: AS NOTED DATE:

ROUTE NO.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
F.A.I. 74	81-1HB	ROCK ISLAND	389	254
FED. ROAD DIST. NO. 7	ILLINOIS	FED. AID PROJECT I-74		

DWG. NO. B-6



DE LEUW, CATHER & COMPANY ENGINEERS
DESIGNED BY M. VADKERTY
DRAWN BY H. DE PERCZEL
CHECKED G. C. WAY
IN CHARGE E. S. MARTINS
APPROVED W. G. HORN

TEST BORINGS

F. A. I. 74 - SECTION 81-1HB

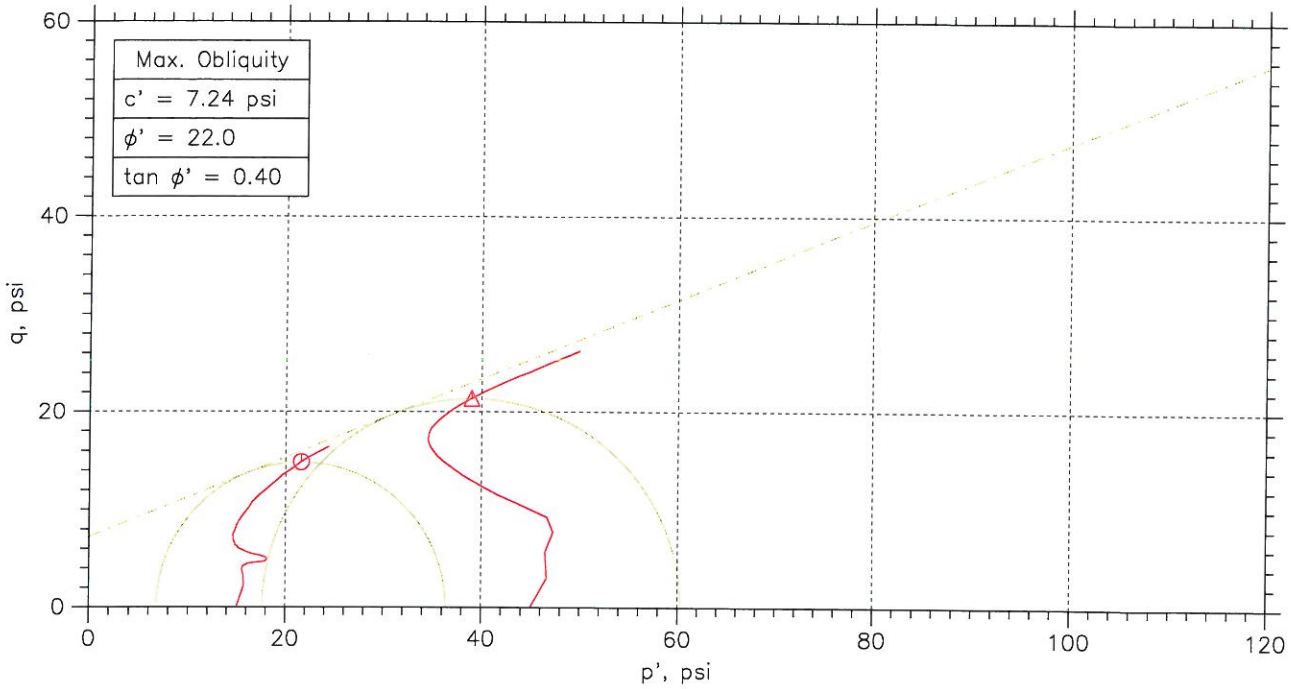
F.A.I. 74 & RAMPS OVER RELOC. 19TH ST.

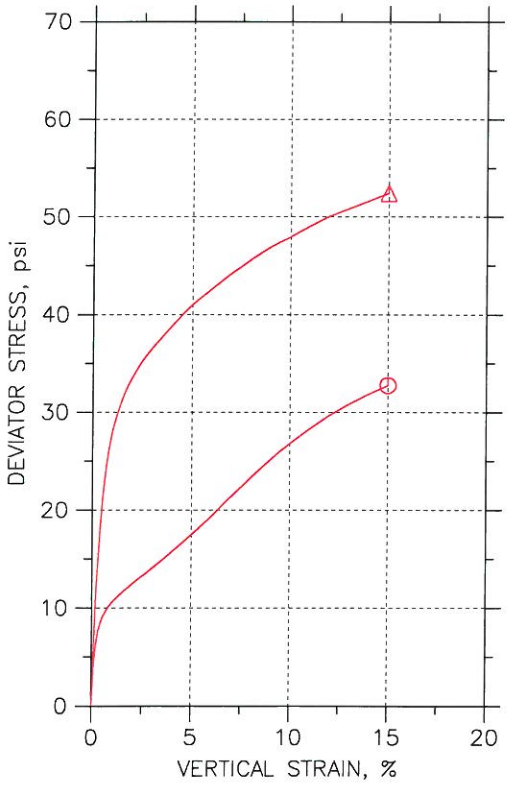
ROCK ISLAND COUNTY

STATION 289+23.09

SCALE: AS NOTED DATE:

CONSOLIDATED UNDRAINED TRIAXIAL TEST





Symbol		⊙	△		
Sample No.		1-1	1-2		
Test No.		1	1		
Depth		1.0-1.5	1.5-2.0		
Initial	Diameter, in	2.862	2.868		
	Height, in	5.505	5.906		
	Water Content, %	14.2	13.9		
	Dry Density, pcf	114.7	117.1		
	Saturation, %	85.1	89.1		
	Void Ratio	0.442	0.413		
Before Shear	Water Content, %	14.4	13.1		
	Dry Density, pcf	119.8	122.8		
	Saturation*, %	100.0	100.0		
	Void Ratio	0.381	0.348		
	Back Press., psi	42.01	41.99		
Ver. Eff. Cons. Stress, psi		14.99	45.01		
Shear Strength, psi		16.35	26.19		
Strain at Failure, %		15	15		
Strain Rate, %/min		1.5	0.0625		
B-Value		0.95	0.95		
Estimated Specific Gravity		2.65	2.65		
Liquid Limit		0	0		
Plastic Limit		0	0		

HANSON

Project: I-74 Mississippi River Br

Location: Quad Cities

Project No.: 08H0120E

Boring No.: RW06-1

Sample Type: Tube

Description: Dk. brn. & brn. f. sandy clayey silt (tr. c. sand & sm. gravel).

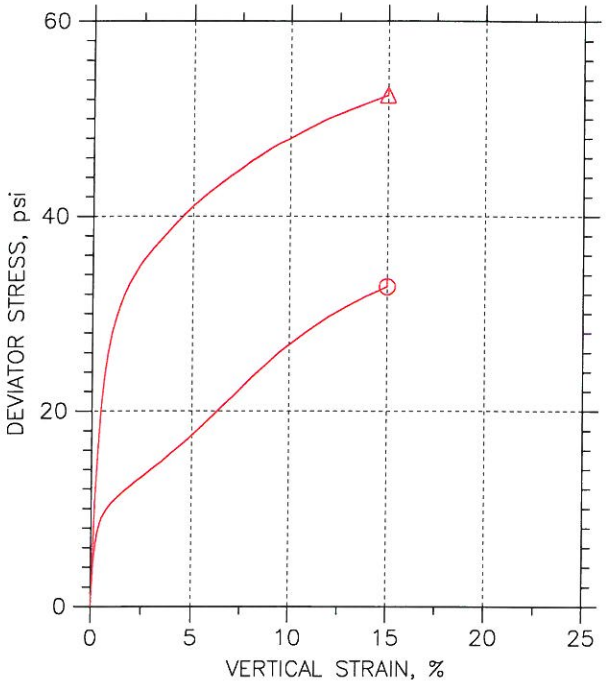
Remarks: 2500 # Load Cell Loadtrac II # 258112 FlowTrac II 13610 & 13610B & LVDT55306

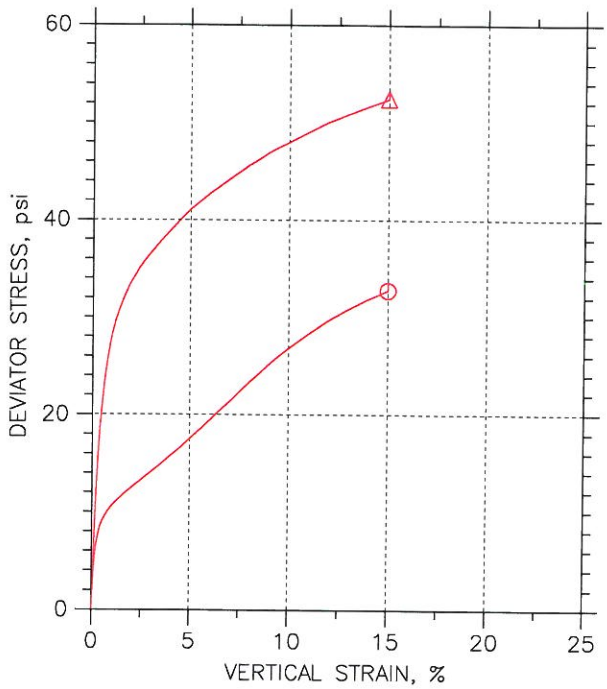
Phase calculations based on start of test.

