

October 15, 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
Jane Byrne Interchange, Contract 60X94
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 two high mast tower structures along the northbound (NB) I-90/94 as part of Jane Byrne Interchange Reconstruction, Contract 60X94, in Chicago, Cook County, Illinois. Based on the information provided by AECOM and TranSystems, Wang understands the proposed high mast towers are located at the following locations:

- 5 VCD4 is located at Station 6148+57.12 and offset 141.94 RT; about 180 feet south of Adams Street Bridge; and
- 7 VCD3 is located at Station 6150+80.56 and offset 141.39' RT; about feet north of Adams Street 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 structures.

Subsurface Investigation and Laboratory Testing

The project site is located in the NW $\frac{1}{4}$ of Section 16, T39N, R14E of the third Principal Meridian. A *Site Location Map* is presented as Exhibits 1. No specific borings were performed for these high

mast tower locations. However, we have considered the soils information from nearby borings and borings with vane shear testing undertaken by Wang in the proximity of the proposed high mast tower locations.

The subsurface investigations of the nearby borings were carried out between June 19 and August 14, 2014. The borings were drilled to depths of 65.0 and 103.82 feet below ground surface (bgs). A vane shear test (VST) boring, designated as Boring VST-02 was used to supplement the soil information. The high mast tower locations, as provided by AECOM and TranSystems, with 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 ⁽¹⁾ SPT Boring/ VST Boring	Termination Depth (ft)
5 VCD4	6148+57.12	141.94 RT	24-RWB-04/ VST-02	65
7 VCD3	6150+80.56	141.39 RT	0589-B-03/ VST-02	103.82

⁽¹⁾ Reference borings are approximately 40 feet away from proposed high mast tower locations. Boring VST-02 is approximately 380 and 160 feet away from 5 VCD 4 and 7 VDC3 towers, respectively.

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.

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.

Below the top soil or pavement, the borings encountered 3 to 6.6 feet of fill materials. The fill consists of stiff silty clay or silty clay loam with unconfined compressive strength (Q_u) values of up to 2.62 tsf, or loose to dense gravelly sand. At elevations of 570.7 to 583.8 feet, the borings advanced through up to 46.3 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 medium stiff to hard silty clay loam to silty loam, followed by medium dense to very dense sand to gravelly sand.

The design and construction of drilled shaft foundations 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 evaluation showed at high mast tower locations, soft to medium stiff clay to silty clay with Q_u values less than 1.0 tsf extending to about 57 feet bgs or about elevation of 537.5. 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 Table 2 and Table 3. The undrained shear strength values shown in tables for the soft clay to silty clay were estimated from the closest vane shear testing conducted near the proposed towers. Vane shear test results are shown in Boring VST-02 (Appendix A).

Table 2: Recommended Parameters for Lateral Load Analysis of High Mast Tower 5 VCD4
 (Reference Borings: 24-RWB-04 and VST-02)

Soil Type (Layer)	Unit Weight, $\gamma^{(1)}$ (pcf)	Undrained Shear Strength, c_u (psf)	Estimated Friction Angle, Φ ($^\circ$)	Estimated Lateral Soil Modulus Parameter, $k^{(2)}$ (pci)	Estimated Soil Strain Parameter, ϵ_{50} (%)
Stiff SILTY CLAY Below topsoil to EL 571 feet	120	1400	0	500	0.7
Soft to M Stiff CLAY EL 571 to 566 feet	115	500	0	100	1.0
Soft to M Stiff CLAY EL 566 to 561 feet	115	900	0	100	1.0
Soft to M Stiff CLAY EL 561 to 553 feet	115	700	0	100	1.0
Soft to M Stiff CLAY EL 553 to 548 feet	115	900	0	100	1.0
Stiff SILTY CLAY EL 548 to 534 feet	120	1100	0	500	0.7
V Stiff SILTY CLAY LOAM EL 534 to 530 feet	120	3800	0	1000	0.5
V Stiff CLAY to SILTY CLAY EL 530 to 517 feet	120	2900	0	1000	0.5
Loose SILT EL 517 to 514 feet	115	0	29	20	--
M Dense SAND ⁽³⁾ EL 514 to 511 feet	120	0	32	60	--

