



*Robert Chantone*  
*June 12, 2012*  
*exp 11/2013*

**Prepared for:**

Illinois Department of  
Transportation, District 2  
819 Depot Avenue  
Dixon, Illinois 61021

**Structure Designer:**

Modjeski and Masters, Inc.  
#4 Sunset Hills Professional Center  
Edwardsville, Illinois 62088  
(618) 659-9102

**Prepared By:**

Hanson Professional Services Inc.  
1525 South Sixth Street  
Springfield, Illinois 62703  
(217) 788-2450

## Structure Geotechnical Report

F.A.I. Route 74  
Section 81-1-2  
Rock Island County  
Job No. P-92-032-01  
Contract No. 64C08  
PTB No. N/A  
Retaining Wall IL-RW07  
Structure Number 081-6016

June 2012

## Table of Contents

<b>1. Project Description</b> .....	<b>3</b>
<b>2. Location</b> .....	<b>3</b>
<b>3. Proposed Structure</b> .....	<b>3</b>
<b>4. Site Investigation</b> .....	<b>4</b>
<b>5. Laboratory Investigation</b> .....	<b>4</b>
<b>6. Subsurface Profile</b> .....	<b>5</b>
<b>7. Geotechnical Evaluations</b> .....	<b>6</b>
<b>8. Design Recommendations</b> .....	<b>7</b>
<b>9. Construction Considerations</b> .....	<b>7</b>
<b>References</b> .....	<b>8</b>
<b>Appendix</b> .....	<b>9</b>

## Tables

Table 6.1 Groundwater Elevations .....	<b>5</b>
--	----------

*Copyright © 2012 by Hanson Professional Services Inc. All rights reserved. This document is intended solely for the individual or the entity to which it is addressed. The information contained in this document shall not be duplicated, stored electronically, or distributed, in whole or in part, by anyone other than the recipient without the express written permission of Hanson Professional Services Inc., 1525 S. Sixth St., Springfield, IL 62703, (217) 788-2450, www.hanson-inc.com. Unauthorized reproduction or transmission of any part of this document is a violation of federal law. Any concepts, designs and project approaches contained herein are considered proprietary. Any use of these concepts and approaches by others is considered a violation of copyright law.*

## 1. Project Description

This report provides geotechnical data and recommendations for the proposed Retaining Wall IL-RW07, which is part of the Central Section of the I-74 over the Mississippi River Project. The project includes reconstruction of I-74 between 14<sup>th</sup> Avenue in Moline, Illinois and Lincoln Road in Bettendorf, Iowa. The retaining wall covered by this structure geotechnical report will be a new structure, constructed to retain existing embankment and the natural bluff line to the north abutments of 19<sup>th</sup> Street.

Nearby project features that have an impact on the design or construction of the proposed retaining wall include the I-74 and Ramp 7th A over 19th Street Bridges (S.N.'s 081-0179, 081-0180 and 081-0181), the south abutment retaining wall (IL-RW06, S.N. 081-6015), the I-74 roadway, and the 19th Street roadway. Geotechnical recommendations for the bridges and Retaining Wall IL-RW06 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 CH2M HILL in September 2009.

## 2. Location

The proposed Retaining Wall IL-RW07 is located in the north central portion of Rock Island County, within Sections 32 and 33 of Township 18 North, Range 1 West. It is located between 19<sup>th</sup> Street Sta. 1918+92.00 and 1928+18.00. The wall separates I-74 and Ramp 7<sup>th</sup>-A on the high side from 19<sup>th</sup> Street on the low side.

## 3. Proposed Structure

The general structure widths and span arrangements of the bridges over 19<sup>th</sup> Street 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 bridge abutments were changed to a conventional, closed configuration. Retaining Wall IL-RW07, located in front of the north abutment, was shifted closer to 19<sup>th</sup> Street and significantly reduced in height. Retaining Wall IL-RW06, previously located in front of the south abutment, was terminated at the west end of the abutment.

Retaining Wall IL-RW07 is now a soldier pile and lagging wall following the outside edge of the sidewalk along 19<sup>th</sup> Street. Most of the wall is in a cut configuration, where the grade in front of the wall will be lowered from its current elevation. A small length of the wall, located under the proposed Ramp 7<sup>th</sup>-A Bridge, is in a fill configuration. The ground behind the wall generally slopes up at 1V:2H. Under the bridges, the existing 1V:2H bridge end slope intersects the top of the wall. East of the bridges, the existing natural slope typically intersects the wall a few feet below the top. Fill sloped at 1V:4H to 1V:10H will be placed between the existing hillside and the back of the wall. This fill is used to smooth the top of wall profile and facilitate surface drainage. The wall will have an exposed height, measured from the finished grade line in front to the top of wall, between 0.4 and 7.9 feet.

The proposed bridges will be constructed in stages in order to allow traffic on I-74 and 19<sup>th</sup> Street throughout the construction period. The middle portion of the bridges, located in the current I-74 median, will be constructed first, followed by the east side (WB I-74 and Ramp 7<sup>th</sup>-A), then the west side (EB I-74). The wall construction follows a similar sequence. The first stage of the wall construction is required to allow a temporary detour for 19<sup>th</sup> Street in the area of the current abutment end slope. The second stage is required to place the embankment fill for Ramp 7<sup>th</sup>-A.

#### 4. Site Investigation

The project site is located in the steeply sloping terrain of the bluffs along the Mississippi River. 19<sup>th</sup> 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. 19<sup>th</sup> 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 an existing hillside at or near the natural grade. The height from the toe of the bridge end slopes to the roadway grade is approximately 25 feet on the north side of 19<sup>th</sup> Street. Three existing bridge piers are located on the slope between the proposed wall and the existing bridge abutments. Presently, 19<sup>th</sup> 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-foot 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 structures.

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.

Six 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 260 feet. Standard Penetration Test samples were collected at 2.5 ft. to 5.0 ft. intervals in all borings. Several Shelby tube samples were collected at representative locations in cohesive strata. The boring depths ranged from 6.0 ft. to 67.0 ft.

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

#### 5. 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.

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 completed 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.

## 6. Subsurface Profile

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

The subsurface profile consists of deposits of fill material, 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 two of the borings drilled for this structure. The bedrock surface varies from Elev. 559.5 at the west end of the structure to Elev. 585.5 near the east end. Based on other borings in the vicinity, the rock surface is erratic. Generally there is a layer of gray to black, very soft clay shale overlying a layer of white to gray, hard limestone.

Glacial till was encountered in all of the borings except ILR0803, which did not penetrate the existing fill. The top of this stratum was encountered between Elev. 591.5 and Elev. 605.8. 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 11 and 20 blows per foot. Natural moisture contents ranged from 6 to 20 percent and averaged approximately 14 percent. Thin sand seams were encountered in a few locations within the otherwise clayey till.

Alluvial soils were encountered above the till in the borings east of the existing bridges. The alluvial stratum was between 4 and 7 feet thick, where it was encountered. These soils were typically brown to gray, soft to stiff, silty clays or loose sands. Unconfined strengths were 0.4 to 2.2 tsf, with an average of 0.8 tsf. SPT values were 4 to 15 blows per foot. Natural moisture contents ranged from 12 to 21 percent.

A 6 to 23.5 feet thick layer of fill was encountered in all of the borings. 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. 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 6.1 Groundwater Elevations**

<b>Boring No.</b>	<b>During Drilling</b>	<b>At End of Boring</b>	<b>24-hour Reading</b>
ILR0701	581.3	-	-
ILR0803	-	-	-
ILR1401	-	-	-
ILR1402	-	-	-
ILR1405	-	-	-
RW401	-	-	-
RW07-1	-	599.1	-

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.

## 7. Geotechnical Evaluations

Further analysis of the previously proposed full-height MSE abutment wall determined 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. Very tall temporary shoring would be needed to excavate for the reinforced soil mass of the first phase construction. Full-height temporary MSE walls would be needed to retain the first phase reinforced soil mass during excavation for the second and third phases. One 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 and temporary structures eliminate the typical economic advantage of the MSE abutments.

It was determined that constructing new partial-height closed abutments on the existing bridges' end slope was a better alternative. A top-down wall configuration (IL-RW07) constructed across the existing end slope will allow the bottom of the end slope to be excavated without affecting the existing and proposed bridge abutments located at the top of the slope. The area in front of Retaining Wall IL-RW07 will be used for temporary 19<sup>th</sup> Street traffic during construction of the bridge pier. This configuration eliminates the overall stability and bearing capacity deficiencies. It also results in a significant reduction in excavation and temporary wall quantities.

The grading between the Ramp 7<sup>th</sup>-A Bridge and the hillside to the east was reworked to connect the former Retaining Wall IL-RW14 to this wall. Raising the grade in that low area allows a shorter, conventional wingwall on the north abutment of the Ramp 7<sup>th</sup>-A Bridge and also presents a uniform appearance along 19<sup>th</sup> Street. Retaining Wall IL-RW07 now extends for 926 feet along 19<sup>th</sup> Street from south of I-74 to the intersection with 11<sup>th</sup> Avenue A.

Soil nail walls can be constructed in a top-down sequence, but they are not feasible when fill is required. Semi-gravity and MSE walls would require significant excavations in the existing steep slopes. A soldier pile and lagging wall can be constructed without disturbing the existing slope and bridge substructures located behind the proposed wall. A soldier pile wall can also be constructed in a bottom-up configuration where needed. For the low heights retained by this structure, tiebacks are not cost-effective.

Driven soldier pile walls are typically constructed with H-piles as the structural elements. When soldier piles are set in drilled holes, larger and more-efficient shapes may be used. The encasement concrete also increases the effective width of the soldier piles and allows for slightly smaller beams to be used. The equipment used for installing drilled soldier piles is typically more compact and mobile than the pile-driving equipment used for driven soldier piles. The drilling equipment will be used for another structure, Retaining Wall IL-RW04, in the same construction contract.

A slope stability analysis of the wall's critical section was completed to determine the overall stability of the wall. Results of this analysis are included in the Appendix. The 2.97 factor of safety satisfies AASHTO requirements.

Insignificant settlement is anticipated for most of the wall because no new fill will be placed. The estimated total settlement under the weight of the proposed fill in front of the proposed Ramp 7<sup>th</sup>-A abutment is 0.5 inch at the back of the wall.

## 8. Design Recommendations

A cantilever, drilled soldier pile and lagging retaining wall is recommended for the proposed structure. Design earth pressure coefficients are 0.54 for active conditions and 5.10 for passive conditions. These coefficients assume a 1V:2H slope behind the wall and level ground in front of the wall. A 130 pcf unit weight should be used for the fill and glacial till. Due to the possibility of perched groundwater, buoyant unit weights should be used for soils more than five feet below the 19<sup>th</sup> Street grade. A geocomposite drain and underdrain should be used to prevent the buildup of hydrostatic pressures behind the wall. The design of the wall should consider the temporary condition where the front face of the wall is excavated to the bottom of the facing.

In areas where fill will be placed behind the proposed wall, the soldier piles and lagging should be installed prior to placing any fill. The fill should be granular material within 5 feet of the back of facing. Use of the granular material will minimize the earth pressures from compacting around the soldier piles and against the lagging.

