

November 8, 2019

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

**AECOM**

303 East Wacker Drive, Suite 1400

Chicago, IL 60601

Re: Geotechnical Letter Report  
High Mast Towers - Contract **62A76 Addendum**  
Jane Byrne Interchange  
Cook County, Illinois  
**Wang No. 1100-04-01**

Dear Mr. Bhatt,

Wang Engineering Inc. (Wang) is pleased to present our geotechnical analyses and recommendations for the design of three high mast tower structures along the northbound (NB) I-90/94 as part of Jane Byrne Interchange Reconstruction, Contract 62A76, in Chicago, Cook County, Illinois. We submitted a report for high mast towers and sign structures for Contract 62A76 on September 17, 2019. This report addresses three additional high mast towers not included on our September 17, 2019 report. Based on the information provided by AECOM and TranSystems, Wang understands the proposed high mast towers are proposed at the following locations:

- 7 VEF1 at Station 6160+68.78 and 109.5 feet RT offset; about 95 feet north of W Madison Street Bridge;
- 7 VEF2 at Station 6155+94.52 and 150.0 feet RT offset; about 85 feet north of W Monroe Street Bridge; and
- 7 VGH1 at Station 6165+78.39 and 102.0 feet RT offset; about 95 feet north of W Washington Blvd Bridge.

The purpose of the investigation was to characterize the subsurface conditions and provide geotechnical analyses and recommendations for the design and construction of the proposed high mast tower structures.

### Subsurface Investigation and Laboratory Testing

The project site is located on the SW ¼ of Section 9 and NW ¼ of Section 16, T39N, R14E of the third Principal Meridian. A *Site Location Map* is presented as Exhibit 1. The subsurface investigation consisted of three soil borings, designated as Borings LTB-15, LTB-16, and LTB-17 and was carried out between July 1 and July 10, 2019. The borings were drilled to depths of 50 to 55 feet below ground surface (bgs). One previously drilled boring for wall 30, Boring 30-RWB-01, was included on our analyses because its location to the proposed high mast tower 7 VEF2. Vane shear test (VST) borings, designated as Borings VST-03 and Z051-RWB-04 were used to supplement the soil information. The high mast tower locations, as provided by AECOM and TranSystems, and corresponding reference borings are shown in Table 1.

Table 1: High Mast Tower Locations and Reference Borings along NB I-90/94

High Mast Tower Structure ID	Proposed High Mast Tower Station	Proposed High Mast Tower Offset	Reference <sup>(1)</sup> SPT Boring(s)/VST Boring	Distance between LTB Boring and HMLT (ft)	Termination Depth (ft)
7 VEF1	6160+68.78	109.50 RT	LTB-16 / VST-03	17	55
7 VEF2	6155+94.52	150.00 RT	LTB-15, 30-RWB-01 / VST-03	51	50
7 VGH1	6165+78.39	102.00 RT	LTB-17 / Z051-RWB-04	44	55

<sup>(1)</sup> Boring VST-03 is approximately 377 and 112 feet away from 7 VEF1 and 7 VEF2 towers, respectively. Boring Z051-RWB-04 is approximately 171 feet away from 7 VGH1.

Truck-mounted drilling rigs, equipped with hollow stem augers, were used to advance and maintain an open borehole. Soil sampling was performed in accordance with 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 5.0-foot intervals thereafter to the boring termination depth. Soil samples collected from each sampling interval were placed in sealed jars for further examination and laboratory testing.

Field boring logs were prepared and maintained by Wang engineers, and included lithologic descriptions, visual-manual soil classifications, penetrometer or Rimac unconfined compressive strength tests, and results of standard penetration tests recorded as blows per 6-inches of penetration.

Ground water level was measured during drilling and at completion of each boring. The boreholes were backfilled with bentonite chips after completion, and the surface was restored as close as possible to its original condition.

Soil samples were tested in the laboratory for moisture content (AASHTO T 265). Field visual descriptions of the soil samples were verified in the laboratory and classified according to IDH Soil Classification System.

The as-drilled boring locations were surveyed by Wang and station and offset information for each boring were provided by AECOM/ TranSystems. It is noted that LTB boring locations prepared during OUC submittal process are now 17 to 51 feet away from the latest high mast tower location drawings provided by AECOM. The boring elevations were provided by AECOM / TranSystems from topo drawings. Boring location data are presented in the *Boring Logs* (Appendix A) and 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.

Below the pavement, the borings encountered 4.5 to 7 feet of fill materials. The fill consists of stiff to very stiff silty clay or medium stiff clay loam with unconfined compressive strength ( $Q_u$ ) values of up to 3.36 tsf, or loose to medium dense gravelly sand. At elevations of 572.6 to 574.6 feet, the borings advanced through up to 33.7 feet of very soft to soft clay to silty clay. Beneath the very soft to soft clay to silty clay, the borings encountered up to 23.8 feet of medium stiff to hard silty clay loam to silty clay loam. In Boring 30-RWB-01, the very stiff silty clay to silty clay loam is followed by very dense silt, medium dense sand and very dense silty loam. Dolostone bedrock was encountered at 112 feet bgs (482 feet elevation).

