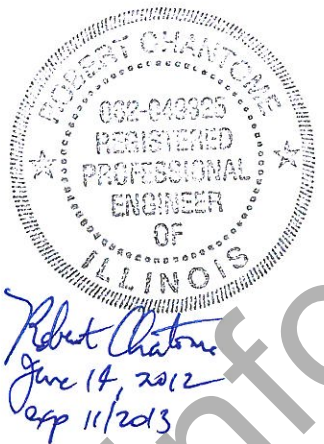

June 14, 2012
exp 11/2013

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Structure Geotechnical Report

F.A.I. Route 74
Section 81-1HVB
Rock Island County
Job No. P-92-032-01
Contract No. 64C08
PTB No. N/A
Retaining Wall IL-RW02
Structure Number 081-6011

September 2011 / Revised June 2012

Table of Contents

Tables

Figures

1. Project Description

This report provides geotechnical data and recommendations for the proposed Retaining Wall IL-RW02, which is 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 retaining wall covered by this structure geotechnical report will be a new structure, constructed to retain fill for the proposed Ramp RD-G roadway.

Nearby project features that have an impact on the design or construction of the proposed retaining wall include the I-74 Mississippi River Bridge, the eastbound I-74 retaining wall (IL-RW16, S.N. 081-6018), the Ramp RD-H retaining wall (IL-RW01, S.N. 081-6010) and the I-74 mainline and ramps. Geotechnical recommendations for the river bridge are presented in a soils design package prepared by Hanson Professional Services Inc. (Hanson) in January 2011. Geotechnical recommendations for Retaining Walls IL-RW01 and IL-RW16 are presented in separate structure geotechnical reports prepared by Hanson. Geotechnical recommendations for the roadways are contained in a soil survey report currently being prepared by Hanson.

This report supersedes the structure geotechnical report prepared by CH2M HILL in September 2009.

2. Location

The proposed Retaining Wall IL-RW02 is located in the north central portion of Rock Island County, within Section 32 of Township 18 North, Range 1 West. The wall is adjacent to and parallel to the right shoulder of Ramp RD-G. The wall separates the ramp on the high side from a future bike path on the low side. The wall begins at Ramp RD-G Sta. 130+50.00 and traverses southward to Sta. 134+50.17.

3. Proposed Structure

Prior to the final planning for this structure, the Benesch Team completed a value engineering study for the portion of the project between the south abutment of the river bridge and the north abutment of the Illinois Viaduct. Estimated construction costs, maintenance requirements, local access, and aesthetics were compared for three alternatives. The study concluded that a plug fill, comprised of earth embankment and mechanically stabilized earth (MSE) retaining walls, was the preferred alternative. Meeting minutes summarizing the value engineering study are included in the Appendix.

After the value engineering study was completed, the grading for the plug fill was further refined and the foundation conditions were more thoroughly analyzed. Some of the retaining walls were replaced with earth slopes and the estimated foundation treatment quantities were reduced.

The proposed structure will be a mechanically stabilized earth (MSE) wall, as determined by a previous value engineering study. A wall using precast panels with the minimum reinforced soil mass width is preferred for cost and construction schedule. The wall will have a height, measured from the theoretical top of leveling pad to the finished grade line, between 3.5 and 8.6 ft. With this range of heights a typical MSE wall section would have an equivalent uniform bearing pressure varying from 700 to 1,700 psf along the length of the wall.

The cross-section of the wall is typical for an Illinois Department of Transportation (IDOT) structure. A parapet and anchorage slab bears on the reinforced soil mass. Both ends of the wall terminate in a low embankment for Ramp RD-G.

Construction of the wall will be governed by a performance specification. The MSE wall supplier will be responsible for the internal stability of the reinforced soil mass. This report provides geotechnical recommendations for external stability and global stability, which are the responsibility of the wall designer.

4. Site Investigation

The field exploration completed for this structure was completed in three phases. The first two phases were completed in November 2005 and September 2007 by another consultant. IDOT provided the data collected from those two phases. The third phase was completed in July 2010 by Hanson. The primary purpose of the third phase was to collect additional soil samples for strength and consolidation testing. A representative from Hanson logged the borings and performed a general site reconnaissance during the third phase.

The alignment for the proposed retaining wall passes through a former foundry site. The area is now mostly now vacant land. Remnants of floor slabs and other evidence of the past industrial use are visible throughout. At the time of the July 2010 site investigation, significant quantities of random material had been dumped in the area. The random material consists of fine to coarse grained soils, construction debris, dead branches, and metal scraps. The topography is generally flat, with the elevation of the natural ground between 566 ft. and 572 ft. The wall alignment intersects an approximately 5 ft. tall berm that surrounds the property to the west of the site. Mounds of the random material up to 8 ft. above the surrounding grade were tightly spaced at the north end of the site.

Six borings were drilled in the first two phases and six borings were 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 90 ft.; however, most borings were spaced at 75 feet or less. Standard Penetration Test samples were collected at 2.5 ft. to 5.0 ft. intervals in all borings between the ground surface and bedrock. Several Shelby tube samples were collected at representative locations in cohesive strata. A 15 to 25 ft. long core sample of the bedrock was collected in Borings ILR0201-S, ILR0204, and ILR0206. The boring depths ranged from 11.2 to 45.8 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. Most of the testing consisted of index testing of representative samples. Three organic content tests and a consolidated-undrained triaxial test were completed.

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 consolidated undrained triaxial test envelope, two consolidation tests, and one organic content test were performed on Shelby tube samples. Index testing was completed on three representative samples to help correlate the strength and consolidation testing data with the other borings drilled for the project.

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

6. Subsurface Profile

A subsurface data profile has been developed from the boring logs. It is presented in the Appendix for use by the structure designer.

The subsurface profile consists of fill materials overlying natural soil and bedrock strata. The fill was found over the entire wall alignment from the ground surface to depths of 3 to 11 ft. The depth of fill generally increases from the south to the north. Natural soils were encountered below the fill. These soils can be categorized into three distinct strata – weathered till (gumbotil), glacial till, and alluvium. Bedrock was encountered at depths of 10 to 19 ft.

The fill consists of a random mix of sands, gravels, silts, clays, and debris, including, but not limited to brick, dead branches, concrete, lumber, and metal scraps. Many of the samples recovered from the borings north of I-74 Sta. 25+75 had a large quantity of rotting wood matter with a consistency similar to mulch. The fill at the south end of the wall had more soil-like characteristics.

Strata of weathered till and glacial till were encountered in most of the borings. These strata were typically composed of medium stiff to stiff sandy clays.

A thin layer of granular alluvial soils was encountered under the glacial soils at the north and south ends of the site. The gradation and consistency of these soils varied considerably.

The bedrock surface was predominantly sandstone towards the north end of the site and shale towards the south. Cyclic deposits of sandstone, shale, limestone, and coal were found in the core borings. The shallow bedrock was generally towards the south end of the site.

Groundwater was encountered in all of the borings where measurements were taken. The groundwater elevation measured at first encounter and at the end of boring varied between Elevation 557.3 and Elevation 563.4 as shown in Table 6.1. Stabilized readings, measured 24 hours after completion of RDG01 and RDG02, were at Elevation 563.4 and 563.5, respectively. For comparison, the water level in the Mississippi River, approximately 100 ft to the north of the site, is usually about Elevation 561.0.

Table 6.1 Groundwater Elevations

Boring No.	During Drilling	At End of Boring	24-hour Reading
ILR0201-S	562.4	-	-
ILR0203	-	-	-
ILR0204	557.9		
ILR0205	559.9	-	-
ILR0206	562.2	-	-
RDG01	-	563.4	563.4
RDG02	-	562.0	563.5
RW02-1	-	562.2	-
RW02-2	-	557.3	-
RW02-3	-	560.9	-
RW02-4	-	-	-
RW1501	562.7	-	-

The Illinois State Geological Survey Directory of Coal Mines does not list any mines in the immediate vicinity of the site.

Although an environmental investigation was beyond the scope of this report, evidence of potential contamination was encountered during the geotechnical investigation. Petroleum odors and construction debris were encountered in the borings.

7. Geotechnical Evaluations

Considering the proposed maximum height of the wall and the existing ground configuration, the most feasible wall type is an MSE wall. Although MSE wall systems are extremely flexible and can tolerate significant total and differential settlements without undue distress, they require good foundation soils to provide acceptable factors of safety against bearing capacity or global stability failures.

The miscellaneous fill, generally found north of I-74 Sta. 25+75, is not a suitable subgrade for the retaining wall or the roadway embankment. The poor compaction and heterogeneous nature of this material would result in localized instability and unpredictable settlement, if it used to support any significant load. Settlement could continue for many years after construction due to further decay within the large pockets of organic matter.

In-situ treatment of this material is not feasible. Many of the more common ground improvement techniques are not suited for the conditions found at this site. The construction debris would present a significant obstruction to any of the techniques where a probe or auger is inserted into the ground. Organics and groundwater can be problematic for vibratory and compaction techniques.

Removal and replacement of the unsuitable material is a feasible solution, if the support of the Mississippi River Bridge approach embankment and the three retaining walls are considered. The site has sufficient right-of-way to allow laid back excavation slopes and efficient large-scale earth-moving operations. It is estimated that up to 11,000 cubic yards of unsuitable material must be excavated, removed from the site, and replaced with suitable backfill. The approximately $500,000 cost to remove the unsuitable material and replace it with granular embankment material is very economical when compared to the substitution of additional bridge spans for the proposed embankment.

If the unsuitable fill material and excessively soft soils are removed, the replacement fill and the remaining native soils will have allowable bearing capacities that exceed the applied bearing pressures. The proposed wall would meet the Standard Specifications for Highway Bridges (AASHTO) requirements for bearing pressure and sliding stability.

A slope stability analysis of the wall's critical section near Sta. 132+50 was completed to determine the overall stability of the wall. Results of this analysis are included in the Appendix. The computed factor of safety exceeds the minimum value of 1.3 required by AASHTO.

Once the objectionable fill material and excessively soft soils are removed, the remaining native soils are overconsolidated and exhibit fairly low compressibility. The estimated total settlement under the weight of the proposed wall and embankment ranges from 0.25 to 4.0 inches. The settlement is estimated to be 90 percent complete after 15 months. Less than 0.5 inches of primary consolidation would remain 3 months after completion of the retaining wall's backfill. This magnitude and duration of settlement is acceptable for construction of an MSE wall.

8. Design Recommendations

Removal and replacement is the recommended treatment option for the unsuitable subgrade soils. Existing soils with significant woody material, large chunks of demolition debris, moisture contents greater than 50 percent, or organic contents greater than 5 percent should be excavated and removed from the area of retaining wall and embankment construction. The lateral limits of the unsuitable material removal should cover the area bounded by the Mississippi River Bridge south abutment, Ramp RD-H, the Illinois Viaduct north abutment, and Ramp RD-G. It is anticipated that the unsuitable material will extend to depths up to 20 feet below the ground surface. Due to the presence of granular layers and the close proximity to the river, dewatering of the excavation would be very difficult. The contractor should be allowed to excavate through groundwater. The excavation should be backfilled with porous granular embankment in accordance with the IDOT Standard Specifications for Road and Bridge Construction (IDOT Standard Specifications).

Removal and replacement is also recommended for any soft cohesive soils that are located directly beneath the wall. Cohesive soils with an unconfined compressive strength that is less than the applied bearing pressure of the wall should be removed within the lateral limits shown in Figure 8.1. It is anticipated that these soft soils will be encountered at shallow depths over a small portion of the wall's footprint. Backfill should be with porous granular embankment and embankment as shown in Figure 8.1.

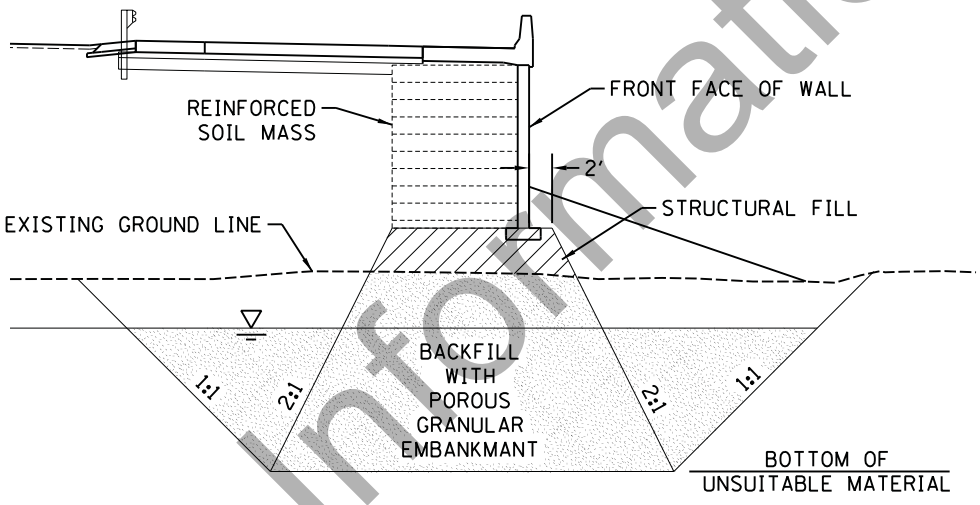


Figure 8.1 Lateral Limits of Unsuitable Material Removal and Replacement

The estimated vertical removal limits for the unsuitable material and soft cohesive soils are provided in Table 8.1. An estimated base of removal elevation is provided at each boring drilled in the vicinity. It is believed that the soft soils found in the borings beneath this wall are isolated strata. For plan quantities, the extents of the soft soil should not be interpolated between borings, but should be assumed to extend at a constant elevation half way to the next boring along the wall. The actual limits of removal will be determined during construction based on the materials encountered.

Table 8.1 Estimated Bottom of Unsuitable Material

Boring No.	Station	Base of Removal Elevation	Objectionable Material
RW1501	129+69	-	-
RW02-1	130+12	555.70	debris
ILR0201-S	130+16	555.39	debris
ILR0203	131+05	-	-
RW02-2	131+83	559.70	soft clay
ILR0204	131+97	-	-
RDG01	132+53	-	-
RW02-3	132+79	562.40	debris
ILR0205	133+47	-	-
ILR0206	134+22	-	-
RW02-4	134+57	563.00	soft clay
RDG02	134+65	-	-

It is recommended that the removal, disposal, and replacement of the large volume of miscellaneous fill, generally found north of I-74 Sta. 25+75, be treated as a roadway item per Section 202 of the IDOT Standard Specifications. The limits of the miscellaneous fill removal will extend under the I-74 embankment a considerable distance beyond the footprint of this retaining wall. Removal and disposal of the soft clays, which will only be required beneath the wall, should be in accordance with Section 502.

With the removal and replacement of the unsuitable soils, a conventional precast panel MSE wall is feasible. The theoretical top of leveling pad or base of reinforced soil mass may be located at the minimum embedment required by IDOT (3'-6" below finished grade). If the base of the wall is above natural grade, compacted structural fill should be used to raise the grade. The minimum limits of the structural fill should be defined as shown in Figure 8.1. Other fill, outside the limits of the required structural fill and the reinforced soil mass, may be embankment fill in accordance with the IDOT Standard Specifications.

When designing for the external stability of the MSE wall, it should be assumed that the reinforced soil mass will be composed of a granular select backfill and the fill behind the reinforced soil mass will be embankment material as defined by the IDOT Standard Specifications. Both materials should be assumed to have a total unit weight of 125 pcf. The active earth pressure coefficient of the embankment fill could vary greatly depending on the actual material used, but should be assumed to be 0.36 for design.

The replacement fill and the remaining native soils, when prepared according to the recommendations herein, have an allowable bearing capacity of 2,500 psf. The native cohesive soils have an undrained sliding resistance of at least 1,000 psf. The drained sliding resistance is 0.53 times the effective vertical stress for the native subgrade or 0.62 times the effective vertical stress for a compacted granular fill subgrade.

The MSE wall should be detailed to accommodate 0 to 4 inches of settlement after the first facing panel is placed. The parapet and anchorage slab details that are shown in the IDOT Bridge Manual will satisfy this requirement.

9. Construction Considerations

The construction of MSE walls are not covered by the IDOT Standard Specifications. Guide Bridge Special Provision No. 38, Mechanically Stabilized Earth Retaining Walls (Revised: April 19, 2012), should be included in

the construction documents. This special provision requires that the contractor take responsibility for the final design of portions of the structure.

It should be anticipated that groundwater will influence the excavation of unsuitable material and the backfill with granular material. A dragline or long-reach excavator will be needed to complete the deeper portions of the excavation. The contractor must stage the work so that the excavated material can be inspected and sorted, as necessary. Compaction of porous granular embankment placed below the water will not be required; however, the material should be carefully placed in a manner to achieve the highest density practicable. Compaction should begin as soon as the backfill has reached a level where it can support compaction equipment.

Some of the excavated unsuitable material has the potential to be classified as special waste due to the presence of petroleum residue and other potentially hazardous substances. Material that is considered special waste must be handled and disposed of in accordance with applicable laws and regulations. Further environmental investigation will be required prior to or during construction.

References

American Association of State Highway and Transportation Officials (2002). *Standard Specifications for Highway Bridges, 17th Edition.*

CH2M HILL (2009, September). Structure Geotechnical Report Ramp RD-G Retaining Wall Structure Number 081-6011.

Illinois Department of Transportation (2009). *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 July 30, 2010 from http://www.isgs.illinois.edu/maps-data-pub/coal-maps/counties/rockisland.shtml.

U.S. Department of Transportation, Federal Highway Administration (1997, August). *Mechanically Stabilized Earth Walls and Reinforced Soil Slopes Design and Construction Guidelines* (Publication No. FHWA-SA-96-071).

Appendix

Boring Location Plan
Subsurface Data Profile
Boring Logs
Soils Laboratory Test Results
Summary of Slope Stability Analysis
I-74 Illinois Retaining Walls and Bridges Value Engineering Study

RAMP RD-H

RETAINING WALL IL-RW01
S.N. 081-6010

PI TRANS

435+00

RAMP 6TH-D

3RD AVE

S.N. 081-0177

I-74 WB

30+00

440+00

I-74 OVER MISSISSIPPI
RIVER BRIDGE

FDN

I-74 EB

S.N. 081-0178

RAMP 6TH-C

RETAINING WALL IL-RW16
S.N. 081-6018

320+00

AREA

ILR0201-S

RAMP RD-G

RDG02

135+00

RET WALL

RW-1501

130+00

ILR0203

RDG01

RW02-2

ILR0204

RW02-3

ILR0205

RW02-4

AC

RW02-1

ILR0206

AC

RETAINING WALL IL-RW02
S.N. 081-6011

RET WALL

RET WALL

LEGEND

RW600 BORING LOCATION

0 50 100
SCALE IN FEET

N

HANSON

BORING LOCATION PLAN

RAMP RD-G RETAINING WALL IL-RW02
S.N. 081-6011
ROCK ISLAND COUNTY, ILLINOIS

08H0120E 8/24/11

madau00223
09\29\2011
ILRW02-A0432-002-Subsurface Data.dgn

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

RW1501
Sta. 129+69, 10' LT

	N	Qu	w%		
570.72					Clayey Gravel (GC) - Clayey gravel to fine grained sand, dark brown to brown, dry to moist, stratified. Borehole moved out of mounds of debris for safety reasons
568.72	21				
	7				Silty sand (SM) - Fine grained sand, brown, dry to moist, homogeneous.
	2				Petroleum odor from 4-6'.
DD ▽ 562.72	2		19.0		WOH = Weight of Hammer
560.72	4		56.0	R	Clay (CH) - Clay, dark brown to black, moist, homogenous. Shelby tube from 8ft-10ft obtained from adjacent boring. CD Triaxial test and Atterberg limit (LL=50, PI=23) test performed.
	2				Clayey Sand (SC) - Clayey sand, trace organics, dark brown to brown, moist to 12.0', wet deeper, homogeneous
556.72	7		48.0		
	25				Sand and Clay (SP,SC) - Sand and clay, trace gravel, trace organics, dark brown, wet, homogeneous
550.72	50/5"				Clay to Silt (CL-ML) - Clay to silt, dark gray brown to light gray, wet, poss. wthrd shale, Auger refusal at 20.5'
550.22					Decontaminate equipment starting at 8:56am.
					Bottom of hole = 20.5 feet

RW02-1
Sta. 130+12, 25' RT

	N	Qu	w%		
566.20					
565.70					CONCRETE
	7		11		FILL - Dark to very dark brown, moist to wet, soft and loose, silt, fine- to coarse grained sand and gravel, with degrading plywood, particle board, timber, lumber, bituminous materials, metal scraps, cinder blocks, and brick fragments, petroleum odor
0h ▽ 562.20	7	0.50P	20		
	11	1.75P	18		
	6		196		
555.70					
554.70	26	0.75P	20		Brownish gray, wet, dense, clayey, silty, fine-grained SAND with trace gravel
552.20	50/5"		17		Gray, fine-grained, WEATHERED SANDSTONE
					Bottom of hole = 14.0 feet

ILR0201-S
Sta. 130+16, 11' LT

	N	Qu	w%		
566.39					Concrete - 7" slab with rebar
565.39					Fill: Fine to Medium Sand With Silt (SP-SM) - Very dark brown, dry to moist, medium dense, little gravel, fine to medium sands, trace coarse sands
563.39	13				
562.4 ▽ DD			30.0	O	Fill: Sandy Lean Clay (CL) - Very dark gray mottled with greenish gray, moist to wet, stiff, faint petroleum odor, trace medium to fine gravel, with sand seams (LL=28 PI=5)
	7	1.8P			
				O	Fill: wood matter with fine to coarse sand, strong petroleum odor, saturated, possible old railroad ties
558.39	3		40.3		Fill: Silty Sand Trace Gravel (SM) - Top 5": Brown, wet, root matter with petroleum odor and root matter throughout Remainder: Silty Sand trace gravel, dark to medium gray, wet, non plastic, medium to fine sands, trace subrounded fine gravels, loose, faint petroleum odor, Encountered WT at 10' bgs
	3				
555.39					Silty Fine to Coarse Sand (SM) - trace gravel, brown, wet, very loose to medium dense, faint petroleum odor, occasional root, possible native soil, non odorous
553.39	3		11.0		
	50/2"				Sandy Silt With Clay And Gravel (CL) - Top 2": Dark brown followed by yellowish orange and then light gray at bottom 2", wet, non plastic, very angular flat coarse to fine gravels (possible rock fragments), some medium to fine sands with silt and few clay, possible gumbo/residual soil. Driller began set up for rock coring at 0950
550.56					
	Rec. = 78% RQD = 41% 381.7 tsf				Sandstone - with Limestone and bands of coal towards bottom of sample, light brown with light gray, rough texture at top 32", remainder has smooth texture, medium to fine grained with little coarse grains, slightly weathered to unweathered, medium to strong, top 32": sandstone, remainder Limestone with coal bands 15.83' - Horizontal to 15° fractures, rough planar fractures at top 32" of sample, remainder fractures are irregular and undulated, little hard greenish gray impermeable clay infilling throughout top 13" of sample, remainder: no infilling, surface stains only, surfaces stained greenish gray at top 16", 16" to 30" no stains, 30" to bottom dark gray and brown coal stains, top 30": no rock wall contact due to crushed rock, remainder tightly healed with coal strands, sound to moderate fractures, very close to moderate discontinuities 23'-86" = top of run, 1/2-1/2-1/4-3/4-3/4 light gray milky water, brown water 2.5' down and 7'-4' dark brown to dark green 23'-31.5" = end run
	Rec. = 95% RQD = 67%				Medium to fine grained, smooth texture, slightly weathered to unweathered, medium strong 21.42' - 15° to 45° degree fractures, irregular, undulating, slickensided at 11", 15" 51", 67" and 88" from top, hard impermeable clay infilling 1/8" to 1/2" thick that has tightly healed at most fractures except from 45" to 51" from top, dark gray surface stains, no infilling and surface stains from 45" to 51", from 57" to bottom thinly bedded throughout, stiff to very stiff gray clay infilling that is 1/2" to 1/4" thick at fracture, sound to moderate fractures, close to wide discontinuities, Average 1-1/4 minute per foot for top 5 feet, 10-20-30 (3/4-3/4')
534.97					
					Bottom of hole = 31.42 feet

LEGEND

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

SUBSURFACE DATA PROFILE
STRUCTURE NO. 081-6011

PROFESSIONAL DESIGN FIRM LICENSE #184-001084

HANSON
Hanson Professional Services Inc.