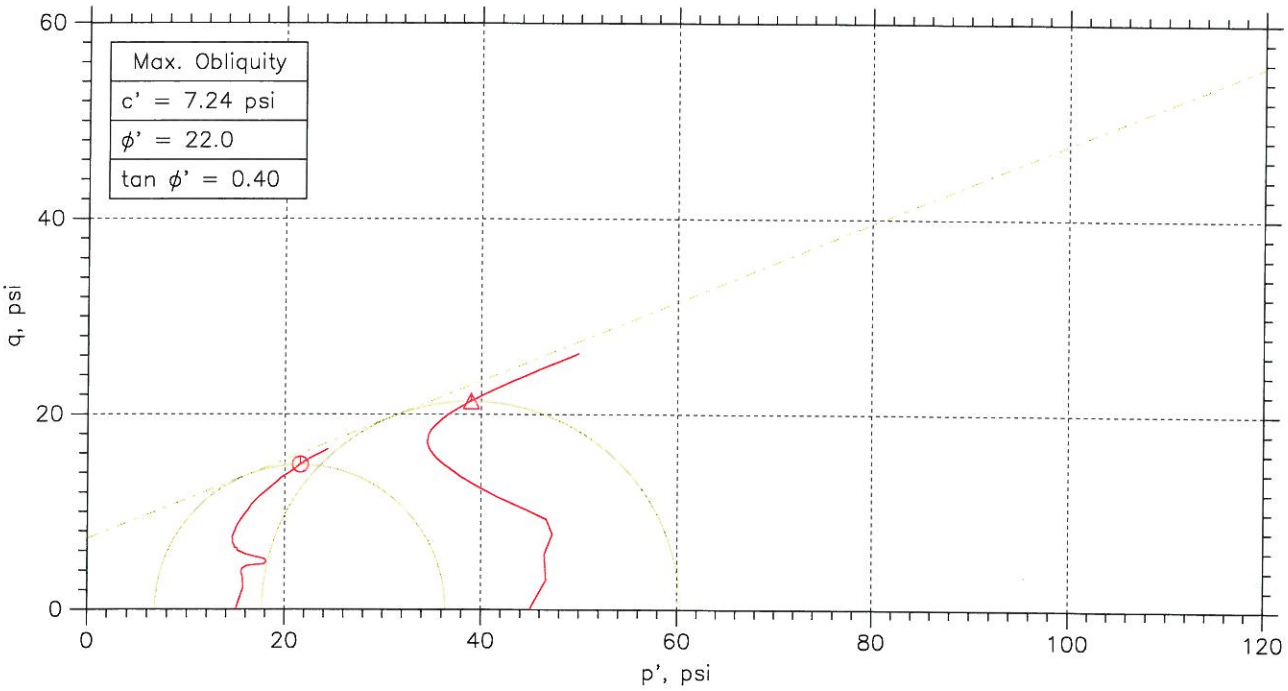
Wed, 15-SEP-2010 11:05:03

* Saturation is set to 100% for phase calculations.

CONSOLIDATED UNDRAINED TRIAXIAL TEST







	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
⏲	1-1	1	1.0-1.5	RIN	8/18/10	JCC		RW06-1-1-1CU.dat
△	1-2	1	1.5-2.0	RIN	8/18/10	JCC		RW06-1-1-2CU.dat

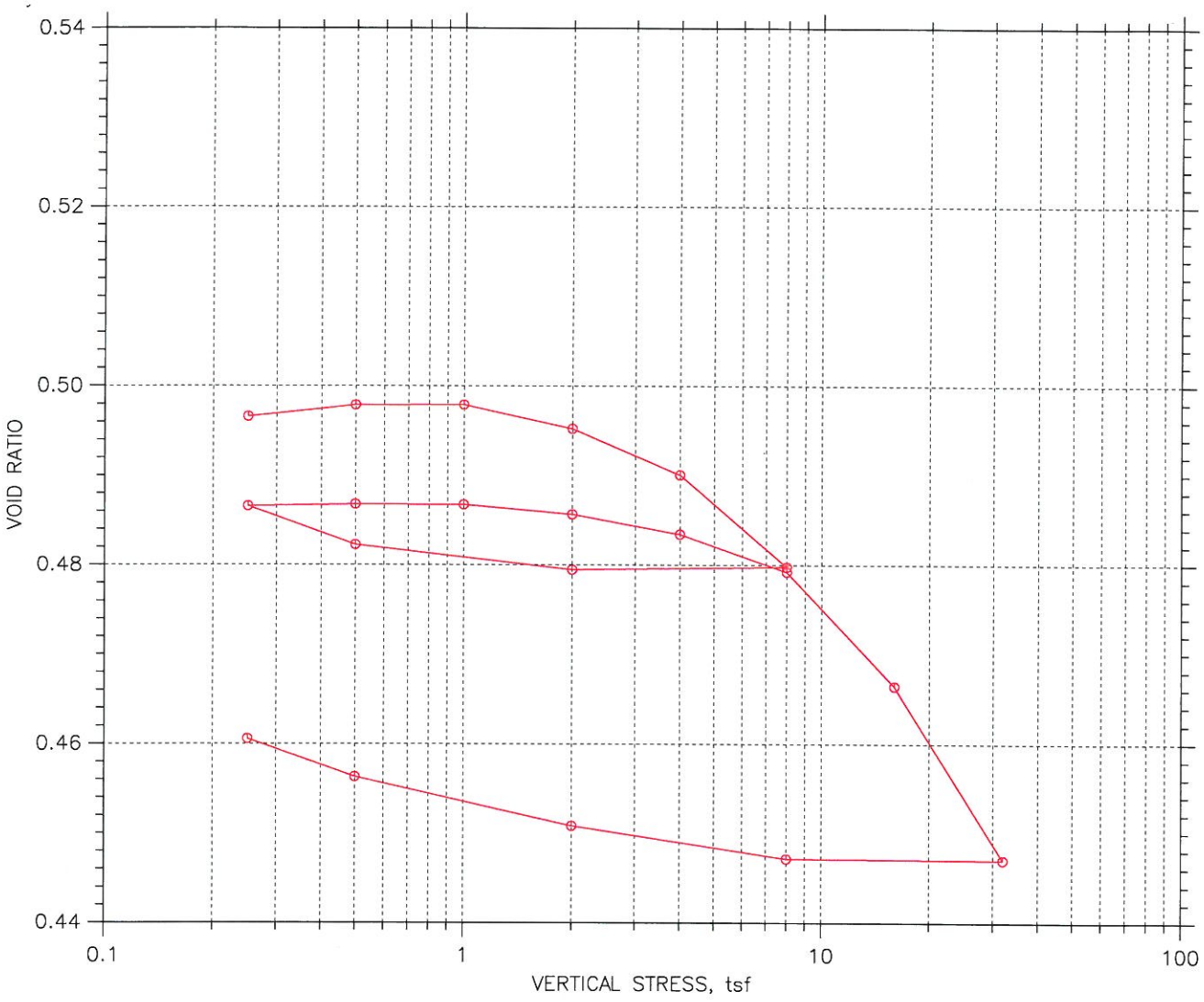
HANSON

Project: I-74 Mississippi River Br	Location: Quad Cities	Project No.: 08H0120E
Boring No.: RW06-1	Sample Type: Tube	
Description: Dk. brn. & brn. f. sandy clayey silt (tr. c. sand & sm. gravel).		
Remarks: 2500 # Load Cell Loadtrac II # 258112 FlowTrac II 13610 & 13610B & LVDT55306		

Wed, 15-SEP-2010 11:05:04

CONSOLIDATION TEST DATA

SUMMARY REPORT



				Before Test	After Test
Overburden Pressure: 0 tsf				Water Content, %	18.64	18.12
Preconsolidation Pressure: 0 tsf				Dry Unit Weight, pcf	110.8	113.3
Compression Index: 2.54639e-313				Saturation, %	100.22	104.25
Diameter: 2.5 in		Height: 0.994 in		Void Ratio	0.49	0.46
LL: 0	PL: 0	PI: 0	GS: 2.65			

HANSON	Project: I74	Location: Quad Cities	Project No.: 08H0120E
	Boring No.: RW06-1	Tested By: Rin	Checked By: JCC
	Sample No.: 1-3	Test Date: 8/19/10	Depth: 2.2-2.5
	Test No.: 1	Sample Type: Tube	Elevation:
	Description: Brn. gray vf. sandy clayey silt.		
	Remarks:		

Mon, 13-SEP-2010 14:27:35

CONSOLIDATION TEST DATA

Project: I74
Boring No.: RW06-1
Sample No.: 1-3
Test No.: 1

Location: Quad Cities
Tested By: Rin
Test Date: 8/19/10
Sample Type: Tube

Project No.: 08H0120E
Checked By: JCC
Depth: 2.2-2.5
Elevation:

Soil Description: Brn. gray vf. sandy clayey silt.
Remarks:

	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	T50 Fitting Sq.Rt. min	T50 Fitting Log min	Coefficient of Consolidation Sq.Rt. in^2/sec	Coefficient of Consolidation Log in^2/sec	Coefficient of Consolidation Ave. in^2/sec
1	0.25	-0.002363	0.497	-0.24	0.0	0.0	0.00e+000	0.00e+000	0.00e+000
2	0.5	-0.003214	0.498	-0.32	0.3	0.0	3.25e-003	0.00e+000	3.25e-003
3	1	-0.003234	0.498	-0.33	1.1	0.1	7.66e-004	7.35e-003	1.39e-003
4	2	-0.00146	0.495	-0.15	1.7	0.0	4.80e-004	0.00e+000	4.80e-004
5	4	0.001976	0.490	0.20	0.5	0.0	1.79e-003	0.00e+000	1.79e-003
6	8	0.008816	0.480	0.89	1.8	0.0	4.41e-004	0.00e+000	4.41e-004
7	2	0.009023	0.479	0.91	0.4	0.0	1.83e-003	0.00e+000	1.83e-003
8	0.5	0.007177	0.482	0.72	7.0	0.0	1.14e-004	0.00e+000	1.14e-004
9	0.25	0.004305	0.487	0.43	27.1	45.8	2.96e-005	1.75e-005	2.20e-005
10	0.5	0.004166	0.487	0.42	3.7	0.2	2.19e-004	4.95e-003	4.19e-004
11	1	0.004197	0.487	0.42	11.9	0.0	6.76e-005	0.00e+000	6.76e-005
12	2	0.004912	0.486	0.49	7.4	0.0	1.09e-004	0.00e+000	1.09e-004
13	4	0.006386	0.483	0.64	0.9	0.0	9.16e-004	0.00e+000	9.16e-004
14	8	0.009183	0.479	0.92	0.9	0.3	8.55e-004	2.64e-003	1.29e-003
15	16	0.0177	0.466	1.78	3.5	0.0	2.24e-004	0.00e+000	2.24e-004
16	32	0.03063	0.447	3.08	3.8	0.0	2.02e-004	0.00e+000	2.02e-004
17	8	0.03055	0.447	3.07	0.1	0.0	9.80e-003	2.09e+001	1.96e-002
18	2	0.02811	0.451	2.83	3.5	0.0	2.18e-004	0.00e+000	2.18e-004
19	0.5	0.02447	0.456	2.46	14.9	22.6	5.17e-005	3.41e-005	4.11e-005
20	0.25	0.02163	0.461	2.18	0.0	0.0	0.00e+000	0.00e+000	0.00e+000

