
**STRUCTURE GEOTECHNICAL REPORT
CIRCLE INTERCHANGE RECONSTRUCTION
SOUTHEAST RAMP BRIDGE OVER
INTERSTATES 290 AND 90/94
EXISTING SN 016-2452, PROPOSED SN 016-1714
FAI 290, SECTION XXX-XXXX
IDOT D-91-227-13, PTB 163/ITEM 001
COOK COUNTY, ILLINOIS**

For

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| 11. Abstract | | |
| <p>The existing, fourteen-span ramp bridge over Interstates 290 and 90/94 will be removed and replaced with a new, eight-span structure with a closed abutment and multi-column piers. The bridge will have a back-to-back length of 740.8 feet and an out-to-out width of 29.2 feet.</p> <p>The foundation soils consist of up to 15 feet of fill, 2.5 to 10 feet medium stiff to very stiff silty clay to silty loam crust, up to 38 feet of soft clay, and 32 to 52 feet of medium stiff to hard silty loam. Deeper foundation soils include up to 29 feet of hard silty clay or very dense silt or silty loam hardpan and very dense gravelly sand resting on top of strong, fair to good rock quality dolostone at depths of 90 feet or more. The site classifies in the Seismic Class D and is in the Seismic Performance Zone 1.</p> <p>Wang understands that the profile grade along the spans will only change slightly; thus, we anticipate negligible settlements due to surcharge at the piers and suitable global stability. However, a new approach embankment and retaining walls will be constructed at north abutment where significant settlement may take place due to underlying soft clay. The new retaining walls and settlement will be discussed in separate SGR's.</p> <p>The proposed abutment and piers could be supported on drilled shafts established within hardpan at elevations ranging from 504 to 512 feet with factored resistances of about 273 to 855 kips for 4- to 6-foot diameter bases. Drilled shafts could be also socketed into the bedrock at elevations ranging from 491 to 485 feet to achieve factored resistance as high as 1901 kips for a 4-foot diameter socket. Downdrag was considered for the abutment drilled shafts. Alternatively, micropiles may also be used to support the substructures.</p> <p><i>Temporary Soil Retention System</i> will be needed to construct the piers adjacent to the CTA tracks.</p> <p>The selection of foundation type for the substructures should be based on the estimated loads and construction costs. The shafts near bedrock would likely require casing to protect against groundwater infiltration.</p> | | |
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1.0 INTRODUCTION

This report presents the results of our subsurface investigation, laboratory testing, and geotechnical evaluations for the design and construction of a new ramp bridge connecting Southbound Interstate 90/94 (SB I-90/94) to Eastbound Interstate 290 (EB I-290) within the Circle Interchange in Chicago, Cook County, Illinois. This structure is also identified as Ramp SE over I-290 and I-90/94. A *Site Location Map* is presented as Exhibit 1.

1.1 Proposed Structure

Wang Engineering, Inc. (Wang) understands AECOM envisions a new, eight-span bridge structure (SN 016-1714) supporting the interchange ramp as it flies south from the north abutment on I-90/94 and carries traffic over I-290 and I-90/94 turning east joining EB I-290. The bridge will have a back of north abutment to centerline of Pier E2 (SN 016-1029) length of 740.8 feet, with spans ranging from 67 to 128 feet in length. The out-to-out bridge width will measure 29.2 feet to accommodate a 16-foot wide lane, with 4 to 6-foot wide shoulders and barriers. The spans will be supported by 36-inch and 46-inch wide flange beams. The substructure will consist of a reinforced concrete closed abutment at the north end and multi-column piers (P1 through P7), all supported on drilled shaft foundations. The new bridge structure will connect to the existing Pier E2 on EB I-290 at the east end elevation. We estimate the north approach embankment will have retaining walls with maximum heights of 20 feet. The new retaining walls and approach embankment will be discussed in separate SGR's. The new bridge will be slightly higher and have a different alignment than the existing bridge that will be removed. The TSL dated January 7, 2014 is shown in the *Type Size Location Plan* (Appendix C).

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

1.2 Existing Structure

The existing structure (SN016-2452) is a 14-span bridge that was constructed in 1960 under FAI Route 1, Section 2424.28-B. The bridge has a total length, from back of north abutment to centerline of east pier, of 787.4 feet and an out-to-out bridge width of 29.0 feet. The spans are supported by 36-inch wide flange beams.

The substructures consist of a reinforced concrete open abutment and multi-column piers supported on drilled shaft foundations. The existing bridge will be removed and replaced by the new bridge.

2.0 SITE CONDITIONS AND GEOLOGICAL SETTING

The site is located within the City of Chicago at the I-90/94 and I-290 Circle Interchange. On the USGS *Chicago Loop 7.5 Minute Series* map, the bridge is located in the NE $\frac{1}{4}$ of Section 16, Tier 39 N, Range 14 E of the Third Principal Meridian.

The following review of published geologic data, with emphasis on factors that might influence the design and construction of the proposed engineering works, is meant to place the project area within a geological framework and confirm the dependability and consistency of the present subsurface investigation results. For the study of the regional geologic framework, Wang considered northeastern Illinois in general and Cook County in particular. Exhibit 2 illustrates the *Site and Regional Geology*.

2.1 Physiography

The bridge is situated within the Chicago Lake Plain Physiographic Subsection. The area is characterized by a flat surface that slopes gently toward the lake, largely made of groundmoraine till covered by thin and discontinuous lacustrine silt and clay.

The bridge carrying the SB I-90/94 exit ramp to EB I-290 starts from approximate elevation of 601 feet at north abutment to elevation of 600 feet at the east end (Pier E2). The proposed ground lines are 580.14 (north abutment); 579.0 (Pier 1), 582.39 (Pier 2); 583.89 (Pier 3); 584.69 (Pier 4); 588.33 (Pier 5); 574.70 (Pier 6); and 575.67 (Pier 7).

2.2 Surficial Cover

The project area was shaped during the Wisconsin-age glaciation, and more than 75-foot thick drift covers the bedrock (Leetaru et al. 2004). The glacial cover is made up of clay and silt of the Equality Formation of the Mason Group and diamictons of the Wadsworth and Lemont Formations of the Wedron Group (Hansel and Johnson 1996). The Equality Formation is made up of bedded silt and clay, locally laminated, with lenses and/or thin beds of sand and gravel. The Wadsworth Formation consists of relatively homogenous, massive, gray till with clay to silty clay matrix, with dolostone and shale clasts and occasional lenses of sorted and stratified silt. The Wadsworth Formation is underlain by the pebbly silty clay loam to silty loam diamicton of the Yorkville Member of the Lemont Formation, known informally as the Chicago “hardpan.”

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

2.3 Bedrock

In the project area, the glacial deposits unconformably rest over approximately 350-foot thick Silurian-age dolostone (Leetaru et al. 2004). The top of bedrock may be encountered at 475 to 500 feet elevation or 75 to 100 feet below ground surface (bgs) or more. The Silurian dolostone dips gently eastward at a pace of 15 feet per mile. Only inactive faults are known in the area, and the seismic risk is minimal (Leetaru et al. 2004; Willman 1971). There are no records of mining activity in the area, but deep tunnel excavations are known to exist.

Our subsurface investigation results fit into the local geologic context. The borings drilled in the project area revealed the native sediments consist of clay to silty clay diamicton of the Wadsworth Formation resting on top of more competent silty clay loam diamicton (hardpan) of the Lemont Formation, which in turn is underlain by bedrock. Sound dolostone bedrock was sampled or inferred at depths ranging from 90.5 to 109.0 feet bgs, corresponding to 490.9 to 481.3 feet elevation, within the range predicted based on published geological data.

3.0 METHODS OF INVESTIGATION

The following sections outline the subsurface and laboratory investigations. All elevations in this report are based on North American Vertical Datum (NAVD) 1988.

3.1 Subsurface Investigation

The subsurface investigation consisted of five structure borings designated as 1714-B-01 to 1714-B-05 along the new alignment and three nearby structure borings designated as 1705-B-07, 1705-B-10 and 2081-B-04.

The borings were drilled by Wang from the top of existing pavement or ground surface of the existing interchange from elevations of 573.3 to 593.2 feet to depths of 89 to 117 feet bgs. The as drilled boring elevations were surveyed by Dynasty Group Inc., and station and offset information for each boring were provided by AECOM. The station and offset referenced the wall alignment. Boring location data are presented in the *Boring Logs* (Appendix A). The as-drilled boring locations are shown in the *Boring Location Plan* (Exhibit 3).

A truck-mounted drilling rig, equipped with solid and hollow stem augers and mud rotary equipment, was used to advance and maintain an open borehole. Soil sampling was performed according to AASHTO T 206, "*Penetration Test and Split Barrel Sampling of Soils*." The soil was sampled at 2.5-foot intervals to 30 feet bgs and at 5-foot intervals thereafter. Samples collected from each interval were placed in sealed jars for further examination and testing. NWD4-size bedrock cores were collected from Boreholes 1714-B-02, 1714-B-04, 1714-B-05 and 1705-B-10 in 10-foot runs.

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

Wang performed vane shear tests in Boring 1705-B-10 to determine in-situ shear strength of soft/very soft silty clay. The tests were performed using an Acker Vane Shear Test kit in undisturbed and remolded conditions. The results are shown on the boring logs. The sensitivity is the ratio of shear strength in undisturbed and remolded conditions. In general, the vane shear values were significantly higher than the corresponding Rimac values. Vane shear test results were used for analyses.

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

3.2 Laboratory Testing

Soil samples were tested in the laboratory for moisture content (AASHTO T-265). Atterberg limits (AASHTO T 89/T 90) and particle size (AASHTO T 88) analyses were performed to classify selected samples. Field visual descriptions of the soil samples were verified in the laboratory, and the tested samples were classified in accordance with the IDH Textural Classification chart. Selected rock core samples were tested for unconfined compressive strength (ASTM D7012). Laboratory test results are shown in the *Boring Logs* (Appendix A) and in the *Laboratory Test Results* (Appendix B).

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

4.0 RESULTS OF FIELD AND LABORATORY INVESTIGATIONS

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

4.1 Soil Conditions

Along the proposed Ramp SE, the investigation revealed the surface to consist of dark brown loam to silty loam topsoil with thickness ranging from 2 to 15 inches; a composite pavement structure of 2 to 4 inches of asphalt overlying 8 to 12 inches of concrete overlying 6 to 12 inches of crushed stone base; or an 11 to 14 inches thick asphalt overlying 4 to 20 inches of sandy gravel base. In descending order, the general lithologic succession encountered beneath the topsoil/pavement includes

1) man-made ground (fill); 2) medium stiff to very stiff silty clay to silty loam; 3) very soft to medium stiff clay to silty clay; 4) medium stiff to hard silty clay to silty loam; 5) hard silty clay loam or very dense silt or silty loam; 6) very dense gravelly silty loam/sand, medium to very dense silt; and 7) strong dolostone bedrock.

1) Man-made ground (fill)

Underneath the topsoil or pavement, borings encountered 5.5- to 10.5-foot thick fill. The granular fill consists of medium dense sand to sandy loam with SPT N values of 11 to 17 blows per foot and moisture content (MC) values 8 to 13 %. The cohesive fill consists of very stiff to hard silty clay to clay loam with unconfined compressive strength (Q_u) values of 2.62 to 6.56 with MC values of 13 to 20 %. The fill in Boring 2081-B-04 that is adjacent to the existing CTA Tracks retaining wall was about 15.5 feet thick.

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

Below the fill, medium stiff to very stiff, gray clay “crust” approximately 2.5 to 10.0 feet thick, was encountered at depths of 1.25 to 10.50 feet bgs corresponding to 584.0 to 573.2 feet elevation. The clay layer has Q_u values ranging from 0.98 to 3.5 tsf with an average of 1.48 tsf, and MC from 16 to 24% with an average of 19%. The “crust” was not encountered in Borings 1714-B-04 and 2081-B-04.

3) Very soft to medium stiff clay to silty clay

Underneath the crust, borings encountered up to 38 feet of very soft to medium stiff, gray clay to silty clay deposits with Q_u values of 0.08 to 0.98 tsf with an average of 0.36 tsf and MC values of 19 to 36% with an average of 25%. This layer is commonly known as the “Chicago Blue Clay.”

Liquid (LL) and plastic (PL) limits measure 33 to 35% and 16 to 18%, respectively. The soil classifies as A-6 (9-17) under AASHTO M145.

4) Medium stiff to hard silty clay to silty loam

At elevations of 544.5 to 535.8 feet (about 32 to 52 feet bgs), borings advanced through up to 30 feet of medium stiff to hard silty clay to clay loam with layers of medium dense to very dense gravelly sand to silty loam. The clay has Q_u values of 0.57 to 7.46 tsf with an average of 3.61 tsf, and MC values of 11 to 37% averaging 19%.

5) Hard silty clay loam or very dense silt or silty loam

At elevations ranging from 519.5 to 508.9 feet (about 57 to 79 feet bgs), the borings advanced through

up to 29 feet of hard silty clay loam to dense to very dense silt/silty loam. The silty clay loam has Q_u values of 5.33 to 10.25 tsf and MC values of 11 to 23% averaging 15% that correspond to a cohesive intermediate geomaterial (IGM) as per FHWA (2010). The silty loam has SPT N values of 60 to 81 blows/foot, averaging 69 blows/foot which corresponds to cohesionless IGM material according to AASHTO (2012). This layer is commonly known as the “Chicago Hardpan.” Liquid (LL) and plastic (PL) limits measures 35% and 17%, respectively, and the soil classifies as A-6 (10).

6) Very dense gravelly silty loam/sand, medium to very dense silt

At elevations of 504.9 to 492.0 feet (about 77 to 97 feet bgs) borings advanced through up to 17 feet of gray, very dense gravelly silty loam/sand, medium to very dense silt with SPT N values of 23 to greater than 100 blows/foot, and MC values of 11 to 24%. The unit rests on top of bedrock.

7) Strong dolostone bedrock

Dolostone bedrock was confirmed at 90.5 to 107.0 feet bgs in Borings 1714-B-02, 1714-B-04, 1714-B-05 and 1705-B-10 corresponding to elevations of 490.9 to 481.3 feet. Auger/bit refusal on the apparent top of bedrock was recorded at 94.0 and 109 feet bgs in Borings 1705-B-07 and 1714-B-01. The top 1 to 2 feet is considered weathered bedrock. Based on a 10-foot rock cores taken, the RQD ranges from 62 to 86% corresponding to fair to good quality rock. Dolostone bedrock was strong, light gray, fresh, thinly bedded, and slightly vuggy. Rock Mass Rating (RMR) values ranged from 57 to 67. Unconfined compressive strength of rock ranged from 9,480 to 11,660 psi. Bedrock core photographs are shown in Appendix A.

4.2 Groundwater Conditions

Groundwater may be perched within the water-bearing granular soils. This was observed at various levels in the saturated/wet samples of sand, silt, sandy loam and gravelly sand taken from Borings 1714-B-01 (at 516.5 and 496.2 feet), 1714-B-03 (at 510.9 feet) and 1714-B-04 (at 523.2, 518.2 and 498.2). The possibility of these layers should be accounted for during the design and construction of the foundations.

4.3 Seismic Design Considerations

Due to the fixity considerations included in the IDOT *All Geotechnical Manual Users (AGMU) 9.1* method of analysis, the seismic site class is dependent on the type of foundation chosen. A 3-foot diameter drilled shaft was assumed in the calculations. The soils within the top 100 feet have a weighted average S_u of 1.18 ksf (AASHTO 2012; Method C controlling), and the results classify the

site in the Seismic Site Class D in accordance with the IDOT method. The project location belongs to the Seismic Performance Zone 1.

The seismic spectral acceleration parameters were determined using AASHTO' computer program "Seismic Design Parameters, version 2.10" by specifying the location by latitude and longitude. The location of the bridge was considered at Latitude of 41.875857 and Longitude of -87.646364. The seismic spectral acceleration parameters recommended for design in accordance with AASHTO (2012) are summarized in Table 1. The factor of safety (FOS) against liquefaction for the bridge site is greater than the AASHTO-required value of 1.

Table 1: Seismic Design Parameters

| Spectral Acceleration Period (sec) | Spectral Acceleration Coefficient ¹⁾ (% g) | Site Class Factors | Design Spectrum for Site Class D ²⁾ (% g) |
|---|--|-----------------------|--|
| 0.0 | PGA = 4.2 | $F_{pga} = 2.5$ | $A_s = 6.6$ |
| 0.2 | $S_s = 9.0$ | $F_a = 2.5$ | $S_{DS} = 14.4$ |
| 1.0 | $S_1 = 3.6$ | $F_v = 3.5$ | $S_{D1} = 8.5$ |

1) Base spectral acceleration coefficients from AASHTO (2012)

2) Site Class D values to be presented on plans ($A_s = PGA * F_{pga}$; $S_{DS} = S_s * F_a$; $S_{D1} = S_1 * F_v$)

5.0 FOUNDATION ANALYSIS AND RECOMMENDATIONS

Geotechnical evaluations and recommendations for the north abutment and pier structure foundations are included in the following sections. It is understood the design will be based on 2012 AASHTO LRFD Bridge Design Specification and IDOT 2012 Bridge Manual. We recommend supporting the new abutment and piers on drilled shafts. Due to noise and vibration concerns, we do not recommend the use of driven piles.

Wang understands that the profile grade along the spans will only change slightly, thus, we anticipate negligible settlements due to surcharge at the piers and suitable global stability. However, a new embankment and retaining walls will be constructed at north abutment where significant settlement may take place due to underlying soft clay. Based on MSE wall embankment settlement curves previously developed for the circle interchange, we anticipate a maximum of 1.9 inches of

settlement for an MSE wall with maximum wall height of 15 feet, using cellular concrete (30 pcf) as backfill with no aggregate column ground improvement. The maximum settlement may be reduced to 1 inch by the end of the construction period. The north abutment will be supported by drilled shafts founded in hardpan or encased in bedrock. The new retaining walls with SN 016-1835 and 016-1837 will be discussed in separate SGR's. Downdrag should be considered for the drilled shafts at the north abutment.

Based on the TSL drawings, the existing bridge (SN 016-2452) abutment and piers are to be removed. The alignment of the new bridge is offset from the existing one and there should not be interference of the foundations except for Pier 2 where partial overlapping of the foundation footprints is observed. The possibility of using some of the existing drilled shafts in supporting the new pier should be considered at this location. A load test may be required to establish existing drilled shaft capacity.

5.1 Approach Embankments and Slabs

The settlement and slope stability of the north approach embankment and slab will be discussed in the SGR's for retaining walls that will be produced separately for the north approach embankment.

5.2 Structure Foundations

Wang recommends supporting the north abutment and piers 1 through 7 on drilled shafts. Preliminary factored vertical and lateral loads for the north abutment and piers have been provided by TranSystems (Table 2).

Table 2: Summary of Factored Foundation Loads

| Substructure ID | Maximum Vertical Load (kips) | Maximum Lateral Load (kips) |
|-----------------|------------------------------|-----------------------------|
| North Abutment | 998 | 165 |
| Pier 1 | 2072 | 263 |
| Pier 2 | 2193 | 274 |
| Pier 3 | 2200 | 287 |
| Pier 4 | 2186 | 285 |

| | | |
|--------|------|-----|
| Pier 5 | 2162 | 276 |
| Pier 6 | 2458 | 375 |
| Pier 7 | 3248 | 118 |

5.2.1 Drilled Shafts

The foundations for the north abutment and piers could be supported on drilled shafts founded in the hard silty clay loam or very dense silty loam (hardpan) IGM (**Layer 5**) or socketed into bedrock (**Layer 7**) depending on the applied loads and lateral stability.

The borings encountered 10 feet or more of hardpan material at elevations ranging from 517.2 to 508.9 feet. We estimate that drilled shafts could be established within this material. Alternatively, the shafts could be socketed into bedrock that was encountered in Borings 1714-B-02, 1714-B-04, 1714-B-05 and 1705-B-10 at elevations of 490.9 to 481.3 feet.

Shafts bearing on the hardpan should be designed for an end bearing resistance factor (ϕ_{stat}) of 0.55 in accordance with AASHTO (2012). The hardpan soil encountered above the bedrock has N60 values of more than 50 blows per foot and may be considered an IGM as per AASHTO (2012). We estimate the shafts will have a nominal unit base resistance of 55 ksf for the north abutment and Piers 1 through 4, and 50 ksf for Piers 5, 6, and 7, corresponding to factored unit base resistance of 30.0 and 27.5 ksf, respectively. The R_F , R_N , and estimated base elevations are summarized below in Table 3 for 4-, 5-, and 6-foot diameter shafts. We estimate the settlement of the shafts will be less than 0.5 inch. The available factored resistance for the North Abutment includes a reduction for downdrag due to greater than 0.4-inch embankment settlement expected adjacent to the abutment creating downdrag to Elevation 547.50.

Table 3: Estimated Resistances and Base Elevations for Shafts in Hardpan (IGM)

| Structure Unit | Shaft Cap Base Elevations (feet) | Nominal Unit Base Resistance (ksf) | Base Diameter (feet) | Nominal Shaft Resistance, R _N (kips) | Factored Resistance Available, R _F (kips) | Total Shaft Length ¹ (feet) | Estimated Shaft Base Elevation (feet) |
|-------------------------------|----------------------------------|------------------------------------|----------------------|---|--|--|---------------------------------------|
| North Abutment (1714-B-02) | 593.5 | 55 | 4 | 691 | 273* | 84 | 511.0 |
| | | | 5 | 1080 | 461* | 84 | 511.0 |
| | | | 6 | 1555 | 695* | 84 | 511.0 |
| Pier 1 (1714-B-02) | 577.0 | 55 | 4 | 691 | 380 | 67 | 511.0 |
| | | | 5 | 1080 | 594 | 67 | 511.0 |
| | | | 6 | 1555 | 855 | 67 | 511.0 |
| Pier 2 (2081-B-04) | 580.39 | 55 | 4 | 691 | 380 | 70 | 511.0 |
| | | | 5 | 1080 | 594 | 70 | 511.0 |
| | | | 6 | 1555 | 855 | 70 | 511.0 |
| Pier 3 (1714-B-03) | 581.89 | 55 | 4 | 691 | 380 | 79 | 504.0 |
| | | | 5 | 1080 | 594 | 79 | 504.0 |
| | | | 6 | 1555 | 855 | 79 | 504.0 |
| Pier 4 (1714-B-03) | 582.69 | 55 | 4 | 691 | 380 | 79 | 504.0 |
| | | | 5 | 1080 | 594 | 79 | 504.0 |
| | | | 6 | 1555 | 855 | 79 | 504.0 |
| Pier 5 (1714-B-05) | 586.33 | 50 | 4 | 628 | 345 | 75 | 512.0 |
| | | | 5 | 982 | 540 | 75 | 512.0 |

| Structure Unit | Shaft Cap Base Elevations (feet) | Nominal Unit Base Resistance (ksf) | Base Diameter (feet) | Nominal Shaft Resistance, R_N (kips) | Factored Resistance Available, R_F (kips) | Total Shaft Length ¹ (feet) | Estimated Shaft Base Elevation (feet) |
|-----------------------|----------------------------------|------------------------------------|----------------------|--|---|--|---------------------------------------|
| | | | 6 | 1414 | 777 | 75 | 512.0 |
| Pier 6 (1714-B-04) | 572.7 | 50 | 4 | 628 | 345 | 66 | 508.0 |
| | | | 5 | 982 | 540 | 66 | 508.0 |
| | | | 6 | 1414 | 777 | 66 | 508.0 |
| Pier 7 (1705-B-07) | 573.67 | 50 | 4 | 628 | 345 | 68 | 507.0 |
| | | | 5 | 982 | 540 | 68 | 507.0 |
| | | | 6 | 1414 | 777 | 68 | 507.0 |

*Factored resistance available includes a reduction for downdrag at the Abutment to an elevation of 547.50 below which the settlement becomes less than 0.4-inch.

¹The lengths shown in the table include a 1-foot shaft embedment into the abutments and piers

If the estimated bearing resistances for shafts established within the hardpan do not meet the loading criteria, the shafts may be established in rock sockets bearing upon sound bedrock. The bedrock cores show uniform, fair to good rock quality conditions, with sound, unfractured bedrock beginning about 2 feet below the top of weathered rock. We estimate the rock sockets will have diameters of 3.0 to 4.0 feet. Above the bedrock, the shafts should have diameters 6 inches larger than the sockets. Due to the possible presence of water-bearing granular materials above the bedrock, the shafts should have casings extending to the top of the rock.

We recommend designing the rock sockets based on the methods outlined in the 2012 AASHTO LRFD *Bridge Design Specifications*, that indicate the sockets should be designed for a geotechnical unit base resistance factor (ϕ_{stat}) 0.50 (AASHTO 2012). Based on this criterion, the R_F , R_N , and estimated base elevations for 3.0-, 3.5-, and 4.0- foot diameter sockets are summarized below in Table 4. We estimate the settlement of the rock sockets will be less than 0.5 inch. The available factored resistance for the North Abutment includes a reduction for downdrag due to greater than 0.4-inch embankment settlement expected adjacent to the abutment creating downdrag to Elevation 547.50.

As per IDOT (2012a), in most cases drilled shafts extending into rock should be designed utilizing only end bearing or side resistance in rock, whichever is larger. For shafts socketed into the bedrock less than 10 feet, we estimate the end bearing will give more capacity than the side resistance; thus, only the end bearing resistance was considered in the calculations.