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

## Engineering Analyses and Recommendations

Our subsurface investigation shows soft to soft clay to silty clay with  $Q_u$  values less than 1.0 tsf extending to about 39.2 feet bgs or about elevation of 540 feet. Therefore, standard foundation dimension criteria were not met. Accordingly, the 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 high mast tower foundations under lateral loads are presented in Tables 2, 3 and 4. The undrained shear strength values shown in Tables 2 to Table 4 for the soft clay to silty clay were estimated from the closest vane shear testing conducted near the structure. Information on the vane shear testing is provided in Appendix B for reference.

Table 2: Recommended Parameters for Lateral Load Analysis of High Mast Tower 7 VEF1  
 (Reference Borings: LTB-16 and VST-03)

Soil Type (Layer)	Unit Weight, $\gamma^{(1)}$ (pcf)	Undrained Shear Strength, $c_u$ (psf)	Estimated Friction Angle, $\Phi$ ( $^\circ$ )	Estimated Lateral Soil Modulus Parameter, $k^{(2)}$ (pci)	Estimated Soil Strain Parameter, $\epsilon_{50}$ (%)
Existing Fill Below pavement to EL 574 feet	120	3300	0	1000	0.5
Soft CLAY to SILTY CLAY EL 574 to 565 feet	110	400	0	30	2.0
Soft CLAY to SILTY CLAY EL 565 to 552 feet	110	600	0	100	1.0
Soft CLAY to SILTY CLAY EL 552 to 547 feet	110	950	0	100	1.0
Soft CLAY to SILTY CLAY EL 547 to 540 feet	115	1400	0	500	0.7
Stiff to Hard SILTY CLAY EL 540 to 532.2 feet	120	1200	0	500	0.7
Stiff to Hard SILTY CLAY EL 532.2 to 527.2 feet	120	2600	0	1000	0.5
Stiff to Hard SILTY CLAY EL 527.2 to 524.2 feet	120	4600	0	2000	0.4

<sup>(1)</sup> Based on Naval Facilities Engineering Command, Design Manual 7.1 (1996)

<sup>(2)</sup> Based on L-Pile Technical Manual 2012

**Table 3: Recommended Parameters for Lateral Load Analysis of High Mast Tower 7 VEF2**  
 (Reference Borings: LTB-15, 30-RWB-01 and VST-03)

Soil Type (Layer)	Unit Weight, $\gamma^{(1)}$ (pcf)	Undrained Shear Strength, $c_u$ (psf)	Estimated Friction Angle, $\Phi$ ( $^\circ$ )	Estimated Lateral Soil Modulus Parameter, $k^{(2)}$ (pci)	Estimated Soil Strain Parameter, $\epsilon_{50}$ (%)
Existing Fill Below pavement to EL 573 feet	120	1750	0	500	0.7
Soft CLAY to SILTY CLAY EL 573 to 565 feet	110	400	0	30	2.0
Soft CLAY to SILTY CLAY EL 565 to 552 feet	110	600	0	100	1.0
Soft CLAY to SILTY CLAY EL 552 to 547 feet	110	950	0	100	1.0
Soft CLAY to SILTY CLAY EL 547 to 537 feet	115	1400	0	500	0.7
V Stiff SILTY CLAY to SILTY CLAY LOAM EL 537 to 512 feet	120	1700	0	500	0.7
V Dense SILT <sup>(3)</sup> EL 512 to 507 feet	125	0	36	125	--
M Dense Sand EL 507 to 505 feet	120	0	35	60	--
V Dense SILTY LOAM EL 505 to 482 feet	130	0	36	125	--

<sup>(1)</sup> Based on Naval Facilities Engineering Command, Design Manual 7.1 (1996)

<sup>(2)</sup> Based on L-Pile Technical Manual 2012

<sup>(3)</sup> Consider submerged unit weight

**Table 4: Recommended Parameters for Lateral Load Analysis of High Mast Tower 7 VGH1**  
 (Reference Borings: LTB-17 and Z051-RWB-04)

Soil Type (Layer)	Unit Weight, $\gamma^{(1)}$ (pcf)	Undrained Shear Strength, $c_u$ (psf)	Estimated Friction Angle, $\Phi$ ( $^\circ$ )	Estimated Lateral Soil Modulus Parameter, $k^{(2)}$ (pci)	Estimated Soil Strain Parameter, $\epsilon_{50}$ (%)
Loose to M Dense GRAVELLY SAND EL 581.6 to 577.1 feet	120	0	34	90	--
M Stiff SILTY CLAY EL 577.1 to 574.6 feet	115	500	0	100	1.0
Soft CLAY to SILTY CLAY EL 574.6 to 562 feet	110	600	0	100	1.0
Soft CLAY to SILTY CLAY EL 562 to 551 feet	110	750	0	500	0.7

Soil Type (Layer)	Unit Weight, $\gamma^{(1)}$ (pcf)	Undrained Shear Strength, $c_u$ (psf)	Estimated Friction Angle, $\Phi$ ( $^\circ$ )	Estimated Lateral Soil Modulus Parameter, $k^{(2)}$ (pci)	Estimated Soil Strain Parameter, $\epsilon_{50}$ (%)
M Stiff CLAY to SILTY CLAY EL 551 to 537 feet	115	900	0	100	1.0
M Stiff to V Stiff SILTY CLAY to SILTY CLAY LOAM EL 537 to 527.6 feet	125	2100	0	1000	0.5