JOB NO. 08H0120E
DATE 8/24/11
SHEET NO. 1
4 SHEETS

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

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

ILR0203
Sta. 131+05, 13' LT

	N	Qu	w%	
567.93				
567.43				Concrete - Surface: 3" of concrete
	4			Silty Sand (SM) - dark brown and black, slightly moist, very loose, fine to medium grained, low plasticity
	4	1.5P	27.0	
561.93				
	5			Sand Silt and Clay (ML) - Black, moist; NOTE: Sample 3 grain size analysis performed
559.93				
	6	1.8P	25.0	Clay (CH) - black, slightly moist, firm to stiff, trace fine sand, moderate plasticity; Rimac: Pu = 94 lbs
	8	1.0P	23.0	NOTE: Sample 4 Atterberg limits: (LL=63, PI=46)
	5	0.5P		Rimac: Pu = 28 lbs
	37			brown, very dense, fine to medium grained, Same as above, sandy gravel in tip, brown, very dense, fine to medium angular gravel <1" diameter
551.93	50/3"			Sandy Gravel (GP) - light gray, wet, very dense, fine to medium angular gravel, fine to coarse sand
549.93				Bottom of hole = 18.0 feet

RW02-2
Sta. 131+83, 32' RT

	N	Qu	w%		
568.30					
567.80					CONCRETE
	5	2.25P	15		Brown, slightly moist, very stiff, clayey SILT with sand
564.80					
	6	0.44B	27		Dark brown, moist, soft, silty, lean CLAY with trace sand
		0.24B	29		
			33	C	(LL=50 PI=31)
		1.80B	25		
559.70		2.75B	25		
Oh ▽					Grayish green, moist, stiff, silty, lean CLAY
557.30	16	0.40B	32		Brown, wet, medium dense, silty, medium-grained SAND with gravel
556.30					
555.80					Gray, fine-grained, WEATHERED SANDSTONE
554.20	50/2"	1.76S	10		
					Bottom of hole = 14.1 feet

ILR0204
Sta. 131+97, 37' RT

	N	Qu	w%		
569.92					
568.92					Topsoil - light brown silt, hole offset 4.5' west of marked boring location
	10	4.3P			Fill Silt With Sand And Gravel (ML) - Yellowish orange transitioning to brown, dry to moist, non plastic, medium to fine sands, little angular flat coarse to fine gravels, possible fill, occasional root matter; Possible underground obstruction (concrete) 4'6" bgs
	50/2"				
563.92					Poorly Graded Medium to Coarse Sand (SP) - Brown, dry to moist, loose to very loose, trace gravel; NOTE: Sample 3 grain size anaylsis performed
561.92	2				
	3				Very Silty Sand (SM, ML) - Brown, moist, very loose; Sample 4: grain size analysis performed
559.92					
557.9 ▽ DD	2	1.3P		O	Very Clayey Fine to Medium Sand (SC) - trace coarse sand and gravel, greenish gray, moist to wet, stiff, with root matter, occasional fibers with "muck-like" appearance
556.92					Sample 5: grain size analysis and Atterberg limit tests (LL=27, PI=12) performed
	6	2.0P	29.0		Clay (CH) - Bluish gray mottled with orange brown, moist to wet, very stiff, little coarse-fine sands, trace gravels, possible glacial till, reddish brick like gravel particles Sample 6: grain size analysis and Atterberg limit (LL=68, PI=12) tests performed
	50/1.5"				
549.92					Silty Clay (poss. weathered Shale) (CL-ML) - Gray with olive green, dry to moist, very stiff, trace coarse gravel, very brittle, shale-like clay, top of Rock 18'8" bgs
548.67					
	Rec. = 80% RQD = 0%				Sandstone - Light gray to gray, coarse to fine grained top 22" of sample, remainder medium to fine grained, rough texture, slightly weathered to unweathered, weak to medium strong rock, gravel-sized crushed rock fragments at 5", 18", and 37-39" from top 21.25'- Horizontal to 15° fractures, very rough surfaces at top 18" of sample, remainder rough to smooth fracture surfaces, undulated, little clay infilling material top 20", discontinuous joints, greenish-gray to gray surface stains, rock wall contact, altered joint walls, tightly healed at 12", 18" and 39" from top, bands of sandy clay fractions at fractures, horizontal bedding throughout top 20" of sample, moderate to extremely fractured, extremely close to close discontinuities Start 10:00; 3/4-1-3/4-1-1/2/6; 28'-81" = top of run; Gray to light gray water 28'-26" - bottom of run
541.92	Rec. = 56% RQD = 27%				Kill switch on rig broke, drilling stopped at 10:05 am temporarily/ medium to fine grained @ 25.83' - Horizontal and vertical fractures at top 16" of sample, 60° fracture at 63" from top, remainder 15° to 30° fracture, top 36", rough and irregular, undulating surfaces, remainder rough and planar fracture surfaces, residual soil, soft sandy clay infilling material at top 4" of sample, stiff to hard clay, impermeable gray clay infilling, 4" thick zone of clay infilling from 45" to 49" and at bottom 4" of sample, little or no surface stains at top 36", remainder stains dark gray, horizontal to 30" bedding throughout, thick contuous zones of sand clay infilling, tightly healed hard impereable filling from 25" to 67" from top, sound to moderately fractured, very close to medium discontinuities @ Start 13:30; .75-2-1/4-2-2-1/4 70% fluid loss at 26'10" bgs Change to very dark gray fluid at 31'4" bgs; 1-1/2-3/4-2-1-3/4-2-1/4 Bit pressure - 250 psi; Hole plugging at 32'33' bgs; Some fluid loss
	Rec. = 100% RQD = 48%				Limestone - fine grained, smooth texture, residual soil at top 4", remainder slightly weathered, weak to medium strong rock, top 4" residual soil, brittle shale-like clay infilling 47" and 65" from top With strands of Dolostone and coal towards bottom of sample, gray with light gray, smooth texture, slightly weathered to unweathered, medium to strong, 1/8" thick coal band at 105" to 110" and 112" from top, pockets of dolomite at bottom 10" of sample Top 60" Limestone, Bottom 60" Sandstone @ 35.83' - Horizontal to 30° fractures throughout, smooth undulated fractures and irregular undulated fractures from 90° to 120° from top, 1/8" to 1" thick bands of hard _____ impermeable clay infilling throughout, tightly healed at most fractures, bands of coal minerals at bottom 30" of sample, sound to medium fractured, moderate to very close discontinuities, horizontal to 70° thick bedding, vertical fracture at 56" from top, stiff to very stiff clay infilling through fracture from 16" to 24" from top, terminated rock coring at 45'10" bgs @ 14:17
524.09					
					Bottom of hole = 45.83 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
[O]	Organic Content Test
DD	Water Surface Elevation Encountered in Boring
558.10 ▽	DD = during drilling 24h = 24 hours after completion

SUBSURFACE DATA PROFILE
STRUCTURE NO. 081-6011

PROFESSIONAL DESIGN FIRM LICENSE #184-001084

HANSON
Hanson Professional Services Inc.

JOB NO.	SHEET NO.	F.A.I RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
08H0120E	SHEET NO. 2	74	81-1HVB	ROCK ISLAND	_	
DATE 8/24/11	4 SHEETS			CONTRACT NO. 64C08		
		FED. ROAD DIST. NO. _	ILLINOIS	FED. AID PROJECT		

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

RDG01
Sta. 132+53, ℄

	N	Qu	w%	
570.40				Brown, moist, medium, sandy lean CLAY
567.40	50/2"	1.60P	19	CONCRETE
566.90				Brown, moist, soft, sandy, lean CLAY
566.40	26	1.75P	25	Very dark brown, dry to moist, very stiff, sandy SILT
0h/24h ▽ 563.40		0.61S	16 21	Dark brown, moist to wet, stiff, sandy SILT
562.40			28	Very dark brown, wet, soft, sandy, clayey SILT
559.40	11	1.15B	28	Gray, moist, stiff, lean CLAY with silt
556.90	12	1.10B	29	Gray, moist, stiff, lean CLAY with silt and fine-grained sand
554.40	50/3"			Gray, hard, fine-grained, WEATHERED SANDSTONE
551.80	50/1"			Bottom of hole = 18.6 feet

RW02-3
Sta. 132+79, 40' RT

	N	Qu	w%	
567.90				
567.40	50/1"			FILL - Soil
566.90				CONCRETE
	8	1.75P	30	FILL - Gray, moist, loose, silty SAND, creosote wood pieces, metal scraps, brick and concrete fragments
562.40		1.41S	26	
0h ▽ 560.90		0.41B	28	Dark brown and dark gray, moist, soft to stiff, lean CLAY with trace silt (LL=51 PI=22)
560.40		1.50S	25	
		2.31B	26	Grayish green, moist, stiff to very stiff, lean CLAY with trace silt
556.40	9	1.25P	30	Gray, fine-grained, WEATHERED SANDSTONE
554.90	50/2"		8	Dark gray, WEATHERED SHALE
554.20				Bottom of hole = 13.7 feet

ILR0205
Sta. 133+47, 47' RT

	N	Qu	w%	
567.92				
567.42				Concrete - 3" of concrete
	5			Silty Fine to Medium Sand (SM) - black, slightly moist, loose, black, slightly moist
563.92	1	1.0P		Sandy Silt (ML) - black, slightly moist, very soft to stiff
DD ▽	2			
559.92	6	1.5P		Silt (ML) - dark greenish and brown, loose to medium dense, moist, trace fine sand
	28			sandstone in tip pale
555.92	39			Shale - pale olive brown, dense, moderate plasticity
	50/2"	1.5P		
552.42				Bottom of hole = 15.5 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
[O]	Organic Content Test
DD ▽	Water Surface Elevation Encountered in Boring DD = during drilling 24h = 24 hours after completion
558.10 ▽	

SUBSURFACE DATA PROFILE
STRUCTURE NO. 081-6011

PROFESSIONAL DESIGN FIRM LICENSE #184-001084

HANSON
Hanson Professional Services Inc.

JOB NO. 08H0120E
DATE 8/24/11
SHEET NO. 3
4 SHEETS

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

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

ILR0206
Sta. 134+22, 48' RT

	N	Qu	w%	
568.24				Concrete - 7" concrete underlain by dark brown silty clay with sand
567.24				Fill Silty Clay With Sand (CL-ML) - Dark brown, dry to moist, medium stiff to stiff, with reddish brick material, top 1" of sample contained crushed concrete
565.24	6			
564.49				Fill Sandy Silt (ML) - Brown to dark brown, dry to moist, non plastic, loose
DD ▽ 562.24	4	1.8P		Fill: Clayey Silt (ML) - Very dark gray to black, moist, low plasticity, stiff, non odorous, trace fine sand
		1.0P		Fill Silty Fine to Medium Sand (SM) - Gray to brown, moist, trace coarse sand
560.24				
559.64				Medium to Coarse Sand Little Silt And Gravel (SM) - dark brown mottled with orange brown, wet, loose; Sample 3 (8'-10'): grain size analysis performed
559.44	83			Clayey Sand With Silt (SC) - light gray with greenish gray, moist, very dense
	50/2"			Silty Fine to medium sand (SM) - light gray to white with yellowish orange streaks, moist to wet, very dense, possible completely weathered sandstone, little coarse sands, trace fine gravels, possible completely weathered sandstone; Driller notes rough drilling and chatter 11.0' bgs, possible weathered rock
	50/4"			
552.57				Light gray, moist to wet, very dense, medium to fine sands with silt, trace coarse sands, strong cementation, coarse to fine angular flat gravels and sandstone fragments, little clay (possible infilling) throughout, possible completely weathered sandstone
	Rec. = 90% RQD = 7%			
	289.7 tsf Rec. = 83% RQD = 18%			Sandstone - Light brown, rough in texture, slightly weathered, weak to medium strong rock, brittle, crushed rock zone from 22" to 32" from top @ 15.67' - Horizontal fractures from 0"-24", remainder irregular fractures, rough to planar fractured at top 16" of sample, remainder fractured surfaces are rough and irregular, undulating, top 16" of sample, remainder fractured surfaces are rough and irregular, undulating, top 16" no infilling material and no surface stains, unaltered ultered joints wells, Remainder: 1/8 little very stiff greenish grey surface stains, tightly healed from 39"-41", sandy clay material and crushed rock 2mm thick-enough to prevent rock wall contact at remaining fractures, _____discontinuous joints, extremely close to close discontinuities, moderate to fine fractured @ 23'-88" = top of run 188; CR: 1/2 min./foot; 23'-28" = bottom of run 24
	381.2 tsf Rec. = 100% RQD = 57%			Top 14": Subangular to angular, Remainder: Sandstone, gray with dark gray, fine grained, slightly weathered to unweathered, medium strong, rock appears to be sandstone with shale-like clay that has hardened and formed a solid rock @ 20.67' - Top 14": Subangular to angular, Remainder: Horizontal to 20° fractures, rough to undulating, fine surfaces, slightly altered joint walls 14" to 24" from top, Remainder discontinuous joint with very stiff to hard shale-like clay breaks thick enough (<1/4" thick) to prevent rock wall contact, surfaces stained dark gray possibly due to infilling; CR: 3/4 min/foot average Barrel jammed 6" from bottom of sample
537.41				Light brown to light gray, smooth to slightly rough texture, blotchy appearance from 6" to 16", medium strong rock, Band <1.4" thick shale tile hardened clay from 6" to 34" from top 25.67' - 10° to 30° fractures, rough and irregular undulating fracture surfacees, little or no infilling material, gray surface staining only, slightly, altered to altered joint walls, blotches of greenish gray clay that has possibly filled veins in rock and hardened to make a continuous sample from 6" to 34" from top, tightly healed at 18" from top CR: 1 min/foot average
				Bottom of hole = 30.83 feet

RW02-4
Sta. 134+57, 48' RT

	N	Qu	w%		
568.00					
567.70					CONCRETE
	5	0.25P	28		Very dark brown, moist, soft, silty, lean CLAY with fine-grained sand
565.00		0.26B	30	C	
			26		Very dark brown, moist, stiff, silty, lean CLAY with trace very fine-grained sand (LL=35 PI=16)
		1.79B	22	O	
		1.27S	19		
		2.50P	17		Brown, wet, silty, fine- to medium-grained SAND
560.00					
559.50					Brown, moist, medium dense, silty, fine-grained SAND with gravel
558.00	20		15		Gray, WEATHERED SILTSTONE
	50/5"		9		
554.60	50/0"				Gray, fine-grained, WEATHERED SANDSTONE
554.50					Bottom of hole = 13.5 feet

RDG02
Sta. 134+65, ℄

	N	Qu	w%	
568.00				
567.60				TOPSOIL
	27	2.00P	13	FILL - Very dark brown, moist, very stiff, silty, fine- to medium-grained SAND and GRAVEL
565.00				
564.00 ▽				Creosote timber
563.50	24h 7		24	Grayish green, moist, very stiff, fat CLAY
562.00 ▽	0h			
560.50	16	0.81B	30	
		0.30P	20	Dark brown, wet, well-graded, SAND with trace silt
558.50				Brown, wet, medium- to coarse-grained SAND
557.50	50/2"		14	Gray, hard, very fine-grained, WEATHERED SANDSTONE
556.80				Bottom of hole = 11.2 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
[O]	Organic Content Test
DD ▽ 558.10	Water Surface Elevation Encountered in Boring DD = during drilling 24h = 24 hours after completion

SUBSURFACE DATA PROFILE
STRUCTURE NO. 081-6011

PROFESSIONAL DESIGN FIRM LICENSE #184-001084

HANSON
Hanson Professional Services Inc.

JOB NO.	SHEET NO. 4	F.A.I RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
08H0120E		74	81-1HVB	ROCK ISLAND	_	
DATE 8/24/11	4 SHEETS			CONTRACT NO. 64C08		
		FED. ROAD DIST. NO. _	ILLINOIS	FED. AID PROJECT		

Illinois Department of Transportation
Division of Highways
CH2M HILL

SOIL BORING LOG

Date 9/19/07

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=565232.456, E=2459065.732), **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. ILR0201-S
Station _____
Offset _____
Ground Surface Elev. 566.39 ft

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

Groundwater Elev.:
First Encounter 562.4 ft ▼
Upon Completion _____ ft
After _____ **Hrs.** _____ ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Concrete 7" slab with rebar	565.39			
Fill: Fine to Medium Sand With Silt (SP-SM) Very dark brown, dry to moist, medium dense, little gravel, fine to medium sands, trace coarse sands	563.39	4 8 5 4 2		
Fill: Sandy Lean Clay (CL) ▼ Very dark gray mottled with greenish gray, moist to wet, stiff, faint petroleum odor, trace medium to fine gravel, with sand seams	-5	4 3 2	1.8 P	
Fill: wood matter with fine to coarse sand, strong petroleum odor, saturated, possible old railroad ties	558.39	2 1 2 2		
Fill: Silty Sand Trace Gravel (SM) Top 5": Brown, wet, root matter with petroleum odor and root matter throughout	-10	2 1 2 1		
Remainder: Silty Sand trace gravel, dark to medium gray, wet, non plastic, medium to fine sands, trace subrounded fine gravels, loose, faint petroleum odor Encountered WT at 10' bgs	555.39	2 1 2		
Silty Fine to Coarse Sand (SM) trace gravel, brown, wet, very loose to medium dense, faint petroleum odor, occasional root, possible native soil, non odorous	553.39	15 30 50/2		
Sandy Silt With Clay And Gravel (CL) Top 2": Dark brown followed by yellowish orange and then light gray at bottom 2", wet, non plastic, very angular flat coarse to fine gravels (possible rock fragments), some medium to fine sands with silt and few clay, possible gumbo/residual soil□Driller began to set up for rock coring at 0950	-15 550.56 -20			

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
	-25			
	-30			
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)

Illinois Department of Transportation
Division of Highways
CH2M HILL

ROCK CORE LOG

Date 9/19/07

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=565232.456, E=2459065.732), **SEC.** 32, **TWP.** 18N, **RNG.** 1W, 4th **PM**

COUNTY Rock Island **CORING METHOD** Double tube, 10 ft core barrel, NQ wireline, diamond bit

STRUCT. NO. _____ **CORING BARREL TYPE & SIZE** _____

Station _____

Core Diameter _____ in

BORING NO. ILR0201-R **Top of Rock Elev.** 550.56 ft

Station _____ **Begin Core Elev.** 550.56 ft

Offset _____

Ground Surface Elev. 566.39 ft

DEPTH (ft)	CORE (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
	NQ-R1	78	41		
-20					
	NQ-R2	95	67		
-25					
-30					
534.97					
-35					

Sandstone
with Limestone and bands of coal towards bottom of sample, light brown with light gray, rough texture at top 32", remainder has smooth texture, medium to fine grained with little coares grains, slightly weathered to unweathered, medium to strong, top 32": Sandstone, remainder Limestone with coal bands□15.83' - Horizontal to 15° fractures, rough planar fractures at top 32" of sample, raminder fractures are irregular and undulated, little hard greenish gray impermeable clay infilling throughout top 13" of sample, remainder: no infilling, surface stains only, surfaces stained greenish gray at top 16", 16" to 30" no stains, 30" to bottom dark gray and brown coal stains, top 30": no rock wall contact due to crushed rock, remainder tightly healed with coal strands, sound to moderate fractures, very close to moderate discontinuities□23'-86" = top of run
1/2-1/2-1/4-3/4-3/4
light gray milky water, brown water 2.5' down and 7'-4' dark brown to dark green
23'-31.5" = end of run
Medium to fine grained, smooth texture, slightly weathered to unweathered, medium strong□21.42' - 15° to 45° degree fractures, irregular, undulating, slickenslided at 11", 15", 51", 67" and 88" from top, hard impermeable clay infilling 1/8" to 1/2" thick that has tightly healed at most fractures except from 45" to 51" from top, dark gray surface stains, no infilling and surface stains from 45" to 51", from 57" to bottom thinly bedded throughout, stiff to very stiff gray clay infilling that is 1/2" to 1/4" thick at fracure, sound to moderate fractures, close to wide discontinuities□Average 1-1/4 minute per foot for top 5 feet,
10-20-30
(3/4-3/4')

End of Boring

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

BBS, form 138 (Rev. 8-99)

Illinois Department of Transportation
Division of Highways
CH2M HILL

SOIL BORING LOG

Date 9/18/07

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=565145.331, E=2459082.04), 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. ILR0203
Station _____
Offset _____
Ground Surface Elev. 567.93 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
567.43				**Concrete** Surface: 3" of concrete
	2			**Silty Sand (SM)** dark brown and black, slightly moist, very loose, fine to medium grained, low plasticity
	2 2			
	4			
-5	2 2	1.5 P		
561.93				
	0			**Sand Silt and Clay (ML)** Black, moist NOTE: Sample 3 grain size analysis performed
	2 3			
559.93				
	2			**Clay (CH)** black, slightly moist, firm to stiff, trace fine sand, moderate plasticity Rimac: Pu = 94 lbs NOTE: Sample 4 Atterberg limits: LL=63, PI=46
	3 3	1.8 P	25.0	
-10	2			
	3 5	1.0 P	23.0	
	1			Rimac: Pu = 28 lbs
	2 3	0.5 P		
	5			brown, very dense, fine to medium grained, Same as above, sandy gravel in tip, brown, very dense, fine to medium angular gravel <1" diameter
-15	15 22			
551.93				
	50/3"			**Sandy Gravel (GP)** light gray, wet, very dense, fine to medium angular gravel, fine to coarse sand
549.93				
				End of Boring
-20				