Table 4: Estimated Resistances and Base Elevations for 3-foot Length Rock Socket Shafts***

| Structure Unit | Shaft Cap Base Elevations (feet) | Top of Bedrock Elevation (feet) | Nominal Unit Socket Base Resistance (ksf) | Nominal Socket Resistance, R_N (kips) | Factored Resistance Available, R_F (kips) | Total Socket Diameter (feet) | Estimated Total Shaft Length ¹ (feet) |
|----------------------------|----------------------------------|---------------------------------|---|---|---|------------------------------|--|
| North Abutment (1714-B-02) | 593.5 | 486.5 (actual)** | 288 | 2038 | 939* | 3.0 | 108 |
| | | | 288 | 2774 | 1294* | 3.5 | 108 |
| | | | 288 | 3623 | 1705* | 4.0 | 108 |
| Pier 1 (1714-B-02) | 577.0 | 486.5 (actual)** | 288 | 2038 | 1019 | 3.0 | 92 |
| | | | 288 | 2774 | 1387 | 3.5 | 92 |
| | | | 288 | 3623 | 1812 | 4.0 | 92 |
| Pier 2 (1714-B-02) | 580.39 | 486.5 (actual)** | 288 | 2038 | 1019 | 3.0 | 95 |
| | | | 288 | 2774 | 1387 | 3.5 | 95 |
| | | | 288 | 3623 | 1812 | 4.0 | 95 |
| Pier 3 (1714-B-05) | 581.89 | 490.9 (actual)** | 263 | 1856 | 928 | 3.0 | 92 |
| | | | 263 | 2527 | 1264 | 3.5 | 92 |
| | | | 263 | 3300 | 1650 | 4.0 | 92 |
| Pier 4 | 582.69 | 490.9 | 263 | 1856 | 928 | 3.0 | 93 |

| Structure Unit | Shaft Cap Base Elevations (feet) | Top of Bedrock Elevation (feet) | Nominal Unit Socket Base Resistance (ksf) | Nominal Socket Resistance, R_N (kips) | Factored Resistance Available, R_F (kips) | Total Socket Diameter (feet) | Estimated Total Shaft Length ¹ (feet) |
|--------------------|----------------------------------|---------------------------------|---|---|---|------------------------------|--|
| (1714-B-05) | | (actual)** | 263 | 2527 | 1264 | 3.5 | 93 |
| | | | 263 | 3300 | 1650 | 4.0 | 93 |
| Pier 5 (1714-B-05) | 586.33 | 490.9 (actual)** | 263 | 1856 | 928 | 3.0 | 96 |
| | | | 263 | 2527 | 1264 | 3.5 | 96 |
| | | | 263 | 3300 | 1650 | 4.0 | 96 |
| Pier 6 (1714-B-04) | 572.70 | 484.9 (actual)** | 303 | 2139 | 1070 | 3.0 | 89 |
| | | | 303 | 2911 | 1456 | 3.5 | 89 |
| | | | 303 | 3802 | 1901 | 4.0 | 89 |
| Pier 7 (1714-B-04) | 573.67 | 484.9 (actual)** | 303 | 2139 | 1070 | 3.0 | 90 |
| | | | 303 | 2911 | 1456 | 3.5 | 90 |
| | | | 303 | 3802 | 1901 | 4.0 | 90 |

*Factored resistance available includes a reduction for downdrag at the Abutment to an elevation of 547.50 below which the settlement becomes less than 0.4-inch.

** Actual top of bedrock from the nearest boring with bedrock cores.

*** The 3-foot rock socket starts in sound bedrock, after any weathered bedrock.

¹The lengths shown in the table include a 1-foot shaft embedment into the abutments and piers

5.2.2 Micropiles

Alternatively, micropiles may be used to support the abutment and pier foundations since they cause minimal vibrations and noise and can be installed in low headroom conditions. Micropiles embedded into bedrock encountered at elevations ranging from 490.9 to 481.3 feet will likely be the most economical micropile system. The contractor shall design, furnish, install and test micropiles in accordance with FHWA-SA-97-070 (2000), "Micropile Design and Construction Guidelines."

5.2.3 Lateral Loading

Lateral loads on piles and shafts should be analyzed for maximum moments and lateral deflections. Recommended lateral soil modulus and strain parameters required for analysis via the p-y curve method are included in Table 5 and rock parameters are included in Table 6. The incremental parameters for the soft silty clay (**Layer 3**) were obtained from vane shear testing conducted in Boring 1705-B-10 along Ramp NW (SN 016-1705) adjacent to this ramp bridge.

Table 5: Recommended Soil Parameters for Lateral Load Analysis
 Boring 1705-B-10

| Soil Type (Layer) | Unit Weight, γ (pcf) | Undrained Shear Strength, c_u (psf) | Estimated Friction Angle, ϕ ($^\circ$) | Estimated Lateral Soil Modulus Parameter, k (pci) | Estimated Soil Strain Parameter, ϵ_{50} |
|---|-----------------------------|---------------------------------------|---|---|--|
| 588.29 to 582.8 Loam | 115 | 0 | 30 | 25 | -- |
| 582.8 to 580.3 Silty Clay | 120 | 3500 | 0 | 1300 | 0.0048 |
| 580.3 to 567.8 Clay to Silty Clay | 120 | 1100 | 0 | 350 | 0.0082 |
| 567.8 to 550.3 Clay to Silty Clay | 115 | 790 | 0 | 200 | 0.0094 |
| 550.3 to 545.3 Clay to Silty Clay | 120 | 1800 | 0 | 620 | 0.0064 |
| 545.3 to 535.3 Clay to Silty Clay | 120 | 2700 | 0 | 950 | 0.0055 |
| 535.3 to 521.5 Silty Clay | 120 | 4400 | 0 | 1500 | 0.0045 |
| 521.5 to 516.5 Clay | 120 | 1300 | 0 | 420 | 0.0076 |
| 516.5 to 504.0 Silty Clay Loam to Silty Loam | 120 | 9200 | 0 | 2000 | 0.004 |
| 504.0 to 492.0 Silt to Silty Loam | 120 | 0 | 36 | 250 | -- |

| Soil Type (Layer) | Unit Weight, γ (pcf) | Undrained Shear Strength, c_u (psf) | Estimated Friction Angle, ϕ ($^\circ$) | Estimated Lateral Soil Modulus Parameter, k (pci) | Estimated Soil Strain Parameter, ϵ_{50} |
|------------------------------|-----------------------------|---------------------------------------|---|---|--|
| 492.0 to 486.5 Silt | 120 | 0 | 36 | 250 | -- |
| 486.5 to 481.3 Gravelly Sand | 120 | 0 | 36 | 250 | -- |

Table 6: Recommended Rock Parameters for Lateral Load Analysis
 Boring 1714-B-05

| Rock Type | Total Unit Weight, γ (pcf) | Young's Modulus (ksi) | Uniaxial Comp. Strength (ksi) | RQD (%) | Lateral Rock Modulus Parameter |
|------------------------|-----------------------------------|-----------------------|-------------------------------|---------|--------------------------------|
| Fair Quality DOLOSTONE | 135 | 2,500 | 10.1 | 62 | 0.0005 |

5.3 Stage Construction Design Recommendations

Stage construction is not envisaged for this bridge. The removal of the existing substructures and foundations may require temporary shoring of the surrounding soils. We estimate temporary shoring of these excavations based on the charts included in *Design Guide 3.13.1* (IDOT 2012a) will not be feasible. At the abutments, if the soils cannot be sloped at a maximum grade of 1:2 (V:H), they should be supported by *Temporary Soil Retention Systems* designed by the Contractor and approved by IDOT prior to construction. New Piers 1 and 2 will be constructed adjacent to the significant grade separation between the expressway and the CTA tracks, and will require *Temporary Soil Retention Systems* will also be required at these locations.

6.0 CONSTRUCTION CONSIDERATIONS

6.1 Site Preparation

All vegetation, surface topsoil, existing pavement, and debris should be cleared and stripped where

foundations and structural fills will be placed.

The removal of existing structures shall be in accordance with IDOT Section 501, *Removal of Existing Structures* (IDOT 2012b).

6.2 Excavation

Foundation excavations should be performed in accordance with local, state, and federal regulations. The potential effect of ground movements upon nearby utilities should be considered during construction.

6.3 Filling and Backfilling

Fill material required to attain the final design elevations should be structural fill material and should be pre-approved prior to placement. Compacted cohesive or granular soil conforming to IDOT Section 204 would be acceptable as structural fill (IDOT 2012b). The fill material should be free of organic matter and debris. Structural fill should be placed in lifts and compacted according to IDOT Section 205, *Embankment* (IDOT 2012b). The onsite fill materials could be considered as new fill material assuming it has an organic content lower than 10%.

Backfill materials must be pre-approved by the Resident Engineer. To backfill the abutment and piers we recommend the porous granular material conforming to the requirements specified in the IDOT Special Provision, *Granular Backfill for Structures* (IDOT 2012b). Backfill material should be placed and compacted in accordance with the Special Provision. Estimated design parameters for granular structural backfill materials are presented in Table 7.

Table 7: Estimated Granular Backfill Parameters

| Soil Description | Porous Granular Material Backfill |
|--------------------------------------|--------------------------------------|
| Unit Weight | 125 lbs/ft ³ |
| Angle of Effective Internal Friction | 32 degrees |
| Active Earth Pressure Coefficient | 0.31 |
| Passive Earth Pressure Coefficient | 3.26 |
| At-Rest Earth Pressure Coefficient | 0.5 |

It should be noted that if the structure needs to move laterally, an annulus will be needed for the

abutment drilled shafts due to stiffness effect of a cellular concrete backfilled MSE wall. Lightweight cellular concrete fill should not be allowed to adhere to the drilled shafts during construction.

6.4 Earthwork Operations

The required earthwork can be accomplished with conventional construction equipment. Moisture and traffic will cause deterioration of exposed soils. Precautions should be taken by the Contractor to prevent water erosion of the exposed soils. A compacted grade will minimize water runoff erosion.

Earth moving operations should be scheduled to not coincide with excessive cold or wet weather (early spring, late fall, or winter). Any soil allowed to freeze or soften due to the standing water should be removed. Wet weather can cause problems with subgrade compaction.

It is recommended that an experienced geotechnical engineer be retained to inspect the exposed subgrade, monitor earthwork operations, and provide material inspection services during the construction phase of this project.

6.5 Drilled Shafts

The installation of drilled shafts through the water-bearing sand and gravelly sand frequently occurring (a) above the hard silty clay and/or (b) immediately atop of bedrock may present challenges. For the first case, the Contractor should be prepared to install casing or provide drilling fluid at each shaft location if the groundwater is encountered, most likely at about 520 to 510 feet elevation. Installing casing along the sides of the excavation will add uncertainty to the evaluation of mobilized skin friction; therefore, the shafts should be designed for end bearing only. For the second case, shafts socketed into the underlying bedrock, casing extending to the top of bedrock elevation will be required to seal the excavation for coring. Failure to anticipate the challenges posed by the groundwater at this depth will result in caving or heaving sand and complicate bedrock coring operations. Prior to coring the bedrock, casing should be firmly seated into the top of the rock, and any drilling fluid removed to prevent caking of mud on the sides of the bedrock sockets. The shafts should be designed 6 inches larger in diameter than the proposed sockets. The shafts should be constructed in accordance with FHWA Publication NHI-10-016, *Drilled Shafts: Construction Procedures and LRFD Design Methods* (Brown et al. 2010).

In the event that permanent casing is not designed for the construction of drilled shaft socketed into bedrock, shafts structural integrity should be verified by Crosshole Sonic Logging (CSL). IDOT

special provision "Crosshole Sonic Logging" dated March 9, 2010 or latest edition should be included in the specifications for inspection and testing of drilled shaft socketed into bedrock. Wang recommends providing CSL structural integrity testing for at least one drilled shaft per substructure.

It is recommended to case the shafts drilled for Piers 1 and 2 adjacent to the CTA tracks to ensure the stability of the tracks and existing walls during construction.


7.0 QUALIFICATIONS

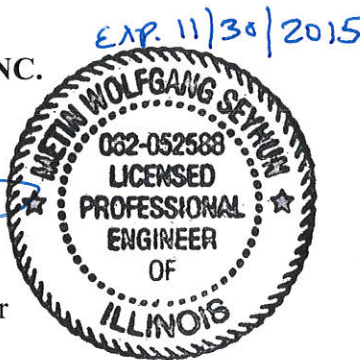
The analysis and recommendations submitted in this report are based upon the data obtained from the borings drilled at the locations shown on the boring logs and in Exhibit 3. This report does not reflect any variations that may occur between the borings or elsewhere on the site, variations whose nature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

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

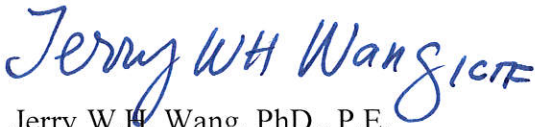
Respectfully Submitted,

WANG ENGINEERING, INC.

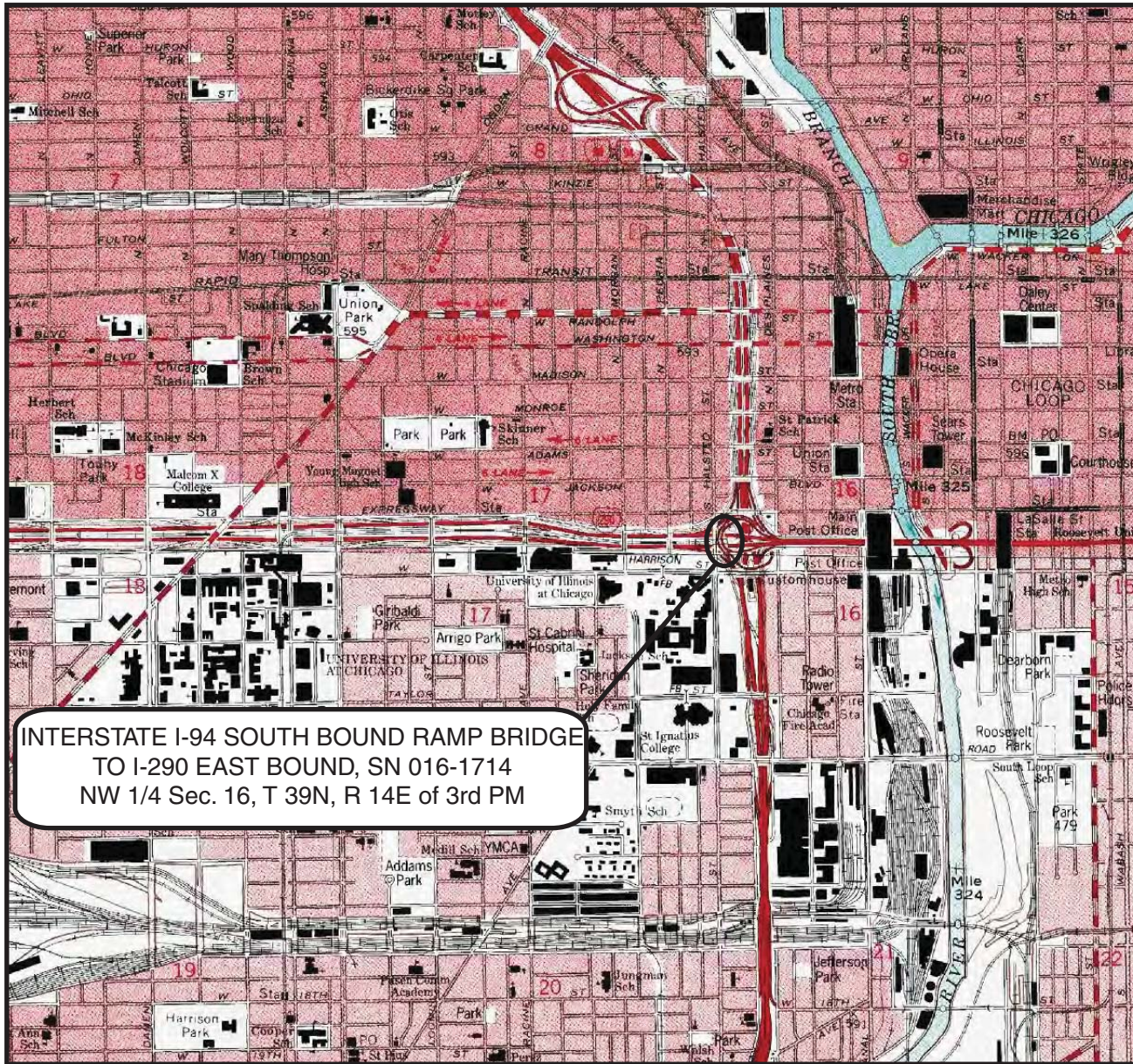

Metin W. Seyhun, P.E.
Senior Geotechnical Engineer



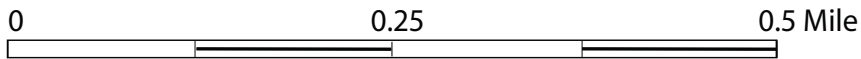

Corina T. Farez, P.E., P.G.
Principal


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

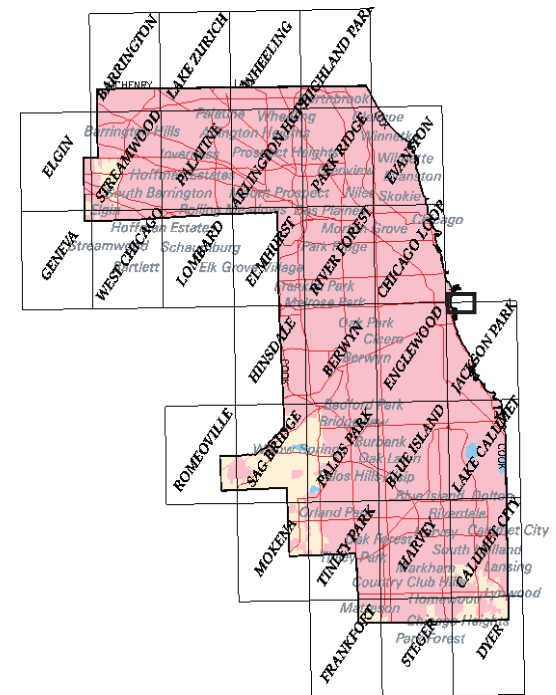
EXHIBITS



**INTERSTATE I-94 SOUTH BOUND RAMP BRIDGE
TO I-290 EAST BOUND, SN 016-1714
NW 1/4 Sec. 16, T 39N, R 14E of 3rd PM**



Illinois



Cook County

**SITE LOCATION MAP: CIRCLE INTERCHANGE RECONSTRUCTION
I-94 SB RAMP BRIDGE TO I-290 EB, SN 016-1714, COOK COUNTY**

SCALE: GRAPHICAL

EXHIBIT 1

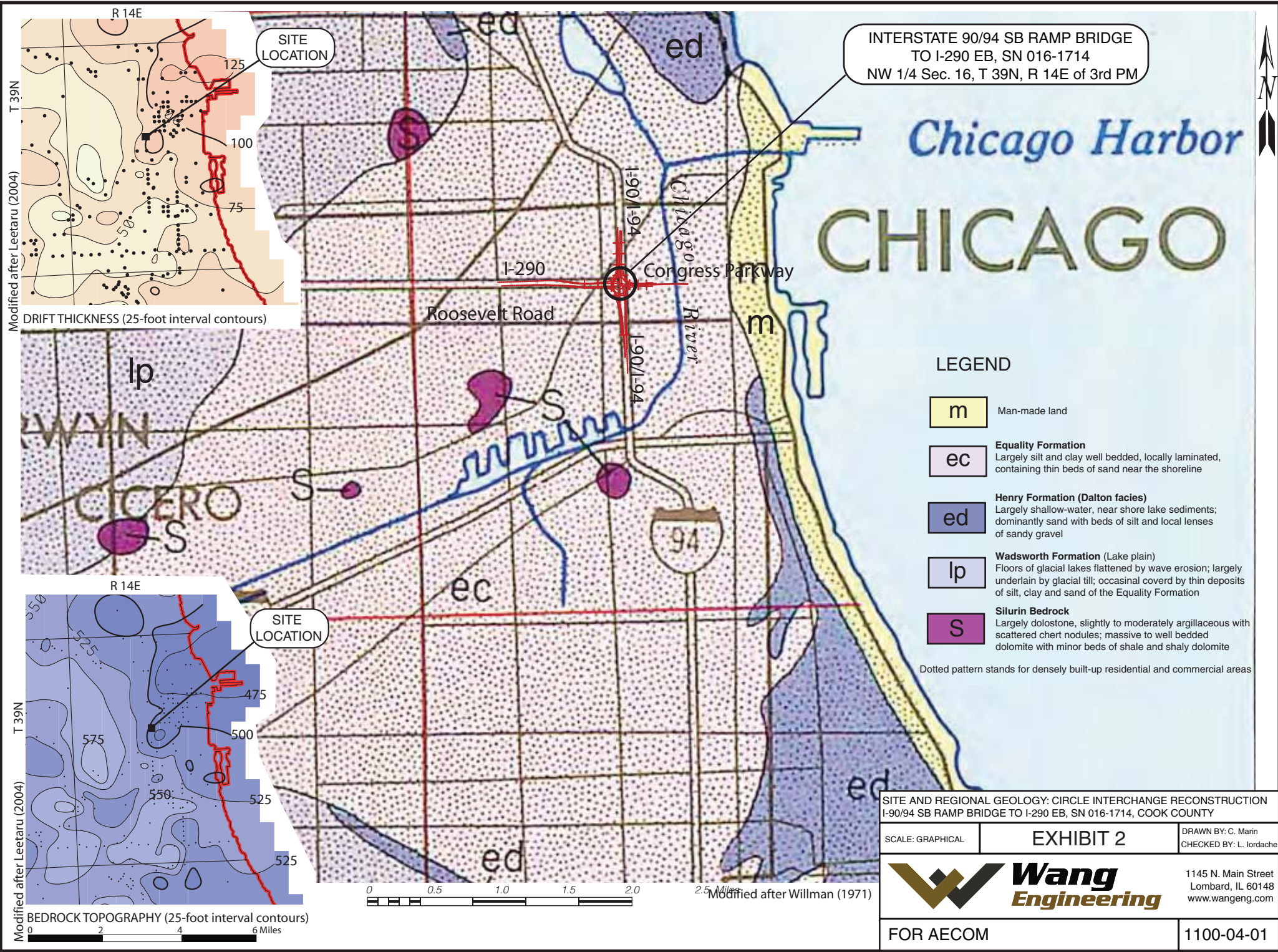
DRAWN BY: M. de los Reyes
CHECKED BY: M. Snider



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

FOR AECOM

1100-04-01



INTERSTATE 90/94 SB RAMP BRIDGE
TO I-290 EB, SN 016-1714
NW 1/4 Sec. 16, T 39N, R 14E of 3rd PM

Chicago Harbor

CHICAGO

LEGEND

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

Modified after Leetaru (2004)

Modified after Leetaru (2004)

Modified after Willman (1971)

SITE AND REGIONAL GEOLOGY: CIRCLE INTERCHANGE RECONSTRUCTION
I-90/94 SB RAMP BRIDGE TO I-290 EB, SN 016-1714, COOK COUNTY

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

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

| | |
|-----------|------------|
| FOR AECOM | 1100-04-01 |
|-----------|------------|

Bench Mark: Cut "X" on C of East Pier at C of Van Buren. Elev. 582.68.

THIS EXHIBIT IS TO BE USED FOR BORING LOCATION ONLY

Existing Structure: SN 016-2452. Constructed in 1960 under F.A.I. Route 1, Section 2424.28-B. Fourteen span bridge that measures 787'-4" from back of north abutment to centerline of east pier. Out-to-out width of 29'-0". The spans are supported by 36" wide flange beams, concrete T-beams and a reinforced concrete slab. Substructure is reinforced concrete closed abutment, multi-column and solid wall piers founded on bell caissons. The existing bridge is to be removed and replaced.

The existing bridge will be closed to traffic and detoured during construction.

No Salvage.

