

July 6, 2018

Mr. Amish T. Bhatt, S.E, P.E

**AECOM**

303 East Wacker Drive, Suite 1400

Chicago, IL 60601

Re: Geotechnical Letter Report  
Overhead Sign Structures  
Jane Byrne Interchange, Contract 60X93  
Cook County, Illinois  
**Wang No. 1100-04-01**

Dear Mr. Bhatt,

This letter report presents the results of our geotechnical analysis and recommendations to support the design and construction of the two overhead sign structure foundations at the Jane Byrne Interchange in Cook County, Illinois. Based on the information provided by AECOM, Wang Engineering, Inc. (Wang) understands the proposed overhead sign structures are located at following locations:

- Sign #1 is proposed on southbound I-90/94 and about 150 feet north of Madison Street Bridge; and
- Sign #2 is located at southbound I-90/94 near the convergence with Ramps WS and ES

### **Subsurface Investigation and Laboratory Testing**

No specific borings were performed at the sign structure locations. However, we have considered the soils information recent borings and borings with vane shear testing undertaken by Wang in the proximity of the proposed sign structure locations. The sign structure locations with corresponding reference borings are shown in Table 1.

Table 1: Sign Structure Locations and Reference Borings

Sign Structure ID	Approximate Station	Reference Borings <sup>(1)</sup>
Sign #1 SB I-90/94 (North of Madison Street Bridge)	6165+00 (I-90/94)	32-RWB-01, 32-RWB-02, 33-RWB-02, SB90-SGB-01, and VST-03
Sign #2 SB I-90/94 near convergence with Ramps WS and ES	1232+00 (Ramp WS)	10-RWB-04, 14-RWB-03, 10-PZ-01, and VST-01

<sup>(1)</sup> RWB, SGB, and VST borings performed by Wang in 2014 and 2015.

For Wang borings, 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 boring locations are shown in Exhibit 2.

### Subsurface Conditions

Detailed descriptions of the soil conditions encountered are presented in the attached *Boring Logs* (Appendix A). Please note the lithological boundaries shown on the logs and profiles (Exhibit 3) represent approximate boundaries between the soil types. In the field, the actual transition between soil types might be different in horizontal and vertical directions.

In our analysis, the soil lithology at each sign location was selected based on the soils information acquired from previously drilled nearby soil borings and from in-situ vane shear test results.

#### Sign #1 – SB I-90/94 (North of Madison Street Bridge)

Below the pavement, the borings encountered 3 feet of fill materials. The fill consists of very stiff silty clay loam with unconfined compressive strength ( $Q_u$ ) values of 2.1 to 2.7 tsf. At elevations of 574 to 580 (3 to 5 feet bgs), the borings advanced through up to 33 feet of very soft to medium stiff clay to silty clay. Beneath the very soft to medium stiff clay to silty clay, the borings encountered up to 25 feet of stiff to hard silty clay to silty loam followed by medium dense to very dense silt to silty loam and sand. Boring 33-RWB-02 encountered Dolostone bedrock at 112 feet bgs (482 feet elevation).

The design and construction of drilled shaft foundation should consider the groundwater in granular fill and in the granular soils below clay are expected to be saturated and groundwater in granular soils above the bedrock is expected to be under hydrostatic pressure.

### Sign #2 – SB I-90/94 near convergence with Ramps WS and ES

Below the pavement, the borings encountered 3 to 4 feet of fill materials. The fill consists of loose to medium dense gravel to crushed stone with N values of 7 to 11 blows per foot. Below the fill, at elevations of 572 to 573 (3 to 4 feet bgs), the borings advanced through 30 feet of very soft to medium stiff clay to silty clay. Beneath the very soft to medium stiff clay to silty clay, the borings encountered up to 27 feet of stiff to hard silty clay to silty clay loam followed by dense to very dense sandy loam. Boring 10-RWB-04 encountered weathered bedrock at 97 feet bgs and Dolostone bedrock at 101 feet bgs (492 feet elevation).

The design and construction of drilled shaft foundation should consider the groundwater in granular fill and in the granular soils below clay are expected to be saturated and groundwater in granular soils above the bedrock is expected to be under hydrostatic pressure.

### **Engineering Analyses and Recommendations**

Based on the information provided by AECOM, Wang understands that two new overhead sign structures will be Span Sign Structures “S-type” and will span approximately 128 to 135 feet.

Our evaluation showed at both sign structure locations, soft to medium stiff clay to silty clay with  $Q_u$  values less than 1.25 tsf extending to about 35 feet below ground surface or about elevation of 542 feet. Therefore, the standard foundation dimensions criteria were not met. Accordingly, the sign structure foundations will require site specific design as per IDOT Sign Structure Manual (IDOT 2012).

Lateral loads on drilled shafts should be analyzed for maximum moments and lateral deflections. The lateral load capacity analysis can be performed using computer program such as COMP 624P, LPILE, LATPILE, or any other similar programs. The estimated soil parameters that may be used to analyze stresses and deflections of drilled shafts sign structure foundations under lateral loads are presented in Tables 2 and 3.

Table 2: Recommended Parameters for Lateral Load Analysis of Sign Structure at SB I-90/94 (North of Madison Street Bridge)  
 (Reference Borings: 32-RWB-01, 32-RWB-02, 33-RWB-02, SB90-SGB-01, and VST-03)

Soil Type (Layer)	Unit Weight, $\gamma$ (pcf)	Undrained Shear Strength, $c_u$ (psf)	Average Blow Counts, N blows/foot	Estimated Friction Angle, $\Phi$ ( $^\circ$ )	Estimated Lateral Soil Modulus Parameter, k (pci)	Estimated Soil Strain Parameter, $\epsilon_{50}$ (%)
Existing FILL Existing Grade to EL 574 feet	120	0	6	30	50	--
Soft to M Stiff CLAY to SILTY CLAY EL 574 to 562 feet	110	420	1	0	40	1.5
Soft to M Stiff CLAY to SILTY CLAY EL 562 to 555 feet	110	600	1	0	80	1.3
M Stiff CLAY to SILTY CLAY EL 555 to 547 feet	115	900	4	0	100	1.0
Stiff CLAY to SILTY CLAY EL 547 to 542 feet	115	1200	9	0	500	0.9
Stiff SILTY CLAY LOAM to SILTY LOAM EL 542 to 532 feet	120	1500	11	0	500	0.9
Stiff to V Stiff CLAY to SILTY CLAY EL 532 to 515 feet	125	2600	13	0	1000	0.5
Hard SILTY LOAM EL 515 to 507 feet	125	4500	50	0	2000	0.4
M Dense SILT EL 507 to 500 feet	120	0	24	32	90	--
V Dense SAND and SILT to SILTY LOAM EL 500 to 482 feet	63 <sup>(1)</sup>	0	60	37	125	--

(1) Submerged unit weight.

Table 3: Recommended Parameters for Lateral Load Analysis of Sign Structure at SB I-90/94 near convergence with Ramps WS and ES  
 (Reference Borings: 10-RWB-04, 14-RWB-03, 10-PZ-01, and VST-03)

Soil Type (Layer)	Unit Weight, $\gamma$ (pcf)	Undrained Shear Strength, $c_u$ (psf)	Average Blow Counts, N blows/foot	Estimated Friction Angle, $\Phi$ ( $^\circ$ )	Estimated Lateral Soil Modulus Parameter, k (pci)	Estimated Soil Strain Parameter, $\epsilon_{50}$ (%)
Existing FILL Existing Grade to EL 579 feet	120	0	8	30	50	--
Stiff SILTY CLAY EL 579 to 575 feet	120	1400	7	0	500	0.7
Soft to M Stiff CLAY to SILTY CLAY EL 575 to 570 feet	110	480	0	0	40	1.5
Soft to M Stiff CLAY to SILTY CLAY EL 570 to 553 feet	110	600	1	0	80	1.3
M Stiff CLAY to SILTY CLAY EL 553 to 547 feet	115	900	6	0	100	1.0
Stiff CLAY to SILTY CLAY EL 547 to 542 feet	115	1200	9	0	500	0.9
Dense to V Dense CLAY LOAM to SILTY LOAM EL 542 to 526 feet	125	5000	35	0	2000	0.4
Dense to V Dense SAND EL 526 to 512 feet	63 <sup>(1)</sup>	0	38	35	120	--
V Dense GRAVELLY SAND EL 512 to 504 feet	63 <sup>(1)</sup>	0	70	36	125	--
Hard SILTY LOAM EL 504 to 496 feet	63 <sup>(1)</sup>	4500	100	0	2000	0.4
V Dense WEATHERED BEDROCK EL 496 to 492 <sup>(2)</sup> feet	68 <sup>(1)</sup>	0	100	37	130	--

(1) Submerged unit weight; (2) Bedrock.

## **Construction Considerations**

### Excavation

Foundations excavation should be performed in accordance with local, state, and federal regulations including current OSHA regulations. The potential effect of ground movements upon nearby structures and utilities should be considered.