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 9/18/07

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=565046.146, E=2459048.298), 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. ILR0204
Station _____
Offset _____
Ground Surface Elev. 569.92 ft

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

Groundwater Elev.:
First Encounter 557.9 ft ▼
Upon Completion _____ ft
After _____ Hrs. _____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				Topsoil light brown silt, hole offset 4.5' west of marked boring location
568.92				
	3			**Fill Silt With Sand And Gravel (ML)** Yellowish orange transitioning to brown, dry to moist, non plastic, medium to fine sands, little angular flat coarse to fine gravels, possible fill, occasional root matter Possible underground obstruction (concrete) 4'6" bgs
	4	4.3		
	6	P		
	5			
	2			
-5	50/2			
563.92				
	1			**Poorly Graded Medium to Coarse Sand (SP)** Brown, dry to moist, loose to very loose, trace gravel NOTE: Sample 3 grain size analysis performed
	1			
	1			
561.92	2			
	1			**Very Silty Sand (SM, ML)** Brown, moist, very loose Sample 4: grain size analysis performed
	1			
	2			
559.92 -10	2			
	2			**Very Clayey Fine to Medium Sand (SC)** trace coarse sand and gravel, greenish gray, moist to wet, stiff, with root matter, occasional fibers with "muck-like" appearance Sample 5: grain size anaylsis and Aterberg limit tests (LL=27, PI-12) performed
	1	1.3		
	1	P		
▼	4			
556.92				
	2			**Clay (CH)** Bluish gray mottled with orange brown, moist to wet, very stiff, little coarse-fine sands, trace gravels possible glacial till, reddish brick like gravel particles Sample 6: grain size analysis and Atterberg limit (LL=68, PI=12) tests performed
	2	2.0	29.0	
	4	P		
-15	5			
	38			
	50/1.5			
-20				

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				Silty Clay (poss. weathered Shale) (CL-ML) Gray with olive green, dry to moist, very stiff, trace coarse gravel, very brittle, shale-like clay, top of Rock 18'8" bgs *(continued)*
548.67				Borehole continued with rock coring.
-25				
-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
CH2M HILL

ROCK CORE LOG

Date 9/18/07

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=565046.146, E=2459048.298), **SEC.** 32, **TWP.** 18N, **RNG.** 1W, 4th **PM**

COUNTY Rock Island **CORING METHOD** Double tube, 10 ft core barrel, NQ wireline, diamond bit

STRUCT. NO. _____ **CORING BARREL TYPE & SIZE** _____
Station _____
Core Diameter _____ in
BORING NO. ILR0204 **Top of Rock Elev.** 548.67 ft
Station _____ **Begin Core Elev.** 548.67 ft
Offset _____
Ground Surface Elev. 569.92 ft

DEPTH (ft)	CORE (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
548.67	NQ-R1	80	0		
-25	NQ-R2	56	27		
541.92					
-30					
-35	NQ-R3	100	48		
-40					

Sandstone
Light gray to gray, coarse to fine grained top 22" of sample, ramainder medium to fine grained, rough texture, slightly weathered to unweathered, weak to medium stront rock, gravel-sized crushed rock fragments at 5", 18", and 37-39" from top□21.25' - Horizontal to 15° fractures, very rough surfaces at top 18" of sample, remainder rough to smooth fracture surfaces, undulated, little clay infilling material top 20", discontinous joints, greenish-gray to gray surface stains, rock wall contact, altered joint walls, tightly healed at 12", 18" and 39" from top, bands of sandy clay fractions at fractures, horizontal bedding throughout top 20" of sample, moderate to extremely fractured, extremely close to close discontinuities□Start 10:00
3/4-1-3/4-1-1/2/6
28'-81" = top of run
Gray to light gray water
28'-26" - bottom of run

Kill switch on rig broke, drilling dtopped at 10:05 am temporarily\
medium to fine grained□25.83' - Horizontal and vertical fractures at top 16" of sample, 60° fracture at 63" from top, remainder15° to 30° fracture, top 36", rough and irregular, undulating surfaces, remainder rough and planar fracture surfaces, residual soil, soft sandy clay infilling material at top 4" of sample, stiff to hard clay, impermeable gray clay infilling, 4" thick zone of clay infilling from 45" to 49" and at bottom 4" of sample, little or no surface stains at top 36", remainder stains dark gray, horizontal to 30" bedding throughout, thick continous zones of sand clay infilling , tightly healed hard impermeable filling from 25" to 67" from top, sound to moderately fractured, very close to medium discontinuities□Start 13:30
.75·2-1/4·2·2-1/4
70% fluid loss at 26'10" bgs

Change to very dark gray fluid at 31'4" bgs
1-1/2·3/4·2·1-3/4·2-1/4

Bit pressure - 250 psi

Hole plugging at 32'-33' bgs
Some fluid loss

Limestone
fine grained, smooth texture, residual soil at top 4", remainder slightly weathered, weak to medium strong rock, top 4" residual soil, brittle shale-like clay infilling 47" and 65" from top
With strands of Dolostone and coal towards bottom of sample, gray with light gray, smooth texture, slightly weathered to unweathered, medium to strong, 1/8" thick coal band at 105" to 110" and 112" from top, pockets of dolomite at bottom 10" of sample

Top 60" Limestone
Bottom 60" Sandstone□35.83' - Horizontal to 30° fractures throughout, smooth undulated fractures and irregular undulated fractures from 90" to 120" from top, 1/8" to 1" thick bands of hard ____ impermeable clay infilling throughout, tightly healed at most fractures, bands of coal minerals at bottom 30" of sample, sound to medium

Color pictures of the cores _____
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

ROCK CORE LOG

Date 9/18/07

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=565046.146, E=2459048.298), SEC. 32, TWP. 18N, RNG. 1W, 4th PM

COUNTY Rock Island CORING METHOD Double tube, 10 ft core barrel, NQ wireline, diamond bit

STRUCT. NO. _____ CORING BARREL TYPE & SIZE _____

Station _____

Core Diameter _____ in

BORING NO. ILR0204 Top of Rock Elev. 548.67 ft

Station _____ Begin Core Elev. 548.67 ft

Offset _____

Ground Surface Elev. 569.92 ft

DEPTH (ft)	CORE (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
-45					
-50					
-55					
-60					

gractured, moderate to very close discontinuties, horizontal to 70" thick bedding, vertical fracture at 56" form top, stiff to very stiff clay infilling through fracture from 16" to 24" from top,

teminated rock coring at 45' 10" bgs @! 14:17

Limestone

fine grained, smooth texture, residual soil at top 4", remainder slightly weathered, weak to medium strong rock, top 4" residual soil, brittle shale-like clay infilling 47" and 65" from top *(continued)*

524.09

End of Boring

Color pictures of the cores _____

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 9/18/07

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=564896.826, E=2459062.562), 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. ILR0205
Station _____
Offset _____
Ground Surface Elev. 567.92 ft

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

Groundwater Elev.:
First Encounter 559.9 ft ▼
Upon Completion _____ ft
After _____ Hrs. _____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Concrete 567.42 3" of concrete			
Silty Fine to Medium Sand (SM) black, slightly moist, loose, black , slightly moist	1 2 3		
563.92			
Sandy Silt (ML) black, slightly moist, very soft to stiff	0 0 1	1.0 P	
-5	0 0 2		
559.92 ▼			
Silt (ML) dark greenish and brown, loose to medium dense, moist, trace fine sand	3 3 3	1.5 P	
-10			
sandstone in tip pale	5 12 16		
555.92			
Shale pale olive brown, dense, moderate plasticity	4 9 30		
	50/2		
-15		1.5 P	
552.42			
End of Boring			
-20			

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 9/21/07

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=564822.636, E=2459073.618), 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. ILR0206
Station _____
Offset _____
Ground Surface Elev. 568.24 ft

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

Groundwater Elev.:
First Encounter 562.2 ft ▼
Upon Completion _____ ft
After _____ Hrs. _____ ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Concrete 7" concrete underlain by dark brown silty clay with sand 567.24		2		
Fill Silty Clay With Sand (CL-ML) Dark brown, dry to moist, medium stiff to stiff, with reddish brick material top 1" of sample contained crushed concrete 565.24		3 3 2		
Fill Sandy Silt (ML) Brown to dark brown, dry to moist, non plastic, loose 564.49		2		
	-5	2 3	1.8 P	
Fill: Clayey Silt (ML) Very dark gray to black, moist, low plasticity, stiff, non odorous, trace fine sand 562.24 ▼				
Fill Silty Fine to Medium Sand (SM) Gray to brown, moist, trace coarse sand 560.24			1.0 P	
Medium to Coarse Sand Little Silt And Gravel (SM) dark brown mottled with orange brown, wet, loose 559.64		2		
Sample 3 (8'-10'): grain size analysis performed 559.44		36 47		
	-10	32		
Clayey Sand With Silt (SC) light gray with greenish gray, moist, very dense		50/2		
Silty Fine to Medium Sand (SM) light gray to white with yellowish orange streaks, moist to wet, very dense, possible completely weathered sandstone		32		
little coarse sands, trace fine gravels, possible completely weathered sandstone		15 50/4		
	-15			
Driller notes rough drilling and chatter 11.0' bgs, possible weathered rock 552.57				
Light gray, moist to wet, very dense, medium to fine sands with silt, trace coarse sands, strong cementation, coarse to fine angular flat gravels and sandstone fragments, little clay (possible infilling) throughout, possible completely weathered sandstone	-20			

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

ROCK CORE LOG

Date 9/21/07

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=564822.636, E=2459073.618), **SEC.** 32, **TWP.** 18N, **RNG.** 1W, 4th **PM**

COUNTY Rock Island **CORING METHOD** Double tube, 10 ft core barrel, NQ wireline, diamond bit

STRUCT. NO. _____ **CORING BARREL TYPE & SIZE** _____

Station _____

Core Diameter _____ in

BORING NO. ILR0206 **Top of Rock Elev.** 552.57 ft

Station _____ **Begin Core Elev.** 552.57 ft

Offset _____

Ground Surface Elev. 568.24 ft

DEPTH (ft)	CORE (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
552.57					
	NQ-R1	90	7		
-20					
	NQ-R2	83	18		
-25					
	NQ-R3	100	57		
-30					
537.41					
-35					

Sandstone
Light brown, rough in texture, slightly weathered, weak to medium strong rock, brittle, crushed rock zone from 22" to 32" from top□15.67' - Horizontal fractures from 0"-24", remainder irregular fractures, rough to plannar fractured at top 16" of sample, remainder fractured surfaces are rough and irregular, undulating, top 16" no infilling material and no surface stains, unaltered ultered joints wells, Remainder: 1/8 little very stiff greenish gray clay infilling 1/8" to 1/4" in thickness at most fractures, greenish grey surface stains, tightly healed from 39" to 41", sandy clay material and crushed rock 2mm thick-enough to prevent rock wall contact at remaining fractures, ____discontinuous joints, extremely close to close discontinuities, moderate to fine fractured□23'-88"= top of run 188
CR: 1/2 min/foot
23'-28"=bottom of run 24
Top 14": Subangular to angular, Remainder: Sandstone, gray with dark gray, fine grained, slightly weathered to unweathered, medium strong, rock appears to be sandstone with shale-like clay that has hardened and formed a solid rock□20.67' -
Top 14": Subangular to angular, Remainder: Horizontal to 20° fractures, rough to undulating, fine surfaces, slightly altered joint walls 14" to 24" from top, Remainder discontinuous joint with very stiff to hard shale-like clay breaks thick enough (<1/4" thick) to prevent rock wall contact, surfaces stained dark gray possibly do to infilling□CR: 3/4 min/foot average

Barrel jammed 6" from bottom of sample

Light brown to light gray, smooth to slightly rough texture, blotchy appearance from 6" to 16", medium strong rock, Band <1.4" thick of shale tile hardened clay from 6" to 34" from top
25.67' - 10° to 30° fractures, rough and irregular undulating fracture surfaces, little or no infilling material, gray surface staining only, slightly altered to altered joint walls, blotches of greenish gray clay that has possibly filled veins in rock and hardened to make a continuous sample from 6" to 34" from top, tightly healed at 18" from top
CR: 1 min/foot average

End of Boring

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

BBS, form 138 (Rev. 8-99)

HANSON

SOIL BORING LOG

Date 6/29/10

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

SECTION 81B **LOCATION** NE¼ of SEC. 32, TWP. 18N, RNG. 1W, 4th P.M.

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

STRUCT. NO. _____
Station _____
BORING NO. RDG 01
Station 132+53
Offset CL
Ground Surface Elev. 570.4 ft

Surface Water Elev. _____
Stream Bed Elev. _____

Groundwater Elev.:
First Encounter _____ ft
Upon Completion 563.4 ft ▽
After 24 **Hrs.** 563.4 ft ▼

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				Brown, moist, medium, sandy, lean CLAY
	4	1.60P	19	
2	4			
	50/2"			
567.40				
				CONCRETE
566.90				
	7	1.75P	25	Brown, moist, soft, sandy, lean CLAY
566.40 4	11			
	15			Very dark brown, dry to moist, very stiff, sandy SILT
6			16	
563.40 ▼		0.61S	21	
				Dark brown, moist to wet, stiff, sandy SILT
562.40			28	
8				Very dark brown, wet, soft, sandy, clayey SILT
10				
559.40				
	3	1.15B	28	Gray, moist, stiff, lean CLAY with silt
12	5			
	6			
556.90				
	3	1.10B	29	Gray, moist, stiff, lean CLAY with silt and fine-grained sand
14	5			
	7			
554.40 16				
	50/3"			Gray, hard, fine-grained, WEATHERED SANDSTONE
18				
551.80				
	50/1"			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)

HANSON

SOIL BORING LOG

Date 6/28/10

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

SECTION 81B **LOCATION** NE¼ of SEC. 32, TWP. 18N, RNG. 1W, 4th P.M.

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

STRUCT. NO. _____
Station _____
BORING NO. RDG 02
Station 134+65
Offset 5' Lt.
Ground Surface Elev. 568.0 ft

Surface Water Elev. _____
Stream Bed Elev. _____

Groundwater Elev.:
First Encounter _____ ft
Upon Completion 562.0 ft ▽
After 24 **Hrs.** 563.5 ft ▼

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
TOPSOIL 567.60				
FILL - Very dark brown, moist, very stiff, silty, fine- to medium-grained SAND and GRAVEL	2	7 12 15	2.00P	13
565.00				
Creosote timber				
564.00	4	5 4 3		24
Grayish green, moist, very stiff, fat CLAY	▼			
	▽ 6	5 8 8	0.81B	30
560.50				
Dark brown, wet, well-graded, SAND with trace silt	8		0.30P	20
558.50				
Brown, wet, medium- to coarse-grained SAND 557.50	10			
Gray, hard, very fine-grained, WEATHERED SANDSTONE 556.80		50/2"		14
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)

HANSON

SOIL BORING LOG

Date 6/29/10

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

SECTION 81-1HVB **LOCATION** NE¼ of SEC. 32, TWP. 18N, RNG. 1W, 4th P.M.

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

STRUCT. NO. 081-6011
Station
BORING NO. RW 02-1
Station 130+12
Offset 25' Rt.
Ground Surface Elev. 566.2 ft

Surface Water Elev.
Stream Bed Elev.

Groundwater Elev.:
First Encounter ft
Upon Completion 562.2 ft ▽
After Hrs. ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
CONCRETE 565.70			
FILL - Dark to very dark brown, moist to wet, soft and loose, silt, fine- to coarse-grained sand and gravel, with degrading plywood, particle board, timber, lumber, bituminous materials, metal scraps, cinder blocks, and brick fragments, petroleum odor	4 5 2		11
2			
▽ 4	2 2 5	0.50P	20
6	4 5 6	1.75P	18
8	2 3 3		196
10			
555.70 Brownish gray, wet, dense, clayey, silty, fine-grained SAND with trace gravel 554.70	10 12 14	0.75P	20
12 Gray, fine-grained, WEATHERED SANDSTONE			
552.20	50/5"		17
14 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)

HANSON

SOIL BORING LOG

Date 6/29/10

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

SECTION 81-1HVB **LOCATION** NE¼ of SEC. 32, TWP. 18N, RNG. 1W, 4th P.M.

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

STRUCT. NO. 081-6011
Station
BORING NO. RW 02-2
Station 131+83
Offset 32' Rt.
Ground Surface Elev. 568.3 ft

Surface Water Elev.
Stream Bed Elev.

Groundwater Elev.:
First Encounter ft
Upon Completion 557.3 ft ▽
After Hrs. ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
CONCRETE 567.80			
Brown, slightly moist, very stiff, clayey SILT with sand	5 3 2	2.25P	15
564.80			
Dark brown, moist, soft, silty, lean CLAY with trace sand	2 2 4	0.44B	27
		0.49B	29
			33
		1.80B	25
559.70		2.75B	25
Grayish green, moist, stiff, silty, lean CLAY ▽	6 8 8	0.40B	32
556.30			
Brown, wet, medium dense, silty, medium-grained SAND with gravel 555.80			
Gray, fine-grained, WEATHERED SANDSTONE 554.20			
End of Boring	15 50/2"	1.76S	10

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 6/29/10

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

SECTION 81-1HVB **LOCATION** NE¼ of SEC. 32, TWP. 18N, RNG. 1W, 4th P.M.

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

STRUCT. NO. 081-6011
Station
BORING NO. RW 02-3
Station 132+79
Offset 40' Rt.
Ground Surface Elev. 567.9 ft

Surface Water Elev.
Stream Bed Elev.

Groundwater Elev.:
First Encounter ft
Upon Completion 560.9 ft ▽
After Hrs. ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
FILL - Soil 567.40				
CONCRETE 566.90				
FILL - Gray, moist, loose, silty SAND, creosote wood pieces, metal scraps, brick and concrete fragments	2	50/1"		
	4	3 3 5	1.75P	30
562.40				
Dark brown and dark gray, moist, soft to stiff, lean CLAY with silt	6		1.41S	26
▽			0.41B	28
560.40				
Grayish green, moist, stiff to very stiff, lean CLAY with trace silt	8		1.50S	25
			2.31B	26
	10			
556.40		4 3 6	1.25P	30
Gray, fine-grained, WEATHERED SANDSTONE	12			
554.90				
Dark gray, WEATHERED SHALE 554.20				
End of Boring		50/2"		8

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 6/28/10

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

SECTION 81-1HVB **LOCATION** NE¼ of SEC. 32, TWP. 18N, RNG. 1W, 4th P.M.

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

STRUCT. NO. 081-6011
Station
BORING NO. RW 02-4
Station 134+57
Offset 48' Rt.
Ground Surface Elev. 568.0 ft

Surface Water Elev.
Stream Bed Elev.

Groundwater Elev.:
First Encounter NM ft
Upon Completion ft
After Hrs. ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
CONCRETE 567.70			
Very dark brown, moist, soft, silty, lean CLAY with fine-grained sand	2 2 3	0.25P	28
565.00			
Very dark brown, moist, stiff, silty, lean CLAY with trace very fine-grained sand		0.26B	30
		0.53B	26
		1.79B	22
		1.27S	19
		2.50P	17
560.00			
Brown, wet, silty, fine- to medium-grained SAND 559.50	6 8 12		15
Brown, moist, medium dense, silty, fine-grained SAND with gravel 558.00			
Gray, WEATHERED SILTSTONE	50/5"		9
554.60			
Gray, fine-grained, WEATHERED SANDSTONE 554.50	50/0"		
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 12/30/99

ROUTE I-74 DESCRIPTION New I-74 Bridge Over Mississippi River - Illinois Approach LOGGED BY L. Hunt

SECTION I-74 Bridge over Mississippi River LOCATION (N=565278.629, E=2459057.591), 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. RW1501
Station
Offset
Ground Surface Elev. 570.72 ft

Surface Water Elev. ft
Stream Bed Elev. ft
Groundwater Elev.:
First Encounter 562.7 ft ▼
Upon Completion ft
After Hrs. ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Clayey Gravel (GC) Clayey gravel to fine grained sand, dark brown to brown, dry to moist, stratified. Borehole moved out of mounds of debris for safety reasons	9, 12, 9, 8		
568.72			
Silty Sand (SM) Fine grained sand, brown, dry to moist, homogeneous. Petroleum odor from 4-6'.	3, 4, 3, 2, 1		
-5	1, 1, WOH, WOH		
WOH = Weight of Hammer	1, WOH		19.0
562.72 ▼	2		
Clay (CH) Clay, dark brown to black, moist, homogeneous. Shelby tube from 8ft-10ft obtained from adjacent boring. CD Triaxial test and Atterberg limit (LL=50, PI=23) test performed.	WOH, WOH, 2		56.0
560.72 -10	2, Push		
Clayey Sand (SC) Clayey sand, trace organics, dark brown to brown, moist to 12.0', wet deeper, homogeneous	WOH, WOH, 2, 2		48.0
556.72	6, 4, 3, 4		
Sand and Clay (SP,SC) Sand and clay, trace gravel, trace organics, dark brown, wet, homogeneous	-15 1, 10, 15, 33		
550.72 -20			

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Clay to Silt (CL-ML) Clay to silt, dark gray brown to light gray, wet, poss. wthrd shale Auger refusal at 20.5'	50/5		
550.22			
Decontaminate equipment starting at 8:56 am. End of Boring			
-25			
-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)

Project No. 07045052

	ORGANIC CONTENT TEST	1	2	3	4	5	6
	Boring #	ILR0103	ILR0201	ILR0204	ILR0103	ILR0201	ILR0103
	Sample Ident.	T-1	S-4	S-5	S-3	S-2	S-4
	Depth (feet)	11'-13'	8'	10'-12'	6'-8'	3'-5'	8'-10'
	Tare #	E	White Blank	D	A	X	F
A	Moisture: Wet + Tare	186.66	194.86	234.98	81.26	125.24	145.11
B	Moisture: Dry + Tare	163.52	158.09	231.67	79.12	122.24	142.73
C	Tare Wt.	79.38	66.73	84.44	43.77	45.18	70.43
D	Wt. Water	23.14	36.77	3.31	2.14	3.00	2.38
E	Wt. Dry	84.14	91.36	147.23	35.35	77.06	72.30
	% MC	27.50	40.25	2.25	6.05	3.89	3.29
F	Ashed Sample + Tare	158.50	149.33	228.58	68.04	114.93	133.47
G	Ashed Sample	79.12	82.60	144.14	24.27	69.75	63.04
H	% Ash Content	94.03	90.41	97.90	68.66	90.51	87.19
	% Organic Content	**5.97**	**9.59**	**2.10**	**31.34**	**9.49**	**12.81**