Legend:



Soil Boring

SEISMIC DATA

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

DESIGN SPECIFICATIONS

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

DESIGN STRESSES

FIELD UNITS

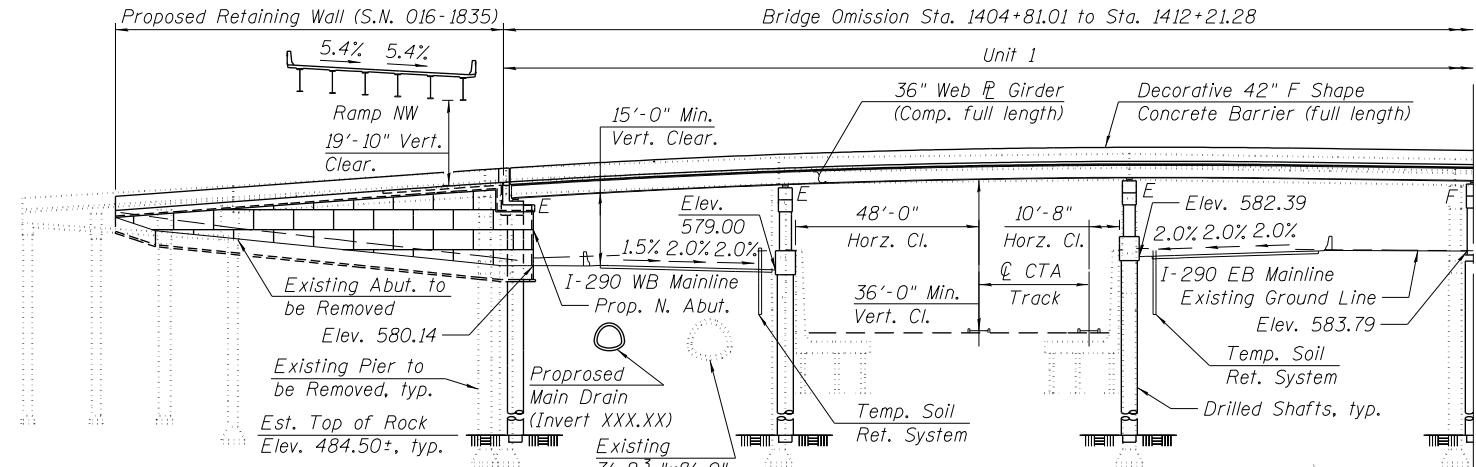
f'c = 3,500 psi
 fy = 60,000 psi (Reinforcement)
 fy = 50,000 psi (M270 Grade 50)

LOADING HL-93

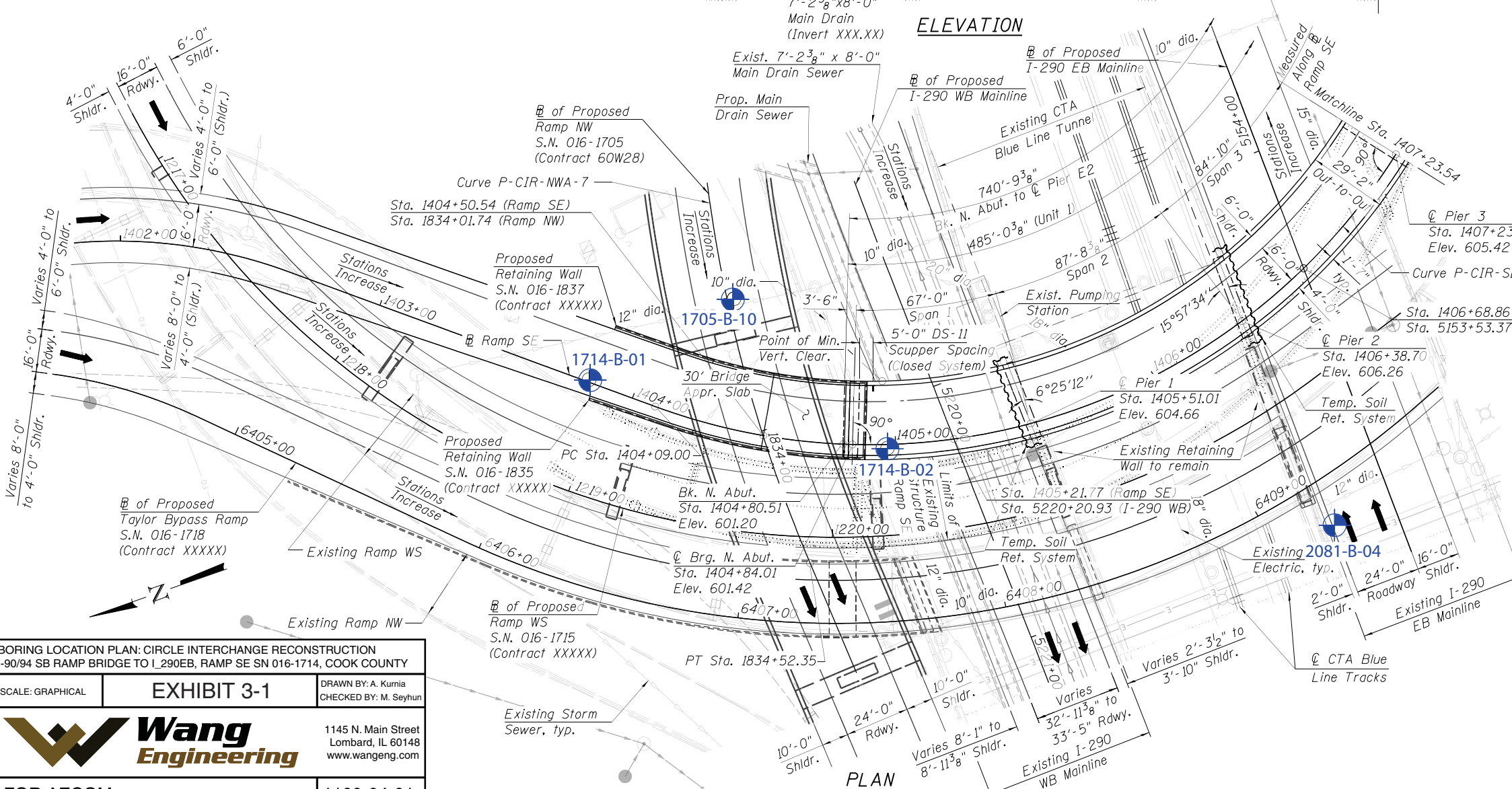
Allow 50#/sq. ft. for future wearing surface.

HIGHWAY CLASSIFICATION

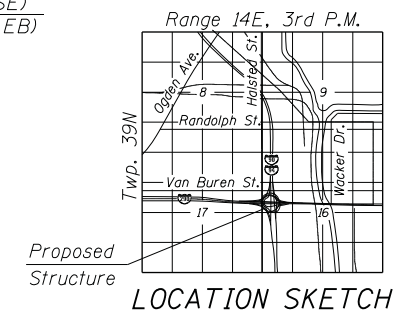
| Ramp SE | Ramp NW |
|------------------------------------|-----------------------------------|
| Functional Class: Interstate | Functional Class: Interstate |
| ADT: 4,600 (2010); 5,000 (2040) | ADT: 32,500 (2012); 36,000 (2040) |
| ADTT: 123 (2012); 134 (2040) | ADTT: 2,403 (2012); 2,750 (2040) |
| DHV: 440 (2040) | DHV: 2,790 (2040) |
| Design Speed: 25 m.p.h. | Design Speed: 35 m.p.h. |
| Posted Speed: 25 m.p.h. | Posted Speed: 25 m.p.h. |
| One-Way Traffic | One-Way Traffic |
| Directional Distribution: 100% | Directional Distribution: 100% |
| F.A.I. Rte. 290 EB | F.A.I. Rte. 290 WB |
| Functional Class: Interstate | Functional Class: Interstate |
| ADT: 32,500 (2012); 33,000 (2040) | ADT: 29,700 (2012); 31,000 (2040) |
| ADTT: 380 (2012); 386 (2040) | ADTT: 520 (2012); 543 (2040) |
| DHV: 2,610 (2040) | DHV: 2,130 (2040) |
| Design Speed: 50 m.p.h. | Design Speed: 45 m.p.h. |
| Posted Speed: 45 m.p.h. | Posted Speed: 45 m.p.h. |
| One-Way Traffic | One-Way Traffic |
| Directional Distribution: 100% | Directional Distribution: 100% |
| F.A.I. Rte. 90/94 SB | F.A.I. Rte. 90/94 NB |
| Functional Class: Interstate | Functional Class: Interstate |
| ADT: 100,100 (2012); 98,000 (2040) | ADT: 96,700 (2012); 81,000 (2040) |
| ADTT: 11,351 (2012); 11,113 (2040) | ADTT: 11,217 (2012); 9,393 (2040) |
| DHV: 6,340 (2040) | DHV: 4,780 (2040) |
| Design Speed: 60 m.p.h. | Design Speed: 60 m.p.h. |
| Posted Speed: 45 m.p.h. | Posted Speed: 45 m.p.h. |
| One-Way Traffic | One-Way Traffic |
| Directional Distribution: 100% | Directional Distribution: 100% |



ELEVATION



PLAN



LOCATION SKETCH

GENERAL PLAN & ELEVATION - 1
RAMP SE OVER
F.A.I. 290 (EISENHOWER EXPRESSWAY),
F.A.I. 90/94 (KENNEDY EXPRESSWAY) AND CTA
F.A.I. 94 (I-90/94 SB to I-290 EB)

SECTION 2013-010R
COOK COUNTY
STATION 1408+50.90
STRUCTURE NO. 016-1714

BORING LOCATION PLAN: CIRCLE INTERCHANGE RECONSTRUCTION
 I-90/94 SB RAMP BRIDGE TO I-290EB, RAMP SE SN 016-1714, COOK COUNTY

SCALE: GRAPHICAL **EXHIBIT 3-1**

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

FOR AECOM **1100-04-01**

| | | |
|--|------------------|----------|
| USER NAME = wjcolletti | DESIGNED - WJC | REVISD - |
| | CHECKED - KAH | REVISD - |
| PLOT SCALE = 48:0 "/td> <td>DRAWN - WJC</td> <td>REVISD -</td> | DRAWN - WJC | REVISD - |
| PLOT DATE = 1/7/2014 | CHECKED - KAH/DL | REVISD - |

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

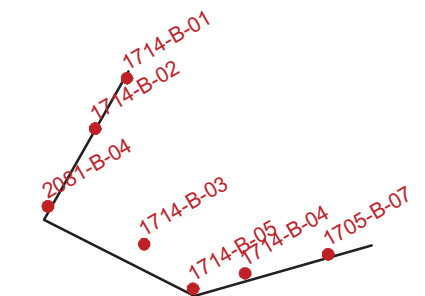
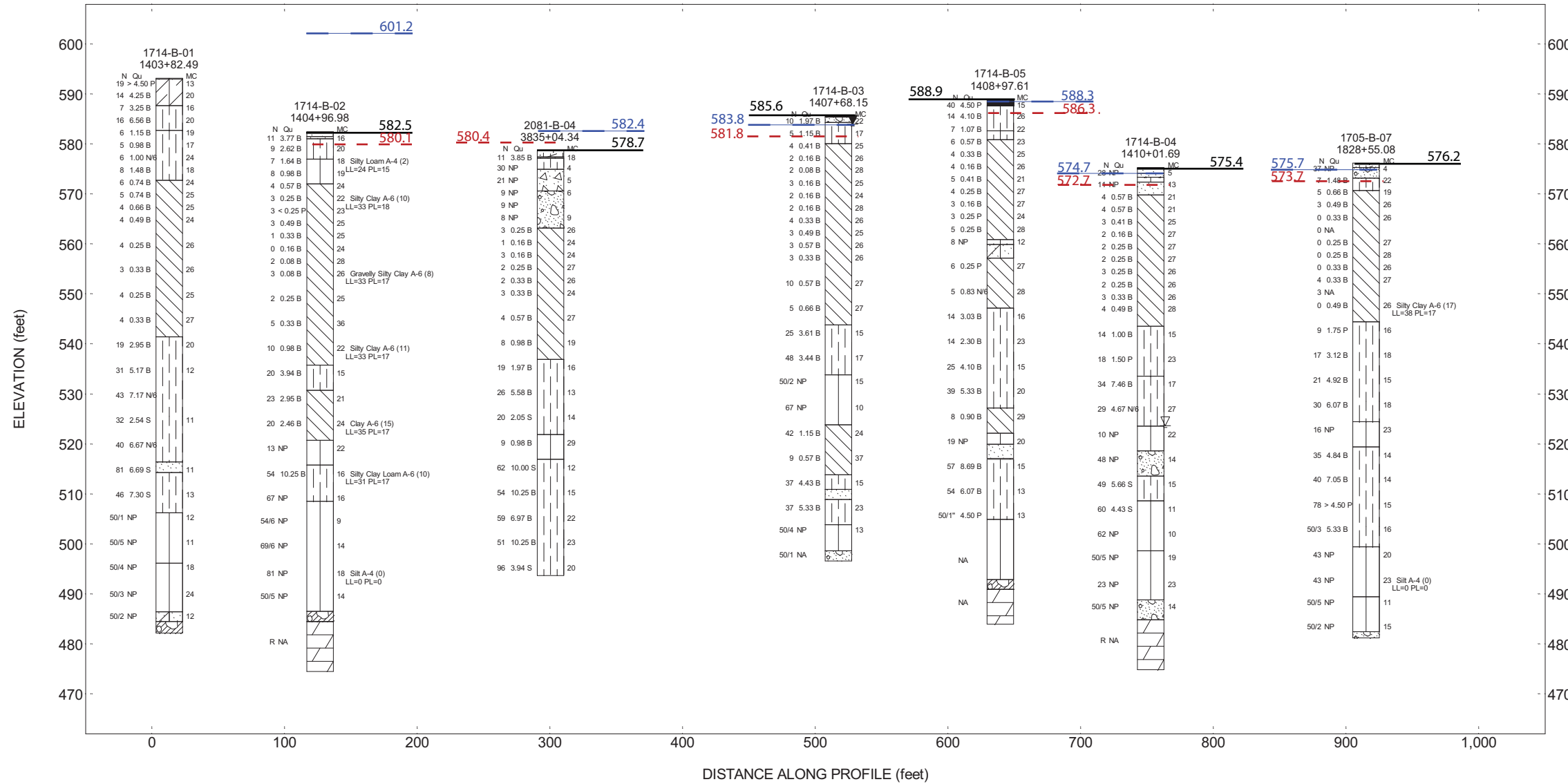
| F.A.I. RTE. | SECTION | COUNTY | TOTAL SHEETS | SHEET NO. |
|---------------------------|-----------|--------|--------------|-----------|
| 0094 | 2013-010R | COOK | 4 | 1 |
| CONTRACT NO. XXXXX | | | | |
| ILLINOIS FED. AID PROJECT | | | | |



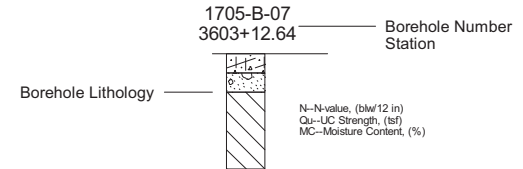
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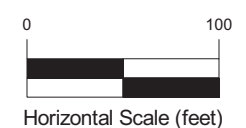
North Abutment Pier 1 Pier 2 Pier 3 Pier 4 Pier 5 Pier 6 Pier 7



Explanation:



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



Vertical Exaggeration: 4x

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

Soil Profile
S.N. 016-1714



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

| | |
|------------|--------------|
| JOB NUMBER | PLATE NUMBER |
| 1100-04-01 | EXHIBIT 4 |

Lithology Graphics

- | | | | |
|----------------------|-----------------------------|---------------------------------|---------------------------------|
| Pavement | Gravelly sand, sandy gravel | IDH Silty Clay, Silty Clay Loam | IDH Clay |
| IDH Silt, Silty Loam | IDH Loam | IDH Clay Loam | IDH Sand, Sandy Loam |
| Weathered bedrock | Concrete | Crushed stone | Dolomite or Dolomitic Limestone |
| Topsoil | Existing Grade | Proposed Grade | Bottom of Substructure |

APPENDIX A



BORING LOG 1714-B-01

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

WEI Job No.: 1100-04-01

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

Datum: NAVD 88
 Elevation: 593.22 ft
 North: 1898191.77 ft
 East: 1171304.89 ft
 Station: 1403+82.49
 Offset: 00.00

| 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 (%) |
|---------|----------------|--|------------|----------------------|------------|-----------------------|-------------|----------------------|---------|----------------|---------------------------|------------|----------------------|------------|-----------------------|-------------|----------------------|
| | 593.03 | 3-inch thick, brown LOAM --TOPSOIL-- Hard, brown CLAY LOAM, trace gravel and brick fragments --FILL-- | | | 1 | 6 10 9 | 4.50 P | 13 | | | | | | 11 | 2 2 2 | 0.66 B | 25 |
| | | | 5 | | 2 | 7 7 7 | 4.25 B | 20 | | | | 30 | | 12 | 2 2 2 | 0.49 B | 24 |
| | 587.7 | Very stiff to hard, brown and gray SILTY CLAY, trace gravel --FILL-- | | | 3 | 3 3 4 | 3.25 B | 16 | | | | | | 13 | 1 2 2 | 0.25 B | 26 |
| | | | 10 | | 4 | 6 8 8 | 6.56 B | 20 | | | | 35 | | 14 | 1 1 2 | 0.33 B | 26 |
| | 582.7 | Medium stiff to stiff, gray SILTY CLAY, trace gravel | | | 5 | 2 3 3 | 1.15 B | 19 | | | | | | 15 | 2 2 4 | 1.00 N/6 | 24 |
| | | | 15 | | 6 | 2 2 3 | 0.98 B | 17 | | | | 40 | | 15 | 2 2 2 | 0.25 B | 25 |
| | | | 20 | | 7 | 2 2 4 | 1.00 N/6 | 24 | | | | 45 | | 16 | 2 2 2 | 0.33 B | 27 |
| | 572.7 | Soft to medium stiff, gray CLAY to SILTY CLAY, trace gravel | | | 8 | 2 4 4 | 1.48 B | 18 | | | | | | 9 | 2 3 3 | 0.74 B | 24 |
| | | | 25 | | 10 | 2 3 2 | 0.74 B | 25 | | | | 50 | | 16 | 2 2 2 | 0.33 B | 27 |

GENERAL NOTES

Begin Drilling **10-16-2013** Complete Drilling **10-16-2013**
 Drilling Contractor **Wang Testing Services** Drill Rig **CME-55 TMR**
 Driller **R&J** Logger **A. Tomaras** Checked by **C. Marin**
 Drilling Method **2.25" HSA to 10', mud rotary thereafter, boring backfilled upon completion**

WATER LEVEL DATA

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

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

WANGENGINC 11000401.GPJ WANGENG.GDT 12/9/13



BORING LOG 1714-B-01

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 Fax: 630 953-9938

WEI Job No.: 1100-04-01

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

Datum: NAVD 88
 Elevation: 593.22 ft
 North: 1898191.77 ft
 East: 1171304.89 ft
 Station: 1403+82.49
 Offset: 00.00

| 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 (%) | |
|---------|----------------|--|------------|----------------------|------------|-----------------------|----------------|----------------------|---------|----------------|--|---|----------------------|------------|-----------------------|----------------|----------------------|----|
| | 541.5 | Very stiff to hard, gray SILTY CLAY to SILTY CLAY LOAM, trace gravel | | | | | | | | 516.5 | Gray SANDY LOAM --Wet-- | | | | | | | |
| | | | | 55 | X | 17 | 7 7 12 | 2.95 B | 20 | | 514.3 | Hard, gray SILTY CLAY LOAM, trace gravel | 80 | X | 22 | 33 41 40 | 6.69 S | 11 |
| | | | | 60 | X | 18 | 16 15 16 | 5.17 B | 12 | | | --HARD DRILLING-- --Possible Cobbles-- | 85 | X | 23 | 16 21 25 | 7.30 S | 13 |
| | | | | 65 | ○ | 19 | 18 20 23 | 7.17 N/6 | | | 506.2 | Very dense, gray SILTY LOAM, trace gravel and cobbles | 90 | X | 24 | 50/1 | NP | 12 |
| | | | | 70 | X | 20 | 10 13 19 | 2.54 S | 11 | | | --HARD DRILLING-- --Possible Cobbles-- | 95 | X | 26 | 50/5 | NP | 11 |
| | | | 75 | ○ | 21 | 12 17 23 | 6.67 N/6 | | | 496.2 | Very dense, gray SILT --Saturated-- | 100 | X | 27 | 50/4 | NP | 18 | |

GENERAL NOTES

WATER LEVEL DATA

Begin Drilling **10-16-2013** Complete Drilling **10-16-2013**
 Drilling Contractor **Wang Testing Services** Drill Rig **CME-55 TMR**
 Driller **R&J** Logger **A. Tomaras** Checked by **C. Marin**
 Drilling Method **2.25" HSA to 10', mud rotary thereafter, boring backfilled upon completion**

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

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

WANGENGINC 11000401.GPJ WANGENG.GDT 12/9/13



BORING LOG 1714-B-01

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WEI Job No.: 1100-04-01

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

Datum: NAVD 88
 Elevation: 593.22 ft
 North: 1898191.77 ft
 East: 1171304.89 ft
 Station: 1403+82.49
 Offset: 00.00

| 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 (%) |
|---------|----------------|--|------------|----------------------|------------|-----------------------|----------|----------------------|---------|----------------|---------------------------|------------|----------------------|------------|-----------------------|----------|----------------------|
| | | | 105 | | 28 | 30 45 50/3 | NP | 24 | | | | | | | | | |
| | 486.5 | Very dense, gray GRAVELLY LOAM, trace pyrite and dolostone fragments | | | | | | | | | | | | | | | |
| | 484.5 | --WEATHERED BEDROCK-- --ROLLER BIT REFUSAL-- | 110 | | 29 | 50/2 | NP | 12 | | | | | | | | | |
| | 482.2 | Boring terminated at 111.00 ft | | | | | | | | | | | | | | | |
| | | | 115 | | | | | | | | | | | | | | |
| | | | 120 | | | | | | | | | | | | | | |
| | | | 125 | | | | | | | | | | | | | | |

GENERAL NOTES

Begin Drilling **10-16-2013** Complete Drilling **10-16-2013**
 Drilling Contractor **Wang Testing Services** Drill Rig **CME-55 TMR**
 Driller **R&J** Logger **A. Tomaras** Checked by **C. Marin**
 Drilling Method **2.25" HSA to 10', mud rotary thereafter, boring backfilled upon completion**

WATER LEVEL DATA

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

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



BORING LOG 1714-B-02

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WEI Job No.: 1100-04-01

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

Datum: NAVD 88
 Elevation: 582.53 ft
 North: 1898095.52 ft
 East: 1171244.20 ft
 Station: 1404+96.58
 Offset: 00.00

| 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 (%) |
|---------|----------------|---|------------|----------------------|------------|-----------------------|----------|----------------------|---------|----------------|---------------------------|------------|----------------------|------------|-----------------------|----------|----------------------|
| | 474.5 | with >0.2" or no infilling, vuggy and cherty, with stylolites. --Run 1 - RECOVERY= 93%-- --RQD= 86%-- | 105 | | 1 | | | | | | | | | | | | |
| | | Boring terminated at 108.00 ft | 110 | | | | | | | | | | | | | | |
| | | | 115 | | | | | | | | | | | | | | |
| | | | 120 | | | | | | | | | | | | | | |
| | | | 125 | | | | | | | | | | | | | | |

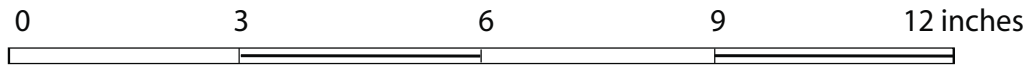
GENERAL NOTES

Begin Drilling **10-08-2013** Complete Drilling **10-08-2013**
 Drilling Contractor **Wang Testing Services** Drill Rig **D-50 TMR**
 Driller **R&R** Logger **D. Kolpacki** Checked by **C. Marin**
 Drilling Method **3.25" HSA to 10', mud rotary thereafter, boring backfilled upon completion**

WATER LEVEL DATA

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

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



Boring 1714-B-02:
Run 1, 98' to 108', RECOVERY = 93%, RQD = 86%

| | | |
|---|-----------|---|
| BEDROCK CORE: CIRCLE INTERCHANGE RECONSTRUCTION STRUCTURE SN 016-1714, CHICAGO, IL | | |
| SCALE : GRAPHIC | 1714-B-02 | DRAWN BY: A. Tomaras CHECKED BY: C. Marin |
|  | | 1145 N. Main Street Lombard, IL 60148 www.wangeng.com |
| FOR AECOM | | 1100-04-01 |



BORING LOG 1705-B-10

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WEI Job No.: 1100-04-01

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

Datum: NAVD 88
 Elevation: 588.29 ft
 North: 1898131.01 ft
 East: 1171315.43 ft
 Station: 1833+49.76
 Offset: 256 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 (%) |
|---------|----------------|---|------------|----------------------|------------|-----------------------|-----------|----------------------|---------|----------------|--|------------|----------------------|------------|-----------------------|-----------|----------------------|
| | 587.3 | 12-inch thick, dark brown LOAM --TOPSOIL-- | | | | | | | | | --L _L (%)=35, P _L (%)=17-- --%Gravel=2.9-- --%Sand=13.3-- --%Silt=49.9-- --%Clay=33.9-- --A-6 (14)-- | | | | | | |
| | | Medium dense, brown LOAM, trace gravel, crushed stone, and brick fragments --FILL-- | | | 1 | 4 10 7 | NP | 10 | | | --In-Situ Vane Shear, 28.0 feet-- --S _{u undis} = 699.3 psf-- --S _{u remold} = 414.9 psf-- --Sensitivity = 1.69-- | | | 11 | 1 1 2 | 0.08 B | 26 |
| | 584.3 | Medium dense, brown SAND --FILL-- | | | 2 | 9 9 5 | NP | 8 | | | | | | 12 | 0 2 2 | 0.08 B | 22 |
| | 582.8 | Very stiff, gray SILTY CLAY, trace gravel | | | 3 | 3 3 3 | 3.50 P | 16 | | | | | | | | | |
| | 580.3 | Very soft to medium stiff, gray CLAY to SILTY CLAY, trace gravel | | | 4 | 3 2 3 | 0.41 B | 22 | | | --In-Situ Vane Shear, 35.5 feet-- --S _{u undis} = 880.6 psf-- --S _{u remold} = 518.0 psf-- --Sensitivity = 1.70-- | | | 13 | 0 0 1 | 0.16 B | 25 |
| | | | 10 | | 5 | 1 2 3 | 0.49 B | 19 | | | | | | | | | |
| | | --In-Situ Vane Shear, 13.0 feet-- --S _{u undis} = 1061.9 psf-- --S _{u remold} = 543.9 psf-- --Sensitivity = 1.95-- | | | 6 | 2 2 3 | 0.41 B | 20 | | | --In-Situ Vane Shear, 40.5 feet-- --S _{u undis} = 1809.5 psf-- --S _{u remold} = 1137.4 psf-- --Sensitivity = 1.59-- | | | 14 | 0 3 3 | 0.57 B | 23 |
| | | | 15 | | 7 | 0 2 1 | 0.33 B | 25 | | | | | | | | | |
| | | --In-Situ Vane Shear, 18.0 feet-- --S _{u undis} = 1191.4 psf-- --S _{u remold} = 543.9 psf-- --Sensitivity = 2.19-- | | | 8 | 1 2 2 | 0.41 B | 22 | | | --In-Situ Vane Shear, 45.5 feet-- --S _{u undis} = 2585.0 psf-- --S _{u remold} = 1551.0 psf-- --Sensitivity = 1.66-- | | | 15 | 2 2 4 | 0.33 B | 19 |
| | | | 20 | | 9 | 0 0 1 | 0.16 B | 22 | | 541.5 | Very stiff, gray SILTY CLAY, trace gravel | | | | | | |
| | | --In-Situ Vane Shear, 23.0 feet-- --S _{u undis} = 802.9 psf-- --S _{u remold} = 414.4 psf-- --Sensitivity = 1.94-- | | | 10 | 0 2 1 | 0.25 B | 24 | | | | | | | | | |
| | | | 25 | | | | | | | | | | | 16 | 5 8 14 | 2.79 B | 19 |

GENERAL NOTES

WATER LEVEL DATA

Begin Drilling **07-30-2013** Complete Drilling **08-01-2013**
 Drilling Contractor **Wang Testing Services** Drill Rig **CME-55 TMR**
 Driller **R&J** Logger **A. Tomaras** Checked by **C. Marin**
 Drilling Method **2.25" SSA to 10', mud rotary thereafter, boring**
backfilled upon completion

While Drilling **DRY**
 At Completion of Drilling **NA**
 Time After Drilling **NA**
 Depth to Water **NA**
 The stratification lines represent the approximate boundary between soil types; the actual transition may be gradual.

