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**STRUCTURE GEOTECHNICAL REPORT  
CIRCLE INTERCHANGE RECONSTRUCTION  
RAMP NE OVER NB BYPASS/S. DESPLAINES STREET  
EXSN: 016-2451 PRSN 016-1710  
IDOT PTB 163-001, PTB 163/ITEM 001  
COOK COUNTY, ILLINOIS**

**for**

**AECOM**

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**submitted by**

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11. Abstract		
<p>A new NE Ramp over I-90/94 is considered. The new structure will have an overall length of 543.50 feet from bearing center line of common pier 4 to exiting pier C4 bearing center line. This report provides geotechnical recommendations for the design of the proposed piers foundations.</p> <p>Below 2.0 to 12.0 feet mostly cohesive fill, the foundation soils consists up to 12 feet of stiff to very stiff silty clay to silty clay loam, up to 43.8 feet of very soft to medium stiff clay to silty clay lake bottom deposits, 25 feet of stiff to hard silty clay to silty loam diamicton, up to 35.0 feet of hardpan, 3 to 16 feet of dense to very dense sandy gravel, and dolostone bedrock with RQD ranging from 45 to 75%. Dolostone bedrock was encountered at an elevations of 485.5 to 490.0 feet. The site classifies in the Seismic Class E for the drilled shafts.</p> <p>We provide recommendations for belled or straight drilled shafts into hardpan and socketed into the bedrock. The selection of best foundation type for the various substructures should be based on the estimated loads and construction costs.</p>		
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### REFERENCES

**EXHIBITS**

- 1. Site Location Map*
- 2. Site and Regional Geology*
- 3. Boring Location Plan*
- 4. Subsurface Soil Data Profile*

**APPENDIX A**

*Boring Logs*

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*Laboratory Test Results*

**APPENDIX C**

*Seismic Site Class Determination*

**APPENDIX D**

*Type Size Location Plan*

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CIRCLE INTERCHANGE RECONSTRUCTION  
RAMP NE OVER NB BYPASS/S. DES PLAINES STREET  
EXISTING SN 016-2451 PROPOSED SN 016-1710  
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COOK COUNTY, ILLINOIS**

**FOR  
AECOM**

## **1.0 INTRODUCTION**

This report presents the results of Wang Engineering, Inc. (Wang) subsurface investigation, laboratory testing, and geotechnical engineering evaluations for the proposed construction of the NE Ramp Bridge, NB I-90/94 to EB I-290, in connection with the Circle Interchange Reconstruction program in the City of Chicago, Cook County, Illinois. A *Site Location Map* is presented as Exhibit 1.

The purpose of our investigation was to characterize the site soil and groundwater conditions, perform geotechnical engineering analyses, and provide recommendations for the design and construction of the new bridge foundations.

### **1.1 Proposed Structure**

The proposed structure will consist of a 4-span steel superstructure supported on a straddle bent and hammerhead piers. There is no abutment. The structure will have an overall length of 543.5 feet from bearing center line of Pier 4 (common pier with SN 016-1705) to bearing center line of existing Pier C4 (existing SN 016-0461). The structure will have an out-to-out deck width of 29'-2" accommodating one travel lane and two shoulders. The existing Pier C4 foundation will be modified as part of design of the existing structure SN 016-0461. TSL Plan prepared by Parsons Brinckerhoff dated June 11, 2014 is included in Appendix D.

Preliminary service and factored loads provided by the designer (Parsons Brinckerhoff) are shown in Table 1.

Table 1: Preliminary Foundation Loads

Location	Estimated Total Service DL (kips)	Estimated Total Service LL (kips)	Estimated Total Service Load (DL + LL) (kips)	Estimated Total Factored DL (kips)	Estimated Total Factored LL (kips)	Estimated Total Factored Load (DL + LL) (kips)
Pier 4 (016-1705)*	330	210	540	420	370	790
Pier 1	2010	400	2410	2560	700	3260
Pier 2	1930	420	2350	2480	740	3220
Pier 3	1730	390	2120	2210	680	2890
Pier C4 (016-0461)**	160	190	350	210	330	540

\*Shared Pier. Not accounting for the superstructure loads of S.N. 016-1705

\*\*Shared Pier. Not accounting for the superstructure loads of S.N. 016-0461

Note: Dead Load (DL) and Live load (LL) are approximate and are calculated at the bottom of the Column.

## 1.2 Existing Structure

Existing Structure: S.N. 016-2451 was originally built in 1960 under section 0101.6-IP and F.A.I. Route Number 94 carries NB I-90/94 traffic to EB I-290. The existing three (3) span Structure has overall length of approx. 180'-0" and out to out width of 29'-0". The existing superstructure consists of simple span wide flange beams with 7 1/2" thick concrete deck with 2" overlay. The existing substructure consists of reinforced concrete abutment and multi-columns piers. Existing substructure units are supported on caissons. The existing structure is to be removed and replaced.

## 2.0 SITE CONDITIONS AND GEOLOGICAL SETTING

The project area is located within the City of Chicago limits. On the USGS *Chicago Loop 7.5 Minute Series* map, the bridge is located in the NW ¼ of Section 16, Tier 39 N, Range 14 E of the Third Principal Meridian.

The following review of published geologic data, with emphasis on factors that might influence the design and construction of the proposed engineering works, is meant to place the project area within a geological framework and confirm the dependability and consistency of the present subsurface investigation results. For the study of the regional geologic framework, Wang considered northeastern

Illinois in general and Cook County in particular. Exhibit 2 illustrates the *Site and Regional Geology*.

## **2.1 Physiography**

The general topography of the project area slopes gently southeast toward Lake Michigan. The ramp bridge is situated within the Chicago Lake Plain Physiographic Subsection. The area is characterized by a flat surface that slopes gently toward the lake, largely made of ground moraine till covered by thin and discontinuous lacustrine silt and clay.

The proposed bridge carrying the Ramp NE that connects NB I-90/94 with EB I-290 starts at Pier 4 shared with NW Flyover Ramp from an approximate elevation of 623 feet. The ground elevation along the NE Ramp Bridge ranges from 580 feet at south end to 587 feet at east end and reaches 597 feet in between at the passing over the existing roadway embankments.

## **2.2 Surficial Cover**

The project area was shaped during the Wisconsinian-age glaciation and a 90-foot thick drift or more covers the bedrock (Leetaru et al. 2004). The glacial cover is made up of clay and silt of the Equality Formation of the Mason Group and diamictons of the Wadsworth and Lemont Formations of the Wedron Group (Hansel and Johnson 1996). The Equality Formation is made up of bedded silt and clay, locally laminated, with lenses and/or thin beds of sand and gravel. The Wadsworth Formation consists of relatively homogenous, massive, gray till with clay to silty clay matrix, with dolostone and shale clasts and occasional lenses of sorted and stratified silt. The Wadsworth Formation is underlined by the pebbly silty clay loam to silty loam diamicton of the Yorkville Member of the Lemont Formation, informally known as the Chicago “hardpan.”

From a geotechnical viewpoint, the Equality Formation is characterized by low strength, medium to high plasticity, and medium to high moisture content, whereas the Wadsworth Formation is characterized by low plasticity, medium to low moisture content, medium to very stiff consistency, poor permeability, and low compressibility. The Yorkville Member (hardpan) is characterized by low plasticity, high blow counts, and low moisture content (Bauer et al. 1991; Peck and Reed 1954).

## **2.3 Bedrock**

In the project area, the glacial deposits unconformably rest over approximately 350-foot thick Silurian-age dolostone (Leetaru et al 2004). The top of bedrock may be encountered at 475 to 500 feet elevation or 90 feet below ground surface (bgs) or more. The Silurian dolostone dips gently

eastward at a pace of 15 feet per mile. Only inactive faults are known in the area, and the seismic risk to the proposed structure from the existing faults is minimal (Leetaru et al. 2004; Willman 1971). There are no records of mining activity in the area, but deep tunnel excavations are known to exist.

Our subsurface investigation results fit into the local geologic context. The borings drilled in the project area revealed the native sediments consist of clay to silty clay diamicton of the Wadsworth Formation resting on top of more competent silty clay loam diamicton (hardpan) of the Lemont Formation, which in turn is underlain by bedrock. Sound dolostone bedrock was sampled or inferred at depths ranging from 83 to 107 feet bgs or 484.5 to 497.2 feet elevation, within the range predicted based on published geological data.

### **3.0 EXISTING GEOTECHNICAL DATA**

Two borings were performed near the alignment of the proposed structure. Boring S-2 was performed by others in 1958 for South Route-Maxwell to Lexington and Boring B-28 was performed in 1985 by others for I-94 roadway improvement. Boring S-2 was drilled to a depth of 50 feet and B-28 to approximate depth of 74 feet below grade existed at that time. Log of Boring S-2 and subsurface soil data as part of soil profile for Boring B-28 are included in Appendix A.

### **4.0 METHODS OF INVESTIGATION**

#### **4.1 Subsurface Investigation**

Wang drilled nine structure borings between July 22, 2013 and March 26, 2014 along the ramp's new alignment. The borings are designated as 1705-B-05, 1705-B-05A, 1705-B-06, 1705-B-06A, 21-RWB-02, 21-RWB-03, 1710-B-03, 1710-B-04, and 0461-B-15. The investigated substructure, ground surface elevations, and boring termination depths are summarized in Table 2. The as drilled boring locations were surveyed by Dynasty Group Inc., and station and offset information for each boring were provided by AECOM. Boring location data are presented in the *Boring Logs* (Appendix A). The as drilled boring locations are shown in the *Boring Location Plan* (Exhibit 3). As shown in Exhibit 3.



Table 2: Structure Boring Summary

Bridge Substructure	Reference Borings	Existing Grade Elevation at Boring (feet)	Boring Depth (feet)
Pier 4 (Common Pier)	1705-B-05/1705-B-05A	579.65 and 580.24	32.5 and 83.0
Pier 1	21-RWB-02, 21-RWB-03, 1705-B-06, and 1705-B-06A	596.95, 591.97, and 591.98	107.0, 104.5, 50.0, and 112.0
Pier 2	1710-B-04	588.53	113.0
	1710-B-03	587.04	103.5
Pier 3	0461B-15	587.87	109.0
	1710-B-03	587.04	103.5

Truck-mounted drilling rigs, equipped with hollow stem augers, were used to advance and maintain an open borehole to 10 feet. Mud rotary drilling technique was used from 10 feet to boring termination depths or to the top of bedrock. Soil sampling was performed according to AASHTO T 206, "*Penetration Test and Split Barrel Sampling of Soils.*" The soil was sampled at 2.5-foot intervals to 30 feet bgs and at 5-foot intervals to boring termination depth. Soil samples collected from each sampling interval were placed in sealed jars and transported to Wang Geotechnical Laboratory in Lombard, Illinois for further examination and laboratory testing. Bedrock cores, 10-foot long runs, were obtained from Borings 1705-B-06A, 1710-B-04, and 0461-B-15 with an NWD4 size core barrel.

Field boring logs, prepared and maintained by a Wang soil inspector or geologist, include lithological descriptions, visual-manual soil classifications, results of Rimac and pocket penetrometer unconfined compressive strength tests, results of Standard Penetration Tests (SPT) recorded as blows per 6 inches of penetration, rock cores recovery and Rock Quality Designation (RQD). The SPT N value, shown on the soil profile, is the sum of the second and third blows per 6 inches. The soils were described and classified according to Illinois Division of Highways (IDH) Textural Classification system. The field logs were finalized by an experienced engineering geologist after verifying the field visual classifications and laboratory test results.

Groundwater observations were made during and at the end of drilling operations. Due to safety considerations, boreholes were backfilled with lean grout immediately upon completion.

## **4.2 Vane Shear Tests**

Vane shear tests were performed in nearby Boring 1705-B-06A to determine in-situ shear strength of soft/very soft clay (Chicago Blue Clay). After drilling to the desired depth, casing was installed and vane shear test was performed using Acker Vane Shear Test Kit. Tests were performed in undisturbed and remolded conditions. The sensitivity is the ratio of shear strength in undisturbed and remolded conditions. The results are shown on the boring log.

## **4.3 Laboratory Testing**

All soil samples were tested in the laboratory for moisture content (AASHTO T-265). Atterberg limits (AASHTO T 89/T 90) and particle size (AASHTO T 88) analyses were performed on selected soil samples representing the main soil layers encountered during the investigation. Field visual descriptions of the soil samples were verified in the laboratory. Laboratory test results are shown in the *Boring Logs* (Appendix A), in the *Soil Profile* (Exhibit 4), and in the *Laboratory Test Results* (Appendix B).

The soil and rock core samples will be retained in our laboratory for 60 days following this report submittal. The samples will be discarded unless a specific written request is received as to their disposition.

## **5.0 RESULTS OF FIELD AND LABORATORY INVESTIGATIONS**

Detailed descriptions of the soil conditions encountered during our subsurface investigation are presented in the attached *Boring Logs* (Appendix A), and in the *Soil Profile* (Exhibit 4). Please note that strata contact lines represent approximate boundaries between soil types. The actual transition between soil types in the field may be gradual in horizontal and vertical directions.

### **5.1 Soil Conditions**

Along the proposed ramp alignment, our subsurface investigation revealed black to brown loam and silty loam topsoil with thicknesses ranging from 6.0 to 12.0 inches. Borings 1705-B-05, 1710-B-03, 1710-B-05, and 0461-B-15 encountered various pavement structures consisting of asphalt over concrete over granular base, asphalt over granular base, and concrete over granular base. The asphalt thickness varies from 2.5 to 12 inches and concrete thickness varies from 8 to 10 inches. A detailed pavement description is shown in Appendix A - *Boring Logs*. In descending order, the general lithologic succession encountered beneath pavements or topsoil includes 1) man-made ground (fill);

2) medium stiff to very stiff silty clay to silty clay loam, 3) very soft to medium stiff clay to silty clay; 4) stiff to hard silty clay to silty clay loam diamicton; 5) very stiff to hard silty clay loam to silty loam; 6) dense to very dense sand to sandy gravel; and 7) dolostone bedrock.

*(1) Man-made ground (fill)*

Underneath pavement structure or topsoil, borings encountered 2.0- to 12.0-foot thick mostly cohesive fill. The cohesive fill consists of stiff to hard silty clay to clay loam and has an average unconfined compressive strength ( $Q_u$ ) value of 3.8 tsf and moisture content (MC) values of 11 to 21%. The granular fill consists of loose to dense, sand to gravelly sand occasionally with construction debris has SPT N values of 7 to 40 blows/foot and moisture content (MC) values of 4 to 21%.

*(2) Medium stiff to very stiff silty clay to silty clay loam*

Underneath the fill, pavement or topsoil, borings encountered up to 6 feet of medium stiff to very stiff, brown and gray to gray silty clay to silty clay loam with  $Q_u$  values of 1.9 to 3.6 tsf and averaging 2.8 tsf and MC values of 19 to 25% and averaging 22%. Laboratory index testing on one sample shows liquid limit ( $L_L$ ) value of 32% and plastic limit ( $P_L$ ) value of 19%. According to the AASHTO soil classification, the subgrade soils belong mainly to the A-6 group.

*(3) Very soft to medium stiff clay to silty clay*

At elevations ranging from 576.6 to 582.4 feet, the borings encountered up to 43.8 feet of very soft to medium stiff, gray clay to silty clay lake bottom deposits with  $Q_u$  values of 0.08 to 0.8 tsf and averaging 0.3 tsf and MC values of 18 to 44% and averaging 25%. Laboratory index testing shows liquid limit ( $L_L$ ) values of 29 to 35% and plastic limit ( $P_L$ ) values of 15 to 18%. According to the AASHTO soil classification, the subgrade soils belong to the A-6 group. Field vane shear tests performed in Boring 1705-B-06 show higher values of in-situ shear strength.

*(4) Stiff to hard silty clay to silty clay loam diamicton*

At elevations of 538.5 to 541.8 feet (42 to 57 feet bgs), borings advanced through up to 25 feet of stiff to hard silty clay to silty clay loam diamicton of the Wadsworth Formation. The diamicton has  $Q_u$  values of 1.1 to 8.5 tsf and averaging 3.8 tsf and MC values of 12 to 34% and averaging 18%. A 5-foot thick interbed of more granular diamicton consisting of medium dense to dense silty loam to sandy loam with an SPT N value of 23 blows/foot and an MC value of 25% was encountered in Boring 1705-B-05A. Laboratory index testing on samples from this layer shows  $L_L$  values of 34 to 53% and  $P_L$  values of 18 to 21%. This soil is AASHTO classified as A-6 and A-7-6.

*(5) Very stiff to hard silty clay loam to silty loam (Hardpan)*

At elevations of 531.1 to 513.5 feet (49 to 62 feet bgs) the borings advanced through up to 35 feet of very stiff to hard silty clay loam to silty loam or very dense silty loam hardpan. Mainly cohesive the hardpan has  $Q_u$  values of more than 4.5 tsf, MC values of 8 to 22% averaging 13%, and SPT N values of 42 blows/foot to spoon refusal. Laboratory index testing showed  $L_L$  of 20 to 23% and  $P_L$  of 15 to 19%. The soil has been AASHTO classified as A-4.

*(6) Dense to very dense sand to sandy gravel*

At elevations of 495.2 to 501.8 feet (87 to 97 feet bgs) the borings advanced through 3 to 16 feet of brown and gray, dense to very dense sand to sandy gravel with SPT N values of 40 blows/foot to sampler refusal and MC values of 6 to 16%.

*(7) Dolostone bedrock*

Borings 1705-B-05A, and 21-RWB-02 were ended with auger refusal at elevations 497.2 and 490.0 feet (83 to 107 feet bgs). At Borings 21-RWB-03 and 1710-B-03, weathered dolostone bedrock was encountered at 484.5 and 490.2 feet elevation (102 feet bgs). Dolostone bedrock was cored in Borings 1705-B-06A, 1710-B-04, and 0461-B-15 to 10.0 feet from auger refusal at an elevations of 485.5 to 490.0 feet (99.0 to 103.0 feet bgs). The bedrock was described as strong, with fair to good rock quality, light gray, joint breaks with little to no infill, slightly vuggy. The rock recovery is 93 to 100% with RQD of 55 to 75%.

## **5.2 Groundwater Conditions**

Groundwater was encountered during drilling at 3.0 to 3.5 feet bgs, more likely perched water into the granular fill. At the completion of drilling groundwater was recorded at 87.0 to 90.0 feet bgs and it is associated with the granular soils (Layer 6). Groundwater is probably close to the level in the Chicago River or the Lake Michigan.

## **5.3 Seismic Design Considerations**

The Seismic Site Class was determined using IDOT Design Guide AGMU Memo 09.01 LRFD Seismic Soil Site Class Definition dated January 7, 2009 and IDOT spreadsheet "Seismic Site Class Determination" dated December 13 2010. Based on subsurface soil profile, the site is in Seismic Site Class D for the drilled shaft foundation. We assumed drilled shaft diameter to be 3 feet. Table 3 shows seismic design parameters to be considered for the design and the results of seismic site class determination are presented in Appendix C.

Table 3: Seismic Design Parameters

Seismic Performance Zone (SPZ)	1
Design Spectral Acceleration at 1.0 sec. ( $S_{D1}$ )	0.085g
Design Spectral Acceleration at 0.2 sec. ( $S_{D5}$ )	0.144g
Soil Site Class	D

## 6.0 ANALYSIS AND RECOMMENDATIONS

It is understood that the structure design will be based on 2012 AASHTO LRFD Bridge Design Specifications except modified by the IDOT 2012 Bridge Manual. The following sections include geotechnical evaluations and recommendations for the substructure foundations.

### 6.1 Approach Embankments and Slabs

Since the NE Ramp bridge is bordered by other two bridge structures there are no abutments and no approach slabs.

### 6.2 Bridge Structure Foundations

#### 6.2.1 Spread Footing

Based on the soil conditions encountered during our investigation and anticipated loads, shallow foundation system consisting of spread footings will not be suitable.

#### 6.2.2 Driven Piles

The substructures could be supported on driven piles. However, it is understood that driven piles are not to be considered due to concern of noise and vibration.

#### 6.2.3 Hardpan Drilled Shafts

The hardpan soil (silty loam) above the bedrock with N60 values more than 50 blows per foot could be considered as Intermediate Geo Material (IGM) as per 2012 AASHTO LRFD Bridge Design Specifications. We recommend a factored unit tip resistance of 27.5 ksf considering nominal unit tip resistance of 50 ksf and resistance factor of 0.55 for drilled shafts established into IGM layer. Recommended drilled shaft tip at each substructure location are summarized in Table 4. We recommend ignoring side resistance.

Table 4: Drilled Shafts into Hardpan

Substructure	Reference Borings	Estimated Tip Elevation (ft)	Estimated depth below grade at boring location (ft)
Pier 1	21-RWB-02	511.0	86.0
Pier 2	1710-B-03 1710-B-04	526.0	61.0
Pier 3	0461-B-15	517.0	71.0
Pier 4		Note 1	
Pier C4		Note 2	

Notes: 1. Foundation will be designed and constructed as part of SN 016-1705

2: Foundation will be designed and constructed as part of SN 016-0461.

#### 6.2.4 Rock Socketed Drilled Shafts

The substructures could also be supported on drilled shafts socketed into bedrock. Drilled shaft socketed two feet into bedrock can be designed considering base and side resistances. We calculated tip and side resistances based on 2012 AASHTO LRFD Bridge Design Specifications. Table 5 shows design value for the factored unit tip resistance. The side resistance is controlled by the compressive strength of concrete. We recommend considering factored unit side resistance of 12.5 ksf considering nominal unit side resistance of 22.7 ksf and resistance factor of 0.55. The variations in unit tip resistances are due to variation in RQD and unconfined compressive strength of the rock. As per 2012 IDOT Bridge Manual drilled shafts extending into rock, in most cases, should be designed utilizing only end bearing or side resistance in rock, whichever is larger. The socket shaft diameter in the rock should be at least 6 inches less than the shaft diameter in the overburden soils.

Table 5: Recommended Rock Unit Tip Resistance

Substructure Reference Boring	Estimated Top of Bedrock Elevation (ft)	Tip Elevation (ft)	Approximate depth below grade at boring location (ft)	Nominal Unit Tip Resistance (ksf)	Factored Unit Tip Resistance (ksf)
Pier 1 21-RWB-02 1705-B-06A	490.0	488.0	109.0	300	150
Pier 2 1710-B-04 1710-B-03	485.5	483.5	105.0	300	150
Pier 3 0461-B-15	488.9	487.9	101	300	150
Pier 4			Note 1		

Resistance factor for tip resistance in rock = 0.50

Notes: 1. Foundation will be designed and constructed as part of SN 016-1705

### 6.3 Resistance to Lateral Loads

Lateral loads on drilled shafts should be analyzed for maximum moments and lateral deflections. A geotechnical resistance factor of 1.0 should be used. No allowance should be made for the frictional resistance of the concrete cap on soil. The lateral load capacity analysis can be performed using computer program such as COMP 624P, L-pile, LATPILE, or any other similar programs. The estimated soil parameters that may be used to analyze of stresses and deflections of piles or drilled shafts under lateral loads are presented in Tables 6, 7 and 8. Group action should be considered in calculating total lateral load resistance of substructures.