### Drilled Shafts Construction

The drilled shafts should be constructed in accordance with IDOT Standard Specification Section 516, *Drilled Shafts*. The soft soil layer with  $Q_u$  less than 0.5 tsf is prone to squeeze if left open for long period of time. Therefore, to minimize the squeeze potential, casing should be provided. Due to high squeeze potential, the following note should appear on the final plans:

*'Due to the squeeze potential of the clay soils, the use of temporary casing may be required to properly construct the shafts. Casing may be pulled or remain in place, as determined by the Contractor at no cost to the Department.'*

## Qualifications

The analyses and recommendations contained in this letter report are based on data obtained at the boring locations shown in Exhibit 2 and do not reflect any variations that may occur elsewhere on the site, variations whose nature and extent may not become obvious until late in the construction phase. Should subsurface conditions encountered during construction differ from those encountered in the borings or if any change in the location of the overhead signs is planned, Wang should be timely notified so that our recommendations could be reviewed and revised as necessary.

It has been a pleasure to assist AECOM and the Illinois Department of Transportation on this project. Please contact us if you have any questions or if we can be of further assistance.

Respectfully Submitted,

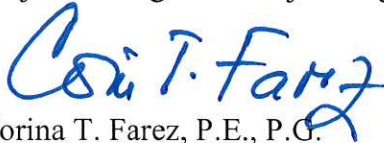
## WANG ENGINEERING, INC.



Metin W. Seyhun, P.E.  
Project Manager/Sr. Project Engineer



Nesam S. Balakumaran  
Project Geotechnical Engineer



Corina T. Farez, P.E., P.G.  
Vice President

### Attachments:

- Exhibit 1: Site Location Map
- Exhibit 2: Boring Location Plan
- Exhibit 3: Subsurface Soil Data Profile
- Appendix A: Boring Logs

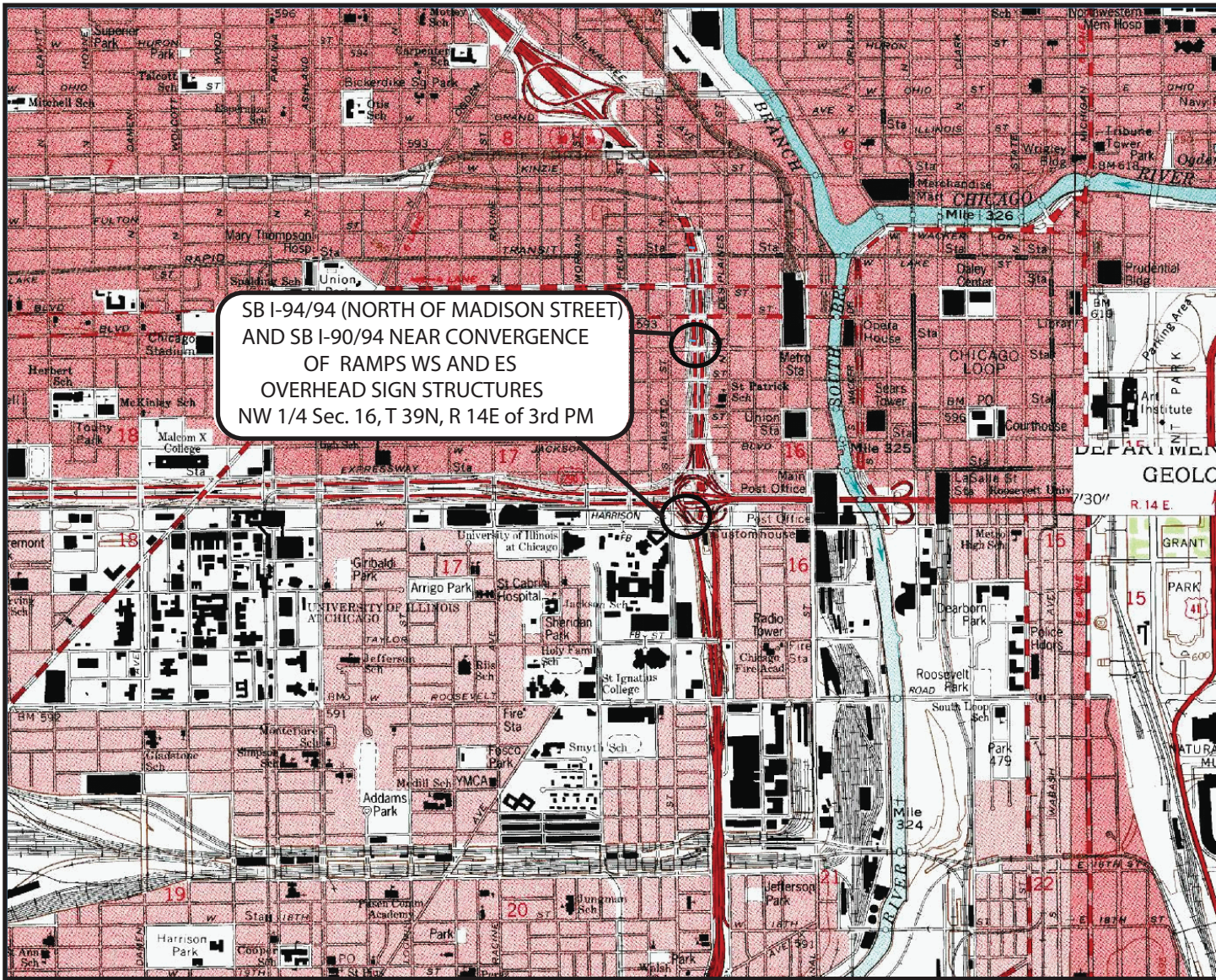
## **EXHIBITS**

Exhibit 1: Site Location Map

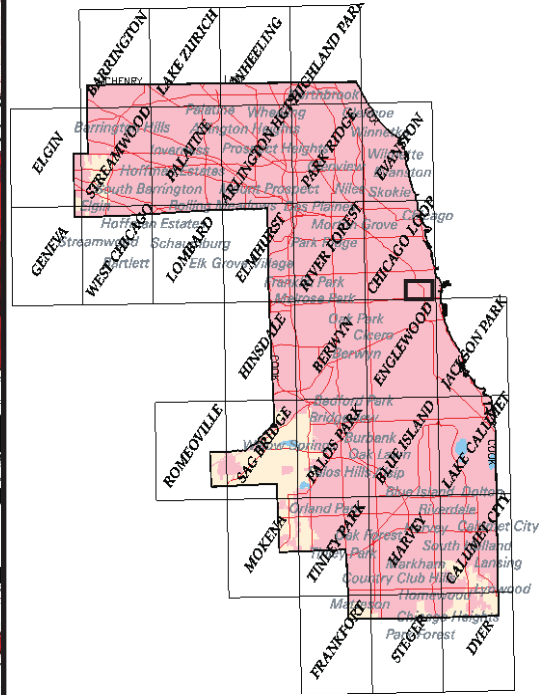
Exhibit 2: Boring Location Plan

Exhibit 3: Subsurface Soil Data Profile

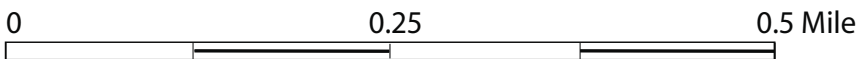




SB I-94/94 (NORTH OF MADISON STREET)  
AND SB I-90/94 NEAR CONVERGENCE  
OF RAMPS WS AND ES  
OVERHEAD SIGN STRUCTURES  
NW 1/4 Sec. 16, T 39N, R 14E of 3rd PM



Cook County



SITE LOCATION MAP: CIRCLE INTERCHANGE RECONSTRUCTION, OVERHEAD SIGN STRUCTURES, COOK COUNTY, IL

SCALE: GRAPHICAL	EXHIBIT 1	DRAWN BY: NSB CHECKED BY: MWS
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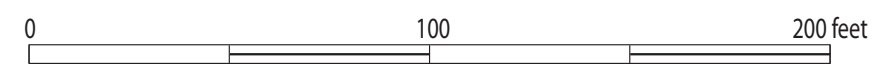