WANGENGINC 11000401.GPJ WANGENG.GDT 12/9/13



BORING LOG 1705-B-10

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WEI Job No.: 1100-04-01

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

Datum: NAVD 88
 Elevation: 588.29 ft
 North: 1898131.01 ft
 East: 1171315.43 ft
 Station: 1833+49.76
 Offset: 256 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 (%) |
|---------|----------------|--|------------|----------------------|------------|-----------------------|-----------|----------------------|---------|----------------|--|------------|----------------------|------------|-----------------------|-----------|----------------------|
| | 533.8 | | | | 17 | 8 12 17 | 4.84 B | 14 | | | | | | | | | |
| | | Medium dense, gray, medium SAND | 55 | | | | | | | | | 80 | | 22 | 18 22 25 | 8.94 S | 13 |
| | 531.5 | | | | | | | | | | | | | | | | |
| | | Hard, gray SILTY CLAY, trace gravel and fine sand lenses | | | | | | | | | | | | | | | |
| | | | 60 | | 18 | 6 10 20 | 4.02 B | 19 | | 504.0 | | 85 | | 23 | 37 37 50/5 | 4.35 S | 13 |
| | | | | | | | | | | | | | | | | | |
| | | | 65 | | 18 | 5 12 30 | 4.18 B | 19 | | | --HARD DRILLING (5 min/0.5')-- --Possible Cobbles-- | | | 24 | 50/2 | NP | 11 |
| | 521.5 | | | | | | | | | | | | | | | | |
| | | Stiff, gray, laminated layers of CLAY and SILT | | | | | | | | | --HARD DRILLING-- --Possible Cobbles-- | | | | | | |
| | | | 70 | | 20 | 5 4 6 | 1.31 B | 27 | | | | 95 | | 25 | 50/6 | NP | 11 |
| | 516.5 | | | | | | | | | | | | | | | | |
| | | Hard, gray SILTY CLAY LOAM to SILTY LOAM, trace gravel | | | | | | | | 492.0 | | | | | | | |
| | | | 75 | | 21 | 10 14 31 | 9.51 S | 12 | | | Very dense, gray SILT | | | 26 | 20 26 40 | NP | 17 |

GENERAL NOTES

WATER LEVEL DATA

Begin Drilling **07-30-2013** Complete Drilling **08-01-2013**
 Drilling Contractor **Wang Testing Services** Drill Rig **CME-55 TMR**
 Driller **R&J** Logger **A. Tomaras** Checked by **C. Marin**
 Drilling Method **2.25" SSA to 10', mud rotary thereafter, boring**
backfilled upon completion

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

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

WANGENGINC 11000401.GPJ WANGENG.GDT 12/9/13



BORING LOG 1705-B-10

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WEI Job No.: 1100-04-01

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

Datum: NAVD 88
 Elevation: 588.29 ft
 North: 1898131.01 ft
 East: 1171315.43 ft
 Station: 1833+49.76
 Offset: 256 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 (%) |
|---------|----------------|--|------------|----------------------|------------|-----------------------|----------|----------------------|---------|----------------|---------------------------|------------|----------------------|------------|-----------------------|----------|----------------------|
| | 486.5 | Very dense, gray GRAVELLY SAND, trace cobbles --HARD DRILLING-- --Possible Cobbles-- | 105 | | 27 | 50/2 | NR | | | | | | | | | | |
| | 481.3 | Strong, poor to fair rock quality, light gray, fresh, vertical and horizontal joints, joint breaks with little to no infill, horizontal stylolites, slightly vuggy DOLOSTONE --Run 1 - RECOVERY= 97.5%-- --RQD(top 5ft)=73%-- --RQD(10ft)=50%-- | 110 | | 1 | | NP | | | | | | | | | | |
| | 471.3 | Boring terminated at 117.00 ft | 120 | | | | | | | | | | | | | | |

GENERAL NOTES

Begin Drilling **07-30-2013** Complete Drilling **08-01-2013**
 Drilling Contractor **Wang Testing Services** Drill Rig **CME-55 TMR**
 Driller **R&J** Logger **A. Tomaras** Checked by **C. Marin**
 Drilling Method **2.25" SSA to 10', mud rotary thereafter, boring backfilled upon completion**

WATER LEVEL DATA

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

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



BORING LOG 1714-B-03

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WEI Job No.: 1100-04-01

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

Datum: NAVD 88
 Elevation: 585.63 ft
 North: 1897874.84 ft
 East: 1171337.66 ft
 Station: 1407+67.90
 Offset: 33.82 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 (%) |
|---------|----------------|--|------------|----------------------|------------|-----------------------|-----------|----------------------|---------|----------------|--|------------|----------------------|------------|-----------------------|-----------|----------------------|
| | 585.42 | 2-inch thick, dark brown SILTY LOAM | | | | | | | | | | | | | | | |
| | 584.3 | --TOPSOIL-- Brown GRAVELLY SAND | | | 1 | 4 4 6 | 1.97 B | 22 | | | | | | 11 | 1 1 2 | 0.57 B | 26 |
| | | --FILL-- Stiff, gray SILTY CLAY LOAM, trace gravel | | | 2 | 2 2 3 | 1.15 B | 17 | | | | 30 | | 12 | 1 1 2 | 0.33 B | 26 |
| | 580.1 | Very soft to medium stiff, gray CLAY to SILTY CLAY, trace gravel | | | 3 | 1 2 2 | 0.41 B | 25 | | | | | | 13 | 2 4 6 | 0.57 B | 27 |
| | | | | | 4 | 1 1 1 | 0.16 B | 26 | | | | | | 14 | 1 2 3 | 0.66 B | 27 |
| | | | | | 5 | 1 1 1 | 0.08 B | 28 | | | | | | 15 | 3 8 17 | 3.61 B | 15 |
| | | | | | 6 | 1 1 2 | 0.16 B | 25 | | | | | | 16 | 7 16 32 | 3.44 B | 17 |
| | | | | | 7 | 1 1 1 | 0.16 B | 24 | | 543.9 | Very stiff, gray SILTY CLAY LOAM, trace gravel | | | | | | |
| | | | | | 8 | 0 1 1 | 0.16 B | 28 | | | | | | | | | |
| | | | | | 9 | 1 1 3 | 0.33 B | 26 | | | | | | | | | |
| | | | | | 10 | 1 1 2 | 0.49 B | 25 | | | | | | | | | |

WANGENGINC 11000401.GPJ WANGENG.GDT 12/9/13

GENERAL NOTES

Begin Drilling **10-17-2013** Complete Drilling **10-18-2013**
 Drilling Contractor **Wang Testing Services** Drill Rig **D-25 ATV**
 Driller **P&N** Logger **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 ∇ **DRY**
 At Completion of Drilling ∇ **MUD (2')**
 Time After Drilling **24 hours**
 Depth to Water ∇ **2.00 ft**

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



BORING LOG 1714-B-03

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WEI Job No.: 1100-04-01

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

Datum: NAVD 88
 Elevation: 585.63 ft
 North: 1897874.84 ft
 East: 1171337.66 ft
 Station: 1407+67.90
 Offset: 33.82 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 (%) |
|---------|----------------|---|------------|----------------------|------------|-----------------------|-----------|----------------------|---------|----------------|---|------------|----------------------|------------|-----------------------|-----------|----------------------|
| | 533.9 | Very dense, gray SILTY LOAM, trace gravel | 55 | X | 17 | 16 50/2 | NP | 15 | | 508.9 | Gray, fine SAND --Wet-- | 80 | X | 22 | 10 15 22 | 5.33 B | 23 |
| | 523.9 | Medium stiff to stiff, gray CLAY | 60 | X | 18 | 21 31 36 | NP | 10 | | 503.9 | Hard, gray SILTY CLAY LOAM, trace gravel | 85 | X | 23 | 50/4 | NP | 13 |
| | 513.9 | Hard, gray SILTY CLAY, trace gravel | 65 | X | 19 | 3 9 33 | 1.15 B | 24 | | 498.6 | Very dense, gray SILTY LOAM, trace gravel and dolostone fragments | 90 | | 24 | 50/1 | | |
| | 510.9 | | 70 | X | 20 | 3 4 5 | 0.57 B | 37 | | 496.6 | --HARD DRILLING-- --WEATHERED BEDROCK-- | 95 | | | | | |
| | | | 75 | X | 21 | 9 14 23 | 4.43 B | 15 | | | Boring terminated at 30.00 ft | 100 | | | | | |

GENERAL NOTES

Begin Drilling **10-17-2013** Complete Drilling **10-18-2013**
 Drilling Contractor **Wang Testing Services** Drill Rig **D-25 ATV**
 Driller **P&N** Logger **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 ∇ **DRY**
 At Completion of Drilling \blacktriangledown **MUD (2')**
 Time After Drilling **24 hours**
 Depth to Water ∇ **2.00 ft**

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

WANGENGINC 11000401.GPJ WANGENG.GDT 12/9/13



BORING LOG 1714-B-04

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WEI Job No.: 1100-04-01

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

Datum: NAVD 88
 Elevation: 575.37 ft
 North: 1897818.98 ft
 East: 1171530.45 ft
 Station: 5238+29.69
 Offset: 63.7269 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 (%) |
|---------|----------------|--|------------|----------------------|------------|-----------------------|-----------|----------------------|---------|----------------|--|------------|----------------------|------------|-----------------------|-------------|----------------------|
| | 575.2 | 22-inch thick ASPHALT --PAVEMENT-- | | | | | | | | | | | | | | | |
| | 574.2 | 12-inch thick CONCRETE --PAVEMENT-- | | | | | | | | | | | | | | | |
| | 573.4 | 10-inch thick CRUSHED STONE --BASE COURSE-- | | | 1 | 13 19 9 | NP | 5 | | | | | | 11 | 1 1 2 | 0.33 B | 26 |
| | 572.4 | Brown SILTY LOAM --FILL-- | | | 2 | 7 6 5 | NP | 13 | | | | | | 12 | 1 2 2 | 0.49 B | 28 |
| | 569.9 | Medium dense, gray SANDY LOAM --FILL-- | | | 3 | 1 2 2 | 0.57 B | 21 | | 543.6 | Stiff, gray SILTY CLAY, trace gravel | | | | | | |
| | | Very soft to soft, gray CLAY to SILTY CLAY, trace gravel | | | 4 | 1 2 2 | 0.57 B | 21 | | | | | | 13 | 3 6 8 | 1.00 B | 15 |
| | | | | | 5 | 0 1 2 | 0.41 B | 25 | | | | | | | | | |
| | | | | | 6 | 0 1 1 | 0.16 B | 27 | | | | | | 14 | 6 5 13 | 1.50 P | 23 |
| | | | | | 7 | 0 1 1 | 0.25 B | 27 | | 533.6 | Hard, gray SILTY CLAY LOAM, trace gravel | | | | | | |
| | | | | | 8 | 1 1 1 | 0.25 B | 27 | | | | | | 15 | 7 10 24 | 7.46 B | 17 |
| | | | | | 9 | 0 1 2 | 0.25 B | 26 | | | | | | | | | |
| | | | | | 10 | 1 1 1 | 0.25 B | 26 | | | | | | 16 | 9 11 18 | 4.67 N/6 | 27 |

GENERAL NOTES

Begin Drilling **10-27-2013** Complete Drilling **10-27-2013**
 Drilling Contractor **Wang Testing Services** Drill Rig **CME-55 TMR**
 Driller **R&J** Logger **A. Tomaras** Checked by **DRAFT**
 Drilling Method **2.25" SSA to 10', mud rotary thereafter, boring backfilled upon completion**

WATER LEVEL DATA

While Drilling ∇ **52.00 ft**
 At Completion of Drilling ∇ **NA**
 Time After Drilling **NA**
 Depth to Water ∇ **NA**

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

WANGENGINC 11000401.GPJ WANGENG.GDT 12/16/13



BORING LOG 1714-B-04

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

WEI Job No.: 1100-04-01

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

Datum: NAVD 88
 Elevation: 575.37 ft
 North: 1897818.98 ft
 East: 1171530.45 ft
 Station: 5238+29.69
 Offset: 63.7269 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 (%) |
|---------|----------------|--|------------|----------------------|------------|-----------------------|-----------|----------------------|---------|----------------|--|------------|----------------------|------------|-----------------------|----------|----------------------|
| | 523.6 | Medium dense, gray SILTY LOAM --Saturated-- | 55 | X | 17 | 6 5 5 | NP | 22 | | 498.6 | Medium dense to dense, gray SILT --Saturated-- | 80 | X | 22 | 29 50/5 | NP | 19 |
| | 518.6 | Dense, gray GRAVELLY SAND --Saturated-- | 60 | X | 18 | 18 40 8 | NP | 14 | | 85 | | 85 | X | 23 | 15 8 15 | NP | 23 |
| | 513.6 | Hard. gray SILTY CLAY LOAM, trace gravel | 65 | X | 19 | 12 16 33 | 5.66 S | 15 | | 90 | Very dense, gray GRAVELLY SILTY LOAM | 90 | X | 24 | 50/5 | NP | 14 |
| | 508.6 | Very dense, gray SILTY LOAM, trace gravel | 70 | X | 20 | 22 27 33 | 4.43 S | 11 | | 95 | Strong, light gray, fair rock quality, bedded DOLOSTONE, beds (2" to 12"), joint spacing 2" to 12", joints with >0.2" or no infilling, vuggy, with stylolites. --Run 1 - RECOVERY= 100%-- --RQD= 63%-- | 95 | | 1 | | | |
| | | | 75 | X | 21 | 15 27 35 | NP | 10 | | 100 | | 100 | | | | | |

GENERAL NOTES

Begin Drilling **10-27-2013** Complete Drilling **10-27-2013**
 Drilling Contractor **Wang Testing Services** Drill Rig **CME-55 TMR**
 Driller **R&J** Logger **A. Tomaras** Checked by **DRAFT**
 Drilling Method **2.25" SSA to 10', mud rotary thereafter, boring backfilled upon completion**

WATER LEVEL DATA

While Drilling **52.00 ft**
 At Completion of Drilling **NA**
 Time After Drilling **NA**
 Depth to Water **NA**

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

WANGENGINC 11000401.GPJ WANGENG.GDT 12/16/13



BORING LOG 1714-B-04

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

WEI Job No.: 1100-04-01

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

Datum: NAVD 88
 Elevation: 575.37 ft
 North: 1897818.98 ft
 East: 1171530.45 ft
 Station: 5238+29.69
 Offset: 63.7269 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 (%) |
|---------|----------------|--------------------------------|------------|----------------------|------------|-----------------------|----------|----------------------|---------|----------------|---------------------------|------------|----------------------|------------|-----------------------|----------|----------------------|
| | 474.9 | Boring terminated at 100.50 ft | 105 | | | | | | | | | | | | | | |
| | | | 110 | | | | | | | | | | | | | | |
| | | | 115 | | | | | | | | | | | | | | |
| | | | 120 | | | | | | | | | | | | | | |
| | | | 125 | | | | | | | | | | | | | | |

GENERAL NOTES

Begin Drilling **10-27-2013** Complete Drilling **10-27-2013**
 Drilling Contractor **Wang Testing Services** Drill Rig **CME-55 TMR**
 Driller **R&J** Logger **A. Tomaras** Checked by **DRAFT**
 Drilling Method **2.25" SSA to 10', mud rotary thereafter, boring backfilled upon completion**

WATER LEVEL DATA


While Drilling ∇ **52.00 ft**
 At Completion of Drilling \blacktriangledown **NA**
 Time After Drilling **NA**
 Depth to Water ∇ **NA**

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



0 3 6 9 12 inches

Boring 1714-B-04:
Run 1, 90.5' to 100.5', RECOVERY = 100%, RQD = 63%

| | | |
|---|-----------|---|
| BEDROCK CORE: CIRCLE INTERCHANGE RECONSTRUCTION STRUCTURE SN 016-1714, CHICAGO, IL | | |
| SCALE : GRAPHIC | 1714-B-04 | DRAWN BY: A. Tomaras CHECKED BY: C. Marin |
|  Wang Engineering | | 1145 N. Main Street Lombard, IL 60148 www.wangeng.com |
| FOR AECOM | | 1100-04-01 |



BORING LOG 1714-B-05

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

WEI Job No.: 1100-04-01

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

Datum: NAVD 88
 Elevation: 588.93 ft
 North: 1897789.86 ft
 East: 1171431.16 ft
 Station: 1408+97.61
 Offset: 6.5640 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 (%) |
|---------|----------------|--|------------|----------------------|------------|-----------------------|-----------|----------------------|---------|----------------|--|------------|----------------------|------------|-----------------------|-------------|----------------------|
| | 587.7 | 15-inch thick, black SILTY LOAM --TOPSOIL-- | | | | | | | | | | | | | | | |
| | | Hard, brown and gray SILTY CLAY LOAM, trace gravel and brick fragments --FILL-- | 1 | X | 1 | 8 20 20 | 4.50 P | 15 | | 560.9 | Very stiff (2.0P), gray SILTY CLAY LOAM, little gravel | 11 | X | 11 | 1 2 3 | 0.25 B | 28 |
| | | | 2 | X | 2 | 4 6 8 | 4.10 B | 26 | | 559.9 | Loose, gray LOAM, some gravel | 12 | X | 12 | 4 5 3 | NP | 12 |
| | 582.7 | Stiff, gray SILTY CLAY, trace gravel | 3 | X | 3 | 3 3 4 | 1.07 B | 22 | | 557.2 | Soft medium stiff, gray CLAY to SILTY CLAY, trace gravel | | | | | | |
| | 580.9 | Very soft to medium stiff, gray CLAY to SILTY CLAY, trace gravel | 4 | X | 4 | 2 2 4 | 0.57 B | 23 | | | | 13 | X | 13 | 2 2 4 | 0.25 P | 27 |
| | | | 5 | X | 5 | 1 2 2 | 0.33 B | 25 | | | | | | | | | |
| | | | 6 | X | 6 | 1 2 2 | 0.16 B | 26 | | | | 14 | X | 14 | 2 2 3 | 0.83 N/6 | 28 |
| | | | 7 | X | 7 | 2 2 3 | 0.41 B | 21 | | 547.2 | Very stiff to hard, gray SILTY CLAY LOAM, trace to little gravel | | | | | | |
| | | | 8 | X | 8 | 1 2 2 | 0.25 B | 27 | | | | 15 | X | 15 | 6 7 7 | 3.03 B | 16 |
| | | | 9 | X | 9 | 1 1 2 | 0.16 B | 27 | | | | | | | | | |
| | | | 10 | X | 10 | 1 1 2 | 0.25 P | 24 | | | | 16 | X | 16 | 4 6 8 | 2.30 B | 23 |

GENERAL NOTES

Begin Drilling **04-18-2014** Complete Drilling **04-21-2014**
 Drilling Contractor **Wang Testing Services** Drill Rig **D-25 ATV**
 Driller **N&J** 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 ∇ **MUD**
 At Completion of Drilling ∇ **NA**
 Time After Drilling **NA**
 Depth to Water ∇ **NA**

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

WANGENGINC 11000401.GPJ WANGENG.GDT 5/28/14



BORING LOG 1714-B-05

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WEI Job No.: 1100-04-01

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

Datum: NAVD 88
 Elevation: 588.93 ft
 North: 1897789.86 ft
 East: 1171431.16 ft
 Station: 1408+97.61
 Offset: 6.5640 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 (%) |
|---------|----------------|--|------------|----------------------|------------|-----------------------|-----------|----------------------|---------|----------------|---|------------|----------------------|------------|-----------------------|-----------|----------------------|
| | | | 55 | X | 17 | 6 10 15 | 4.10 B | 15 | | | | 80 | X | 22 | 16 23 31 | 6.07 B | 13 |
| | | | 60 | X | 18 | 9 16 23 | 5.33 B | 20 | | 504.9 | Very dense, gray SILTY LOAM, trace gravel and cobbles | 85 | X | 23 | 21 35 50.4 | 4.50 P | 13 |
| | 527.2 | Medium stiff, gray CLAY | | | | | | | | | --HARD DRILLING-- --Possible Cobbles-- | | | | | | |
| | | | 65 | X | 19 | 4 4 4 | 0.90 B | 29 | | | | 90 | | | | | |
| | 522.2 | Medium dense, gray SILT | | | | | | | | | --HARD DRILLING-- --Possible Cobbles-- | | | | | | |
| | | | 70 | X | 20 | 9 9 10 | NP | 20 | | | | 95 | | | | | |
| | 519.9 | Medium dense, gray SANDY LOAM, trace gravel | | | | | | | | | --HARD DRILLING-- --Possible Cobbles-- | | | | | | |
| | | | 75 | X | 21 | 12 28 29 | 8.69 B | 15 | | 492.9 | --VERY HARD DRILLING-- --WEATHERED BEDROCK-- | | | | | | |
| | 517.2 | Hard, gray SILTY CLAY LOAM to SILTY LOAM, trace gravel | | | | | | | | 490.9 | Strong, light gray, fair rock quality, bedded DOLOSTONE, beds up to 12 inch, vuggy, 6 inch joint spacing, joints with less than 100 | | | | | | |

GENERAL NOTES

Begin Drilling **04-18-2014** Complete Drilling **04-21-2014**
 Drilling Contractor **Wang Testing Services** Drill Rig **D-25 ATV**
 Driller **N&J** 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 **MUD**
 At Completion of Drilling **NA**
 Time After Drilling **NA**
 Depth to Water **NA**

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

WANGENGINC 11000401.GPJ WANGENG.GDT 5/28/14



BORING LOG 1714-B-05

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

WEI Job No.: 1100-04-01

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

Datum: NAVD 88
 Elevation: 588.93 ft
 North: 1897789.86 ft
 East: 1171431.16 ft
 Station: 1408+97.61
 Offset: 6.5640 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 (%) |
|---------|----------------|---|------------|----------------------|------------|-----------------------|----------|----------------------|---------|----------------|---------------------------|------------|----------------------|------------|-----------------------|----------|----------------------|
| | 483.9 | 0.2 inch or no infilling, and stylolitic surfaces. --Run 1 - RECOVERY= 90%-- --RQD= 62%-- | 105 | | 2 | | | | | | | | | | | | |
| | | Boring terminated at 105.00 ft | | | | | | | | | | | | | | | |

GENERAL NOTES

Begin Drilling **04-18-2014** Complete Drilling **04-21-2014**
 Drilling Contractor **Wang Testing Services** Drill Rig **D-25 ATV**
 Driller **N&J** 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 ∇ **MUD**
 At Completion of Drilling ∇ **NA**
 Time After Drilling **NA**
 Depth to Water ∇ **NA**

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



Boring 1714-B-05:
 Run 1, 88' to 98', RECOVERY = 4%, RQD = 0%
 Run 2, 98' to 105', RECOVERY = 90%, RQD = 62%

| | | |
|---|-----------|---|
| BEDROCK CORE: CIRCLE INTERCHANGE RECONSTRUCTION STRUCTURE SN 016-1714, CHICAGO, IL | | |
| SCALE : GRAPHIC | 1714-B-05 | DRAWN BY: A. Tomaras CHECKED BY: C. Marin |
|  | | 1145 N. Main Street Lombard, IL 60148 www.wangeng.com |
| | | FOR AECOM |