Samples air dryed - Not Natural moistures

full of wood chips or fibers

HANSON

ORGANIC CONTENT

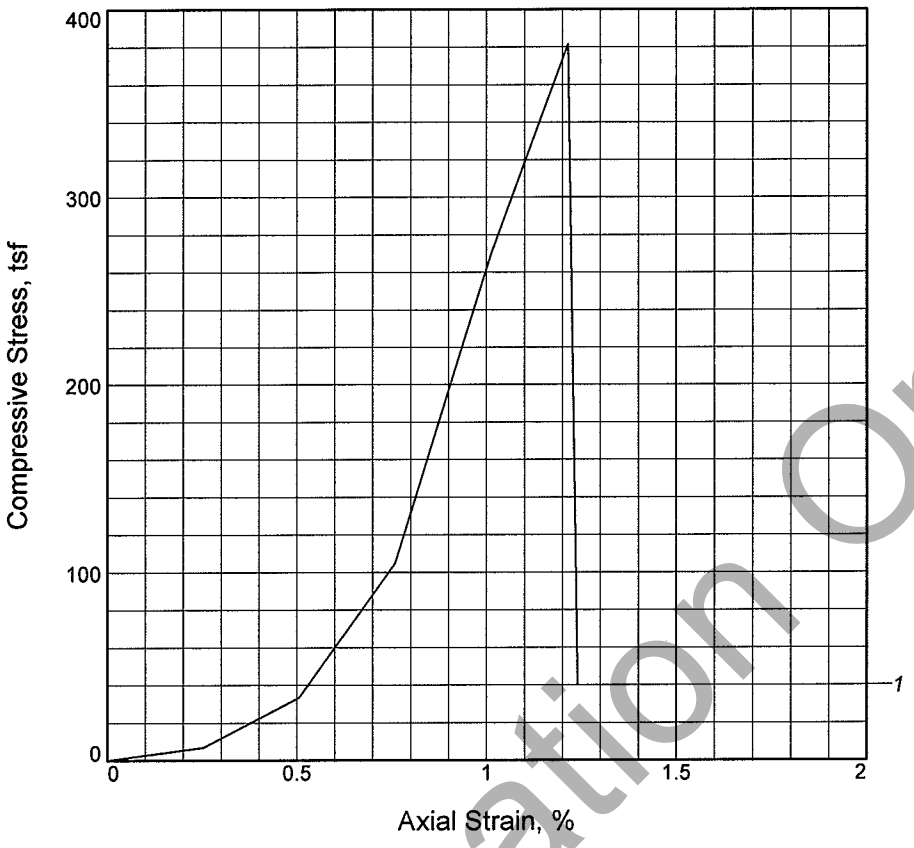
Project: I-74 Over Mississippi River Job Number: 08H0120E

Client: Iowa DOT Date: 8/23/2010

Checked by: SLS Date: 8/23/2010

Boring/ Sample Number	Oven Dry Weight of Soil+Tare (grams)	Fired Weight of Soil+Tare (grams)	Weight of Tare (grams)	Loss On Ignition (%)	Furnace Temperature (C)
I-74 01 ST4-2 8.5'-9.0'	121.34	120.03	81.55	3.3	440.0
RW01-2 ST2-1 3.0'-3.5'	93.11	92.54	79.37	4.1	440.0
RW01-3 ST2-1 3.0'-3.5'	136.56	135.47	79.37	1.9	440.0
RW01-3 ST3-2 6.5'-7.0'	118.23	116.79	81.55	3.9	440.0
RW02-4 ST2-1 6.0'-6.5'	142.60	140.28	79.37	3.7	440.0
RW16-1 ST5-1 11.0'-11.5'	104.58	95.74	79.38	35.1	440.0
RW16-1 ST6-1 13.0'-13.5'	99.40	91.88	81.56	42.2	440.0
RW135-04 SPT-5 7.0'-7.5'	87.08	85.49	81.56	28.8	440.0

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, tsf	381.6723			
Undrained shear strength, tsf	190.8362			
Failure strain,	1.2			
Strain rate, in./min.	0.500			
Water content, %	3.7			
Wet density, pcf	160.7			
Dry density, pcf	155.0			
Saturation, %	N/A			
Void ratio	N/A			
Specimen diameter, in.	1.840			
Specimen height, in.	3.950			
Height/diameter ratio	2.15			

Description: LIMESTONE

LL =	PL =	PI =	GS=	Type: Limestone

Project No.: 19636.040
Date: 4-7-08
Remarks:
Lab No. 3188

Figure _____

Client: TERRACON (#07045052)

Project: I-74 CROSSING-BETTENDORF-MOLINE

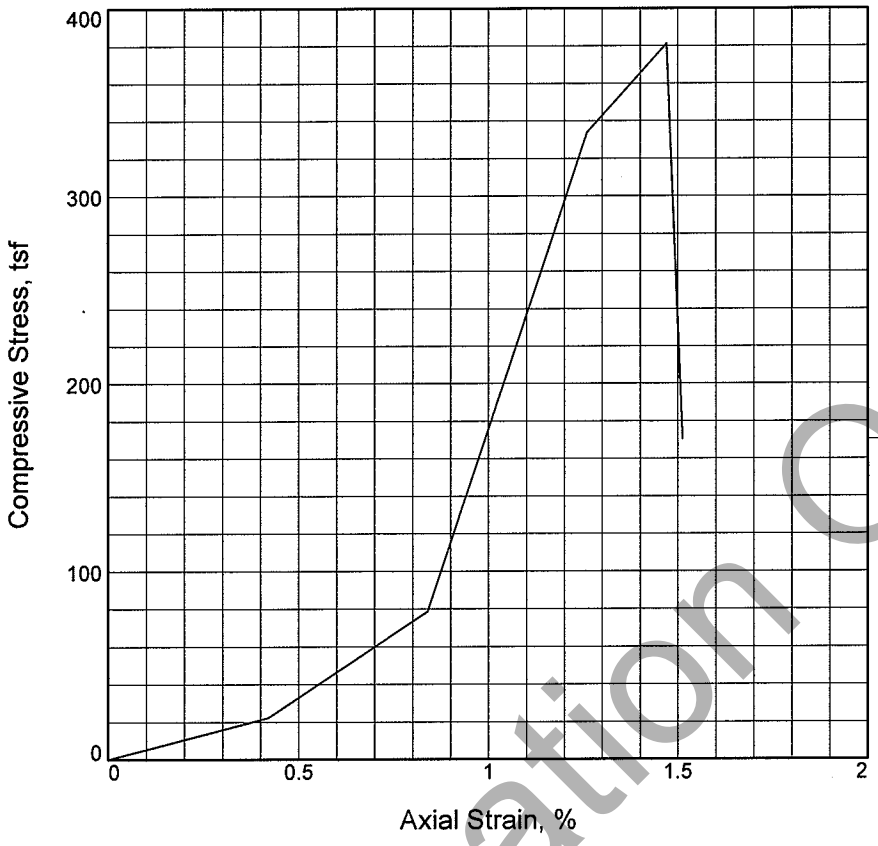
Source of Sample: ILR0201 **Depth:** 17'10"
Sample Number: R-1

UNCONFINED COMPRESSION TEST

H. C. NUTTING COMPANY

Tested By: DR **Checked By:** GS

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, tsf	381.1925			
Undrained shear strength, tsf	190.5962			
Failure strain,	1.5			
Strain rate, in./min.	0.500			
Water content, %	5.9			
Wet density, pcf	127.7			
Dry density, pcf	120.6			
Saturation, %	N/A			
Void ratio	N/A			
Specimen diameter, in.	1.840			
Specimen height, in.	2.380			
Height/diameter ratio	1.29			

Description: SANDSTONE

LL =	PL =	PI =	GS=	Type: Sandstone

Project No.: 19636.040
Date: 4-7-08
Remarks:
Lab No. 3190

Figure _____

Client: TERRACON (#07045052)

Project: I-74 CROSSING-BETTENDORF-MOLINE

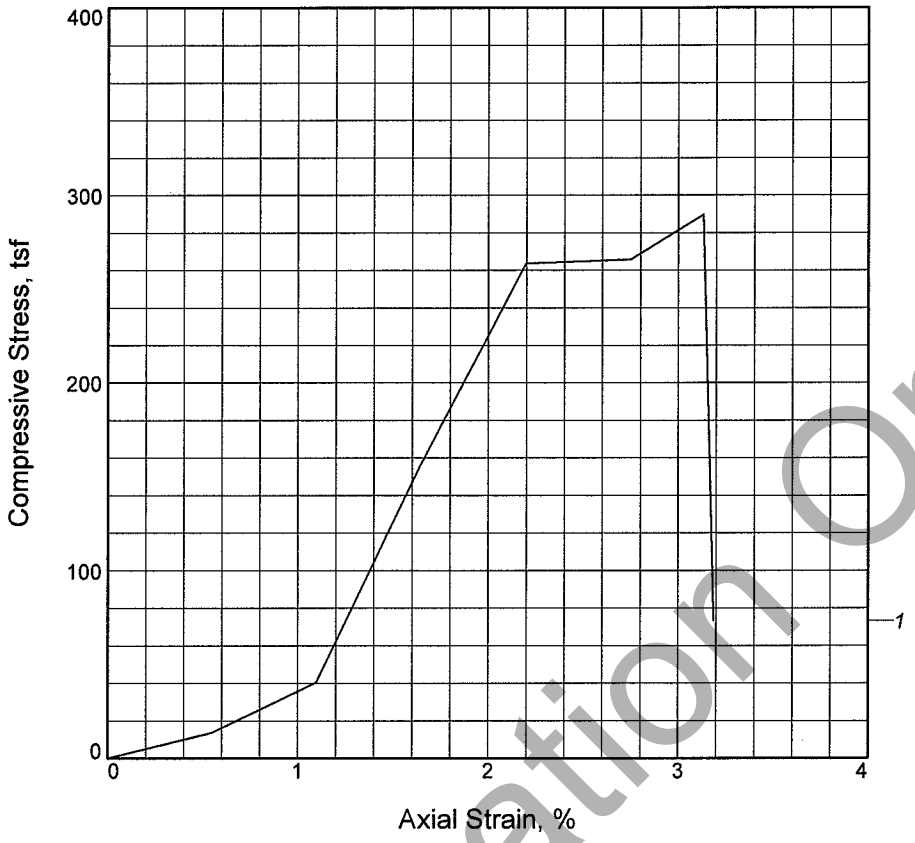
Source of Sample: ILR0206 **Depth:** 20'8"
Sample Number: R-1

UNCONFINED COMPRESSION TEST

H. C. NUTTING COMPANY

Tested By: DR **Checked By:** GS

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, tsf	289.6510			
Undrained shear strength, tsf	144.8255			
Failure strain,	3.1			
Strain rate, in./min.	0.500			
Water content, %	2.8			
Wet density, pcf	151.2			
Dry density, pcf	147.1			
Saturation, %	N/A			
Void ratio	N/A			
Specimen diameter, in.	1.840			
Specimen height, in.	1.820			
Height/diameter ratio	0.99			

Description: SANDSTONE

LL =	PL =	PI =	GS=	**Type:** Sandstone

Project No.: 19636.040
Date: 4-7-08

Remarks:
Lab No. 3191

Figure _____

Client: TERRACON (#07045052)

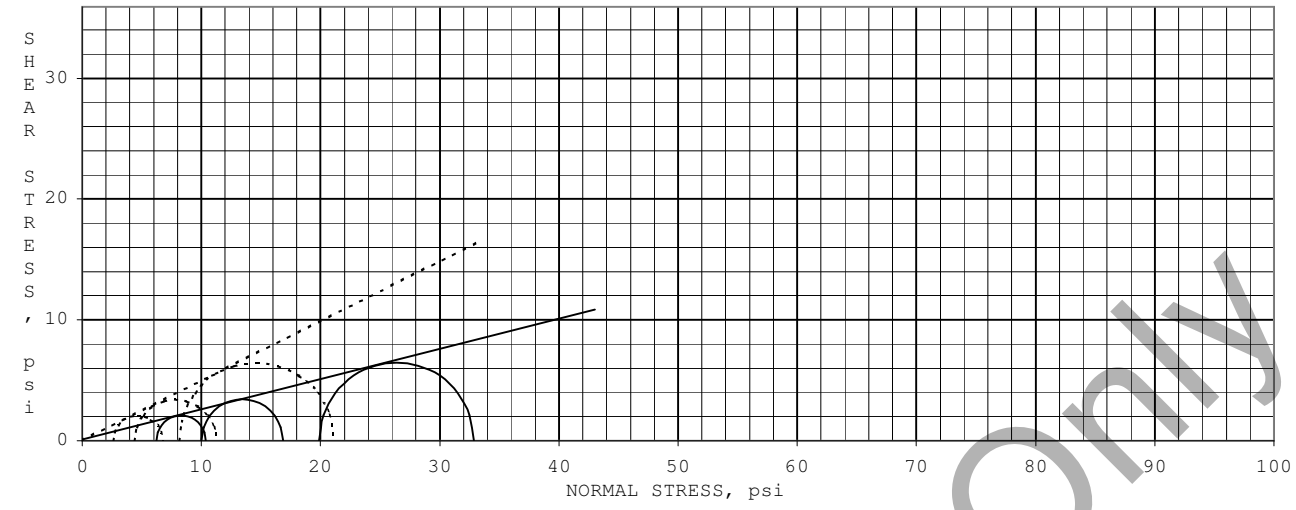
Project: I-74 CROSSING-BETTENDORF-MOLINE

Source of Sample: ILR0206 **Depth:** 23'8"
Sample Number: R-2

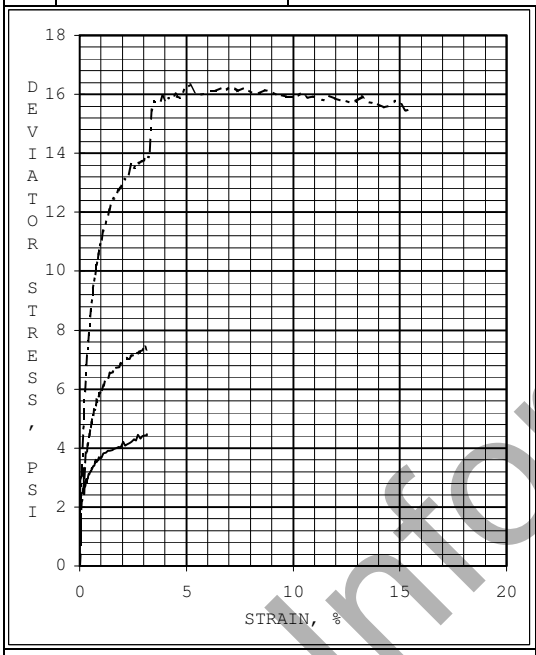
UNCONFINED COMPRESSION TEST

H. C. NUTTING COMPANY

Tested By: DR **Checked By:** GS



EFFECTIVE STRESS	ANGLE OF INTERNAL FRICTION, deg	**26.4**	COHESION, psi	**0.0**
TOTAL STRESS	ANGLE OF INTERNAL FRICTION, deg	**14.0**	COHESION, psi	**0.1**



SPECIMEN #:		A	B	C
INITIAL	WATER CONTENT, %	55.6	59.3	56.1
	DRY DENSITY, pcf	62.1	64.8	67.0
	SATURATION, %	88	100	100
	VOID RATIO	1.72	1.60	1.52
BEFORE SHEAR	WATER CONTENT, %	59.3	56.1	52.2
	DRY DENSITY, pcf	64.8	67.0	69.9
	SATURATION (B PARAMETER)	1.00	1.00	1.00
	VOID RATIO	1.60	1.51	1.41
	FINAL BACK PRESSURE, psi	99.9	100.8	100.2
MINOR PRINCIPAL STRESS, psi		106.1	110.8	120.1
DEVIATOR STRESS @ 2% STRAIN, psi		4.2	6.9	13.0
TIME TO 2% STRAIN, min.		456	457	465
ULTIMATE DEVIATOR STRESS, psi		NA	NA	15.6
INITIAL DIAMETER, inch		2.842	2.838	2.832
INITIAL HEIGHT, inch		5.642	5.417	5.264
AREA AFTER CONSOLIDATION, inch2*		6.173	6.154	6.079

CONTROLLED - STRAIN TEST

t_{50} 71 min | Strain Rate, %/hr 0.26

DESCRIPTION OF SPECIMENS: FAT CLAY WITH ORGANICS, VERY DARK GRAY

LL 50 | PL 27 | PI 23 | Gs 2.7 EST.

SAMPLE TYPE: 3" SHELBY TUBE | TEST TYPE: $\overline{CU}$

REMARKS:

MOHR'S CIRCLES DRAWN AT 2% STRAIN

SAMPLE WAS STAGE LOADED

* SECTION 10.2.2.1 METHOD A

PROJECT: I-74 CENTER SECTION
QUAD CITIES, IA/IL 07045052

BORING #: RW1501

SAMPLE #: S-1

DEPTH OR ELEV.: 8.0 TO 10.0 feet

LABORATORY: TERRACON - LENEXA | DATE: 1/20/2006

TRIAXIAL COMPRESSION TEST REPORT

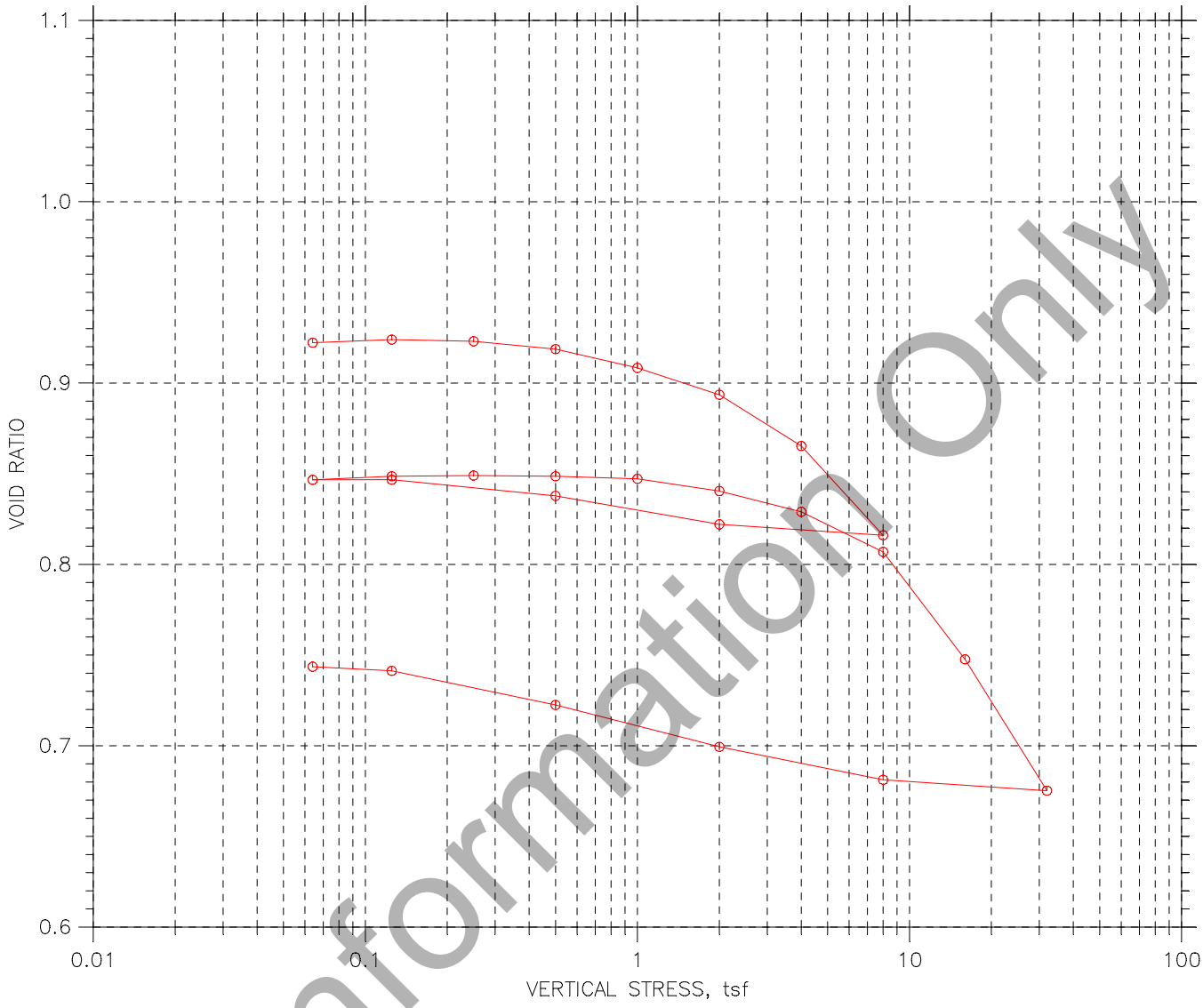
PROCEDURE: ASTM D4767, CONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST ON COHESIVE SOILS (MODIFIED DUE TO STAGE LOADING)

Terracon

C:\Documents and Settings\ECARRASC\My Documents\PROJECTS\Iowa\I-74\Central Section Iowa\Retaining Walls Design\Lab results\[07045052TriaxialCUStaged-RW1501-S1.xls]REPORT

CONSOLIDATION TEST DATA

SUMMARY REPORT



				Before Test	After Test
Overburden Pressure: 0 tsf			Water Content, %	32.80	26.56
Preconsolidation Pressure: 0 tsf			Dry Unit Weight, pcf	87.76	96.67
Compression Index: 0			Saturation, %	96.20	96.45
Diameter: 2.499 in		Height: 0.994 in	Void Ratio	0.92	0.74
LL: 0	PL: 0	PI: 0	GS: 2.70		

HANSON	Project: I74	Location: Quad Cities	Project No.: 08H0120E
	Boring No.: RW02-2	Tested By: Rin	Checked By: JCC
	Sample No.: 3-2	Test Date: 7/13/10	Depth: 6.5-6.8
	Test No.: 1	Sample Type: Tube	Elevation:
	Description: Black vf. sandy clayey silt - organic.		
	Remarks:		