**Wang Engineering**  
 1145 N. Main Street  
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 www.wangeng.com





Legend

⊙ Boring Locations



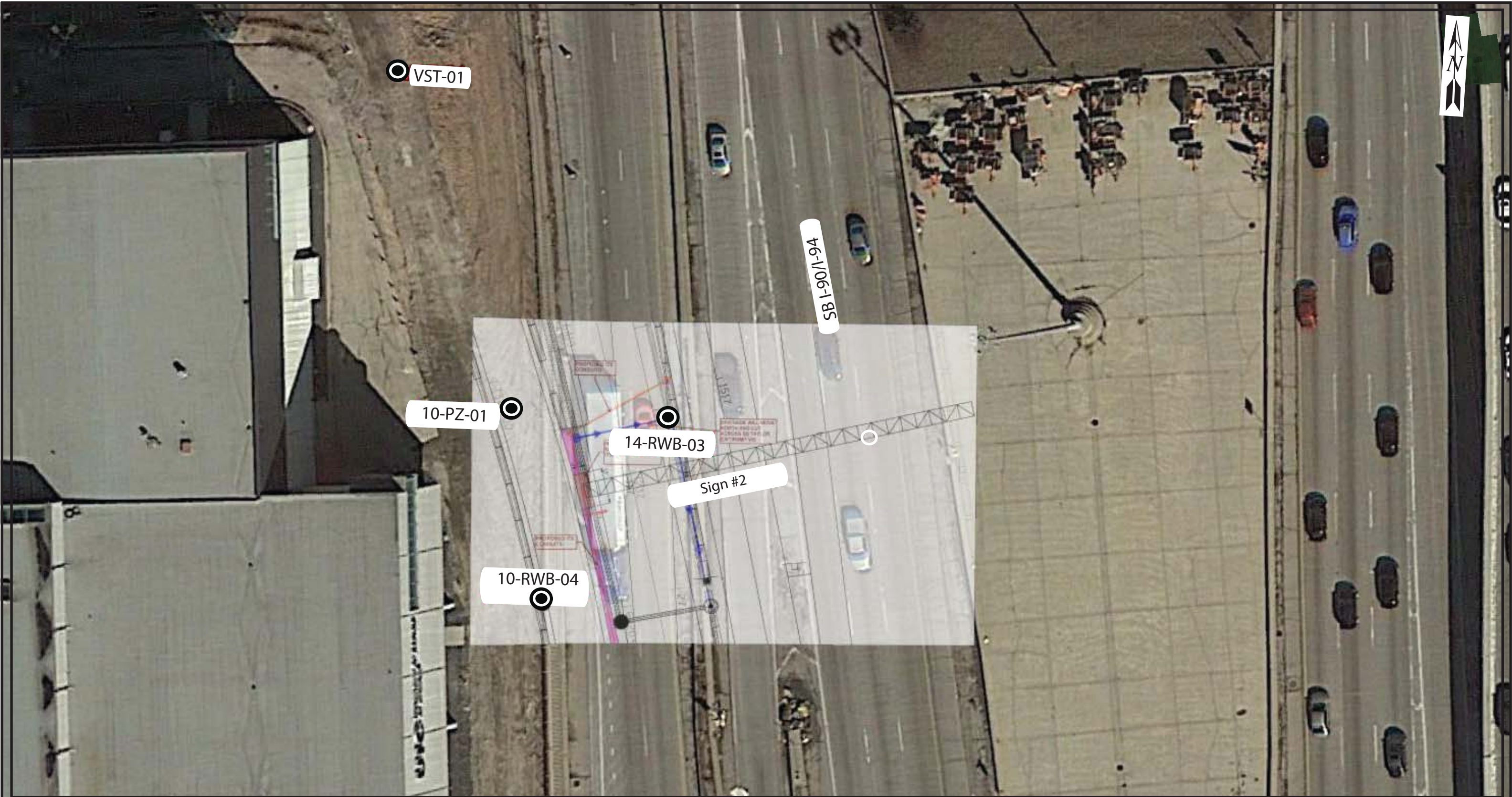
BORING LOCATION PLAN: ICIRCLE INTERCHANGE RECONSTRUCTION, CONTRACT 60X93  
SIGN STRUCTURE AT SB I-90/94 NEAR MADISON STREET, COOK COUNTY, ILLINOIS

SCALE: GRAPHICAL	EXHIBIT 2-1	DRAWN BY: NSB CHECKED BY: MWS
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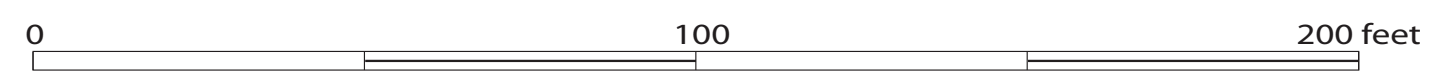
FOR AECOM 1100-04-01






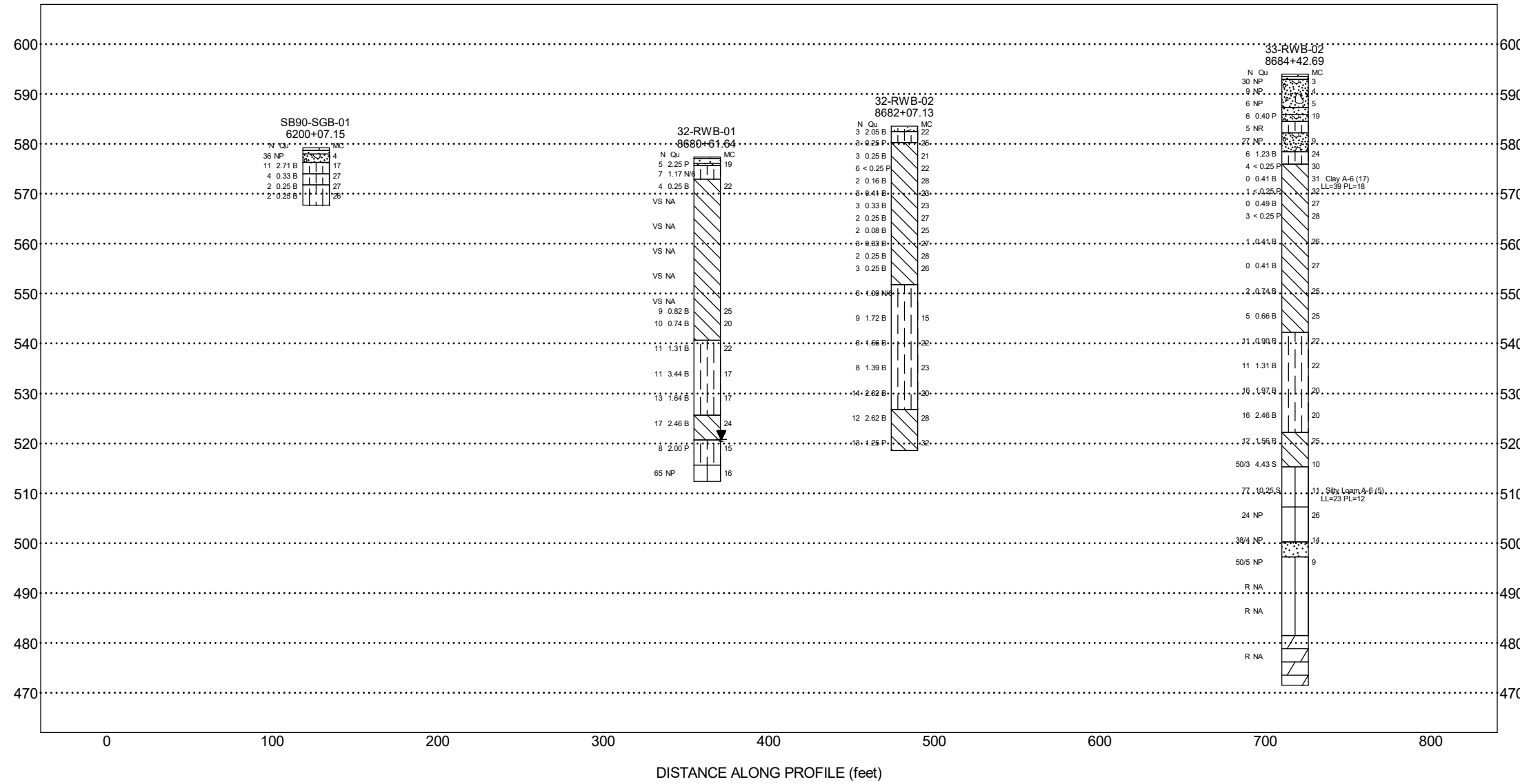
Legend

 Boring Locations



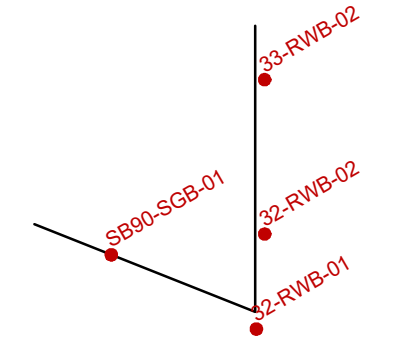
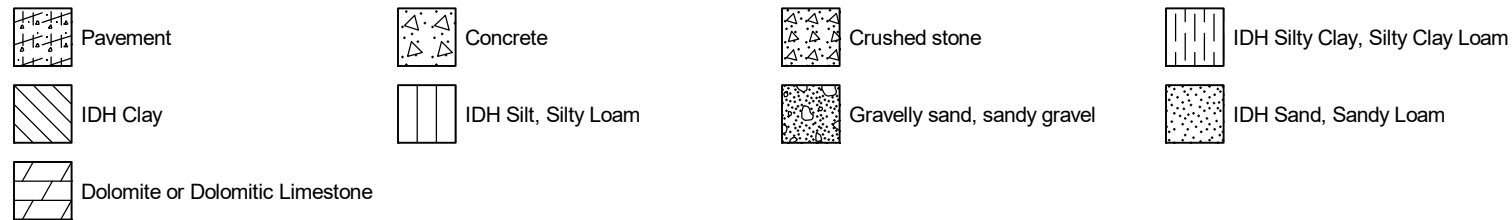
BORING LOCATION PLAN: CIRCLE INTERCHANGE RECONSTRUCTION, CONTRACT 60X93 SIGN STRUCTURE AT SB I-90/94 NEAR CONVERGENCE WITH RAMPS WS AND ES, COOK		
SCALE: GRAPHICAL	EXHIBIT 2-2	DRAWN BY: NSB CHECKED BY: MWS
		1145 N. Main Street Lombard, IL 60148 www.wangeng.com
FOR AECOM		1100-04-01