<sup>(1)</sup> Based on Naval Facilities Engineering Command, Design Manual 7.1 (1996)

<sup>(2)</sup> Based on L-Pile Technical Manual 2012

## 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 and water bearing in granular layer potential, the following note should appear on the final plans:

*'Due to the squeeze potential of the clay soils and the presence of water bearing layers, 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 high mast towers 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.**

Andri A. Kurnia, P.E.  
Sr. Geotechnical Engineer

Edwin Greenwood  
Engineering Geologist

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

**Attachments:**

Exhibit 1: Site Location Map

Exhibit 2: Boring Location Plan

Exhibit 3: Soil Profile

Appendix A: Boring Logs

Appendix B: Vane Shear Testing Borings

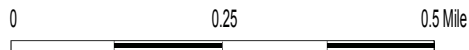
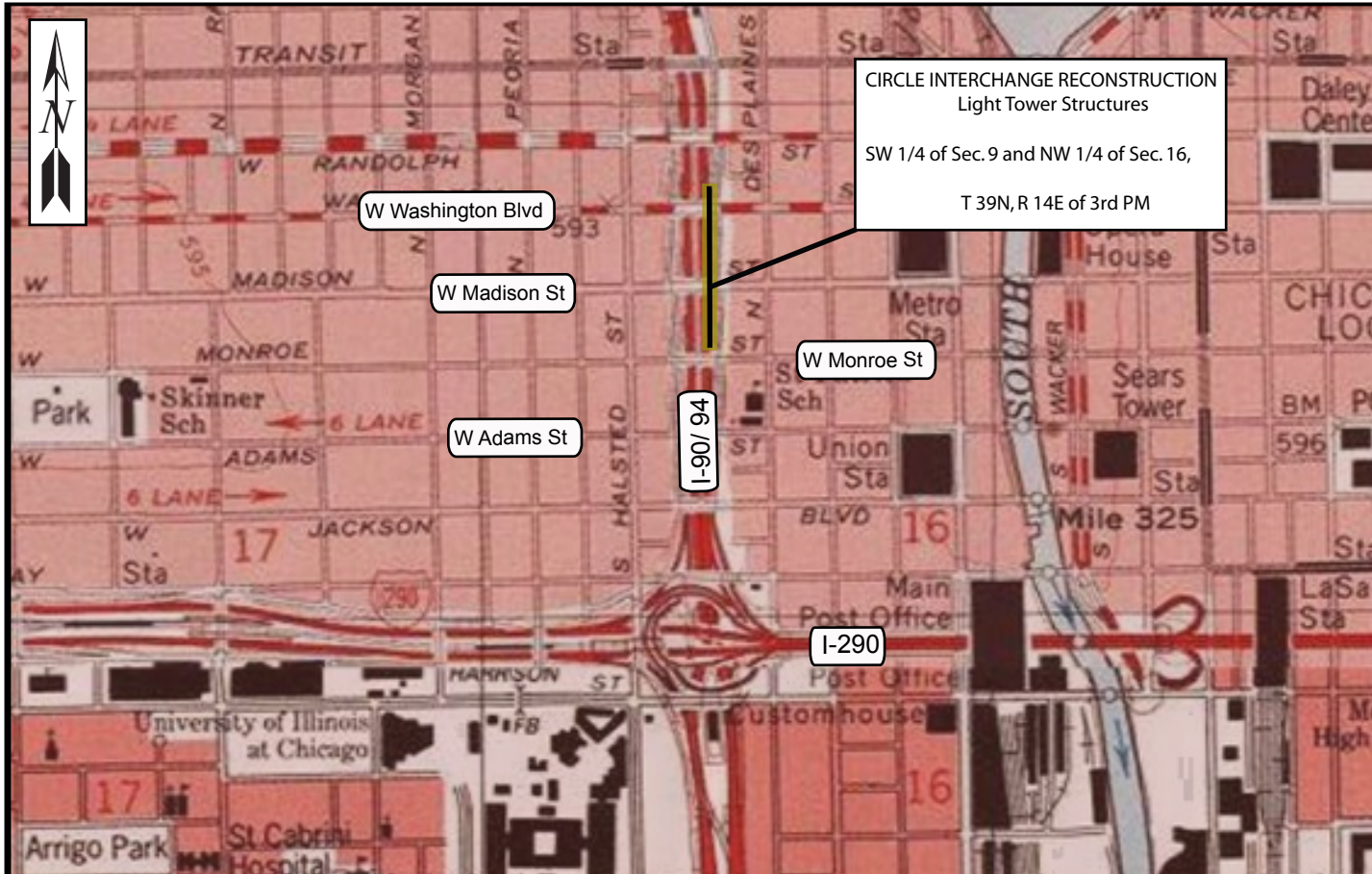
## **EXHIBITS**