CONSOLIDATION TEST DATA

Project: I74
Boring No.: RW02-2
Sample No.: 3-2
Test No.: 1

Location: Quad Cities
Tested By: Rin
Test Date: 7/13/10
Sample Type: Tube

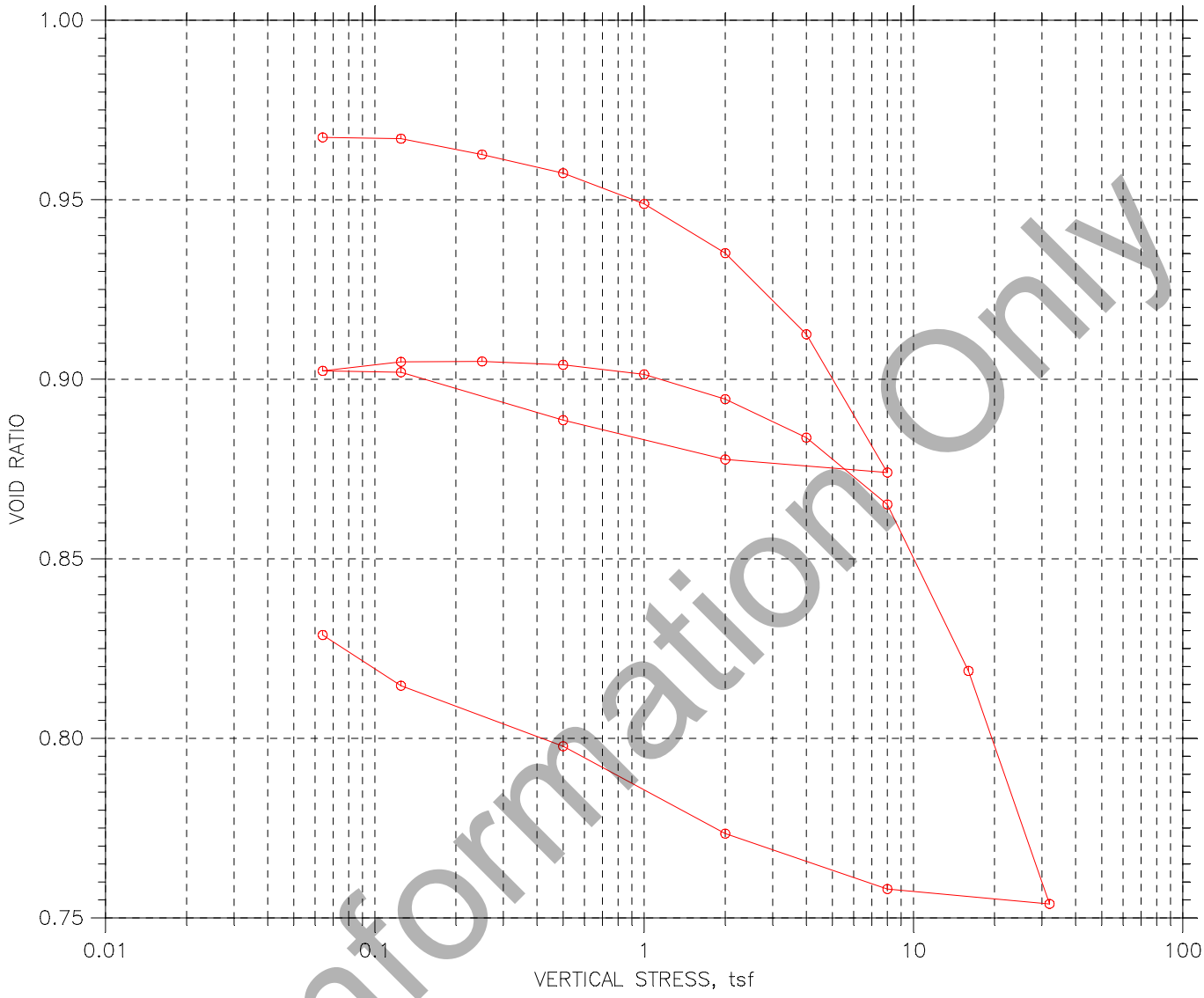
Project No.: 08H0120E
Checked By: JCC
Depth: 6.5-6.8
Elevation:

Soil Description: Black vf. sandy clayey silt - organic.
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	0.064	-0.0008207	0.922	-0.08	0.0	0.0	0.00e+000	0.00e+000	0.00e+000
2	0.125	-0.001697	0.924	-0.17	0.0	0.0	0.00e+000	0.00e+000	0.00e+000
3	0.25	-0.001225	0.923	-0.12	1.9	0.9	4.37e-004	9.36e-004	5.96e-004
4	0.5	0.001008	0.919	0.10	1.9	0.7	4.34e-004	1.21e-003	6.40e-004
5	1	0.006384	0.908	0.64	1.8	1.2	4.49e-004	6.88e-004	5.44e-004
6	2	0.01403	0.894	1.41	1.8	1.4	4.40e-004	5.87e-004	5.03e-004
7	4	0.02867	0.865	2.88	1.8	1.5	4.32e-004	5.16e-004	4.70e-004
8	8	0.05415	0.816	5.45	3.4	3.3	2.22e-004	2.26e-004	2.24e-004
9	2	0.05102	0.822	5.13	1.0	0.0	7.35e-004	0.00e+000	7.35e-004
10	0.5	0.0429	0.838	4.32	3.5	0.0	2.10e-004	0.00e+000	2.10e-004
11	0.125	0.0383	0.847	3.85	8.4	0.0	8.91e-005	0.00e+000	8.91e-005
12	0.064	0.03832	0.847	3.86	7.0	0.0	1.08e-004	0.00e+000	1.08e-004
13	0.125	0.0373	0.849	3.75	0.0	0.0	0.00e+000	0.00e+000	0.00e+000
14	0.25	0.03709	0.849	3.73	1.1	0.3	6.57e-004	2.77e-003	1.06e-003
15	0.5	0.03732	0.849	3.75	2.9	0.5	2.57e-004	1.55e-003	4.41e-004
16	1	0.03805	0.847	3.83	1.8	1.4	4.14e-004	5.20e-004	4.61e-004
17	2	0.04151	0.840	4.18	1.9	0.0	4.01e-004	0.00e+000	4.01e-004
18	4	0.04747	0.829	4.78	1.8	1.5	4.06e-004	5.02e-004	4.49e-004
19	8	0.05889	0.807	5.92	1.8	2.5	3.99e-004	2.88e-004	3.35e-004
20	16	0.08955	0.748	9.01	3.5	3.5	1.99e-004	1.98e-004	1.98e-004
21	32	0.127	0.675	12.78	3.5	0.0	1.84e-004	0.00e+000	1.84e-004
22	8	0.1239	0.681	12.47	0.9	0.0	6.61e-004	0.00e+000	6.61e-004
23	2	0.1145	0.699	11.52	7.1	0.0	8.86e-005	0.00e+000	8.86e-005
24	0.5	0.1026	0.722	10.32	26.8	0.0	2.40e-005	0.00e+000	2.40e-005
25	0.125	0.09285	0.741	9.34	51.8	0.0	1.28e-005	0.00e+000	1.28e-005
26	0.064	0.09167	0.744	9.22	0.0	31.4	0.00e+000	2.13e-005	2.13e-005

CONSOLIDATION TEST DATA

SUMMARY REPORT



				Before Test	After Test
Overburden Pressure: 0 tsf			Water Content, %	32.38	28.23
Preconsolidation Pressure: 0 tsf			Dry Unit Weight, pcf	85.82	92.17
Compression Index: 0			Saturation, %	90.68	91.97
Diameter: 2.499 in		Height: 0.997 in	Void Ratio	0.96	0.83
LL: 0	PL: 0	PI: 0	GS: 2.70		

HANSON

Project: I74	Location: Quad Cities	Project No.: 08H0120E
Boring No.: RW02-4	Tested By: Rin	Checked By: JCC
Sample No.: 2-1	Test Date: 7/15/10	Depth: 3.2-3.5
Test No.: 1	Sample Type: Tube	Elevation:
Description: Black vf. sandy clayey silt - organic.		
Remarks:		

CONSOLIDATION TEST DATA

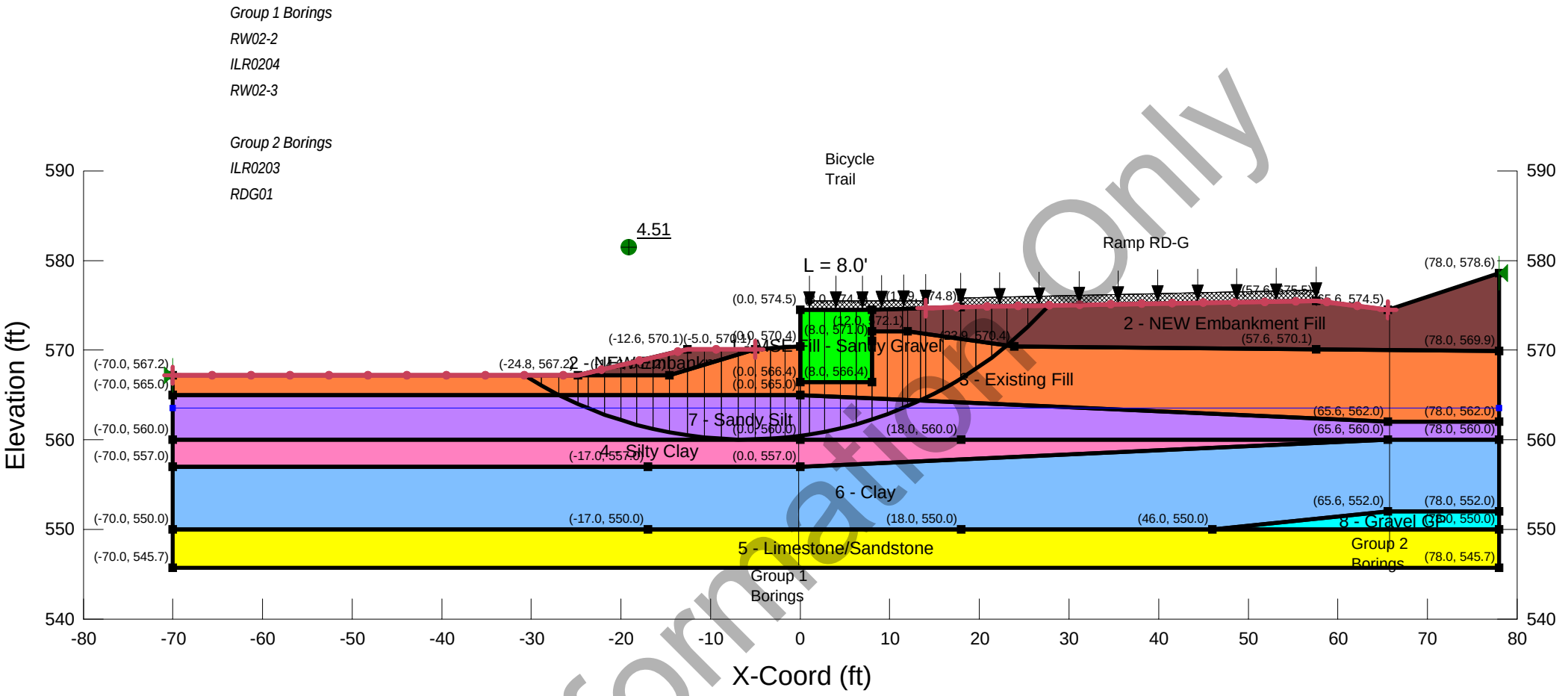
Project: I74
Boring No.: RW02-4
Sample No.: 2-1
Test No.: 1

Location: Quad Cities
Tested By: Rin
Test Date: 7/15/10
Sample Type: Tube

Project No.: 08H0120E
Checked By: JCC
Depth: 3.2-3.5
Elevation:

Soil Description: Black vf. sandy clayey silt - organic.
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	0.064	-0.001665	0.967	-0.17	0.0	0.0	0.00e+000	0.00e+000	0.00e+000
2	0.125	-0.001477	0.967	-0.15	1.4	1.0	5.93e-004	8.19e-004	6.88e-004
3	0.25	0.0007573	0.963	0.08	18.4	7.6	4.45e-005	1.07e-004	6.29e-005
4	0.5	0.003394	0.957	0.34	3.5	0.0	2.32e-004	0.00e+000	2.32e-004
5	1	0.007743	0.949	0.78	3.3	0.0	2.42e-004	0.00e+000	2.42e-004
6	2	0.01469	0.935	1.47	3.3	0.0	2.42e-004	0.00e+000	2.42e-004
7	4	0.02617	0.913	2.62	3.4	0.0	2.32e-004	0.00e+000	2.32e-004
8	8	0.04571	0.874	4.58	3.7	0.0	2.06e-004	0.00e+000	2.06e-004
9	2	0.04386	0.878	4.40	0.9	0.0	8.25e-004	0.00e+000	8.25e-004
10	0.5	0.03831	0.889	3.84	7.3	0.0	1.02e-004	0.00e+000	1.02e-004
11	0.125	0.03154	0.902	3.16	37.8	0.0	2.01e-005	0.00e+000	2.01e-005
12	0.064	0.03135	0.902	3.14	11.6	6.4	6.61e-005	1.20e-004	8.51e-005
13	0.125	0.03007	0.905	3.02	0.0	0.0	0.00e+000	0.00e+000	0.00e+000
14	0.25	0.03	0.905	3.01	3.5	0.0	2.19e-004	0.00e+000	2.19e-004
15	0.5	0.03049	0.904	3.06	7.6	0.0	1.01e-004	0.00e+000	1.01e-004
16	1	0.03184	0.901	3.19	12.3	0.0	6.23e-005	0.00e+000	6.23e-005
17	2	0.03535	0.894	3.55	3.7	0.0	2.08e-004	0.00e+000	2.08e-004
18	4	0.04079	0.884	4.09	3.5	0.0	2.15e-004	0.00e+000	2.15e-004
19	8	0.05023	0.865	5.04	3.5	0.0	2.12e-004	0.00e+000	2.12e-004
20	16	0.07376	0.819	7.40	3.6	0.0	1.98e-004	0.00e+000	1.98e-004
21	32	0.1067	0.754	10.70	3.8	5.5	1.79e-004	1.23e-004	1.46e-004
22	8	0.1046	0.758	10.49	0.3	0.0	2.04e-003	0.00e+000	2.04e-003
23	2	0.09676	0.773	9.71	7.0	0.0	9.40e-005	0.00e+000	9.40e-005
24	0.5	0.08442	0.798	8.47	27.9	0.0	2.42e-005	0.00e+000	2.42e-005
25	0.125	0.07585	0.815	7.61	82.2	0.0	8.41e-006	0.00e+000	8.41e-006
26	0.064	0.06868	0.829	6.89	0.0	0.0	0.00e+000	0.00e+000	0.00e+000



Material Properties

Name: 1 - MSE Fill - Sandy Gravel Model: Mohr-Coulomb Unit Weight: 125 pcf Cohesion: 0 psf Phi: 34 °
Name: 2 - NEW Embankment Fill Model: Mohr-Coulomb Unit Weight: 125 pcf Cohesion: 1000 psf Phi: 0 °
Name: 3 - Existing Fill Model: Mohr-Coulomb Unit Weight: 118 pcf Cohesion: 1000 psf Phi: 0 °
Name: 4 - Silty Clay Model: Mohr-Coulomb Unit Weight: 118 pcf Cohesion: 1300 psf Phi: 0 °
Name: 5 - Limestone/Sandstone Model: Bedrock (Impenetrable)
Name: 6 - Clay Model: Mohr-Coulomb Unit Weight: 118 pcf Cohesion: 1100 psf Phi: 0 °
Name: 7 - Sandy Silt Model: Mohr-Coulomb Unit Weight: 118 pcf Cohesion: 0 psf Phi: 27 °
Name: 8 - Gravel GP Model: Mohr-Coulomb Unit Weight: 125 pcf Cohesion: 0 psf Phi: 34 °

SN 081-6011 IL-RW02
Case 1 - Sta 132+50 (E/E)
File Name: I-74 RW02 MSE Wall-2.gsz
Last Edited By: Robert Chantome
Date: 10/20/2011 5:03:49 PM

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

HANSON

benesch
engineers · scientists · planners

Meeting Minutes

Project Name:	I-74 over the Mississippi
Project Number:	IM-74-1(185)5--13-82
Current Date:	March 15, 2011
Date of Meeting:	November 16, 2010
Time of Meeting:	1:00 p.m.- 2:30 p.m.
Meeting Location:	Conference Call and WebEx
Regarding:	I-74 FHWA VE Illinois Retaining Walls and Bridges – Status Update

Participant's Name	Title and Company Name
See Attached Sign in Sheet	

1. Purpose of Meeting:

The purpose of the meeting was to discuss the Benesch Team's findings regarding the evaluation of the FHWA's VE Recommendations for the Plug Fill and several retaining walls on the Illinois side. These minutes reflect discussions pertaining to the following:

- Plug Fill which includes retaining walls RW01 (SN 081-6010), RW02 (SN 081-6011), RW16 (SN 081-6018) and RW15
- Retaining wall RW03 (SN 081-6012), which retains Proposed Ramp 6th–D
- Retaining wall RW04 (SN 081-6013), which is east of 19th Street
- Retaining wall RW14 ,which is east of proposed Ramp 7th-A

David Morrill opened the meeting at 1 p.m. The attendees were identified and added to the attached Attendance Roster.

David noted that Benesch presented our initial findings regarding the plug fill to District 2 on October 25, 2010. The preliminary conclusion from that meeting was to adopt the Structure option. This was based on the Illinois DOT's understanding of the City of Moline's concerns with the Plug Fill option. Subsequent to the October meeting, Benesch refined the cost analysis; specifically the special waste costs. The results remain the same, namely the Plug Fill option is less expensive than the Structure option. The analysis and results are summarized in a PowerPoint presentation (see Attachment A) that was presented during the conference call via WebEx.

With respect to the Plug Fill retaining walls, Benesch's intent was to present the initial findings and recommendations to make sure everyone is on the same page before the Benesch Team proceeds with completing the TSLs and SGRs. The walls presented included retaining wall RW03, an MSE wallwith temporary wire facing and retaining walls RW04 and RW14, soldier pile and lagging walls with permanent CIP concrete facing.

As noted in Tim's previous comments on the unapproved retaining wall TS&Ls, the D5 preliminary studies did not fully address the soils issues. Therefore those TSLs with soil issues were not approved. Hanson reviewed the D5 SGRs along with additional soil borings and/or analysis to verify these soil concerns. They concluded that some type of soil remediation is required for the Plug Fill area and for RW03 which validates Tim's concerns.

2. Plug Fill Alternatives:

David walked the group through the PowerPoint presentation (see Attachment A) which included the following discussion items:

- Review Preliminary Engineering (Phase I) Design
- Review Existing Soil Conditions
- Review Alternatives
- Review Costs
- Present Renderings
- Advantages and Limitations
- Recommendations
- Next Steps

The existing soils conditions have a wide range of variability with no consistent section. There are significant settlement issues requiring a long time period (over 400 days) for consolidation.

Three alternatives were explored in detailed:

- Plug Fill – included the removal and replacement and strengthening of existing soils
- Structure for mainline and ramps
- Structure for mainline only

The City of Moline/Renew Moline expressed concerns with the Plug Fill alternative, a large mass of earth framed by concrete walls that would block views and access.

To assist in the evaluation of the alternatives, visual renderings were created with views looking to the east, the northeast, the north and the northwest.

The advantages of the Plug Fill alternative are:

- Easily accommodates the I-74 MOT crossover and sag;
- Less maintenance;
- Lessens the industrial feeling; and
- Provides opportunity for incorporating aesthetics on the walls.

The limitations of the Plug Fill alternative are:

- Less open vista; and
- Limits east-west access

The advantages of the Structure alternatives are:

- More open vista; and

- Accommodates east-west access,

The limitations of the Plug Fill alternative are:

- Crossover on Structure adds complications;
- Sags on bridges are not generally favored by the Bridge Office;
- More structure to maintain;
- Openness is more of an industrial feel; and
- Does not permit clear view of the river

The cost for the Plug Fill alternative is approximately $19.0 million while the Mainline and Ramp Structure alternative is approximately $3.1 million more, i.e. $22.1 million. The cost for the Mainline only Structure alternative is approximately $23.5 million which is more than the structure only alternative due to an inefficient combination of bridge and wall. Therefore this alternative was removed from further consideration. If the City of Moline requests that the DOTs build the Mainline and Ramp Structure alternative, then the additional $3 million cost would be attributed to aesthetics.

The next step is for the Illinois DOT to present these findings to the City of Moline and Renew Moline. Until a decision is made, the Benesch Team is on hold with Phase I tasks such as the completion of TS&L's and SGR's for the Plug Fill alternative or the development of new TS&Ls and SGR's for the Structure alternative. Repercussions affecting the adjacent Illinois Viaduct and the Mississippi River South Approach Structures are unknown and therefore work on these structures is also on hold.

3. Retaining Wall RW03 (SN 081-6012):

Retaining wall RW03 is a mechanically stabilized earth (MSE) wall with precast concrete panels which retains the fill for the proposed Ramp 6th– D roadway. The wall continues in a straight line past the Ramp 6th– D Bridge (SN 081-0187) abutment, terminating at the toe of slope of the abutment spill slope. Piles for the bridge pass through the reinforced soil mass. The unapproved D5 RW03 SGR identified insufficient bearing capacity at the higher segment of the wall.

As the result of these issues, the TSL and SGR for RW03 were not approved. Hanson's preliminary results support the bearing capacity issue and also identified global slope stability issues. Their recommendation is to incorporate soil remediation to the D5 solution as a means to minimize and/or eliminate these concerns.

Benesch considered the following alternatives:

- Alternative A: D5 solution + Strengthen the existing soils
  –
- Alternative B: Reduce the length of wall

Alternative A with modifications to the soils, such as aggregate column ground improvement would increase the D5 cost by at least $100,000. Alternative B incorporates an embankment with 3:1 slopes resulting in the reduction of the wall by 167 ft and a reduction of the D5 costs by approximately $250,000. This alternative would still require modifications to the soils. Thus the overall cost savings is expected to be $150,000 ($150,000 - $250,000).
It was agreed to pursue alternative B. Refer to Attachment B for exhibits.

4. Retaining wall RW04 (SN 081-6013):

Retaining wall RW04 is a hybrid wall retaining both cut and fill soil. The wall is located on the east side of 19th Street. The D5 recommended a soldier pile and lagging wall with permanent cast in place facing. Both the SGR and TS&L were approved for RW04. However, the FHWA VE study identified potential cost savings through reduction and/or elimination of the wall.

Benesch considered the following alternatives:

- Alternative A: D5 solution
- Alternative B: Reduce length of wall by removing the extra 7 ft shoulder.

Alternative B would reduce the length of wall by 100 ft and reduce the height of wall by an average of 3 ft reducing the D5 solution by $230,000. It was agreed to pursue Alternative B. Refer to Attachment C for exhibits.

5. Retaining Wall RW14

Retaining wall RW14 is a hybrid wall retaining both cut and fill soil. The wall is east of proposed Ramp 7th–A. The D5 recommended an anchored soldier pile and lagging wall with permanent cast in place facing. Both the SGR and TS&L were approved for RW14. However, the FHWA VE study identified potential cost savings through reduction and/or elimination of the wall.

Benesch considered the following alternatives:

- Alternative A: D5 solution
- Alternative B: Replace wall with a concrete barrier adjacent to 19th Street (w/sidewalk behind the concrete barrier)
- Alternative C: Keep the wall but reduce the buffer from 5 ft to 2 ft

Alternative B would replace wall with concrete barrier adjacent to 19th Street (sidewalk behind concrete barrier). However, this alternative would result in potential sight issue with barrier adjacent to the roadway. A sight analysis would be required to determine if the concrete barrier is an obstruction. In addition, Alternative B would require drainage structures on both side of the concrete barrier. On the sidewalk side, the structure cannot be within the walking surface. Finally, this alternative would have a concrete barrier blunt end near the intersection of 19th Street and 11th Avenue that would require guardrail to protect the motorists. Ideally the guardrail would wrap around the curb return, but due to the pedestrian movement across 11th Avenue, this cannot happen. A Terminal Type 1 would need to be used.