ELEVATION (feet)



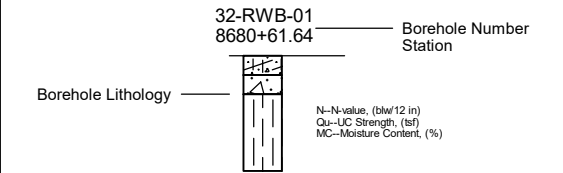
DISTANCE ALONG PROFILE (feet)

**Lithology Graphics**

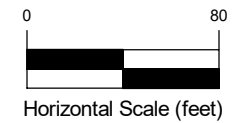


Site Map Scale 1 inch equals 295 feet

**Explanation:**



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



Vertical Exaggeration: 3x

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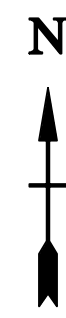
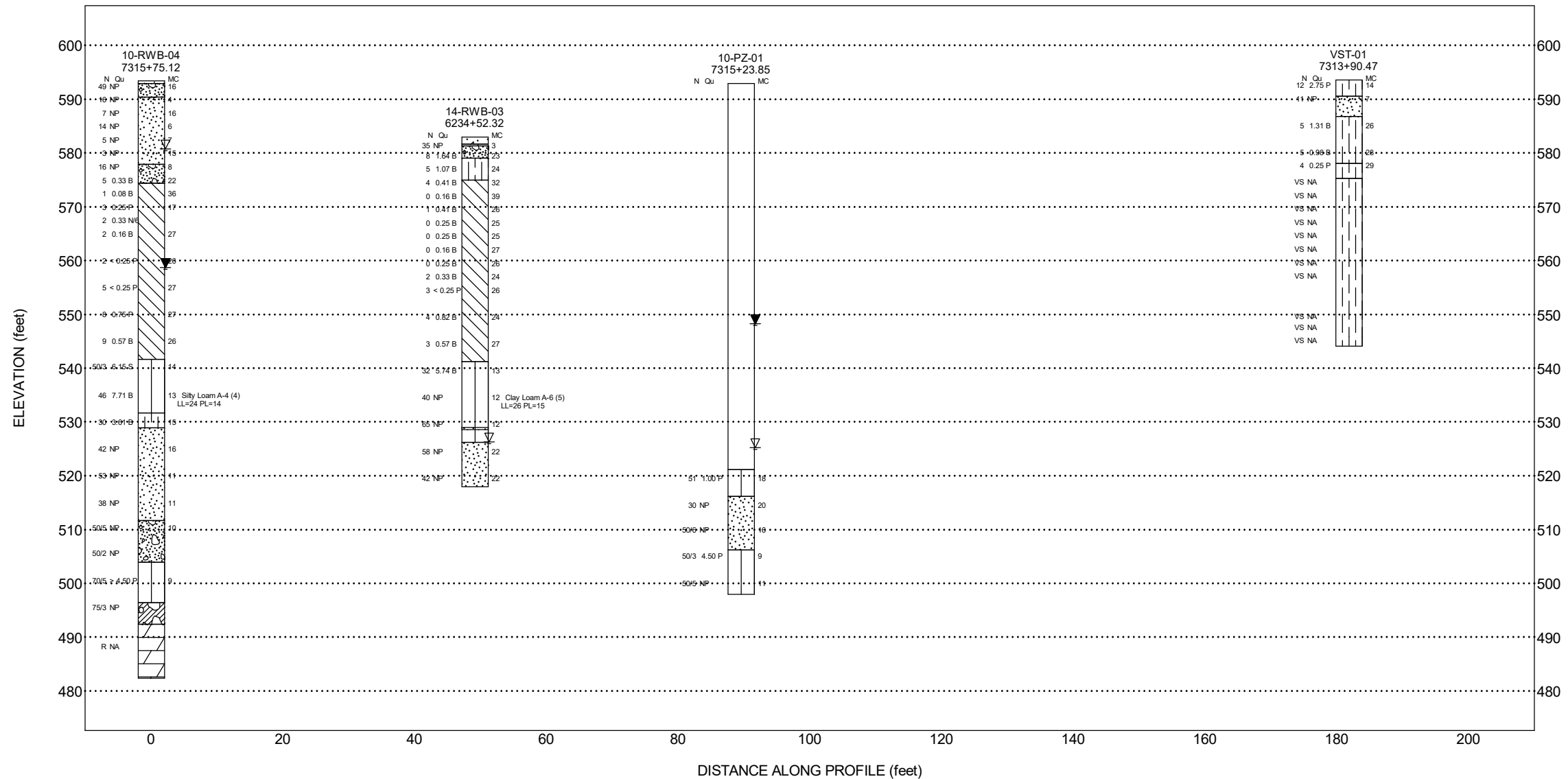
**Subsurface Data Profile  
Sign #1 at SB I-90/94  
(North of Madison Street)**



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

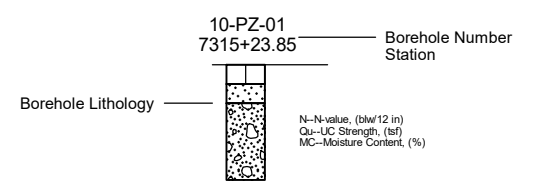
JOB NUMBER	PLATE NUMBER
1100-04-01	EXHIBIT 3-1



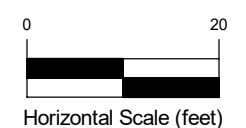


Site Map Scale 1 inch equals 75 feet

**Explanation:**



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



Vertical Exaggeration: 1x

**Lithology Graphics**

IDH Silt, Silty Loam	IDH Sand, Sandy Loam	Pavement	Gravelly sand, sandy gravel
IDH Clay	IDH Silty Clay, Silty Clay Loam	Weathered bedrock	Dolomite or Dolomitic Limestone
Concrete			

**Wang Engineering, Inc.**  
 1145 North Main Street  
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**Subsurface Data Profile  
 Sign #2 at SB I-90/94 near convergence  
 with Ramps WS and ES**



Jane Byrne Interchange  
 Section 17, T39N, R14E of 3rd PM

JOB NUMBER	PLATE NUMBER
1100-04-01	EXHIBIT 3-2

## **APPENDIX A: BORING LOGS**



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 Lombard, IL 60148  
 Telephone: 630-953-9928  
 Fax: 630-953-9938

# BORING LOG 32-RWB-01

WEI Job No.: 1100-04-01

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

Datum: NAVD 88  
 Elevation: 577.40 ft  
 North: 1900327.19 ft  
 East: 1171617.41 ft  
 Station: 8680+61.64  
 Offset: 3.3374 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 (%)
	577.14	1-inch thick, ASPHALT --PAVEMENT--									--S <sub>u remold</sub> = 440.3 psf-- --Sensitivity = 1.82--						
	576.21	1-inch thick, CONCRETE --PAVEMENT--															
	575.7	CRUSHED STONE --BASE COURSE--			1	3 2 3	2.25 P	19									
		Stiff, gray SILTY CLAY, trace gravel and brick fragments --FILL--															
	572.9	Soft to medium stiff, gray CLAY to SILTY CLAY, trace gravel			2	3 3 4	1.17 N/6				--In-Situ Vane Shear, 24.5 feet-- --S <sub>u undis</sub> = 984.2 psf-- --S <sub>u remold</sub> = 466.2 psf-- --Sensitivity = 2.11--	25		4			
					3	1 2 2	0.25 B	22									
		--In-Situ Vane Shear, 9.5 feet-- --S <sub>u undis</sub> = 725.2 psf-- --S <sub>u remold</sub> = 440.3 psf-- --Sensitivity = 1.65--			1						--In-Situ Vane Shear, 29.5 feet-- --S <sub>u undis</sub> = 1450.4 psf-- --S <sub>u remold</sub> = 751.1 psf-- --Sensitivity = 1.93--	30		5			
															4 4 5	0.82 B	25
		--In-Situ Vane Shear, 14.5 feet-- --S <sub>u undis</sub> = 699.3 psf-- --S <sub>u remold</sub> = 362.6 psf-- --Sensitivity = 1.93--			2										3 4 6	0.74 B	20
		--In-Situ Vane Shear, 19.5 feet-- --S <sub>u undis</sub> = 802.9 psf--			3										3 5 6	1.31 B	22
										540.7	Stiff to very stiff, gray SILTY CLAY, trace gravel						