BORING LOG 1705-B-07

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

WEI Job No.: 1100-04-01

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

Datum: NAVD 88
 Elevation: 576.23 ft
 North: 1897855.27 ft
 East: 1171688.90 ft
 Station: 1828+55.18
 Offset: 28.83 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 (%) |
|---------|----------------|---|------------|----------------------|------------|-----------------------|-----------|----------------------|---------|----------------|---|------------|----------------------|------------|-----------------------|-----------|----------------------|
| | 575.3 | 11-inch thick, ASPHALT --PAVEMENT-- | | | | | | | | | | | | | | | |
| | | 25-inch thick SANDY GRAVEL --BASE COURSE-- | | | 1 | 18 22 15 | NP | 4 | | | | | | 11 | 0 0 3 | NA | |
| | 573.2 | Stiff, gray SILTY CLAY, trace gravel | | | 2 | 2 3 4 | 1.48 B | 22 | | | | | | 12 | 0 0 0 | 0.49 B | 26 |
| | 570.7 | Soft to medium stiff, gray CLAY to SILTY CLAY, trace gravel | | | 3 | 1 2 3 | 0.66 B | 19 | | 544.5 | --L _L (%)=38, P _L (%)=17-- --%Gravel=2.0-- --%Sand=13.4--30 --%Silt=51.3-- --%Clay=33.2-- --A-6 (17)-- | | | | | | |
| | | | | | 4 | 0 1 2 | 0.49 B | 26 | | | Stiff to hard, gray SILTY CLAY LOAM, trace gravel | | | 13 | 2 3 6 | 1.75 P | 16 |
| | | | | | 5 | 0 0 0 | 0.33 B | 26 | | | | | | | | | |
| | | | | | 6 | 0 0 0 | NA | | | | | | | 14 | 4 6 11 | 3.12 B | 18 |
| | | | | | 7 | 0 0 0 | 0.25 B | 27 | | | | | | | | | |
| | | | | | 8 | 0 0 0 | 0.25 B | 28 | | | | | | 15 | 5 8 13 | 4.92 B | 15 |
| | | | | | 9 | 0 0 0 | 0.33 B | 26 | | | | | | | | | |
| | | | | | 10 | 2 2 2 | 0.33 B | 27 | | | | | | 16 | 6 13 17 | 6.07 B | 18 |

GENERAL NOTES

Begin Drilling **07-24-2013** Complete Drilling **07-25-2013**
 Drilling Contractor **Wang Testing Services** Drill Rig **D-50 TMR**
 Driller **R&N** Logger **F. Bozga** Checked by **C. Marin**
 Drilling Method **2.25" SSA to 10', mud rotary thereafter, boring**
backfilled upon completion

WATER LEVEL DATA

While Drilling **NA**
 At Completion of Drilling **MUD (11')**
 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 12/9/13



BORING LOG 1705-B-07

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

WEI Job No.: 1100-04-01

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

Datum: NAVD 88
 Elevation: 576.23 ft
 North: 1897855.27 ft
 East: 1171688.90 ft
 Station: 1828+55.18
 Offset: 28.83 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 (%) |
|---------|----------------|--|------------|----------------------|------------|-----------------------|-----------|----------------------|---------|----------------|--|------------|----------------------|------------|-----------------------|----------|----------------------|
| | 524.5 | Medium dense, gray SILT | | | | | | | | 499.5 | Dense, gray SILT | | | | | | |
| | | | 55 | X | 17 | 4 7 9 | NP | 23 | | | | 80 | X | 22 | 11 18 25 | NP | 20 |
| | 519.5 | Hard, gray SILTY CLAY LOAM, trace gravel | | | | | | | | | --%Gravel=0.4-- --%Sand=3.9-- --%Silt=88.1--85 --%Clay=7.7-- --A-4 (0)-- | | | | | | |
| | | | 60 | X | 18 | 13 15 20 | 4.84 B | 14 | | | | 90 | X | 23 | 14 19 24 | NP | 23 |
| | | | 65 | X | 19 | 8 16 24 | 7.05 B | 14 | | 489.5 | Very dense, gray SILTY LOAM, little gravel | | | | | | |
| | | | 70 | X | 20 | 24 36 42 | 4.50 P | 15 | | 482.5 | ROCK FRAGMENTS --HARD DRILLING-- --AUGER REFUSAL-- | | | | | | |
| | | | 75 | X | 21 | 12 16 50/3 | 5.33 B | 16 | | 481.2 | Boring terminated at 95.00 ft | | | | | | |
| | | | | | | | | | | | | 95 | | | 50/2 | NP | 15 |

GENERAL NOTES

Begin Drilling **07-24-2013** Complete Drilling **07-25-2013**
 Drilling Contractor **Wang Testing Services** Drill Rig **D-50 TMR**
 Driller **R&N** Logger **F. Bozga** Checked by **C. Marin**
 Drilling Method **2.25" SSA to 10', mud rotary thereafter, boring backfilled upon completion**

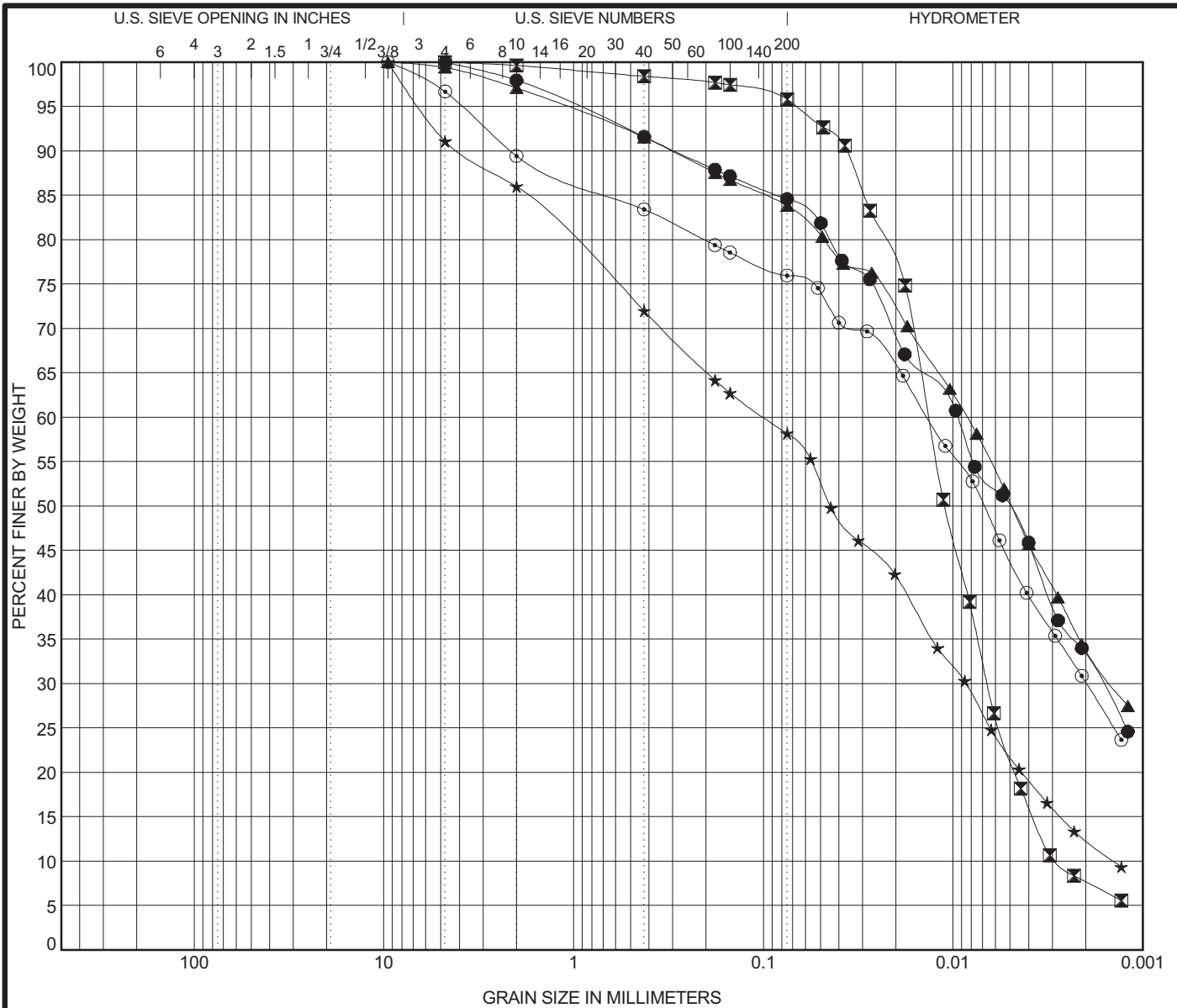
WATER LEVEL DATA

While Drilling **NA**
 At Completion of Drilling **MUD (11')**
 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 12/9/13

APPENDIX B



| | | | | |
|---------|--------|--------|------|---------------|
| COBBLES | GRAVEL | SAND | | SILT AND CLAY |
| | | coarse | fine | |

| Specimen Identification | | | IDH Classification | | | | | LL | PL | PI | Cc | Cu |
|-------------------------|--------------|---------|--------------------|-------|-------|-------|---------|-------|-------|-------|------|-------|
| ● | 1705-B-07#12 | 28.5 ft | Silty Clay | | | | | 38 | 17 | 21 | | |
| ☒ | 1705-B-07#23 | 83.5 ft | Silt | | | | | NP | NP | NP | 1.14 | 4.74 |
| ▲ | 1705-B-10#11 | 26.0 ft | Silty Clay | | | | | 35 | 17 | 18 | | |
| ★ | 1714-B-02#3 | 6.0 ft | Silty Loam | | | | | 24 | 15 | 9 | 0.52 | 69.46 |
| ⊙ | 1714-B-02#6 | 13.5 ft | Silty Clay | | | | | 33 | 18 | 15 | | |
| Specimen Identification | | | D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay | | |
| ● | 1705-B-07#12 | 28.5 ft | 4.75 | 0.009 | 0.002 | | 2.0 | 13.4 | 51.3 | 33.2 | | |
| ☒ | 1705-B-07#23 | 83.5 ft | 4.75 | 0.013 | 0.007 | 0.003 | 0.4 | 3.9 | 88.1 | 7.7 | | |
| ▲ | 1705-B-10#11 | 26.0 ft | 9.5 | 0.008 | 0.001 | | 2.9 | 13.3 | 49.9 | 33.9 | | |
| ★ | 1714-B-02#3 | 6.0 ft | 9.5 | 0.099 | 0.009 | 0.001 | 14.0 | 28.0 | 45.7 | 12.4 | | |
| ⊙ | 1714-B-02#6 | 13.5 ft | 9.5 | 0.014 | 0.002 | | 10.6 | 13.5 | 45.8 | 30.1 | | |

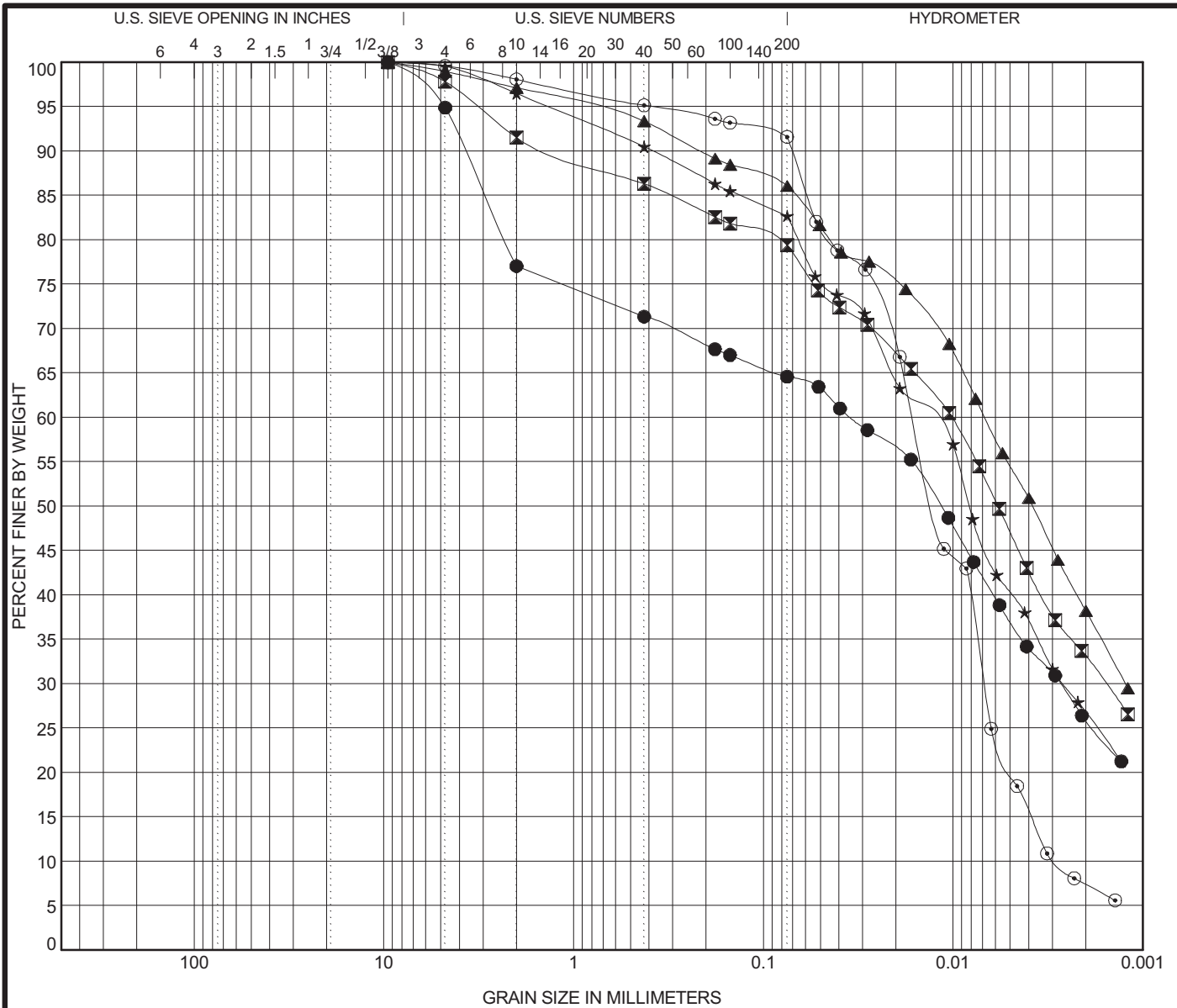
WEI GRAIN SIZE IDH 11000401.GPJ US_LAB.GDT 12/9/13



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

GRAIN SIZE DISTRIBUTION

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



| | | | | |
|---------|--------|--------|------|---------------|
| COBBLES | GRAVEL | SAND | | SILT AND CLAY |
| | | coarse | fine | |

| Specimen Identification | | | IDH Classification | | | | | LL | PL | PI | Cc | Cu |
|-------------------------|--------------|---------|----------------------------|-------|-------|-------|---------|-------|-------|-------|------|------|
| ● | 1714-B-02#12 | 28.5 ft | Gravelly Silty Clay | | | | | 33 | 17 | 16 | | |
| ☒ | 1714-B-02#15 | 43.5 ft | Silty Clay | | | | | 33 | 17 | 16 | | |
| ▲ | 1714-B-02#18 | 58.5 ft | Clay | | | | | 35 | 17 | 18 | | |
| ★ | 1714-B-02#20 | 68.5 ft | Silty Clay Loam | | | | | 31 | 17 | 14 | | |
| ◎ | 1714-B-02#24 | 88.5 ft | Silt | | | | | NP | NP | NP | 1.01 | 5.59 |
| Specimen Identification | | | D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay | | |
| ● | 1714-B-02#12 | 28.5 ft | 9.5 | 0.034 | 0.003 | | 23.0 | 12.5 | 38.7 | 25.9 | | |
| ☒ | 1714-B-02#15 | 43.5 ft | 9.5 | 0.01 | 0.002 | | 8.5 | 12.3 | 46.1 | 33.1 | | |
| ▲ | 1714-B-02#18 | 58.5 ft | 9.5 | 0.007 | 0.001 | | 2.9 | 11.2 | 47.7 | 38.2 | | |
| ★ | 1714-B-02#20 | 68.5 ft | 9.5 | 0.014 | 0.003 | | 3.5 | 14.1 | 55.7 | 26.7 | | |
| ◎ | 1714-B-02#24 | 88.5 ft | 9.5 | 0.016 | 0.007 | 0.003 | 1.9 | 6.8 | 83.8 | 7.4 | | |

WEI GRAIN SIZE IDH 11000401.GPJ US LAB.GDT 12/9/13



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

GRAIN SIZE DISTRIBUTION

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



Unconfined Compressive Strength of Intact Rock Core Specimens

Project: Circle Interchange

Client: AECOM

WEI Job No.: 1100-04-01

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

| Field Sample ID | Lab Specimen ID | Depth (ft) | Location | Sample Description | Length (in) | | Diameter (in) | Total Load (lbs) | Total Pressure (psi) | Fracture Type* | Break Date | Tested By | Area (in ²) |
|--------------------|-----------------|------------|----------|--------------------|----------------|---------------|---------------|------------------|----------------------|----------------|------------|-----------|-------------------------|
| | | | | | Before Capping | After Capping | | | | | | | |
| 1714-B-02 RUN 1 | 9766 | 100.5 | | Dolomite | 3.83 | 4.03 | 2.05 | 31300 | 9480 | 3 | 6/12/14 | AM | 3.30 |
| 1714-B-04 RUN 1 | 9764 | 94.0 | | Dolomite | 3.79 | 3.99 | 2.03 | 37780 | 11660 | 3 | 6/12/14 | AM | 3.24 |
| 1714-B-05 RUN 2 | 9765 | 100.5 | | Dolomite | 3.79 | 3.96 | 2.03 | 32790 | 10120 | 3 | 6/12/14 | AM | 3.24 |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

*** Fracture Types:**

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

Prepared by: Jerry

Checked by: Alf

APPENDIX C

Bench Mark: Cut "X" on C of East Pier at C of Van Buren. Elev. 582.68.

Existing Structure: SN 016-2452. Constructed in 1960 under F.A.I. Route 1, Section 2424.28-B. Fourteen span bridge that measures 787'-4" from back of north abutment to centerline of east pier. Out-to-out width of 29'-0". The spans are supported by 36" wide flange beams, concrete T-beams and a reinforced concrete slab. Substructure is reinforced concrete closed abutment, multi-column and solid wall piers founded on bell caissons. The existing bridge is to be removed and replaced.

The existing bridge will be closed to traffic and detoured during construction.

No Salvage.

SEISMIC DATA

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

DESIGN SPECIFICATIONS

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

DESIGN STRESSES

FIELD UNITS

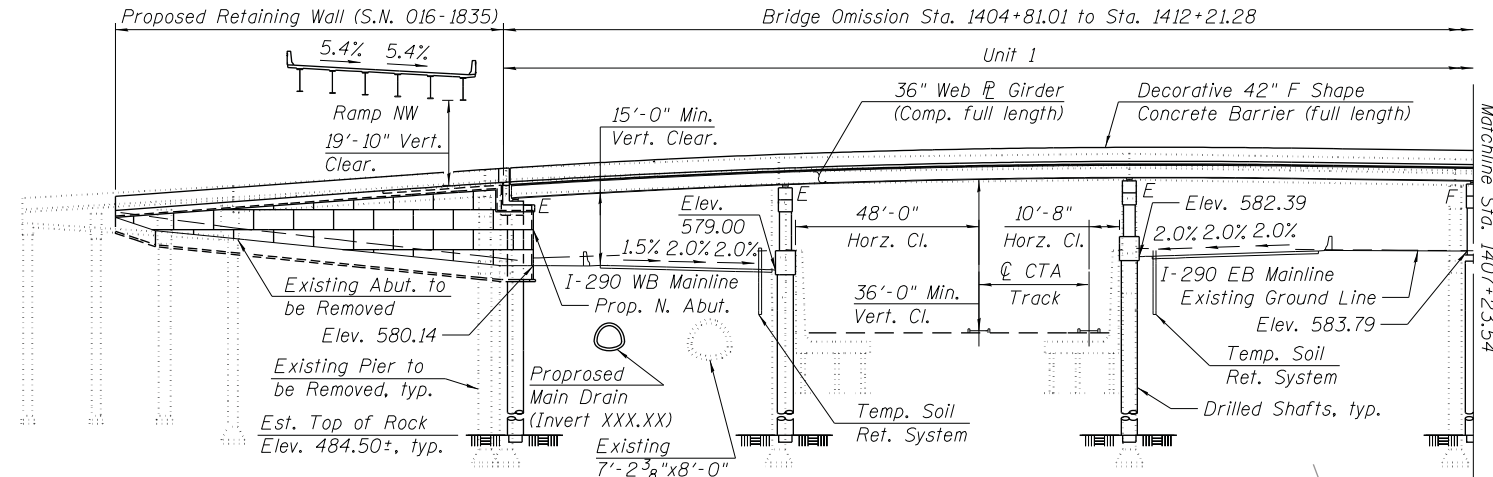
f'c = 3,500 psi
 fy = 60,000 psi (Reinforcement)
 fy = 50,000 psi (M270 Grade 50)

LOADING HL-93

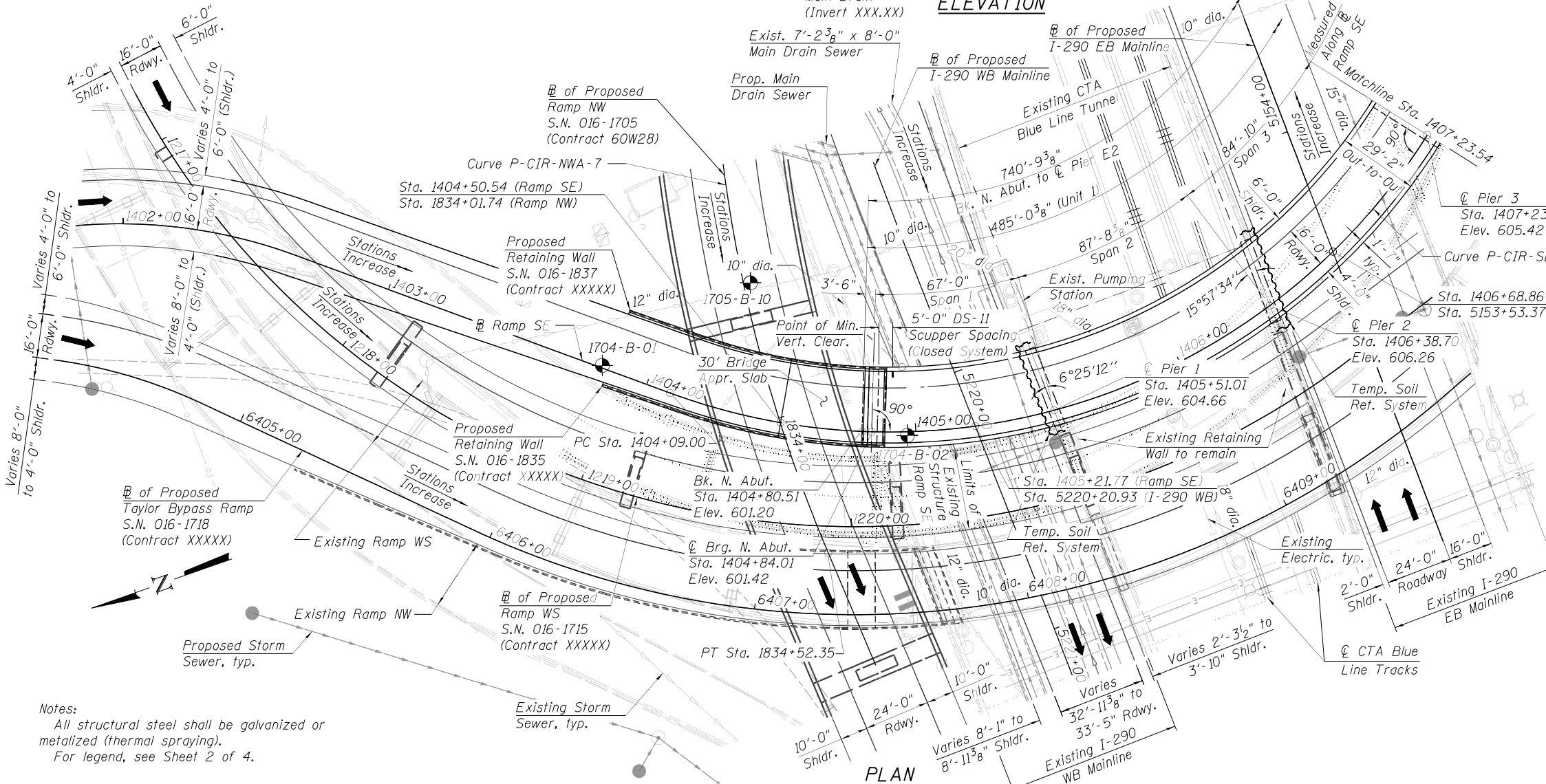
Allow 50#/sq. ft. for future wearing surface.