Alternative C would reduce the buffer from 5 ft to 2 ft giving a total width from face of wall to back of curb of 7 ft. Potential cost savings would be approximately $65,000; however the Benesch Team would need to revise and resubmit the already approved TS&L. It was agreed to keep the D5 design. Refer to Attachment D for exhibits.

6. Conclusions and next steps:

The Benesch Team will proceed with the following actions:

- Complete the unapproved SGR and TS&L for retaining wall RW03 based on Alternative B.
- Revised the approved TS&L for retaining wall RW04 based on Alternative B.
- Keep the D5 solution for retaining wall RW14.

The Illinois DOT will present the Plug Fill and Structure Alternatives to the City of Moline.

The Meeting adjourned at 2:30 p.m.

Closure:

The above constitutes our understanding of the issues discussed and the conclusions reached. If there are any misunderstandings or omissions, please forward comments/corrections within five business days to the undersigned.

Respectfully submitted,

David J. Morrill, S.E., P.E.
Vice President
Project Manager

Diane M. Campione, S.E., P.E.
Deputy Project Manager

DJM/DMC:qmf

cc: All Attendees
Benesch Team Members

Iowa Department of Transportation

Illinois Department of Transportation

ATTENDANCE ROSTER

I-74 Final Design-FHWA VE Recommendation Review Meeting

MEETING LOCATION: WebEx and Star Conference Call

DATE: November 16, 2010

LAST	FIRST	POSITION/OFFICE	TELEPHONE	CELL PHONE	E-MAIL ADDRESS
THE ILLINOIS DOT					
Craven	Tim	Illinois DOT BBS			Tim.Craven@illinois.gov
Marruffo	Rebecca	Project Engineer Illinois DOT – District 2	815-284-5902		Rebecca.Marruffo@illinois.gov
BENESCH					
Campione	Diane	Deputy Project Manager	312-565-0450	312-925-0997	dcampione@benesch.com
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ATTACHMENT A

PLUG FILL POWERPOINT PRESENTATION
(includes retaining walls RW01 (SN 081-6010), RW02 (SN 081-6011), RW16 (SN 081-6018) and RW15)

I-74 Final Design
Plug Fill VE Study Results

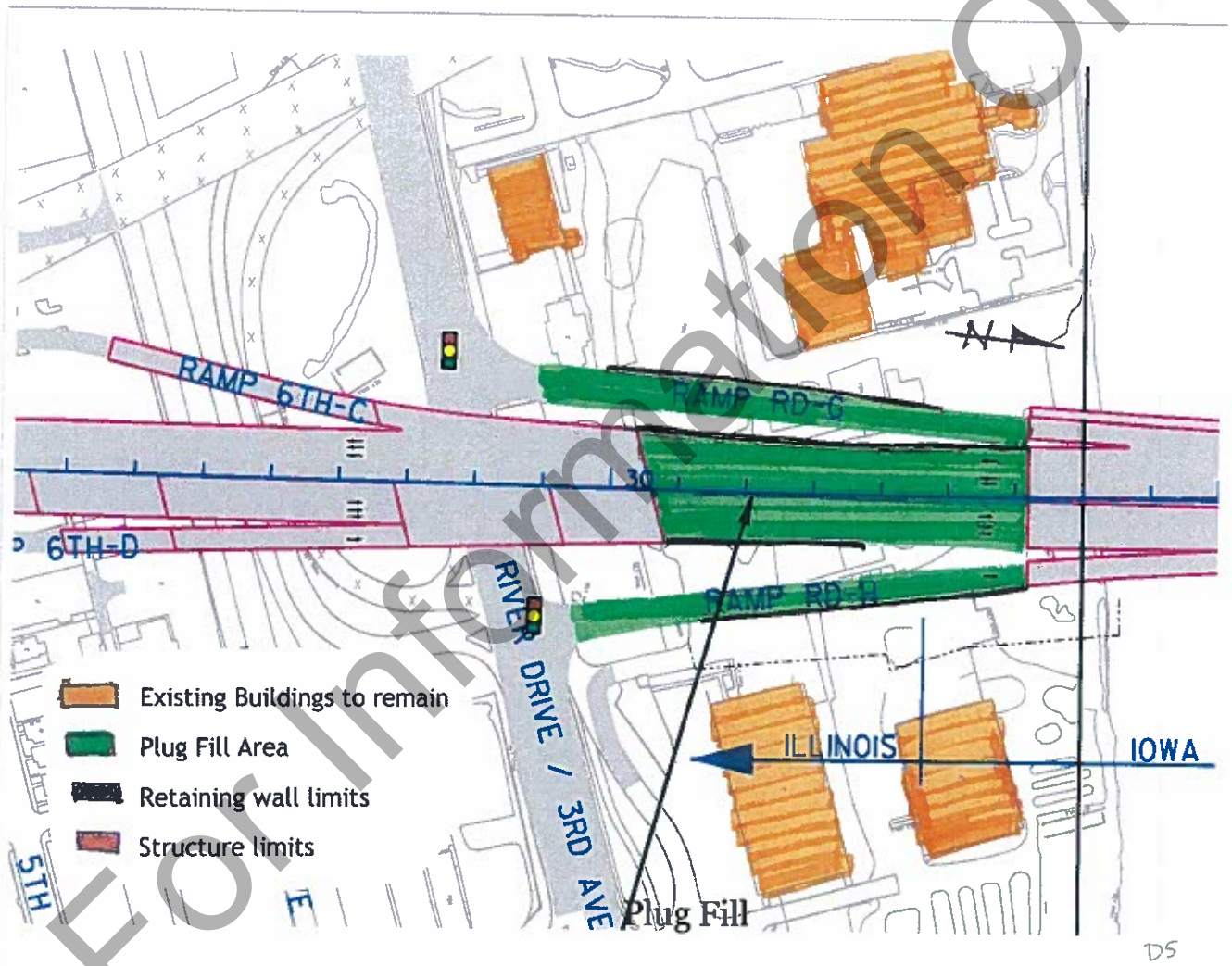
November 16, 2010

I-74/Mississippi River

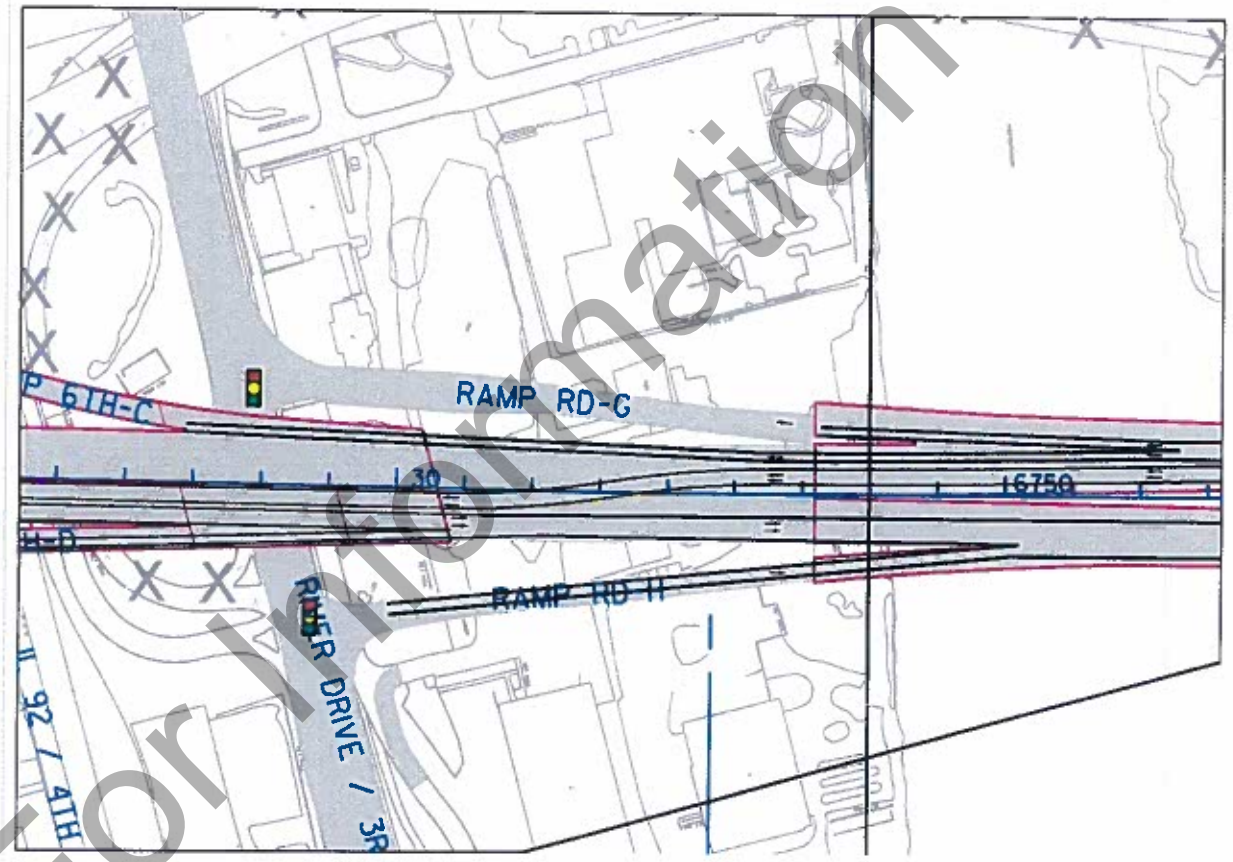
Agenda

- Review Preliminary Engineering (Phase I) Design
- Review Existing Soil Conditions
- Review Alternatives
- Review Costs
- Present Renderings
- Advantages and Limitations
- Recommendations
- Next Steps

Preliminary Engineering (Phase I) Design - Plug Fill



Preliminary Engineering (Phase I) - Plug Fill MOT Crossover (Year 5 Stage 2)



MOT crossover

Existing Soil Conditions in Plug Fill Area

Subsurface Profile (top to bottom)

- Random fill (varies 6 - 12 ft)
- Loose sand filled with debris (varies 2 - 6 ft; one location 20 ft)
- Soft to very soft clay with organic (4 - 10 ft)
- Weathered sandstone, shale or weathered shale bedrock

Existing Soil Conditions in Plug Fill Area

Soil Analysis Results

- Stability Analysis of abutment end slope
  - Low Factor of Safety
- Settlement Analysis (primary)
  - differential settlement
  - 90% consolidation within 60 days near abutment
  - 90% consolidation within 420 days elsewhere
- Settlement Analysis (secondary/creep)
  - 1.8 inches after 5 years
  - 2.4 inches after 25 years

  after construction of embankment

Plug Fill Alternative

Recommendations

@ North End (north of Sta. 26+00)

- Remove soft clay, organic materials and random fill down to bedrock
- Replace with PGE

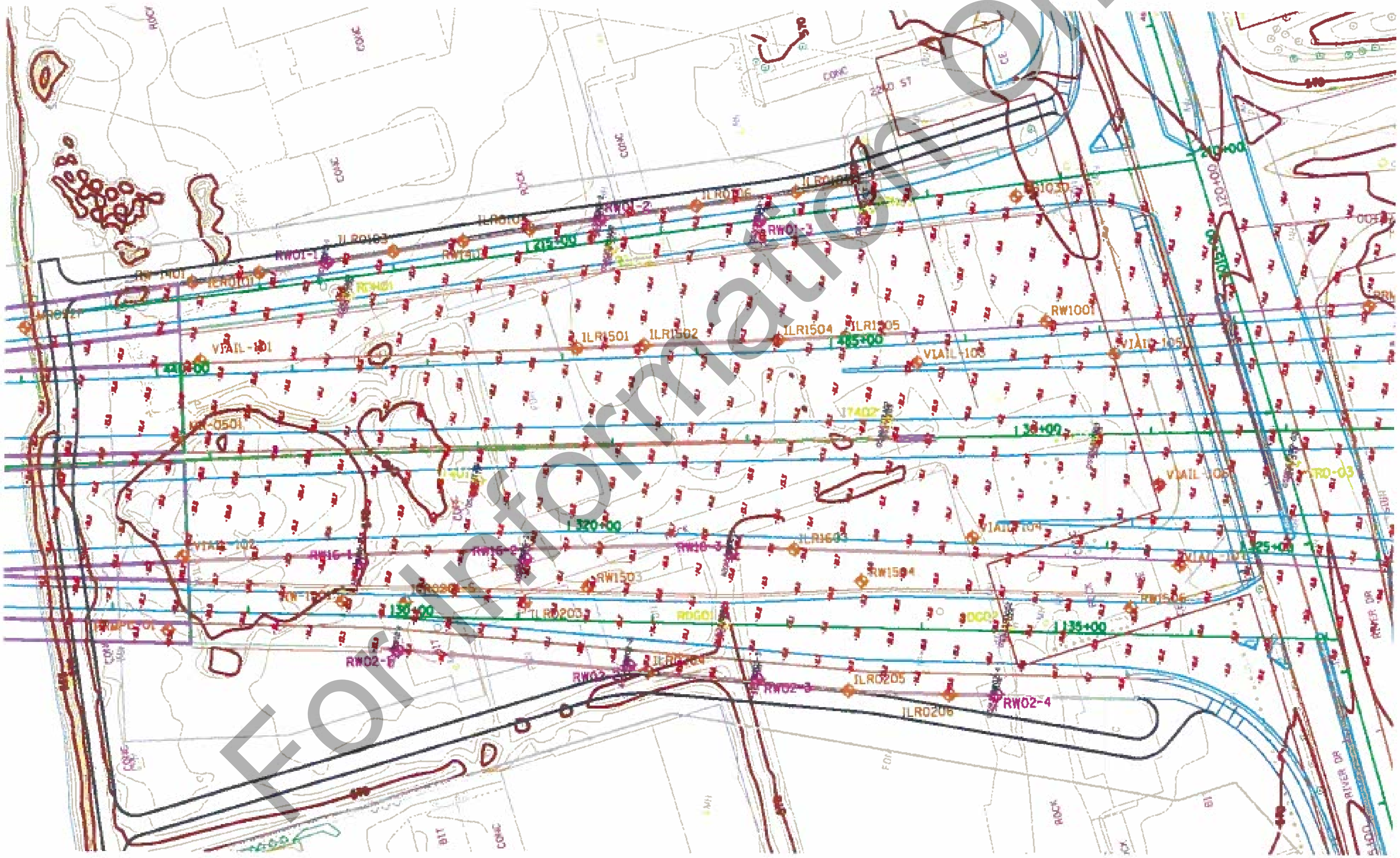
@ South End

- Remove Special Waste (estimated at 10%) and replace with PGE
- Use Aggregate Column Ground Improvement (AGCI) to strengthen the existing soil

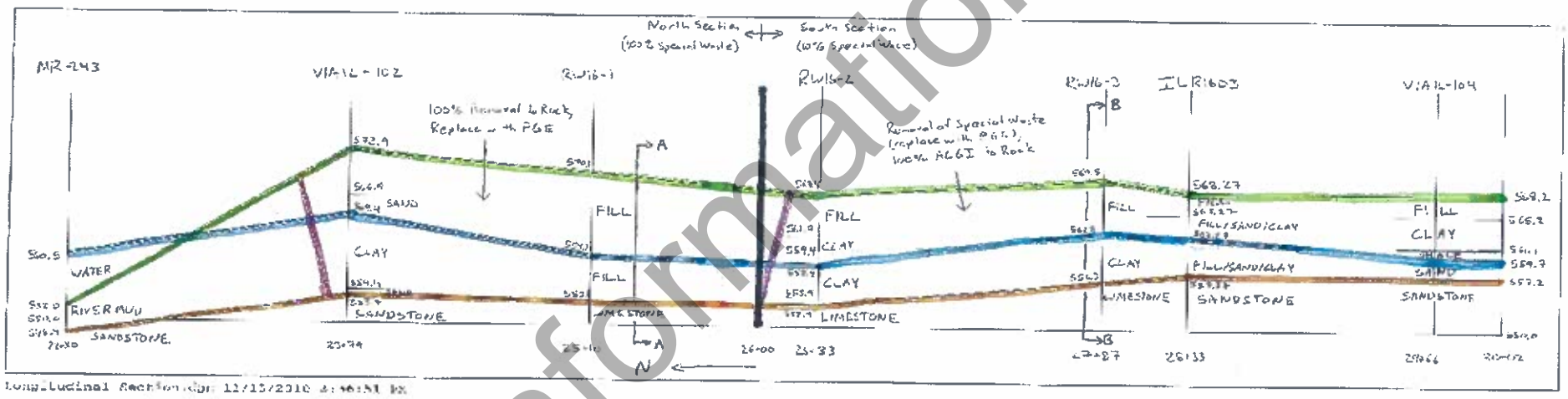
Plug Fill Final Condition

- Acceptable factor of safety for abutment slope
- Primary consolidation concerns addressed
- Secondary consolidation concerns addressed
- Eliminate down drag on piles