Exhibit 1: Site Location Map

Exhibit 2: Boring Location Plan

Exhibit 3: Soil Profile





SITE LOCATION MAP: CIRCLE INTERCHANGE RECONSTRUCTION,  
CONTRACT 62A76, CHICAGO, IL

SCALE: GRAPHICAL

EXHIBIT 1

DRAWN BY: E. Greenwood  
CHECKED BY: A. Kurnia



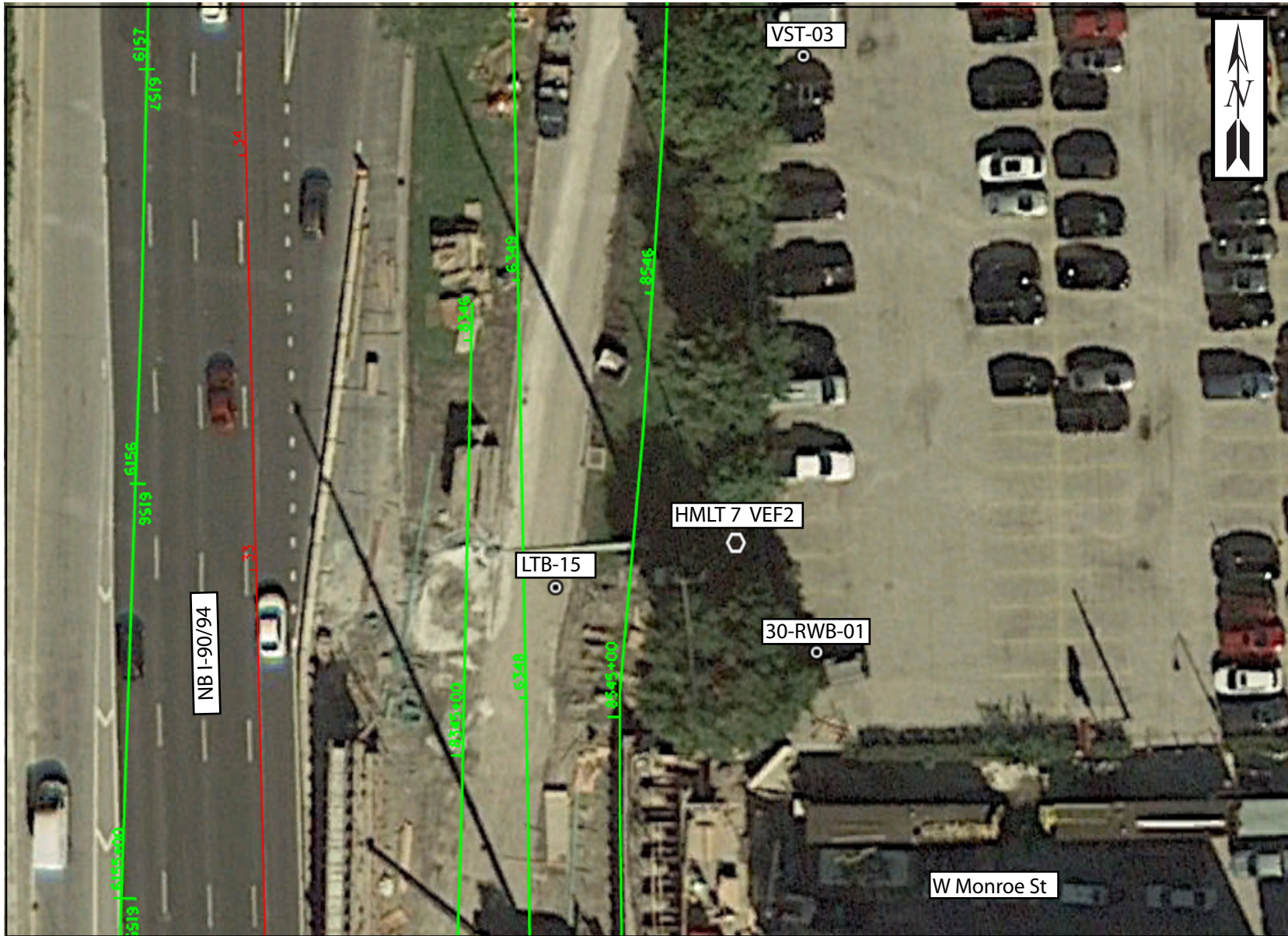
1145 N. Main Street  
Lombard, IL 60148  
www.wangeng.com