Table 6: Recommended Soil Parameters for Lateral Load Analysis  
Pier 4 (Common Pier), Borings 1705-B-05/1705-B-04A

Soil Layer Elevation Range	Moist Unit Weight, (pcf)	Shear Strength Properties			Estimated Lateral Soil Modulus Parameter, k (pci)	Estimated Soil Strain Parameter, $\epsilon_{50}$
		Short Term		Long Term		
		Cohesion $C_u$ (psf)	Friction Angle, $\phi$ (Degree)	Friction Angle, $\phi'$ (Degree)		
576.16 to 572.6 Clay to Silty Clay Loam	120	1027	0	30	300	0.0085
572.6 to 561.6 Clay to Silty Clay	115	984	0	30	250	0.0086

Soil Layer Elevation Range	Moist Unit Weight,  (pcf)	Shear Strength Properties			Estimated Lateral Soil Modulus Parameter, k  (pci)	Estimated Soil Strain Parameter, $\epsilon_{50}$
		Short Term		Long Term		
		Cohesion Cu (psf)	Friction Angle, $\phi$ (Degree)	Friction Angle, $\phi'$ (Degree)		
561.6 to 559.1 Loam	105	0	28	28	10	--
559.1 to 543.2 Silty Clay	115	879	0	30	220	0.0092
543.2 to 538.5 Silty Clay	120	1077	0	30	300	0.0085
538.5 to 523.5 Silty Clay	125	5527	0	33	1800	0.0041
523.5 to 518.5 Clay	120	1150	0	30	350	0.008
518.5 to 513.5 Sandy Loam	115	0	32	32	45	--
513.5 to 508.7 Silty Clay Loam	125	2460	0	30	850	0.0056
508.7 to 503.5 Silty Clay Loam	125	6810	0	32	2000	0.004
503.5 to 497.2 Silty Loam	125	0	36	36	140	--

Table 7: Recommended Soil Parameters for Lateral Load Analysis  
Pier 1, Boring 1705-B-06/1705-B-06A/21-RWB-02

Soil Layer Elevation Range	Moist Unit Weight,  (pcf)	Shear Strength Properties			Estimated Lateral Soil Modulus Parameter, k  (pci)	Estimated Soil Strain Parameter, $\epsilon_{50}$
		Short Term		Long Term		
		Cohesion Cu (psf)	Friction Angle, $\phi$ (Degree)	Friction Angle, $\phi'$ (Degree)		
596.95 to 591.5 Clay Loam	125	6600	0	30	2000	0.004
591.5 to 584.0 Silty Clay	120	1100	0	28	350	0.0083
584.0 to 581.5 Silty Clay	125	3500	0	30	1300	0.0049
581.5 to 574.5 Clay to Silty Clay	115	830	0	28	220	0.0095
574.5 to 568.5 Clay to Silty Clay	110	430	0	28	50	0.018
568.5 to 540.2 Clay to Silty Clay	115	850	0	28	220	0.0095



Soil Layer Elevation Range	Moist Unit Weight,  (pcf)	Shear Strength Properties			Estimated Lateral Soil Modulus Parameter, k  (pci)	Estimated Soil Strain Parameter, $\epsilon_{50}$
		Short Term		Long Term		
		Cohesion Cu (psf)	Friction Angle, $\phi$ (Degree)	Friction Angle, $\phi'$ (Degree)		
540.2 to 525.5 Silty Clay Loam	125	4500	0	32	1500	0.0045
525.5 to 520.5 Silty Clay Loam	120	1800	0	30	610	0.0062
520.5 to 515.2 Silty Clay Loam	125	3000	0	30	1050	0.005
515.2 to 510.0 Silty Loam	125	0	36	36	250	--
510.0 to 500.0 Silty Loam	125	9200	0	36	2000	0.004

Table 8: Recommended Soil Parameters for Lateral Load Analysis  
Piers 2 and 3, Boring 1710-B-03/1710-B-04/0461-B-15

Soil Layer Elevation Range	Moist Unit Weight,  (pcf)	Shear Strength Properties			Estimated Lateral Soil Modulus Parameter, k  (pci)	Estimated Soil Strain Parameter, $\epsilon_{50}$
		Short Term		Long Term		
		Cohesion Cu (psf)	Friction Angle, $\phi$ (Degree)	Friction Angle, $\phi'$ (Degree)		
584.0 to 581.5 Silty Clay Loam	125	3600	0	28	1300	0.0049
581.5 to 574.5 Clay to Silty Clay Loam	115	910	0	28	250	0.0088
574.5 to 568.5 Clay to Silty Clay Loam	110	430	0	28	50	0.018
568.5 to 540.3 Clay to Silty Clay Loam	115	850	0	28	220	0.0095
540.3 to 535.0 Clay to Silty Clay	120	1200	0	30	380	0.0083
535.0 to 530.3 Clay to Silty Clay	125	3100	0	30	1100	0.005
530.3 to 525.5 Silty Loam	125	4600	0	36	1600	0.0045
525.5 to 520.5 Silty Loam	125	6900	0	36	2000	0.004
520.5 to 515.0 Silty Loam	125	3500	0	36	1300	0.0049

Soil Layer Elevation Range	Moist Unit Weight,  (pcf)	Shear Strength Properties			Estimated Lateral Soil Modulus Parameter, k  (pci)	Estimated Soil Strain Parameter, $\epsilon_{50}$
		Short Term		Long Term		
		Cohesion Cu (psf)	Friction Angle, $\phi$ (Degree)	Friction Angle, $\phi'$ (Degree)		
515.0 to 510.0 Silty Loam	125	7800	0	36	2000	0.004
510.0 to 505.5 Silty Loam	125	4500	0	36	1500	0.0045
505.5 to 499.5 Silty Loam	125	9600	0	36	2000	0.004
499.5 to 489.5 Gravelly Sand	125	0	36	36		--
489.5 to 484.5 Silty Loam	125	0	36	36		--

#### 6.4 Global Slope Stability

Since there are no approach embankments there is no global slope stability concern.

#### 6.5 Stage Construction Considerations

There will not be any stage construction, therefore there is no need for a temporary soil retention system.

### 7.0 CONSTRUCTION CONSIDERATIONS

#### 7.1 Excavation and Utilities

Excavations should be performed in accordance with local, State, and federal regulations including OSHA regulations. The potential effect of ground movements upon nearby utilities should be considered during construction. Any open excavation to a depth of 5 feet should have a slope of 1.5:1 (H: V) for cohesive soils and 2:1 (H: V) for granular soils or flatter. Due to the existing soil conditions, for the excavations that extend below 5 feet, a soil retention system with dewatering may be necessary.

#### 7.2 Filling and Backfilling

Embankment fill required to attain the final design subgrade elevations should be in accordance with Section 205 of the IDOT Standard Specifications for Road and Bridge Construction (IDOT Standard Specifications). All fill and backfill materials should be pre-approved by the site engineer. The fill should be free of organic materials and debris.

### **7.3 Drilled Shafts**

After a drilled shaft is completed to the required elevation, the base should be cleaned and inspected by lowering a camera, the reinforcing cage placed, and the concrete discharged at the base using a tremie pipe or concrete pump. The drilled shafts should be constructed in accordance with Section 516 Drilled Shafts of IDOT Standard Specifications for Road and Bridge Construction. The angle of inclination of the bell from vertical should be no greater than 30 degree. Since bells are not inspected by entering the shafts, we recommend that the bell should be oversized by one foot in diameter than required by the design.

Temporary casing should be installed through existing fill and soft clay deposits. The unconfined compressive strength of the soft clays is very low and squeezing of the soft clays is expected. Therefore, a temporary casing or slurry method is anticipated.

If a permanent casing to top of rock is not selected for the rock socketed drilled shafts, we recommend that to verify structural integrity of concrete, non-destructing integrity testing on completed drilled shafts should be performed using the Crosshole Sonic Logging (CSL) method. IDOT special provision "Crosshole Sonic Logging" dated March 9, 2010 or latest edition should be included for this inspection and testing requirements. Wang recommends providing CSL in at least one drilled shaft at each substructure supported on rock socketed drilled shafts.

## 8.0 QUALIFICATIONS

The analysis and recommendations submitted in this report are based upon the data obtained from the borings drilled at the locations shown on the boring logs and in Exhibit 3. This report does not reflect any variations that may occur between the borings or elsewhere on the site, variations whose nature and extent may not become evident until the course of construction. In the event that any changes in the design and/or location of the structure are planned, we should be timely informed so that our recommendations can be adjusted accordingly.

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

Respectfully Submitted,

### WANG ENGINEERING, INC.

*Mohammed A. Kothawala* 6-13-14

Mohammed A. Kothawala, P.E., D.GE  
Senior Geotechnical Engineer

*Jerry WH Wang* IC/F

Jerry W.H. Wang, PhD., P.E.  
QA/QC Reviewer



*License Expires 11-30-15*

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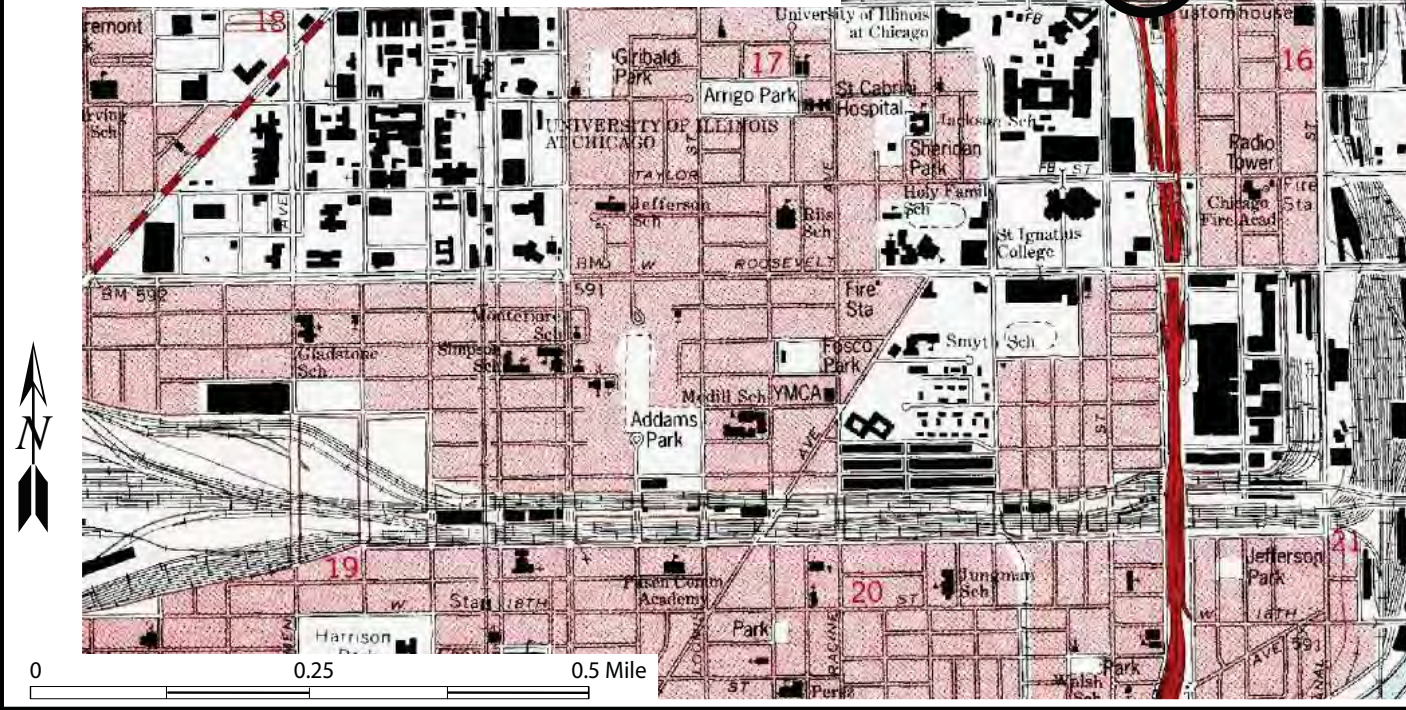
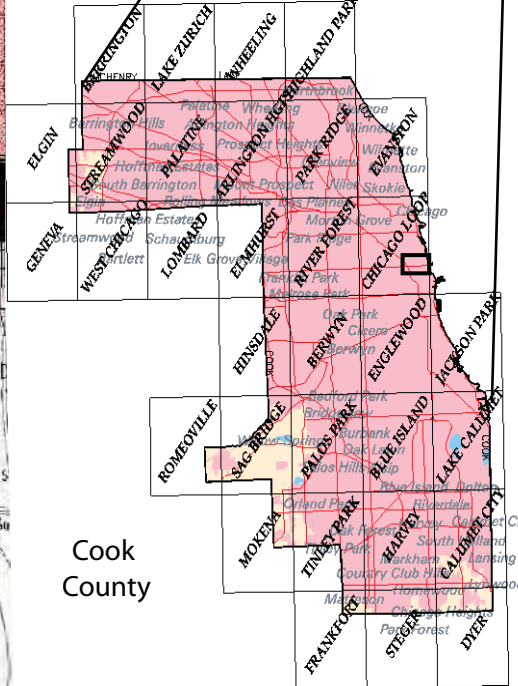
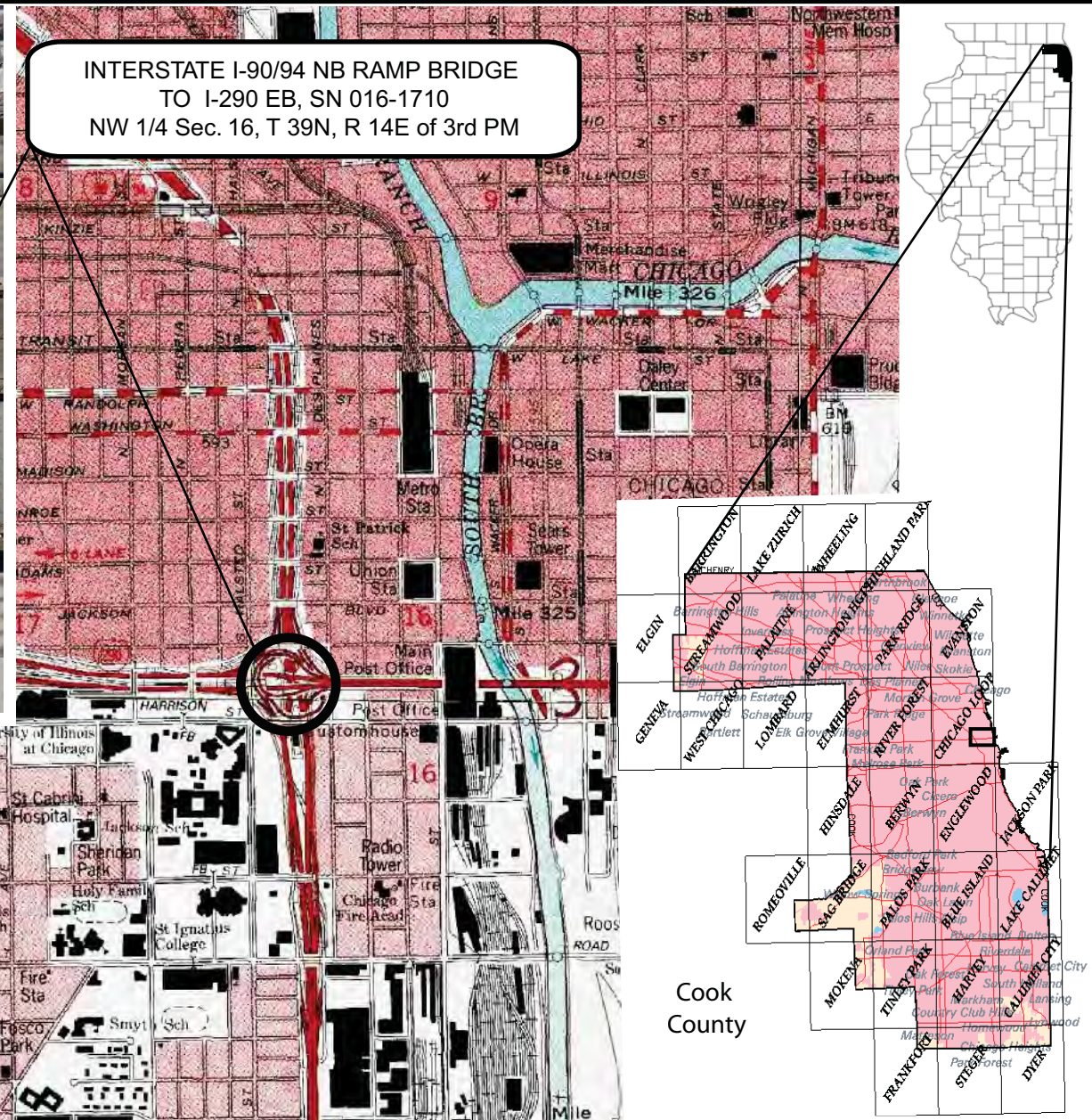
## ***REFERENCES***

- AMERICAN ASSOCIATION OF STATE HIGHWAY TRANSPORTATION OFFICIALS (2012) *LRFD Bridge Design Specifications*. United States Department of Transportation, Washington, D.C.
- BAUER, R.A., CURRY, B.B., GRAESE, A.M., VAIDEN, R.C., SU, W.J., and HASEK, M.J., 1991, Geotechnical Properties of Selected Pleistocene, Silurian, and Ordovician Deposits of Northeastern Illinois: *Environmental Geology* 139, Illinois State Geological Survey, 69 p.
- HANSEL, A.K., and JOHNSON, W.H. (1996) *Wedron and Mason Groups: Lithostratigraphic Reclassification of the Wisconsin Episode, Lake Michigan Lobe Area: ISGS Bulletin 104*. Illinois State Geological Survey, Champaign, IL. 116 p.
- ILLINOIS DEPARTMENT OF TRANSPORTATION (1999) *Geotechnical Manual*. IDOT Bureau of Materials and Physical Research, Springfield, IL.
- ILLINOIS DEPARTMENT OF TRANSPORTATION (2012) *Standard Specifications for Road and Bridge Construction*. IDOT Division of Highways, Springfield, IL.
- ILLINOIS DEPARTMENT OF TRANSPORTATION (2012) *Bridge Manual*. IDOT Bureau of Bridges and Structures, Springfield, IL.
- LEIGHTON, M.M., EKBLAW, G.E., and HORBERG, L. (1948) *Physiographic Divisions of Illinois*. *The Journal of Geology*, v. 56, p. 16-33.

## **EXHIBITS**



INTERSTATE I-90/94 NB RAMP BRIDGE  
TO I-290 EB, SN 016-1710  
NW 1/4 Sec. 16, T 39N, R 14E of 3rd PM

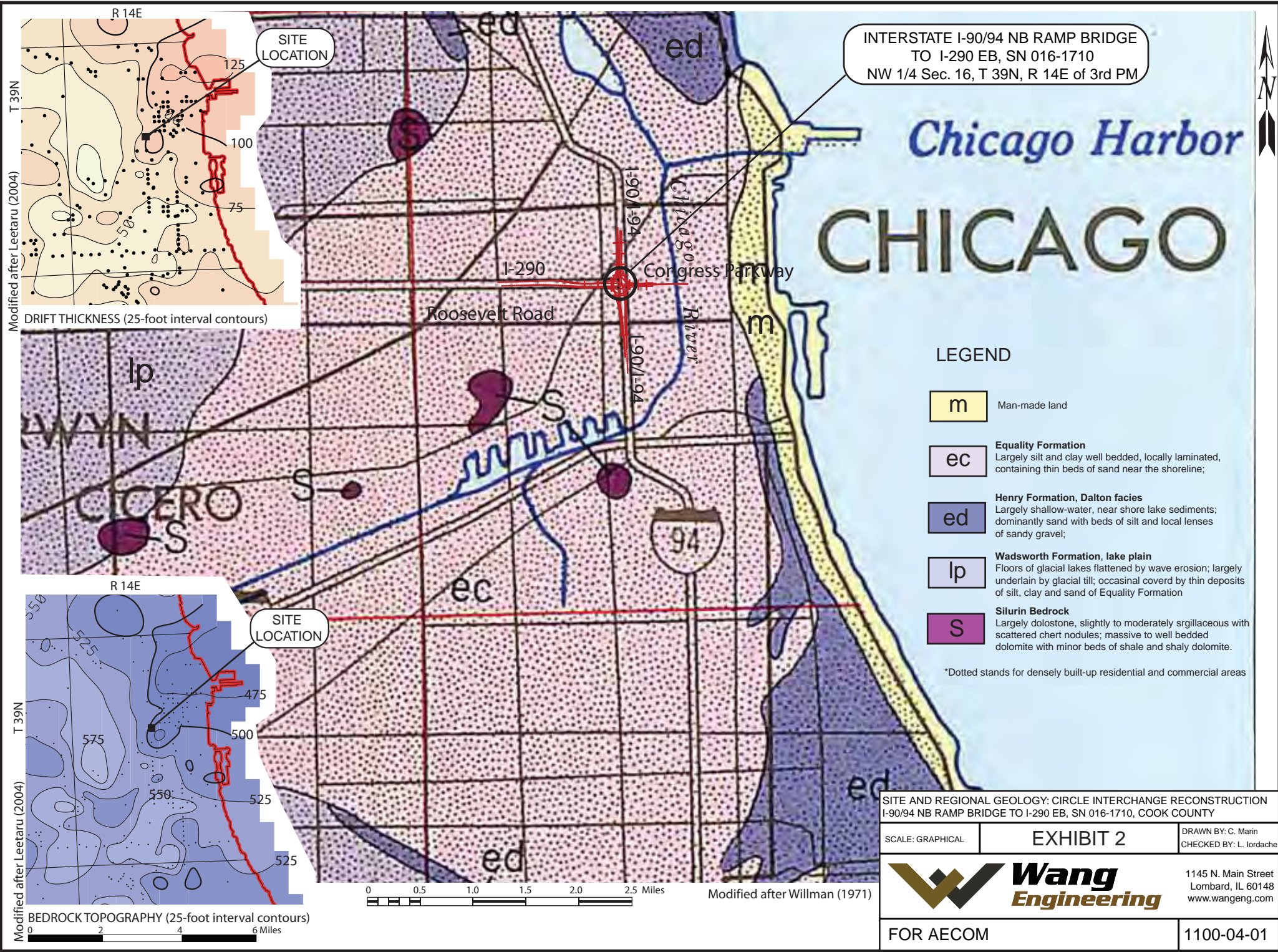


SITE LOCATION MAP: CIRCLE INTERCHANGE RECONSTRUCTION  
I-90/94 NB RAMP BRIDGE TO I-290 EB, SN 016-1710, COOK COUNTY

SCALE: GRAPHICAL | EXHIBIT 1 | DRAWN BY: C. Marin | CHECKED BY: M. Kothawala



FOR AECOM | 1145 N. Main Street | Lombard, IL 60148 | www.wangeng.com | 1100-04-01