Plug Fill: Depths of Required Soil Removal

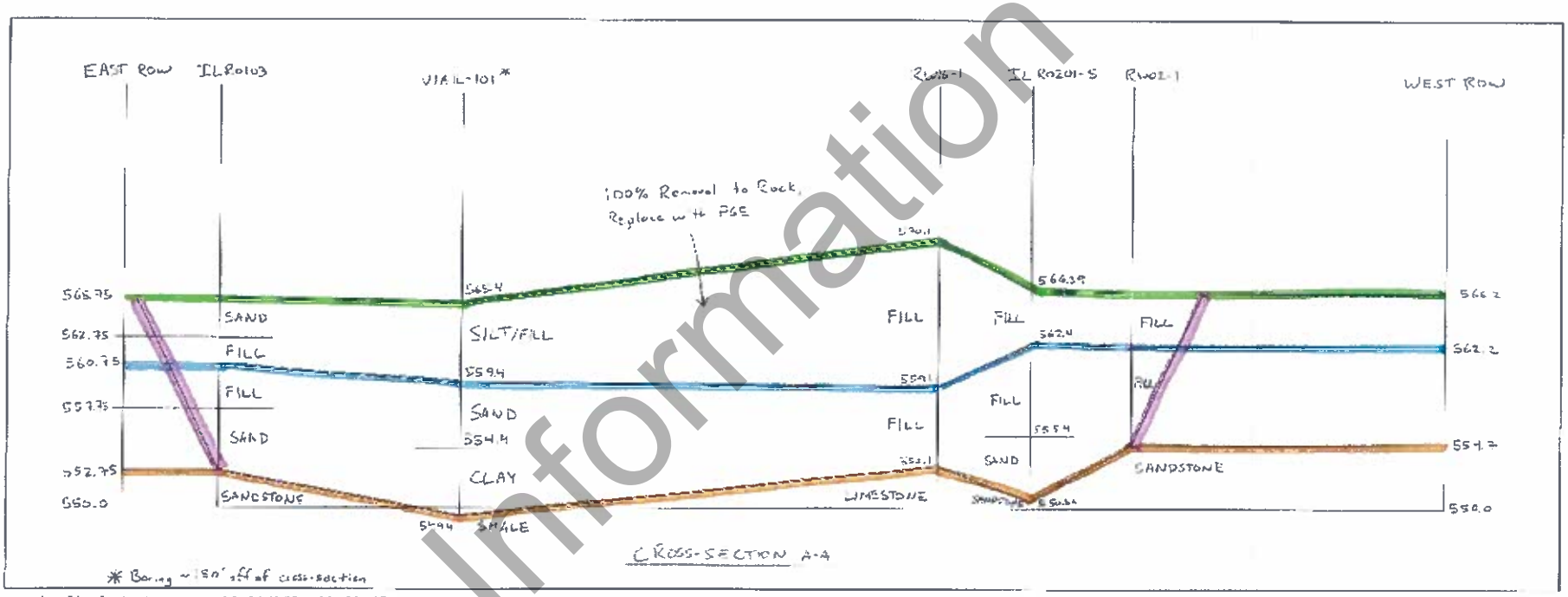


Plug Fill: Limits of Soil Removal/Treatment



Longitudinal Section Along I-74

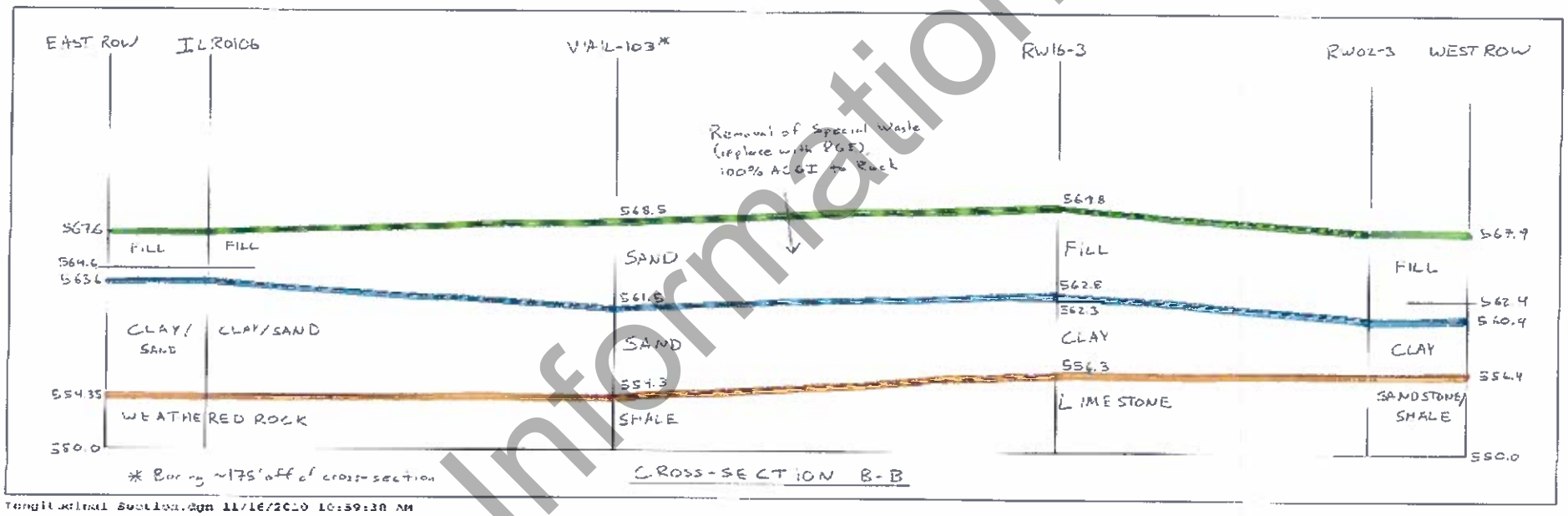
Plug Fill: Limits of Soil Removal



Longitudinal Section.cgn 11/16/2010 11:02:47 AM

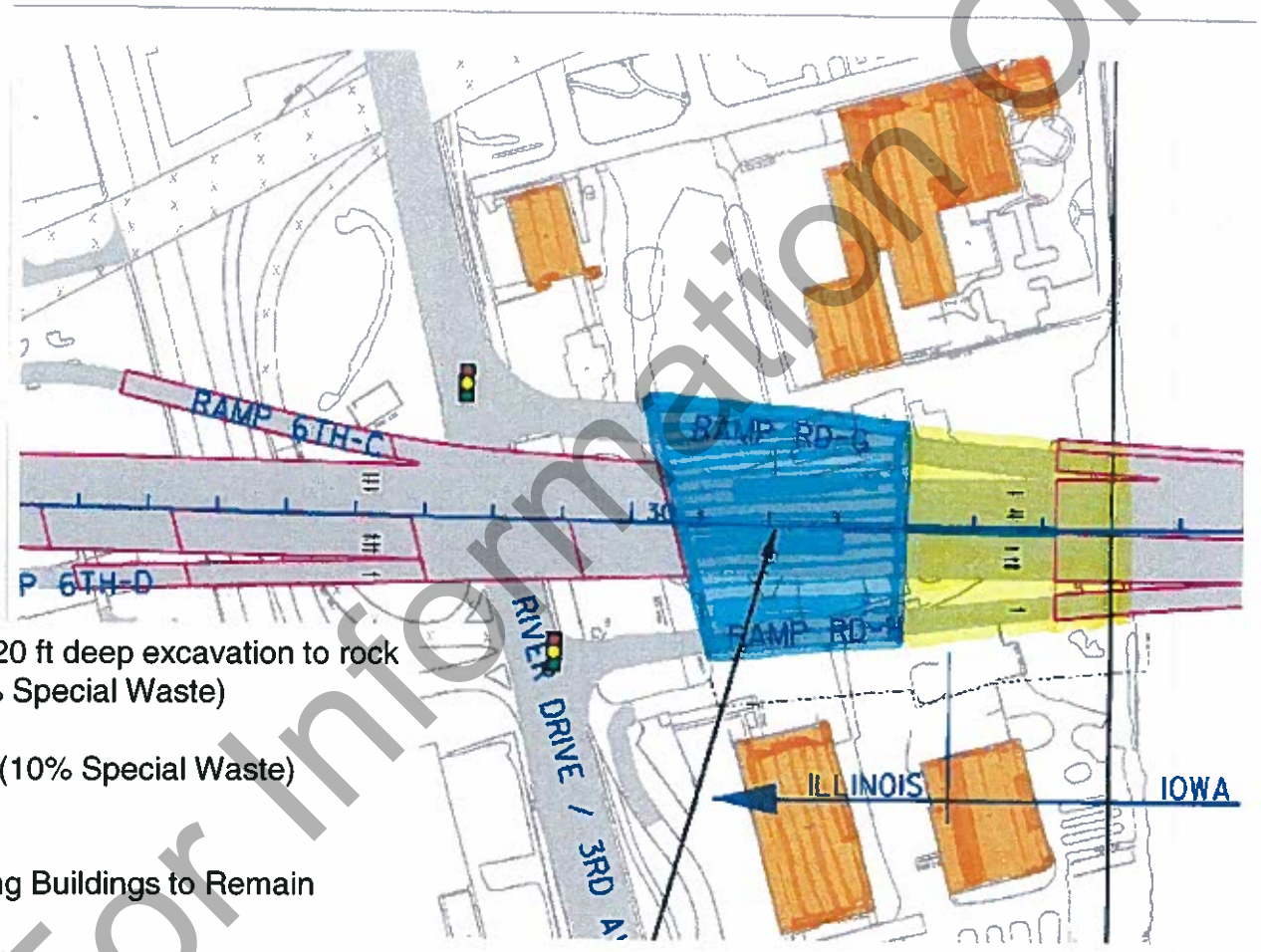
North Zone

Plug Fill: Limits of Soil Treatment



South Zone

Plug Fill: Limits of Soil Removal/Treatment

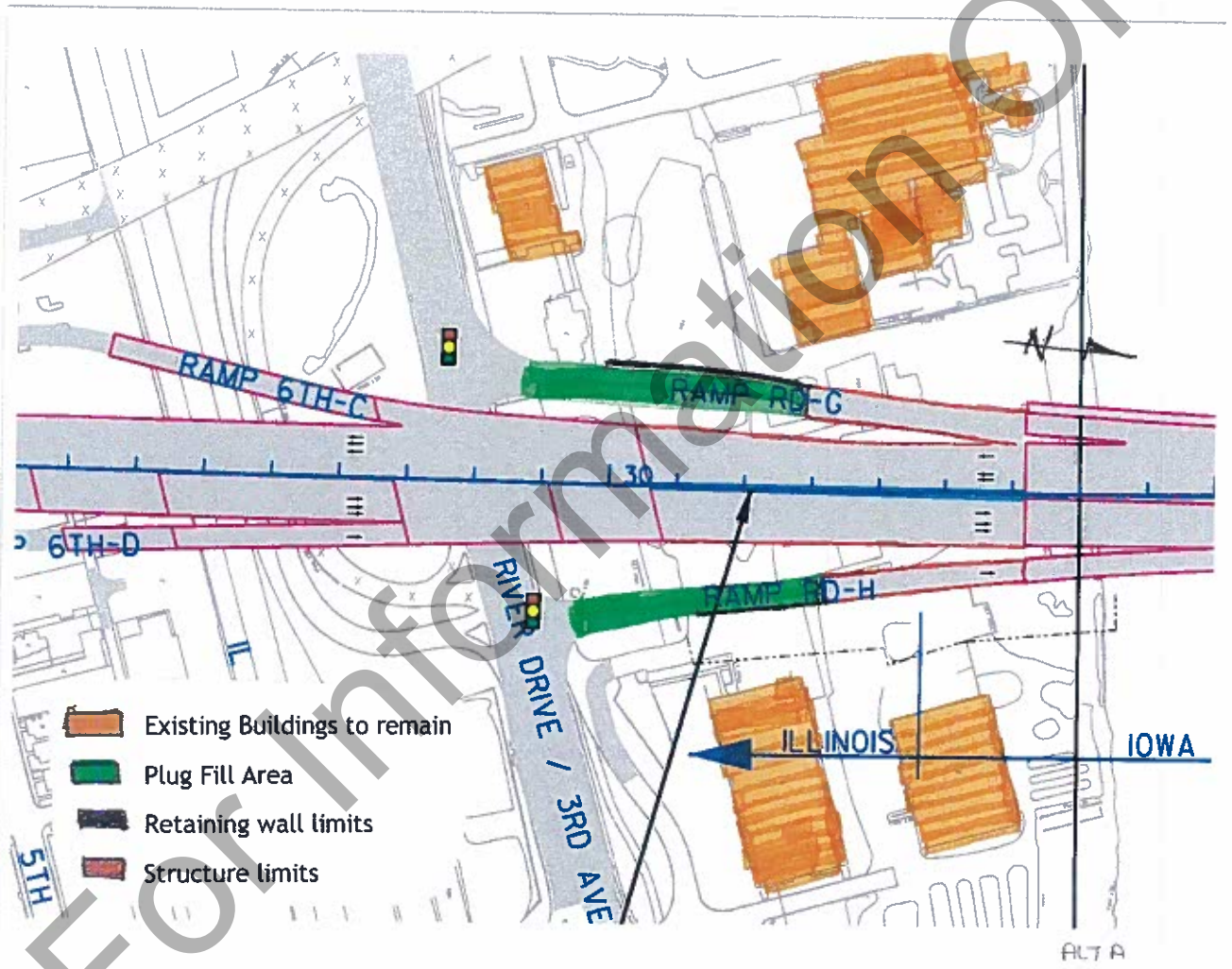


15 to 20 ft deep excavation to rock (100% Special Waste)

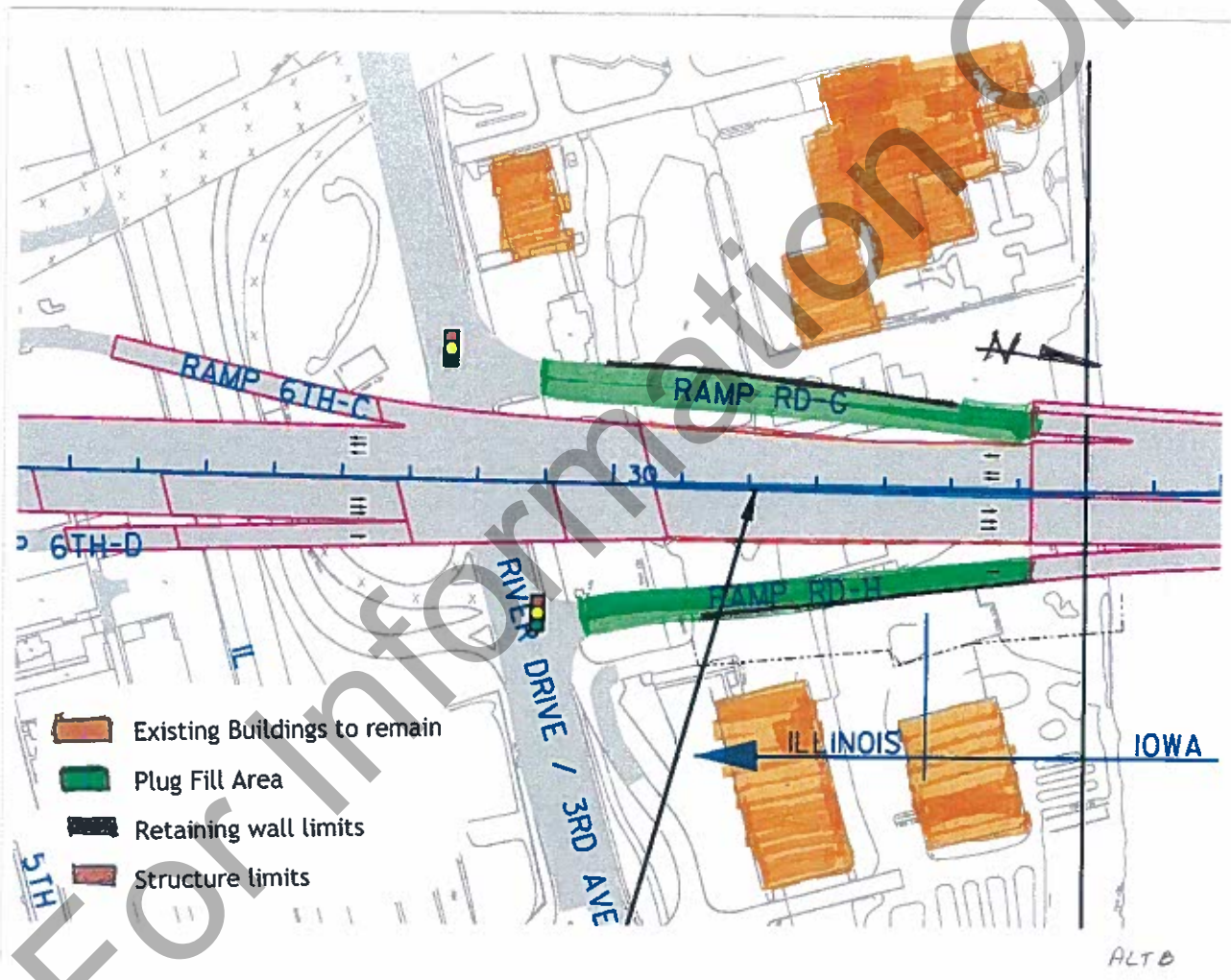
ACGI (10% Special Waste)

Existing Buildings to Remain

Alternative A: Structure (mainline and ramp)



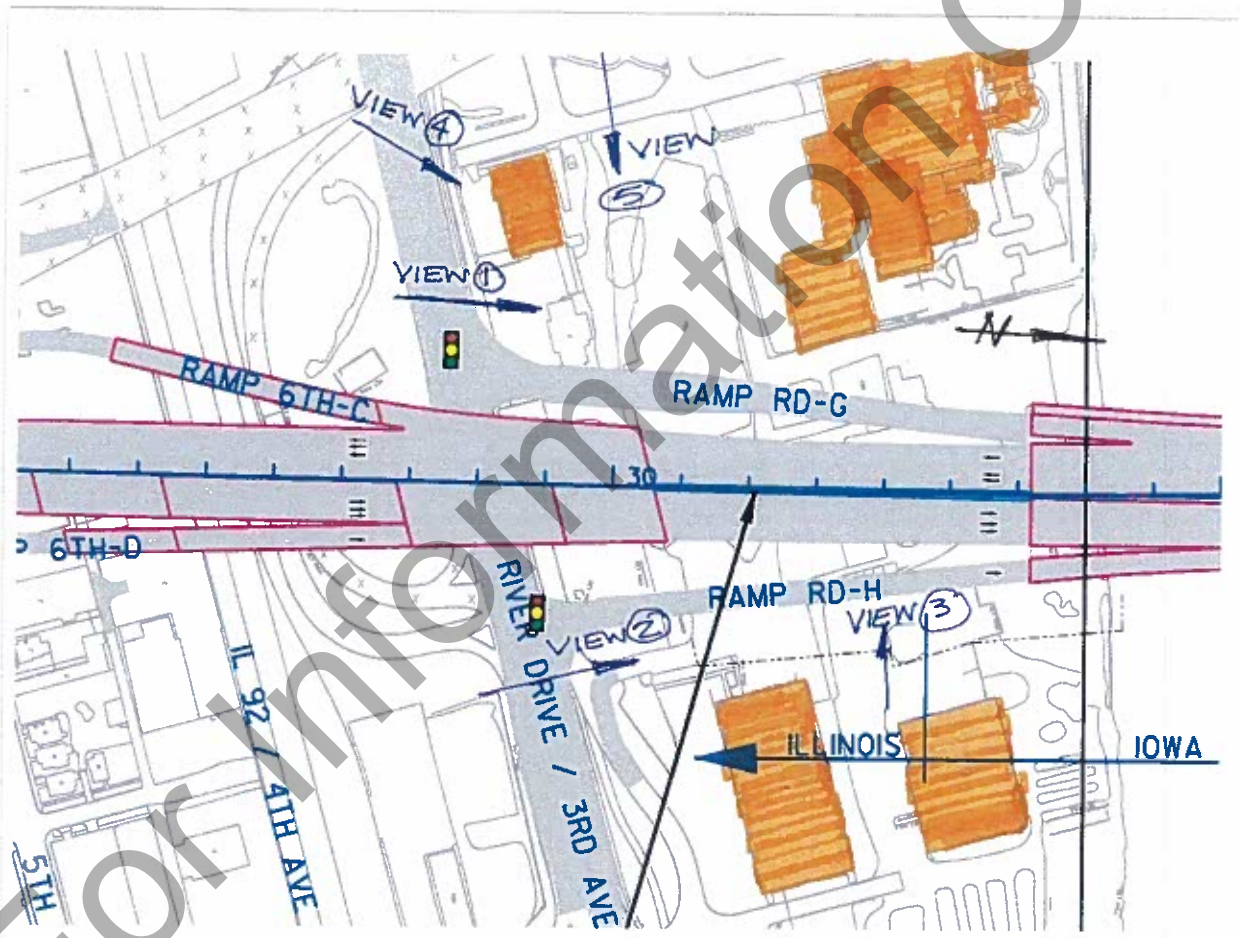
Alternative B: Structure (mainline only)



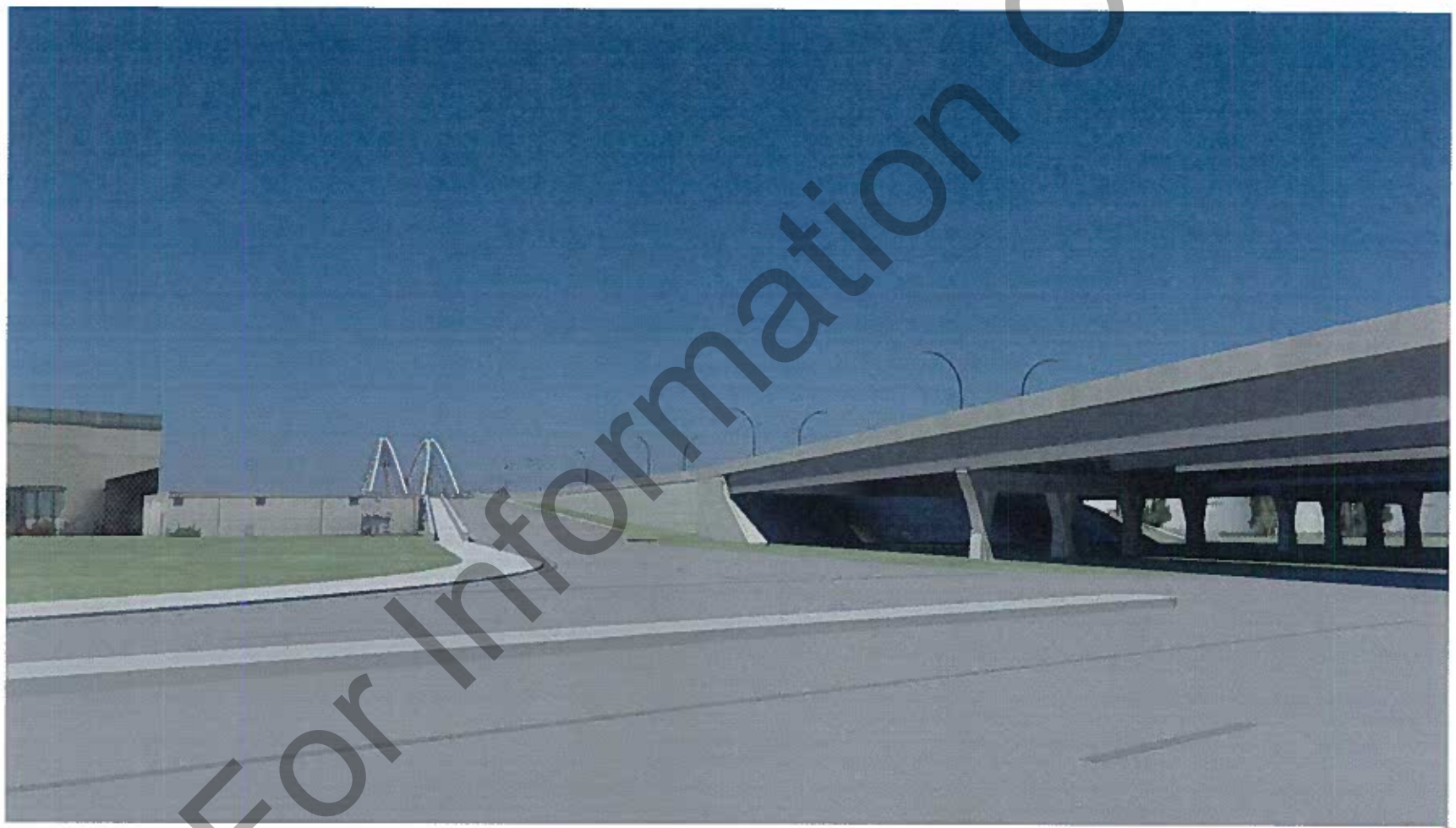
Cost Summary

- Plug Fill
  - $19.0 Million
- Alternative A – Structure: Mainline and Ramp
  - $22.1 Million
- Alternative B – Structure: Mainline only
  - $23.5 Million