ROUTE NO.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
F.A.I. 74	81-1HB	ROCK ISLAND	389	213
FED. ROAD DIST. NO. 7	ILLINOIS	FED. AID PROJECT 1-74		

DWG. NO. S-173

HORIZONTAL CURVE DATA

ITEM	CURVE 1	CURVE 2	CURVE 3	CURVE 4	CURVE 5
Δ	0°-49'-25"	19°-12'-00"	1°-44'-56"	2°-27'-13"	10°-34'-11"
D	2°-30'-00"	2°-30'-00"	2°-27'-56"	1°-00'-00"	4°-00'-00"
R	2291.83'	2291.83'	2323.83'	5729.58'	1432.39'
T	16.47'	387.63'	35.47'	122.70'	133.55'
L	32.94'	768.00'	70.94'	245.37'	266.33'
L.C.	32.94'	764.41'	70.94'	245.35'	265.94'
P.C. STA.	92+67.06	291+41.68	8+29.05	90+54.63	47+62.50
P.I. STA.	92+83.53	295+29.31	8+64.53	91+77.33	48+96.04
P.T. STA.	93+00.00	299+09.68	8+99.99	93+00.00	50+28.82

NOTES:

ALL DIMENSIONS SHOWN ARE BETWEEN POINTS ON A HORIZONTAL PLANE AT A TEMPERATURE OF 50° F.

-INDICATES FLOOR DRAIN.

-INDICATES LOCATION OF BORING HOLES.

-INDICATES LIGHT STANDARD (BY OTHERS)

BENCH MARKS

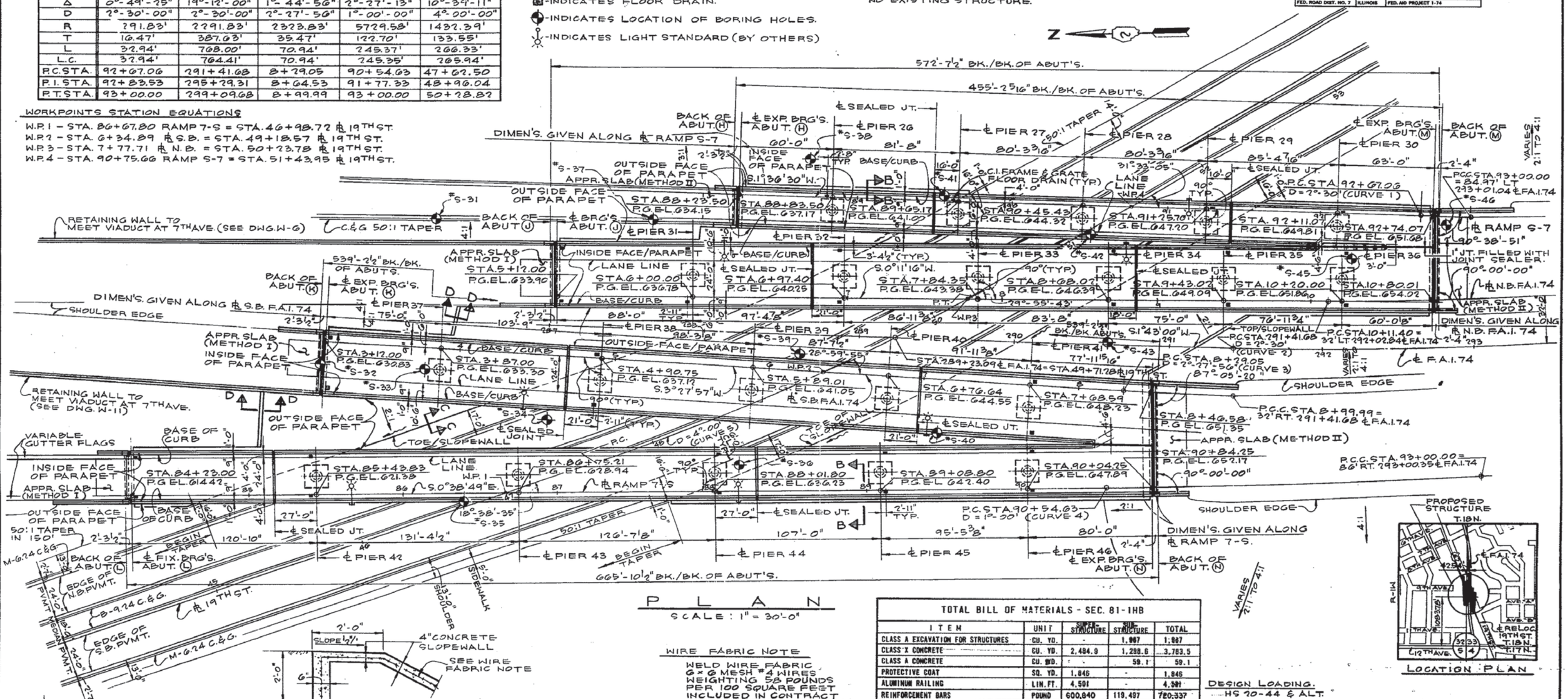
A-4B - CONC. MONUMENT 77' RT. ℄ F.A.I. 74 EL. 600.660

A-4C - CONC. MONUMENT 110' LT. ℄ F.A.I. 74 EL. 605.080

NO EXISTING STRUCTURE.

WORKPOINTS STATION EQUATIONS

W.P. 1 - STA. 86+67.80 RAMP 7-S = STA. 46+98.72 ℄ 19TH ST.
W.P. 2 - STA. 6+34.89 ℄ S.B. = STA. 49+18.57 ℄ 19TH ST.
W.P. 3 - STA. 7+77.71 ℄ N.B. = STA. 50+23.78 ℄ 19TH ST.
W.P. 4 - STA. 90+75.66 RAMP S-7 = STA. 51+43.95 ℄ 19TH ST.



PLAN

SCALE: 1" = 30'-0"

WIRE FABRIC NOTE

WELD WIRE FABRIC 6 × 6 MESH # 4 WIRES WEIGHTING 58 POUNDS PER 100 SQUARE FEET INCLUDED IN CONTRACT UNIT PRICE FOR SLOPEWALL

SLOPEWALL LAYOUT AND QUANTITIES ARE INCLUDED IN HIGHWAY PLANS FOR SECTION 81-1-2.

* APPROACH SLAB PILES NOT INCLUDED. SEE APPROACH SLAB DRAWINGS.

CALCULATED PLAN WEIGHT OF STRUCTURAL STEEL--3,258,390 LBS.

SPECIAL NOTE:

ALL PROFILE GRADE ELEVATIONS AND VERTICAL CURVE DATA GIVEN THROUGHOUT THE STRUCTURAL PLANS REFER TO TOP OF CONCRETE AND DO NOT INCLUDE THE 1½" BITUMINOUS CONCRETE SURFACE COURSE.

SECTION D-D

SCALE: ¾" = 1'-0"

SLOPEWALL SECTION AT ABUTMENTS

SCALE: ¾" = 1'-0"

SECTION B-B

SCALE: ¾" = 1'-0"

SECTION C-C

SCALE: ¾" = 1'-0"

TOTAL BILL OF MATERIALS - SEC. 81-1HB

ITEM	UNIT	SUPER-STRUCTURE	SUB-STRUCTURE	TOTAL
CLASS A EXCAVATION FOR STRUCTURES	CU. YD.	-	1,987	1,987
CLASS X CONCRETE	CU. YD.	2,484.9	1,298.6	3,783.5
CLASS A CONCRETE	CU. YD.	-	59.1	59.1
PROTECTIVE COAT	SQ. YD.	1,846	-	1,846
ALUMINUM RAILING	LIN. FT.	4,501	-	4,501
REINFORCEMENT BARS	POUND	600,840	119,497	720,337
BITUMINOUS CONCRETE SURFACE COURSE, CLASS I	TON	691	-	691
COAL TAR INTERLAYER PROTECTIVE COAT	SQ. YD.	8,190	-	8,190
FURNISHING CREOSOTED PILES UP TO 20 FEET*	LIN. FT.	-	620	620
FURNISHING CREOSOTED PILES 20.1 TO 30 FEET*	LIN. FT.	-	450	450
FURNISH AND ERECT STRUCTURAL STEEL	LUMP SUM	1	-	1
FURNISHING STEEL PILES (10BP42)	LIN. FT.	-	17,025	17,025
DRIVING TIMBER PILES*	LIN. FT.	-	1,070	1,070
DRIVING STEEL PILES	LIN. FT.	-	17,025	17,025
TEST PILE (TIMBER)	EACH	-	3	3
BRIDGE DRAINAGE SYSTEM, 19TH STREET	LUMP SUM	1	-	1
TEST PILE STEEL (10BP42)	EACH	-	28	28
NAME PLATES	EACH	3	-	3
STUD SHEAR CONNECTORS, 4"	EACH	15,183	-	15,183
PREFORMED JOINT SEALER 2½"	LIN. FT.	251	-	251
MODULAR PREFORMED EXPANSION JOINT, 3"	LIN. FT.	85	-	85
MODULAR PREFORMED EXPANSION JOINT, 2"	LIN. FT.	217	-	217
IMPACT ATTENUATION DEVICE, 8 BAY, NARROW WIDTH	EACH	1	-	1

LOCATION PLAN

DESIGN LOADING:

HS 20-44 & ALT.