FOR AECOM



1100-04-01

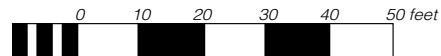






**Legend**

-  Boring Location
-  Proposed HMLT



BORING LOCATION PLAN: CIRCLE INTERCHANGE  
RECONSTRUCTION, CONTRACT 62A76, CHICAGO, ILLINOIS

SCALE: GRAPHICAL

**EXHIBIT 2-3**

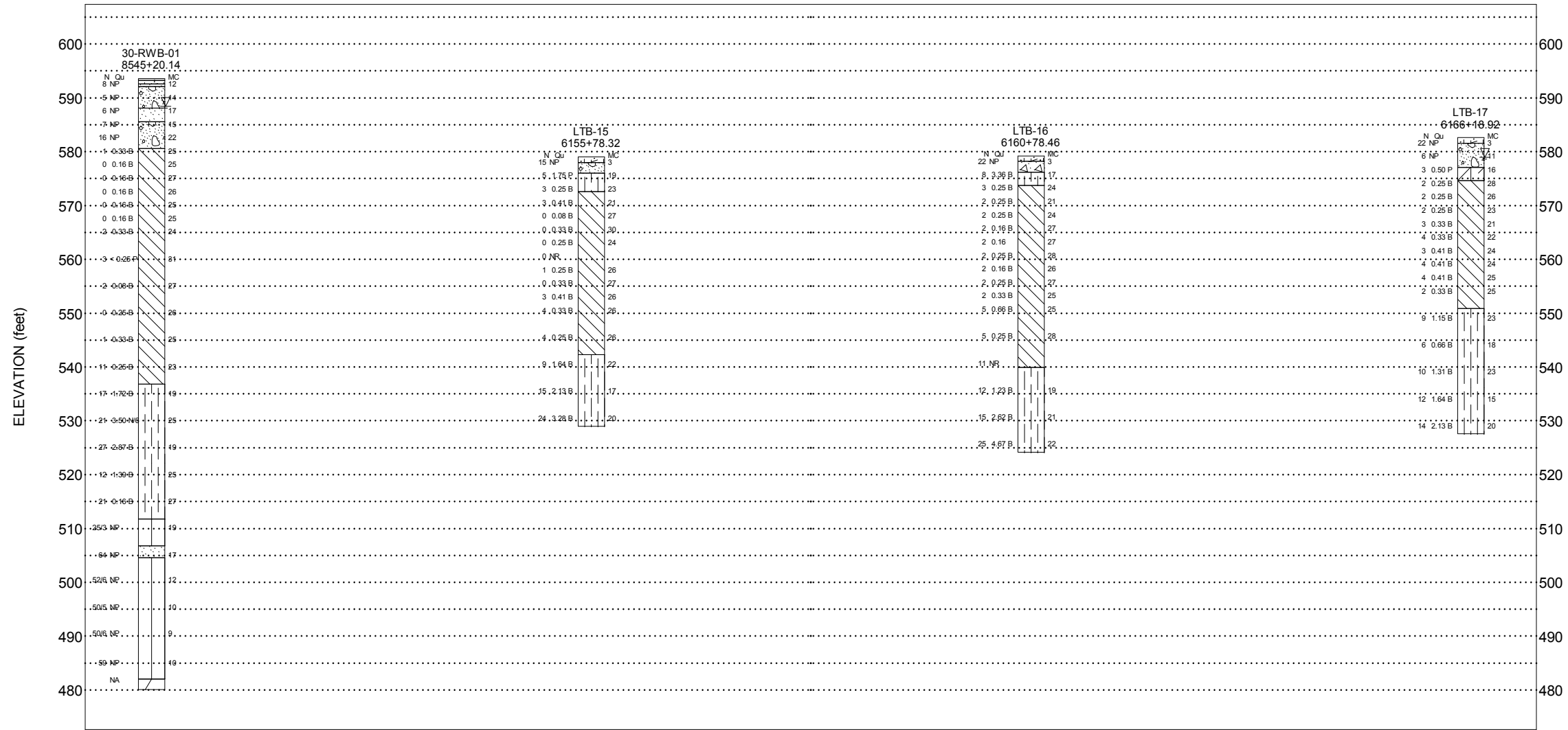
DRAWN BY: E. Greenwood  
CHECKED BY: A. Kurnia



1145 N. Main Street  
Lombard, IL 60148  
www.wangeng.com

FOR AECOM

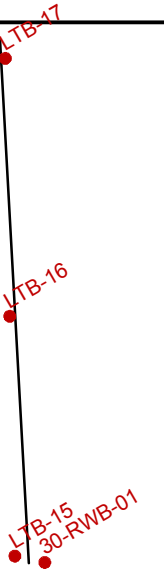
1100-04-01



DISTANCE ALONG PROFILE (feet)

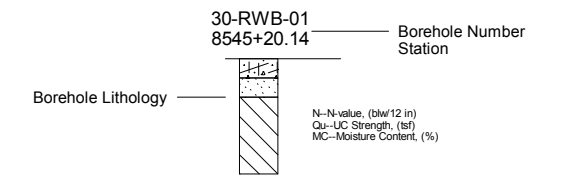
**Lithology Graphics**

- |                                 |                      |                                 |               |
|---------------------------------|----------------------|---------------------------------|---------------|
| Pavement                        | IDH Sand, Sandy Loam | Gravelly sand, sandy gravel     | IDH Clay      |
| IDH Silty Clay, Silty Clay Loam | IDH Silt, Silty Loam | Dolomite or Dolomitic Limestone | Crushed stone |
| IDH Clay Loam                   |                      |                                 |               |

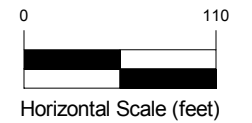


Site Map Scale 1 inch equals 405 feet

**Explanation:**



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



Vertical Exaggeration: 4.5x

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

**Soil Profile**  
**Contract 62A76 Addendum**



Jane Byrne Interchange  
Section 16, T39N, R14E of 3rd PM

JOB NUMBER	PLATE NUMBER
1100-04-01	EXHIBIT 3

## **APPENDIX A: BORING LOGS**



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

# BORING LOG LTB-15

WEI Job No.: 1100-04-01

Client: **AECOM**  
 Project: **Jane Byrne Interchange**  
 Location: **Section 16, T39N, R14E of 3rd PM**