INTERSTATE I-90/94 NB RAMP BRIDGE  
TO I-290 EB, SN 016-1710  
NW 1/4 Sec. 16, T 39N, R 14E of 3rd PM

# Chicago Harbor

## CHICAGO

### LEGEND

- m** Man-made land
  - ec** Equality Formation  
Largely silt and clay well bedded, locally laminated, containing thin beds of sand near the shoreline;
  - ed** Henry Formation, Dalton facies  
Largely shallow-water, near shore lake sediments; dominantly sand with beds of silt and local lenses of sandy gravel;
  - lp** Wadsworth Formation, lake plain  
Floors of glacial lakes flattened by wave erosion; largely underlain by glacial till; occasional covered by thin deposits of silt, clay and sand of Equality Formation
  - S** Silurin Bedrock  
Largely dolostone, slightly to moderately argillaceous with scattered chert nodules; massive to well bedded dolomite with minor beds of shale and shaly dolomite.
- \*Dotted stands for densely built-up residential and commercial areas

SITE AND REGIONAL GEOLOGY: CIRCLE INTERCHANGE RECONSTRUCTION  
I-90/94 NB RAMP BRIDGE TO I-290 EB, SN 016-1710, COOK COUNTY

SCALE: GRAPHICAL      EXHIBIT 2      DRAWN BY: C. Marin  
CHECKED BY: L. Iordache

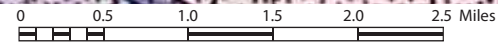


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www.wangeng.com

FOR AECOM      1100-04-01

Modified after Leetaru (2004)

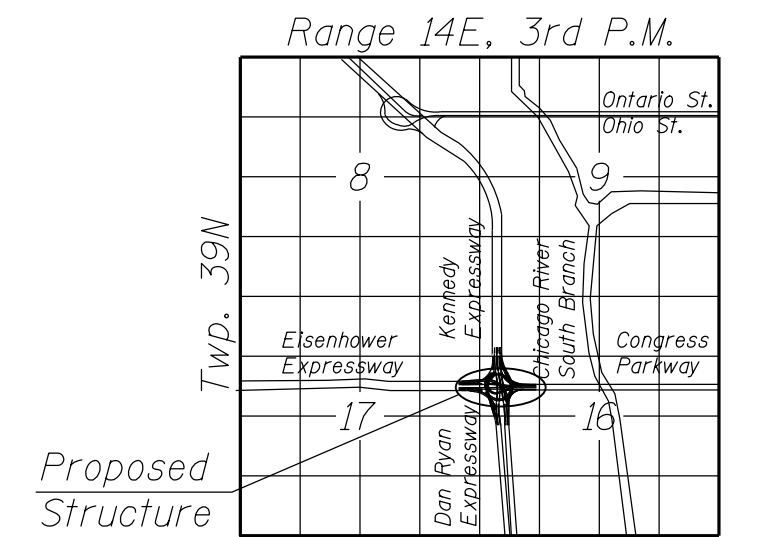
Modified after Leetaru (2004)



Modified after Willman (1971)

0 2 4 6 Miles

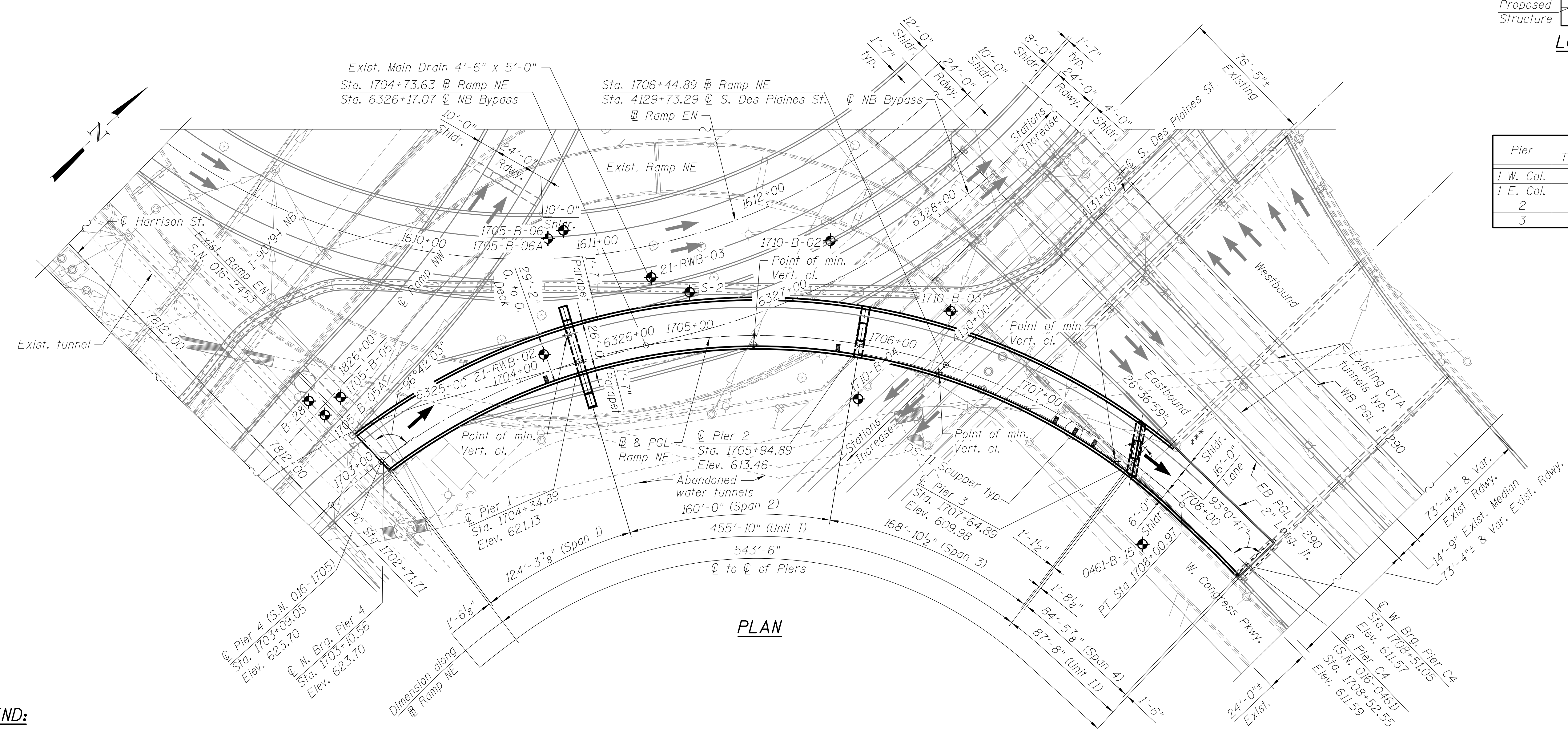




LOCATION SKETCH

TABLE 1

Pier	Estimated T/Ground Elev.	Estimated T/Rock Elev.
1 W. Col.	594.55	490.0
1 E. Col.	597.16	490.0
2	588.35	484.5
3	587.55	488.9



PLAN

LEGEND:

- ⊕ Soil Boring Location
- (W)— Water Line
- (E)— Electric
- (T)— Telephone line
- (CTV)— Television line
- Combined Sewer
- (S)— Storm Sewer
- (FO)— Fiber Optic
- (G)— Gas Line
- ⊙ Fire Hydrant
- ⊗ Light Pole
- ⊕ Point of Min. Vert. Cl.

**GENERAL PLAN AND ELEVATION**  
**RAMP NE OVER**  
**I-90/94 NB BYPASS/S. DES PLAINES ST.**  
**F.A.I. RTE. I-90/94 - SECTION 2014-005R&B**  
**COOK COUNTY**  
**STATION 1704+73.63**  
**STRUCTURE NO. 016-1710**

BORING LOCATION MAP: CIRCLE INTERCHANGE RECONSTRUCTION NE RAMP OVER I-90/94, SN 016-1710, COOK COUNTY		06/12/2014	<b>EXHIBIT 3</b>	DRAWN BY: C. Marin CHECKED BY: M. Kothawala
		1145 N. Main Street Lombard, IL 60148 www.wangeng.com		
FOR AECOM		1100-04-01		

T:\16898A\Struct\Cadd\1710\16-1710-CIRCLE100-SHT-PB-ST-TSL-001.dgn 29-MAY-2014 13:36



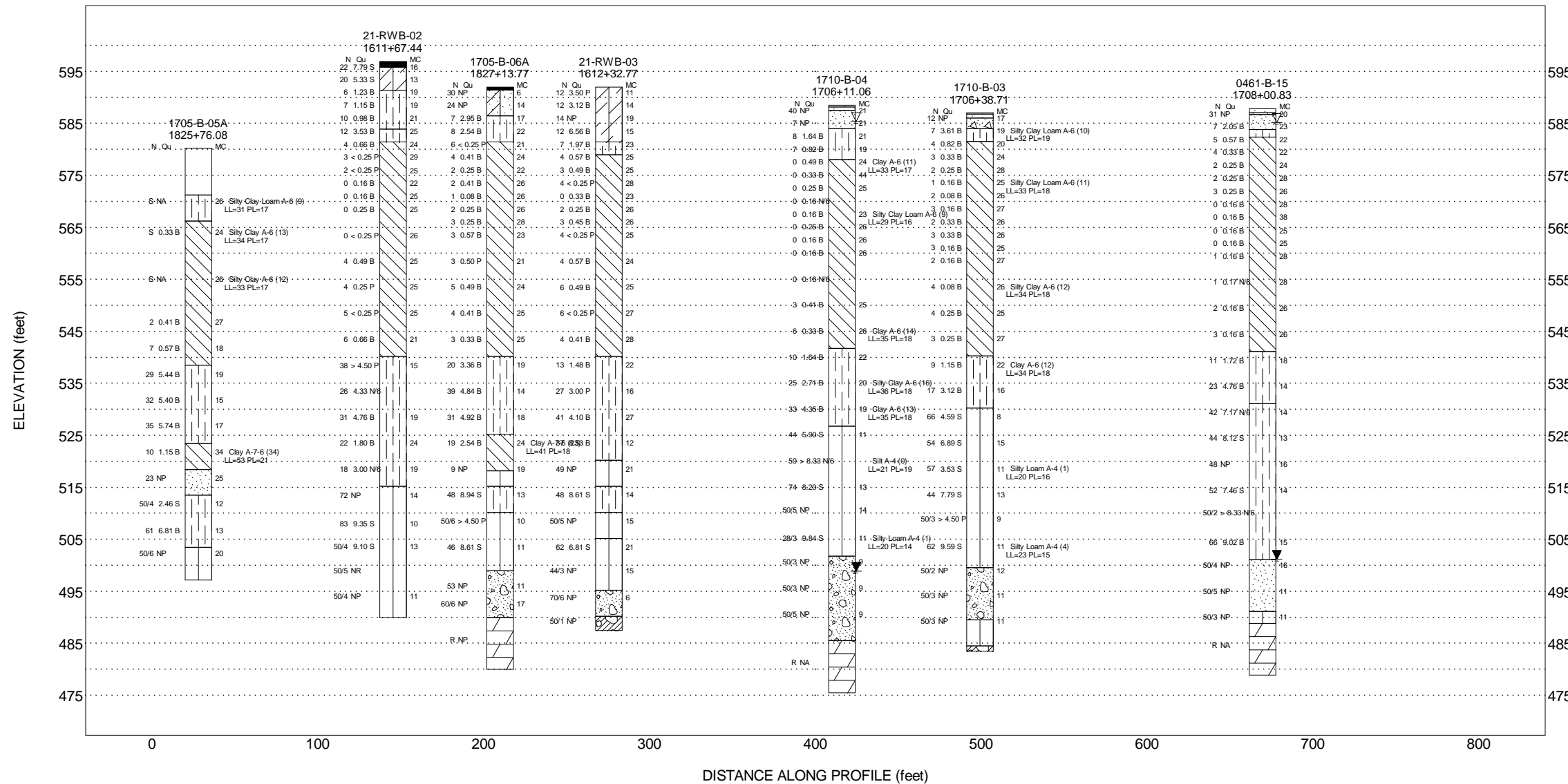
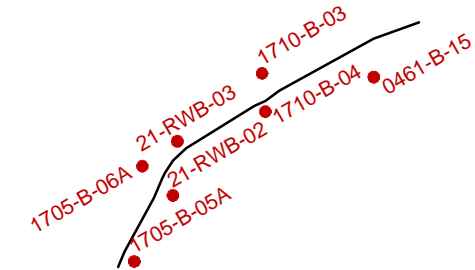
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PLOT DATE = 5/29/2014	DRAWN - DCP	REVISED -
	CHECKED - JIG	REVISED -

**STATE OF ILLINOIS**  
**DEPARTMENT OF TRANSPORTATION**

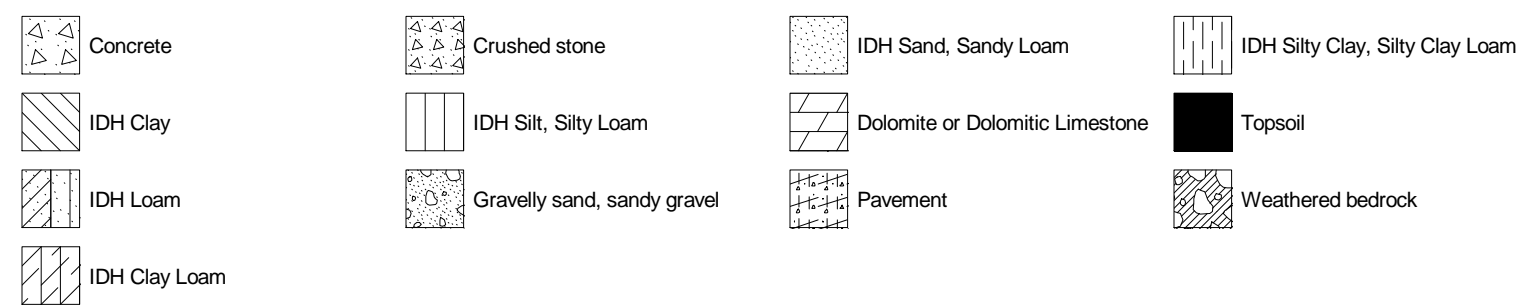
STRUCTURE NO. 016-1710

SHEET NO. 1 OF 3 SHEETS

F.A.I. RTE. 90/94/290	SECTION 2014-005R&B	COUNTY COOK	TOTAL SHEETS 3	SHEET NO. 1
ILLINOIS FED. AID PROJECT				CONTRACT NO. 60X79

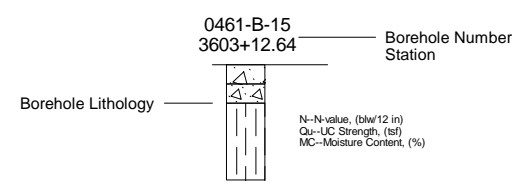


**Lithology Graphics**

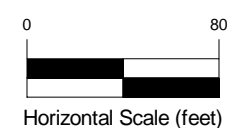


Site Map Scale 1 inch equals 295 feet

**Explanation:**



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



Vertical Exaggeration: 3x

**Wang Engineering, Inc.**  
1145 N Main Street  
Lombard, IL 60148

**SN 016-1710**  
**Subsurface Data Profile**



Circle Interchange Reconstruction  
Section 17, T39N, R14E of 3rd PM

JOB NUMBER	PLATE NUMBER
1100-04-01	EXHIBIT 4

## **APPENDIX A**

## LEGEND FOR BORING LOG

Relative Density of Non-Cohesive Soils	
N-Blows/ 12 inches	Relative Density Term
0-3	Very Loose
4-9	Loose
10-29	Medium Dense
30-49	Dense
50-80+	Very Dense

Consistency of Cohesive Soils	
Unconfined Compressive Strength $Q_u$ , tsf	Consistency Term
<0.25	Very Soft
0.25-0.49	Soft
0.50-0.99	Medium Stiff
1.00-1.99	Stiff
2.00-3.99	Very Stiff
>4.00	Hard

Proportional Terms		
Trace	1-9	Percent of Dry Weight
Little	10-19	
Some	20-34	
And	35-50	
Gradation Terminology		
Boulders	>200mm	
Cobbles	200mm to 75mm	
Gravel	75mm to 2mm	
Sand	2-0mm to 0.074mm	
Silt	0.074mm to 0.002mm	
Clay	<0.002mm	

SS = Split Spoon  
 ST = Shelby Tube  
 SPT = Standard Penetration Test  
 $Q_u$  = Unconfined Compressive Strength  
 P = Pocket Penetrometer  
 S = Shear failure of sample, Rimac test  
 B = Bulge failure of sample, Rimac test  
 SSA = Solid Stem Augers,  
 HSA = Hollow Stem Augers,

### Sample Type Symbols



Split Spoon



Rock Core



In-situ Vane Shear Test



No Recovery



Shelby Tube



Geoprobe



Auger Cuttings

SPT = Standard Penetration Test  
 N Value is the sum of the second and the third numbers



# BORING LOG 0461-B-15

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

WEI Job No.: 1100-04-01

Client **AECOM**  
 Project **Circle Interchange Reconstruction**  
 Location **Section 17, T39N, R14E of 3rd PM**

Datum: NAVD 88  
 Elevation: 587.87 ft  
 North: 1897885.92 ft  
 East: 1172158.86 ft  
 Station: 1708+00.83  
 Offset: 29.1344 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	587.1 586.8	10-inch thick CONCRETE --PAVEMENT--															
		3-inch thick CRUSHED STONE --BASE COURSE--			1	14 18 13	NP	20						11	0 0 0	0.16 B	25
		Dense, brown, fine SAND --FILL--															
	583.9	Very stiff, gray SILTY CLAY, trace gravel	5		2	3 3 4	2.05 B	23				30		12	0 0 1	0.16 B	28
	582.4	Very soft to medium stiff, gray CLAY to SILTY CLAY, trace gravel															
					3	4 3 2	0.57 B	22									
			10		4	1 2 2	0.33 B	22				35		13	0 0 1	0.17 N/6	28
					5	1 1 1	0.25 B	24									
			15		6	0 0 2	0.25 B	28				40		14	1 1 1	0.16 B	26
					7	0 1 2	0.25 B	26									
			20		8	0 0 0	0.16 B	28				45		15	1 2 1	0.16 B	26
					9	0 0 0	0.16 B	38		541.1	Stiff to hard, gray SILTY CLAY, trace gravel						
			25		10	0 0 0	0.16 B	25				50		16	2 4 7	1.72 B	18

### GENERAL NOTES

Begin Drilling **03-26-2014** Complete Drilling **03-26-2014**  
 Drilling Contractor **Wang Testing Services** Drill Rig **B-57 TMR**  
 Driller **P&P** Logger **D. Kolpacki** Checked by **C. Marin**  
 Drilling Method **3.25" HSA to 10', mud rotary thereafter, boring**  
**backfilled upon completion**

### WATER LEVEL DATA

While Drilling  $\nabla$  **3.00 ft**  
 At Completion of Drilling  $\nabla$  **87.00 ft**  
 Time After Drilling **NA**  
 Depth to Water  $\nabla$  **NA**

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

WANGENGINC 11000401.GPJ WANGENG.GDT 5/6/14



# BORING LOG 0461-B-15

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 Lombard, IL 60148  
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 Fax: 630 953-9938

WEI Job No.: 1100-04-01

Client: **AECOM**  
 Project: **Circle Interchange Reconstruction**  
 Location: **Section 17, T39N, R14E of 3rd PM**

Datum: NAVD 88  
 Elevation: 587.87 ft  
 North: 1897885.92 ft  
 East: 1172158.86 ft  
 Station: 1708+00.83  
 Offset: 29.1344 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	
	531.1	Hard, gray SILTY CLAY LOAM to SILTY LOAM, trace gravel	55	X	17	7 10 13	4.76 B	14				80			50/2	8.33 N/6		
			60	X	18	10 20 22	7.17 N/6	14				85	X	23	15 25 41	9.02 B	15	
			65	X	19	9 18 26	8.12 S	13			501.1	Very dense, gray, fine SAND --WET--	90	X	24	50/4	NP	16
			70	X	20	12 17 31	NP	16					95	X	25	50/5	NP	11
			75	X	21	16 24 28	7.46 S	14			491.1	Very dense, gray SILTY LOAM, some gravel	100	X	26	50/3 C	NP	11
										488.9	Strong, light gray, fair to good rock mass quality, bedded fresh							

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **03-26-2014** Complete Drilling **03-26-2014**  
 Drilling Contractor **Wang Testing Services** Drill Rig **B-57 TMR**  
 Driller **P&P** Logger **D. Kolpacki** Checked by **C. Marin**  
 Drilling Method **3.25" HSA to 10', mud rotary thereafter, boring backfilled upon completion**

While Drilling **3.00 ft**  
 At Completion of Drilling **87.00 ft**  
 Time After Drilling **NA**  
 Depth to Water **NA**

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

WANGENGINC 11000401.GPJ WANGENG.GDT 5/6/14



# BORING LOG 0461-B-15

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

WEI Job No.: 1100-04-01

Client: **AECOM**  
 Project: **Circle Interchange Reconstruction**  
 Location: **Section 17, T39N, R14E of 3rd PM**

Datum: NAVD 88  
 Elevation: 587.87 ft  
 North: 1897885.92 ft  
 East: 1172158.86 ft  
 Station: 1708+00.83  
 Offset: 29.1344 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	478.9	DOLOSTONE, up to 18-inch beds, 10-inch joints spacing, horizontal joints with none to less than 0.2-inch infilling, hard joint wall, with stylolitic surfaces, and moderately vuggy porosity  --Run 1 - RECOVERY=100%-- --RQD=75%--	105		1	100											
		Boring terminated at 109.00 ft	110														
			115														
			120														
			125														