DESIGN STRESSES:

f'c = 1200 P.S.I. SUPERSTRUCTURE. DECK SLABS.
f'c = 1400 P.S.I. CURBS, PARAPETS AND SUBSTRUCTURE.
f'c = 1000 P.S.I. RETAINING WALLS.
fs = 20,000 P.S.I. REINF. BARS & STRUCT. STEEL (A-36).
v = 75 P.S.I. MAX. ALLOW. SHEAR IN FOOTINGS.
n = 10
ALLOWABLE L.L. DEFLECTION - $\frac{L}{1000}$ (NON-COMPOSITE), $\frac{L}{1200}$ (COMPOSITE)

GENERAL PLAN

F.A.I. 74 - SECTION 81-1HB

F.A.I. 74 & RAMPS OVER RELOC. 19TH ST.

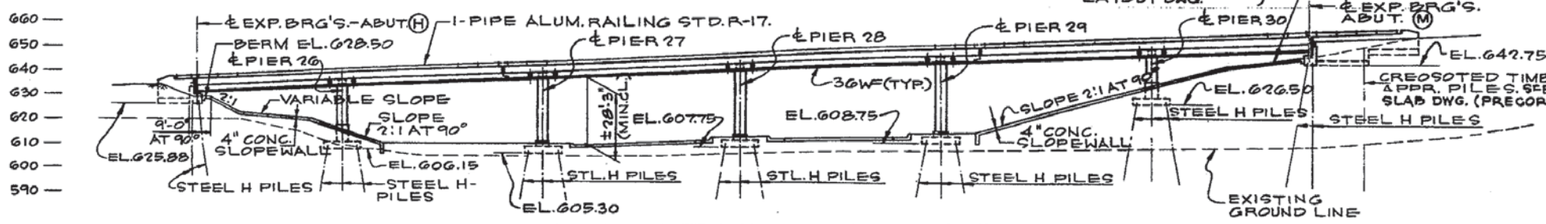
ROCK ISLAND COUNTY

STATION 289+23.09

SCALE: AS NOTED DATE:

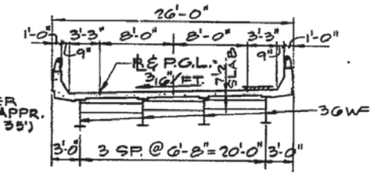
DESIGNED BY J. BARRAZA
DRAWN BY G. P. ALLEMAN
CHECKED E. S. MARTINS
IN CHARGE E. S. MARTINS
APPROVED W.G. HORN

DE LEUW, CATHER & COMPANY ENGINEERS



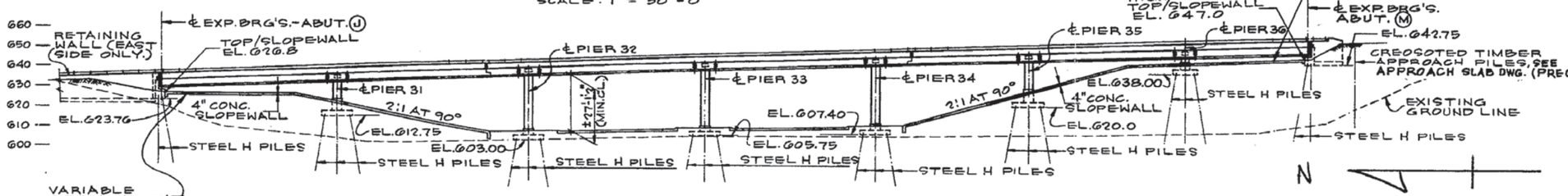
ELEVATION - RAMP S-7

SCALE: 1" = 30'-0"



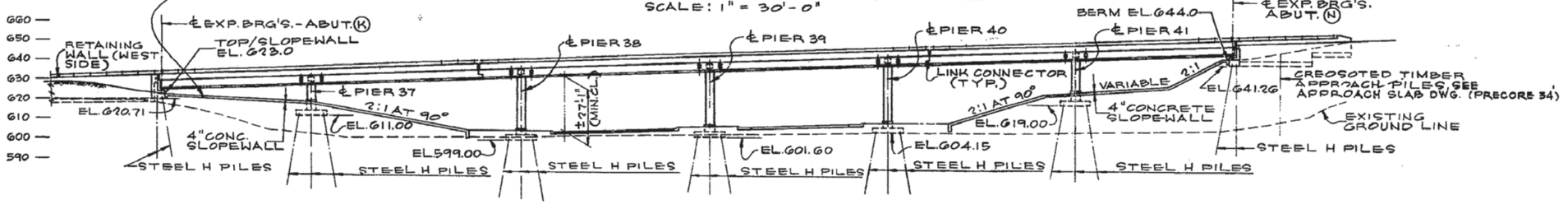
RAMP S-7 - TYP. SECTION

(S.E. TRANSITION BEGINS AT STA. 91+00)



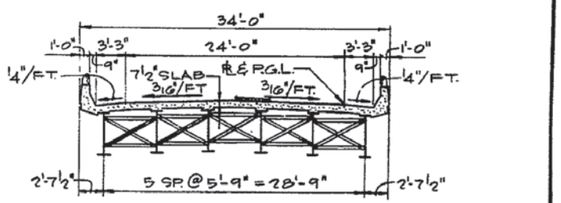
ELEVATION - N.B. F.A.I. 74

SCALE: 1" = 30'-0"

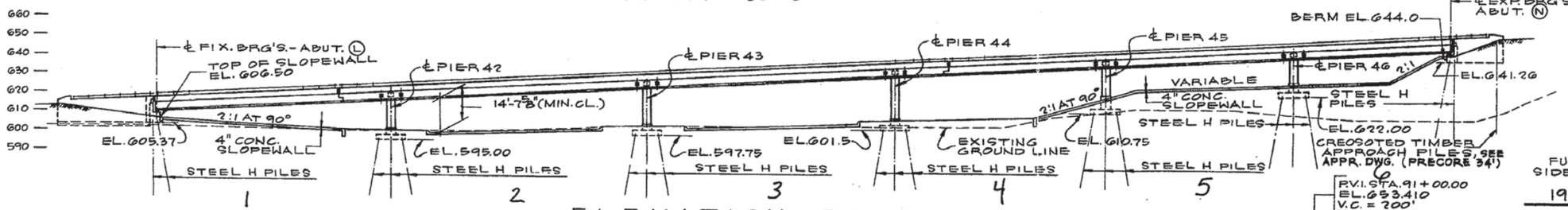


ELEVATION - S.B. F.A.I. 74

SCALE: 1" = 30'-0"

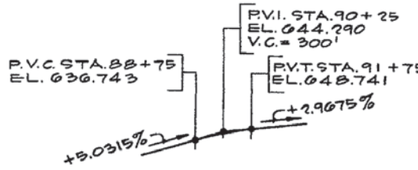


RAMP 7-S - TYP. SECTION

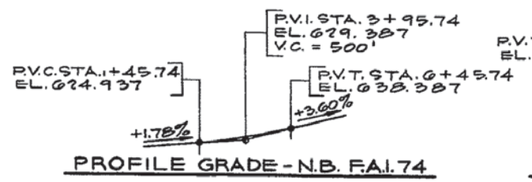


ELEVATION - RAMP 7-S

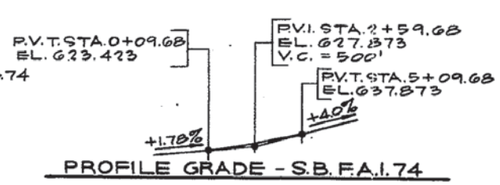
SCALE: 1" = 30'-0"



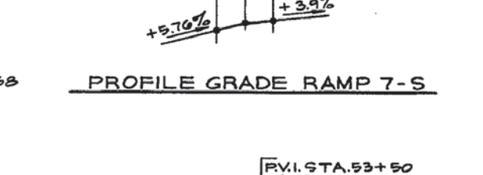
PROFILE GRADE - RAMP S-7



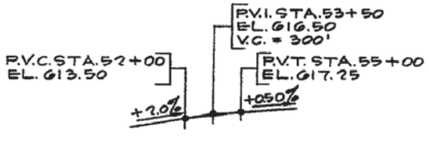
PROFILE GRADE - N.B. F.A.I. 74



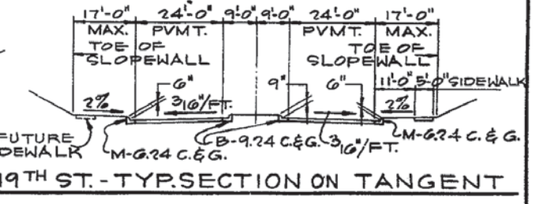
PROFILE GRADE - S.B. F.A.I. 74



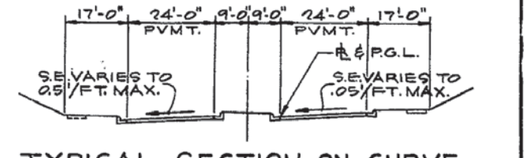
PROFILE GRADE RAMP 7-S



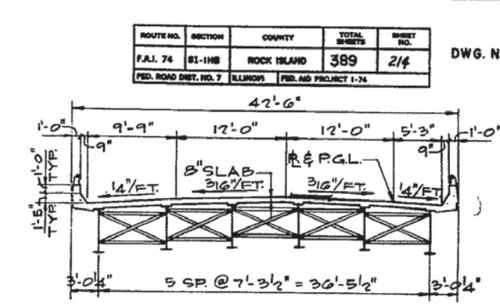
PROFILE GRADE - 19TH ST.



19TH ST. - TYP. SECTION ON TANGENT

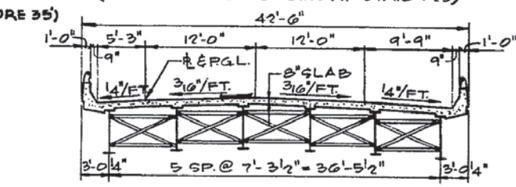


TYPICAL SECTION ON CURVE



N.B. F.A.I. 74 - TYP. SECTION

(S.E. TRANSITION BEGINS AT STA. 8+75)



S.B. F.A.I 74 - TYP. SECTION

(S.E. TRANSITION BEGINS AT STA. 7+00)

ROUTE NO.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
F.A.I. 74	81-1HB	ROCK ISLAND	389	2/4
FED. ROAD DIST. NO. 7	ILLINOIS	FED. AID PROJECT 1-74		

DWG. NO. S-174

DE LEUW, CATHER & COMPANY ENGINEERS
DESIGNED BY J. BARRAZA
DRAWN BY G. P. ALLEMAN
CHECKED E. S. MARTINS
IN CHARGE E. S. MARTINS
APPROVED W. G. HORN

ELEVATIONS & SECTIONS

F.A.I. 74 - SECTION 81-1HB
F.A.I. 74 & RAMPS OVER RELOC. 19TH ST.