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **07-02-2014** Complete Drilling **07-02-2014**  
 Drilling Contractor **Wang Testing Services** Drill Rig  
 Driller **N&K** Logger **D. Kolpacki** Checked by **C. Marin**  
 Drilling Method **2.25" HSA to 9.5', mud rotary thereafter, boring**  
**backfilled upon completion**

While Drilling **57.00 ft**  
 At Completion of Drilling **57.00 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 6/8/18



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 Lombard, IL 60148  
 Telephone: 630-953-9928  
 Fax: 630-953-9938

# BORING LOG 32-RWB-01

WEI Job No.: 1100-04-01

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

Datum: NAVD 88  
 Elevation: 577.40 ft  
 North: 1900327.19 ft  
 East: 1171617.41 ft  
 Station: 8680+61.64  
 Offset: 3.3374 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 (%)
	515.7									515.7	Very dense, gray SILTY LOAM, trace gravel						
		--Interbedded SILT--	45	X	7	5 6 5	3.44 B	17			--Wet--		X	11	22 28 37	NP	16
										512.4	Boring terminated at 65.00 ft						
	525.7	Very stiff, gray CLAY, trace gravel															
	520.7	Very stiff, gray SILTY CLAY LOAM															
		--Interbedded SILT and SAND, saturated--	60	X	10	3 4 4	2.00 P	15									

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **07-02-2014** Complete Drilling **07-02-2014**  
 Drilling Contractor **Wang Testing Services** Drill Rig  
 Driller **N&K** Logger **D. Kolpacki** Checked by **C. Marin**  
 Drilling Method **2.25" HSA to 9.5', mud rotary thereafter, boring**  
**backfilled upon completion**

While Drilling  $\nabla$  **57.00 ft**  
 At Completion of Drilling  $\nabla$  **57.00 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 6/8/18





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# BORING LOG 32-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: 583.52 ft  
 North: 1900472.26 ft  
 East: 1171630.21 ft  
 Station: 8682+07.13  
 Offset: 3.8668 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 (%)
	582.5	12-inch thick ASPHALT --PAVEMENT--															
		Very stiff, brown and gray SILTY CLAY LOAM, trace gravel --FILL--			1	3 1 2	2.05 B	22						9	1 1 1	0.08 B	25
	580.3	Very soft to medium stiff, gray CLAY to SILTY CLAY, trace gravel			2	2 2 1	0.25 P	25				25		10	1 1 2	0.33 B	27
			5		3	2 2 1	0.25 B	21						11	1 1 1	0.25 B	28
					4	2 3 3	< 0.25 P	22						12	0 1 2	0.25 B	26
					5	1 1 1	0.16 B	28		551.8	Stiff to very stiff, gray SILTY CLAY to SILTY CLAY LOAM, trace gravel						
					6	1 1 2	0.41 B	23						13	2 3 3	1.00 N/6	
					7	1 1 2	0.33 B	23									
					8	1 1 1	0.25 B	27						14	3 4 5	1.72 B	15
			20									40					

### GENERAL NOTES

Begin Drilling **06-26-2014** Complete Drilling **06-26-2014**  
 Drilling Contractor **Wang Testing Services** Drill Rig  
 Driller **N&K** Logger **A. Happel** Checked by **C. Marin**  
 Drilling Method **2.25" HSA to 10', mud rotary thereafter, boring backfilled upon completion**

### WATER LEVEL DATA

While Drilling **Rotary wash**  
 At Completion of Drilling **mud in the borehole**  
 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 6/8/18



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 Lombard, IL 60148  
 Telephone: 630-953-9928  
 Fax: 630-953-9938

# BORING LOG 32-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: 583.52 ft  
 North: 1900472.26 ft  
 East: 1171630.21 ft  
 Station: 8682+07.13  
 Offset: 3.8668 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
			45		15	3 4 4	1.56 B	22		518.5		65		19	5 6 7	1.25 P	32
										Boring terminated at 65.00 ft							
			50		16	4 3 5	1.39 B	23				70					
			55		17	5 6 8	2.62 B	20				75					
	526.8	Stiff to very stiff, gray CLAY, trace gravel															
			60		18	5 6 6	2.62 B	28				80					

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling ..... **06-26-2014** ..... Complete Drilling ..... **06-26-2014** .....  
 Drilling Contractor ..... **Wang Testing Services** ..... Drill Rig .....  
 Driller ..... **N&K** ..... Logger ..... **A. Happel** ..... Checked by ..... **C. Marin** .....  
 Drilling Method ..... **2.25" HSA to 10', mud rotary thereafter, boring** .....  
 ..... **backfilled upon completion** .....

While Drilling ..... ▽ ..... **Rotary wash** .....  
 At Completion of Drilling ..... ▽ ..... **mud in the borehole** .....  
 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 6/8/18



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# BORING LOG 33-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: 593.96 ft  
 North: 1900708.05 ft  
 East: 1171630.08 ft  
 Station: 8684+42.69  
 Offset: 6.4626 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 (%)
	593.5	5-inch thick ASPHALT --PAVEMENT--															
	593.0	7-inch thick CONCRETE --PAVEMENT--															
		Medium dense, grayish white SANDY GRAVEL --FILL--			1	7 13 17	NP	3						9	0 0 0	0.41 B	31
					2	8 5 4	NP	4						10	0 0 1	< 0.25 P	32
	587.3	Loose, brown, fine SAND, trace gravel --FILL--			3	3 3 3	NP	5						11	0 0 0	0.49 B	27
	586.0	Grayish white SANDY GRAVEL --FILL--			4	3 3 3	0.40 P	19						12	0 1 2	< 0.25 P	28
	584.5	Soft, brown SILTY CLAY LOAM, trace gravel --FILL--	10		5	3 2 3	NR										
	582.2	Medium dense, grayish white SANDY GRAVEL --FILL--			6	8 11 16	NP	9						13	0 0 1	0.41 B	26
	578.5	Stiff, brown and gray SILTY CLAY LOAM to SILTY CLAY, trace gravel			7	1 2 4	1.23 B	24									
	576.0	Very soft to medium stiff, gray CLAY to SILTY CLAY, trace gravel			8	1 2 2	< 0.25 P	30						14	0 0 0	0.41 B	27

--L<sub>L</sub>(%)=39, P<sub>L</sub>(%)=18--  
 --%Gravel=5.1--  
 --%Sand=13.2--  
 --%Silt=42.2--  
 --%Clay=39.5--  
 --A-6 (17)--

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **07-01-2014** Complete Drilling **07-02-2014**  
 Drilling Contractor **Wang Testing Services** Drill Rig  
 Driller **R&J** Logger **S. Woods** Checked by **CLM (-data)**  
 Drilling Method **2.25" SSA to 10', mud rotary thereafter, boring**  
**backfilled upon completion**

While Drilling **Rotary wash**  
 At Completion of Drilling **mud in the borehole**  
 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 33-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: 593.96 ft  
 North: 1900708.05 ft  
 East: 1171630.08 ft  
 Station: 8684+42.69  
 Offset: 6.4626 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 (%)
			45		15	0 0 2	0.74 B	25				65		19	3 7 9	1.97 B	20
			50		16	0 1 4	0.66 B	25				70		20	3 7 9	2.46 B	20
	542.2	Medium stiff to very stiff, gray SILTY CLAY, trace gravel								522.2	Stiff, gray CLAY to SILTY CLAY, trace gravel						
			55		17	2 7 4	0.90 B	22				75		21	2 5 7	1.56 B	25
			60		18	1 5 6	1.31 B	22		515.3	Hard, gray SILTY LOAM, trace gravel			22	39 50/3	4.43 S	10
												-80					

### GENERAL NOTES

Begin Drilling **07-01-2014** Complete Drilling **07-02-2014**  
 Drilling Contractor **Wang Testing Services** Drill Rig  
 Driller **R&J** Logger **S. Woods** Checked by **CLM (-data)**  
 Drilling Method **2.25" SSA to 10', mud rotary thereafter, boring backfilled upon completion**