HIGHWAY CLASSIFICATION

| Ramp SE | Ramp NW |
|------------------------------------|-----------------------------------|
| Functional Class: Interstate | Functional Class: Interstate |
| ADT: 4,600 (2010); 5,000 (2040) | ADT: 32,500 (2012); 36,000 (2040) |
| ADTT: 123 (2012); 134 (2040) | ADTT: 2,403 (2012); 2,750 (2040) |
| DHV: 440 (2040) | DHV: 2,790 (2040) |
| Design Speed: 25 m.p.h. | Design Speed: 35 m.p.h. |
| Posted Speed: 25 m.p.h. | Posted Speed: 25 m.p.h. |
| One-Way Traffic | One-Way Traffic |
| Directional Distribution: 100% | Directional Distribution: 100% |
| F.A.I. Rte. 290 EB | F.A.I. Rte. 290 WB |
| Functional Class: Interstate | Functional Class: Interstate |
| ADT: 32,500 (2012); 33,000 (2040) | ADT: 29,700 (2012); 31,000 (2040) |
| ADTT: 380 (2012); 386 (2040) | ADTT: 520 (2012); 543 (2040) |
| DHV: 2,610 (2040) | DHV: 2,130 (2040) |
| Design Speed: 50 m.p.h. | Design Speed: 45 m.p.h. |
| Posted Speed: 45 m.p.h. | Posted Speed: 45 m.p.h. |
| One-Way Traffic | One-Way Traffic |
| Directional Distribution: 100% | Directional Distribution: 100% |
| F.A.I. Rte. 90/94 SB | F.A.I. Rte. 90/94 NB |
| Functional Class: Interstate | Functional Class: Interstate |
| ADT: 100,100 (2012); 98,000 (2040) | ADT: 96,700 (2012); 81,000 (2040) |
| ADTT: 11,351 (2012); 11,113 (2040) | ADTT: 11,217 (2012); 9,393 (2040) |
| DHV: 6,340 (2040) | DHV: 4,780 (2040) |
| Design Speed: 60 m.p.h. | Design Speed: 60 m.p.h. |
| Posted Speed: 45 m.p.h. | Posted Speed: 45 m.p.h. |
| One-Way Traffic | One-Way Traffic |
| Directional Distribution: 100% | Directional Distribution: 100% |

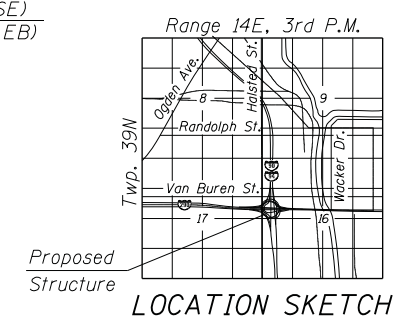


ELEVATION



PLAN

Notes:
 All structural steel shall be galvanized or metalized (thermal spraying).
 For legend, see Sheet 2 of 4.



LOCATION SKETCH

GENERAL PLAN & ELEVATION - 1
RAMP SE OVER
F.A.I. 290 (EISENHOWER EXPRESSWAY),
F.A.I. 90/94 (KENNEDY EXPRESSWAY) AND CTA
F.A.I. 94 (I-90/94 SB to I-290 EB)
SECTION 2013-010R
COOK COUNTY
STATION 1408+50.90
STRUCTURE NO. 016-1714

1/7/2014 10:50:31AM - 8FILES

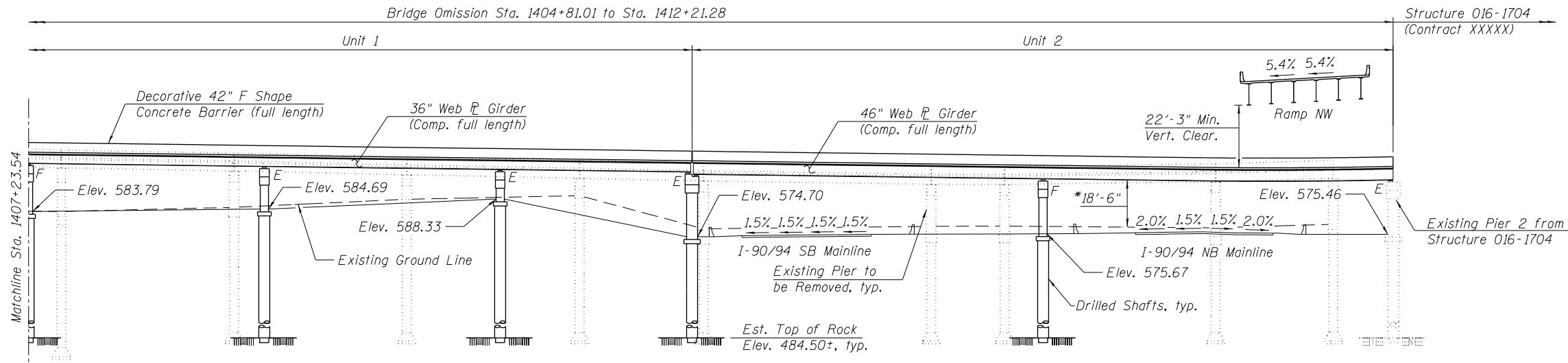


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| PLOT SCALE = 48:0 "/> | | |

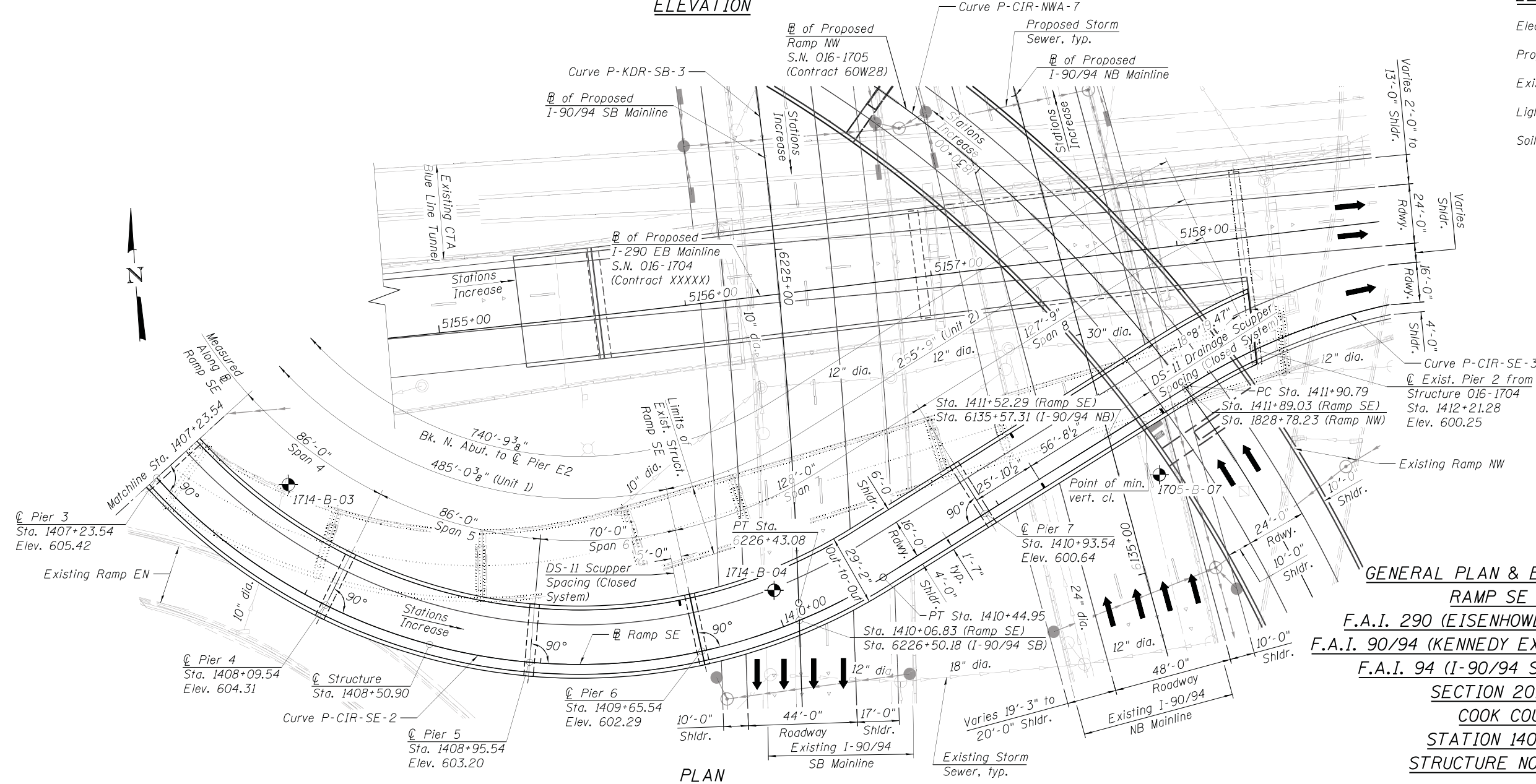
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

SHEET NO. 1 OF 4 SHEETS

| F.A.I. RTE. | SECTION | COUNTY | TOTAL SHEETS | SHEET NO. |
|---------------------------|-----------|--------|--------------|--------------------|
| 0094 | 2013-010R | COOK | 4 | 1 |
| | | | | CONTRACT NO. XXXXX |
| ILLINOIS FED. AID PROJECT | | | | |



ELEVATION



PLAN

LEGEND

| | |
|--------------------|-------|
| Electric | —E— |
| Prop. Storm Sewer | —>>> |
| Exist. Storm Sewer | —>>>— |
| Light Pole | ⊙ |
| Soil Boring | ⊕ |

GENERAL PLAN & ELEVATION - 2
RAMP SE OVER
F.A.I. 290 (EISENHOWER EXPRESSWAY),
F.A.I. 90/94 (KENNEDY EXPRESSWAY) AND CTA
F.A.I. 94 (I-90/94 SB to I-290 EB)
SECTION 2013-010R
COOK COUNTY
STATION 1408+50.90
STRUCTURE NO. 016-1714

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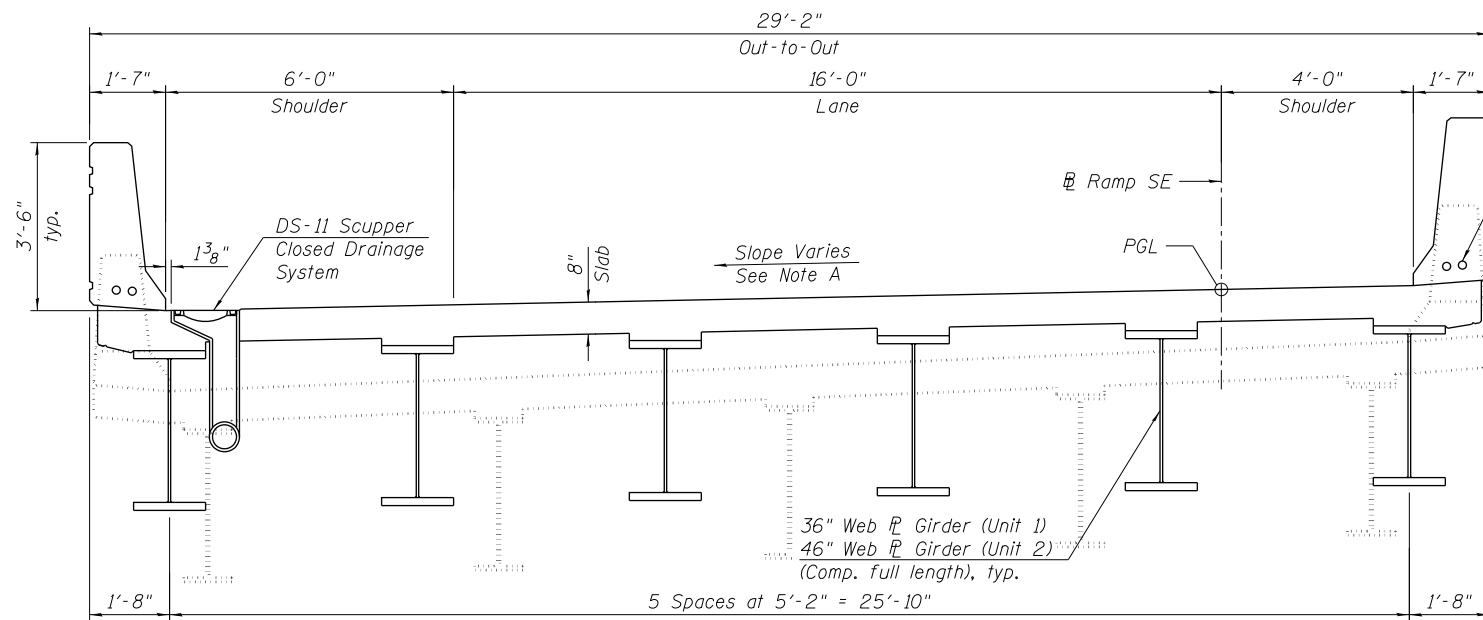
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|-----------------------|----------------|-----------|
| USER NAME = wjcollett | DESIGNED - WJC | REVISED - |
| | CHECKED - KAH | REVISED - |
| PLOT SCALE = 48:0 "/> | | |

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

SHEET NO. 2 OF 4 SHEETS

| | | | | |
|--------------------|-------------------|-------------|---------------------------|-------------|
| F.A.I. RTE. 0094 | SECTION 2013-010R | COUNTY COOK | TOTAL SHEETS 4 | SHEET NO. 2 |
| CONTRACT NO. XXXXX | | | ILLINOIS FED. AID PROJECT | |

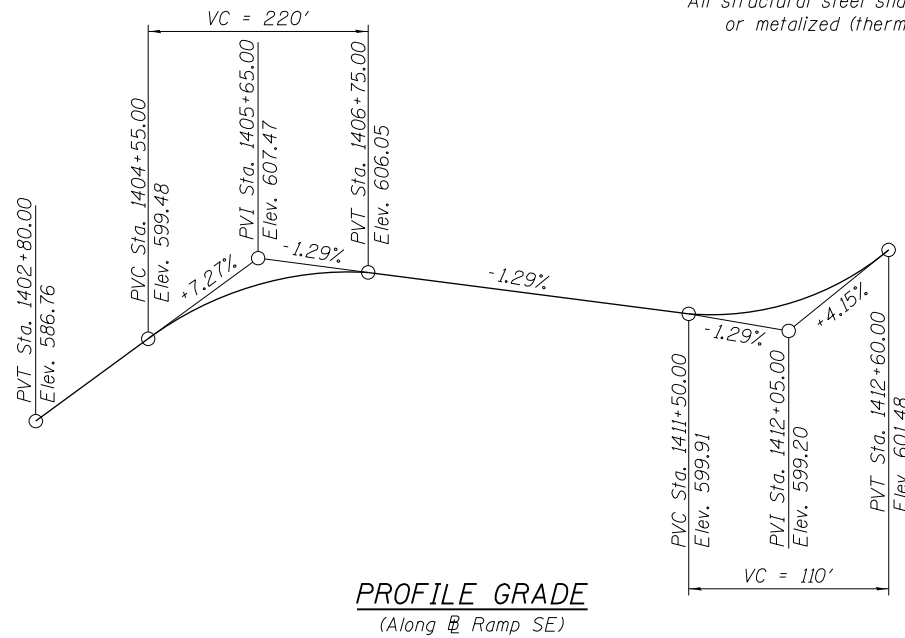
Note A: (Direction of slope referenced from right edge of pavement)
 Cross Slope (-5.60%) Sta. 1404+66.81 to Sta. 1409+91.41
 Transition (-5.60% to 0.00%) Sta. 1409+91.41 to Sta. 1411+19.41
 Transition (0.00% to 5.40%) Sta. 1411+19.41 to Sta. 1412+42.41



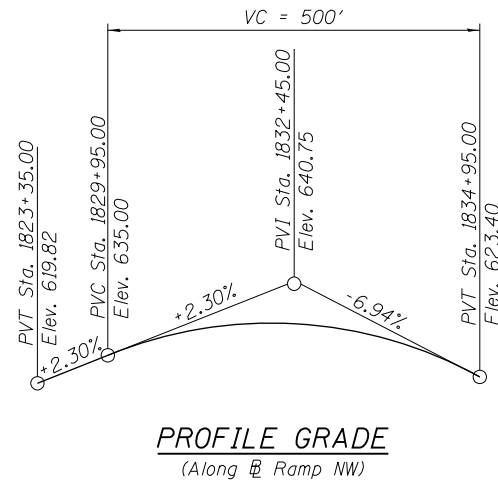
CROSS SECTION

(Looking Upstation)

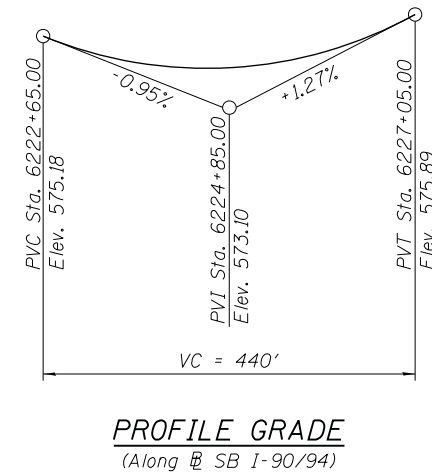
All structural steel shall be galvanized or metalized (thermal spraying)



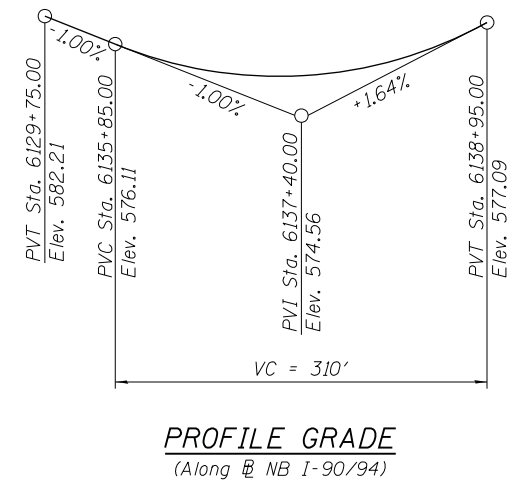
PROFILE GRADE
(Along EB I-290)



PROFILE GRADE
(Along Ramp NW)



PROFILE GRADE
(Along SB I-90/94)



PROFILE GRADE
(Along NB I-90/94)

CURVE DATA

(Ramp SE)

| | |
|------------------------------------|-----------------------------------|
| P-CIR-SE-2 | P-CIR-SE-3 |
| P.I. Sta. = 1415+83.08 | P.I. Sta. = 1412+44.91 |
| $\Delta = 157^\circ 44' 18''$ (LT) | $\Delta = 24^\circ 25' 53''$ (RT) |
| D = 24°48'12" | D = 22°55'06" |
| R = 231.00' | R = 250.00' |
| T = 1174.08' | T = 54.12' |
| L = 635.96' | L = 106.60' |
| E = 965.59' | E = 5.79' |
| e = 5.6% | e = 5.4% |
| T.R. = NA | T.R. = NA |
| S.E. Run = 128' | S.E. Run = 78' |
| P.C. Sta. = 1404+09.00 | P.C. Sta. = 1411+90.79 |
| P.T. Sta. = 1410+44.95 | P.T. Sta. = 1412+97.39 |

CURVE DATA

(Ramp NW)

| | |
|-----------------------------------|-----------------------------------|
| P-CIR-NWA-7 | P-KDR-SB-3 |
| P.I. Sta. = 1831+44.30 | P.I. Sta. = 6224+30.06 |
| $\Delta = 88^\circ 30' 25''$ (LT) | $\Delta = 11^\circ 28' 39''$ (RT) |
| D = 10°36'37" | D = 2°41'06" |
| R = 540.00' | R = 2,134.00' |
| T = 526.11' | T = 214.46' |
| L = 834.16' | L = 427.48' |
| E = 213.92' | E = 10.75' |
| e = 5.4% | e = 4.2% |
| T.R. = 39' | T.R. = NA |
| S.E. Run = 105' | S.E. Run = 203' |
| P.C. Sta. = 1826+18.19 | P.C. Sta. = 6222+15.60 |
| P.T. Sta. = 1834+52.35 | P.T. Sta. = 6226+43.08 |

CURVE DATA

(F.A.I. Rte. SB 90/94)

CROSS SECTION, PROFILE GRADES AND CURVE DATA

**RAMP SE OVER
 F.A.I. 290 (EISENHOWER EXPRESSWAY),
 F.A.I. 90/94 (KENNEDY EXPRESSWAY) AND CTA
 F.A.I. 94 (I-90/94 SB to I-290 EB)
 SECTION 2013-010R
 COOK COUNTY
 STATION 1408+50.90
 STRUCTURE NO. 016-1714**

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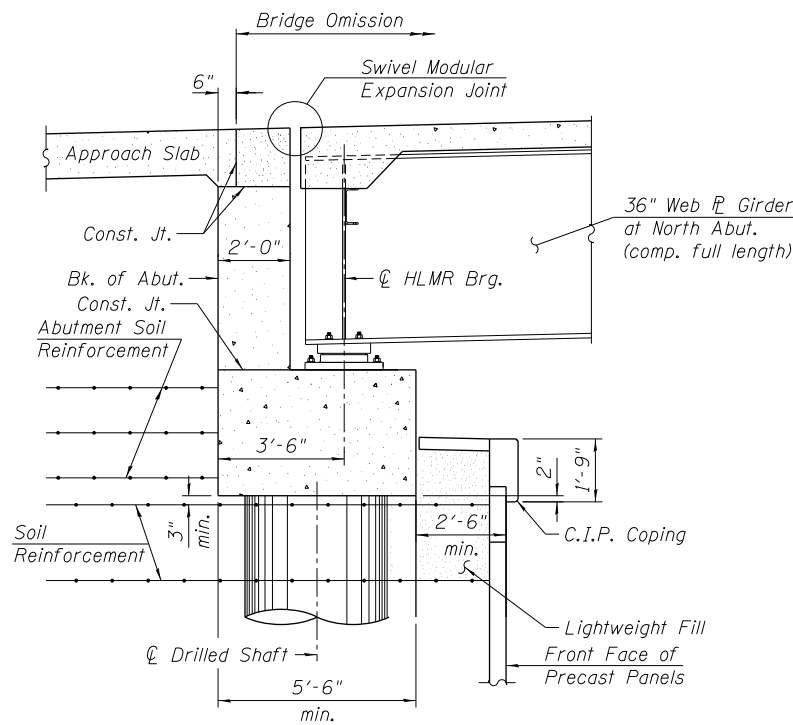


| | | |
|---------------------------|------------------|-----------|
| USER NAME = wjcolletti | DESIGNED - WJC | REVISED - |
| PLOT SCALE = 48:0' / 1" = | CHECKED - KAH | REVISED - |
| PLOT DATE = 1/7/2014 | DRAWN - WJC | REVISED - |
| | CHECKED - KAH/DL | REVISED - |

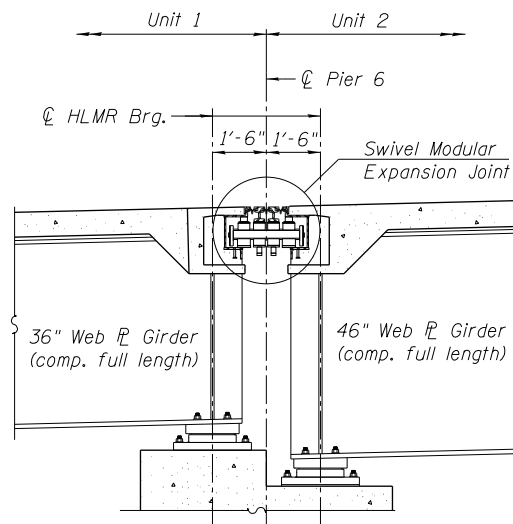
**STATE OF ILLINOIS
 DEPARTMENT OF TRANSPORTATION**

SHEET NO. 3 OF 4 SHEETS

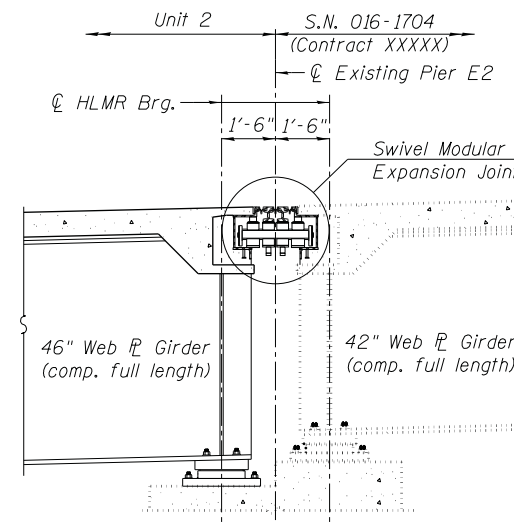
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| CONTRACT NO. XXXXX | | | ILLINOIS FED. AID PROJECT | |



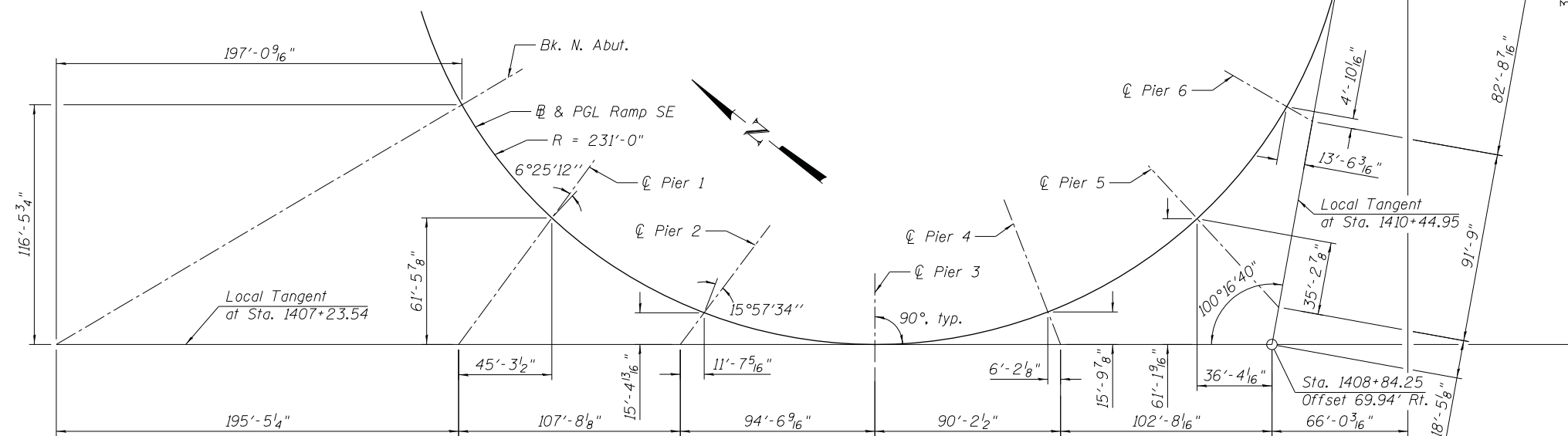
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(Horiz. Dim. @ Rt. L's)