## 9. Construction Considerations

The construction of soldier pile and lagging walls is not covered by the IDOT Standard Specifications. Guide Bridge Special Provision No. 42, Drilled Soldier Pile Retaining Wall (Revised: October 15, 2011) should be included in the construction documents.

It is anticipated that a portion of the proposed wall may need to be constructed under the existing I-74 bridges. The clearance from existing grade to the bottom of the structures is approximately 16 feet. Drilling rigs capable of working within this space are readily available. Setting the soldier piles in the drilled holes will be the most difficult part of the construction. The sequence of wall construction relative to the removal of the existing bridge decks should be carefully considered. Provisions for splicing some of the soldier beams may be required.



---

## References

- American Association of State Highway and Transportation Officials (2010). ASHTO LRFD Bridge Design Specifications, Fifth Edition.
- CH2M HILL (2009, September). Structure Geotechnical Report I-74 Mainline Retaining Wall Structure Number 081-6015.
- CH2M HILL (2009, September). Structure Geotechnical Report I-74 Mainline Retaining Wall Structure Number 081-6016.
- Hanson Professional Services Inc. (2012, June). Structure Geotechnical Report, I-74 & Ramp 7<sup>th</sup>-A Over 19<sup>th</sup> St. Bridges, Structure Nos. 081-0179, 081-0180, and 081-0181.
- Hanson Professional Services Inc. (2012, June). Structure Geotechnical Report, Retaining Wall IL-RW07, Structure Number. 081-6016.
- Illinois Department of Transportation (2012). *Bridge Manual*.
- Illinois Department of Transportation (1999). *Geotechnical Manual*.
- Illinois Department of Transportation (2012). *Standard Specifications for Road and Bridge Construction*.
- Illinois State Geological Survey, Rock Island County coal data, Retrieved February 27, 2012 from <http://www.isgs.illinois.edu/maps-data-pub/coal-maps/counties/rockisland.shtml>.
- Jacobs Civil Inc. (2008, June). Phase 1B Geotechnical Report New I-74 Bridges Over 19th Street, Proposed Structure No's. 081-0179, 081-0180 and 081-0181.

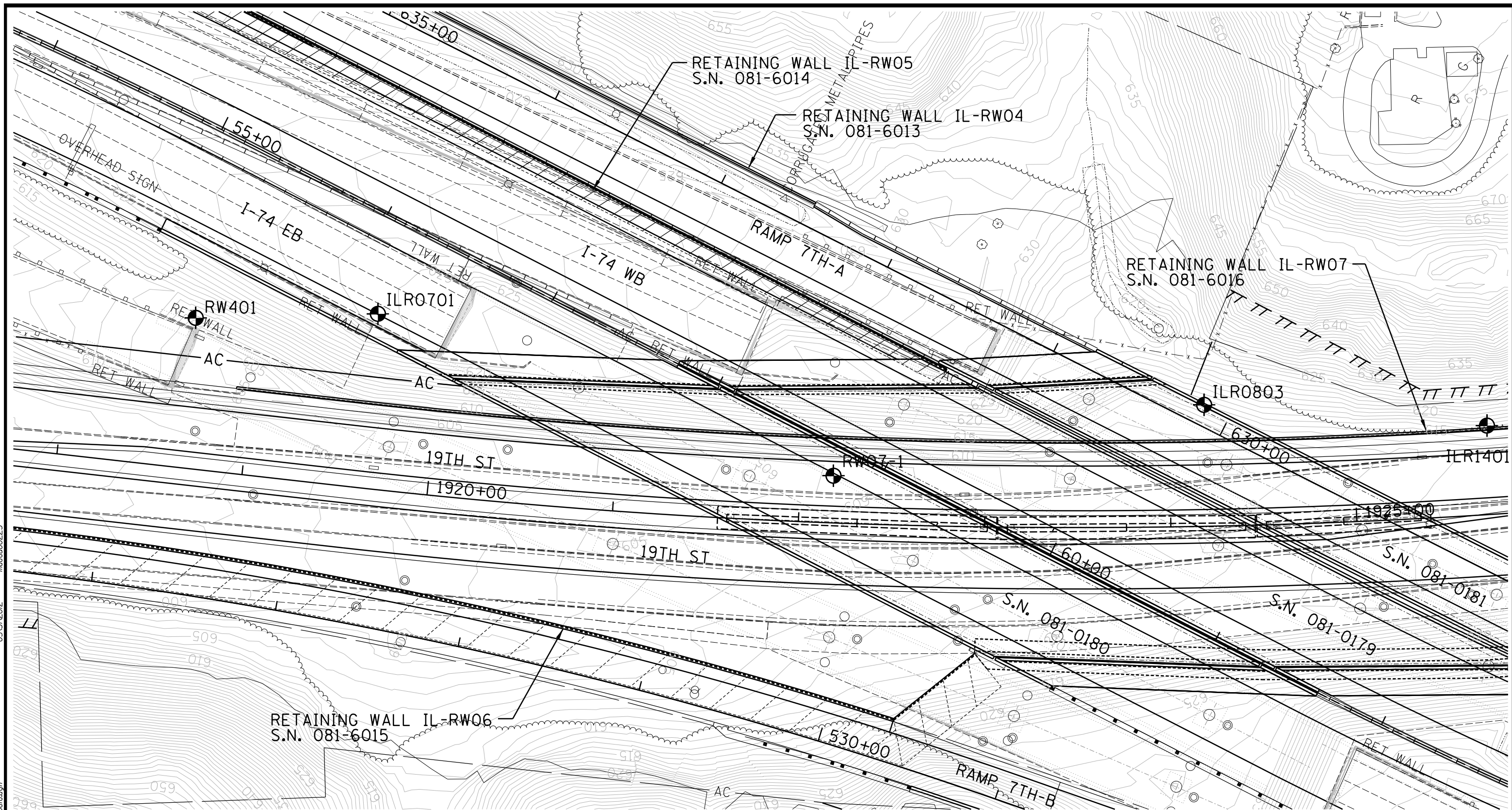


---

## Appendix

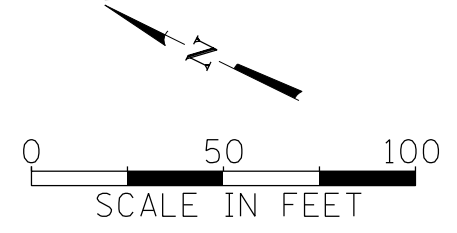
Boring Location Plan  
Subsurface Data Profile  
Boring Logs  
Soils Laboratory Test Results  
Summary of Slope Stability Analysis

05/31/2012 macau00223 ILRW07-A0432-007-Subsurface Data.dgn

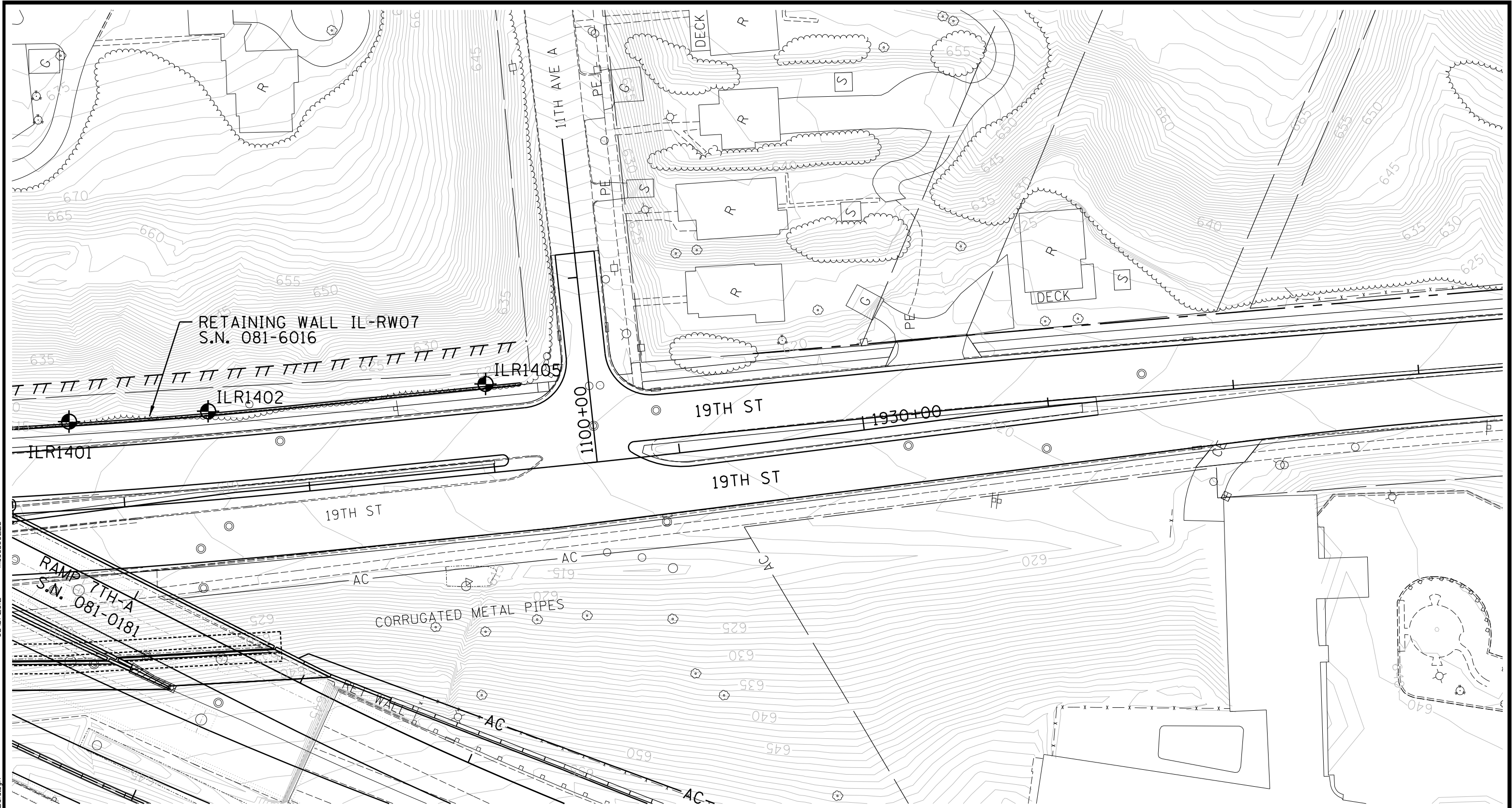


**LEGEND**

⊙ RW600 BORING LOCATION

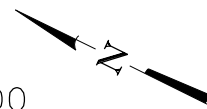
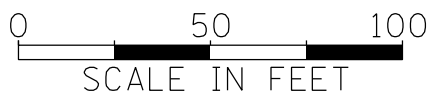


<b>BORING LOCATION PLAN</b>	
I-74 MAINLINE RETAINING WALL IL-RW07 S.N. 081-6016 ROCK ISLAND COUNTY, ILLINOIS	
08H0120E	5/30/12



**LEGEND**

◉ RW600 BORING LOCATION



© Copyright Hanson Professional Services Inc.