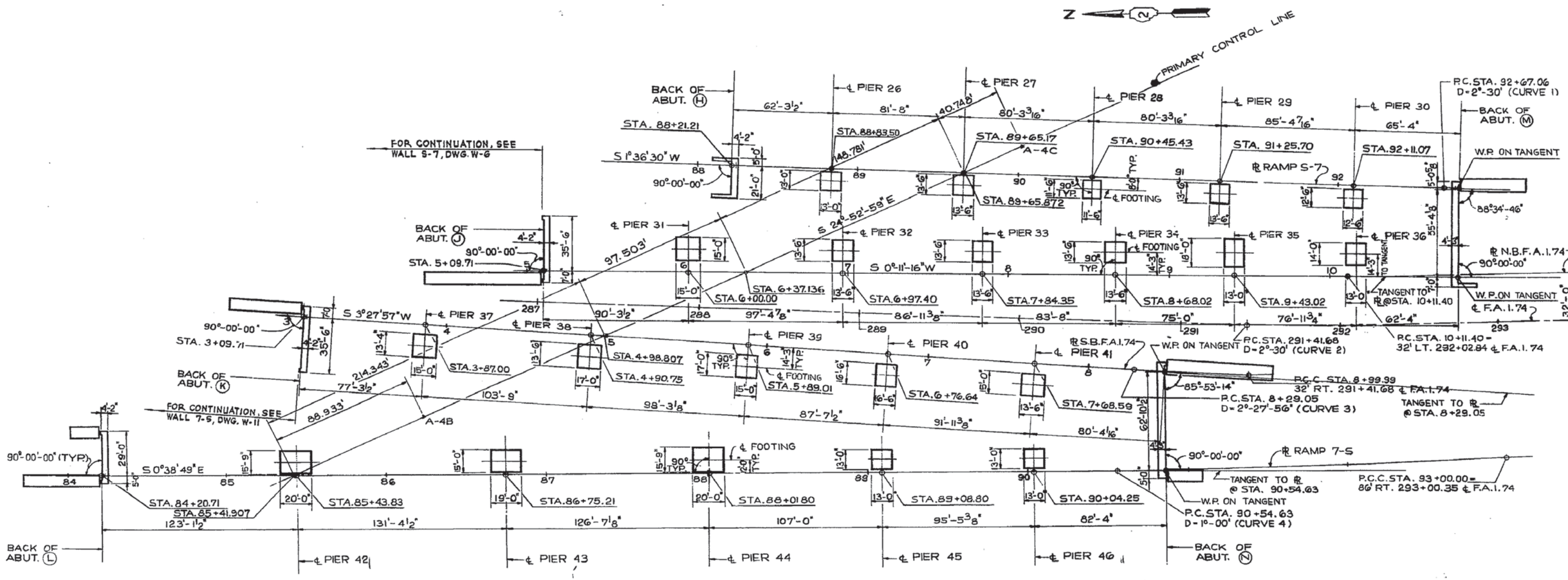
ROCK ISLAND COUNTY

STATION 289+23.09

SCALE: AS NOTED DATE:

DWG. NO. S-175

ROUTE NO.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
F.A.I. 74	81-1HB	ROCK ISLAND	389	215
FED. ROAD DIST. NO. 7	ILLINOIS	FED. AID PROJECT I-74		



FOUNDATION PLAN

SCALE: 1"= 30'-0"

DE LEUW, CATHER & COMPANY ENGINEERS
DESIGNED BY J.A. BARRAZA
DRAWN BY L. TROUSIL
CHECKED
IN CHARGE E.S. MARTINS
APPROVED W.G. HORN

SUBSTRUCTURE LOCATION

F.A.I. 74 - SECTION 81-1HB

F.A.I. 74 & RAMPS OVER RELOC. 19TH ST.

ROCK ISLAND COUNTY

STATION 289 + 23.09

SCALE: AS NOTED DATE:

DWG. NO. S-185

ROUTE NO.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
F.A.I. 74	81-1HB	ROCK ISLAND	389	225
FED. ROAD DIST. NO. 7	ILLINOIS	FED. AID PROJECT I-74		

PILE DATA		
	ABUTMENT	WINGWALL
TYPE	STEEL 10BP42	CREOSOTED
CAPACITY	DRIVE TO REFUSAL	24 TONS
EST. LENGTH	58 FT	20 FT.
NO. REQ'D	9*	14*

*INCLUDES 1 TEST PILE

↓ INDICATES BATTER PILES

PLAN
SCALE: 1/4"=1'-0"

ELEVATION
SCALE: 1/4"=1'-0"

*ELEVATIONS AT FRONT FACE OF BACKWALL

PLAN PILE CAP
SCALE: 1/4"=1'-0"

SECTION E-F
SCALE: 3/8"=1'-0"

SECTION B-B
SCALE: 1/4"=1'-0"

SECTION A-A
SCALE: 3/8"=1'-0"

SECTION C-C
SCALE: 3/8"=1'-0" HOR.
NOT TO SCALE VER.

SECTION D-D
SCALE: 3/8"=1'-0"

SECTION E-E
SCALE: 3/8"=1'-0"

BAR H4 · BARS U3, V3 & V59 · BAR S · BAR V6 · BAR V12 · BAR V7 · BAR V14 · BAR H17 · BARS H10, H7 & H49

MARK	A	B
U3	4'-2"	2'-0"
V3	9"	1'-9"
V59	9"	2'-4"

MARK	E	F
H10	1'-8"	1'-6"
H7	3'-0"	1'-8"
H49	1'-8"	0'-8"

REINFORCING BAR LIST

BAR MARK	QUANTITY OF BARS	BAR SIZE	LENGTH	SHAPE
H4	2	4	6-10	
H6	6	6	20-3	
H7	4	6	4-8	
H9	4	6	3-0	
H10	12	4	3-2	
H21	16	4	1-8	
H43	24	5	21-10	
H47	32	4	24-2	
H48	3	4	22-2	
H49	12	4	2-4	
N17	48	6	4-5	
P6	16	7	22-0	
S	42	4	14-9	
T13	103	4	7-8	
U3	8	6	8-2	
V3	47	4	4-3	
V6	8	4	4-0	
V7	48	5	4-9	
V10	40	4	8-2	
V12	6	5	2-7	
V14	6	5	9-2	
V17	25	5	5-6	
V48	7	4	19-8	
V59	4	4	5-5	
V67	40	4	3-1	
V68	23	5	8-8	
V69	7	4	7-6	
V71	6	4	9-10	
V73	40	4	6-3	
W19	14	4	22-0	
W20	14	4	24-0	

BILL OF MATERIAL

ITEM	UNIT	QUANTITY
CLASS A EXCAVATION FOR STRUCTURES	CU. YD.	70.3
CLASS X CONCRETE	CU. YD.	90.5
REINFORCING BARS	POUND	5340
FURNISHING STEEL PILES 10BP42	LIN. FT.	464
DRIVING STEEL PILES	LIN. FT.	464
FURNISHING CREOSOTED PILES UP TO 20FT	LIN. FT.	260
DRIVING TIMBER PILES	LIN. FT.	260
TEST PILES STEEL 10BP42	EACH	1
TEST PILE TIMBER	EACH	1

DE LEUW, CATHER & COMPANY ENGINEERS
DESIGNED BY R.J. BLACK
DRAWN BY AL POLIDO
CHECKED
IN CHARGE E.S. MARTINS
APPROVED W.G. HORN

ABUTMENT (K)

F.A.I. 74 - SECTION 81-1HB

F.A.I. 74 & RAMPS OVER RELOC. 19TH ST.

ROCK ISLAND COUNTY

STATION 289+23.09

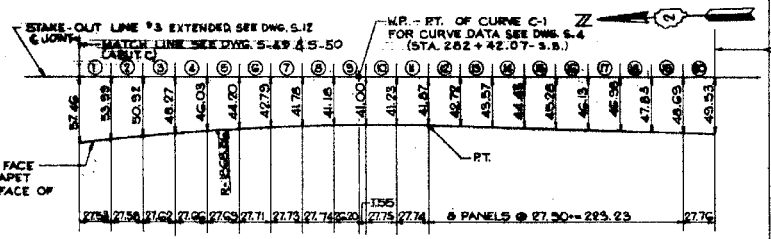
SCALE: AS NOTED DATE:

Rev. 5-22-73

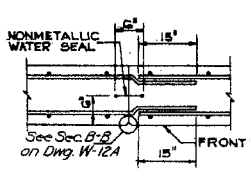
K & E CO. 10-6186

DWG. NO. W-11

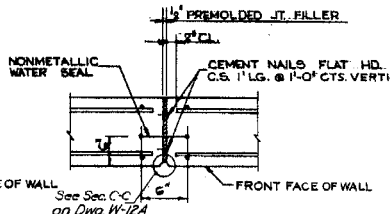
SHEETS NO.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
F.A.I. 74	81-1-2	ROCK ISLAND	389	290
FED. ROAD DIST. NO. 7	ILLINOIS	FED. AID PROJECT I-74		



STAKE – OUT DIAGRAM
SCALE: 1" = 50'-0"