### GENERAL NOTES

Begin Drilling **03-26-2014** Complete Drilling **03-26-2014**  
 Drilling Contractor **Wang Testing Services** Drill Rig **B-57 TMR**  
 Driller **P&P** Logger **D. Kolpacki** Checked by **C. Marin**  
 Drilling Method **3.25" HSA to 10', mud rotary thereafter, boring backfilled upon completion**

### WATER LEVEL DATA

While Drilling  $\nabla$  **3.00 ft**  
 At Completion of Drilling  $\blacktriangledown$  **87.00 ft**  
 Time After Drilling **NA**  
 Depth to Water  $\nabla$  **NA**


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

Run #1

TOP



Boring 0461-B-15:  
Run 1, 99' to 109', RECOVERY = 100%, RQD = 75%

BEDROCK CORE: CIRCLE INTERCHANGE RECONSTRUCTION CHICAGO, IL		
SCALE : GRAPHIC	0461-B-15	DRAWN BY: M. de los Reyes CHECKED BY: C. Marin
		1145 N. Main Street Lombard, IL 60148 www.wangeng.com
FOR AECOM		1100-04-01





# BORING LOG 1705-B-05

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 Telephone: 630 953-9928  
 Fax: 630 953-9938

WEI Job No.: 1100-04-01

Client **AECOM**  
 Project **Circle Interchange Reconstruction**  
 Location **Section 17, T39N, R14E of 3rd PM**

Datum: NAVD 88  
 Elevation: 579.65 ft  
 North: 1897590.86 ft  
 East: 1171794.26 ft  
 Station: 1825+62.58  
 Offset: 4.2306 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	578.6	12-inch thick ASPHALT --PAVEMENT--															
		Loose, gray SANDY GRAVEL --FILL--			1	5 3 4	NP	4						11	0 2 2	< 0.25 P	27
	576.6	Very soft to soft, gray CLAY to SILTY CLAY LOAM, trace gravel			2	0 0 0	< 0.25 P	18						12	0 0 1	0.41 B	25
			5														
					3	0 0 1	0.41 B	20									
					4	0 0 0	0.25 B	21									
			10														
					5	0 0 0	0.25 B	24									
					6	0 3 2	0.33 B	23									
		--L <sub>L</sub> (%)=35, P <sub>L</sub> (%)=15-- --%Gravel=5.8-- --%Sand=17.8-- --%Silt=48.3-- --%Clay=28.1-- --A-6 (14)--	15														
	561.6	Very loose, gray LOAM			7	0 0 1	0.41 B	24									
					8	0 0 0	NP	28									
	559.1	Very soft to soft, gray CLAY to SILTY CLAY, trace gravel			9	0 0 0	0.25 B	25									
			20														
					10	1 1 2	0.41 B	25									
			25														
										547.1	--Obstruction at 32.5 ft-- Boring terminated at 32.50 ft						

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **07-22-2013** Complete Drilling **07-22-2013**  
 Drilling Contractor **Wang Testing Services** Drill Rig **D-50 TMR**  
 Driller **R&N** Logger **A. Happel** Checked by **C. Marin**  
 Drilling Method **2.25" SSA to 10', mud rotary thereafter, boring backfilled upon completion**

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

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

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# BORING LOG 1705-B-05A

WEI Job No.: 1100-04-01

Client: **AECOM**  
 Project: **Circle Interchange Reconstruction**  
 Location: **Section 17, T39N, R14E of 3rd PM**

Datum: NAVD 88  
 Elevation: 580.24 ft  
 North: 1897604.27 ft  
 East: 1171792.75 ft  
 Station: 1825+76.08  
 Offset: 3.9157 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	
		--Blind drilled--									--L <sub>L</sub> (%)=33, P <sub>L</sub> (%)=17-- --%Gravel=2.9-- --%Sand=13.8-- --%Silt=49.3-- --%Clay=33.9-- --A-6 (12)--			3			26	
	571.2	SILTY CLAY LOAM --L <sub>L</sub> (%)=31, P <sub>L</sub> (%)=17--10 --%Gravel=4.4-- --%Sand=18.7-- --%Silt=48.3-- --%Clay=28.6-- --A-6 (9)--	5		1			26				35		13	0 0 2	0.41 B		27
	566.2	Soft to medium stiff, gray CLAY to SILTY CLAY, trace gravel --L <sub>L</sub> (%)=34, P <sub>L</sub> (%)=17-- --%Gravel=4.2-- --%Sand=13.9-- --%Silt=49.8-- --%Clay=32.1-- --A-6 (13)--	15		2		0.33 B	24				40		14	0 2 5	0.57 B		18
		--L <sub>L</sub> (%)=32, P <sub>L</sub> (%)=17-- --%Gravel=2.9-- --%Sand=14.3-- --%Silt=50.9-- --%Clay=31.9-- --A-6 (11)--	20							538.5	Hard, gray SILTY CLAY, trace gravel	45		15	7 12 17	5.44 B		19
			25									50		16	8 12 20	5.40 B		15

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **07-23-2013** Complete Drilling **07-24-2013**  
 Drilling Contractor **Wang Testing Services** Drill Rig **D-50 TMR**  
 Driller **R&N** Logger **A. Happel** Checked by **C. Marin**  
 Drilling Method **2.25" SSA to 10', mud rotary thereafter, boring**  
**backfilled upon completion**

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

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

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# BORING LOG 1705-B-05A

WEI Job No.: 1100-04-01

Client: **AECOM**  
 Project: **Circle Interchange Reconstruction**  
 Location: **Section 17, T39N, R14E of 3rd PM**

Datum: NAVD 88  
 Elevation: 580.24 ft  
 North: 1897604.27 ft  
 East: 1171792.75 ft  
 Station: 1825+76.08  
 Offset: 3.9157 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	503.5									503.5	Very dense, gray SILTY LOAM, trace gravel						
			55	X	17	7 15 20	5.74 B	17				80	X	22	50/6	NP	20
	523.5	Stiff, gray CLAY --L <sub>L</sub> (%)=53, P <sub>L</sub> (%)=21-- --%Gravel=0.5-- --%Sand=2.9-- --%Silt=34.0-- --%Clay=62.6--60 --A-7-6 (34)--		X	18	5 5 5	1.15 B	34		497.2	--AUGER REFUSAL-- Boring terminated at 83.00 ft						
	518.5	Medium dense, gray SANDY LOAM		X	19	8 10 13	NP	25				90					
	513.5	Very stiff to hard, gray SILTY CLAY LOAM, trace gravel		X	20	10 48 50/4	2.46 S	12				95					
			75	X	21	21 30 31	6.81 B	13				100					

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **07-23-2013** Complete Drilling **07-24-2013**  
 Drilling Contractor **Wang Testing Services** Drill Rig **D-50 TMR**  
 Driller **R&N** Logger **A. Happel** Checked by **C. Marin**  
 Drilling Method **2.25" SSA to 10', mud rotary thereafter, boring backfilled upon completion**

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

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

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# BORING LOG 1705-B-06A

WEI Job No.: 1100-04-01

Client: **AECOM**  
 Project: **Circle Interchange Reconstruction**  
 Location: **Section 17, T39N, R14E of 3rd PM**

Datum: NAVD 88  
 Elevation: 591.98 ft  
 North: 1897749.88 ft  
 East: 1171805.18 ft  
 Station: 1827+13.77  
 Offset: 38.2558 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	
	591.56	6-inch thick, black SILTY LOAM --TOPSOIL-- Medium dense to dense, brown LOAM, little gravel and brick fragments --FILL--			1	9 17 13	NP	6						11	0 0 3	0.25 B	28	
			5		2	2 15 9	NP	14				30		12	0 1 2	0.57 B	23	
	586.5	Very stiff, gray SILTY CLAY LOAM, trace gravel			3	2 3 4	2.95 B	17										
			10		4	2 4 4	2.54 B	22				35		13	0 1 2	0.50 P	21	
	581.5	Very soft to medium stiff, gray CLAY to SILTY CLAY, trace gravel			5	3 3 3	< 0.25 P	21										
			15		6	0 2 2	0.41 B	24				40		14	0 3 2	0.49 B	24	
					7	0 1 1	0.25 B	22										
			20		8	0 0 2	0.41 B	26				45		15	0 2 2	0.41 B	25	
					9	0 0 1	0.08 B	26										
			25		10	0 0 2	0.25 B	26				50		16	1 1 2	0.33 B	25	

### GENERAL NOTES

Begin Drilling **07-25-2013** Complete Drilling **07-26-2013**  
 Drilling Contractor **Wang Testing Services** Drill Rig **CME-55 TMR**  
 Driller **R&J** Logger **A. Tomaras** Checked by **C. Marin**  
 Drilling Method **2.25" SSA to 10', mud rotary thereafter, boring backfilled upon completion**

### WATER LEVEL DATA

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

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

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# BORING LOG 1705-B-06A

WEI Job No.: 1100-04-01

Client: **AECOM**  
 Project: **Circle Interchange Reconstruction**  
 Location: **Section 17, T39N, R14E of 3rd PM**

Datum: NAVD 88  
 Elevation: 591.98 ft  
 North: 1897749.88 ft  
 East: 1171805.18 ft  
 Station: 1827+13.77  
 Offset: 38.2558 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	
	540.2	Very stiff to hard, gray SILTY CLAY, trace gravel	55	X	17	6 7 13	3.36 B	19		515.2	Hard, gray SILTY CLAY, trace gravel	80	X	22	13 20 28	8.94 S	13	
	60		X	18	13 18 21	4.84 B	14		510.2	Very dense to hard, gray SILTY LOAM to SILTY CLAY LOAM, trace gravel		85	X	23	33 46 50/6	> 4.50 P	10	
	65		X	19	10 12 19	4.92 B	18		90		X	24	13 20 26	8.61 S	11			
	525.2	Very stiff, gray CLAY, trace gravel  --L <sub>L</sub> (%)=41, P <sub>L</sub> (%)=18-- --%Gravel=0.1-- --%Sand=3.0--70 --%Silt=46.6-- --%Clay=50.3-- --A-7-6 (23)--	70	X	20	6 9 10	2.54 B	24			499.0	Very dense, SANDY GRAVEL, with rock fragments	95	X	25	21 24 29	NP	11
	518.2		Loose, gray SILT --Wet--	75	X	21	2 4 5	NP	19									

### GENERAL NOTES

Begin Drilling **07-25-2013** Complete Drilling **07-26-2013**  
 Drilling Contractor **Wang Testing Services** Drill Rig **CME-55 TMR**  
 Driller **R&J** Logger **A. Tomaras** Checked by **C. Marin**  
 Drilling Method **2.25" SSA to 10', mud rotary thereafter, boring backfilled upon completion**

### WATER LEVEL DATA

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

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

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# BORING LOG 1705-B-06A

WEI Job No.: 1100-04-01

Client: **AECOM**  
 Project: **Circle Interchange Reconstruction**  
 Location: **Section 17, T39N, R14E of 3rd PM**

Datum: NAVD 88  
 Elevation: 591.98 ft  
 North: 1897749.88 ft  
 East: 1171805.18 ft  
 Station: 1827+13.77  
 Offset: 38.2558 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	490.0	Strong, fair to good rock quality, light gray, fresh, joint breaks with little to no infill, slightly vuggy DOLOSTONE with stylolites  --Run 1 - RECOVERY=100%-- --RQD (top 5ft)=45%-- --RQD= (10ft)=62%--		⊗	26	60/6	NP	17									
	480.0					1		NP									
	480.0	Boring terminated at 112.00 ft															

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **07-25-2013** Complete Drilling **07-26-2013**  
 Drilling Contractor **Wang Testing Services** Drill Rig **CME-55 TMR**  
 Driller **R&J** Logger **A. Tomaras** Checked by **C. Marin**  
 Drilling Method **2.25" SSA to 10', mud rotary thereafter, boring backfilled upon completion**

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


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0 3 6 9 12 inches

Boring 1705-B-06A:  
 Run #1, 102.0' to 112.0', RECOVERY = 100% , RQD (Top 5ft)=45%, RQD (10ft)=62%

BEDROCK CORE: CIRCLE INTERCHANGE RECONSTRUCTION CHICAGO, IL		
SCALE : GRAPHIC	1705-B-06A	DRAWN BY: M. de los Reyes CHECKED BY: C. Marin
		1145 N. Main Street Lombard, IL 60148 www.wangeng.com
		FOR AECOM





# BORING LOG 1710-B-03

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WEI Job No.: 1100-04-01

Client **AECOM**  
 Project **Circle Interchange Reconstruction**  
 Location **Section 17, T39N, R14E of 3rd PM**

Datum: NAVD 88  
 Elevation: 587.04 ft  
 North: 1897891.66 ft  
 East: 1171988.13 ft  
 Station: 1706+38.71  
 Offset: 29.9313 LT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	586.82	2.5-inch thick ASPHALT over															
	586.09	0.5-inch thick CONCRETE															
		--PAVEMENT--															
		Medium dense, white CRUSHED STONE aggregate			1	6 5 7	NP	17						11	0 2 1	0.16 B	25
	584.0	--FILL--															
		Very stiff, gray SILTY CLAY LOAM, trace gravel			2	3 3 4	3.61 B	19				30		12	0 1 1	0.16 B	27
	581.5	--L <sub>L</sub> (%)=32, P <sub>L</sub> (%)=19--			5												
		--%Gravel=2.0--															
		--%Sand=16.6--															
		--%Silt=52.1--															
		--%Clay=29.3--															
		--A-6(10)--															
		Very soft to medium stiff, gray CLAY to SILTY CLAY LOAM, trace gravel			3	2 2 2	0.82 B	20									
					4	2 2 1	0.33 B	24						13	0 2 2	0.08 B	26
					5	0 1 1	0.25 B	28									
					6	0 0 1	0.16 B	25						14	2 1 3	0.25 B	25
		--L <sub>L</sub> (%)=33, P <sub>L</sub> (%)=18--															
		--%Gravel=3.1--															
		--%Sand=17.5--															
		--%Silt=50.4--															
		--%Clay=29.0--															
		--A-6(11)--															
					7	0 0 2	0.08 B	26									
					8	0 1 2	0.16 B	27						15	2 1 2	0.25 B	27
					9	0 0 2	0.33 B	26									
					10	0 2 1	0.33 B	26						16	4 3 6	1.15 B	22
										540.3	Stiff to very stiff, gray CLAY to SILTY CLAY, trace gravel						

### GENERAL NOTES

Begin Drilling **10-14-2013** Complete Drilling **10-14-2013**  
 Drilling Contractor **Wang Testing Services** Drill Rig **CME-55 TMR**  
 Driller **R&J** Logger **A. Tomaras** Checked by **L. lordache**  
 Drilling Method **2.25" SSA to 10', mud rotary thereafter, boring**  
**backfilled upon completion**

### WATER LEVEL DATA

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

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

WANGENGINC 11000401.GPJ WANGENG.GDT 5/6/14



# BORING LOG 1710-B-03

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WEI Job No.: 1100-04-01

Client: **AECOM**  
 Project: **Circle Interchange Reconstruction**  
 Location: **Section 17, T39N, R14E of 3rd PM**

Datum: NAVD 88  
 Elevation: 587.04 ft  
 North: 1897891.66 ft  
 East: 1171988.13 ft  
 Station: 1706+38.71  
 Offset: 29.9313 LT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
		--%Silt=47.9-- --%Clay=35.5-- --A-6(12)--															
	530.3	Hard, gray SILTY LOAM, trace gravel	55	X	17	5 7 10	3.12 B	16			--HARD DRILLING-- --Possible Cobbles--	80	X	22	50 50/3	4.50 P	9
			60	X	18	22 32 34	4.59 S	8			--L <sub>L</sub> (%)=23, P <sub>L</sub> (%)=15-- --%Gravel=5.2-- --%Sand=16.7--85 --%Silt=62.3-- --%Clay=15.7-- --A-4(4)--	80	X	23	25 30 32	9.59 S	11
			65	X	19	18 26 28	6.89 S	15		499.5	--HARD DRILLING-- Very dense, gray GRAVELLY SAND, trace cobbles	90	X	24	50 50/2	NP	12
		--L <sub>L</sub> (%)=20 P <sub>L</sub> (%)=16-- --%Gravel=1.6-- --%Sand=15.1--70 --%Silt=71.3-- --%Clay=11.9-- --A-4(1)--	70	X	20	19 25 32	3.53 S	11				95	X	25	50/3	NP	11
			75	X	21	15 18 26	7.79 S	13		489.5	Very dense, gray SILTY LOAM, little gravel	100	X	26	50/3	NP	11

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **10-14-2013** Complete Drilling **10-14-2013**  
 Drilling Contractor **Wang Testing Services** Drill Rig **CME-55 TMR**  
 Driller **R&J** Logger **A. Tomaras** Checked by **L. Iordache**  
 Drilling Method **2.25" SSA to 10', mud rotary thereafter, boring backfilled upon completion**

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

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



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# BORING LOG 1710-B-03

WEI Job No.: 1100-04-01

Client: **AECOM**  
 Project: **Circle Interchange Reconstruction**  
 Location: **Section 17, T39N, R14E of 3rd PM**

Datum: NAVD 88  
 Elevation: 587.04 ft  
 North: 1897891.66 ft  
 East: 1171988.13 ft  
 Station: 1706+38.71  
 Offset: 29.9313 LT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
		--HARD DRILLING-- --Possible Cobbles--															
	484.5	--WEATHERED BEDROCK-- --ROLLER BIT REFUSAL--															
	483.5	Boring terminated at 103.50 ft															
			105														
			110														
			115														
			120														
			125														

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **10-14-2013** Complete Drilling **10-14-2013**  
 Drilling Contractor **Wang Testing Services** Drill Rig **CME-55 TMR**  
 Driller **R&J** Logger **A. Tomaras** Checked by **L. lordache**  
 Drilling Method **2.25" SSA to 10', mud rotary thereafter, boring backfilled upon completion**

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

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





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# BORING LOG 1710-B-04

WEI Job No.: 1100-04-01

Client: **AECOM**  
 Project: **Circle Interchange Reconstruction**  
 Location: **Section 17, T39N, R14E of 3rd PM**

Datum: NAVD 88  
 Elevation: 588.53 ft  
 North: 1897833.15 ft  
 East: 1171993.09 ft  
 Station: 1706+11.06  
 Offset: 21.6348' RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	526.8									501.8							
		--L <sub>L</sub> (%)=36, P <sub>L</sub> (%)=18-- --%Gravel=1.4-- --%Sand=8.1--55 --%Silt=49.8-- --%Clay=40.7-- --A-6 (16)--	80	⊗	17	10 11 14	2.71 B	20				80	⊗	22	50/5	NP	14
		--L <sub>L</sub> (%)=35, P <sub>L</sub> (%)=18-- --%Gravel=2.7-- --%Sand=14.6--60 --%Silt=46.6-- --%Clay=36.1-- --A-6 (13)--	60	⊗	18	7 13 20	4.35 B	19				85	⊗	23	32 40 28/3	9.84 S	11
		Hard, gray SILT to SILTY LOAM, trace gravel	65	⊗	19	14 19 25	5.90 S	11				90	⊗	24	50/3	NP	9
		--L <sub>L</sub> (%)=21, P <sub>L</sub> (%)=19-- --%Gravel=1.7-- --%Sand=10.5--70 --%Silt=80.1-- --%Clay=7.6-- --A-4 (0)--	70	⊗	20	19 26 33	8.33 N/6					95	⊗	25	50/3	NP	9
			75	⊗	21	16 32 42	8.20 S	13				100	⊗	26	50/5	NP	9

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **02-19-2014** Complete Drilling **02-21-2014**  
 Drilling Contractor **Wang Testing Services** Drill Rig **CME-55 TMR**  
 Driller **R&N** Logger **D. Kolpacki** Checked by **C. Marin**  
 Drilling Method **2.25" SSA to 10', mud rotary thereafter, boring**  
**backfilled upon completion**

While Drilling **3.50 ft**  
 At Completion of Drilling **90.00 ft**  
 Time After Drilling **NA**  
 Depth to Water **NA**

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



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# BORING LOG 1710-B-04

WEI Job No.: 1100-04-01

Client: **AECOM**  
 Project: **Circle Interchange Reconstruction**  
 Location: **Section 17, T39N, R14E of 3rd PM**

Datum: NAVD 88  
 Elevation: 588.53 ft  
 North: 1897833.15 ft  
 East: 1171993.09 ft  
 Station: 1706+11.06  
 Offset: 21.6348' RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	485.5	Strong, light gray and white, fair rock mass quality, bedded, moderately vuggy porosity, fresh DOLOSTONE, up to 11-inch beds, 6-inch spaced joints, horizontal joints with 0.05 to more than 0.2-inch infilling, hard joint wall, with greenish gray argillaceous infill, and silolitic surfaces.  --Run 1 - RECOVERY=93%-- --RQD=55%--	105	1													
	475.5		110														
	475.5	Boring terminated at 113.00 ft	115														
			120														
			125														

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **02-19-2014** Complete Drilling **02-21-2014**  
 Drilling Contractor **Wang Testing Services** Drill Rig **CME-55 TMR**  
 Driller **R&N** Logger **D. Kolpacki** Checked by **C. Marin**  
 Drilling Method **2.25" SSA to 10', mud rotary thereafter, boring backfilled upon completion**

While Drilling  $\nabla$  **3.50 ft**  
 At Completion of Drilling  $\blacktriangledown$  **90.00 ft**  
 Time After Drilling **NA**  
 Depth to Water  $\nabla$  **NA**

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



Run #1

TOP

103'

1710-B-04

1100-04-01


2-21-2014

Run 1  
Bottom  
113' →

BOTTOM



Boring 1710-B-04:  
Run 1, 103' to 113', RECOVERY = 93%, RQD = 55%

BEDROCK CORE: CIRCLE INTERCHANGE RECONSTRUCTION STRUCTURE SN 016-1710, CHICAGO, IL		
SCALE: GRAPHIC	1710-B-04	DRAWN BY: M. de los Reyes CHECKED BY: C. Marin
		1145 N. Main Street Lombard, IL 60148 www.wangeng.com
FOR AECOM		1100-04-01



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# BORING LOG 21-RWB-02

WEI Job No.: 1100-04-01

Client: **AECOM**  
 Project: **Circle Interchange Reconstruction**  
 Location: **Section 17, T39N, R14E of 3rd PM**