⁽¹⁾ Based on Naval Facilities Engineering Command, Design Manual 7.1 (1996)

⁽²⁾ Based on L-Pile Technical Manual 2012

⁽³⁾ Consider submerged unit weight

Table 3: Recommended Parameters for Lateral Load Analysis of High Mast Tower 7 VCD3
 (Reference Borings: 0589-B-03 and VST-02)

Soil Type (Layer)	Unit Weight, $\gamma^{(1)}$ (pcf)	Undrained Shear Strength, c_u (psf)	Estimated Friction Angle, Φ ($^\circ$)	Estimated Lateral Soil Modulus Parameter, $k^{(2)}$ (pci)	Estimated Soil Strain Parameter, ϵ_{50} (%)
Existing FILL Below pavement to EL 586 feet	120	0	32	25	--
V Stiff SILTY CLAY LOAM EL 586 to 584 feet	120	2600	0	1000	0.5
Soft to M Stiff CLAY EL 584 to 566 feet	115	500	0	100	1.0
Soft to M Stiff CLAY EL 566 to 561 feet	115	900	0	100	1.0
Soft to M Stiff CLAY EL 561 to 553 feet	115	700	0	100	1.0
Soft to M Stiff CLAY EL 553 to 548 feet	115	900	0	100	1.0
Stiff SILTY CLAY EL 548 to 537 feet	120	1100	0	500	0.7
Stiff SILTY CLAY LOAM EL 537 to 532 feet	120	1900	0	500	0.7
V Stiff SILTY CLAY LOAM EL 532 to 527 feet	120	2700	0	1000	0.5
Hard SILTY CLAY LOAM EL 527 to 522 feet	120	4000	0	2000	0.4
M Stiff CLAY EL 522 to 512	115	800	0	100	1.0
M Dense to Dense SAND ⁽³⁾ EL 512 to 502 feet	125	0	34	60	--
Dense to V Dense GRAVELLY SAND ⁽³⁾ EL 502 to 490 feet	130	0	36	125	--

⁽¹⁾ Based on Naval Facilities Engineering Command, Design Manual 7.1 (1996)

⁽²⁾ Based on L-Pile Technical Manual 2012

⁽³⁾ Consider submerged unit weight

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:

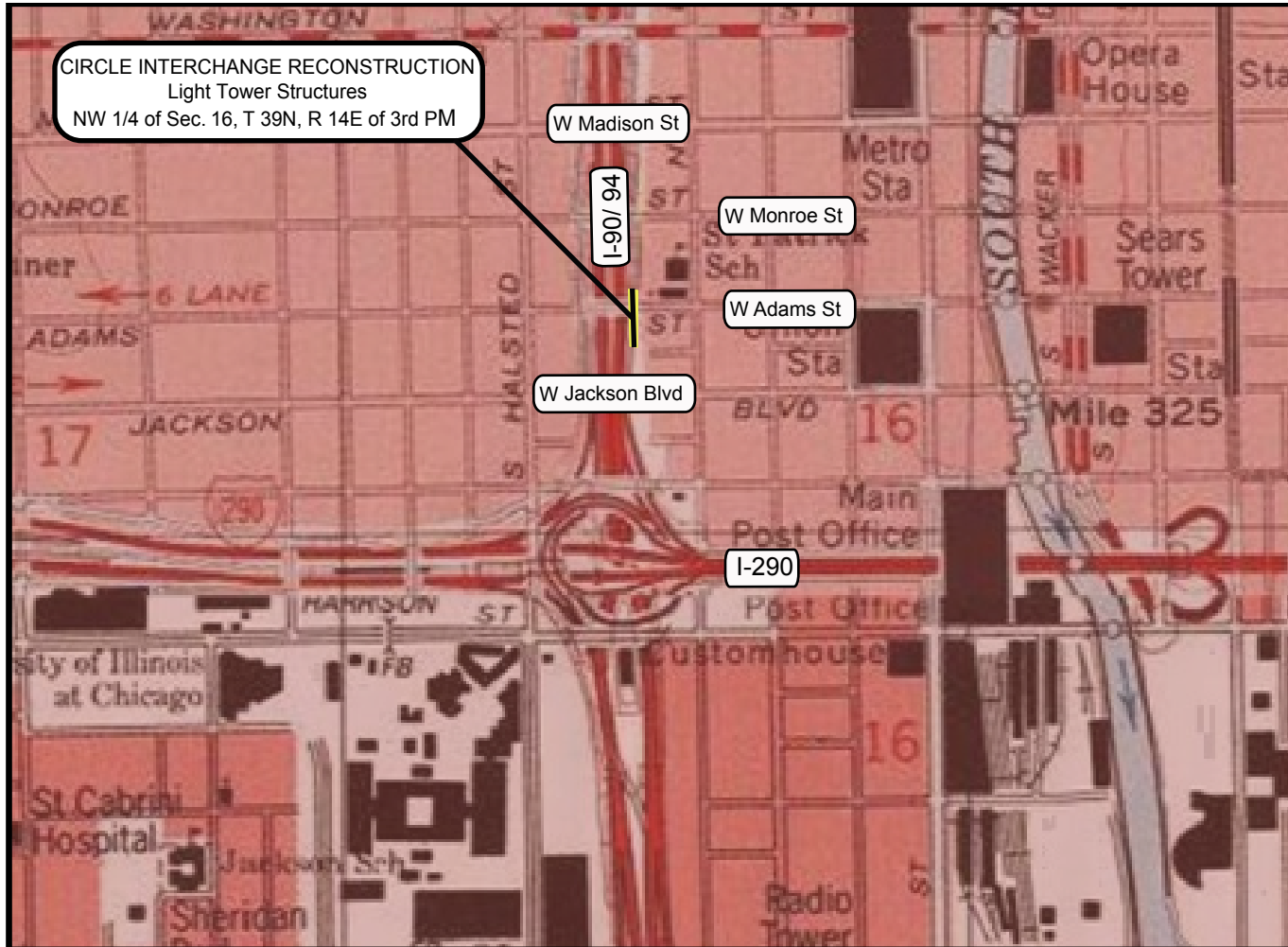
Exhibit 1: Site Location Map
Exhibit 2: Boring Location Plan
Exhibit 3: Soil Profile
Appendix A: Boring Logs

EXHIBITS

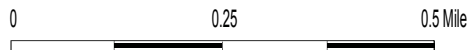
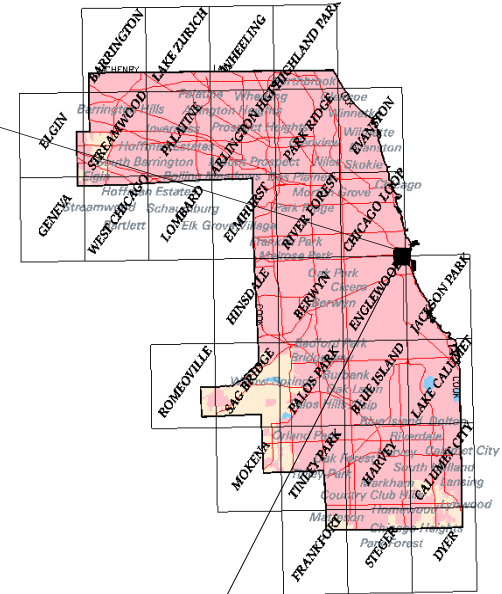
Exhibit 1: Site Location Map