**BORING LOCATION PLAN**

I-74 MAINLINE RETAINING WALL IL-RW07  
S.N. 081-6016  
ROCK ISLAND COUNTY, ILLINOIS

08H0120E

5/30/12

ILRW07-A0432-007-Subsurface Datanon 05/31/2012 macau00223

STATE OF ILLINOIS  
DEPARTMENT OF TRANSPORTATION

ILR0701  
Sta. 56+20, 50' RT

Depth (ft)	N	Qu	w%	Notes
629.30				
628.70				7" Thick ACC followed by gravel subbase to 1.0'
625.30	12			Silty Sandy Clay with Gravel, greenish brown, moist, low plasticity, stiff, with subangular to subrounded gravel embedded throughout, fill/subbase
621.30	9	3.0P to 4.0P		Sandy Clay Trace Gravel, dark gray, frozen, stiff, with subangular to subrounded fine to coarse gravel embedded throughout, fill
615.80	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)
610.80	5	2.0P 16.0		Sandy Lean Clay Trace Gravel, gray, moist, stiff, medium plasticity, fill or disturbed till (LL=30 PI=14)
605.80	11			Same As Above, turning grayish brown at bottom 3", piece of wood embedded, possible fill
600.80	12	3.0P		Sandy Lean Clay Trace Gravel, brown, moist, stiff, low plasticity, possible weathered till
595.80	15	2.5P to 3.5P 15.0		Same As Above, gray, then brown, split in almost vertical with reddish brown surface, weathered till
583.50	12	2.5P to 3.0P		Sandy Lean Clay Trace Gravel, gray, moist, stiff, low plasticity, unweathered till
581.30	DD			
580.80	15	2.5P		
579.30	28			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 Bottom of hole = 50.0 feet

RW401  
Sta. 55+34, 96' RT

Depth (ft)	N	Qu	w%	Notes
609.50				
607.50	16			Sandy Clay (CL) - Brown, dry, very stiff, with angular-subangular gravel pieces, fill
605.50	28			Sandy Clay, Trace Gravel (CL) - Brown, dry, very hard, subrounded-subangular gravel, fine to coarse, fill
603.50	50/5"			Fill - Concrete rubble pieces
	9			Silty Clay (CL) - Brown gray, moist, soft, low plasticity, fill
	5			Dark brown, moist, soft, low plasticity, rounded-subrounded, fine to medium gravel throughout, fill
	24			No recovery possible due to piece of coarse gravel stuck in shoe
	7			Dark brown, stiff, low plasticity
	12			Similar to above with fine to medium, rounded-subrounded gravel, fill
591.50	11			Sandy Clay (CL) - Light brown, moist, stiff, with clay seams, fine to medium, rounded-subrounded gravel embedded throughout, possible gumbotil
583.50	15			Similar to above, dark reddish brown
	15			Sandy Lean Clay Trace Gravel (CL) - Gray, moist, stiff, fine to medium rounded-subrounded gravel embedded throughout, glacial clay
559.50	66			Sandy Shale - Dark gray, dry, hard, weathered shale with coal and sand seams
557.50				
556.50				Shale - gray, very fine grain, soft, slightly weathered, very weak, sound rock, very sandy; horizontal joints, possibly caused during core retrieval, no staining, smooth, planar joint surfaces, 2" thick soft, silty infilling at shale sandstone interface
552.50				Limestone - Dark gray, fine to coarse grained, appearance is a mixture of fine sand and gravel, ruffed texture, moderately weathered, weak to medium strong, moderately fractured to extremely fractured; horizontal joints, black staining, rough, undulating surfaces, very close to close spaced discontinuities, joints are open
				Sandstone - No recovery, possibly sandstone, brown, fine grained sandstone piece in bit
542.50				Bottom of hole = 67.0 feet

RW07-1  
Sta. 58+77, 15' RT


Depth (ft)	N	Qu	w%	Notes
605.10				
604.70				CONCRETE
	15	1.67S 14		FILL - Brown, moist, very stiff, clayey SILT with trace sand
		0.90B 13		
		1.95S 13		
600.10	Oh			Brown, wet, silty, clayey, fine-grained SAND with trace gravel
599.10	5	0.42B 21		Dark brown, moist, soft to stiff, clayey SILT
		1.25P 19		
		1.6		
596.10				Brown, wet, silty, clayey, fine-grained SAND with gravel
594.10	22	2.30P 13		Brown, moist, very stiff, clayey SILT with trace sand and gravel
		3.11B 16		
		3.04B 15		Gray, moist, very stiff, silty CLAY with trace sand and gravel
591.60	19	2.19B 14		
		2.93B 13		
		4.43B 13		
		3.50P 13		
585.10				Bottom of hole = 20.0 feet

LEGEND

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

SUBSURFACE DATA PROFILE  
STRUCTURE NO. 081-6016

PROFESSIONAL DESIGN FIRM LICENSE #184-001084

 Hanson Professional Services Inc.	JOB NO. 08H0120E	SHEET NO. 1	F.A.I RTE. 74	SECTION 81-1-2	COUNTY ROCK ISLAND	TOTAL SHEETS -	SHEET NO.
	DATE 5/30/12	3 SHEETS	CONTRACT NO. 64C08		FED. ROAD DIST. NO. - ILLINOIS FED. AID PROJECT		

STATE OF ILLINOIS  
DEPARTMENT OF TRANSPORTATION

ILR0803  
Sta. 630+15, 11' RT

	N	Qu	w%	
614.67				Silt With Trace Sand (ML) - yellowish brown, slightly moist, medium stiff, fine to coarse grained, low plasticity
	8	6.7S		
608.67	29	4.0P		
Bottom of hole = 6.0 feet				

ILR1401  
Sta. 1925+73, 48' LT

	N	Qu	w%	
616.50				Clay (CL) - gray, moist, stiff, moderate plasticity, trace of sand
	15	2.0P		
	11	1.3S		stiff
	11	1.0P		stiff
	4	0.5P	16	soft, trace of coarse sand
	4			no recovery, possibly due to gravel at the tip
604.50	7			Silty Sand (SM) - reddish brown, slightly moist, loose, fine to coarse grained, low plasticity fines
602.50	7	6.1S	6	Clay with Trace of Sand (CL) - brown, slightly moist, firm, fine to medium grained, moderate plasticity
	33	4.5P	14	hard (LL=33 PI=14)
	28	15.0S		very stiff
				50/2"
586.50				Bottom of hole = 30.0 feet

ILR1402  
Sta. 1926+49, 48' LT

	N	Qu	w%	
615.48				Clay (CL) - dark gray, slightly moist, stiff, fine to coarse grained, low plasticity
	12	2.5P		very stiff, trace of broken brick fragments
	21		10	(LL=31 PI=18)
609.48	9	2.2S	12	Silt with Sand (ML) - gray, slightly moist, stiff, fine to medium grained, low plasticity, trace of coarse sand
605.48	8			no recovery (LL=31 PI=16)
	5	1.5P		Clay (CL) - dark brown, slightly moist, firm, low plasticity, trace of coarse sand and chipped gravel
	6	1.0P	20	firm, no gravel observed (LL=36 PI=18)
	12	6.6S		brown, stiff
	13	2.5P	13	gray, stiff, trace of coarse sand (LL=29 PI=14)
	22	3.0P		very stiff, trace of rounded gravel, <1/2"
585.48	24			wet, very stiff, Shale on the tip
Bottom of hole = 30.0 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

SUBSURFACE DATA PROFILE  
STRUCTURE NO. 081-6016

PROFESSIONAL DESIGN FIRM LICENSE #184-001084

© Copyright Hanson Professional Services Inc.



JOB NO.

08H0120E

DATE

5/30/12

SHEET NO. 2
3 SHEETS

F.A.I RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
74	81-1-2	ROCK ISLAND	-	
CONTRACT NO. 64C08				
FED. ROAD DIST. NO. _ ILLINOIS FED. AID PROJECT				

STATE OF ILLINOIS  
DEPARTMENT OF TRANSPORTATION

ILR1405  
Sta. 1928+00, 48' LT

	N	Qu	w%	
617.28				Grass Matter - followed by brown silty sand, moist, non plastic, topsoil. Hole offset 12.0' Northeast of proposed boring location
616.28	9	4.5P		Silty Clay with Sand (CL-ML) - medium brown with olive gray, dry, non plastic, stiff, few coarse to fine sands, strong cementation, some medium to fine sands at top 4 inches of sample, possible fill
613.58	7	4.0P		
611.28				Sandy Silt with Gravel (ML) - dark brown, dry, crumbly, stiff to medium stiff, trace medium to fine subangular to subrounded gravel silt with medium to fine sands, possible fill
609.28	11			Silty Clay with Sand and Gravel (CL-ML) - brown, dry, non plastic, stiff, silty clay with few medium to fine sands, trace medium to fine subangular to subrounded gravels, possible fill
606.28	6	3.5P		
604.28	DD			Sandy Silty Clay (CL-ML) - mingled brown, dry, non plastic, medium stiff, slightly crumbly silty clay and medium to fine sands, little medium to fine angular to flat gravels, possible hardened sand and clay particles mottled, occasional root and wood matter, possible old topsoil (LL=28 PI=14)
	15			
599.28				Poorly Graded Sand with Silt (SP-SM) - medium brown, moist to wet, loose, medium to fine sands with silt, trace coarse sands, possible old alluvium deposits. Gradual transition from soil above, medium dense, medium brown, wet, medium to fine sands with little coarse sands, little silt, possible old alluvium deposits. Encountered water at 13.0' while sampling.
594.28	14	1.8P		Lean Clay with Sand (CL) - uniform gray, dry to moist, medium to low plasticity, stiff to very stiff, little to few coarse to fine sands, strong cementation, unweathered, possible glacial till (LL=37 PI=25)
	20	2.2		Sandy Lean Clay trace Gravel (CL) - uniform gray, very stiff, few coarse to fine sands, trace medium to fine subangular to subrounded gravels, strong cementation, unweathered glacial till
	20	4.5P		
584.28	50/2"			Silty Clay with Sand (CL-ML) - greenish gray mottled with brown, dry, non plastic, crumbly, hard, silt with clay and few medium to fine sands, oxidized, possible residual soil
583.58				Bottom of hole = 33.7 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

SUBSURFACE DATA PROFILE  
STRUCTURE NO. 081-6016

PROFESSIONAL DESIGN FIRM LICENSE #184-001084

© Copyright Hanson Professional Services Inc.



JOB NO.