Datum: NAVD 88  
 Elevation: 579.00 ft  
 North: 1899876.86 ft  
 East: 1171632.46 ft  
 Station: 6155+78.32  
 Offset: 102.91 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 (%)
	578.0	3-inch thick, ASPHALT over 9-inch thick, CONCRETE --PAVEMENT--															
		Medium dense, brown SANDY GRAVEL; damp --FILL-- --RDR 2--			1	13 10 5	NP	3						9	0 0 1	0.25 B	26
	576.0	Stiff, gray SILTY CLAY, trace gravel; moist --FILL-- --RDR 2--			2	2 2 3	1.75 P	19				25		10	0 0 0	0.33 B	27
	572.6	Very soft, gray CLAY to SILTY CLAY, trace gravel; damp to moist --RDR 2--			3	1 1 2	0.25 B	23						11	0 0 3	0.41 B	26
					4	0 0 3	0.41 B	21						12	2 2 2	0.33 B	26
					5	0 0 0	0.08 B	27									
					6	0 0 0	0.33 B	30						13	2 2 2	0.25 B	26
					7	0 0 0	0.25 B	24		542.3	Stiff to very stiff, gray SILTY CLAY, trace gravel; damp to moist --RDR 2--						
					8	0 0 0	NR							14	3 4 5	1.64 B	22

### GENERAL NOTES

Begin Drilling **07-03-2019** Complete Drilling **07-03-2019**  
 Drilling Contractor **Wang Testing Services** Drill Rig  
 Driller **R&J** Logger **E. Yim** Checked by **C. Marin**  
 Drilling Method **3.25" HSA to 10', mud rotary thereafter, boring**  
**backfilled upon completion**

### WATER LEVEL DATA

While Drilling **DRY**  
 At Completion of Drilling **6' mud**  
 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 11/8/19



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

# BORING LOG LTB-15

WEI Job No.: 1100-04-01

Client ..... **AECOM** .....  
 Project ..... **Jane Byrne Interchange** .....  
 Location ..... **Section 16, T39N, R14E of 3rd PM** .....

Datum: NAVD 88  
 Elevation: 579.00 ft  
 North: 1899876.86 ft  
 East: 1171632.46 ft  
 Station: 6155+78.32  
 Offset: 102.91 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 (%)
	529.0		45		15	4 7 8	2.13 B	17									
			50		16	6 9 15	3.28 B	20									
		Boring terminated at 50.00 ft															
			55														
			60														

### GENERAL NOTES

Begin Drilling ..... **07-03-2019** ..... Complete Drilling ..... **07-03-2019** .....  
 Drilling Contractor ..... **Wang Testing Services** ..... Drill Rig .....  
 Driller ..... **R&J** ..... Logger ..... **E. Yim** ..... Checked by ..... **C. Marin** .....  
 Drilling Method ..... **3.25" HSA to 10', mud rotary thereafter, boring** .....  
 ..... **backfilled upon completion** .....

### WATER LEVEL DATA

While Drilling ..... ▽ ..... **DRY** .....  
 At Completion of Drilling ..... ▽ ..... **6' mud** .....  
 Time After Drilling ..... **NA** .....  
 Depth to Water ..... ▽ ..... **NA** .....

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





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

# BORING LOG LTB-16

WEI Job No.: 1100-04-01

Client ..... **AECOM** .....  
 Project ..... **Jane Byrne Interchange** .....  
 Location ..... **Section 16, T39N, R14E of 3rd PM** .....

Datum: NAVD 88  
 Elevation: 579.20 ft  
 North: 1900380.73 ft  
 East: 1171621.69 ft  
 Station: 6160+78.46  
 Offset: 90.88 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 (%)
	578.2	4-inch thick, ASPHALT over 8-inch thick, CONCRETE --PAVEMENT--															
		Medium dense, white and brown SANDY GRAVEL; dry to damp --BASE COURSE--			1	14 10 12	NP	3						9	1 1 1	0.16 B	26
	576.2	--RDR 4--															
		Very stiff, gray SILTY CLAY, trace gravel; damp --FILL-- --RDR 2--			2	3 4 4	3.36 B	17				25		10	1 1 1	0.25 B	27
	573.7				5												
		Very soft to soft, gray CLAY to SILTY CLAY, trace gravel; damp to moist --RDR 2--			3	1 1 2	0.25 B	24						11	1 1 1	0.33 B	25
					4	1 1 1	0.25 B	21						12	1 2 3	0.66 B	25
					5	1 1 1	0.25 B	24									
					6	0 1 1	0.16 B	27						13	1 2 3	0.25 B	28
					7	1 1 1	0.16	27									
					8	1 1 1	0.25 B	28		540.0	Stiff to hard, gray SILTY CLAY,			14	4 4 7	NR	

### GENERAL NOTES

Begin Drilling ..... **07-10-2019** ..... Complete Drilling ..... **07-10-2019** .....  
 Drilling Contractor ..... **Wang Testing Services** ..... Drill Rig .....  
 Driller ..... **N&A** ..... Logger ..... **M. Sadowski** ..... Checked by ..... **C. Marin** .....  
 Drilling Method ..... **3.25" HSA to 10', mud rotary thereafter, boring** .....  
 ..... **backfilled upon completion** .....

### WATER LEVEL DATA

While Drilling ..... **DRY** .....  
 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 11/8/19



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

# BORING LOG LTB-16

WEI Job No.: 1100-04-01

Client ..... **AECOM** .....  
 Project ..... **Jane Byrne Interchange** .....  
 Location ..... **Section 16, T39N, R14E of 3rd PM** .....