Exhibit 2: Boring Location Plan

Exhibit 3: Soil Profile



Cook County



SITE LOCATION MAP: CIRCLE INTERCHANGE RECONSTRUCTION,
CONTRACT 60X94, CHICAGO, IL

SCALE: GRAPHICAL

EXHIBIT 1

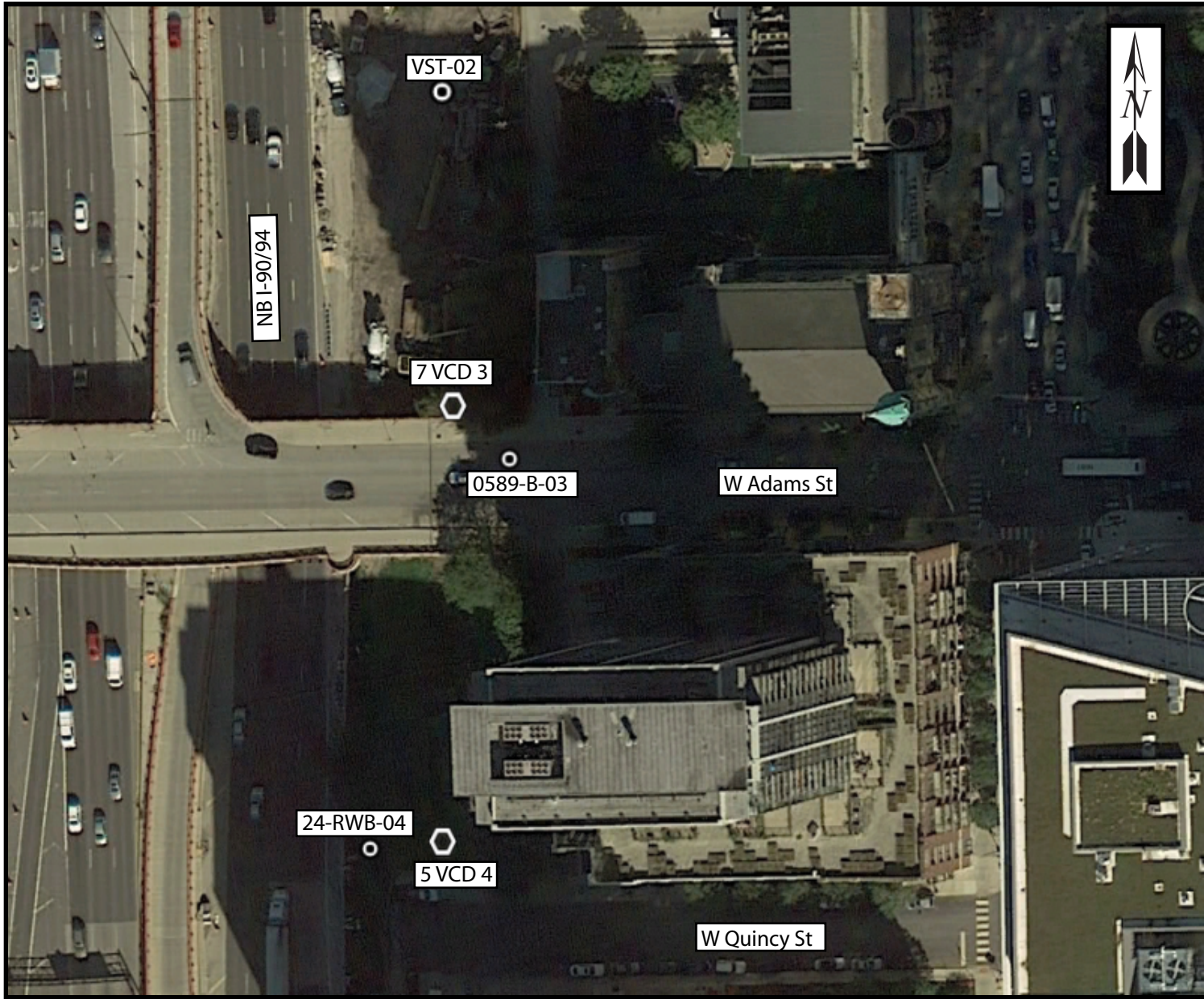
DRAWN BY: E. Greenwood
CHECKED BY: A. Kurnia





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 60X94, CHICAGO, ILLINOIS

SCALE: GRAPHICAL

EXHIBIT 2

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



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







1100-04-01

WEI 11X17 11000401.GPJ_WANGENG.GDT_10/11/19



DISTANCE ALONG PROFILE (feet)

Lithology Graphics

 Pavement	 Concrete	 Gravelly sand, sandy gravel	 IDH Silty Clay, Silty Clay Loam
 IDH Clay	 IDH Silt, Silty Loam	 IDH Sand, Sandy Loam	 Topsoil

Site Map Scale 1 inch equals 80 feet



Explanation:

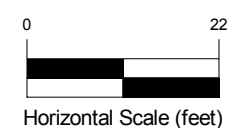
0589-B-03
8315+31.06

Borehole Number Station

Borehole Lithology

N-N-value, (blw/12 in)
Cu-UC Strength, (tsf)
MC-Moisture Content, (%)

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



Vertical Exaggeration: 1x

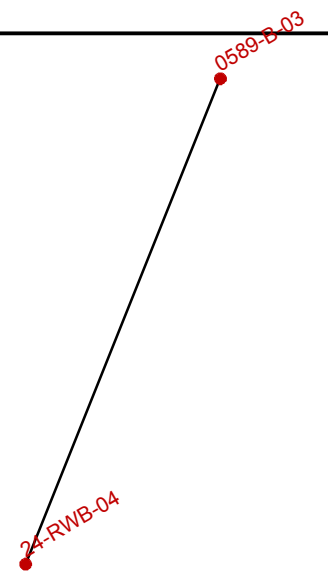
Wang Engineering, Inc.
1145 North Main Street
Lombard, IL 60148

Soil Profile Contract 60X94



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

JOB NUMBER	PLATE NUMBER
1100-04-01	EXHIBIT 3



APPENDIX A: BORING LOGS



BORING LOG 0589-B-03

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

WEI Job No.: 1100-04-01

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

Datum: NAVD 88
 Elevation: 594.27 ft
 North: 1899354.98 ft
 East: 1171689.92 ft
 Station: 8315+31.06
 Offset: 15.8956 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 (%)
	593.7	7-inch thick ASPHALT --PAVEMENT--															
	592.9	9-inch thick CONCRETE --PAVEMENT--															
		Loose to very dense, brown GRAVELLY SAND; dry to wet --FILL--			1	3 2 2	NP	5						11	0 0 0	< 0.25 P	26
			5		2	5 3 3	NP	5						12	0 0 3	0.57 B	29
					3	32 44 3	NP	11									
	586.3	Very stiff, gray SILTY CLAY LOAM, trace gravel			4	4 6 7	2.62 B	20						13	1 2 2	< 0.25 P	28
	583.8	Very soft to medium stiff, gray CLAY to SILTY CLAY, trace gravel			5	1 2 2	0.66 B	25									
					6	0 0 0	0.16 B	25						14	0 0 1	0.41 B	26
					7	1 2 1	< 0.25 P	29									
					8	0 0 0	< 0.25 P	24						15	0 0 2	0.41 B	26
					9	0 0 0	0.25 B	26									
					10	0 0 0	NR							16	1 2 4	0.66 B	25

--L_L(%)=34, P_L(%)=16--
 --%Gravel=7.0--
 --%Sand=13.9--30
 --%Silt=50.1--
 --%Clay=29.1--
 --A-6 (13)--

GENERAL NOTES

Begin Drilling **06-19-2014** Complete Drilling **06-22-2014**
 Drilling Contractor **Wang Testing Services** Drill Rig
 Driller **P&J** Logger **S. Woods** Checked by **C. Marin**
 Drilling Method **2.25" SSA to 10', mud rotary thereafter, boring**
backfilled upon completion

WATER LEVEL DATA

While Drilling **5.50 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.

WANGENGINC 11000401.GPJ WANGENG.GDT 10/14/19



BORING LOG 0589-B-03

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 1145 North Main Street
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 Telephone: 630-953-9928
 Fax: 630-953-9938

WEI Job No.: 1100-04-01

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

Datum: NAVD 88
 Elevation: 594.27 ft
 North: 1899354.98 ft
 East: 1171689.92 ft
 Station: 8315+31.06
 Offset: 15.8956 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 (%)
	537.5	Stiff to hard, gray SILTY CLAY LOAM to SILTY LOAM, trace gravel	55	X	17	0 3 5	0.82 B	21		512.5	Gray SILT; dry	80	X	22	7 7 11	< 0.25 P	26
			60	X	18	3 6 11	1.89 B	23		510.3	Medium dense to dense, gray SAND, trace gravel; moist --possible underpressure groundwater bearing layer--	85	X	23	8 10 12	NP	16
			65	X	19	3 6 8	2.71 B	19				90	X	24	14 18 26	NP	19
			70	X	20	10 14 17	4.00 P	19		502.5	Dense to very dense, gray GRAVELLY SAND; moist to saturated --possible underpressure groundwater bearing layer--	95	X	25	13 13 20	NP	12
	522.5	Soft to medium stiff, gray CLAY to SILTY CLAY, trace gravel	75	X	21	1 3 6	0.82 B	37				100	X	26	19 27 35	NP	11