### WATER LEVEL DATA

While Drilling **Rotary wash**  
 At Completion of Drilling **mud in the borehole**  
 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 33-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: 593.96 ft  
 North: 1900708.05 ft  
 East: 1171630.08 ft  
 Station: 8684+42.69  
 Offset: 6.4626 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 (%)
		--L <sub>I</sub> (%)=23, P <sub>I</sub> (%)=12-- --%Gravel=6.9-- --%Sand=20.1-- --%Silt=57.0-- --%Clay=15.9-- --A-6 (5)--	85	X	23	24 37 40	10.25 S	11			--HARD DRILLING--	105		1			
	507.2	Medium dense, gray SILT --Dry--	90	X	24	10 10 14	NP	26				110		2			
	500.2	Very stiff, brown, fine SAND and SILT --Dry--	95	X	25	22 44 38/4	NP	14			--DIFFICULT DRILLING--	115		3			
	497.2	Very dense, gray SILTY LOAM, trace gravel --Dolostone fragments--	100	X	26	50/5	NP	9		481.5	Strong, light gray, good rock mass quality, bedded fresh DOLOSTONE, up to 20-inch beds, 9-inch spaced joints, horizontal joints with none or less than <0.2-inch infilling, hard joint wall, with stylolitic surfaces, and moderately vuggy porosity. Run 1 - RECOVERY = 100% RQD = 86%	120		3			

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **07-01-2014** Complete Drilling **07-02-2014**  
 Drilling Contractor **Wang Testing Services** Drill Rig  
 Driller **R&J** Logger **S. Woods** Checked by **CLM (-data)**  
 Drilling Method **2.25" SSA to 10', mud rotary thereafter, boring backfilled upon completion**

While Drilling  **Rotary wash**  
 At Completion of Drilling  **mud in the borehole**  
 Time After Drilling **NA**  
 Depth to Water  **NA**

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# BORING LOG 33-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: 593.96 ft  
 North: 1900708.05 ft  
 East: 1171630.08 ft  
 Station: 8684+42.69  
 Offset: 6.4626 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 (%)
		--drilling water loss--															
	471.5	Boring terminated at 122.50 ft															
			125														
			130														
			135														
			140														

### GENERAL NOTES

Begin Drilling ..... **07-01-2014** ..... Complete Drilling ..... **07-02-2014** .....  
 Drilling Contractor ..... **Wang Testing Services** ..... Drill Rig .....  
 Driller ..... **R&J** ..... Logger ..... **S. Woods** ..... Checked by **CLM (-data)** .....  
 Drilling Method ..... **2.25" SSA to 10', mud rotary thereafter, boring** .....  
 ..... **backfilled upon completion** .....

### WATER LEVEL DATA

While Drilling ..... ▽ ..... **Rotary wash** .....  
 At Completion of Drilling ..... ▽ ..... **mud in the borehole** .....  
 Time After Drilling ..... **NA** .....  
 Depth to Water ..... ▽ ..... **NA** .....

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# BORING LOG SB90-SGB-01

WEI Job No.: 1100-04-01

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

Datum: NAVD 88  
 Elevation: 579.26 ft  
 North: 1900440.64 ft  
 East: 1171395.88 ft  
 Station: 6200+07.15  
 Offset: 30.2937 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 (%)
	578.7	6.5-inch thick, ASPHALT --PAVEMENT--															
	578.09	9-inch thick, CONCRETE --PAVEMENT--															
	576.3	Dense, gray SANDY GRAVEL, crushed stone --BASE COURSE--			1	11 28 8 5	NP	4									
	574.0	Very stiff, brown and gray SILTY CLAY LOAM, trace gravel, brick fragments --FILL--	5		2	6 5 6 5	2.71 B	17									
	571.8	Soft, gray SILTY CLAY LOAM, trace gravel			3	1 2 2 2	0.33 B	27									
	571.8	Soft, gray SILTY CLAY			4	1 1 1 2	0.25 B	27									
	567.8	Boring terminated at 11.50 ft			5	0 1 1 1 1	0.25 B	26									

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling ..... **10-19-2014** ..... Complete Drilling ..... **10-19-2014** .....  
 Drilling Contractor ..... **Wang Testing Services** ..... Drill Rig .....  
 Driller ..... **P&P** ..... Logger ..... **F. Bozga** ..... Checked by ..... **RKC** .....  
 Drilling Method ..... **2.25" IDA HSA, boring backfilled upon completion** .....

While Drilling ..... ▽ ..... **DRY** .....  
 At Completion of Drilling ..... ▼ ..... **DRY** .....  
 Time After Drilling ..... **NA** .....  
 Depth to Water ..... ▼ ..... **NA** .....

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# BORING LOG VST-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: 593.21 ft  
 North: 1899985.05 ft  
 East: 1171693.33 ft  
 Station: 8415+53.90  
 Offset: 182.276 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 (%)
	592.9	ASPHALT --PAVEMENT-- Medium dense, brown gravelly coarse SAND --FILL--	5		1	5 7 7	NP	6			--S <sub>u undis</sub> = 425.9 psf-- --S <sub>u remold</sub> = 371.3 psf-- --Sensitivity = 1.1--  --In-Situ Vane Shear, 22.0 feet-- --S <sub>u undis</sub> = 371.3 psf-- --S <sub>u remold</sub> = 305.8 psf-- --Sensitivity = 1.2--	25		2			
	586.5	Medium stiff, brown and gray SILTY CLAY LOAM	10		2	3 2 2	0.75 P	26			--In-Situ Vane Shear, 24.5 feet-- --S <sub>u undis</sub> = 382.2 psf-- --S <sub>u remold</sub> = 316.7 psf-- --Sensitivity = 1.2--  --In-Situ Vane Shear, 27.0 feet-- --S <sub>u undis</sub> = 393.1 psf-- --S <sub>u remold</sub> = 338.5 psf-- --Sensitivity = 1.2--	30		3			
	580.2	Soft, gray SILTY CLAY	15		3	3 2 2	NR				--In-Situ Vane Shear, 29.5 feet-- --S <sub>u undis</sub> = 622.5 psf-- --S <sub>u remold</sub> = 371.3 psf-- --Sensitivity = 1.7--  --In-Situ Vane Shear, 32.0 feet-- --S <sub>u undis</sub> = 535.1 psf-- --S <sub>u remold</sub> = 327.6 psf-- --Sensitivity = 1.6--	35		4			
	575.0	--In-Situ Vane Shear, 19.5 feet--	20		4	1 1 1	0.25 P	23			--In-Situ Vane Shear, 34.5 feet-- --S <sub>u undis</sub> = 535.1 psf-- --S <sub>u remold</sub> = 393.1 psf-- --Sensitivity = 1.4--  --In-Situ Vane Shear, 37.0 feet-- --S <sub>u undis</sub> = 655.2 psf-- --S <sub>u remold</sub> = 404.1 psf-- --Sensitivity = 1.6--	40		5			
											--In-Situ Vane Shear, 39.5 feet--						

### GENERAL NOTES

Begin Drilling **12-02-2015** Complete Drilling **12-02-2015**  
 Drilling Contractor **Wang Testing Services** Drill Rig  
 Driller **R&N** Logger **F. Bozga** Checked by **A. Kurnia**  
 Drilling Method **2.25" HSA to 10', mud rotary thereafter, boring**  
**backfilled upon completion**

### WATER LEVEL DATA

While Drilling **Rotary wash**  
 At Completion of Drilling **mud in the borehole**  
 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 VST-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: 593.21 ft  
 North: 1899985.05 ft  
 East: 1171693.33 ft  
 Station: 8415+53.90  
 Offset: 182.276 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 (%)
		--S <sub>u undis</sub> = 622.5 psf-- --S <sub>u remold</sub> = 382.2 psf-- --Sensitivity = 1.6--				VS											
		--In-Situ Vane Shear, 42.0 feet-- --S <sub>u undis</sub> = 851.8 psf-- --S <sub>u remold</sub> = 458.7 psf-- --Sensitivity = 1.9--	10		10	VS											
		--In-Situ Vane Shear, 44.5 feet-- --S <sub>u undis</sub> = 928.3 psf-- --S <sub>u remold</sub> = 600.6 psf-- --Sensitivity = 1.5--	45		11	VS											
		--In-Situ Vane Shear, 47.0 feet-- --S <sub>u undis</sub> = 1266.8 psf-- --S <sub>u remold</sub> = 633.4 psf-- --Sensitivity = 2.0--			12	VS											
		--In-Situ Vane Shear, 51.0 feet-- --S <sub>u undis</sub> = 1681.8 psf-- --S <sub>u remold</sub> = 1266.8 psf-- --Sensitivity = 1.3--			13	VS											
	541.7	Boring terminated at 51.50 ft															

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **12-02-2015** Complete Drilling **12-02-2015**  
 Drilling Contractor **Wang Testing Services** Drill Rig  
 Driller **R&N** Logger **F. Bozga** Checked by **A. Kurnia**  
 Drilling Method **2.25" HSA to 10', mud rotary thereafter, boring backfilled upon completion**

While Drilling **Rotary wash**  
 At Completion of Drilling **mud in the borehole**  
 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 10-PZ-01

WEI Job No.: 1100-04-01

Client ..... **AECOM**  
 Project ..... **Jane Byrne Interchange**  
 Location ..... **Section 17, T39N, R14E of 3rd PM**

Datum: NAVD 88  
 Elevation: 592.93 ft  
 North: 1897019.14 ft  
 East: 1171462.69 ft  
 Station: 7315+23.85  
 Offset: 4.45 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 (%)
		--Drilled without sampling--	5									25					
			10									30					
			15									35					
			20									40					

Piezometer Data:  
 --Installed in Dec. 11, 2014  
 --Bentonite Seal 66 to 71 feet  
 --Top of Sand Pack at 71 feet  
 --Top of Screen at 73 feet  
 --Screen Length 20 feet  
 --Bottom of Screen at 93 feet

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling ..... **12-10-2014** ..... Complete Drilling ..... **12-11-2014** .....  
 Drilling Contractor ..... **Wang Testing Services** ..... Drill Rig .....  
 Driller ..... **P&P** ..... Logger ..... **A. Happel** ..... Checked by ..... **C. Marin** .....  
 Drilling Method ..... **4.25" HSA, monitoring water well; pizometer** .....  
 ..... **installed on 12/11/2014** .....