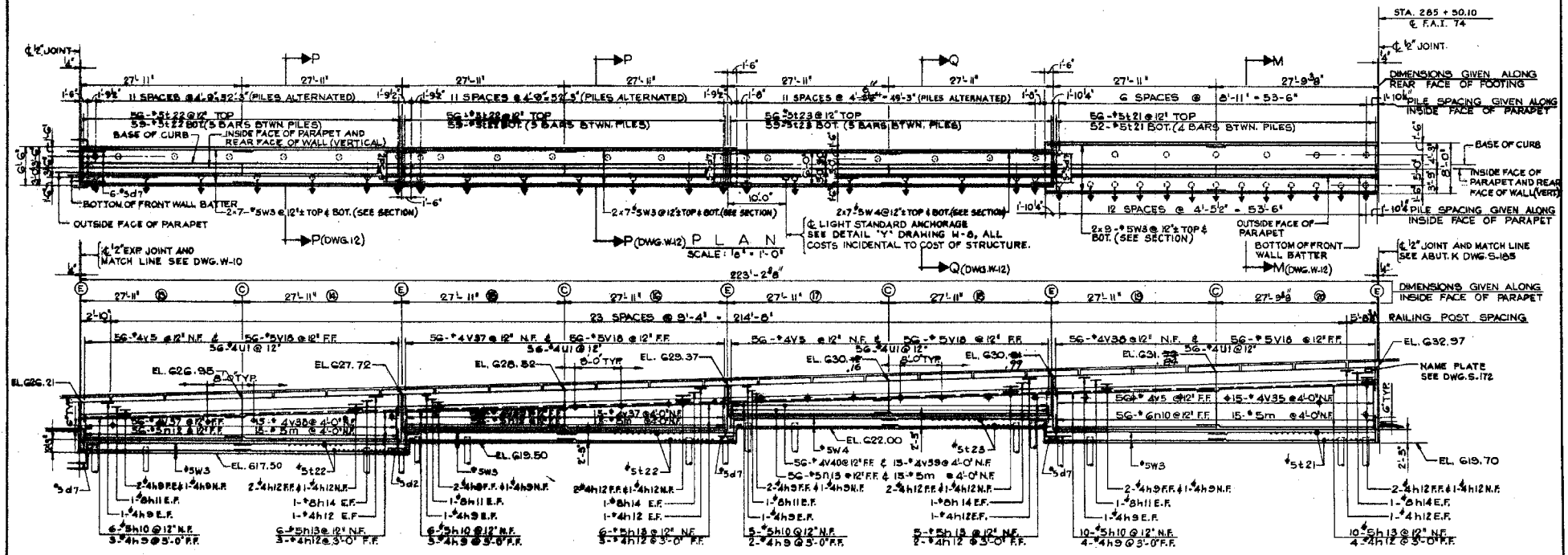


CONTRACTION JOINT
SCALE: 1"=1'-0"



EXPANSION JOINT
SCALE: 1"=1'-0"

Note: For Rustication Details see Dwg W-12A.



ELEVATION (FRONT FACE)
SCALE: ⅛" = 1'-0"

PILE DATA				
PANEL NO.	13 & 14	15 & 16	17 & 18	19 & 20
PILE TYPE	CREOSOTED	CREOSOTED	CREOSOTED	CREOSOTED
CAPACITY	23 TONS	22 TONS	18 TONS	18 TONS
NUMBER REQUIRED	14 *	14	14 *	20
ESTIMATED LENGTH	19 FT.	23 FT.	27 FT.	25 FT.
CUT OFF ELEVATION	618.50	620.50	623.00	620.70

* INCLUDES 1 TEST PILE

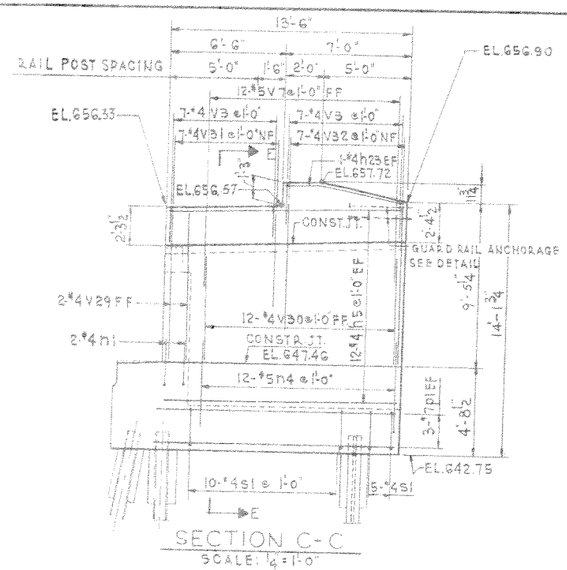
DE LEUW, CATHER & COMPANY ENGINEERS
DESIGNED BY S. KLEINSEDT
DRAWN BY AL FELIZO
CHECKED
IN CHARGE E.S. MARTINS
APPROVED W.B. HORN

RETAINING WALL 7-S
F.A.I. 74 - SECTION 81-1-2
PANELS 13 THRU 20
ROCK ISLAND COUNTY

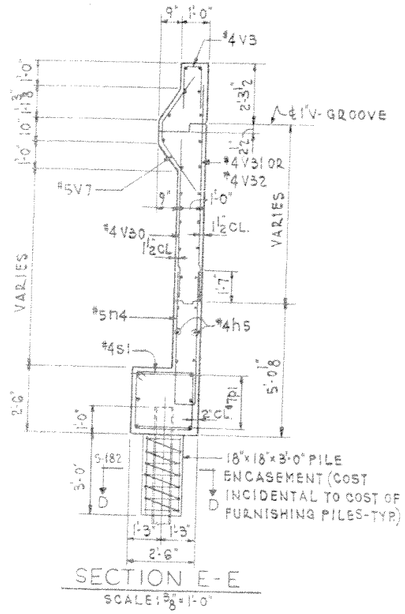
SCALE: AS NOTED DATE:

DWG. NO. S-183

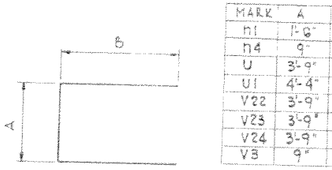
ROUTE NO.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
F.A.I. 74	81-1HB	ROCK ISLAND	389	223
FED. ROAD DIST. NO. 7	ILLINOIS	FED. AID PROJECT I-74		



SECTION C-C
SCALE: 1/4 = 1'-0"

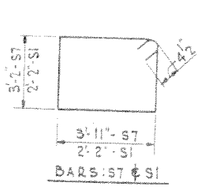


SECTION E-E
SCALE: 3/8 = 1'-0"

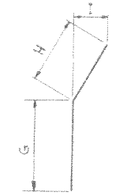


MARK	A	B
h1	1'-6"	2'-6"
h4	9"	5'-3"
U	3'-9"	1'-9"
U1	4'-4"	2'-2"
V22	3'-9"	2'-3"
V23	3'-9"	2'-9"
V24	3'-9"	3'-6"
V3	9"	1'-9"

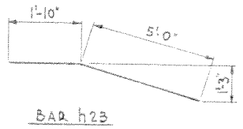
MARK	E	F
h1	3'-3"	1'-6"
h2	1'-6"	1'-6"
h10	1'-8"	1'-6"
h11	1'-8"	10"
V9	6'-4"	1'-3"
V28	4'-6"	1'-3"



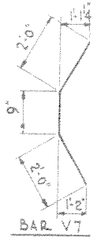
BARS: S7 & S1



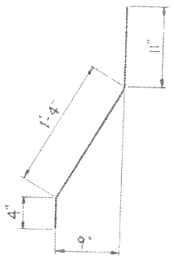
MARK	G	H	T
V25	6'-5"	1'-0"	6½
V29	6'-8"	2'-0"	1'-1¼"