GENERAL NOTES

Begin Drilling **06-19-2014** Complete Drilling **06-22-2014**
 Drilling Contractor **Wang Testing Services** Drill Rig _____
 Driller **P&J** Logger **S. Woods** Checked by **C. Marin**
 Drilling Method **2.25" SSA to 10', mud rotary thereafter, boring backfilled upon completion**

WATER LEVEL DATA

While Drilling ∇ **5.50 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.

WANGENGINC 11000401.GPJ WANGENG.GDT 10/14/19



BORING LOG 0589-B-03

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WEI Job No.: 1100-04-01

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

Datum: NAVD 88
 Elevation: 594.27 ft
 North: 1899354.98 ft
 East: 1171689.92 ft
 Station: 8315+31.06
 Offset: 15.8956 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 (%)
	490.4	Boring terminated at 103.82 ft	103.82	☒	27	100/4	NP	12									

GENERAL NOTES

WATER LEVEL DATA

Begin Drilling **06-19-2014** Complete Drilling **06-22-2014**
 Drilling Contractor **Wang Testing Services** Drill Rig
 Driller **P&J** Logger **S. Woods** Checked by **C. Marin**
 Drilling Method **2.25" SSA to 10', mud rotary thereafter, boring backfilled upon completion**

While Drilling ∇ **5.50 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.

WANGENGINC 11000401.GPJ WANGENG.GDT 10/14/19



BORING LOG 24-RWB-04

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 1145 North Main Street
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 Telephone: 630-953-9928
 Fax: 630-953-9938

WEI Job No.: 1100-04-01

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

Datum: NAVD 88
 Elevation: 576.17 ft
 North: 1899150.98 ft
 East: 1171608.16 ft
 Station: 6341+00.27
 Offset: 2.6124 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 (%)
		Stiff, black SILTY CLAY LOAM, trace gravel, trace roots --TOPSOIL--		X	1	5 8 9	1.39 B	9					X	11	1 1 1	< 0.25 P	27
	573.7	Stiff, gray SILTY CLAY to SILTY CLAY LOAM, trace gravel		X	2	4 3 4	1.48 B	18				30	X	12	1 2 2	0.41 B	24
	570.7	Very soft to medium stiff, gray CLAY to SILTY CLAY, trace gravel		X	3	2 1 2	0.25 B	23					X	13	1 2 3	0.74 B	20
			10	X	4	2 2 2	0.25 B	23				35	X	13	1 2 3	0.74 B	20
				X	5	1 1 2	0.41 B	26					X	14	3 4 6	0.82 B	24
			15	X	6	1 1 2	< 0.25 P	26				40	X	14	3 4 6	0.82 B	24
				X	7	1 1 2	0.16 B	24		534.4	Very stiff, gray SILTY LOAM to SILTY CLAY LOAM, trace gravel		X	15	4 6 9	3.77 B	13
			20	X	8	1 1 2	0.33 B	26				45	X	15	4 6 9	3.77 B	13
				X	9	1 1 2	0.50 N/6			529.4	Very stiff, gray SILTY CLAY, trace gravel		X	16	4 6 12	2.87 B	19
			25	X	10	0 1 2	0.33 B	27				50	X	16	4 6 12	2.87 B	19

GENERAL NOTES

WATER LEVEL DATA

Begin Drilling **08-12-2014** Complete Drilling **08-12-2014**
 Drilling Contractor **Wang Testing Services** Drill Rig
 Driller **R&J** Logger **S. Woods** Checked by **C. Marin**
 Drilling Method **2.25" HSA to 10', mud rotary thereafter, boring backfilled upon completion**