08H0120E

DATE

5/30/12

SHEET NO. 3

3 SHEETS

F.A.I RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
74	81-1-2	ROCK ISLAND	-	
<b>CONTRACT NO. 64C08</b>				
FED. ROAD DIST. NO. _ ILLINOIS FED. AID PROJECT				



# SOIL BORING LOG

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	DEPTH H	BLOW S	UCS Qu	MOIST T	Surface Water Elev. _____ ft	DEPT H	BLOW S	UCS Qu	MOIST T
BORING NO. <u>ILR0701</u> Station _____ Offset _____	(ft)	(/6")	(tsf)	(%)	Stream Bed Elev. _____ ft	(ft)	(/6")	(tsf)	(%)
Ground Surface Elev. <u>629.30</u> ft					Groundwater Elev.:				
					First Encounter <u>581.3</u> ft ▼				
					Upon Completion _____ ft				
					After _____ Hrs. _____ ft				
7" Thick ACC followed by gravel subbase to 1.0'	628.70				Same As Above, turning grayish brown at bottom 3", piece of wood embedded, possible fill (continued)				
Silty Sandy Clay with Gravel, greenish brown, moist, low plasticity, stiff, with subangular to subrounded gravel embedded throughout, fill/subbase	625.30	2 2 10				605.80			
Sandy Clay Trace Gravel, dark gray, frozen, stiff, with subangular to subrounded fine to coarse gravel embedded throughout, fill		4 -5 4 5 3			Sandy Lean Clay Trave Gravel, brown, moist, stiff, low plasticity, possible weathered till		5 6 6		3.0 P
	621.30	5 6 6	3.0 to 4.0						
Silty Clay with Gravel, gray, moist, soft to medium stiff, high plasticity, trace gravel, possible fill		2 3 3 -10	P 2.0 P	15.5	Same as Above, gray, then brown, split in almost vertical with reddish brown surface, weathered till	600.80	6 7 8		2.5 to 3.5 P
	615.80		1.5 P						
Sandy Lean Clay Trace Gravel, gray, moist, stiff, medium plasticity, fill or disturbed till		3 2 -15 3	2.0 P	16.0	Sandy Lean Clay Trace Gravel, gray, moist, stiff, low plasticity, unweathered till	595.80	4 6 6		2.5 to 3.0 P
	610.80								
Same As Above, turning grayish brown at bottom 3", piece of wood embedded, possible fill		3 4 -20 7					5 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)  
 BBS, from 137 (Rev. 8-99)











**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 KB

SECTION I-74 Bridge over Mississippi River LOCATION (N=561610.195, E=2459915.128), SEC. 32, TWP. 18N, RNG. 1W, 4<sup>th</sup> PM

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

STRUCT. NO. Station	DEPTH H	BLOW S	UCS Qu	MOIST T	Surface Water Elev. Stream Bed Elev.	DEPTH H	BLOW S	UCS Qu	MOIST T
	(ft)	(/6")	(tsf)	(%)	ft	(ft)	(/6")	(tsf)	(%)
<b>Clay (CL)</b> dark gray, slightly moist, stiff, fine to coarse grained, low plasticity  very stiff, trace of broken brick fragments  609.48									
		3							
		4	2.5						
		8	P				5		
		4					9	3.0	
		7		10.0			13	P	
		14							
<b>Silt With Sand (ML)</b> gray, slightly moist, stiff, fine to medium grained, low plasticity, trace of coarse sand  no recovery  605.48		2							
		3	2.2	12.0					
		6	S						
		2					2		
		4					9		
		4					15		
<b>Clay (CL)</b> dark brown, slightly moist, firm, low plasticity, trace of coarse sand and chipped gravel  firm, No gravel observed  brown, stiff  gray, stiff, trace of coarse sand  -20		1							
		2	1.5						
		3	P						
		1							
		3	1.0	20.0					
		3	P						
		4							
		5	6.6						
		7	S						
<b>Clay (CL)</b> dark brown, slightly moist, firm, low plasticity, trace of coarse sand and chipped gravel  very stiff, trace of rounded gravel, <1/2"  wet, very stiff, Shale on the tip  585.48  End of Boring  -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)





PROJECT NUMBER: <b>158835.AA.GS.01</b>	BORING NUMBER: <b>RW401</b>	SHEET 1 OF 3
<b>SOIL BORING LOG</b>		

PROJECT : I-74 Bridge over Mississippi River, Quad Cities IA/IL      LOCATION : (562322.6 N, 2459622.9 E)

ELEVATION : 609.5 ft MSL      DRILLING CONTRACTOR : Terracon

DRILLING METHOD AND EQUIPMENT : CME-550, 6" power auger, HSA, SPT with automatic hammer CME-50

WATER LEVELS : ---      START : 12/16/05 09:45      END : 12/16/05 15:00      LOGGER : B. Karnik

DEPTH BELOW EXISTING GRADE (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS	
	RECOVERY (in)	#TYPE					6"-6"-6"-6" (N)
609.5	0.0	14.0	S-1-SS	3-7-9-8 (16)	Frozen	Hole offset to gps #50 adjacent to ramp abutment	
	2.0						
	4.0	10.0	S-2-SS	9-13-15-50/1 (28)			
5		1.0	S-3-SS	50/5 (50/5")			Ground frozen to approximately 4' deep
604.5	6.0						
	8.0	6.0	S-4-SS	7-5-4-3 (9)			
	10.0	6.0	S-5-SS	3-2-3-5 (5)			
10							
599.5	12.0		S-6-SS	4-13-11-6 (24)			No recovery possibly due to piece of coarse gravel stuck in shoe
	14.0	18.0	S-7-SS	4-3-4-4 (7)			Dark brown, stiff, low plasticity
15		19.0	S-8-SS	3-5-7-8 (12)			Similar to above with fine to medium, rounded-subrounded gravel, fill
594.5	16.0						
	20.0						
20		21.0	S-9-SS	3-4-7-10 (11)			
589.5	22.0						
	25.0						
25		22.0	S-10-SS	4-7-8-10 (15)		Similar to above, dark reddish brown	
584.5	27.0					<b>Sandy Lean Clay Trace Gravel (CL)</b> Gray, moist, stiff, fine to medium rounded-subrounded gravel embedded throughout, glacial clay	
	29.0						
30				4-7-8-9		Start mud rotary at 29' after sampling	



PROJECT NUMBER: <b>158835.AA.GS.01</b>	BORING NUMBER: <b>RW401</b>	SHEET 2 OF 3
<b>SOIL BORING LOG</b>		

PROJECT : I-74 Bridge over Mississippi River, Quad Cities IA/IL      LOCATION : (562322.6 N, 2459622.9 E)

ELEVATION : 609.5 ft MSL      DRILLING CONTRACTOR : Terracon

DRILLING METHOD AND EQUIPMENT : CME-550, 6" power auger, HSA, SPT with automatic hammer CME-50

WATER LEVELS : ---      START : 12/16/05 09:45      END : 12/16/05 15:00      LOGGER : B. Karnik

DEPTH BELOW EXISTING GRADE (ft)	INTERVAL (ft)			STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG Frozen	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (in)	#TYPE					
579.5	31.0	23.0	S-11-SS	(15)			
35 574.5							
40 569.5	40.0	24.0	S-12-SS	5-8-10-12 (18)			
45 564.5	42.0						
50 559.5	50.0	12.0	S-13-SS	9-16-50/6 (66/12")	<b>Sandy Shale</b> Dark gray, dry, hard, weathered shale with coal and sand seams		Spoon refusal at 51' end drilling at 11:50 am, start rock coring at 52' at 1:37 pm
55 554.5	52.0				Begin Rock Coring at 52.0 ft below ground surface See the next sheet for the rock core log		
60							





PROJECT NUMBER: <b>158835.AA.GS.01</b>	BORING NUMBER: <b>RW401</b>	SHEET 3 OF 3
<b>ROCK CORE LOG</b>		

PROJECT : I-74 Bridge over Mississippi River, Quad Cities IA/IL      LOCATION : (562322.6 N, 2459622.9 E)  
 ELEVATION : 609.5 ft MSL      DRILLING CONTRACTOR : Terracon  
 CORING METHOD AND EQUIPMENT : CME-550, NQ DOUBLE BARREL DIAMOND TIP      ORIENTATION : VERTICAL  
 WATER LEVELS : ---      START : 12/16/05 09:45      END : 12/16/05 15:00      LOGGER : B. Karnik

DEPTH BELOW SURFACE (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
52.0			1		<b>Shale</b> Gray, very fine grain, soft, slightly weathered, very weak, sound rock, very sandy <b>Limestone</b> Dark gray, fine to coarse grained, appearance is a mixture of fine sand and gravel, rutted texture, moderately weathered, weak to medium strong, moderately fractured to extremely fractured <b>Sandstone??</b> No recovery, possibly sandstone, brown, fine grained sandstone piece in bit	Rate of coring: 5 minutes for 5', very poor recovery	
55 554.5	R-1-NQ 5 ft 45%	23	5	Shale: horizontal joints, possibly caused during core retrieval, no staining, smooth, planar joint surfaces, 2" thick soft, silty infilling at shale sandstone interface Limestone: horizontal joints, black staining, rough, undulating surfaces, very close to close spaced discontinuities, joints are open			
57.0						Rate of coring: 6 minutes for 5', rock piece stuck in bit plugged up barrel	
60 549.5	R-2-NQ 5 ft 0%	0					
62.0						No recovery between 62' to 67' driller could not figure out what was wrong, abandoned drilling at 67' at 3:00pm, coring rate 7 minutes for 5'	
65 544.5	R-3-NQ 5 ft 0%	0					
67.0					Bottom of Boring at 67.0 ft below ground surface on 12/16/05 15:00		
70 539.5							
75 534.5							
80 529.5							



# SOIL BORING LOG

Date 6/22/10ROUTE F.A.I. 74 DESCRIPTION I-74 Over Mississippi River LOGGED BY JMBSECTION 81-1-2 LOCATION SW¼ of SEC. 33, TWP. 18N, RNG. 1W, 4th P.M.COUNTY Rock Island DRILLING METHOD Hollow Stem Auger HAMMER TYPE Auto

STRUCT. NO. 081-6016  
 Station \_\_\_\_\_  
 BORING NO. RW 07-1  
 Station 58+77  
 Offset 15' Rt.  
 Ground Surface Elev. 605.1 ft

D E P T H (ft)	B L O W S (/6")	U C S Qu (tsf)	M O I S T (%)
-------------------------------	--------------------------------	----------------------------	------------------------------

Surface Water Elev. \_\_\_\_\_  
 Stream Bed Elev. \_\_\_\_\_  
 Groundwater Elev.:  
 First Encounter \_\_\_\_\_ ft  
 Upon Completion 599.1 ft  $\nabla$   
 After \_\_\_\_\_ Hrs. \_\_\_\_\_ ft