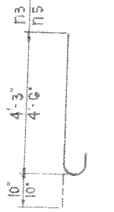
BAR h23



BAR V7



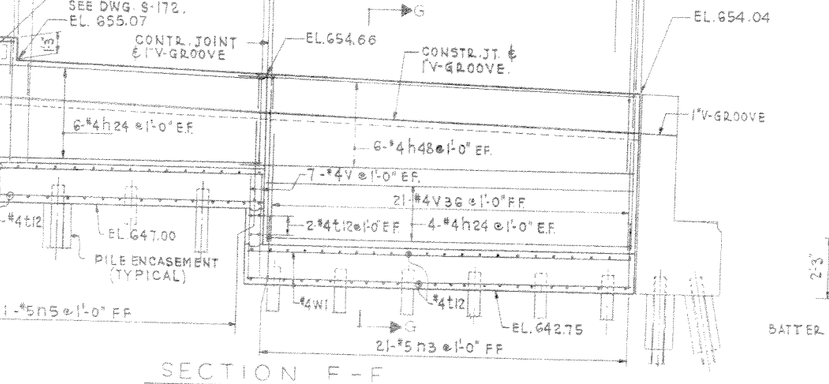
BAR V12



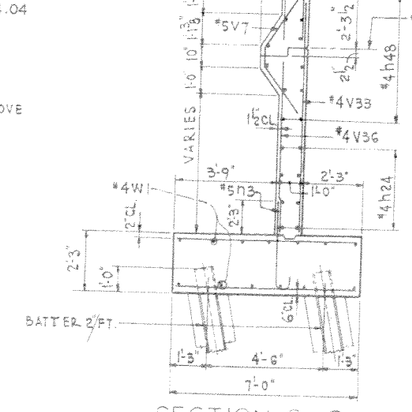
BARS: n3 & n5

REINFORCING BAR LIST

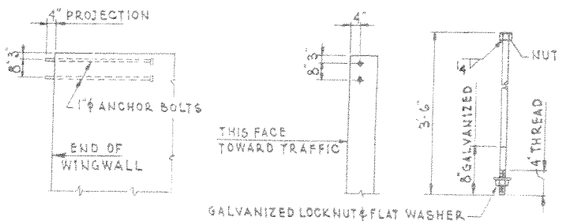
BAR MARK	QUANTITY OF BARS	BAR SIZE	LENGTH	SHAPE
N1	6	6	4- 9	STRAIGHT
N2	10	4	3- 0	STRAIGHT
N3	24	4	13- 2	STRAIGHT
H10	4	4	3- 2	STRAIGHT
H11	6	4	2- 6	STRAIGHT
H14	34	4	23- 3	STRAIGHT
H15	1	4	14- 0	STRAIGHT
H16	15	5	6- 3	STRAIGHT
H17	10	5	8- 0	STRAIGHT
H18	10	5	8- 6	STRAIGHT
H19	5	5	6-10	STRAIGHT
H20	5	5	10- 3	STRAIGHT
H21	6	4	1- 8	STRAIGHT
H22	12	6	22- 6	STRAIGHT
H23	4	4	6-10	STRAIGHT
H24	20	4	20- 8	STRAIGHT
H45	2	6	3- 4	STRAIGHT
H48	12	4	22- 2	STRAIGHT
N1	2	4	8- 6	STRAIGHT
N3	21	5	5- 1	STRAIGHT
N4	12	5	11- 3	STRAIGHT
N5	21	5	5- 4	STRAIGHT
P1	6	7	14- 3	STRAIGHT
P3	24	7	24- 0	STRAIGHT
S1	15	4	9- 5	STRAIGHT
S7	64	4	14-11	STRAIGHT
T32	90	4	6- 8	STRAIGHT
U	4	6	7- 3	STRAIGHT
U1	4	6	8- 8	STRAIGHT
V	37	4	6- 2	STRAIGHT
V3	56	4	4- 3	STRAIGHT
V7	54	5	4- 9	STRAIGHT
V9	41	5	7- 7	STRAIGHT
V10	41	4	8- 2	STRAIGHT
V12	3	5	2- 7	STRAIGHT
V22	18	5	8- 3	STRAIGHT
V23	22	5	9- 3	STRAIGHT
V24	22	5	10- 9	STRAIGHT
V25	3	5	7- 5	STRAIGHT
V26	3	5	8- 5	STRAIGHT
V27	64	4	2- 11	STRAIGHT
V28	23	5	5- 9	STRAIGHT
V29	2	4	8- 8	STRAIGHT
V30	19	4	6- 0	STRAIGHT
V31	7	4	8- 6	STRAIGHT
V32	7	4	9- 2	STRAIGHT
V33	21	4	11-10	STRAIGHT
V44	14	6	5- 4	STRAIGHT
V45	21	4	6- 2	STRAIGHT
W3	13	4	21- 8	STRAIGHT
W2	13	4	20- 8	STRAIGHT



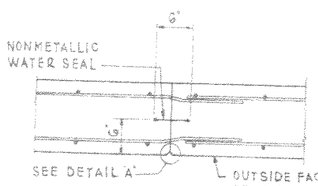
SECTION F-F
SCALE: 1/4 = 1'-0"



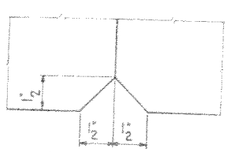
SECTION G-G
SCALE: 3/8 = 1'-0"



GUARD RAIL ANCHORAGE
NO SCALE



CONTRACTION JOINT
SCALE: 1" = 1'-0"



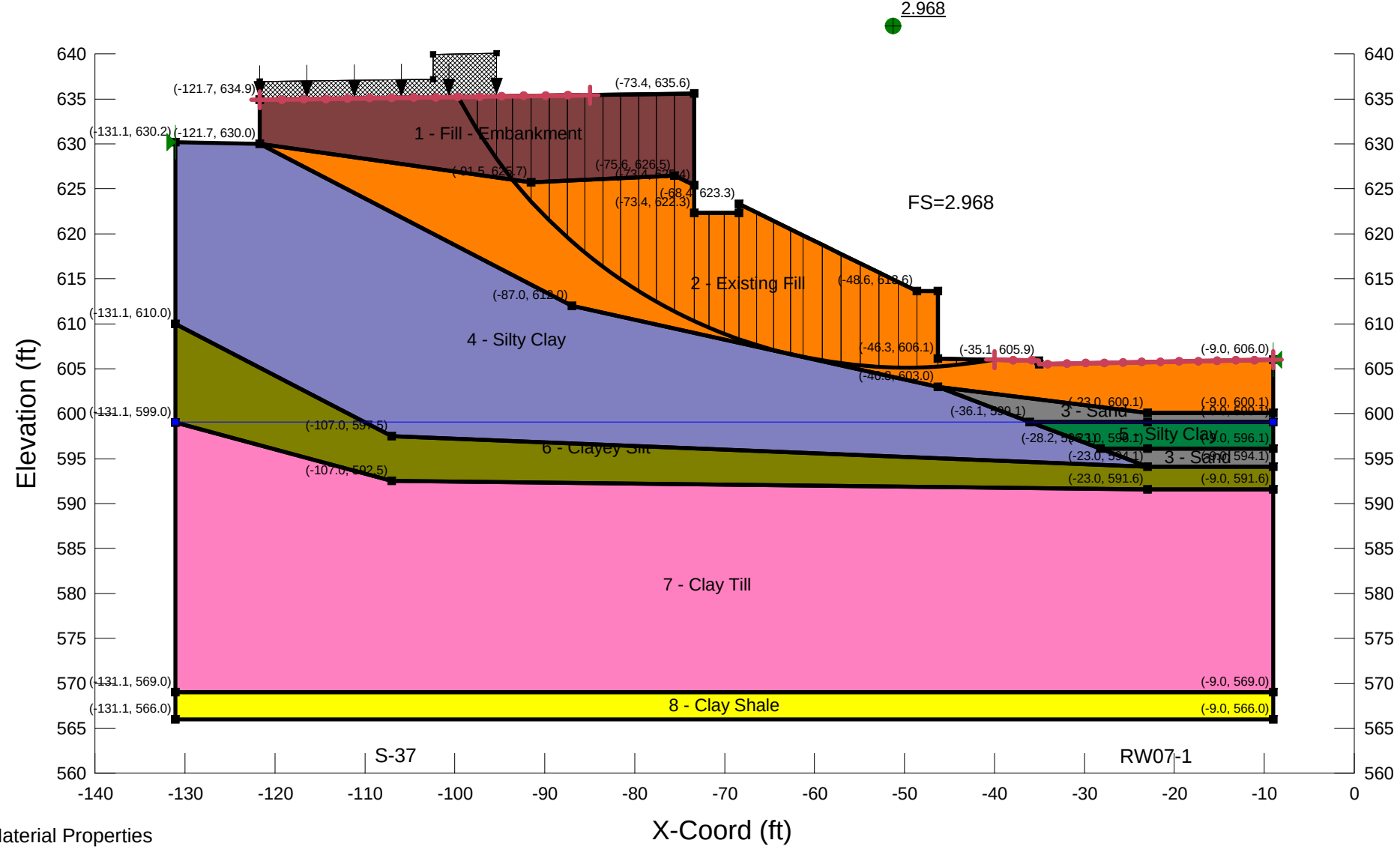
DETAIL 'A'
FULL SCALE.

DE LEUW, CATHER & COMPANY ENGINEERS
DESIGNED BY R.J.BLACK
DRAWN BY A.BUROKAS
CHECKED J. Weber & T. Monker
IN CHARGE E.S. MARTINS
APPROVED W.G. HORN

ABUTMENT (M)
WINGWALLS & MISC. DETAILS

F.A.I. 74 - SECTION 81-1HB
F.A.I. 74 & RAMPS OVER RELOC. 19TH ST.
ROCK ISLAND COUNTY
STATION
SCALE: AS NOTED DATE:

K & E CO. 10-P155



Material Properties

Name: 1 - Fill - Embankment Model: Mohr-Coulomb Unit Weight: 125 pcf Cohesion: 1000 psf Phi: 0 °

Name: 2 - Existing Fill Model: Mohr-Coulomb Unit Weight: 125 pcf Cohesion: 1800 psf Phi: 0 °

Name: 3 - Sand Model: Mohr-Coulomb Unit Weight: 125 pcf Cohesion: 0 psf Phi: 32 °

Name: 4 - Silty Clay Model: Mohr-Coulomb Unit Weight: 125 pcf Cohesion: 2800 psf Phi: 0 °

Name: 5 - Silty Clay Model: Mohr-Coulomb Unit Weight: 120 pcf Cohesion: 400 psf Phi: 0 °

Name: 6 - Clayey Silt Model: Mohr-Coulomb Unit Weight: 125 pcf Cohesion: 1800 psf Phi: 0 °

Name: 7 - Clay Till Model: Mohr-Coulomb Unit Weight: 136 pcf Cohesion: 2700 psf Phi: 0 °

Name: 8 - Clay Shale Model: Bedrock (Impenetrable)