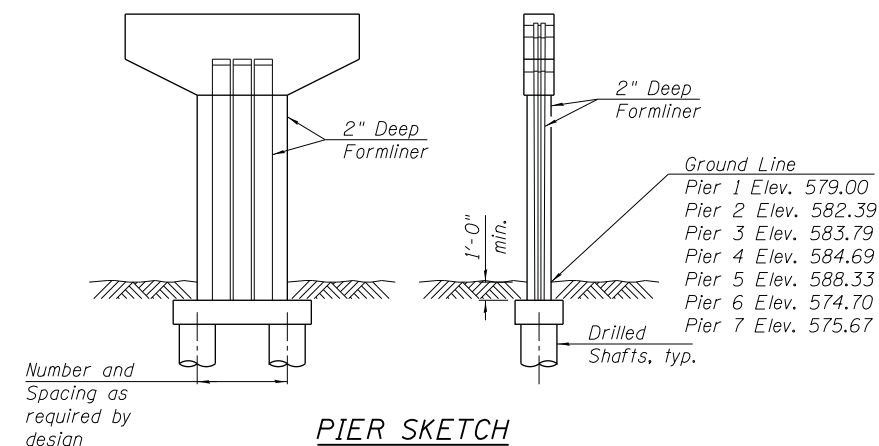
SECTION THRU EXP. PIER
(Horiz. Dim. @ Rt. L's)



SECTION THRU EXP. PIER
(Horiz. Dim. @ Rt. L's)



OFFSET SKETCH



PIER SKETCH

SECTION THRU ABUTMENT, PIER AND OFFSET SKETCH
RAMP SE OVER
F.A.I. 290 (EISENHOWER EXPRESSWAY),
F.A.I. 90/94 (KENNEDY EXPRESSWAY) AND CTA
F.A.I. 94 (I-90/94 SB to I-290 EB)
SECTION 2013-010R
COOK COUNTY
STATION 1408+50.90
STRUCTURE NO. 016-1714

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| | | |
|--------------------------------|------------------|-----------|
| USER NAME = wjcolletti | DESIGNED - WJC | REVISED - |
| | CHECKED - KAH | REVISED - |
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| PLOT DATE = 1/7/2014 | CHECKED - KAH/DL | REVISED - |

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

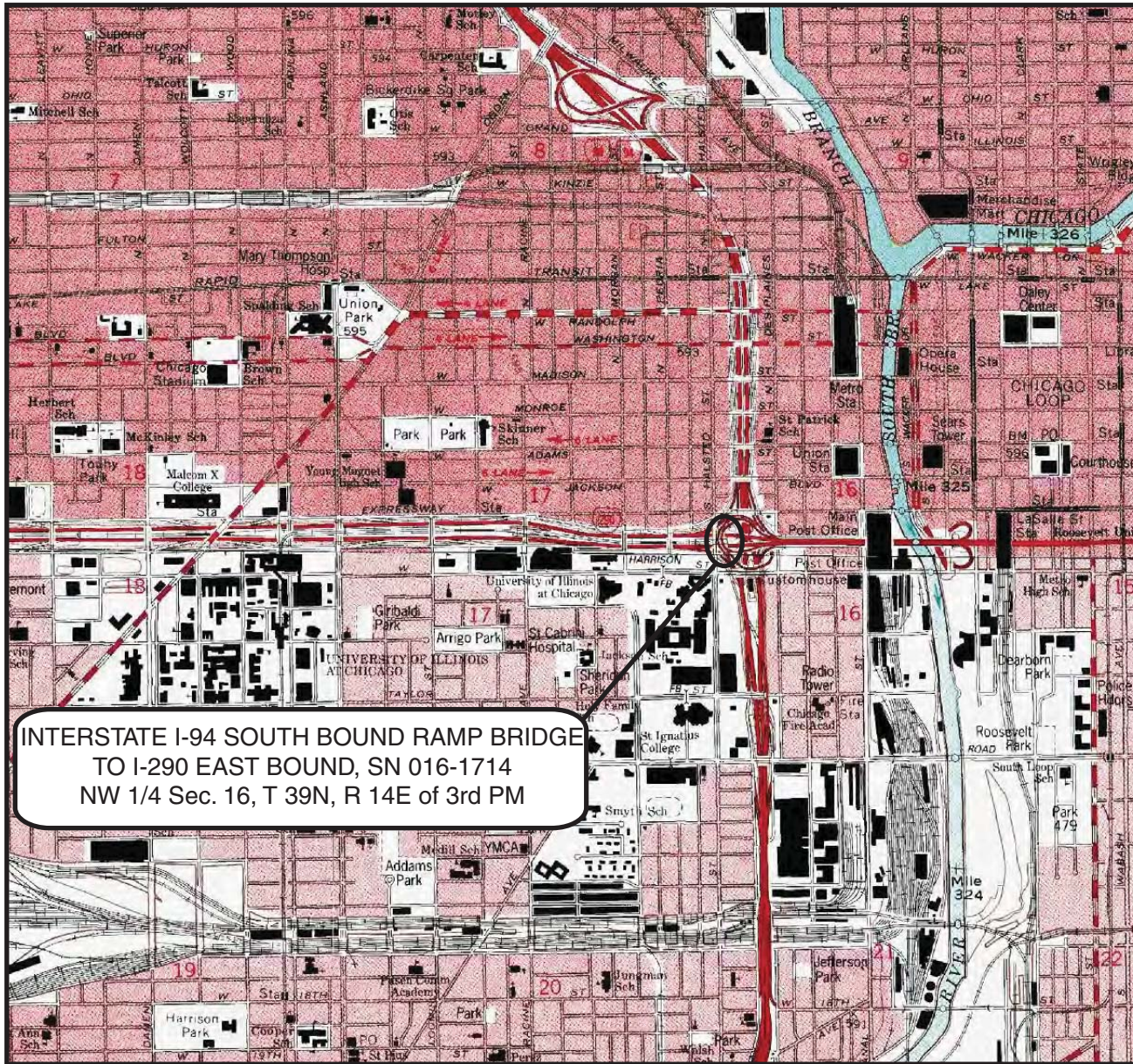
SHEET NO. 4 OF 4 SHEETS

| | | | | |
|---------------------------|-------------------|-------------|----------------|--------------------|
| F.A.I. RTE. 0094 | SECTION 2013-010R | COUNTY COOK | TOTAL SHEETS 4 | SHEET NO. 4 |
| | | | | CONTRACT NO. XXXXX |
| ILLINOIS FED. AID PROJECT | | | | |

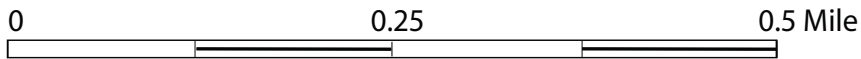
REFERENCES

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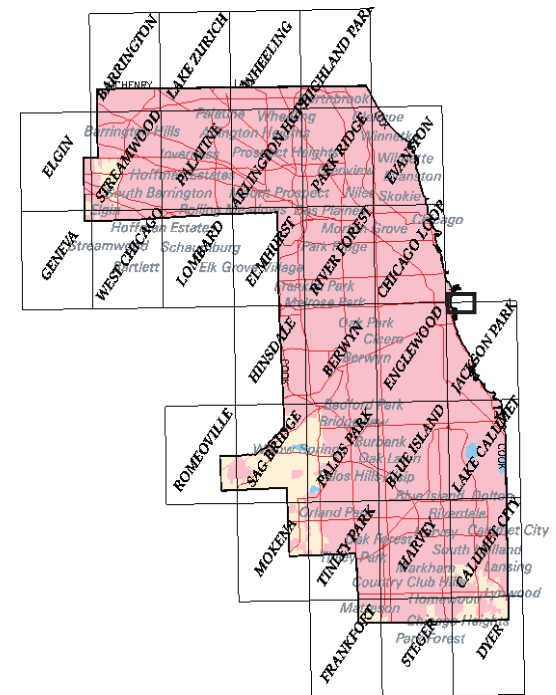
EXHIBITS



**INTERSTATE I-94 SOUTH BOUND RAMP BRIDGE
TO I-290 EAST BOUND, SN 016-1714
NW 1/4 Sec. 16, T 39N, R 14E of 3rd PM**



Illinois



Cook County

**SITE LOCATION MAP: CIRCLE INTERCHANGE RECONSTRUCTION
I-94 SB RAMP BRIDGE TO I-290 EB, SN 016-1714, COOK COUNTY**

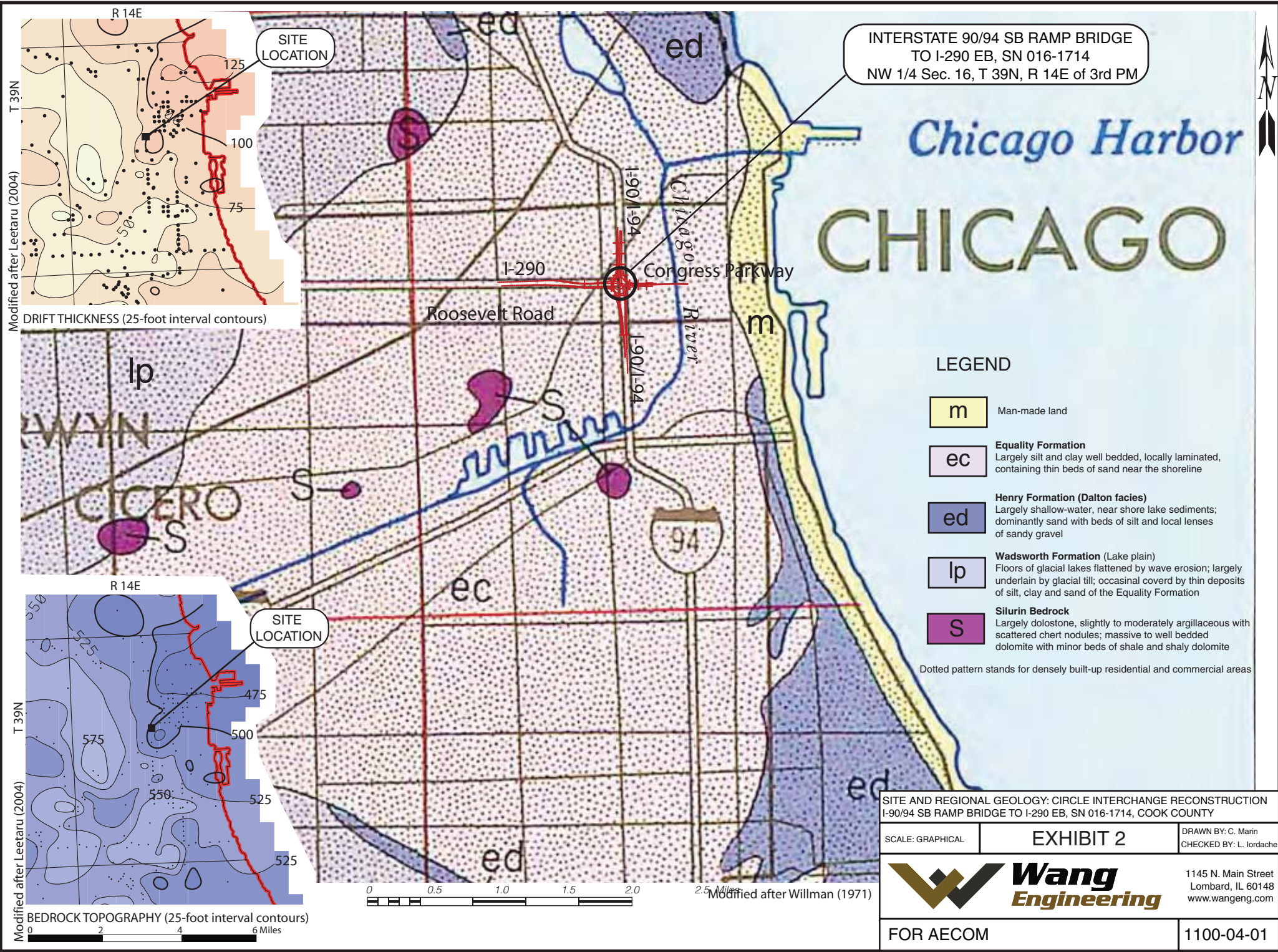
| | | |
|------------------|------------------|--|
| SCALE: GRAPHICAL | EXHIBIT 1 | DRAWN BY: M. de los Reyes CHECKED BY: M. Snider |
|------------------|------------------|--|



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

FOR AECOM

1100-04-01



INTERSTATE 90/94 SB RAMP BRIDGE
TO I-290 EB, SN 016-1714
NW 1/4 Sec. 16, T 39N, R 14E of 3rd PM

Chicago Harbor

CHICAGO

LEGEND

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

Modified after Leetaru (2004)

Modified after Leetaru (2004)

Modified after Willman (1971)

SITE AND REGIONAL GEOLOGY: CIRCLE INTERCHANGE RECONSTRUCTION
I-90/94 SB RAMP BRIDGE TO I-290 EB, SN 016-1714, COOK COUNTY

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

| | |
|--|--|
| | <p>1145 N. Main Street Lombard, IL 60148 www.wangeng.com</p> |
|--|--|

| | |
|-----------|------------|
| FOR AECOM | 1100-04-01 |
|-----------|------------|

Bench Mark: Cut "X" on C of East Pier at C of Van Buren. Elev. 582.68.

THIS EXHIBIT IS TO BE USED FOR BORING LOCATION ONLY

Existing Structure: SN 016-2452. Constructed in 1960 under F.A.I. Route 1, Section 2424.28-B. Fourteen span bridge that measures 787'-4" from back of north abutment to centerline of east pier. Out-to-out width of 29'-0". The spans are supported by 36" wide flange beams, concrete T-beams and a reinforced concrete slab. Substructure is reinforced concrete closed abutment, multi-column and solid wall piers founded on bell caissons. The existing bridge is to be removed and replaced.

The existing bridge will be closed to traffic and detoured during construction.

No Salvage.

Legend:

Soil Boring

SEISMIC DATA

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

DESIGN SPECIFICATIONS

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

DESIGN STRESSES

FIELD UNITS

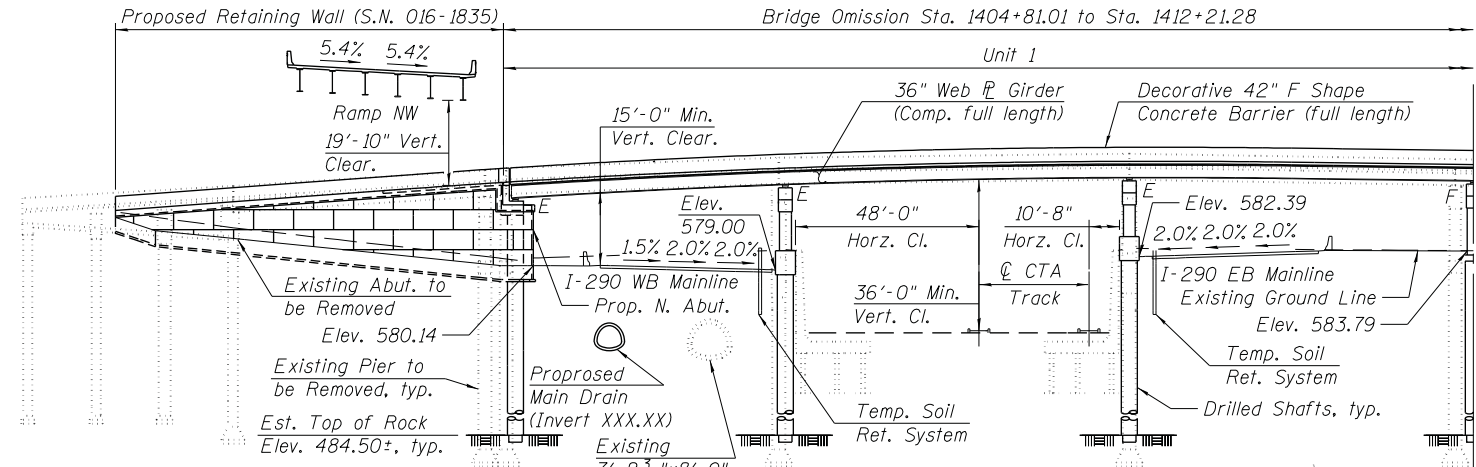
f'c = 3,500 psi
 fy = 60,000 psi (Reinforcement)
 fy = 50,000 psi (M270 Grade 50)

LOADING HL-93

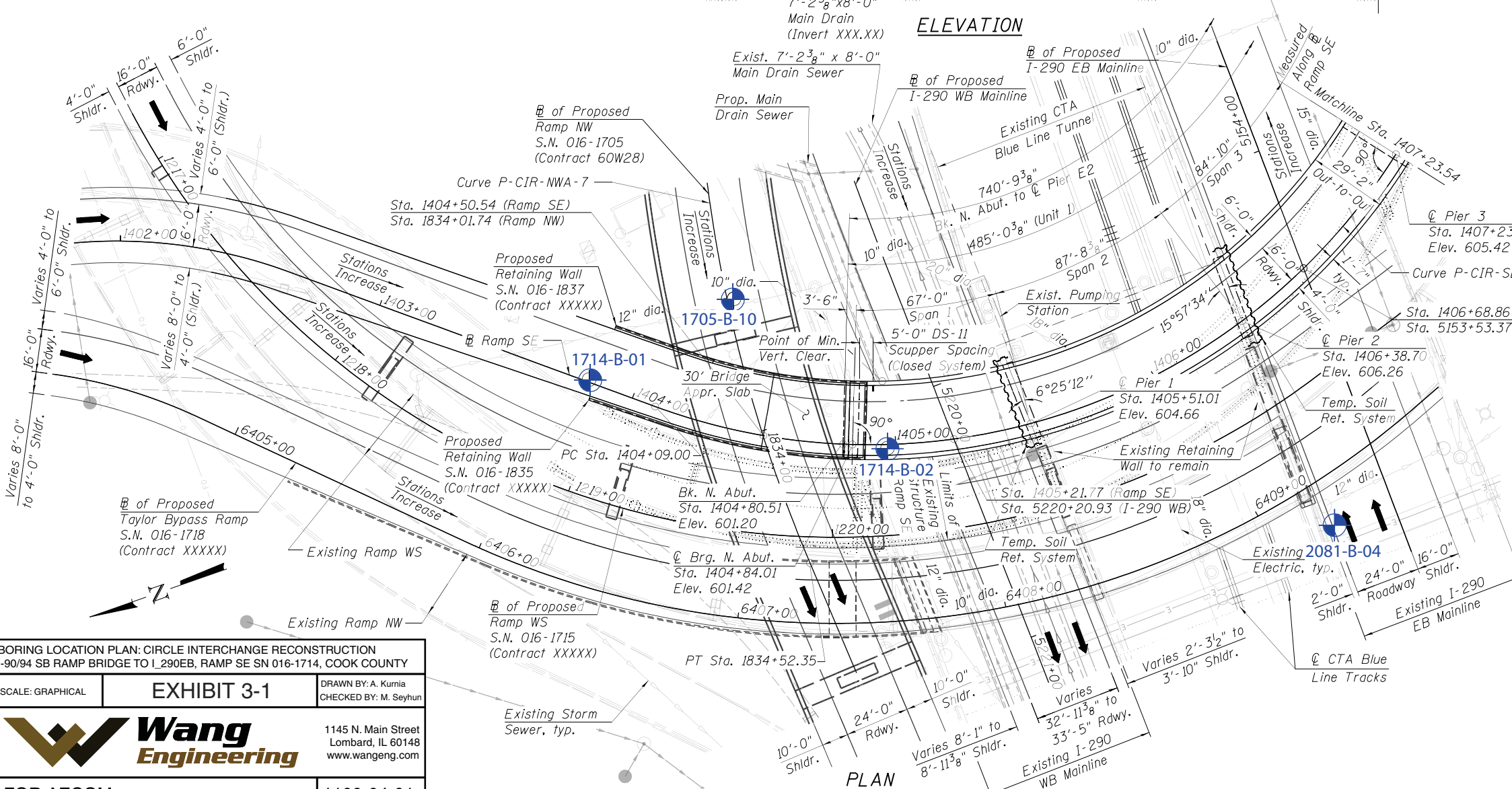
Allow 50#/sq. ft. for future wearing surface.

HIGHWAY CLASSIFICATION

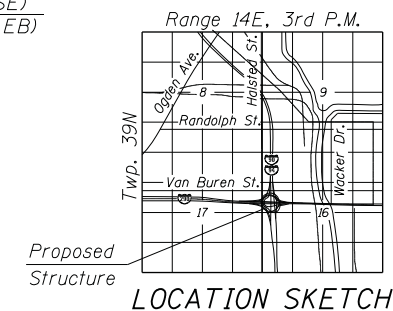
| Ramp SE | Ramp NW |
|------------------------------------|-----------------------------------|
| Functional Class: Interstate | Functional Class: Interstate |
| ADT: 4,600 (2010); 5,000 (2040) | ADT: 32,500 (2012); 36,000 (2040) |
| ADTT: 123 (2012); 134 (2040) | ADTT: 2,403 (2012); 2,750 (2040) |
| DHV: 440 (2040) | DHV: 2,790 (2040) |
| Design Speed: 25 m.p.h. | Design Speed: 35 m.p.h. |
| Posted Speed: 25 m.p.h. | Posted Speed: 25 m.p.h. |
| One-Way Traffic | One-Way Traffic |
| Directional Distribution: 100% | Directional Distribution: 100% |
| F.A.I. Rte. 290 EB | F.A.I. Rte. 290 WB |
| Functional Class: Interstate | Functional Class: Interstate |
| ADT: 32,500 (2012); 33,000 (2040) | ADT: 29,700 (2012); 31,000 (2040) |
| ADTT: 380 (2012); 386 (2040) | ADTT: 520 (2012); 543 (2040) |
| DHV: 2,610 (2040) | DHV: 2,130 (2040) |
| Design Speed: 50 m.p.h. | Design Speed: 45 m.p.h. |
| Posted Speed: 45 m.p.h. | Posted Speed: 45 m.p.h. |
| One-Way Traffic | One-Way Traffic |
| Directional Distribution: 100% | Directional Distribution: 100% |
| F.A.I. Rte. 90/94 SB | F.A.I. Rte. 90/94 NB |
| Functional Class: Interstate | Functional Class: Interstate |
| ADT: 100,100 (2012); 98,000 (2040) | ADT: 96,700 (2012); 81,000 (2040) |
| ADTT: 11,351 (2012); 11,113 (2040) | ADTT: 11,217 (2012); 9,393 (2040) |
| DHV: 6,340 (2040) | DHV: 4,780 (2040) |
| Design Speed: 60 m.p.h. | Design Speed: 60 m.p.h. |
| Posted Speed: 45 m.p.h. | Posted Speed: 45 m.p.h. |
| One-Way Traffic | One-Way Traffic |
| Directional Distribution: 100% | Directional Distribution: 100% |



ELEVATION



PLAN



GENERAL PLAN & ELEVATION - 1
RAMP SE OVER
F.A.I. 290 (EISENHOWER EXPRESSWAY),
F.A.I. 90/94 (KENNEDY EXPRESSWAY) AND CTA
F.A.I. 94 (I-90/94 SB to I-290 EB)
SECTION 2013-010R
COOK COUNTY
STATION 1408+50.90
STRUCTURE NO. 016-1714

BORING LOCATION PLAN: CIRCLE INTERCHANGE RECONSTRUCTION
 I-90/94 SB RAMP BRIDGE TO I-290EB, RAMP SE SN 016-1714, COOK COUNTY

SCALE: GRAPHICAL **EXHIBIT 3-1**

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

FOR AECOM **1100-04-01**

| | | |
|---|------------------|-----------|
| USER NAME = wjcolletti | DESIGNED - WJC | REVISED - |
| | CHECKED - KAH | REVISED - |
| PLOT SCALE = 48:0 "/td> <td>DRAWN - WJC</td> <td>REVISED -</td> | DRAWN - WJC | REVISED - |
| PLOT DATE = 1/7/2014 | CHECKED - KAH/DL | REVISED - |