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 10/14/19



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

BORING LOG 24-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: 576.17 ft
 North: 1899150.98 ft
 East: 1171608.16 ft
 Station: 6341+00.27
 Offset: 2.6124 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 (%)	
	524.4	Very stiff, gray CLAY to SILTY CLAY, trace gravel																
			55	X	17	4 6 8	2.95 B	25										
	516.9	Gray SILT																
			60	X	18	3 4 4	NP	26										
	514.4	Medium dense, brown, medium SAND with silt --possible underpressure groundwater bearing layer--																
			65	X	19	6 9 14	NP	14										
	511.2	Boring terminated at 65.00 ft																
			70															
			75															

GENERAL NOTES

WATER LEVEL DATA

Begin Drilling **08-12-2014** Complete Drilling **08-12-2014**
 Drilling Contractor **Wang Testing Services** Drill Rig
 Driller **R&J** Logger **S. Woods** Checked by **C. Marin**
 Drilling Method **2.25" HSA to 10', mud rotary thereafter, boring backfilled upon completion**

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 10/14/19



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BORING LOG VST-02

WEI Job No.: 1100-04-01

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

Datum: NAVD 88
 Elevation: 585.26 ft
 North: 1899543.57 ft
 East: 1171652.91 ft
 Station: 8415+02.96
 Offset: 258.109 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 (%)
		Medium stiff, black and gray SILTY CLAY, trace gravel --FILL--									--In-Situ Vane Shear, 25.5 feet-- --S _{u undis} = 786.3 psf-- --S _{u remold} = 611.6 psf-- --Sensitivity = 1.3--			7			
	579.8		5		1	6 4 3	0.90 B	28			--In-Situ Vane Shear, 28.0 feet-- --S _{u undis} = 644.3 psf-- --S _{u remold} = 382.2 psf-- --Sensitivity = 1.7--30			8			
	576.8	Very soft, gray SILTY CLAY, trace gravel									--In-Situ Vane Shear, 30.5 feet-- --S _{u undis} = 720.8 psf-- --S _{u remold} = 458.7 psf-- --Sensitivity = 1.6--			9			
			10								--In-Situ Vane Shear, 33.0 feet-- --S _{u undis} = 851.8 psf-- --S _{u remold} = 567.9 psf-- --Sensitivity = 1.5--35			10			
		--In-Situ Vane Shear, 10.5 feet-- --S _{u undis} = 425.9 psf-- --S _{u remold} = 218.4 psf-- --Sensitivity = 2.0--			1						--In-Situ Vane Shear, 35.5 feet-- --S _{u undis} = 895.5 psf-- --S _{u remold} = 666.2 psf-- --Sensitivity = 1.3--			11			
		--In-Situ Vane Shear, 13.0 feet-- --S _{u undis} = 589.7 psf-- --S _{u remold} = 283.9 psf-- --Sensitivity = 2.1--15			2						--In-Situ Vane Shear, 38.0 feet-- --S _{u undis} = 993.8 psf-- --S _{u remold} = 720.8 psf-- --Sensitivity = 1.4--40			12			
		--In-Situ Vane Shear, 15.5 feet-- --S _{u undis} = 622.5 psf-- --S _{u remold} = 425.9 psf-- --Sensitivity = 1.5--			3						--In-Situ Vane Shear, 40.5 feet-- --S _{u undis} = 1277.7 psf-- --S _{u remold} = 808.1 psf-- --Sensitivity = 1.6--			13			
		--In-Situ Vane Shear, 18.0 feet-- --S _{u undis} = 491.4 psf-- --S _{u remold} = 415.0 psf-- --Sensitivity = 1.2--20			4					541.8	--In-Situ Vane Shear, 43.0 feet-- --S _{u undis} > 1750 psf-- Boring terminated at 43.50 ft			14			
		--In-Situ Vane Shear, 20.5 feet-- --S _{u undis} = 884.6 psf-- --S _{u remold} = 655.2 psf-- --Sensitivity = 1.4--			5												
		--In-Situ Vane Shear, 23.0 feet-- --S _{u undis} = 939.2 psf-- --S _{u remold} = 655.2 psf-- --Sensitivity = 1.4--25			6												

GENERAL NOTES

Begin Drilling **12-04-2015** Complete Drilling **12-05-2015**
 Drilling Contractor **Wang Testing Services** Drill Rig
 Driller **R&N** Logger **I. Muhammad** 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.

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