SN 081-6016 - IL-RW07

Case 1 - Sta 1922+00 - Circle

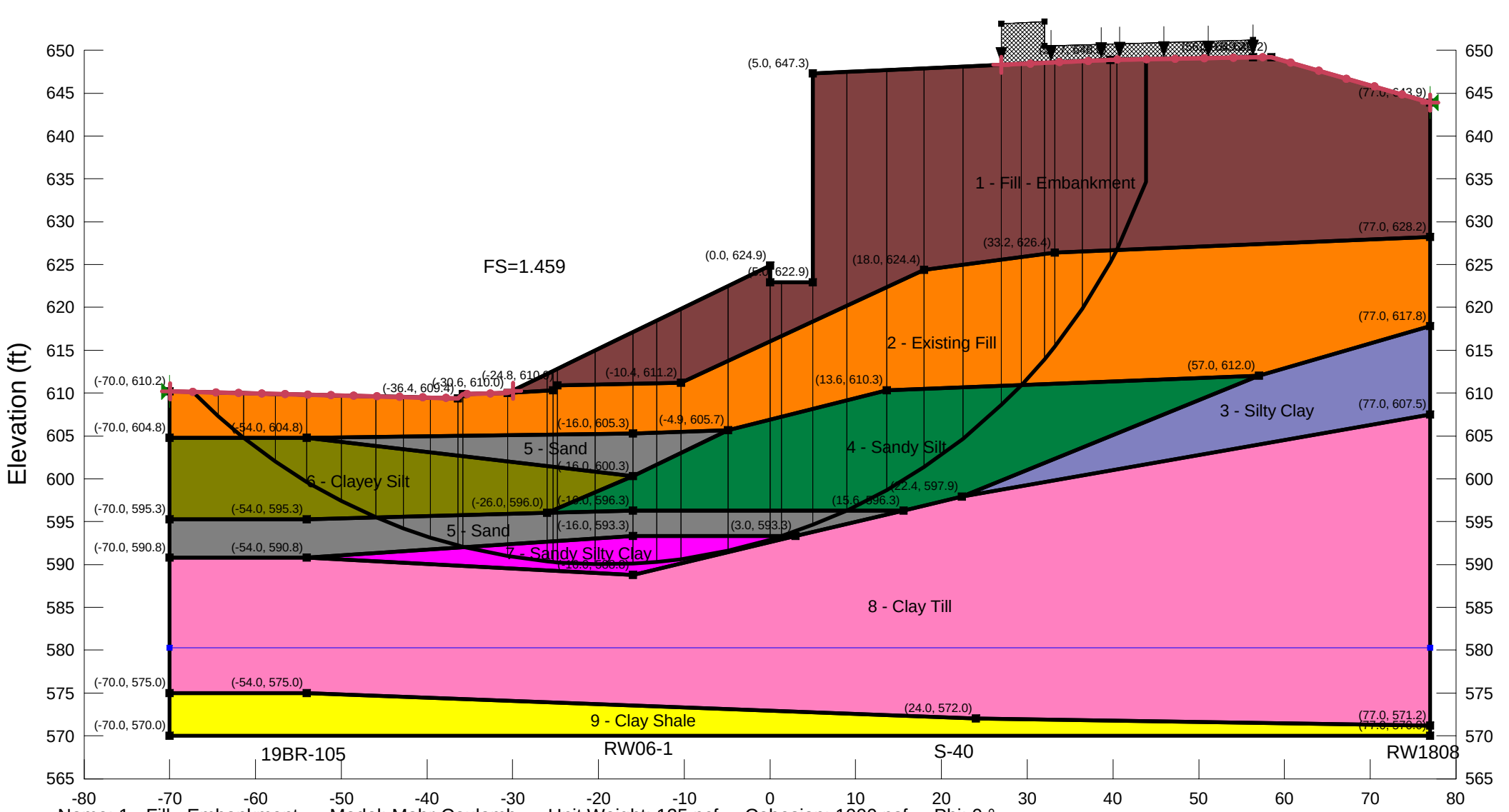
File Name: I-74 081-6016 Sta 1922.gsz

Last Edited By: Robert Chantome

Date: 5/24/2012 10:45:51 AM

I-74 OVER THE MISSISSIPPI RIVER
CENTRAL SECTION FINAL DESIGN
ILLINOIS DEPARTMENT OF TRANSPORTATION
ROCK ISLAND COUNTY, ILLINOIS

HANSON

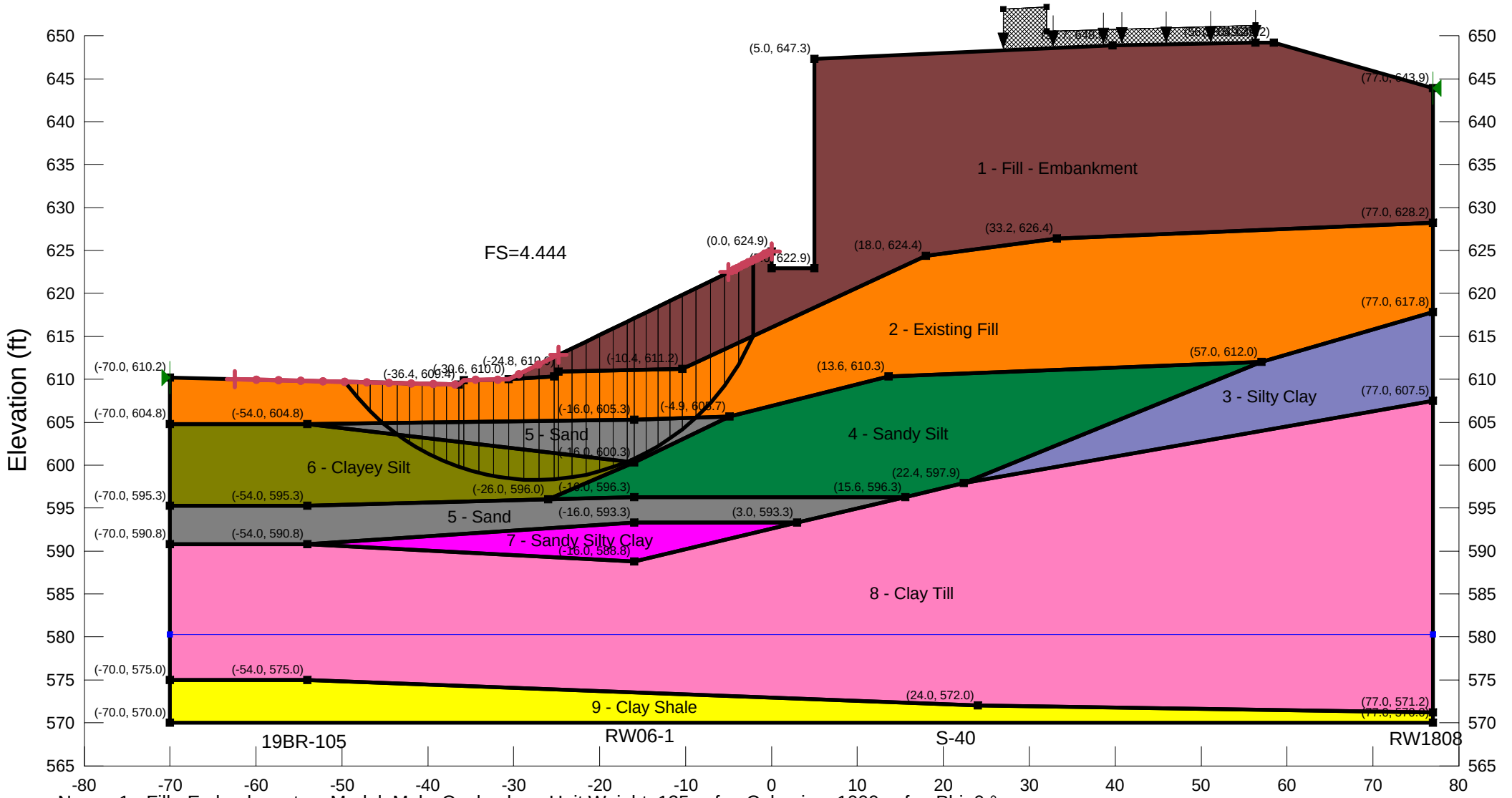


Name: 1 - Fill - Embankment Model: Mohr-Coulomb Unit Weight: 125 pcf Cohesion: 1000 psf Phi: 0 °
Name: 2 - Existing Fill Model: Mohr-Coulomb Unit Weight: 125 pcf Cohesion: 1800 psf Phi: 0 °
Name: 3 - Silty Clay Model: Mohr-Coulomb Unit Weight: 125 pcf Cohesion: 3500 psf Phi: 0 °
Name: 4 - Sandy Silt Model: Mohr-Coulomb Unit Weight: 125 pcf Cohesion: 1650 psf Phi: 0 °
Name: 5 - Sand Model: Mohr-Coulomb Unit Weight: 125 pcf Cohesion: 0 psf Phi: 32 °
Name: 6 - Clayey Silt Model: Mohr-Coulomb Unit Weight: 125 pcf Cohesion: 600 psf Phi: 0 °
Name: 7 - Sandy Silty Clay Model: Mohr-Coulomb Unit Weight: 125 pcf Cohesion: 540 psf Phi: 0 °
Name: 8 - Clay Till Model: Mohr-Coulomb Unit Weight: 136 pcf Cohesion: 2700 psf Phi: 0 °
Name: 9 - Clay Shale Model: Bedrock (Impenetrable)

SN 081-0179/0180 - I-74 over 19th Street
Case 1 - South Abutment - Circle
File Name: I-74 081-0180 South Abutment.gsz
Last Edited By: Robert Chantome
Date: 5/24/2012 1:43:58 PM

I-74 OVER THE MISSISSIPPI RIVER
CENTRAL SECTION FINAL DESIGN
ILLINOIS DEPARTMENT OF TRANSPORTATION
ROCK ISLAND COUNTY, ILLINOIS

HANSON



Name: 1 - Fill - Embankment Model: Mohr-Coulomb Unit Weight: 125 pcf Cohesion: 1000 psf Phi: 0 °
Name: 2 - Existing Fill Model: Mohr-Coulomb Unit Weight: 125 pcf Cohesion: 1800 psf Phi: 0 °
Name: 3 - Silty Clay Model: Mohr-Coulomb Unit Weight: 125 pcf Cohesion: 3500 psf Phi: 0 °
Name: 4 - Sandy Silt Model: Mohr-Coulomb Unit Weight: 125 pcf Cohesion: 1650 psf Phi: 0 °
Name: 5 - Sand Model: Mohr-Coulomb Unit Weight: 125 pcf Cohesion: 0 psf Phi: 32 °
Name: 6 - Clayey Silt Model: Mohr-Coulomb Unit Weight: 125 pcf Cohesion: 600 psf Phi: 0 °
Name: 7 - Sandy Silty Clay Model: Mohr-Coulomb Unit Weight: 125 pcf Cohesion: 540 psf Phi: 0 °
Name: 8 - Clay Till Model: Mohr-Coulomb Unit Weight: 136 pcf Cohesion: 2700 psf Phi: 0 °
Name: 9 - Clay Shale Model: Bedrock (Impenetrable)

SN 081-0179/0180 - I-74 over 19th Street
Case 2 - South Abutment - End Slope
File Name: I-74 081-0180 South Abutment.gsz
Last Edited By: Robert Chantome
Date: 5/24/2012 1:43:58 PM

I-74 OVER THE MISSISSIPPI RIVER
CENTRAL SECTION FINAL DESIGN
ILLINOIS DEPARTMENT OF TRANSPORTATION
ROCK ISLAND COUNTY, ILLINOIS

HANSON