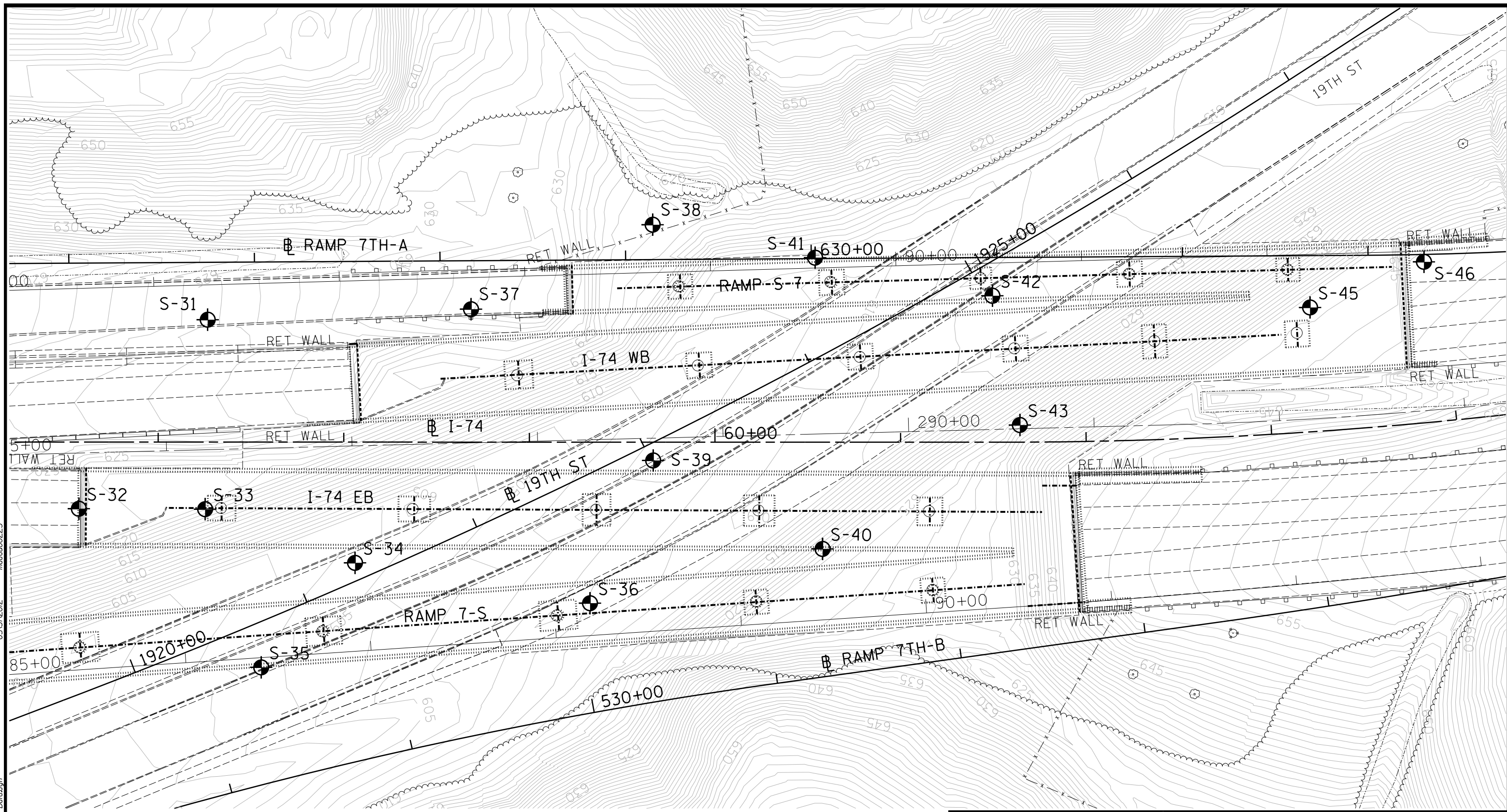
CONCRETE	604.70				
FILL - Brown, moist, very stiff, clayey SILT with trace sand		4		14	
		8			
	2	7			
			1.67S	13	
			0.90B	20	
	4		1.95S	13	
	600.10				
Brown, wet, silty, clayey, fine-grained SAND with trace gravel	599.10 $\nabla$	2	0.42B	21	
Dark brown, moist, soft to stiff, clayey SILT		2			
		3			
	8		1.25P	19	
	596.10			16	
Brown, wet, silty, clayey, fine-grained SAND with gravel					
	10				
	594.10				
Brown, moist, very stiff, clayey SILT with trace sand and gravel		5	2.30P	13	
		15			
	12	7			
	591.60		3.11B	16	
Gray, moist, very stiff, silty CLAY with trace sand and gravel			3.04B	15	
	14				
	16	6	2.19B	14	
		8			
		11			
	18		2.93B	13	
			4.43B	13	
			3.50P	13	
	585.10				
	20				

End of Boring

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)

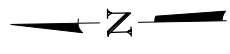
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

0810179-A0326-000-SubsurfFace\_Data.dgn 05/31/2012 macdu00223



**LEGEND**

 RW600 BORING LOCATION



<b>BORING LOCATION PLAN</b>	
EXISTING I-74, RAMP 7-S, & RAMP S-7 OVER 19TH STREET ROCK ISLAND COUNTY, ILLINOIS	
08H0120E	5/30/12

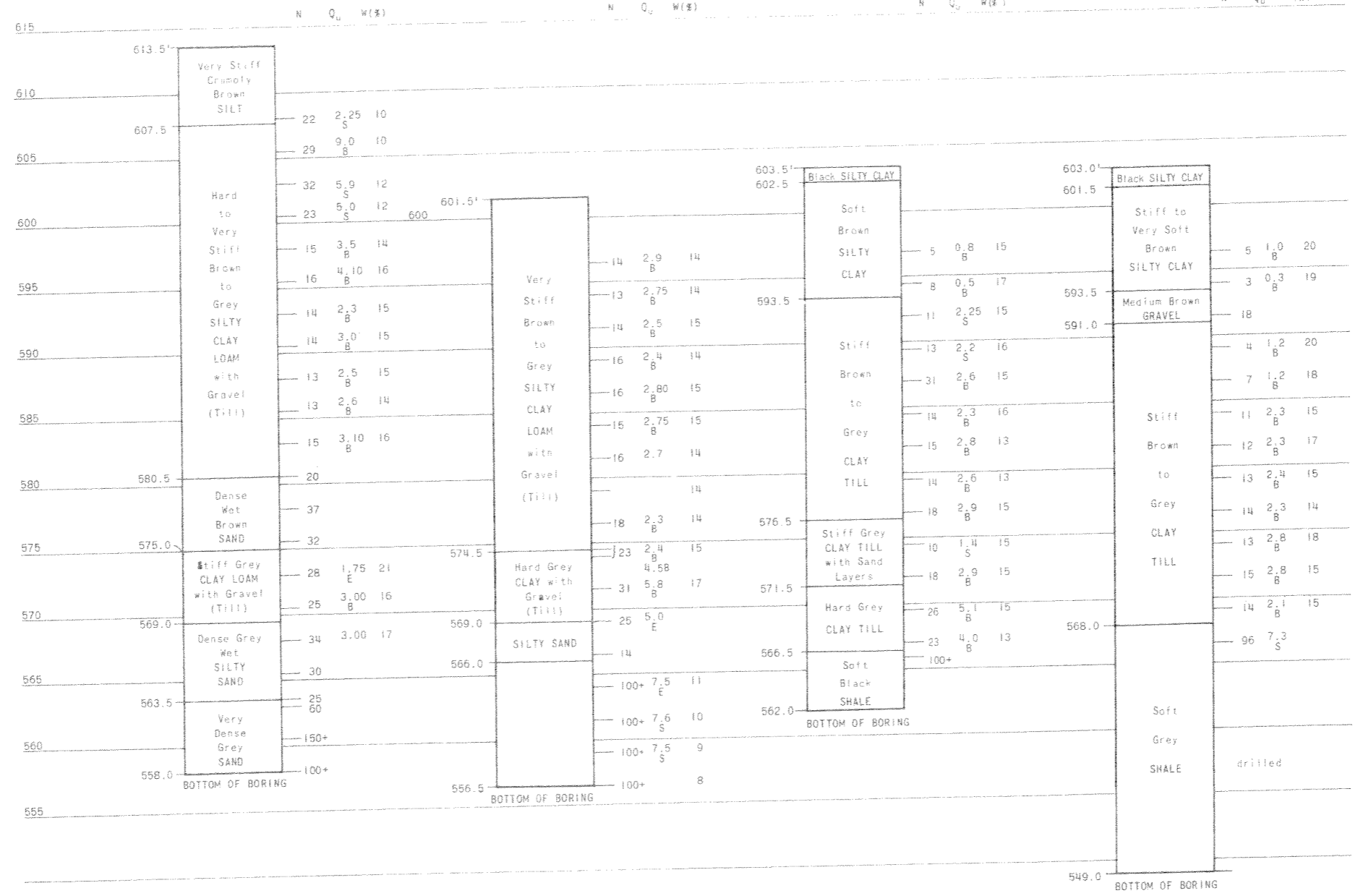
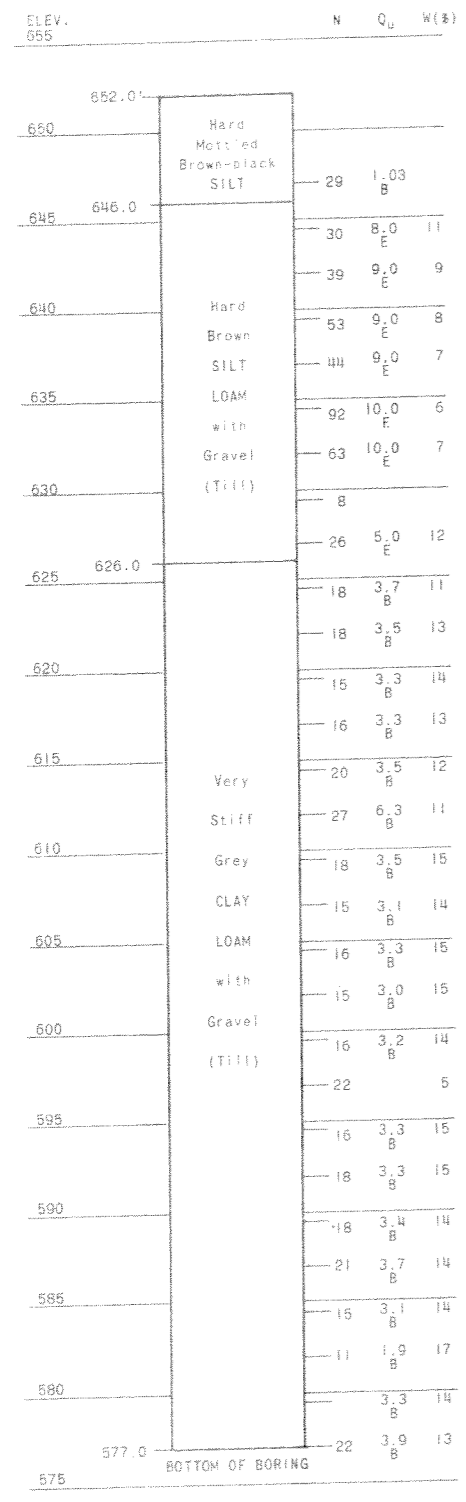
TEST BORING  
NO. S-31  
STATION 286+24 - 70' LT.