Datum: NAVD 88  
 Elevation: 596.95 ft  
 North: 1897705.23 ft  
 East: 1171851.95 ft  
 Station: 1611+67.44  
 Offset: 53.9743 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	596.0	12-inch thick, brown LOAM, trace gravel															
		--TOPSOIL--															
		Hard, gray CLAY LOAM, trace gravel			1	13 11 11	7.79 S	16						11	0 0 0	0.16 B	25
		--FILL--															
			5		2	5 9 11	5.33 S	13				30		12	0 0 0	0.25 B	25
	591.5	Stiff to medium stiff, gray and brown, SILTY CLAY, trace gravel, slag, brick and wood															
		--FILL--															
			10		4	2 3 4	1.15 B	19				35		13	0 0 0	< 0.25 P	26
					5	3 5 5	0.98 B	21									
	584.0	Very stiff, brown and gray SILTY CLAY, trace gravel															
			15		6	3 5 7	3.53 B	25				40		14	0 1 3	0.49 B	25
	581.5	Very soft to medium stiff, gray CLAY to SILTY CLAY, trace gravel															
			20		8	1 1 2	< 0.25 P	29				45		15	2 2 2	0.25 P	25
					9	1 1 1	< 0.25 P	25									
			25		10	0 0 0	0.16 B	22				50		16	1 2 3	< 0.25 P	25

### GENERAL NOTES

Begin Drilling **09-25-2013** Complete Drilling **09-30-2013**  
 Drilling Contractor **Wang Testing Services** Drill Rig **CME-55 TMR**  
 Driller **R&J** Logger **A. Tomaras** Checked by **L. lordache**  
 Drilling Method **2.25" HSA, boring backfilled upon completion**

### WATER LEVEL DATA

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

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

WANGENGINC 11000401.GPJ WANGENG.GDT 5/6/14





# BORING LOG 21-RWB-02

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WEI Job No.: 1100-04-01

Client: **AECOM**  
 Project: **Circle Interchange Reconstruction**  
 Location: **Section 17, T39N, R14E of 3rd PM**

Datum: NAVD 88  
 Elevation: 596.95 ft  
 North: 1897705.23 ft  
 East: 1171851.95 ft  
 Station: 1611+67.44  
 Offset: 53.9743 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	540.2	Stiff to hard, gray SILTY CLAY LOAM, trace gravel	55	X	17	1 3 3	0.66 B	21		515.2	Very dense, gray SILTY LOAM, little to some gravel and cobbles	80	X	22	6 8 10	3.00 N/6	19
	60		X	18	15 17 21	4.50 P	15		85	X		23	13 31 41	NP	14		
	65		O	19	11 10 16	4.33 N/6			90	X		24	18 35 48	9.35 S	10		
	70		X	20	10 12 19	4.76 B	19		95	X		25	20 36 50/4	9.10 S	13		
	75		X	21	6 10 12	1.80 B	24		100	O		26	50/5	NR			
										<p>--HARD DRILLING--          --Possible Cobbles--</p>							

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **09-25-2013** Complete Drilling **09-30-2013**  
 Drilling Contractor **Wang Testing Services** Drill Rig **CME-55 TMR**  
 Driller **R&J** Logger **A. Tomaras** Checked by **L. lordache**  
 Drilling Method **2.25" HSA, boring backfilled upon completion**

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

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# BORING LOG 21-RWB-02

WEI Job No.: 1100-04-01

Client: **AECOM**  
 Project: **Circle Interchange Reconstruction**  
 Location: **Section 17, T39N, R14E of 3rd PM**

Datum: NAVD 88  
 Elevation: 596.95 ft  
 North: 1897705.23 ft  
 East: 1171851.95 ft  
 Station: 1611+67.44  
 Offset: 53.9743 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
		--HARD DRILLING-- --Possible Cobbles--															
					27	50/4	NP	11									
		--HARD DRILLING-- --Possible Cobbles--	105														
	490.0	--ROLLER BIT REFUSAL-- Boring terminated at 107.00 ft															
			110														
			115														
			120														
			125														

### GENERAL NOTES

Begin Drilling **09-25-2013** Complete Drilling **09-30-2013**  
 Drilling Contractor **Wang Testing Services** Drill Rig **CME-55 TMR**  
 Driller **R&J** Logger **A. Tomaras** Checked by **L. lordache**  
 Drilling Method **2.25" HSA, boring backfilled upon completion**

### WATER LEVEL DATA

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

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



# BORING LOG 21-RWB-03

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WEI Job No.: 1100-04-01

Client: **AECOM**  
 Project: **Circle Interchange Reconstruction**  
 Location: **Section 17, T39N, R14E of 3rd PM**

Datum: NAVD 88  
 Elevation: 591.97 ft  
 North: 1897787.89 ft  
 East: 1171858.64 ft  
 Station: 1612+32.77  
 Offset: 11.8407 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
		Very stiff to hard, brown CLAY LOAM, trace brick fragments --FILL--			1	3 4 8	3.50 P	11									
			5		2	5 5 7	3.12 B	14				30		11	0 1 2	0.45 B	26
		--3-inch thick, red, crushed Brick--			3	13 8 6	NP	19						12	2 2 2	< 0.25 P	25
			10		4	5 5 7	6.56 B	15				35		13	1 2 2	0.57 B	24
	581.5				5	2 3 4	1.97 B	23									
	579.0	Stiff, gray SILTY CLAY, trace gravel			6	2 1 3	0.57 B	25				40		14	2 3 3	0.49 B	25
		Very soft to medium stiff, gray CLAY, trace gravel			7	2 1 2	0.49 B	25									
			20		8	2 2 2	< 0.25 P	28				45		15	2 3 3	< 0.25 P	27
					9	0 0 0	0.33 B	23									
			25		10	0 0 2	0.25 B	26				50		16	0 2 2	0.41 B	28

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **09-23-2013** Complete Drilling **09-23-2013**  
 Drilling Contractor **Wang Testing Services** Drill Rig **CME-55 TMR**  
 Driller **R&J** Logger **A. Tomaras** Checked by **L. lordache**  
 Drilling Method **3.25" HSA, boring backfilled upon completion**

While Drilling  **MUD**  
 At Completion of Drilling  **NA**  
 Time After Drilling **NA**  
 Depth to Water  **NA**

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

WANGENGINC 11000401.GPJ WANGENG.GDT 5/6/14



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WEI Job No.: 1100-04-01

Client: **AECOM**  
 Project: **Circle Interchange Reconstruction**  
 Location: **Section 17, T39N, R14E of 3rd PM**

Datum: NAVD 88  
 Elevation: 591.97 ft  
 North: 1897787.89 ft  
 East: 1171858.64 ft  
 Station: 1612+32.77  
 Offset: 11.8407 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	540.2	Very stiff to hard, SILTY CLAY to SILTY CLAY LOAM, trace gravel								515.2	Hard, gray SILTY CLAY LOAM, trace gravel						
	55		17	4 5 8	1.48 B	22			80	22		19 20 28	8.61 S	14			
	60		18	14 12 15	3.00 P	16			85	23		31 32 50/5	NP	15			
	65		19	15 17 24	4.10 B	27			90	24	23 33 29	6.81 S	21				
	70		20	16 17 20	8.53 B	12			95	25	66/6 44/3	NP	15				
	520.2	Dense, gray SILT								505.2	Very dense, gray SILTY LOAM, trace gravel						
	75	21	20 26 23	NP	21			100	26	30 70/6		NP	6				
										495.2	--HARD DRILLING-- Very dense, brown SANDY GRAVEL						

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **09-23-2013** Complete Drilling **09-23-2013**  
 Drilling Contractor **Wang Testing Services** Drill Rig **CME-55 TMR**  
 Driller **R&J** Logger **A. Tomaras** Checked by **L. lordache**  
 Drilling Method **3.25" HSA, boring backfilled upon completion**

While Drilling  **MUD**  
 At Completion of Drilling  **NA**  
 Time After Drilling **NA**  
 Depth to Water  **NA**

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

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# BORING LOG 21-RWB-03

WEI Job No.: 1100-04-01

Client: **AECOM**  
 Project: **Circle Interchange Reconstruction**  
 Location: **Section 17, T39N, R14E of 3rd PM**

Datum: NAVD 88  
 Elevation: 591.97 ft  
 North: 1897787.89 ft  
 East: 1171858.64 ft  
 Station: 1612+32.77  
 Offset: 11.8407 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	490.2	Very dense, weathered DOLOSTONE fragments --WEATHERED BEDROCK--															
	487.5	--ROLLER BIT REFUSAL--			27	50/1	NP										
		Boring terminated at 104.50 ft	105														
			110														
			115														
			120														
			125														

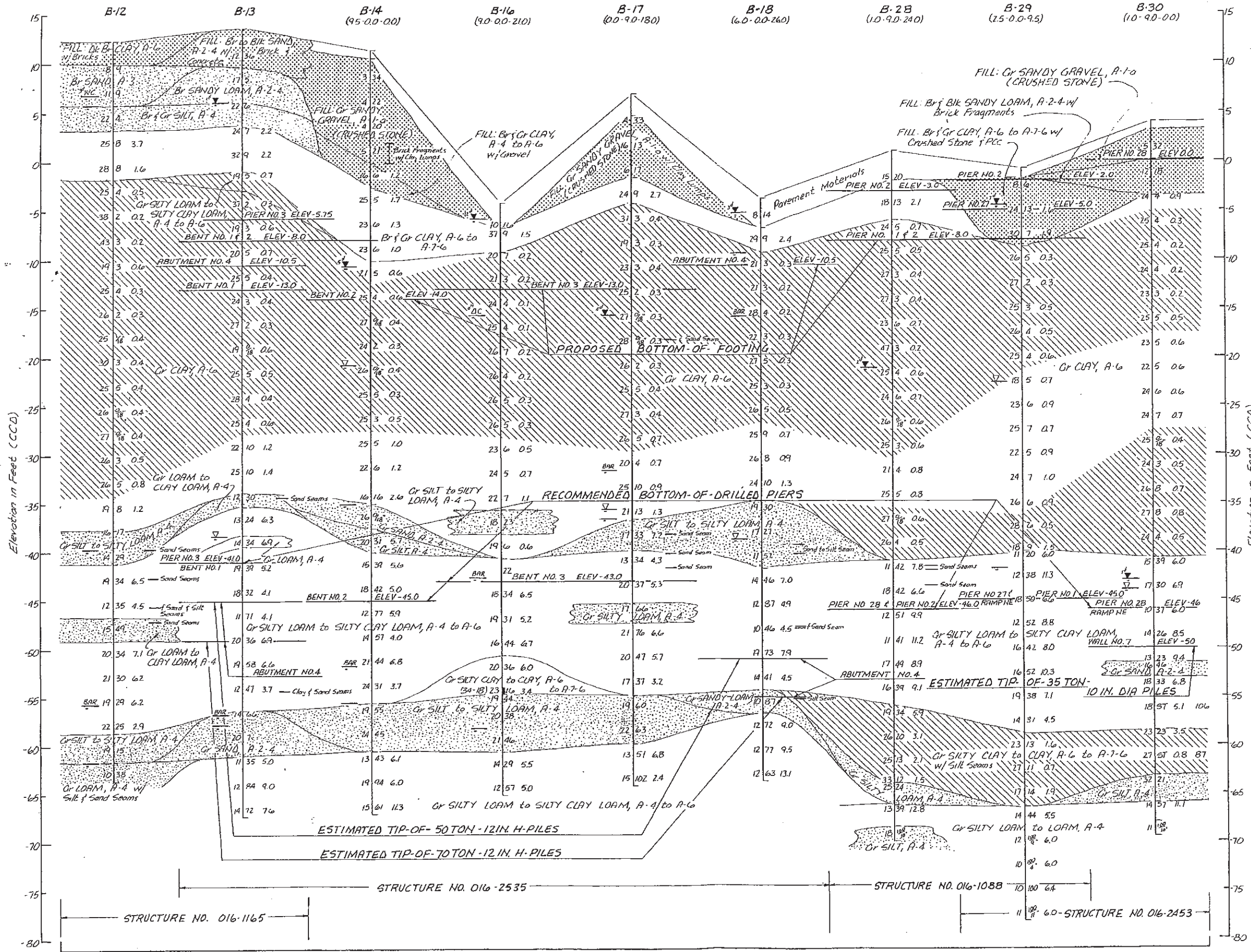
### GENERAL NOTES

Begin Drilling **09-23-2013** Complete Drilling **09-23-2013**  
 Drilling Contractor **Wang Testing Services** Drill Rig **CME-55 TMR**  
 Driller **R&J** Logger **A. Tomaras** Checked by **L. lordache**  
 Drilling Method **3.25" HSA, boring backfilled upon completion**

### WATER LEVEL DATA

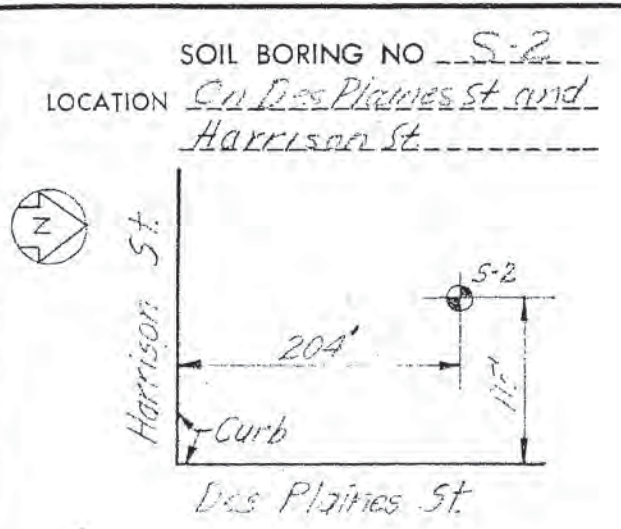
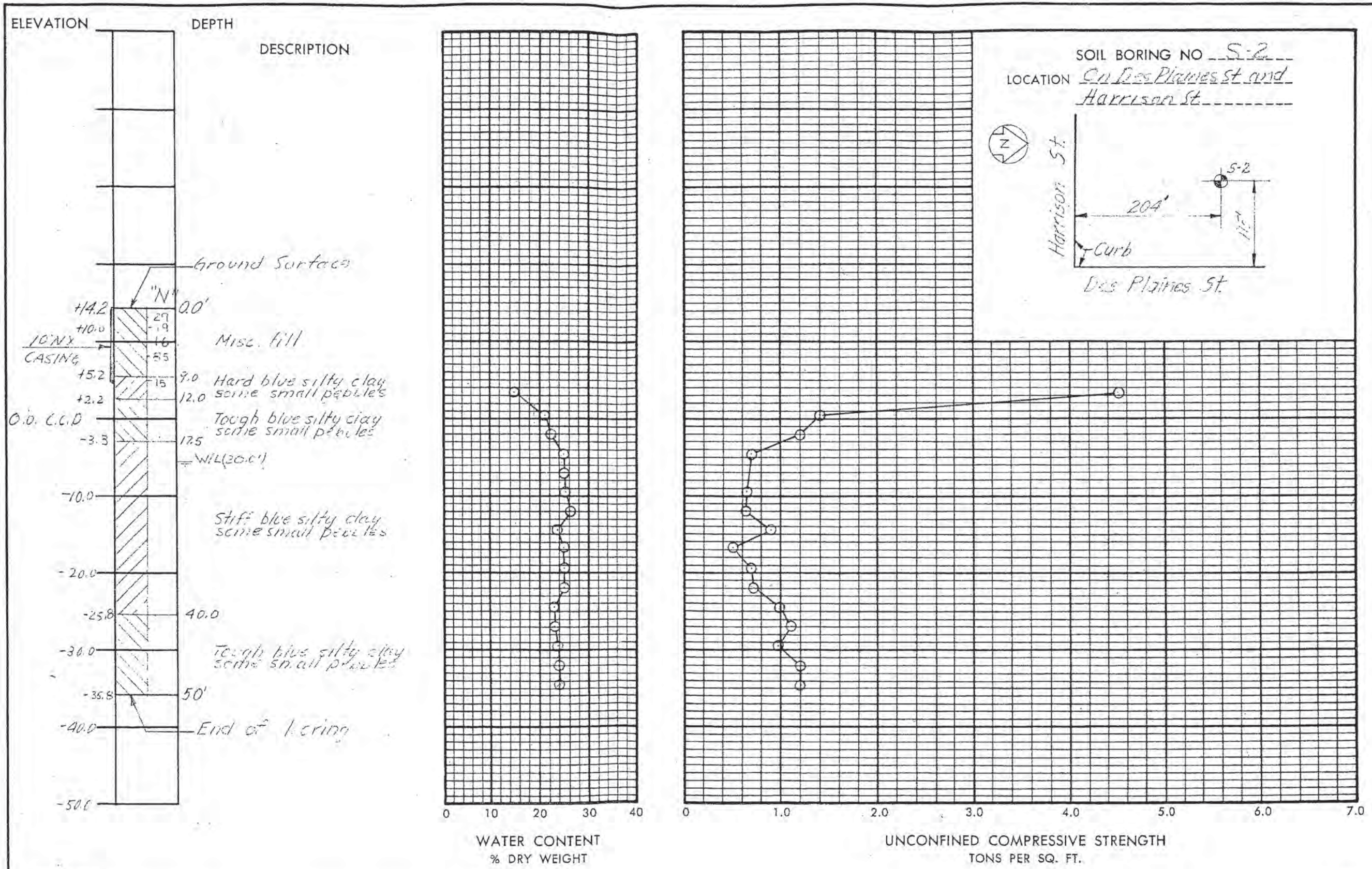
While Drilling  $\nabla$  **MUD**  
 At Completion of Drilling  $\blacktriangledown$  **NA**  
 Time After Drilling **NA**  
 Depth to Water  $\nabla$  **NA**

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



PROJECT BORING LOGS

<b>CLAUDE H. HURLEY COMPANY</b> Consulting Soil and Foundation Engineers	
<b>I-94 IMPROVEMENTS</b> DAN RYAN EXPRESSWAY STATE JOB NO. P-91-206-79 Chicago, Illinois	
SCALE: As Shown DATE: 1-28-85 PROJECT NUMBER: 2-47-02	DRAWN BY: WRS APPROVED BY: CHH FINDER NUMBER: 9



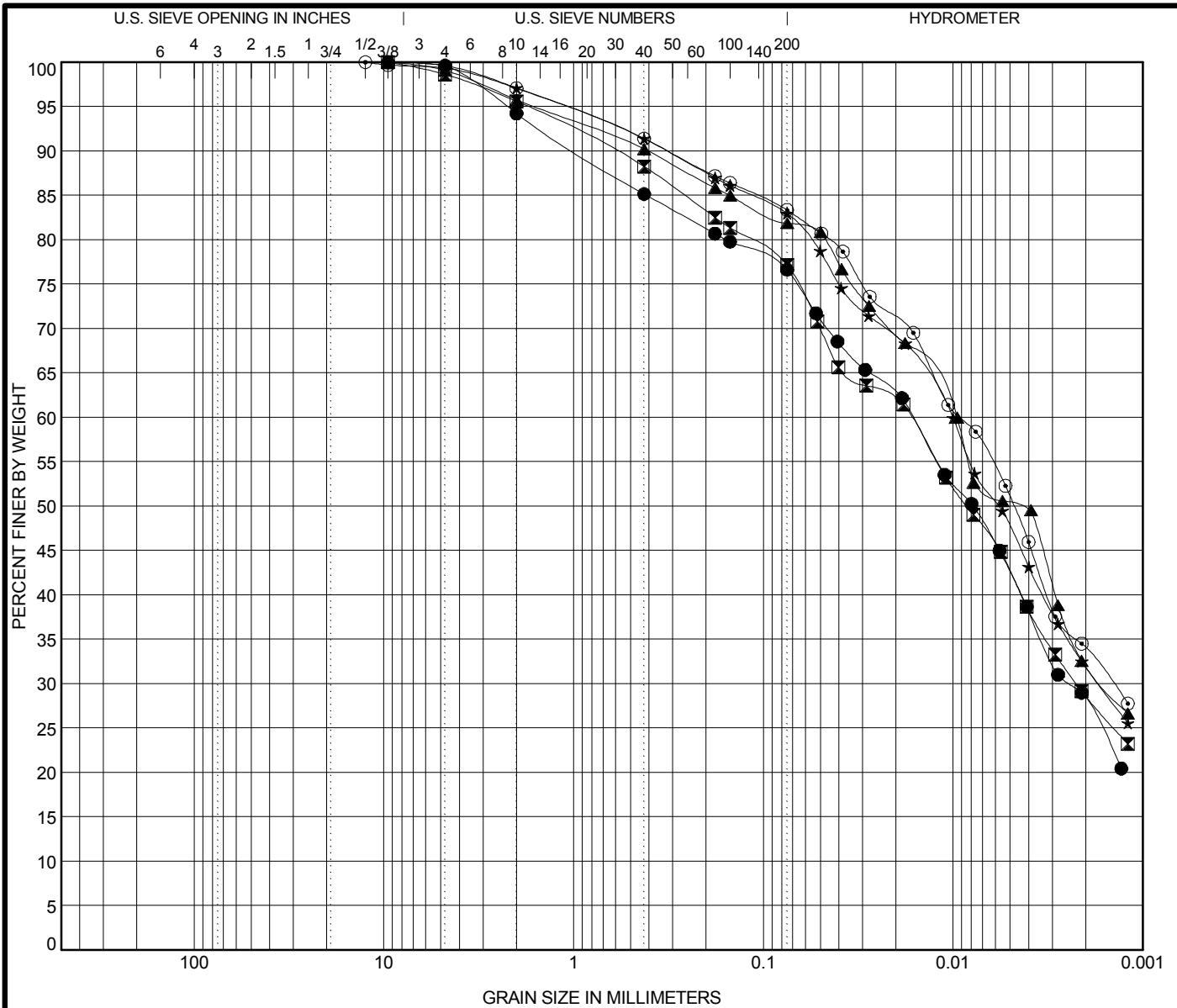
REMARKS  
 W<sub>1/2</sub> - Water level 20.0' 24hr after casing removal.  
 Boring by Soil Testing Service Inc.  
 "N" - Number of Blows of 140 Lb. Hammer Falling 30 Inches  
 Test by Bureau of Engineering

CITY OF CHICAGO  
 DEPARTMENT OF PUBLIC WORKS  
 BUREAU OF ENGINEERING  
 SOUTH ROUTE - MAXWELL TO LEXINGTON  
 SOIL BORING LOG