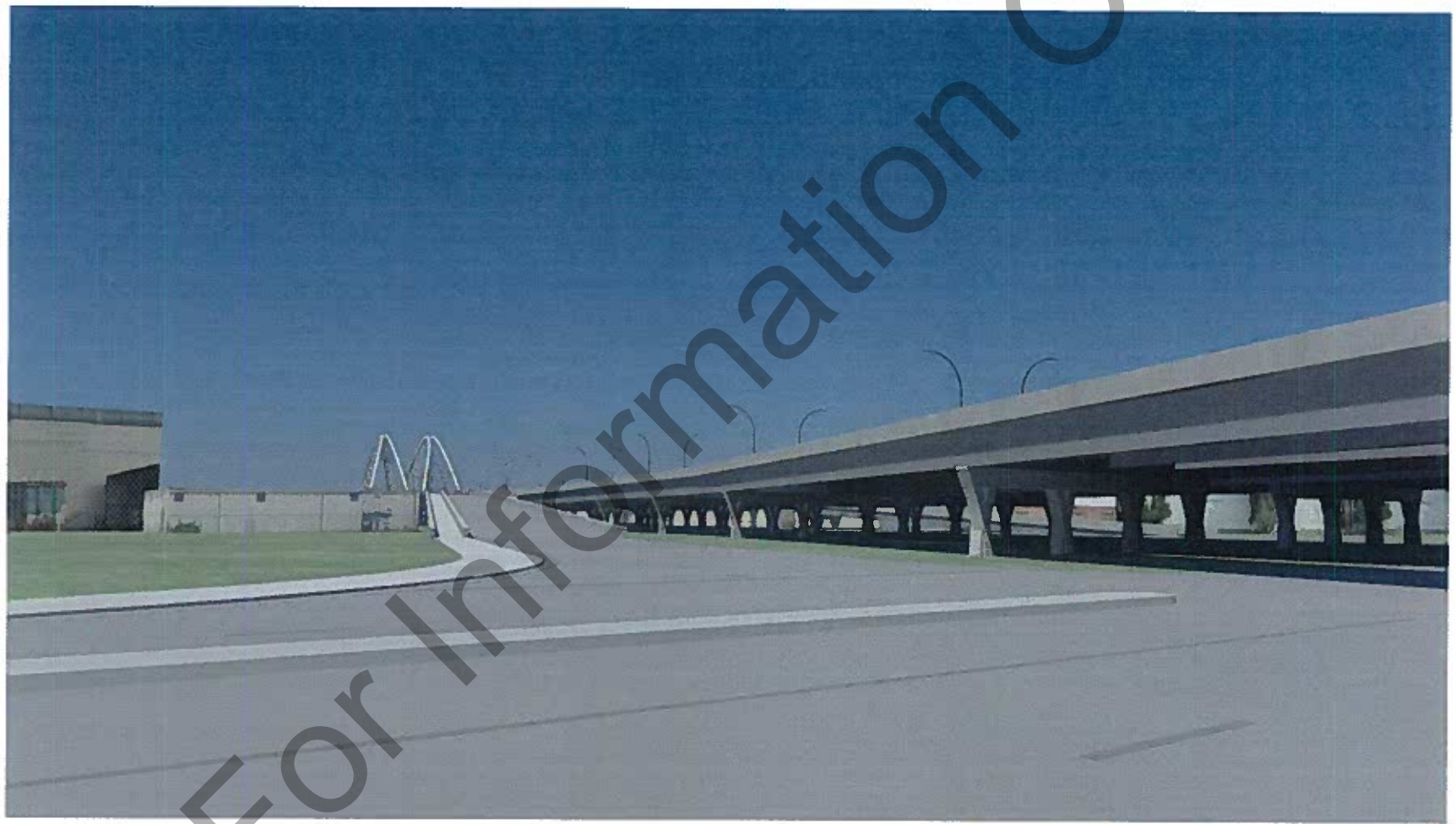
Renderings



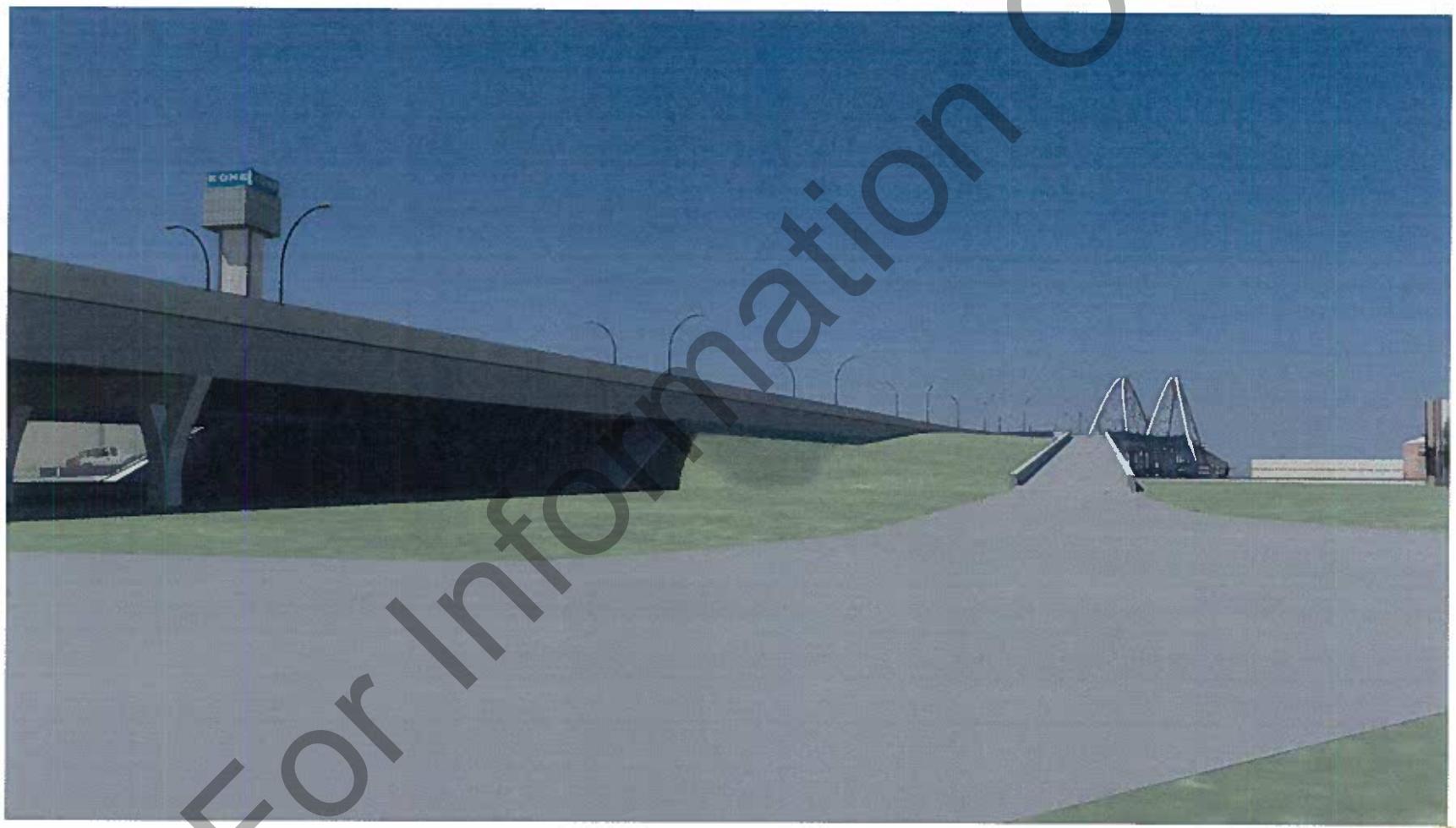
View 1 - Plug Fill
From River Drive: West of Ramp RD-G



View 1 - Alternative A (Structure)
From River Drive: West of Ramp RD-G



View 2 - Plug Fill
From River Drive: East of Ramp RD-H

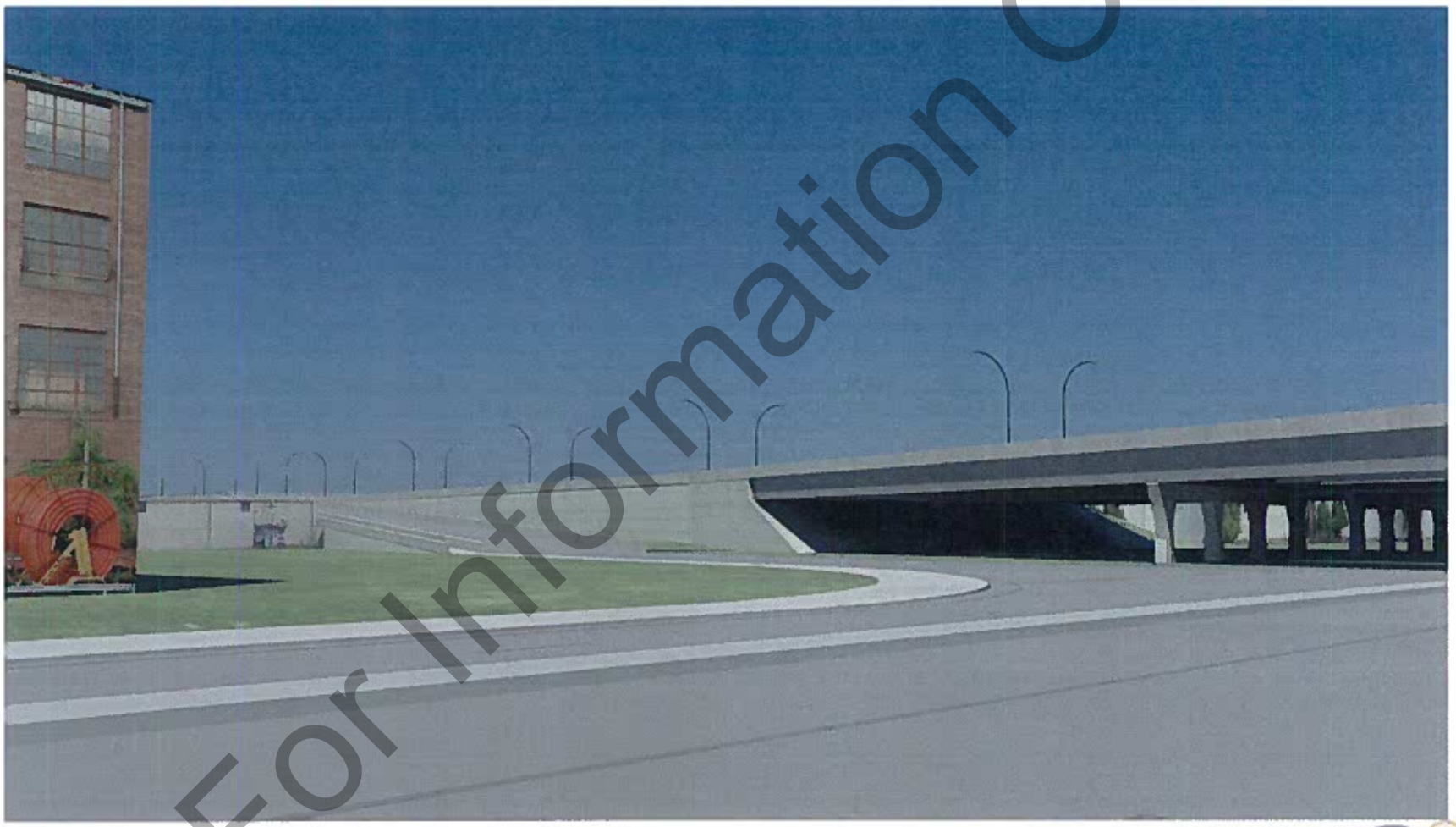


View 2 - Alternative A (Structure)
From River Drive: East of Ramp RD-H

View 3 - Plug Fill (looking west)

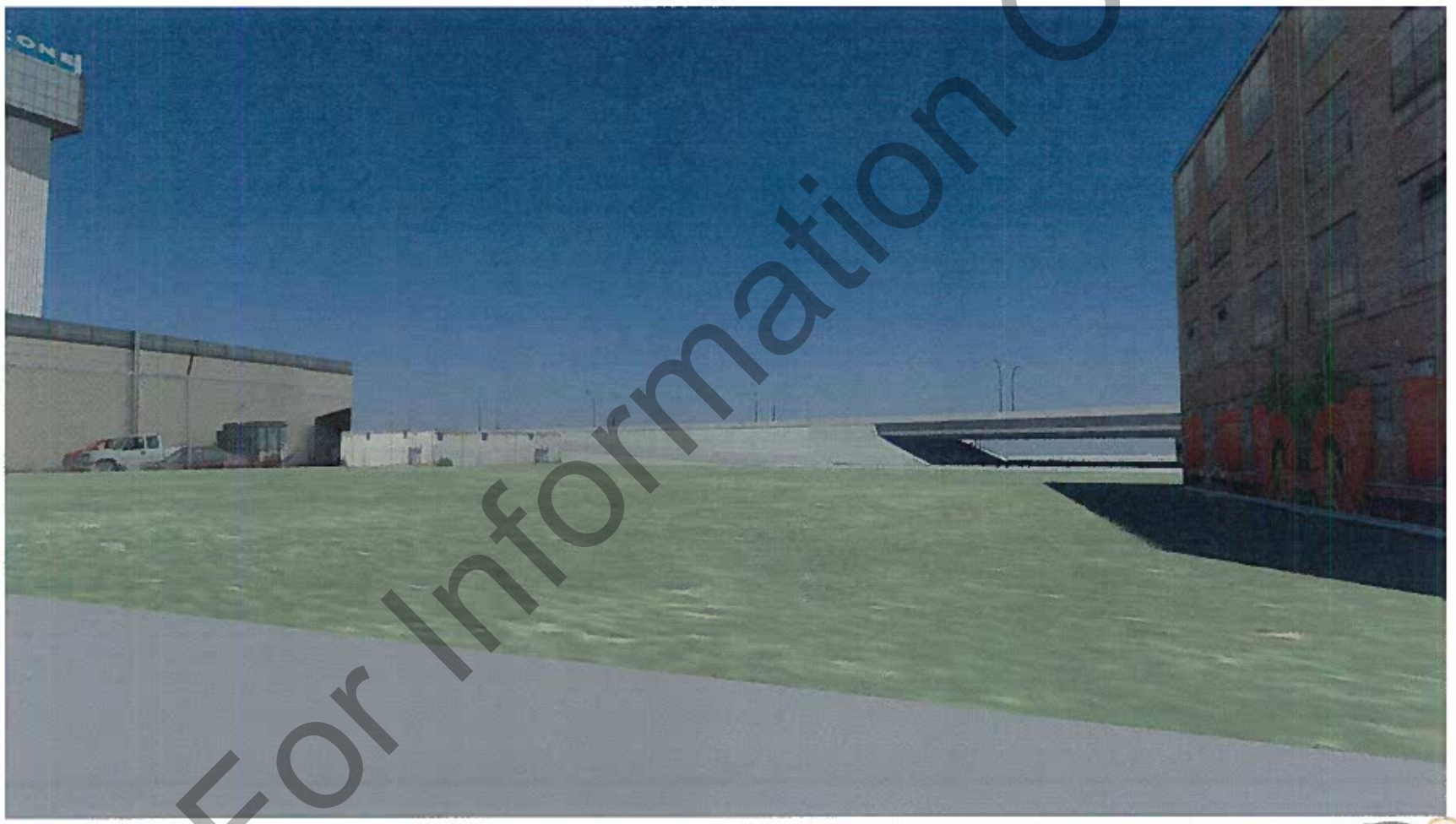
View 3 - Alternative A (Structure) (looking west)

View 4 - Plug Fill
(looking NE from River Drive)



View 4 - Alternative A (Structure) (looking NE from River Drive)

View 5 - Plug Fill (looking East)



View 5 - Alternative A (Structure) (looking East)

Plug Fill - Advantages

- Accommodates (MOT) crossover
- Accommodates sag
- Less maintenance
- Lessens the industrial "feeling"
- Opportunity for creative aesthetics (on wall segments)
- Opportunity to achieve required consolidations (work offline in early stages)

Plug Fill - Limitations

- Less open vista
- Limits east-west access

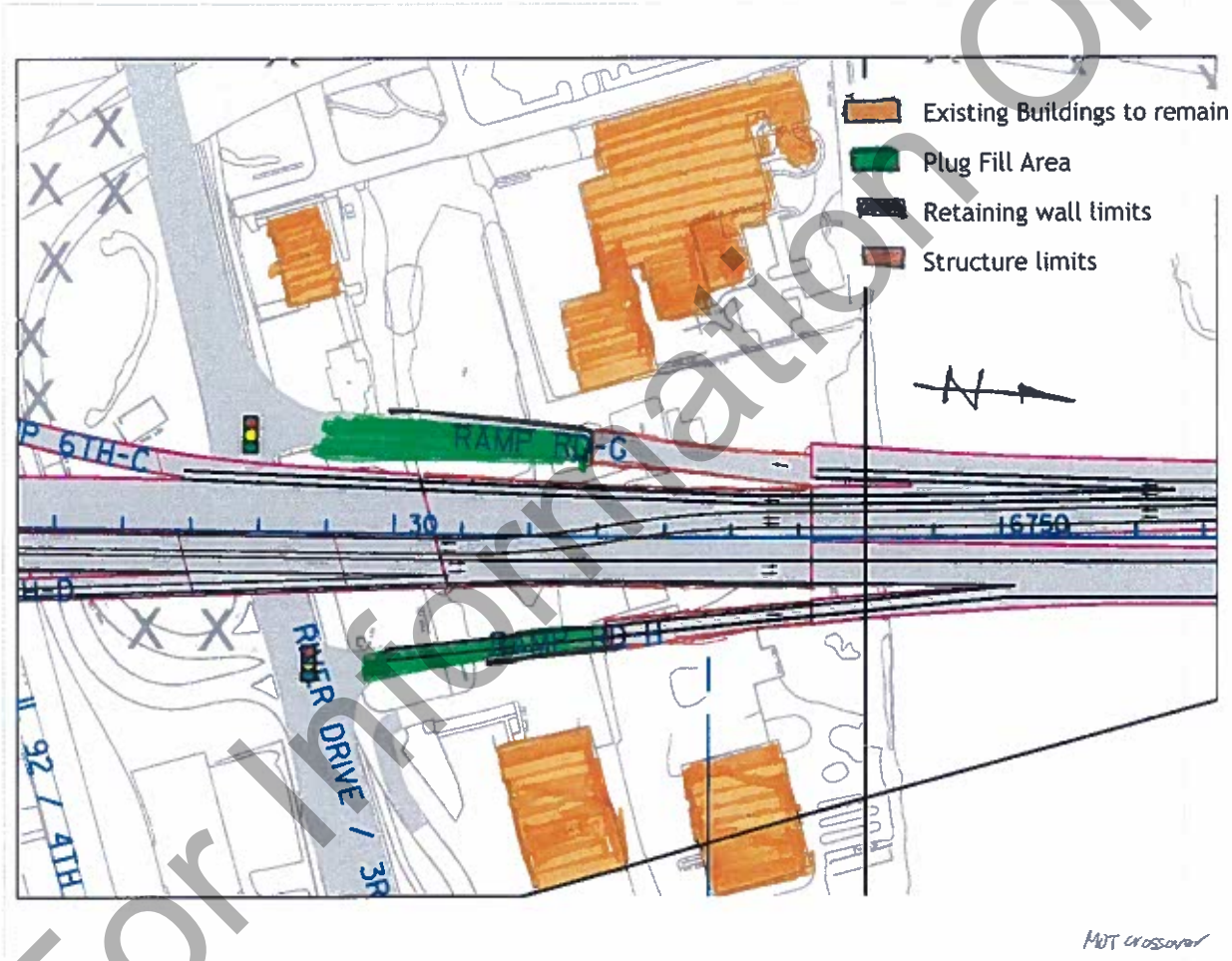
Structure - Advantages

- More open vista
- Accommodates east-west access

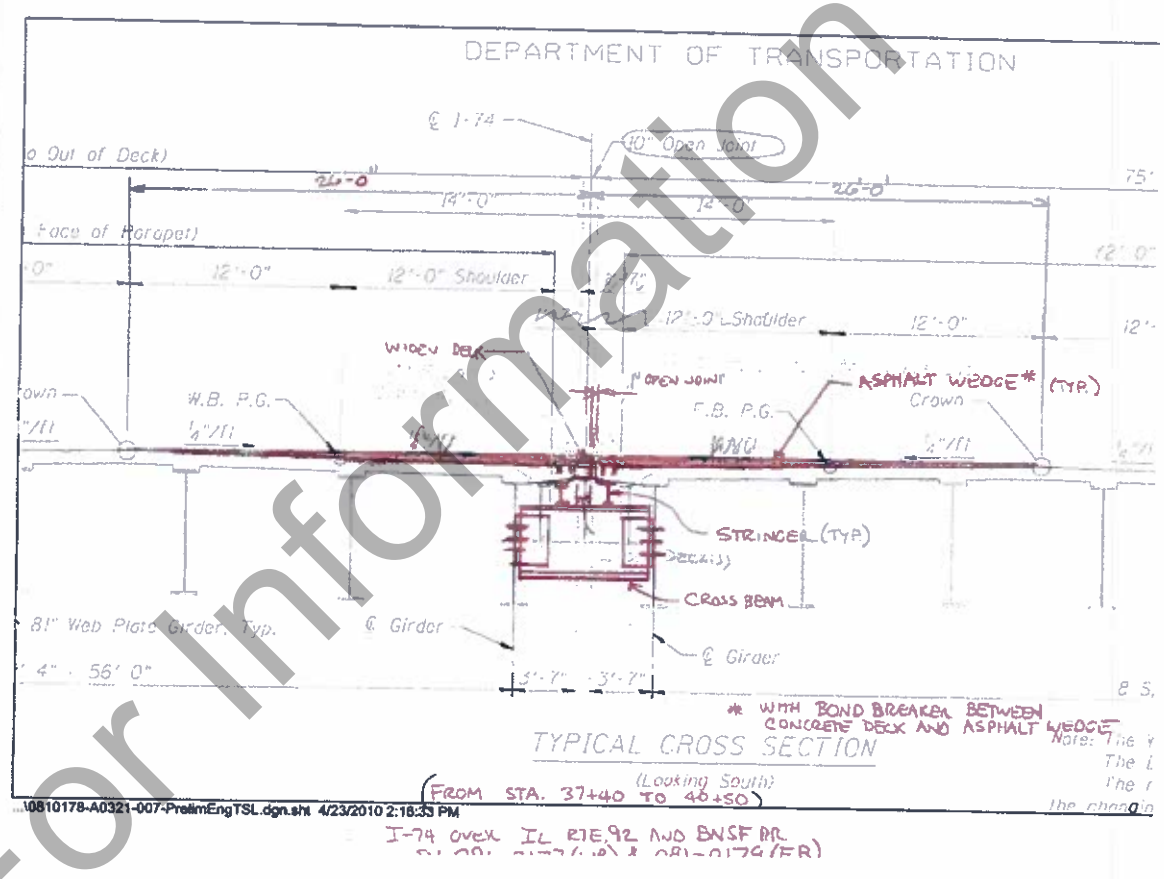
Structure - Limitations

- Crossover on structure – adds complications
- Sag on Bridge – not favored by Bridge Office
- More structure to maintain
- Openness is more of industrial feel
- Not clear view of river

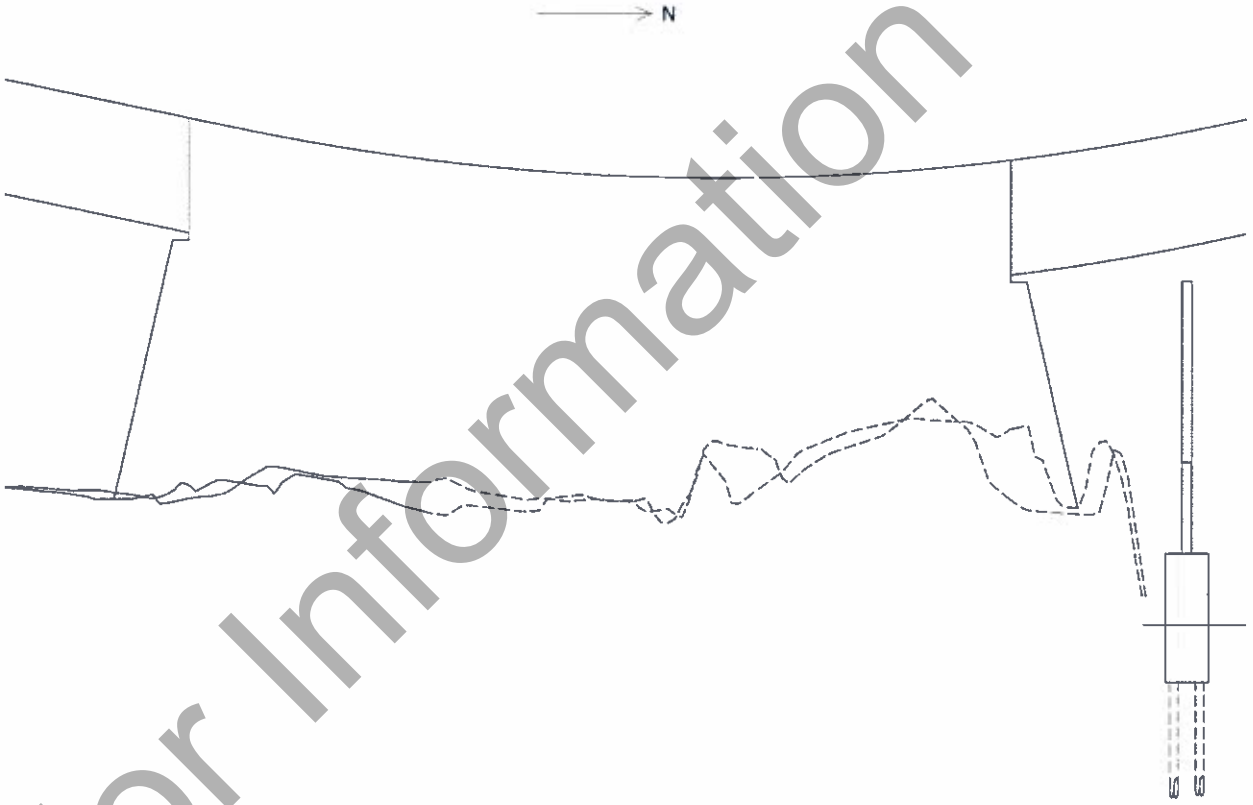
MOT: Crossover (Year 5 Stage 2)



MOT Crossover (Year 5 Stage 2)



Sag on Structure



Recommendations

- Build Structure for Mainline and Ramps??
  - Extra $3 million cost attributed to aesthetics