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

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

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

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



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 81-118  
F.A.I. 74 RAMP OVER RELOC. 19TH ST.  
ROCK ISLAND COUNTY  
STATION 289 + 23.09  
SCALE: AS NOTED DATE:

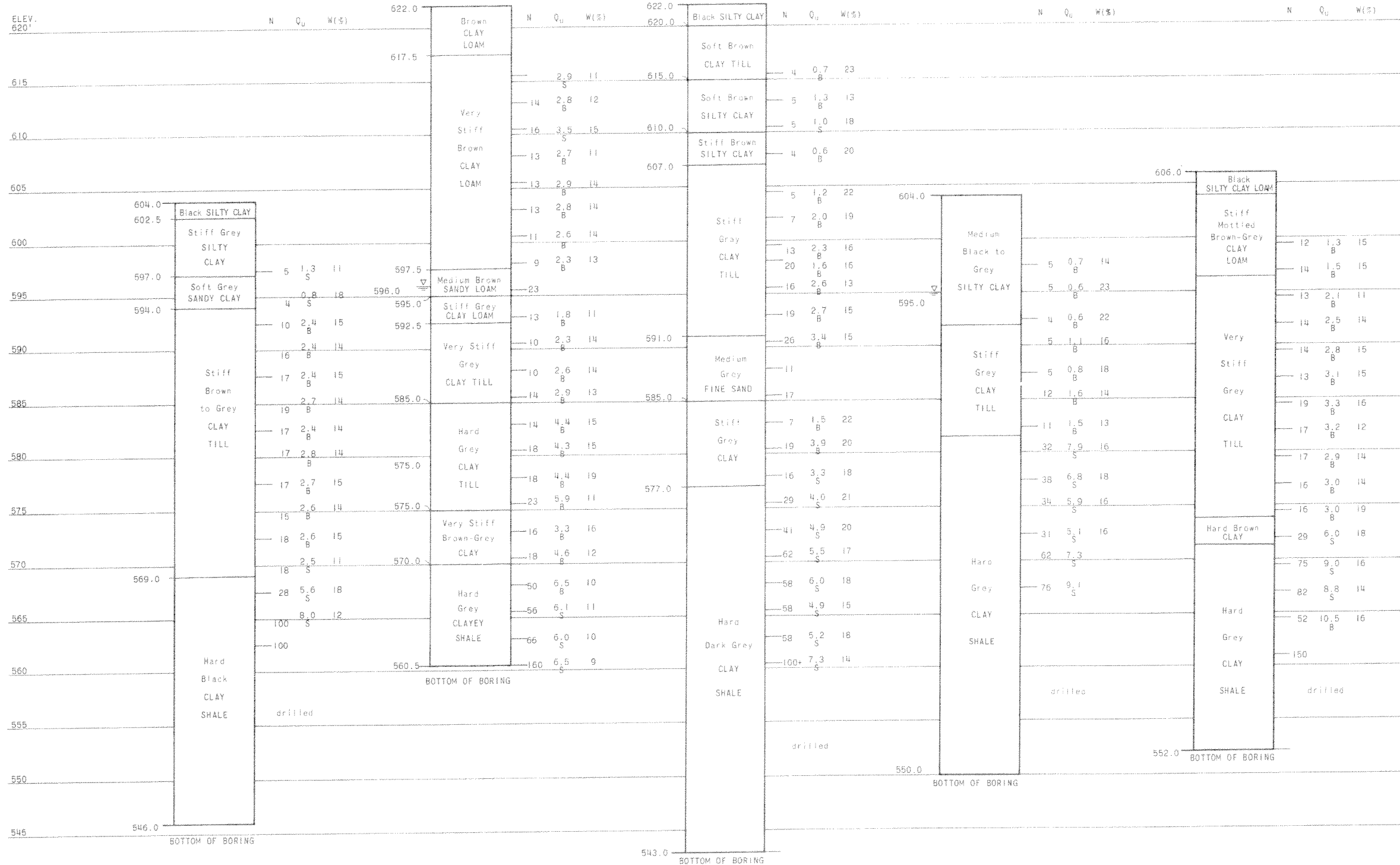
TEST BORING  
NO. S-36  
STATION 288+26 - 88' RT. ☺

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 B RAMP OVER RELOC. 19TH ST.  
ROCK ISLAND COUNTY  
STATION 289 + 23.09

SCALE: AS NOTED DATE:

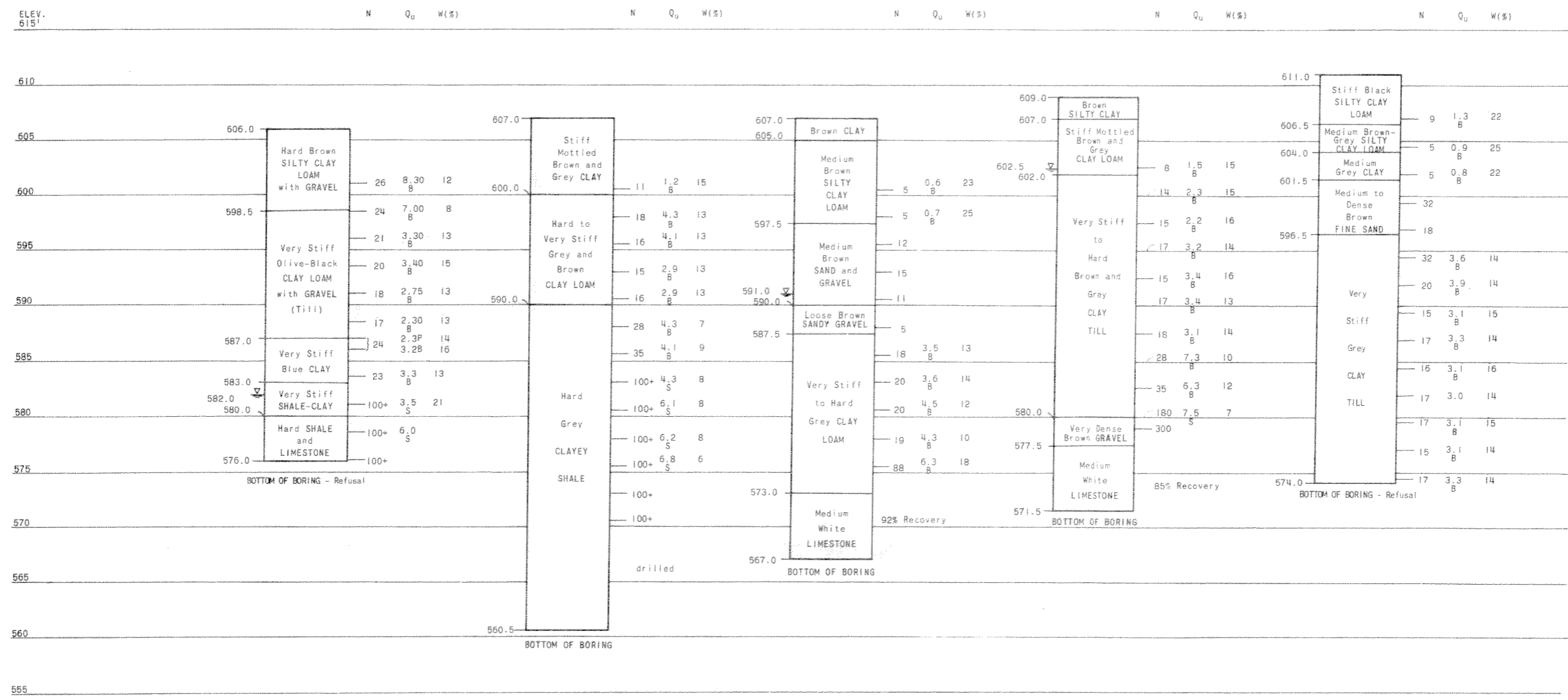
TEST BORING  
NO. S-41  
STATION 289+52 - 95' LT.

TEST BORING  
NO. S-42  
STATION 290+47 - 72' LT.

TEST BORING  
NO. S-43  
STATION 290+60 - 2' LT.

TEST BORING  
NO. S-45  
STATION 292+20 - 60' LT.

TEST BORING  
NO. S-46  
STATION 292+85 - 80' LT.



DE LEUW, CATHAR & 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-IHB  
F.A.I. 74 B RAMP OVER RELOC. 19TH ST.  
ROCK ISLAND COUNTY  
STATION 289+23.09  
SCALE: AS NOTED DATE:



**Hanson Professional Services Inc.**  
**Unconfined Compression Test Report (ASTM D2166)**

Date 8/31/10

Checked By JCC

Date

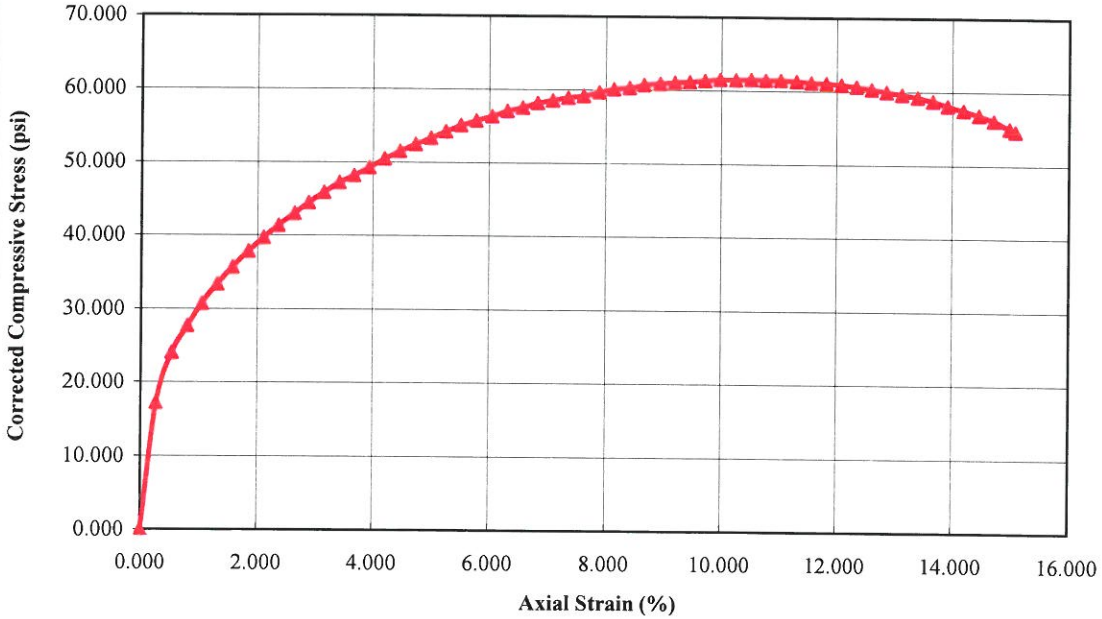
Computed By

8/12/10

Date

Tested By Rin

**Compressive Stress Axial Strain Curve**

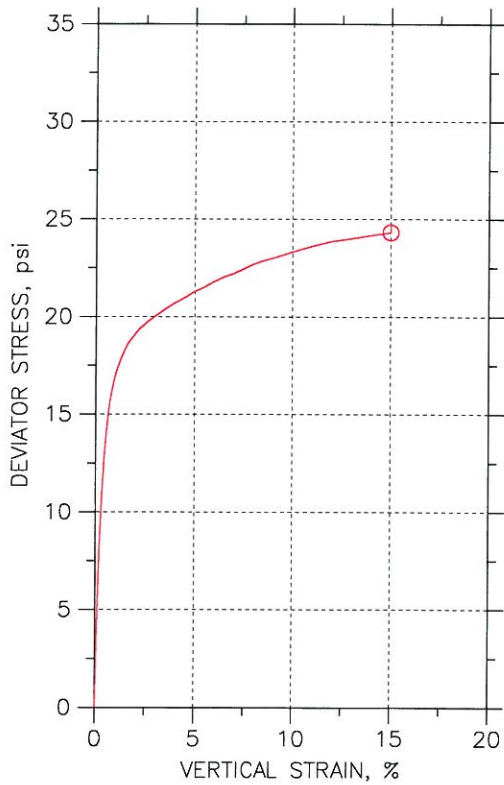
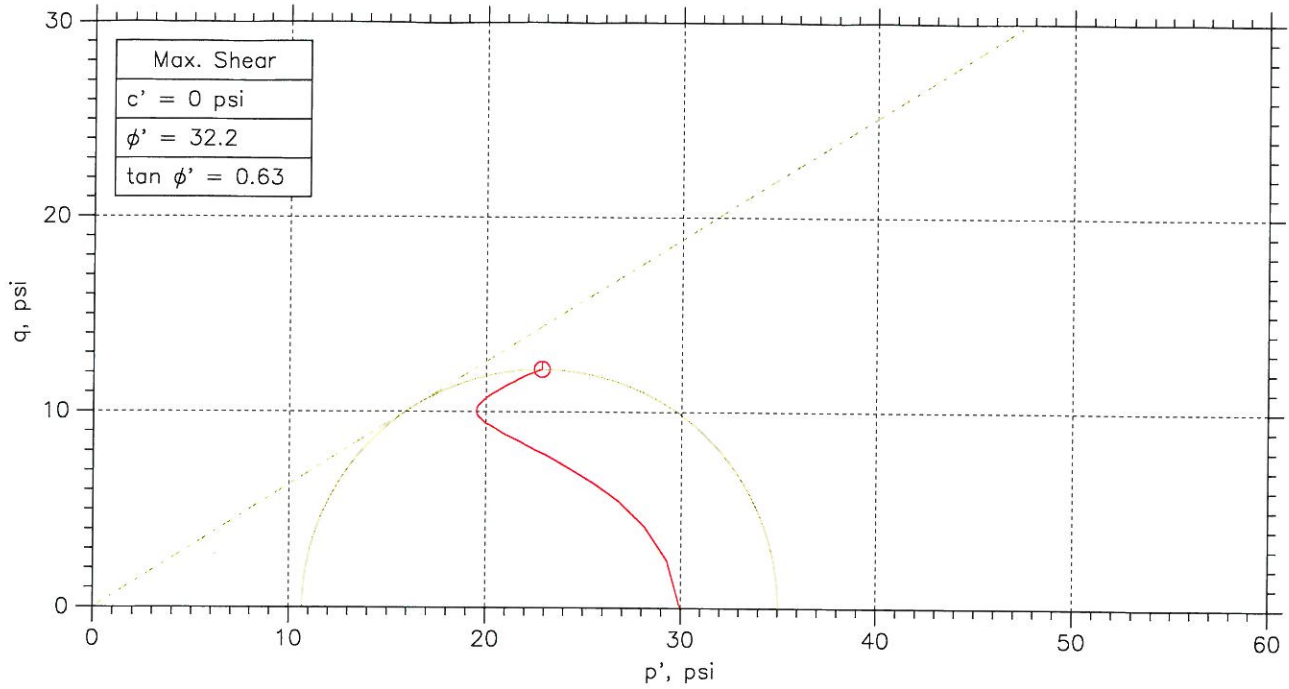


RW07-1-8-2

Before Test	Specimen			
	A	B	C	D
Water Content (%)			13.00	
Dry Density (pcf)			122.989	
Saturation (%)			99.82	
Void Ratio			0.35	
Diameter (in)			2.863	
Height (in)			5.870	
Test Data	A	B	C	D
Unconfined Strength (psi)			61.539	
Undrained Shear Strength (tsf)			2.215	
Undrained Shear Strength (psi)			30.769	
Rate of Strain (in/min)			0.085000	
Strain at Failure (%)			10.52	
Description		Project Information		
		Project Num	08H0120E	
		Project	I-74 Mississippi River Bridge	
		Depth	18.5-19.0	RW07-1-8-2
		Sample #	8-2	
		Client		
		Test Variables		
		Specific Gravity	2.65	
		Liquid Limit:		
		Plastic Limit:		
Remarks				



# CONSOLIDATED UNDRAINED TRIAXIAL TEST



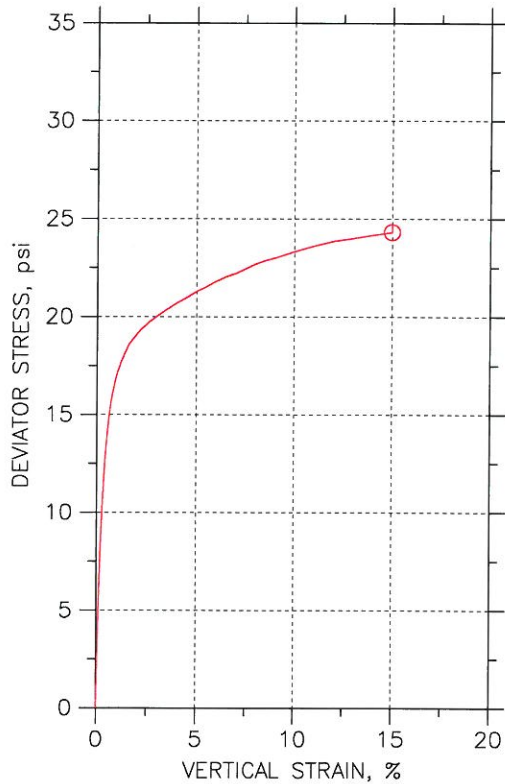
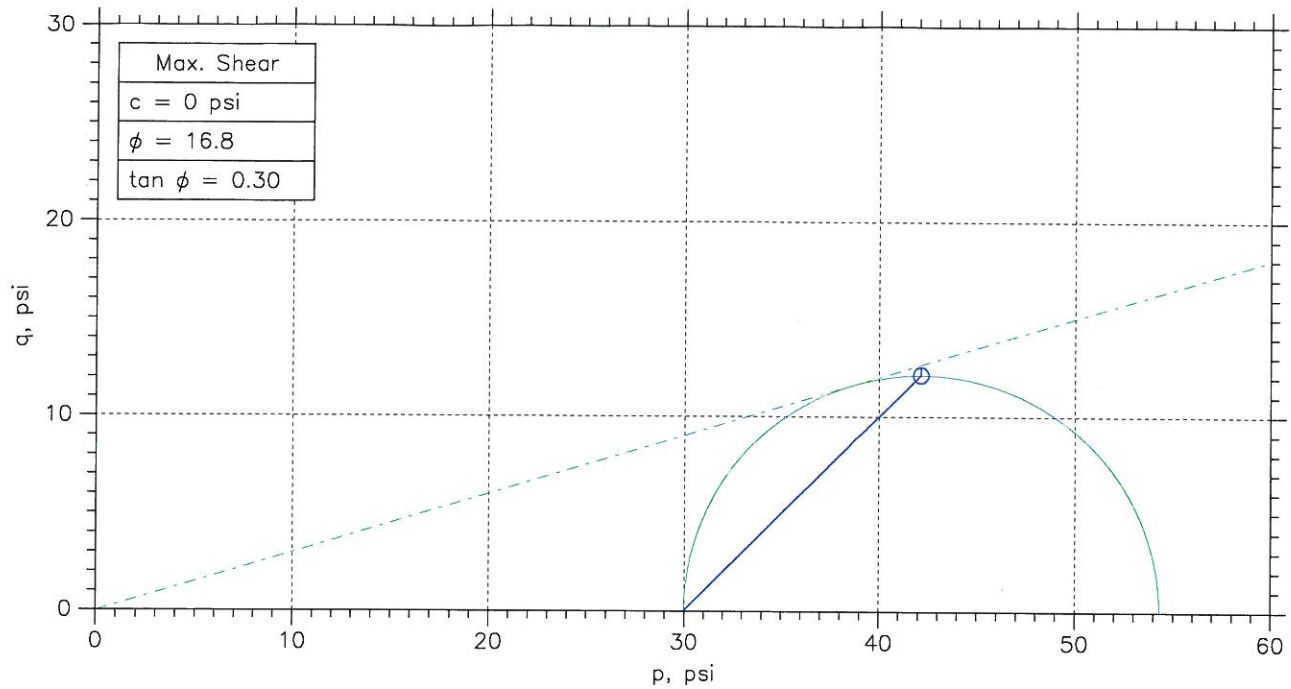
Symbol	⊙		
Sample No.	4-1		
Test No.	1		
Depth	8.0-8.5		
Initial	Diameter, in	2.862	
	Height, in	5.635	
	Water Content, %	18.8	
	Dry Density, pcf	107.6	
	Saturation, %	92.5	
Before Shear	Void Ratio	0.538	
	Water Content, %	16.8	
	Dry Density, pcf	114.4	
	Saturation*, %	100.0	
	Void Ratio	0.446	
	Back Press., psi	62.01	
	Ver. Eff. Cons. Stress, psi	29.98	
	Shear Strength, psi	12.16	
	Strain at Failure, %	15	
	Strain Rate, %/min	0.0625	
	B-Value	0.96	
	Estimated Specific Gravity	2.65	
	Liquid Limit	0	
	Plastic Limit	0	

	Project: I-74 Mississippi River Br				
	Location: Quad Cities				
	Project No.: 08H0120E				
	Boring No.: RW07-1				
	Sample Type: Tube				
	Description: Brn. f. sandy clayey silt / so. c. sand & sm. gravel.				
Remarks: 2500 # Load Cell Loadtrac II # 258112 FlowTrac II 13610 & 13610B & LVDT55306					

Phase calculations based on start of test.

\* Saturation is set to 100% for phase calculations.

# CONSOLIDATED UNDRAINED TRIAXIAL TEST



Symbol	⊙			
Sample No.	4-1			
Test No.	1			
Depth	8.0-8.5			
Initial	Diameter, in	2.862		
	Height, in	5.635		
	Water Content, %	18.8		
	Dry Density, pcf	107.6		
	Saturation, %	92.5		
Before Shear	Void Ratio	0.538		
	Water Content, %	16.8		
	Dry Density, pcf	114.4		
	Saturation*, %	100.0		
	Void Ratio	0.446		
	Back Press., psi	62.01		
	Ver. Eff. Cons. Stress, psi	29.98		
	Shear Strength, psi	12.16		
	Strain at Failure, %	15		
	Strain Rate, %/min	0.0625		
	B-Value	0.96		
	Estimated Specific Gravity	2.65		
	Liquid Limit	0		
	Plastic Limit	0		