SECTION 5-2526.6      SEPT-1958

## **APPENDIX B**





COBBLES	GRAVEL	SAND		SILT AND CLAY
		coarse	fine	

Specimen Identification		IDH Classification				LL	PL	PI	Cc	Cu
●	1705-B-05#7 16.0 ft	<b>Silty Clay Loam</b>				<b>35</b>	<b>15</b>	<b>20</b>		
■	1705-B-05A#1 10.0 ft	<b>Silty Clay Loam</b>				<b>31</b>	<b>17</b>	<b>14</b>		
▲	1705-B-05A#2 16.0 ft	<b>Silty Clay</b>				<b>34</b>	<b>17</b>	<b>17</b>		
★	1705-B-05A# 16.5 ft	<b>Silty Clay</b>				<b>32</b>	<b>17</b>	<b>15</b>		
⊙	1705-B-05A#3 25.0 ft	<b>Silty Clay</b>				<b>33</b>	<b>17</b>	<b>16</b>		
Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay	
●	1705-B-05#7 16.0 ft	<b>9.5</b>	<b>0.016</b>	<b>0.002</b>		<b>5.8</b>	<b>17.8</b>	<b>48.3</b>	<b>28.1</b>	
■	1705-B-05A#1 10.0 ft	<b>9.5</b>	<b>0.017</b>	<b>0.002</b>		<b>4.4</b>	<b>18.7</b>	<b>48.3</b>	<b>28.6</b>	
▲	1705-B-05A#2 16.0 ft	<b>9.5</b>	<b>0.01</b>	<b>0.002</b>		<b>4.2</b>	<b>13.9</b>	<b>49.8</b>	<b>32.1</b>	
★	1705-B-05A# 16.5 ft	<b>9.5</b>	<b>0.01</b>	<b>0.002</b>		<b>2.9</b>	<b>14.3</b>	<b>50.9</b>	<b>31.9</b>	
⊙	1705-B-05A#3 25.0 ft	<b>12.5</b>	<b>0.009</b>	<b>0.001</b>		<b>2.9</b>	<b>13.8</b>	<b>49.3</b>	<b>33.9</b>	

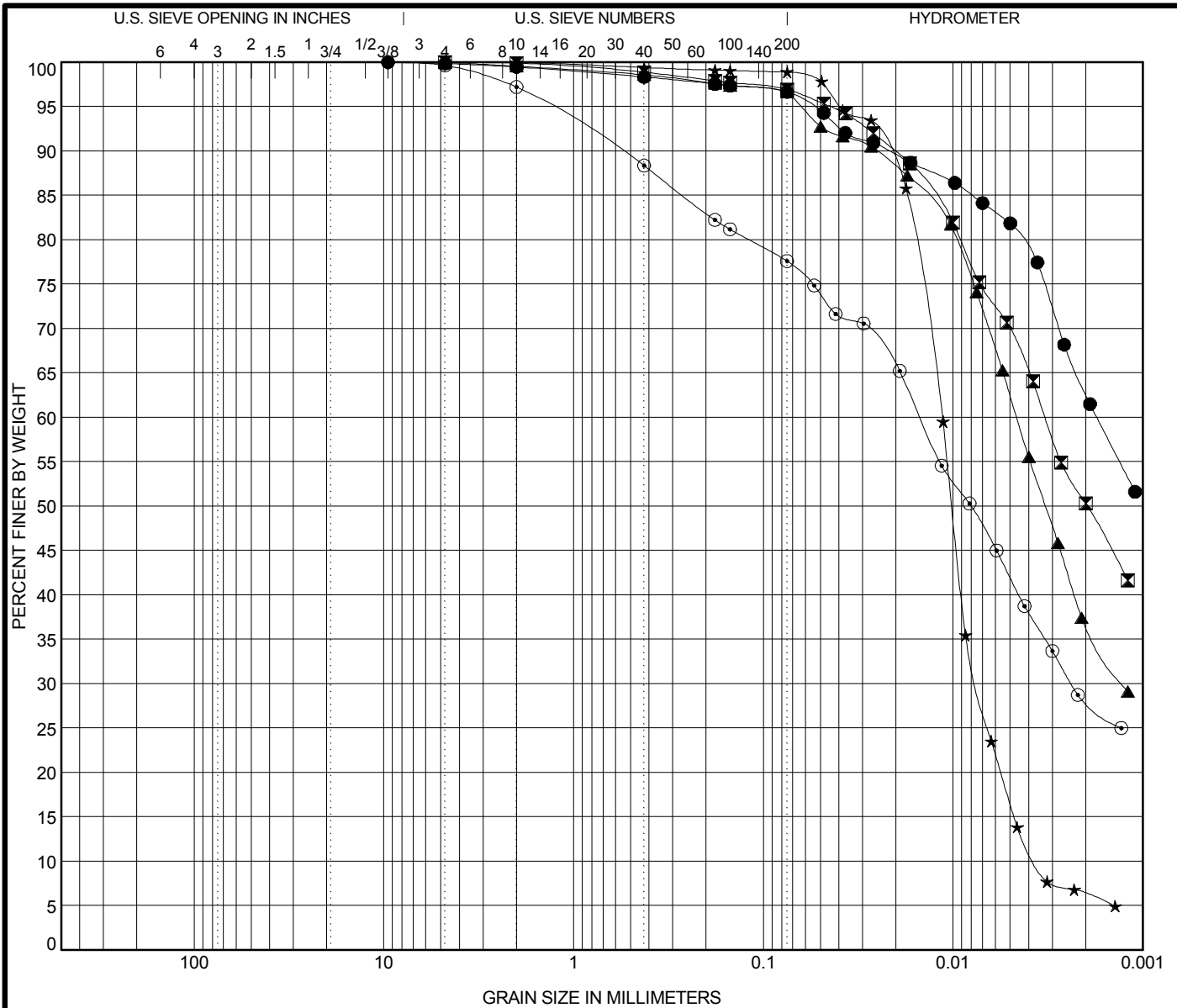
WEI GRAIN SIZE IDH 11000401.GPJ US LAB.GDT 5/6/14



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**GRAIN SIZE DISTRIBUTION**

Project: Circle Interchange Reconstruction  
 Location: Section 17, T39N, R14E of 3rd PM  
 Number: 1100-04-01



COBBLES	GRAVEL	SAND		SILT AND CLAY
		coarse	fine	

Specimen Identification			IDH Classification					LL	PL	PI	Cc	Cu
●	1705-B-05A#18	58.5 ft	Clay					53	21	32		
■	1705-B-06A#20	68.5 ft	Clay					41	18	23		
▲	1715-B-03#16	48.5 ft	Silty Clay					36	18	18		
★	1715-B-03#23	83.5 ft	Silt					NP	NP	NP	1.33	3.11
○	1715-B-04#18	58.5 ft	Silty Clay Loam					31	15	16		
Specimen Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay		
●	1705-B-05A#18	58.5 ft	9.5	0.002			0.5	2.9	34.0	62.6		
■	1705-B-06A#20	68.5 ft	4.75	0.003			0.1	3.0	46.6	50.3		
▲	1715-B-03#16	48.5 ft	4.75	0.005	0.001		0.5	3.1	59.8	36.7		
★	1715-B-03#23	83.5 ft	4.75	0.011	0.007	0.004	0.1	1.1	92.6	6.3		
○	1715-B-04#18	58.5 ft	9.5	0.015	0.002		2.8	19.7	49.4	28.0		

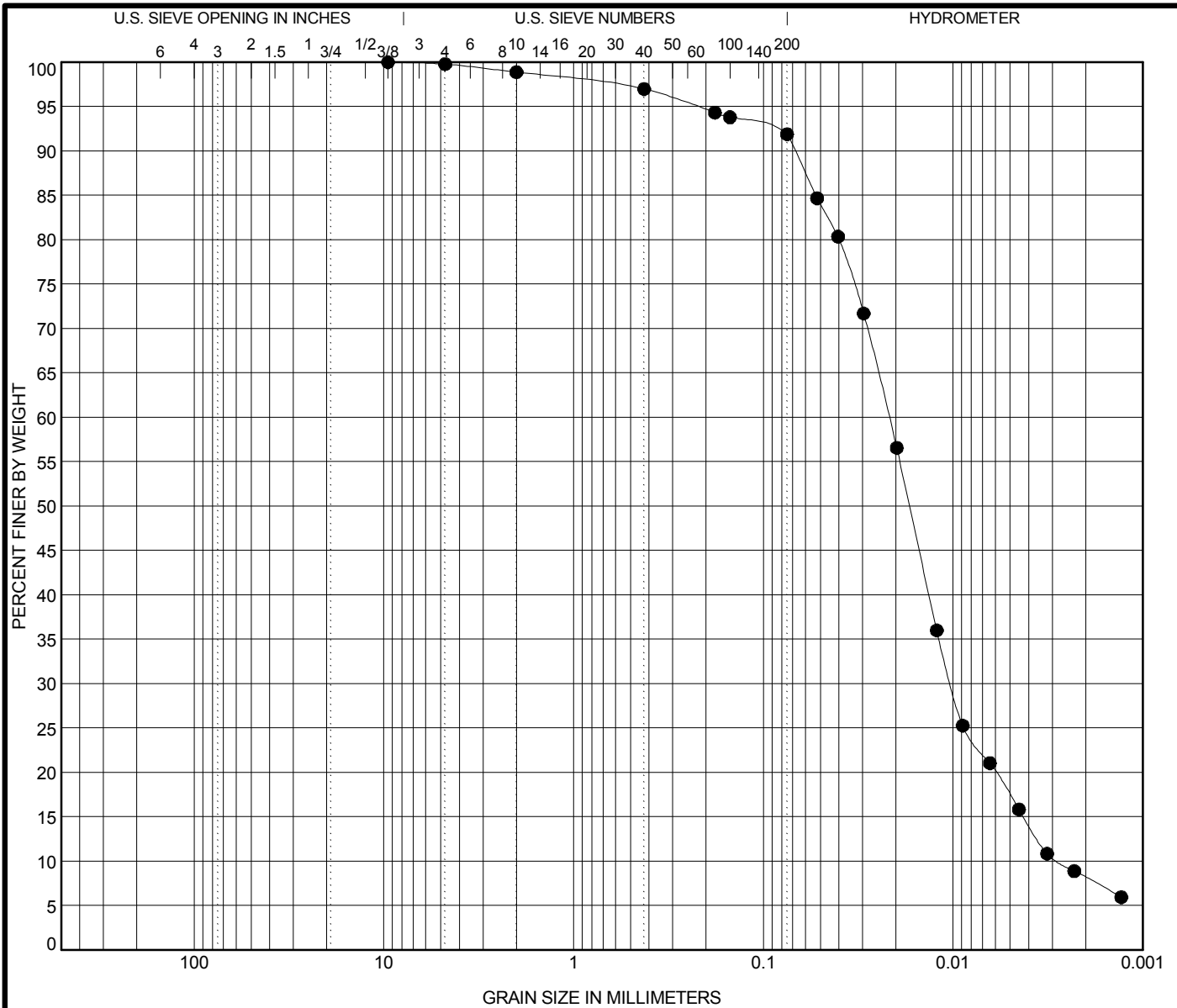
WEI GRAIN SIZE IDH 11000401.GPJ US LAB.GDT 5/6/14



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**GRAIN SIZE DISTRIBUTION**

Project: Circle Interchange Reconstruction  
 Location: Section 17, T39N, R14E of 3rd PM  
 Number: 1100-04-01



COBBLES	GRAVEL	SAND		SILT AND CLAY
		coarse	fine	

Specimen Identification		IDH Classification					LL	PL	PI	Cc	Cu
●	1715-B-04#23 83.5 ft	Silt					NP	NP	NP	1.74	7.82

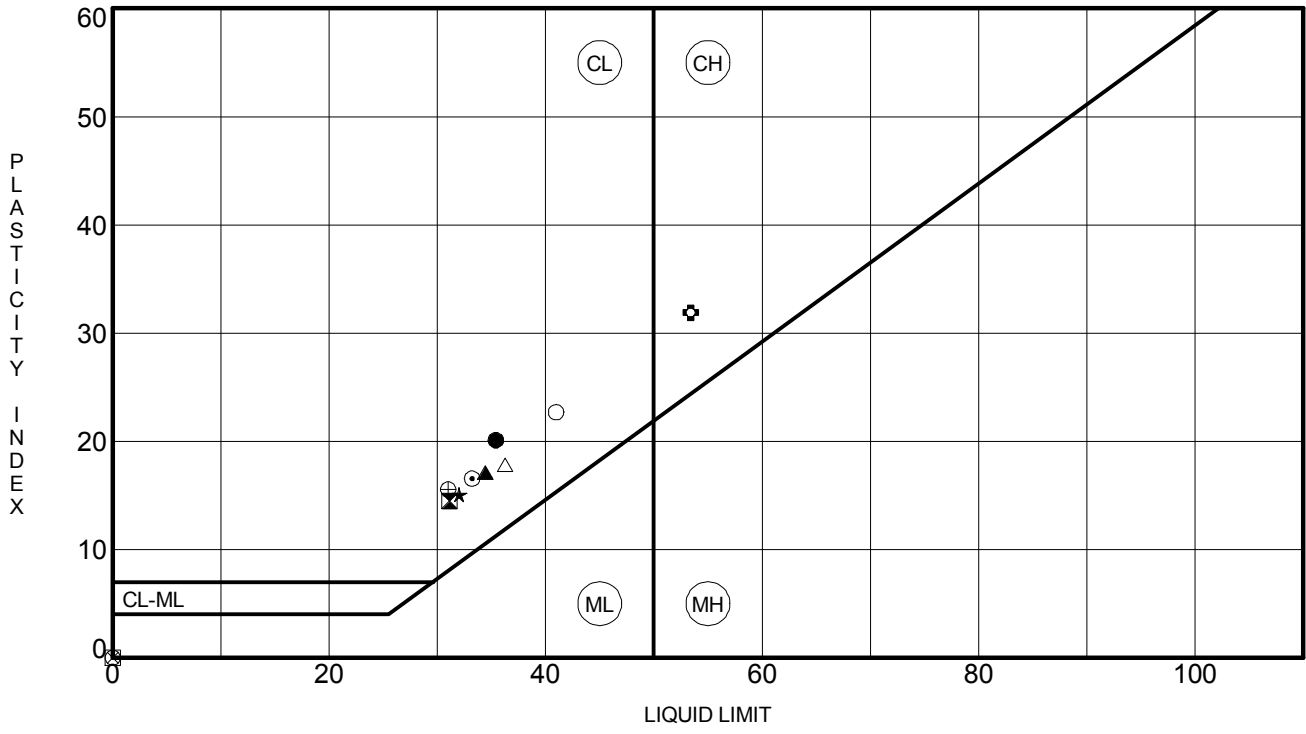
Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	1715-B-04#23 83.5 ft	9.5	0.022	0.01	0.003	1.1	7.3	83.5	8.2



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**GRAIN SIZE DISTRIBUTION**  
 Project: Circle Interchange Reconstruction  
 Location: Section 17, T39N, R14E of 3rd PM  
 Number: 1100-04-01

WEI GRAIN SIZE IDH 11000401.GPJ US LAB.GDT 5/6/14



	Specimen Identification	LL	PL	PI	Fines	IDH Classification	
●	1705-B-05#7	16.0 ft	35	15	20	77	Silty Clay Loam
⊠	1705-B-05A#1	10.0 ft	31	17	14	77	Silty Clay Loam
▲	1705-B-05A#2	16.0 ft	34	17	17	82	Silty Clay
★	1705-B-05A#	16.5 ft	32	17	15	83	Silty Clay
⊙	1705-B-05A#3	25.0 ft	33	17	16	83	Silty Clay
⊕	1705-B-05A#18	58.5 ft	53	21	32	97	Clay
○	1705-B-06A#20	68.5 ft	41	18	23	97	Clay
△	1715-B-03#16	48.5 ft	36	18	18	97	Silty Clay
⊗	1715-B-03#23	83.5 ft	NP	NP	NP	99	Silt
⊕	1715-B-04#18	58.5 ft	31	15	16	78	Silty Clay Loam
□	1715-B-04#23	83.5 ft	NP	NP	NP	92	Silt

WEI ATTERBERG LIMITS IDH 11000401.GPJ US LAB.GDT 5/6/14

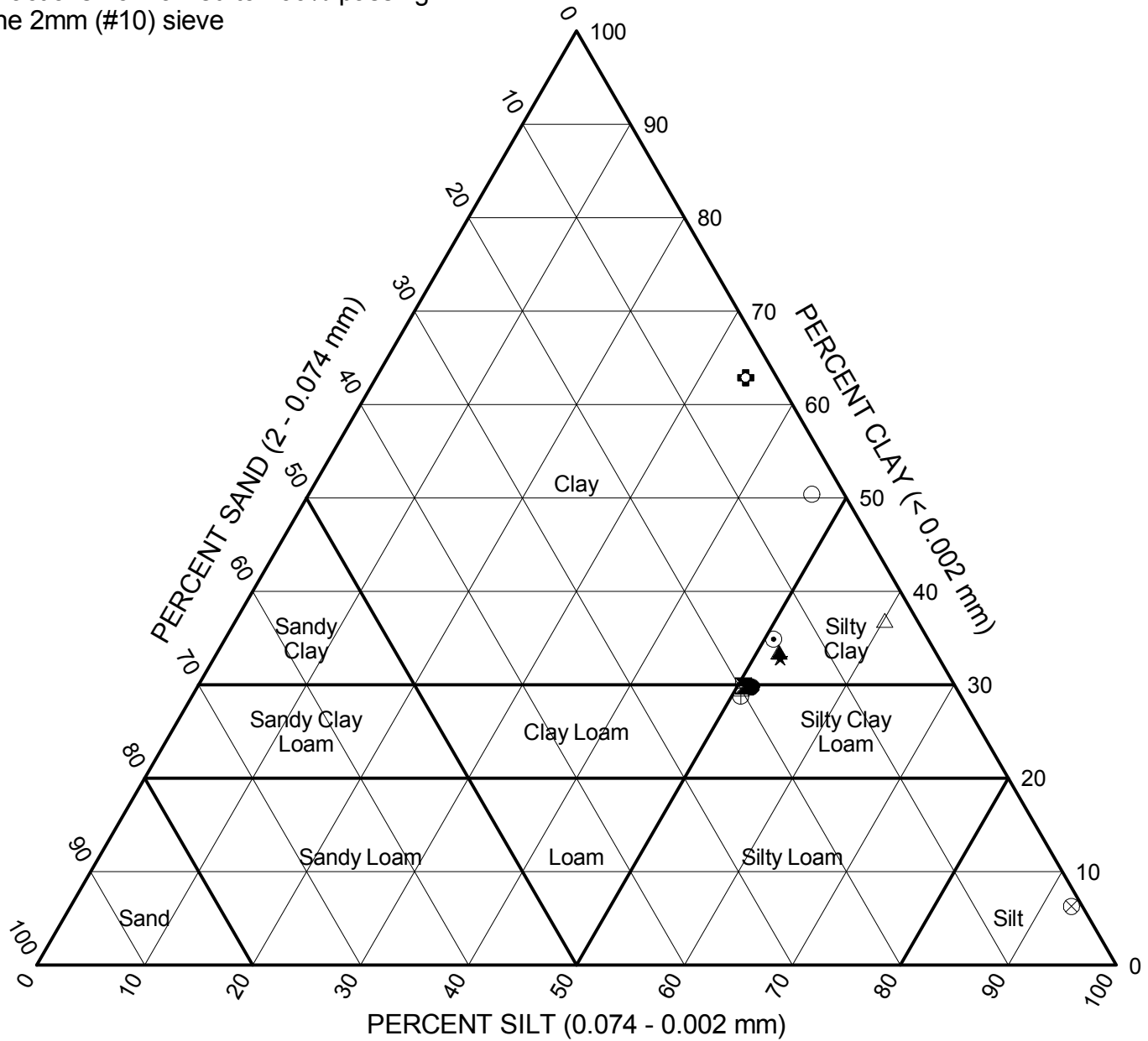


Wang Engineering  
 1145 N Main Street  
 Lombard, IL 60148  
 Telephone: 630 953-9928  
 Fax: 630 953-9938

**ATTERBERG LIMITS' RESULTS**

Project: Circle Interchange Reconstruction  
 Location: Section 17, T39N, R14E of 3rd PM  
 Number: 1100-04-01

Fractions normalized to 100% passing the 2mm (#10) sieve



Sample	Depth (ft)	Sand (%)	Silt (%)	Clay (%)	Classification		
					IL DOT	AASHTO	ASTM
● 1705-B-05#7	16.0	18.9	51.3	29.8	Silty Clay Loam	A-6 (14)	CL
⊠ 1705-B-05A#1	10.0	19.6	50.5	29.9	Silty Clay Loam	A-6 (9)	CL
▲ 1705-B-05A#2	16.0	14.5	52.0	33.5	Silty Clay	A-6 (13)	CL
★ 1705-B-05A#	16.5	14.7	52.4	32.9	Silty Clay	A-6 (11)	CL
⊙ 1705-B-05A#3	25.0	14.2	50.8	34.9	Silty Clay	A-6 (12)	CL
⊕ 1705-B-05A#18	58.5	2.9	34.2	62.9	Clay	A-7-6 (34)	CH
○ 1705-B-06A#20	68.5	3.0	46.6	50.4	Clay	A-7-6 (23)	CL
△ 1715-B-03#16	48.5	3.1	60.1	36.9	Silty Clay	A-6 (18)	CL
⊗ 1715-B-03#23	83.5	1.1	92.7	6.3	Silt	A-4 (0)	ML
⊕ 1715-B-04#18	58.5	20.3	50.8	28.8	Silty Clay Loam	A-6 (10)	CL