While Drilling ..... ▽ ..... **68.00 ft** .....  
 At Completion of Drilling ..... ▼ ..... **74.00 ft** .....  
 Time After Drilling ..... **24 hours** .....  
 Depth to Water ..... ▼ ..... **45.04 ft** .....

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



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# BORING LOG 10-PZ-01

WEI Job No.: 1100-04-01

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

Datum: NAVD 88  
 Elevation: 592.93 ft  
 North: 1897019.14 ft  
 East: 1171462.69 ft  
 Station: 7315+23.85  
 Offset: 4.45 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 (%)
		--piezometer stabilized water level reading -- --reading during well development (12/15/2014) = 43.85 feet bgs-- --reading date: 12/26/2014 = 43.72 feet bgs--	45														
			50														
			55							521.2	Very dense, gray SILTY LOAM --Wet--	75		18 27 24	1.00	18	
			60							516.2	Very dense, gray SANDY LOAM, trace to little gravel --Saturated--	80		7 14 16	NP	20	

GENERAL NOTES				WATER LEVEL DATA			
Begin Drilling	12-10-2014	Complete Drilling	12-11-2014	While Drilling	▽	68.00 ft	
Drilling Contractor	Wang Testing Services	Drill Rig		At Completion of Drilling	▼	74.00 ft	
Driller	P&P	Logger	A. Happel	Time After Drilling		24 hours	
Drilling Method	4.25" HSA, monitoring water well; pizometer			Depth to Water	▼	45.04 ft	
	installed on 12/11/2014			The stratification lines represent the approximate boundary between soil types; the actual transition may be gradual.			

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# BORING LOG 10-PZ-01

WEI Job No.: 1100-04-01

Client ..... **AECOM** .....  
 Project ..... **Jane Byrne Interchange** .....  
 Location ..... **Section 17, T39N, R14E of 3rd PM** .....

Datum: NAVD 88  
 Elevation: 592.93 ft  
 North: 1897019.14 ft  
 East: 1171462.69 ft  
 Station: 7315+23.85  
 Offset: 4.45 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 (%)
	506.2		85		3	50/6	NP	16									
		Very dense, gray SILTY LOAM, trace gravel			4	50/3	4.50 P	9									
		--Moist--	90														
		--Wet--			5	50/5	NP	11									
	497.9	--HARD DRILLING--	95														
		Boring terminated at 95.00 ft															

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling ..... **12-10-2014** ..... Complete Drilling ..... **12-11-2014** .....  
 Drilling Contractor ..... **Wang Testing Services** ..... Drill Rig .....  
 Driller ..... **P&P** ..... Logger ..... **A. Happel** ..... Checked by ..... **C. Marin** .....  
 Drilling Method ..... **4.25" HSA, monitoring water well; pizometer** .....  
 ..... **installed on 12/11/2014** .....

While Drilling ..... ▽ ..... **68.00 ft** .....  
 At Completion of Drilling ..... ▼ ..... **74.00 ft** .....  
 Time After Drilling ..... **24 hours** .....  
 Depth to Water ..... ▼ ..... **45.04 ft** .....

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



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# BORING LOG 10-RWB-04

WEI Job No.: 1100-04-01

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

Datum: NAVD 88  
 Elevation: 593.40 ft  
 North: 1896930.29 ft  
 East: 1171484.09 ft  
 Station: 7315+75.12  
 Offset: 1.47 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 (%)
	592.9	6-inch thick ASPHALT --PAVEMENT--									gravel						
		Dense, brown GRAVELLY LOAM --BASE COURSE--			1	29 29 20	NP	16						9	0 0 1	0.08 B	36
	590.4	Very loose to medium dense, brown, coarse SAND --Dry to saturated-- --FILL--			2	6 9 7	NP	4				25		10	1 1 2	0.25 P	17
					3	3 3 4	NP	16						11	0 0 2	0.33 N/6	
					4	4 8 6	NP	6				30		12	1 1 1	0.16 B	27
					5	3 2 3	NP	7									
					6	2 2 1	NP	15				35		13	0 0 2	< 0.25 P	26
	577.9	Medium dense, gray GRAVELLY SAND --Wet--			7	3 7 9	NP	8									
	574.4	Very soft to medium stiff, gray CLAY to SILTY CLAY, trace			8	10 3 2	0.33 B	22				40		14	1 2 3	< 0.25 P	27

### GENERAL NOTES

Begin Drilling **03-10-2014** Complete Drilling **03-13-2014**  
 Drilling Contractor **Wang Testing Services** Drill Rig  
 Driller **P&N** Logger **F. Bozga** Checked by **C. Marin**  
 Drilling Method **2.25" SSA to 15', mud rotary thereafter, boring**  
**backfilled upon completion**

### WATER LEVEL DATA

While Drilling **13.00 ft**  
 At Completion of Drilling **mud in the borehole**  
 Time After Drilling **72 hours**  
 Depth to Water **35.00 ft**

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

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# BORING LOG 10-RWB-04

WEI Job No.: 1100-04-01

Client ..... **AECOM** .....  
 Project ..... **Jane Byrne Interchange** .....  
 Location ..... **Section 17, T39N, R14E of 3rd PM** .....

Datum: NAVD 88  
 Elevation: 593.40 ft  
 North: 1896930.29 ft  
 East: 1171484.09 ft  
 Station: 7315+75.12  
 Offset: 1.47 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 (%)
											--%Silt=51.5-- --%Clay=17.2-- --A-4 (4)--						
	531.7	Very stiff, gray SILTY CLAY LOAM, trace gravel								528.9							
			45	X	15	4 4 4	0.75 P	27				65	X	19	7 11 19	3.61 B	15
											Dense to very dense, gray, medium to coarse SAND, trace gravel						
											--Wet--						
			50	X	16	1 3 6	0.57 B	26				70	X	20	14 22 20	NP	16
	541.7	Hard, gray SILTY LOAM, trace gravel															
			55	X	17	15 50/3	6.15 S	14				75	X	21	16 17 36	NP	11
			60	X	18	18 19 27	7.71 B	13				80	X	22	16 18 20	NP	11
		--L <sub>L</sub> (%)=24, P <sub>L</sub> (%)=14-- --%Gravel=4.5-- --%Sand=26.8--															

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling ..... **03-10-2014** ..... Complete Drilling ..... **03-13-2014** .....  
 Drilling Contractor ..... **Wang Testing Services** ..... Drill Rig .....  
 Driller ..... **P&N** ..... Logger ..... **F. Bozga** ..... Checked by ..... **C. Marin** .....  
 Drilling Method ..... **2.25" SSA to 15', mud rotary thereafter, boring** .....  
 ..... **backfilled upon completion** .....

While Drilling ..... ▽ ..... **13.00 ft** .....  
 At Completion of Drilling ..... ▽ ..... **mud in the borehole** .....  
 Time After Drilling ..... **72 hours** .....  
 Depth to Water ..... ▽ ..... **35.00 ft** .....