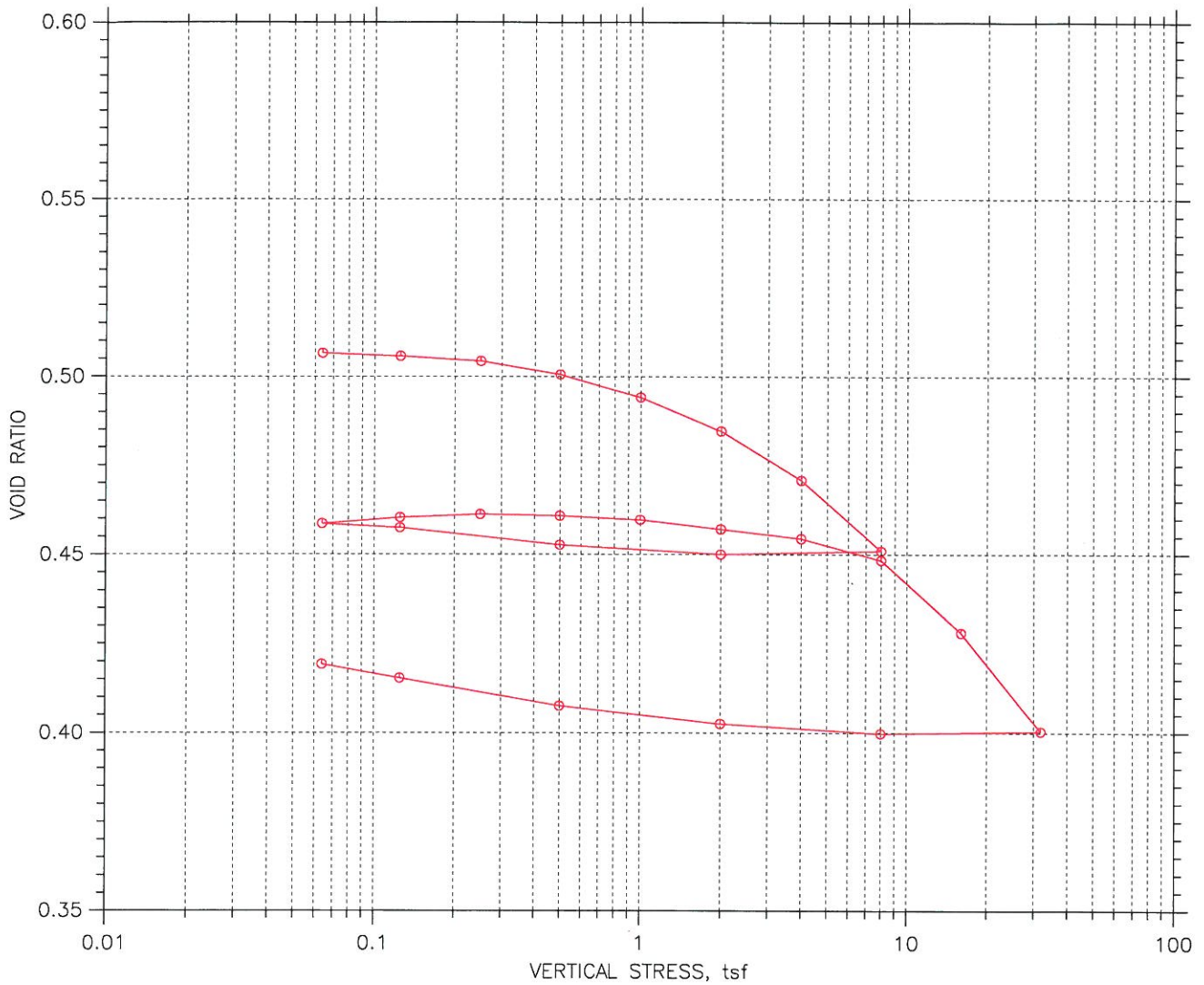
	Project: I-74 Mississippi River Br				
	Location: Quad Cities				
	Project No.: 08H0120E				
	Boring No.: Rw07-1				
	Sample Type: Tube				
	Description: Brn. f. sandy clayey silt / so. c. sand & sm. gravel.				
Remarks: 2500 # Load Cell Loadtrac II # 258112 FlowTrac II 13610 & 13610B & LVDT55306					

Phase calculations based on start of test.

\* Saturation is set to 100% for phase calculations.

# CONSOLIDATION TEST DATA

## SUMMARY REPORT



		Before Test	After Test
Overburden Pressure: 0 tsf		19.57	16.30
Preconsolidation Pressure: 0 tsf		109.7	116.6
Compression Index: 2.54639e-313		102.19	103.07
Diameter: 2.499 in		Void Ratio	
Height: 0.995 in			
LL: 0	PL: 0	0.51	0.42
PI: 0	GS: 2.65		

	Project: I74 mississippi River	Location: Quad Cities	Project No.: 08H0120E
	Boring No.: RW07-1	Tested By: Rin	Checked By: JCC
	Sample No.: 4-2	Test Date: 8/24/10	Depth: 8.5-8.7
	Test No.: 1	Sample Type: Tube	Elevation: N/A
	Description: Brn. f. sandy silt / so. clay, c. sand & sm. gravel.		
	Remarks:		

CONSOLIDATION TEST DATA

Project: I74 mississippi River  
 Boring No.: RW07-1  
 Sample No.: 4-2  
 Test No.: 1

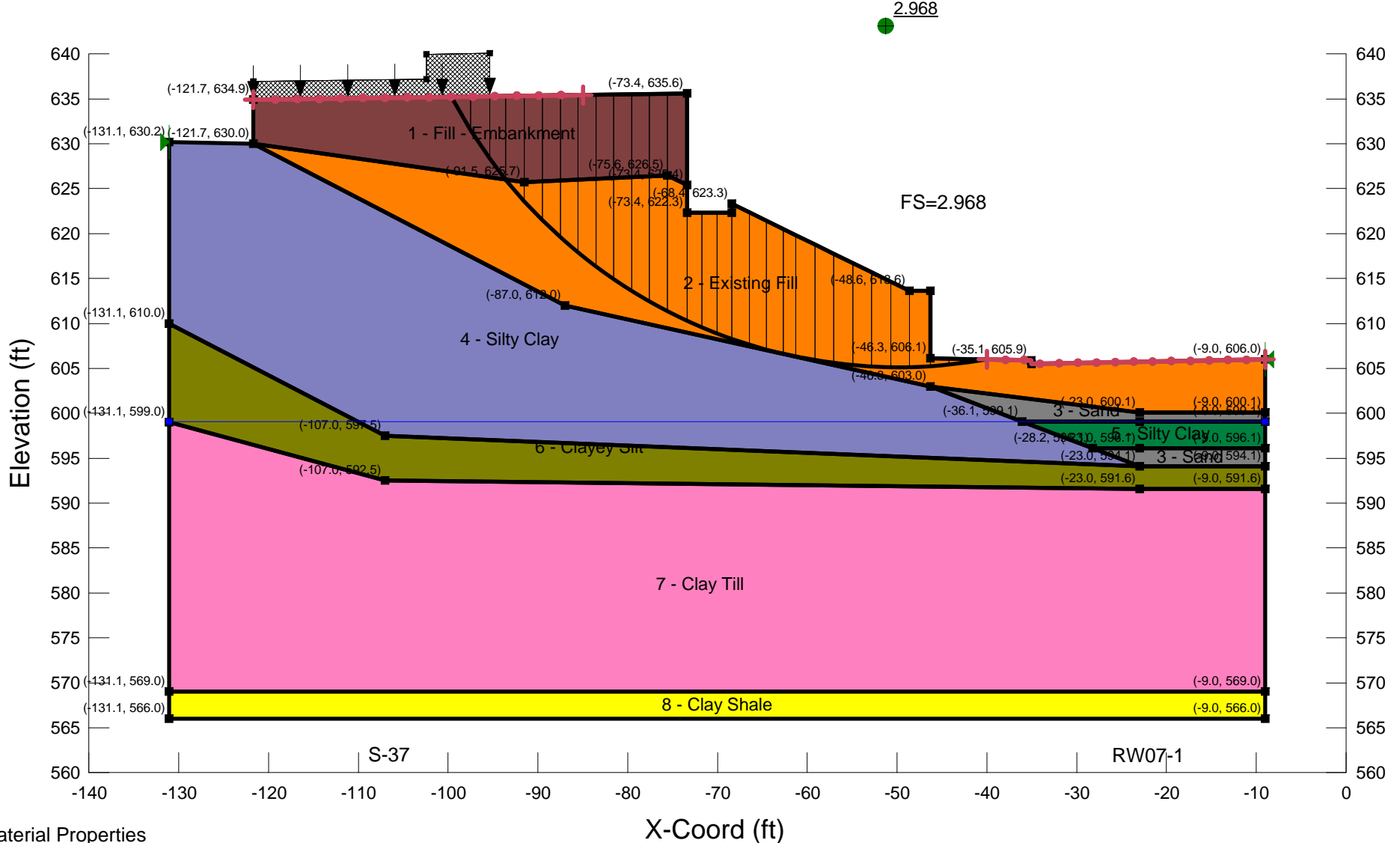
Location: Quad Cities  
 Tested By: Rin  
 Test Date: 8/24/10  
 Sample Type: Tube

Project No.: 08H0120E  
 Checked By: JCC  
 Depth: 8.5-8.7  
 Elevation: N/A

Soil Description: Brn. f. sandy silt / so. clay, c. sand & sm. gravel.  
 Remarks:

	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	T50 Fitting		Coefficient of Consolidation		
					Sq.Rt. min	Log min	Sq.Rt. in <sup>2</sup> /sec	Log in <sup>2</sup> /sec	Ave. in <sup>2</sup> /sec
1	0.064	0.0006478	0.506	0.07	0.0	11.0	0.00e+000	7.42e-005	7.42e-005
2	0.125	0.001203	0.506	0.12	15.4	6.8	5.28e-005	1.20e-004	7.33e-005
3	0.25	0.002152	0.504	0.22	3.5	3.1	2.34e-004	2.58e-004	2.45e-004
4	0.5	0.004606	0.500	0.46	4.3	6.3	1.87e-004	1.28e-004	1.52e-004
5	1	0.008881	0.494	0.89	3.8	0.0	2.12e-004	0.00e+000	2.12e-004
6	2	0.0151	0.485	1.52	1.9	2.6	4.23e-004	3.09e-004	3.57e-004
7	4	0.02422	0.471	2.43	1.9	1.4	4.16e-004	5.70e-004	4.81e-004
8	8	0.03727	0.451	3.75	1.8	1.4	4.17e-004	5.47e-004	4.73e-004
9	2	0.03792	0.450	3.81	0.2	0.0	4.44e-003	0.00e+000	4.44e-003
10	0.5	0.03618	0.453	3.64	1.9	0.0	3.96e-004	0.00e+000	3.96e-004
11	0.125	0.03301	0.457	3.32	7.0	6.1	1.09e-004	1.25e-004	1.16e-004
12	0.064	0.03223	0.459	3.24	37.1	13.5	2.05e-005	5.64e-005	3.01e-005
13	0.125	0.0311	0.460	3.13	0.0	0.0	0.00e+000	0.00e+000	0.00e+000
14	0.25	0.03052	0.461	3.07	0.0	0.0	1.56e-002	1.64e-002	1.60e-002
15	0.5	0.03082	0.461	3.10	1.9	0.0	4.05e-004	0.00e+000	4.05e-004
16	1	0.03155	0.460	3.17	2.0	1.1	3.89e-004	6.93e-004	4.98e-004
17	2	0.03325	0.457	3.34	1.0	0.5	7.75e-004	1.46e-003	1.01e-003
18	4	0.03502	0.454	3.52	0.5	0.4	1.55e-003	1.94e-003	1.72e-003
19	8	0.03899	0.448	3.92	0.9	0.4	8.13e-004	1.99e-003	1.15e-003
20	16	0.05247	0.428	5.27	1.0	1.3	7.69e-004	5.51e-004	6.42e-004
21	32	0.07072	0.400	7.11	1.0	0.7	7.41e-004	1.03e-003	8.60e-004
22	8	0.07108	0.400	7.14	0.0	0.0	4.18e-002	5.45e+000	8.29e-002
23	2	0.0693	0.402	6.97	0.9	0.0	7.52e-004	0.00e+000	7.52e-004
24	0.5	0.06599	0.407	6.63	3.8	5.5	1.84e-004	1.30e-004	1.52e-004
25	0.125	0.06084	0.415	6.11	13.9	0.0	5.14e-005	0.00e+000	5.14e-005
26	0.064	0.05826	0.419	5.86	0.0	37.7	0.00e+000	1.91e-005	1.91e-005





**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**