WEI\_IDH\_11000401.GPJ\_WANGENG.GDT\_5/6/14

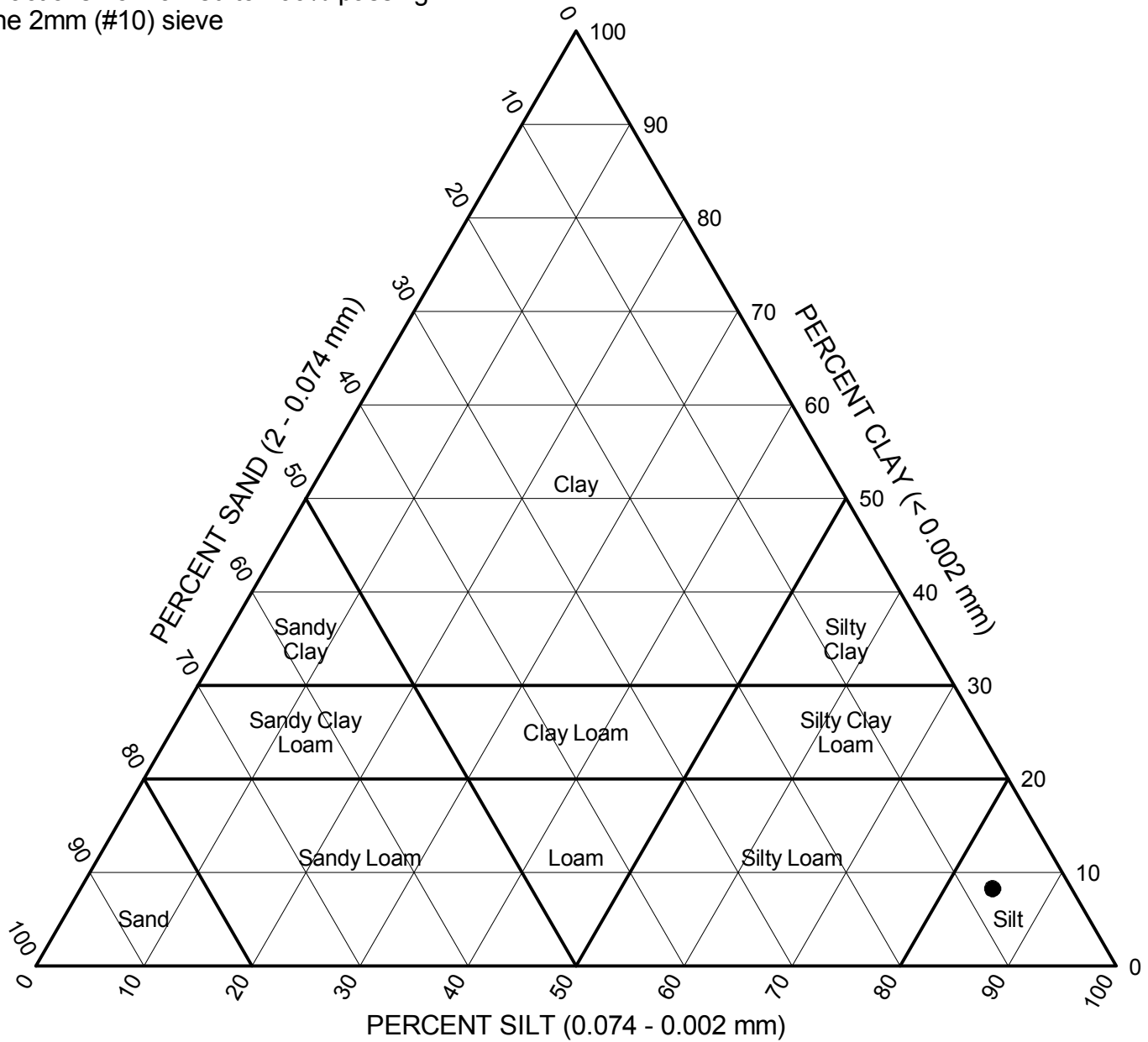


Wang Engineering  
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### IDH Textural Classification Chart

Project: Circle Interchange Reconstruction  
 Location: Section 17, T39N, R14E of 3rd PM  
 Number: 1100-04-01

Fractions normalized to 100% passing the 2mm (#10) sieve



	Sample	Depth (ft)	Sand (%)	Silt (%)	Clay (%)	Classification		
						IL DOT	AASHTO	ASTM
●	1715-B-04#23	83.5	7.4	84.4	8.3	Silt	A-4 (0)	ML

WEI\_IDH\_11000401.GPJ\_WANGENG.GDT\_5/6/14



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 Lombard, IL 60148  
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**IDH Textural Classification Chart**  
 Project: Circle Interchange Reconstruction  
 Location: Section 17, T39N, R14E of 3rd PM  
 Number: 1100-04-01



### Unconfined Compressive Strength of Intact Rock Core Specimens

**Project:** Circle Interchange

**Client:** AECOM

**WEI Job No.:** 1100-04-01

**Note:** The specimens were sulphur capped for a more uniform break

Field Sample ID	Lab Specimen ID	Depth (ft)	Location	Sample Description	Length (in)		Diameter (in)	Total Load (lbs)	Total Pressure (psi)	Fracture Type*	Break Date	Tested By	Area (in <sup>2</sup> )
					Before Capping	After Capping							
1710-B-04 RUN 1	9767	109.5	Ramp SE	Dolomite	3.84	4.05	2.01	35650	11230	3	6/12/14	AM	3.17
0461-B-15 RUN 1	9768	104.0	Congress Parkway	Dolomite	3.89	4.03	2.01	36660	11560	3	6/12/14	AM	3.17
1705-B-06 (1)	122	103.5	Flyover Ramp	Dolomite	4.03	4.14	2.05	32280	9780	3	8/26/13	RG	3.30
1705-B-06 (2)	123	110.5	Flyover Ramp	Dolomite	4.07	4.18	2.05	23980	7270	3	8/26/13	RG	3.30

**\* Fracture Types:**

- Type 1 - Reasonably well-formed cones on both ends, less than 1 in. [25 mm] of cracking through caps;
- Type 2 - Well-formed cone on one end, vertical cracks running through caps, no well defined cone on other end;
- Type 3 - Columnar vertical cracking through both ends, no well-formed cones;
- Type 4 - Diagonal fracture with no cracking through ends; tap with hammer to distinguish from Type 1;
- Type 5 - Side fractures at top or bottom (occur commonly with unbonded caps);
- Type 6 - Similar to Type 5 but end of cylinder is pointed.

Prepared by: *Jeny*

Checked by: *LF*

## **APPENDIX C**



# SEISMIC SITE CLASS DETERMINATION

I.D.O.T. BBS FOUNDATIONS AND GEOTECHNICAL UNIT

Modified on 12/10/10

PROJECT TITLE====Circle Interchange Reconstruction/ (SN: 16-1710)

Substructure 1						
Base of Substruct. Elev. (or ground surf for bents)						575.65
Pile or Shaft Dia.						36
Boring Number						1705-B-05/05A
Top of Boring Elev.						579.65
Approximate Fixity Elev.						557.65
Individual Site Class Definition:						
N (bar):	10	(Blows/ft.)	Soil Site Class E			
N <sub>ch</sub> (bar):	75	(Blows/ft.)	Soil Site Class C			
s <sub>u</sub> (bar):	1.14	(ksf)	Soil Site Class D <----Controls			
Seismic Soil Column	Bot. Of Sample Elevation	Sample Thick.	N	Qu	Layer Description	
Depth	Elevation	Thick.	N	Qu	Boundary	
(ft)	(ft)	(ft.)		(tsf)		
	576.6	3.10	7		B	
	574.1	2.50	0	0.25		
	571.6	2.50	1	0.41		
	569.1	2.50	0	0.25		
	566.6	2.50	0	0.25		
	564.1	2.50	5	0.33		
	561.6	2.50	1	0.41		
	559.1	2.50	0	0.33		
1.1	556.6	2.50	0	0.25		
3.6	554.1	2.50	3	0.41		
6.1	551.6	2.50	4	0.25		
9.6	548.1	3.50	1	0.41		
14.6	543.1	5.00	2	0.41	B	
19.2	538.5	4.60	7	0.57	B	
24.2	533.5	5.00	29	5.44		
29.2	528.5	5.00	32	5.40		
34.2	523.5	5.00	35	5.74	B	
39.2	518.5	5.00	10	1.15	B	
44.2	513.5	5.00	23		B	
49.2	508.5	5.00	100	2.46	B	
54.2	503.5	5.00	61	6.81	B	
59.2	498.5	5.00	100		B	
64.2	493.5	5.00	100			
69.2	488.5	5.00	100			
74.2	483.5	5.00	100		B	
100.0	457.7	25.80	100	5.00	R	

Substructure 2						
Base of Substruct. Elev. (or ground surf for bents)						593.55
Pile or Shaft Dia.						36
Boring Number						21-RWB-02
Top of Boring Elev.						596.95
Approximate Fixity Elev.						575.55
Individual Site Class Definition:						
N (bar):	8	(Blows/ft.)	Soil Site Class E			
N <sub>ch</sub> (bar):	NA	(Blows/ft.)	NA			
s <sub>u</sub> (bar):	0.65	(ksf)	Soil Site Class E <----Controls			
Seismic Soil Column	Bot. Of Sample Elevation	Sample Thick.	N	Qu	Layer Description	
Depth	Elevation	Thick.	N	Qu	Boundary	
(ft)	(ft)	(ft.)		(tsf)		
	594.0	3.00	22	7.79		
	591.5	2.50	20	5.33	B	
	589.0	2.50	6	1.23		
	586.5	2.50	7	1.15	B	
	584.0	2.50	10	0.98	B	
	581.5	2.50	12	3.53	B	
	579.0	2.50	4	0.66		
	576.5	2.50	3	0.25		
	574.0	2.50	2	0.25	B	
1.6	571.5	2.50	0	0.20		
4.1	571.5	2.50	0	0.20		
6.6	569.0	2.50	0	0.20	B	
11.6	564.0	5.00	0	0.25		
16.6	559.0	5.00	0	0.25		
21.6	554.0	5.00	4	0.49		
26.6	549.0	5.00	4	0.25		
31.6	544.0	5.00	5	0.25	B	
35.4	540.2	3.80	6	0.66	B	
40.4	535.2	5.00	38	5.00		
45.4	530.2	5.00	26	4.33		
50.4	525.2	5.00	31	4.76	B	
55.4	520.2	5.00	22	1.80	B	
60.4	515.2	5.00	18	3.00	B	
65.4	510.2	5.00	72		B	
70.4	505.2	5.00	83	9.35		
75.4	500.2	5.00	100	9.10	B	
80.4	495.2	5.00	100			
85.6	490.0	5.20	100			
92.1	483.5	6.50	100	5.00	B	

Substructure 3						
Base of Substruct. Elev. (or ground surf for bents)						587.35
Pile or Shaft Dia.						36
Boring Number						1710-B-03
Top of Boring Elev.						587.04
Approximate Fixity Elev.						569.35
Individual Site Class Definition:						
N (bar):	9	(Blows/ft.)	Soil Site Class E <----Controls			
N <sub>ch</sub> (bar):	100	(Blows/ft.)	Soil Site Class C			
s <sub>u</sub> (bar):	0.56	(ksf)	Soil Site Class E			
Seismic Soil Column	Bot. Of Sample Elevation	Sample Thick.	N	Qu	Layer Description	
Depth	Elevation	Thick.	N	Qu	Boundary	
(ft)	(ft)	(ft.)		(tsf)		
	584.0	3.00	12		B	
	581.5	2.50	7	3.61	B	
	579.0	2.50	4	0.82	B	
	576.5	2.50	3	0.33		
	574.0	2.50	2	0.25	B	
	571.5	2.50	1	0.16		
0.3	569.0	2.50	2	0.08		
2.8	566.5	2.50	3	0.16	B	
5.3	564.0	2.50	2	0.33		
7.8	561.5	2.50	3	0.33	B	
10.3	559.0	2.50	3	0.20		
15.3	554.0	5.00	2	0.20		
20.3	549.0	5.00	4	0.20	B	
25.3	544.0	5.00	4	0.25		
30.3	539.0	5.00	3	0.25	B	
35.3	534.0	5.00	9	1.15	B	
40.3	529.0	5.00	17	3.12	B	
45.3	524.0	5.00	66	4.59		
50.3	519.0	5.00	54	6.89	B	
55.3	514.0	5.00	57	3.53	B	
60.3	509.0	5.00	44	7.79		
65.3	504.0	5.00	100	5.00		
69.8	499.5	4.50	62	9.59	B	
74.8	494.5	5.00	100			
79.8	489.5	5.00	100			
84.8	484.5	5.00	100		B	
103.0	466.3	18.20	100	5.00	R	

Substructure 4						
Base of Substruct. Elev. (or ground surf for bents)						587.35
Pile or Shaft Dia.						36
Boring Number						1710-B-04
Top of Boring Elev.						588.53
Approximate Fixity Elev.						569.35
Individual Site Class Definition:						
N (bar):	147	(Blows/ft.)	Soil Site Class C <----Controls			
N <sub>ch</sub> (bar):	65	(Blows/ft.)	Soil Site Class C			
s <sub>u</sub> (bar):	0.55	(ksf)	Soil Site Class E			
Seismic Soil Column	Bot. Of Sample Elevation	Sample Thick.	N	Qu	Layer Description	
Depth	Elevation	Thick.	N	Qu	Boundary	
(ft)	(ft)	(ft.)		(tsf)		
	586.0	2.50	7		B	
	582.5	3.50		1.64	B	
	578.0	4.50		0.82	B	
	575.5	2.50		0.49		
	573.0	2.50		0.33		
	570.5	2.50		0.25	B	
1.3	568.0	2.50		0.16		
3.8	565.5	2.50		0.16	B	
6.3	563.0	2.50		0.25	B	
8.8	560.5	2.50		0.16		
11.3	558.0	2.50		0.16		
16.3	553.0	5.00		0.16	B	
21.3	548.0	5.00		0.41		
27.5	541.8	6.20		0.33	B	
32.5	536.8	5.00		1.64	B	
37.5	531.8	5.00		2.71	B	
42.5	526.8	5.00		4.35		
47.5	521.8	5.00		5.90	B	
52.5	516.8	5.00	59		B	
57.5	511.8	5.00		8.20	B	
62.5	506.8	5.00	50		B	
67.5	501.8	5.00		9.84	B	
72.5	496.8	5.00	50			
77.5	491.8	5.00	50			
83.8	485.5	6.30	50		B	
103.0	466.3	19.20	100	5.00	R	

Global Site Class Definition: Substructures 1 through 5						
N (bar):	44	(Blows/ft.)	Soil Site Class D <----Controls			
N <sub>ch</sub> (bar):	77	(Blows/ft.)	Soil Site Class C			
s <sub>u</sub> (bar):	0.66	(ksf)	Soil Site Class E			



## **APPENDIX D**

Bench Mark: Cut square at center of door entrance to 707 W. Harrison St; South side of Harrison St. ±90' west of west line of Des Plaines. Elevation 597.47.  
 A X out in the SE anchor bolt at the 11th street light N. of Roosevelt on the W. side of Halsted. Elev. = 594.06

Existing Structure: S.N. 016-2451 was originally built in 1960 under section 0101.6-1P and F.A.I. Route Number 94 carries NB I-90/94 traffic to EB I-290.  
 The existing three (3) span structure has an overall length of approx. 180'-0" and out to out width of 29'-0". The existing superstructure consists of simple span wide flange beams with 7 1/2" thick concrete deck with 2" overlay. The existing substructure consists of reinforced concrete abutment and multi-columns piers. Existing substructure units are supported on caissons. The existing structure is to be removed and replaced.

Traffic Control: Ramp NE and Ramp EN will be closed during construction and traffic will be detoured via local roads.

No Salvage.

- Notes:
1. All structural steel shall be metalized (thermal spraying).
  2. Span lengths are measured along @ & PGL Ramp NE.
  3. All piers are oriented perpendicular to @ & PGL unless noted otherwise.
  4. For other Highway Classifications, see sheet 3.

**HIGHWAY CLASSIFICATION**

Ramp NE  
 Functional Class: Interstate  
 ADT: 3,100 (2012); 4,000 (2040)  
 ADTT: 124 (2012); 160 (2040)  
 DHV: 280 (2040)  
 Design Speed: 30 m.p.h.  
 Posted Speed: 30 m.p.h.  
 One-Way Traffic  
 Directional Distribution: NA

**DESIGN SPECIFICATIONS**

2012 AASHTO LRFD Bridge Design Specifications  
 6th Edition with 2013 Interim Revisions

**LOADING HL-93**

Allow 50#/sq. ft. for future wearing surface.

**DESIGN STRESSES**

**FIELD UNITS**

f'c = 3,500 psi  
 fy = 60,000 psi (Reinforcement)  
 fy = 50,000 psi (M270 Grade 50)

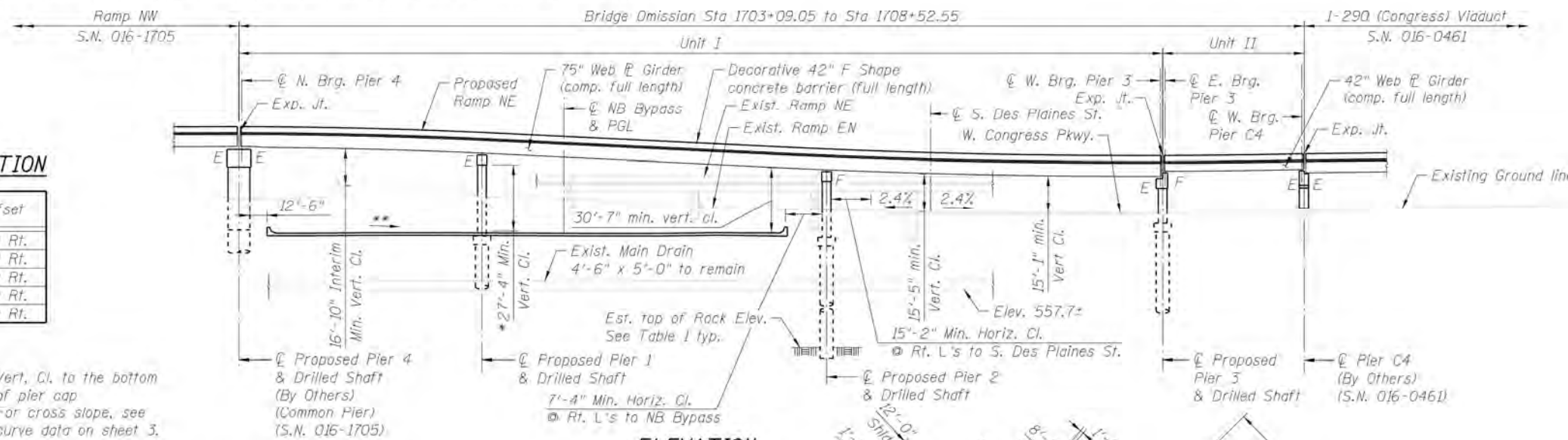
**SEISMIC DATA**

Seismic Performance Zone (SPZ) = 1  
 Design Spectral Acceleration at 1.0 sec. (SD1) = 0.085g  
 Design Spectral Acceleration at 0.2 sec. (SDS) = 0.144g  
 Soil Site Class = D

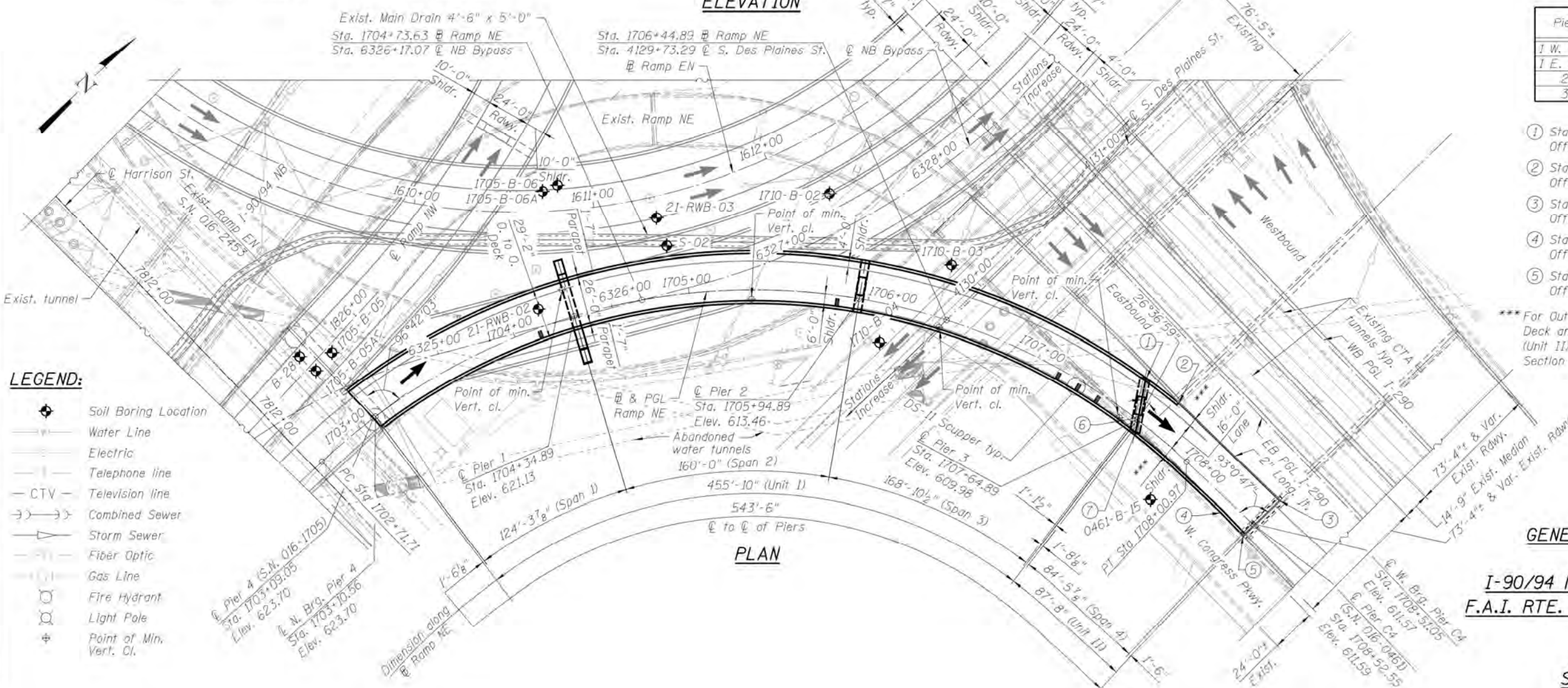
**SCUPPER LOCATION**

Station	Offset
1704+13.94	6.0 Rt.
1705+82.94	6.0 Rt.
1707+14.54	6.0 Rt.
1707+27.34	6.0 Rt.
1707+40.14	6.0 Rt.

- \* Vert. Cl. to the bottom of pier cap
- \*\* For cross slope, see curve data on sheet 3.



**ELEVATION**



**PLAN**

**LEGEND:**

- Soil Boring Location
- Water Line
- Electric
- Telephone line
- CTV - Television line
- Combined Sewer
- Storm Sewer
- Fiber Optic
- Gas Line
- Fire Hydrant
- Light Pole
- Point of Min. Vert. Cl.