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

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# BORING LOG 10-RWB-04

WEI Job No.: 1100-04-01

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

Datum: NAVD 88  
 Elevation: 593.40 ft  
 North: 1896930.29 ft  
 East: 1171484.09 ft  
 Station: 7315+75.12  
 Offset: 1.47 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 (%)
	511.7	--HARD DRILLING-- --Possible Cobbles--								492.4							
		Very dense, gray GRAVELLY SAND									Strong, light gray, fair rock mass quality, bedded fresh DOLOSTONE, up to 19-inch beds, 11-inch joint spacing, horizontal and vertical joints with none to more than 0.2-inch greenish gray infilling, hard joint wall, with stylolitic surfaces, and moderately vuggy porosity.						
		--Wet--	85	X	23	45 50/5	NP	10			--Run 1 - RECOVERY=96%-- --RQD=71%--	105		1			
		-HARD DRILLING up to 89.5 ft-- --Possible Cobbles--															
	503.9		90		24	50/2	NP										
		Hard, gray SILTY LOAM, trace to little gravel															
		--Dry--								482.4	Boring terminated at 111.00 ft						
			95	X	25	70/5	4.50 P	9									
		--HARD DRILLING at 97 ft-- --Possible Cobbles--															
	496.4																
		--WEATHERED BEDROCK--															
		--HARD DRILLING--															
			100		26	75/3	NP										

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **03-10-2014** Complete Drilling **03-13-2014**  
 Drilling Contractor **Wang Testing Services** Drill Rig  
 Driller **P&N** Logger **F. Bozga** Checked by **C. Marin**  
 Drilling Method **2.25" SSA to 15', mud rotary thereafter, boring**  
**backfilled upon completion**

While Drilling **13.00 ft**  
 At Completion of Drilling **mud in the borehole**  
 Time After Drilling **72 hours**  
 Depth to Water **35.00 ft**

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

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# BORING LOG 14-RWB-03

WEI Job No.: 1100-04-01

Client ..... **AECOM** .....  
 Project ..... **Jane Byrne Interchange** .....  
 Location ..... **Section 17, T39N, R14E of 3rd PM** .....

Datum: NAVD 88  
 Elevation: 582.96 ft  
 North: 1896992.53 ft  
 East: 1171501.15 ft  
 Station: 6234+52.32  
 Offset: 75.7462 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
		16-inch thick CONCRETE --PAVEMENT--															
	581.6																
	581.34	1/4-inch thick ASPHALT --PAVEMENT--															
		Dense, grayish white SANDY GRAVEL --FILL--		X	1	22 22 13	NP	3					X	9	0 0 0	0.16 B	27
	579.0			X	2	4 3 5	1.64 B	23					X	10	0 0 0	0.25 B	26
		Stiff, gray SILTY CLAY, trace gravel		X	3	2 2 3	1.07 B	24					X	11	0 1 1	0.33 B	24
	575.0			X	4	1 2 2	0.41 B	32					X	12	1 1 2	< 0.25 P	26
		Very soft to medium stiff, gray CLAY to SILTY CLAY, trace gravel		X	5	0 0 0	0.16 B	39					X	13	1 2 2	0.82 B	24
				X	6	0 0 1	0.41 B	26					X	14	1 1 2	0.57 B	27
				X	7	0 0 0	0.25 B	25					X	14	1 1 2	0.57 B	27
				X	8	0 0 0	0.25 B	25					X	14	1 1 2	0.57 B	27

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling ..... **07-20-2014** ..... Complete Drilling ..... **07-20-2014** .....  
 Drilling Contractor ..... **Wang Testing Services** ..... Drill Rig .....  
 Driller ..... **R&J** ..... Logger ..... **S. Woods** ..... Checked by ..... **C. Marin** .....  
 Drilling Method ..... **2.25" SSA to 10', mud rotary thereafter, boring** .....  
**backfilled upon completion** .....

While Drilling ..... ▽ ..... **57.00 ft** .....  
 At Completion of Drilling ..... ▽ ..... **mud in the borehole** .....  
 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 14-RWB-03

WEI Job No.: 1100-04-01

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

Datum: NAVD 88  
 Elevation: 582.96 ft  
 North: 1896992.53 ft  
 East: 1171501.15 ft  
 Station: 6234+52.32  
 Offset: 75.7462 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 (%)
	541.2	Dense to very dense, gray CLAY LOAM to SILTY LOAM, trace gravel															
		--Dry--	45		15	8 12 20	5.74 B	13		518.0		65		19	16 20 22	NP	22
											Boring terminated at 65.00 ft						
		--L <sub>L</sub> (%)=26, P <sub>L</sub> (%)=15-- --%Gravel=5.1-- --%Sand=25.2-- --%Silt=47.0-- --%Clay=22.7-- --A-6 (5)--	50		16	13 20 20	NP	12				70					
	528.5	--5-inch, brown, coarse SAND--	55		17	9 18 47	NP	12				75					
	526.2	Dense to very dense, brown, fine SAND															
		--Moist--	60		18	15 21 37	NP	22				80					

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling **07-20-2014** Complete Drilling **07-20-2014**  
 Drilling Contractor **Wang Testing Services** Drill Rig  
 Driller **R&J** Logger **S. Woods** Checked by **C. Marin**  
 Drilling Method **2.25" SSA to 10', mud rotary thereafter, boring**  
**backfilled upon completion**

While Drilling  $\nabla$  **57.00 ft**  
 At Completion of Drilling  $\nabla$  **mud in the borehole**  
 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 VST-01

WEI Job No.: 1100-04-01

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

Datum: NAVD 88  
 Elevation: 593.55 ft  
 North: 1897108.36 ft  
 East: 1171435.63 ft  
 Station: 7313+90.47  
 Offset: 2.00 LT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	
		Very stiff, brown SILTY CLAY LOAM, trace gravel --FILL--			1	3 5 7	2.75 P	14			--S <sub>u undis</sub> = 786.3 psf-- --S <sub>u remold</sub> = 371.3 psf-- --Sensitivity = 2.1--							
	590.5	Medium dense, fine SAND	5		2	5 5 6	NP	7			--In-Situ Vane Shear, 22.0 feet-- --S <sub>u undis</sub> = 742.6 psf-- --S <sub>u remold</sub> = 305.8 psf-- --Sensitivity = 2.4--			2				
	586.8	Medium stiff to stiff, gray SILTY CLAY	10		3	2 2 3	1.31 B	26			--In-Situ Vane Shear, 24.5 feet-- --S <sub>u undis</sub> = 578.8 psf-- --S <sub>u remold</sub> = 382.2 psf-- --Sensitivity = 1.5--			3				
			15		4	2 2 3	0.98 B	28			--In-Situ Vane Shear, 27.0 feet-- --S <sub>u undis</sub> = 742.6 psf-- --S <sub>u remold</sub> = 415.0 psf-- --Sensitivity = 1.8--			4				
	578.0	Soft, gray SILTY CLAY			5	1 2 2	0.25 P	29			--In-Situ Vane Shear, 29.5 feet-- --S <sub>u undis</sub> = 589.7 psf-- --S <sub>u remold</sub> = 283.9 psf-- --Sensitivity = 2.1--			5				
	575.3										--In-Situ Vane Shear, 32.0 feet-- --S <sub>u undis</sub> = 1026.6 psf-- --S <sub>u remold</sub> = 447.8 psf-- --Sensitivity = 2.3--			6				
											--In-Situ Vane Shear, 34.5 feet-- --S <sub>u undis</sub> = 764.5 psf-- --S <sub>u remold</sub> = 480.5 psf-- --Sensitivity = 1.6--			7				
											--In-Situ Vane Shear, 37.0 feet-- --S <sub>u undis</sub> = 1026.6 psf-- --S <sub>u remold</sub> = 589.7 psf-- --Sensitivity = 1.7--			8				
											--In-Situ Vane Shear, 19.5 feet--							

### GENERAL NOTES

Begin Drilling **12-01-2015** Complete Drilling **12-01-2015**  
 Drilling Contractor **Wang Testing Services** Drill Rig  
 Driller **R&N** Logger **F. Bozga** Checked by **A. Kurnia**  
 Drilling Method **2.25" HSA to 10', mud rotary thereafter, boring**  
**backfilled upon completion**

### WATER LEVEL DATA

While Drilling **Rotary wash**  
 At Completion of Drilling **mud in the borehole**  
 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 VST-01

WEI Job No.: 1100-04-01

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

Datum: NAVD 88  
 Elevation: 593.55 ft  
 North: 1897108.36 ft  
 East: 1171435.63 ft  
 Station: 7313+90.47  
 Offset: 2.00 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 (%)
	544.0																
		--Equipment Slipped--	45		9	VS											
		--In-Situ Vane Shear, 46.5 feet-- -- $S_{u\text{ undis}} = 1070.2$ psf-- -- $S_{u\text{ remold}} = 633.4$ psf-- --Sensitivity = 1.7--			10	VS											
		--In-Situ Vane Shear, 49.0 feet-- -- $S_{u\text{ undis}} = 1157.6$ psf-- -- $S_{u\text{ remold}} = 611.6$ psf-- --Sensitivity = 2.3-- Boring terminated at 49.50 ft	50		11	VS											
			55														
			60														

### GENERAL NOTES

Begin Drilling **12-01-2015** Complete Drilling **12-01-2015**  
 Drilling Contractor **Wang Testing Services** Drill Rig  
 Driller **R&N** Logger **F. Bozga** Checked by **A. Kurnia**  
 Drilling Method **2.25" HSA to 10', mud rotary thereafter, boring backfilled upon completion**

### WATER LEVEL DATA

While Drilling  $\nabla$  **Rotary wash**  
 At Completion of Drilling  $\nabla$  **mud in the borehole**  
 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.