Datum: NAVD 88  
 Elevation: 579.20 ft  
 North: 1900380.73 ft  
 East: 1171621.69 ft  
 Station: 6160+78.46  
 Offset: 90.88 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 (%)
		trace gravel; damp															
		--RDR 2--															
			45		15	4 5 7	1.23 B	19									
			50		16	4 7 8	2.62 B	21									
			55		17	8 10 15	4.67 B	22									
	524.2	Boring terminated at 55.00 ft															
			60														

### GENERAL NOTES

### WATER LEVEL DATA

Begin Drilling ..... **07-10-2019** ..... Complete Drilling ..... **07-10-2019** .....  
 Drilling Contractor ..... **Wang Testing Services** ..... Drill Rig .....  
 Driller ..... **N&A** ..... Logger ..... **M. Sadowski** ..... Checked by ..... **C. Marin** .....  
 Drilling Method ..... **3.25" HSA to 10', mud rotary thereafter, boring** .....  
 ..... **backfilled upon completion** .....

While Drilling ..... ▽ ..... **DRY** .....  
 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.



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

# BORING LOG LTB-17

WEI Job No.: 1100-04-01

Client: **AECOM**  
 Project: **Jane Byrne Interchange**  
 Location: **Section 16, T39N, R14E of 3rd PM**

Datum: NAVD 88  
 Elevation: 582.58 ft  
 North: 1900922.32 ft  
 East: 1171612.30 ft  
 Station: 6166+18.92  
 Offset: 98.00 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 (%)
	581.6	4-inch thick, ASPHALT over 8-inch thick, CONCRETE --PAVEMENT--															
		Loose to medium dense, brown to gray GRAVELLY SAND; damp to saturated --FILL-- --RDR 3 to 4--	1	X	1	14 10 12	NP	3					X	9	1 1 2	0.41 B	24
			2	X	2	4 3 3	NP	11				25	X	10	1 2 2	0.41 B	24
	577.1	Medium stiff, gray CLAY LOAM, some gravel; moist --FILL-- --RDR 2--	3	X	3	1 1 2	0.50 P	16					X	11	1 2 2	0.41 B	25
	574.6	Soft, gray CLAY to SILTY CLAY, trace gravel; damp to moist --RDR 2--	4	X	4	1 1 1	0.25 B	28				30	X	12	1 1 1	0.33 B	25
			5	X	5	1 1 1	0.25 B	26		550.8	Medium stiff to very stiff, gray SILTY CLAY to SILTY CALY LOAM, trace gravel; damp --RDR 2--						
			6	X	6	1 1 1	0.25 B	23				35	X	13	3 3 6	1.15 B	23
			7	X	7	1 1 2	0.33 B	21									
			8	X	8	1 2 2	0.33 B	22				40	X	14	3 2 4	0.66 B	18

### GENERAL NOTES

Begin Drilling **07-01-2019** Complete Drilling **07-01-2019**  
 Drilling Contractor **Wang Testing Services** Drill Rig  
 Driller **N&A** Logger **M. Sadowski** Checked by **C. Marin**  
 Drilling Method **3.25" IDA HSA, boring backfilled upon completion**

### WATER LEVEL DATA

While Drilling  $\nabla$  **4.00 ft**  
 At Completion of Drilling  $\nabla$  **DRY**  
 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 11/8/19



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

# BORING LOG LTB-17

WEI Job No.: 1100-04-01

Client ..... **AECOM** .....  
 Project ..... **Jane Byrne Interchange** .....  
 Location ..... **Section 16, T39N, R14E of 3rd PM** .....

Datum: NAVD 88  
 Elevation: 582.58 ft  
 North: 1900922.32 ft  
 East: 1171612.30 ft  
 Station: 6166+18.92  
 Offset: 98.00 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 (%)
	527.6		45		15	4 4 6	1.31 B	23									
			50		16	4 5 7	1.64 B	15									
			55		17	4 6 8	2.13 B	20									
		Boring terminated at 55.00 ft															
			60														

### GENERAL NOTES

Begin Drilling ..... **07-01-2019** ..... Complete Drilling ..... **07-01-2019** .....  
 Drilling Contractor ..... **Wang Testing Services** ..... Drill Rig .....  
 Driller ..... **N&A** ..... Logger ..... **M. Sadowski** ..... Checked by ..... **C. Marin** .....  
 Drilling Method ..... **3.25" IDA HSA, boring backfilled upon completion** .....

### WATER LEVEL DATA

While Drilling ..... ▽ ..... **4.00 ft** .....  
 At Completion of Drilling ..... ▼ ..... **DRY** .....  
 Time After Drilling ..... **NA** .....  
 Depth to Water ..... ▼ ..... **NA** .....