**TABLE 1**

Pier	Estimated T/Ground Elev.	Estimated T/Rock Elev.
1 W. Col.	594.55	490.0
1 E. Col.	597.16	490.0
2	588.35	484.5
3	587.55	488.9

- 1 Sta. 1707+55.51  
Offset 21.58' Lt.
- 2 Sta. 1707+76.96  
Offset 21.58' Lt.
- 3 Sta. 1708+53.59  
Offset 19.69' Lt.
- 4 Sta. 1708+34.21  
Offset 7.58' Rt.
- 5 Sta. 1708+52.10  
Offset 8.52' Rt.
- 6 @ W. Brg. Pier 3  
Sta. 1707+63.77  
Elev. 609.96
- 7 @ E. Brg. Pier 3  
Sta. 1707+66.57  
Elev. 610.01



**LOCATION SKETCH**

**GENERAL PLAN AND ELEVATION**  
**RAMP NE OVER**  
**I-90/94 NB BYPASS/S. DES PLAINES ST.**  
**F.A.I. RTE. I-90/94 - SECTION 2014-005R&B**  
**COOK COUNTY**  
**STATION 1704+73.63**  
**STRUCTURE NO. 016-1710**

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**PARSONS BRINCKERHOFF**

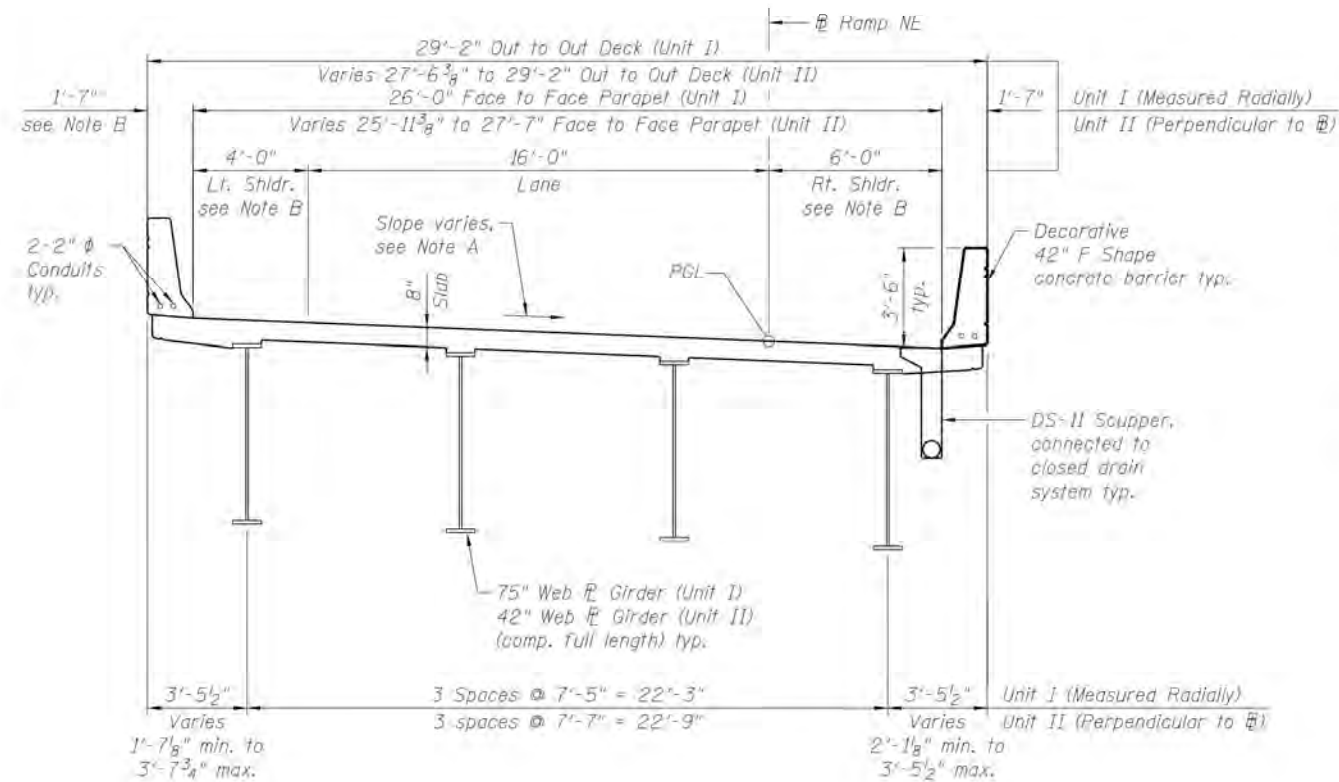
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PILOT SCALE = NONE	CHECKED - MS	REVISED -
PILOT DATE = 6/12/2014	DRAWN - DCP	REVISED -
	CHECKED - JIG	REVISED -

**STATE OF ILLINOIS**  
**DEPARTMENT OF TRANSPORTATION**

**STRUCTURE NO. 016-1710**

SHEET NO. 1 OF 3 SHEETS

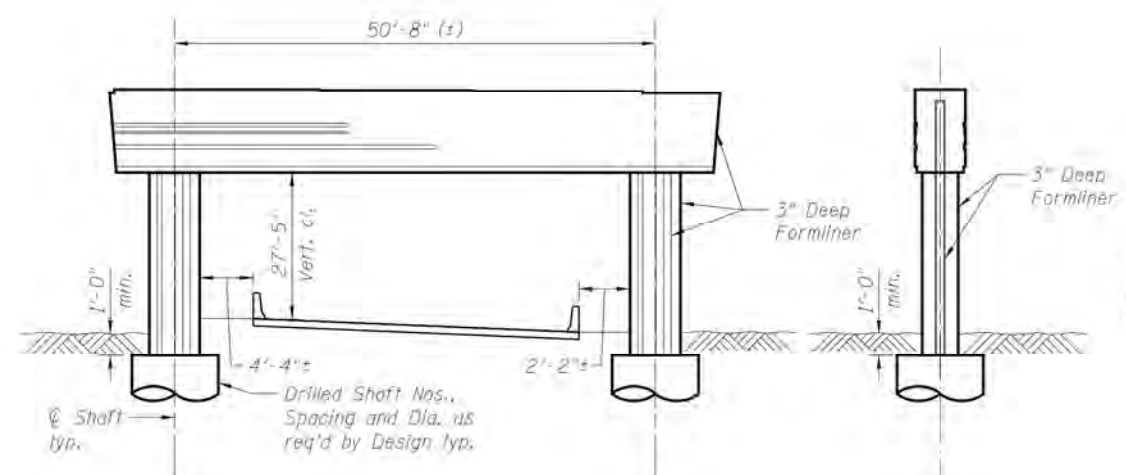
F.A.I. RTE. 90/94/290	SECTION 2014-005R&B	COUNTY COOK	TOTAL SHEETS 3	SHEET NO. 1
CONTRACT NO. 60X79			ILLINOIS FED. AID PROJECT	



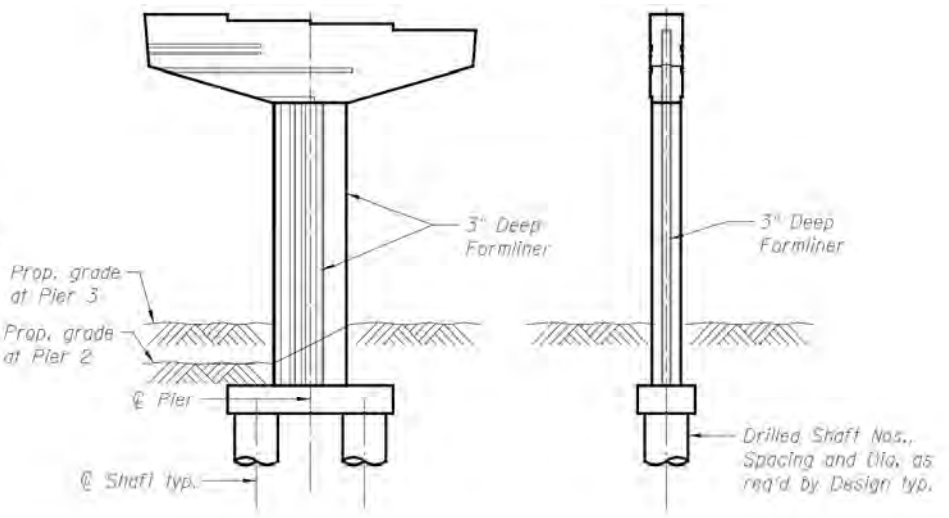
**CROSS SECTION**  
 (Looking upstation units I & II)

Note A: (Direction of slope referenced from left edge of pavement)  
 Transition (-5.06% to -5.60%) Sta. 1703+03.93 to Sta. 1703+16.96  
 Full S.E. (-5.60%) Sta. 1703+16.96 to Sta. 1707+55.72  
 Transition (-5.60% to -2.00%) Sta. 1707+55.72 to Sta. 1708+42.72  
 Cross Slope (-2.00%) Sta. 1708+42.72 to Sta. 1708+52.55.

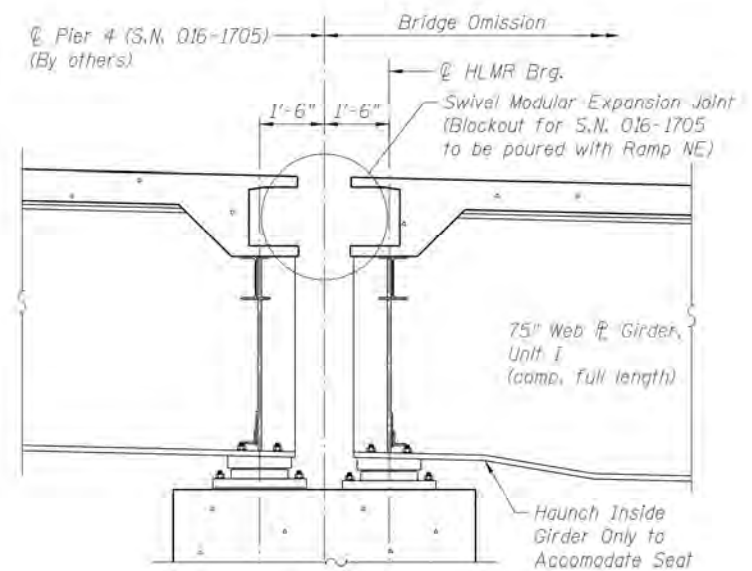
Note B: Lt. Parapet ends at Sta. 1707+76.96 where a 2" long. jt. begins.  
 Lt. Shoulder increases from 4'-0" to 5'-7" at the beginning of long. jt.  
 then decreases to 3'-8 1/4" at Sta. 1708+53.59.  
 Rt. Shoulder increases from 6'-0" at Sta. 1708+34.21 to 6'-11 1/4" at Sta. 1708+52.10.



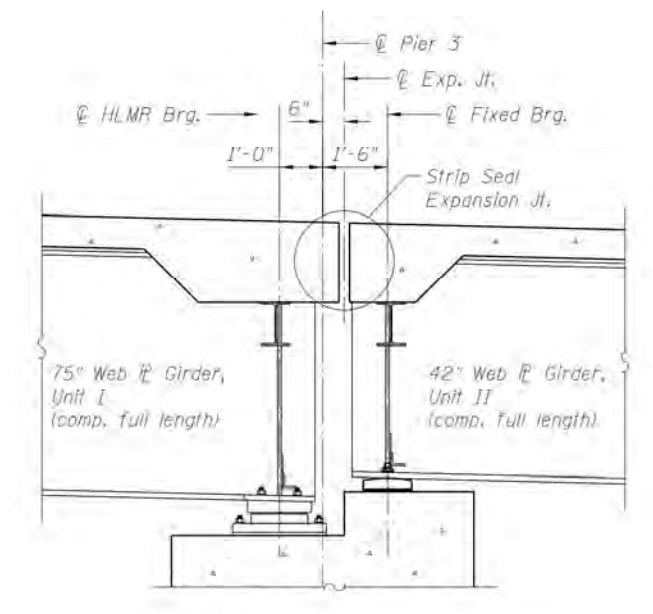
**PIER 1 SKETCH**  
 (Looking Upstation)



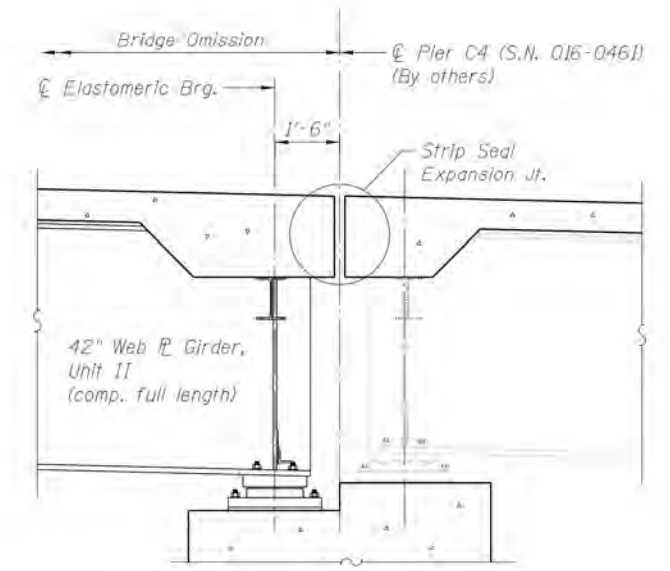
**PIER 2 AND 3 SKETCH**  
 (Looking Upstation)



**SECTION THRU PIER 4**  
 (Horiz. dim. @ Rt. L's  $\Phi$  Pier 4, S.N. 016-1705)



**SECTION THRU PIER 3**  
 (Horiz. dim. @ Rt. L's)



**SECTION THRU PIER C4**  
 (Horiz. dim. @ Rt. L's  $\Phi$  Pier C4, S.N. 016-0461)

**DETAILS**  
**RAMP NE OVER**  
**I-90/94 NB BYPASS/S. DES PLAINES ST.**  
**F.A.I. RTE. I-90/94 - SECTION 2014-005R&B**  
**COOK COUNTY**  
**STATION 1704+73.63**  
**STRUCTURE NO. 016-1710**

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**PARSONS BRINCKERHOFF**

FILE NAME = USER	DESIGNED - LFC	REVISIONS
PILOT SCALE = NONE	CHECKED - MS	REVISIONS
PILOT DATE = 6/12/2014	DRAWN - DCP	REVISIONS
	CHECKED - JIG	REVISIONS

**STATE OF ILLINOIS**  
**DEPARTMENT OF TRANSPORTATION**

**STRUCTURE NO. 016-1710**

SHEET NO. 2 OF 3 SHEETS

F.A.I. RTE. 90/94/290	SECTION 2014-005R&B	COUNTY COOK	TOTAL SHEETS 3	SHEET NO. 2
CONTRACT NO. 60X79			ILLINOIS FED. AID PROJECT	

**CURVE DATA**

(Ramp NE)  
 PROP. CURVE P-CIR-NE-1  
 P.I. Sta. = 1706+01.77  
 $\Delta = 86^\circ 38' 23''$  (RT)  
 $D = 16^\circ 22' 13''$   
 $R = 350.00'$   
 $T = 330.05'$   
 $L = 529.25'$   
 $E = 131.08'$   
 $e = 5.60\%$   
 $T.R. = 0'$   
 $S.E. Run = 87'$   
 $P.C. Sta. = 1702+71.71$   
 $P.T. Sta. = 1708+00.97$   
 $DS = 30$

**CURVE DATA**

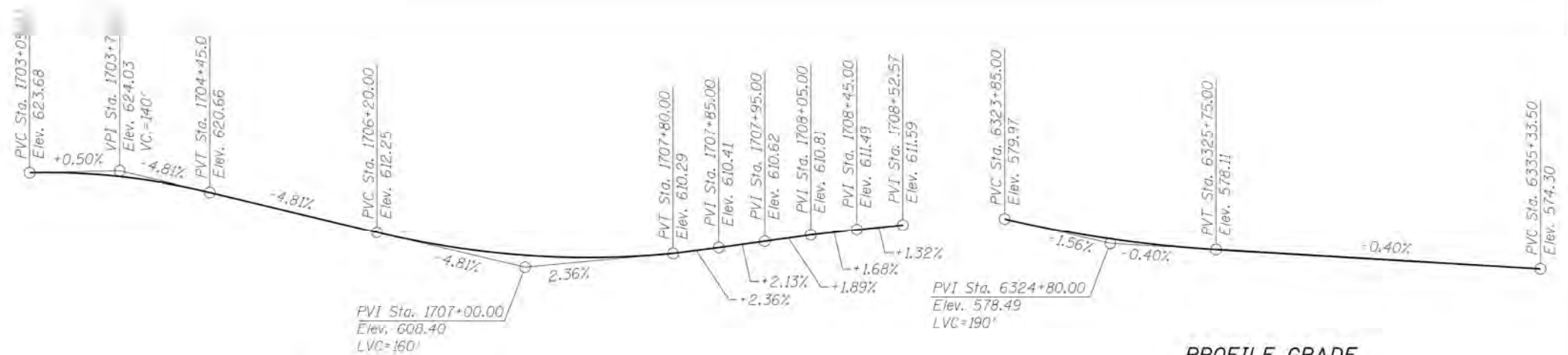
(NB Bypass)  
 PROP. CURVE P-NCD-NX-2  
 P.I. STA. = 6323+25.02  
 $\Delta = 8^\circ 04' 05''$  (RT)  
 $D = 7^\circ 17' 22''$   
 $R = 786.00'$   
 $T = 55.43'$   
 $L = 110.68'$   
 $E = 1.95'$   
 $e = 5.20\%$   
 $T.R. = NA$   
 $S.E. RUN = 101'$   
 $P.C. STA. = 6322+69.59$   
 $P.T. STA. = 6323+80.27$   
 $DS = 35$   
 $PS = 30$

**CURVE DATA**

(NB Bypass)  
 PROP. CURVE P-NCD-NX-3  
 P.I. STA. = 6324+41.27  
 $\Delta = 20^\circ 56' 44''$  (RT)  
 $D = 17^\circ 21' 44''$   
 $R = 330.00'$   
 $T = 61.00'$   
 $L = 120.64'$   
 $E = 5.59'$   
 $e = 5.20\%$   
 $T.R. = NA$   
 $S.E. RUN = 95'$   
 $P.C. STA. = 6323+80.27$   
 $P.T. STA. = 6325+00.91$   
 $DS = 30$   
 $PS = 30$

**CURVE DATA**

(NB Bypass)  
 PROP. CURVE P-NCD-NX-4  
 P.I. STA. = 6328+76.78  
 $\Delta = 59^\circ 05' 41''$  (LT)  
 $D = 14^\circ 08' 50''$   
 $R = 405.00'$   
 $T = 229.58'$   
 $L = 417.72'$   
 $E = 60.54'$   
 $e = 5.40\%$   
 $T.R. = 36'$   
 $S.E. RUN = 98'$   
 $P.C. STA. = 6326+47.20$   
 $P.T. STA. = 6330+64.91$   
 $DS = 30$   
 $PS = 30$



**PROFILE GRADE**

(Along Ramp NE)

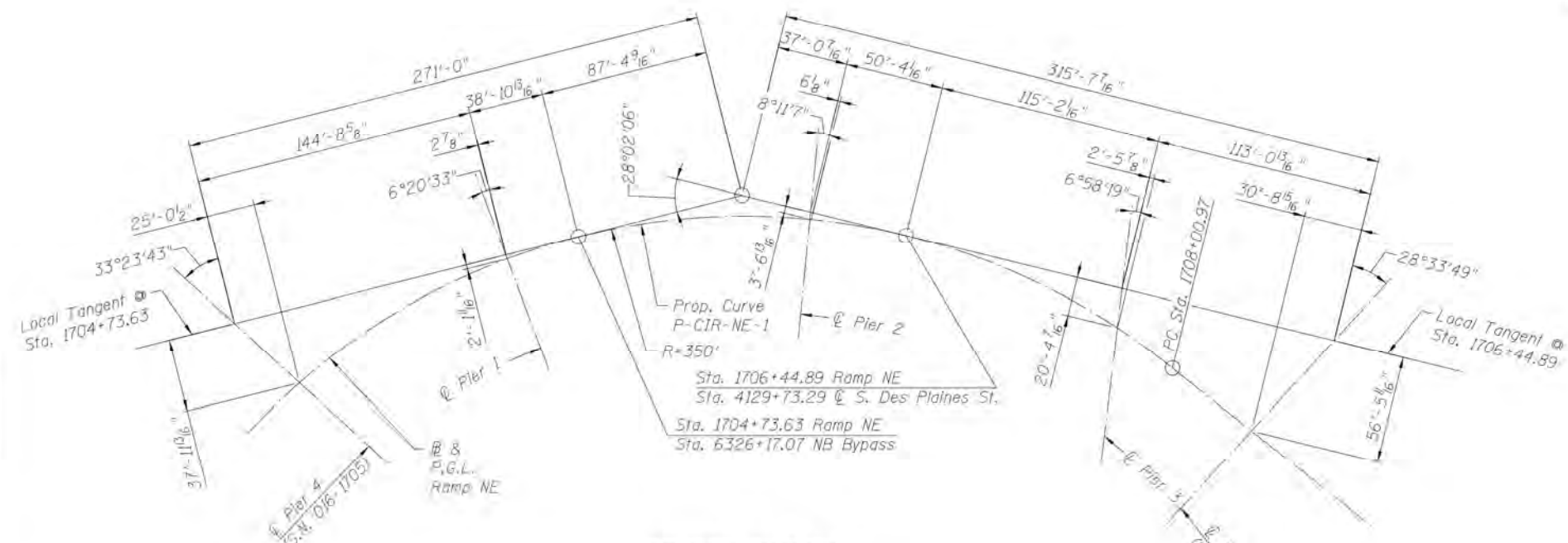


**EXISTING PROFILE GRADE**

(Along S. Des Plaines St.)

**HIGHWAY CLASSIFICATION**

Location	Functional Class	ADT (2012)	ADT (2040)	DHV (2040)	Design Speed	Posted Speed	One-Way Traffic	Directional Distribution
NB Bypass	Interstate	NA	17,000	387	30 m.p.h.	NA	One-Way Traffic	NA
Ramp EN	Interstate	26,600	31,000	1,032	30 m.p.h.	NA	One-Way Traffic	NA
Ramp NW	Interstate	32,500	36,000	2,483	35 m.p.h.	35 m.p.h.	One-Way Traffic	NA
S. Des Plaines St.	Principal Arterial	5,490	5,490	220	30 m.p.h.	30 m.p.h.	One-Way Traffic	NA
F.A.I. Rte. EB I-290	Interstate	32,500	33,000	380	50 m.p.h.	45 m.p.h.	One-Way Traffic	NA



**OFFSET SKETCH**

**PROFILES & CURVES DATA**  
**RAMP NE OVER**  
**I-90/94 NB BYPASS/S. DES PLAINES ST.**  
**F.A.I. RTE. I-90/94 - SECTION 2014-005R&B**  
**COOK COUNTY**  
**STATION 1704+73.63**  
**STRUCTURE NO. 016-1710**

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**PARSONS BRINCKERHOFF**

FILE NAME = USER	DESIGNED - LFC	REVISIONS
PILOT SCALE = NONE	CHECKED - MS	REVISIONS
PLT DATE = 6/12/2014	DRAWN - DCP	REVISIONS
	CHECKED - JIG	REVISIONS

**STATE OF ILLINOIS**  
**DEPARTMENT OF TRANSPORTATION**

**STRUCTURE NO. 016-1710**

SHEET NO. 3 OF 3 SHEETS

F.A.I. RTE. 90/94/290	SECTION 2014-005R&B	COUNTY COOK	TOTAL SHEETS 3	SHEET NO. 3
CONTRACT NO. 60X79			ILLINOIS FED. AID PROJECT	