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



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

# BORING LOG VST-03

WEI Job No.: 1100-04-01

Client: **AECOM**  
 Project: **Jane Byrne Interchange**  
 Location: **Section 16, 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--						
	586.5	Medium stiff, brown and gray SILTY CLAY LOAM, trace gravel	10		2	3 2 2	0.75 P	26			--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			
											--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--			3			
											--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--			4			
											--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--			5			
											--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--			6			
	579.0	Soft, gray CLAY to SILTY CLAY, trace gravel	15		3	3 2 2	NR				--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--			7			
											--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--			8			
	575.0										--In-Situ Vane Shear, 19.5 feet--			1			
											--In-Situ Vane Shear, 39.5 feet--			9			

### 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 **groundwater not observed**  
 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 11/8/19



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

# BORING LOG VST-03

WEI Job No.: 1100-04-01

Client: **AECOM**  
 Project: **Jane Byrne Interchange**  
 Location: **Section 16, 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

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 **groundwater not observed**  
 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.



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

# BORING LOG Z051-RWB-04

WEI Job No.: 1100-04-01

Client: **AECOM**  
 Project: **Jane Byrne Interchange**  
 Location: **Section 16, T39N, R14E of 3rd PM**

Datum: NAVD 88  
 Elevation: 589.15 ft  
 North: 1901046.55 ft  
 East: 1171625.03 ft  
 Station: 6167+42.68  
 Offset: 114.70 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 (%)
	587.8	4-inch thick, ASPHALT over 12-inch thick, CONCRETE --PAVEMENT--									--S <sub>u undis</sub> = 1141.9 psf-- --S <sub>u remold</sub> = 797.2 psf-- --Sensitivity = 1.4--			9			
		Medium dense to very dense, brown to gray CRUSHED STONE and concrete; dry --FILL--			1	9 10 8	NP	3									
					2	5 9	NP	18									
	583.9	Very soft to soft, gray CLAY to SILTY CLAY, trace gravel; damp to moist --RDR 2--	5			50/1					--In-Situ Vane Shear, 24.5 feet-- --S <sub>u undis</sub> = 840.3 psf-- --S <sub>u remold</sub> = 452.7 psf-- --Sensitivity = 1.9-- --Q <sub>u</sub> =0.62 tsf (UC test) --L <sub>L</sub> (%)=32, P <sub>L</sub> (%)=17-- --%Gravel=3.7-- --%Sand=14.7-- --%Silt=46.6-- --%Clay=35.0-- --A-6 (12)--			10			
					3	2 1 2	< 0.25 P	26									
					4	1 1 1	0.33 B	27			--In-Situ Vane Shear, 29.5 feet-- --S <sub>u undis</sub> = 904.9 psf-- --S <sub>u remold</sub> = 474.0 psf-- --Sensitivity = 1.9--			12			
					5		P U S H	0.25 P									
					6		VS P U S H				--In-Situ Vane Shear, 34.5 feet-- --S <sub>u undis</sub> = 667.9 psf-- --S <sub>u remold</sub> = 344.7 psf-- --Sensitivity = 1.9-- --Q <sub>u</sub> =0.31 tsf (UC test) --L <sub>L</sub> (%)=33, P <sub>L</sub> (%)=17-- --%Gravel=2.9-- --%Sand=13.8-- --%Silt=47.8-- --%Clay=35.5-- --A-6 (12)--			14			
					7		P U S H	0.25 P									
					8						--In-Situ Vane Shear, 19.5 feet--						
											--In-Situ Vane Shear, 39.5 feet--			16			

## GENERAL NOTES

Begin Drilling **06-30-2019** Complete Drilling **06-30-2019**  
 Drilling Contractor **Wang Testing Services** Drill Rig  
 Driller **M&A** Logged by **M. Sadowski/F. Bozga** Checked by **C. Marin**  
 Drilling Method **2.25" HSA to 10', mud rotary thereafter, boring**  
**backfilled upon completion**

## WATER LEVEL DATA

While Drilling **groundwater not observed**  
 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 11/8/19



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

# BORING LOG Z051-RWB-04

WEI Job No.: 1100-04-01

Client: **AECOM**  
 Project: **Jane Byrne Interchange**  
 Location: **Section 16, T39N, R14E of 3rd PM**

Datum: NAVD 88  
 Elevation: 589.15 ft  
 North: 1901046.55 ft  
 East: 1171625.03 ft  
 Station: 6167+42.68  
 Offset: 114.70 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 (%)
		-- $S_{u\text{ undis}} = 840.3$ psf-- -- $S_{u\text{ remold}} = 387.8$ psf-- --Sensitivity = 2.1--			17	UCSP	0.50	24									
		--In-Situ Vane Shear, 44.5 feet-- -- $S_{u\text{ undis}} = 904.9$ psf-- -- $S_{u\text{ remold}} = 409.4$ psf-- --Sensitivity = 2.2--	45		18	VS				524.2		65		22	5 7 11	3.28 B	20
											Boring terminated at 65.00 ft						
			50		19	2 2 3	0.41 B	23				70					
	537.4	Stiff to very stiff, gray SILTY CLAY, trace gravel; damp --RDR 2--															
			55		20	11 6 8	1.31 B	17				75					
			60		21	4 5 7	1.23 B	17				80					

### GENERAL NOTES

Begin Drilling **06-30-2019** Complete Drilling **06-30-2019**  
 Drilling Contractor **Wang Testing Services** Drill Rig  
 Driller **M&A** Logged by **M. Sadowski/F. Bozga** Checked by **C. Marin**  
 Drilling Method **2.25" HSA to 10', mud rotary thereafter, boring backfilled upon completion**

### WATER LEVEL DATA

While Drilling **groundwater not observed**  
 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 11/8/19