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

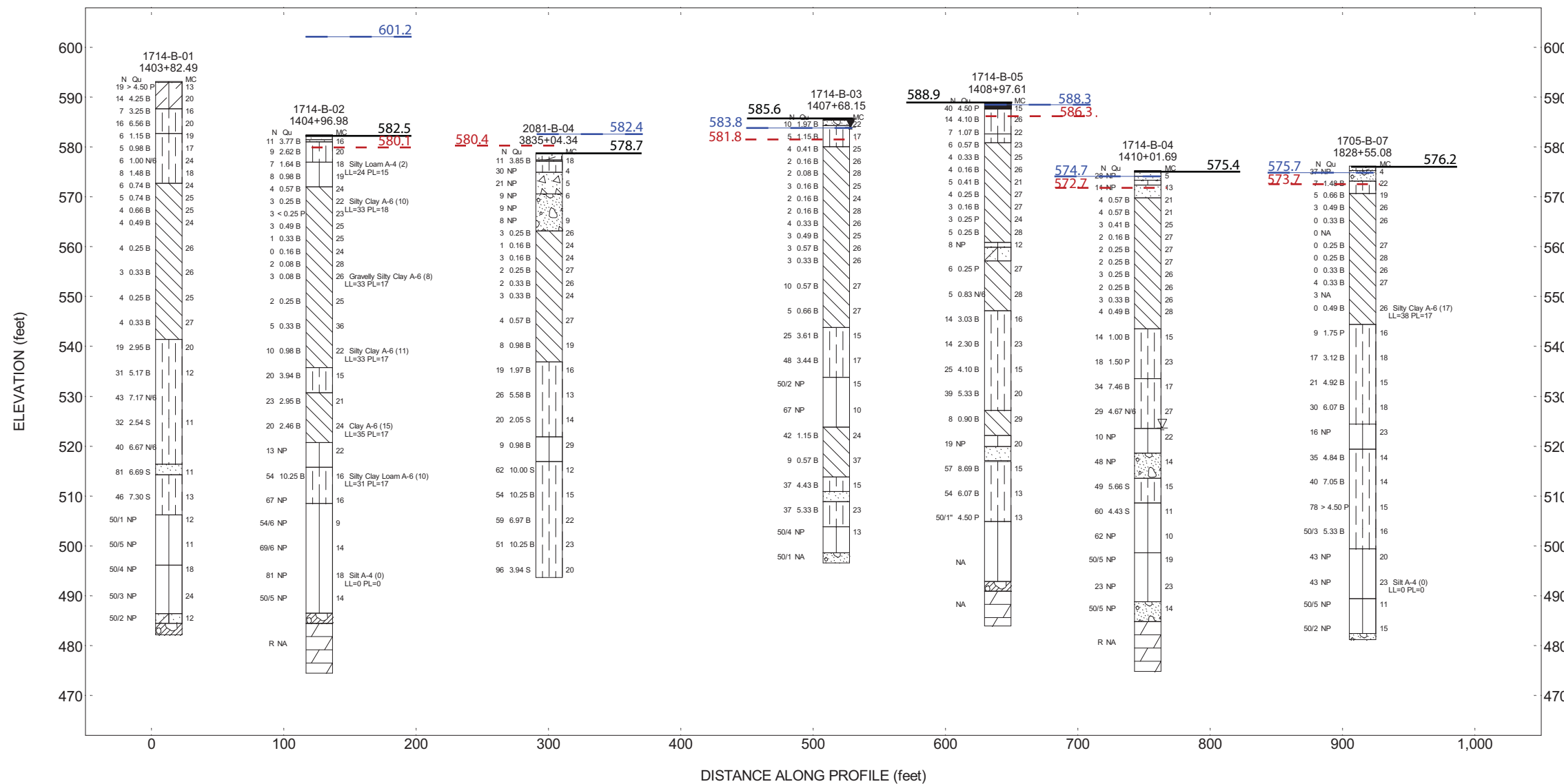
| F.A.I. RTE. | SECTION | COUNTY | TOTAL SHEETS | SHEET NO. |
|---------------------------|-----------|--------|--------------|-----------|
| 0094 | 2013-010R | COOK | 4 | 1 |
| CONTRACT NO. XXXXX | | | | |
| ILLINOIS FED. AID PROJECT | | | | |



N

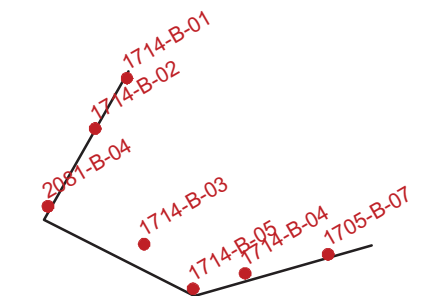


North Abutment Pier 1 Pier 2 Pier 3 Pier 4 Pier 5 Pier 6 Pier 7



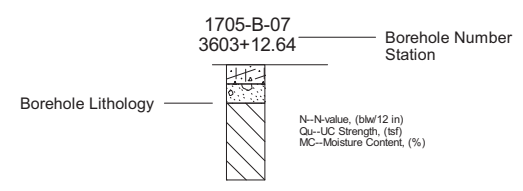
Lithology Graphics

- | | | | |
|----------------------|-----------------------------|---------------------------------|---------------------------------|
| Pavement | Gravelly sand, sandy gravel | IDH Silty Clay, Silty Clay Loam | IDH Clay |
| IDH Silt, Silty Loam | IDH Loam | IDH Clay Loam | IDH Sand, Sandy Loam |
| Weathered bedrock | Concrete | Crushed stone | Dolomite or Dolomitic Limestone |
| Topsoil | Existing Grade | Proposed Grade | Bottom of Substructure |

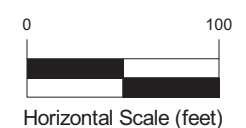


Site Map Scale 1 inch equals 365 feet

Explanation:



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



Vertical Exaggeration: 4x

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

Soil Profile
S.N. 016-1714



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

| | |
|------------|--------------|
| JOB NUMBER | PLATE NUMBER |
| 1100-04-01 | EXHIBIT 4 |

APPENDIX A



BORING LOG 1714-B-01

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

WEI Job No.: 1100-04-01

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

Datum: NAVD 88
 Elevation: 593.22 ft
 North: 1898191.77 ft
 East: 1171304.89 ft
 Station: 1403+82.49
 Offset: 00.00

| 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 (%) |
|---------|----------------|--|------------|----------------------|------------|-----------------------|-------------|----------------------|---------|----------------|---------------------------|------------|----------------------|------------|-----------------------|-------------|----------------------|
| | 593.03 | 3-inch thick, brown LOAM --TOPSOIL-- Hard, brown CLAY LOAM, trace gravel and brick fragments --FILL-- | | | 1 | 6 10 9 | 4.50 P | 13 | | | | | | 11 | 2 2 2 | 0.66 B | 25 |
| | | | 5 | | 2 | 7 7 7 | 4.25 B | 20 | | | | 30 | | 12 | 2 2 2 | 0.49 B | 24 |
| | 587.7 | Very stiff to hard, brown and gray SILTY CLAY, trace gravel --FILL-- | | | 3 | 3 3 4 | 3.25 B | 16 | | | | | | 13 | 1 2 2 | 0.25 B | 26 |
| | | | 10 | | 4 | 6 8 8 | 6.56 B | 20 | | | | 35 | | 14 | 1 1 2 | 0.33 B | 26 |
| | 582.7 | Medium stiff to stiff, gray SILTY CLAY, trace gravel | | | 5 | 2 3 3 | 1.15 B | 19 | | | | | | 15 | 2 2 4 | 1.00 N/6 | 24 |
| | | | 15 | | 6 | 2 2 3 | 0.98 B | 17 | | | | 40 | | 15 | 2 2 2 | 0.25 B | 25 |
| | | | 20 | | 7 | 2 2 4 | 1.00 N/6 | 24 | | | | 45 | | 16 | 2 2 2 | 0.33 B | 27 |
| | 572.7 | Soft to medium stiff, gray CLAY to SILTY CLAY, trace gravel | | | 8 | 2 4 4 | 1.48 B | 18 | | | | | | 9 | 2 3 3 | 0.74 B | 24 |
| | | | 25 | | 10 | 2 3 2 | 0.74 B | 25 | | | | 50 | | 16 | 2 2 2 | 0.33 B | 27 |

GENERAL NOTES

Begin Drilling **10-16-2013** Complete Drilling **10-16-2013**
 Drilling Contractor **Wang Testing Services** Drill Rig **CME-55 TMR**
 Driller **R&J** Logger **A. Tomaras** Checked by **C. Marin**
 Drilling Method **2.25" HSA to 10', mud rotary thereafter, boring backfilled upon completion**

WATER LEVEL DATA

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

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

WANGENGINC 11000401.GPJ WANGENG.GDT 12/9/13



BORING LOG 1714-B-01

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

WEI Job No.: 1100-04-01

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

Datum: NAVD 88
 Elevation: 593.22 ft
 North: 1898191.77 ft
 East: 1171304.89 ft
 Station: 1403+82.49
 Offset: 00.00

| 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 (%) | |
|---------|----------------|--|------------|----------------------|------------|-----------------------|----------------|----------------------|---------|----------------|--|--|----------------------|------------|-----------------------|----------------|----------------------|----|
| | 541.5 | Very stiff to hard, gray SILTY CLAY to SILTY CLAY LOAM, trace gravel | | | | | | | | 516.5 | Gray SANDY LOAM --Wet-- | | | | | | | |
| | | | | 55 | X | 17 | 7 7 12 | 2.95 B | 20 | | 514.3 | Hard, gray SILTY CLAY LOAM, trace gravel | 80 | X | 22 | 33 41 40 | 6.69 S | 11 |
| | | | | 60 | X | 18 | 16 15 16 | 5.17 B | 12 | | | --HARD DRILLING-- --Possible Cobbles-- | 85 | X | 23 | 16 21 25 | 7.30 S | 13 |
| | | | | 65 | ○ | 19 | 18 20 23 | 7.17 N/6 | | | 506.2 | Very dense, gray SILTY LOAM, trace gravel and cobbles | 90 | X | 24 | 50/1 | NP | 12 |
| | | | | 70 | X | 20 | 10 13 19 | 2.54 S | 11 | | | --HARD DRILLING-- --Possible Cobbles-- | 95 | X | 26 | 50/5 | NP | 11 |
| | | | 75 | ○ | 21 | 12 17 23 | 6.67 N/6 | | | 496.2 | Very dense, gray SILT --Saturated-- | 100 | X | 27 | 50/4 | NP | 18 | |

GENERAL NOTES

WATER LEVEL DATA

Begin Drilling **10-16-2013** Complete Drilling **10-16-2013**
 Drilling Contractor **Wang Testing Services** Drill Rig **CME-55 TMR**
 Driller **R&J** Logger **A. Tomaras** Checked by **C. Marin**
 Drilling Method **2.25" HSA to 10', mud rotary thereafter, boring**
backfilled upon completion

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

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

WANGENGINC 11000401.GPJ WANGENG.GDT 12/9/13



BORING LOG 1714-B-01

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

WEI Job No.: 1100-04-01

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

Datum: NAVD 88
 Elevation: 593.22 ft
 North: 1898191.77 ft
 East: 1171304.89 ft
 Station: 1403+82.49
 Offset: 00.00

| 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 (%) |
|---------|----------------|--|------------|----------------------|------------|-----------------------|----------|----------------------|---------|----------------|---------------------------|------------|----------------------|------------|-----------------------|----------|----------------------|
| | | | 105 | | 28 | 30 45 50/3 | NP | 24 | | | | | | | | | |
| | 486.5 | Very dense, gray GRAVELLY LOAM, trace pyrite and dolostone fragments | | | | | | | | | | | | | | | |
| | 484.5 | --WEATHERED BEDROCK-- --ROLLER BIT REFUSAL-- | 110 | | 29 | 50/2 | NP | 12 | | | | | | | | | |
| | 482.2 | Boring terminated at 111.00 ft | | | | | | | | | | | | | | | |
| | | | 115 | | | | | | | | | | | | | | |
| | | | 120 | | | | | | | | | | | | | | |
| | | | 125 | | | | | | | | | | | | | | |

GENERAL NOTES

Begin Drilling **10-16-2013** Complete Drilling **10-16-2013**
 Drilling Contractor **Wang Testing Services** Drill Rig **CME-55 TMR**
 Driller **R&J** Logger **A. Tomaras** Checked by **C. Marin**
 Drilling Method **2.25" HSA to 10', mud rotary thereafter, boring backfilled upon completion**

WATER LEVEL DATA

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

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



BORING LOG 1714-B-02

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

WEI Job No.: 1100-04-01

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

Datum: NAVD 88
 Elevation: 582.53 ft
 North: 1898095.52 ft
 East: 1171244.20 ft
 Station: 1404+96.58
 Offset: 00.00

| 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 (%) |
|---------|----------------|--|------------|----------------------|------------|-----------------------|-------------|----------------------|---------|----------------|---|------------|----------------------|------------|-----------------------|-----------|----------------------|
| | 582.24 | 24-inch thick ASPHALT --PAVEMENT-- | | | | | | | | | | | | | | | |
| | 581.5 | | | | | | | | | | | | | | | | |
| | 581.08 | 08-inch thick CONCRETE --PAVEMENT-- | | | | | | | | | | | | | | | |
| | | 6-inch thick CRUSHED STONE --BASE COURSE-- | | | 1 | 6 5 6 | 3.77 B | 16 | | | | | | 11 | 0 0 2 | 0.08 B | 28 |
| | | Very stiff, brown and gray SILTY CLAY LOAM, trace gravel --FILL-- | 5 | | 2 | 3 4 5 | 2.62 B | 20 | | | | | | 12 | 0 1 2 | 0.08 B | 26 |
| | 577.0 | Medium stiff to stiff, gray SILTY LOAM, trace gravel --L _L (%)=24, P _L (%)=15-- --%Gravel=14.0-- --%Sand=28.0-- --%Silt=45.7-- --%Clay=12.4-- | | | 3 | 2 3 4 | 1.64 B | 18 | | | | | | | | | |
| | | | 10 | | 4 | 3 4 4 | 0.98 B | 19 | | | | | | 13 | 0 0 2 | 0.25 B | 25 |
| | 572.0 | Very soft to medium stiff, gray CLAY to SILTY CLAY, trace to some gravel | | | 5 | 0 2 2 | 0.57 B | 24 | | | | | | | | | |
| | | | | | 6 | 1 1 2 | 0.25 B | 22 | | | | | | 14 | 2 2 3 | 0.33 B | 36 |
| | | | | | 7 | 1 1 2 | < 0.25 P | 23 | | | | | | | | | |
| | | | 20 | | 8 | 1 1 2 | 0.49 B | 25 | | | | | | 15 | 2 4 6 | 0.98 B | 22 |
| | | | | | 9 | 0 0 1 | 0.33 B | 25 | | | | | | | | | |
| | | | | | 10 | 0 0 0 | 0.16 B | 24 | | 535.8 | Very stiff, gray SILTY CLAY, trace gravel | | | 16 | 5 8 12 | 3.94 B | 15 |

GENERAL NOTES

Begin Drilling **10-08-2013** Complete Drilling **10-08-2013**
 Drilling Contractor **Wang Testing Services** Drill Rig **D-50 TMR**
 Driller **R&R** Logger **D. Kolpacki** Checked by **C. Marin**
 Drilling Method **3.25" HSA to 10', mud rotary thereafter, boring**
backfilled upon completion

WATER LEVEL DATA

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

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

WANGENGINC 11000401.GPJ WANGENG.GDT 12/9/13



BORING LOG 1714-B-02

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

WEI Job No.: 1100-04-01

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

Datum: NAVD 88
 Elevation: 582.53 ft
 North: 1898095.52 ft
 East: 1171244.20 ft
 Station: 1404+96.58
 Offset: 00.00

| 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 (%) | |
|---------|----------------|---|------------|----------------------|------------|-----------------------|------------|----------------------|---------|----------------|---------------------------|------------|----------------------|------------|-----------------------|----------|----------------------|------|
| | 530.8 | Very stiff, gray CLAY | | | | | | | | | | | | | | | | |
| | | | 55 | X | 17 | 4 9 14 | 2.95 B | 21 | | | | 80 | X | 22 | 54/6 | | | 9 |
| | | --L _L (%)=35, P _L (%)=17-- --%Gravel=2.9-- --%Sand=11.2--60 --%Silt=47.7-- --%Clay=38.2-- --A-6 (15)-- | | X | 18 | 6 8 12 | 2.46 B | 24 | | | | 85 | X | 23 | 69/6 | | | 14 |
| | 520.8 | Medium dense, gray SILT | | | | | | | | | | | | | | | | |
| | | | 65 | X | 19 | 8 7 6 | NP | 22 | | | | 90 | X | 24 | 31 45 36 | | | 18 |
| | | --%Gravel=1.9-- --%Sand=6.8-- --%Silt=83.8-- --%Clay=7.4--90 --A-4 (0)-- | | | | | | | | | | | | | | | | |
| | 515.8 | Hard, gray SILTY CLAY LOAM, trace gravel | | | | | | | | | | | | | | | | |
| | | --L _L (%)=31, P _L (%)=17-- --%Gravel=3.5-- --%Sand=14.1--70 --%Silt=55.7-- --%Clay=26.7-- --A-6 (10)-- | | X | 20 | 13 21 33 | 10.25 B | 16 | | | | 95 | X | 25 | 50/5 | | | 14 |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | 486.5 | --WEATHERED BEDROCK-- | | | | | | | |
| | | | | | | | | | | 484.5 | | | | | | | | |
| | 508.5 | Very dense, gray SILT to SILTY LOAM, trace gravel | | | | | | | | | | | | | | | | |
| | | | 75 | X | 21 | 11 17 50 | NP | 16 | | | | 100 | | | | | | ROCK |
| | | | | | | | | | | | | | | | | | | |

GENERAL NOTES

Begin Drilling **10-08-2013** Complete Drilling **10-08-2013**
 Drilling Contractor **Wang Testing Services** Drill Rig **D-50 TMR**
 Driller **R&R** Logger **D. Kolpacki** Checked by **C. Marin**
 Drilling Method **3.25" HSA to 10', mud rotary thereafter, boring backfilled upon completion**

WATER LEVEL DATA

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

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

WANGENGINC 11000401.GPJ WANGENG.GDT 12/9/13



BORING LOG 1714-B-02

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

WEI Job No.: 1100-04-01

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

Datum: NAVD 88
 Elevation: 582.53 ft
 North: 1898095.52 ft
 East: 1171244.20 ft
 Station: 1404+96.58
 Offset: 00.00

| 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 (%) |
|---------|----------------|---|------------|----------------------|------------|-----------------------|----------|----------------------|---------|----------------|---------------------------|------------|----------------------|------------|-----------------------|----------|----------------------|
| | 474.5 | with >0.2" or no infilling, vuggy and cherty, with stylolites. --Run 1 - RECOVERY= 93%-- --RQD= 86%-- | 105 | | 1 | | | | | | | | | | | | |
| | | Boring terminated at 108.00 ft | 110 | | | | | | | | | | | | | | |
| | | | 115 | | | | | | | | | | | | | | |
| | | | 120 | | | | | | | | | | | | | | |
| | | | 125 | | | | | | | | | | | | | | |

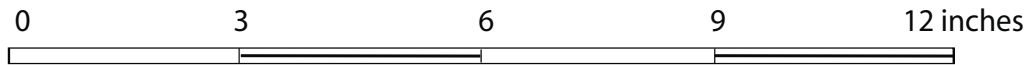
GENERAL NOTES

Begin Drilling **10-08-2013** Complete Drilling **10-08-2013**
 Drilling Contractor **Wang Testing Services** Drill Rig **D-50 TMR**
 Driller **R&R** Logger **D. Kolpacki** Checked by **C. Marin**
 Drilling Method **3.25" HSA to 10', mud rotary thereafter, boring backfilled upon completion**

WATER LEVEL DATA

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

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



Boring 1714-B-02:
Run 1, 98' to 108', RECOVERY = 93%, RQD = 86%

| | | |
|---|-----------|---|
| BEDROCK CORE: CIRCLE INTERCHANGE RECONSTRUCTION STRUCTURE SN 016-1714, CHICAGO, IL | | |
| SCALE : GRAPHIC | 1714-B-02 | DRAWN BY: A. Tomaras CHECKED BY: C. Marin |
|  | | 1145 N. Main Street Lombard, IL 60148 www.wangeng.com |
| FOR AECOM | | 1100-04-01 |



BORING LOG 1705-B-10

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

WEI Job No.: 1100-04-01

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

Datum: NAVD 88
 Elevation: 588.29 ft
 North: 1898131.01 ft
 East: 1171315.43 ft
 Station: 1833+49.76
 Offset: 256 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 (%) |
|---------|----------------|--|------------|----------------------|------------|-----------------------|-----------|----------------------|---------|----------------|--|------------|----------------------|------------|-----------------------|-----------|----------------------|
| | 533.8 | | | | 17 | 8 12 17 | 4.84 B | 14 | | | | | | | | | |
| | | Medium dense, gray, medium SAND | 55 | | | | | | | | | 80 | | 22 | 18 22 25 | 8.94 S | 13 |
| | 531.5 | | | | | | | | | | | | | | | | |
| | | Hard, gray SILTY CLAY, trace gravel and fine sand lenses | | | | | | | | | | | | | | | |
| | | | 60 | | 18 | 6 10 20 | 4.02 B | 19 | | 504.0 | | 85 | | 23 | 37 37 50/5 | 4.35 S | 13 |
| | | | | | | | | | | | | | | | | | |
| | | | 65 | | 18 | 5 12 30 | 4.18 B | 19 | | | --HARD DRILLING (5 min/0.5')-- --Possible Cobbles-- | | | 24 | 50/2 | NP | 11 |
| | 521.5 | | | | | | | | | | | | | | | | |
| | | Stiff, gray, laminated layers of CLAY and SILT | | | | | | | | | --HARD DRILLING-- --Possible Cobbles-- | | | | | | |
| | | | 70 | | 20 | 5 4 6 | 1.31 B | 27 | | | | 95 | | 25 | 50/6 | NP | 11 |
| | 516.5 | | | | | | | | | | | | | | | | |
| | | Hard, gray SILTY CLAY LOAM to SILTY LOAM, trace gravel | | | | | | | | 492.0 | | | | | | | |
| | | | 75 | | 21 | 10 14 31 | 9.51 S | 12 | | | Very dense, gray SILT | | | 26 | 20 26 40 | NP | 17 |

GENERAL NOTES

WATER LEVEL DATA

Begin Drilling **07-30-2013** Complete Drilling **08-01-2013**
 Drilling Contractor **Wang Testing Services** Drill Rig **CME-55 TMR**
 Driller **R&J** Logger **A. Tomaras** Checked by **C. Marin**
 Drilling Method **2.25" SSA to 10', mud rotary thereafter, boring**
backfilled upon completion

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

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

WANGENGINC 11000401.GPJ WANGENG.GDT 12/9/13



BORING LOG 1705-B-10

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 Telephone: 630 953-9928
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WEI Job No.: 1100-04-01

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

Datum: NAVD 88
 Elevation: 588.29 ft
 North: 1898131.01 ft
 East: 1171315.43 ft
 Station: 1833+49.76
 Offset: 256 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 (%) |
|---------|----------------|--|------------|----------------------|------------|-----------------------|----------|----------------------|---------|----------------|---------------------------|------------|----------------------|------------|-----------------------|----------|----------------------|
| | 486.5 | Very dense, gray GRAVELLY SAND, trace cobbles --HARD DRILLING-- --Possible Cobbles-- | 105 | | 27 | 50/2 | NR | | | | | | | | | | |
| | 481.3 | Strong, poor to fair rock quality, light gray, fresh, vertical and horizontal joints, joint breaks with little to no infill, horizontal stylolites, slightly vuggy DOLOSTONE --Run 1 - RECOVERY= 97.5%-- --RQD(top 5ft)=73%-- --RQD(10ft)=50%-- | 110 | | 1 | | NP | | | | | | | | | | |
| | 471.3 | Boring terminated at 117.00 ft | 120 | | | | | | | | | | | | | | |

GENERAL NOTES

Begin Drilling **07-30-2013** Complete Drilling **08-01-2013**
 Drilling Contractor **Wang Testing Services** Drill Rig **CME-55 TMR**
 Driller **R&J** Logger **A. Tomaras** Checked by **C. Marin**
 Drilling Method **2.25" SSA to 10', mud rotary thereafter, boring backfilled upon completion**

WATER LEVEL DATA

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

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



BORING LOG 1714-B-03

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WEI Job No.: 1100-04-01

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

Datum: NAVD 88
 Elevation: 585.63 ft
 North: 1897874.84 ft
 East: 1171337.66 ft
 Station: 1407+67.90
 Offset: 33.82 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 (%) |
|---------|----------------|--|------------|----------------------|------------|-----------------------|-----------|----------------------|---------|----------------|--|------------|----------------------|------------|-----------------------|-----------|----------------------|
| | 585.42 | 2-inch thick, dark brown SILTY LOAM | | | | | | | | | | | | | | | |
| | 584.3 | --TOPSOIL-- Brown GRAVELLY SAND | | | 1 | 4 4 6 | 1.97 B | 22 | | | | | | 11 | 1 1 2 | 0.57 B | 26 |
| | | --FILL-- Stiff, gray SILTY CLAY LOAM, trace gravel | | | 2 | 2 2 3 | 1.15 B | 17 | | | | 30 | | 12 | 1 1 2 | 0.33 B | 26 |
| | 580.1 | Very soft to medium stiff, gray CLAY to SILTY CLAY, trace gravel | | | 3 | 1 2 2 | 0.41 B | 25 | | | | | | 13 | 2 4 6 | 0.57 B | 27 |
| | | | | | 4 | 1 1 1 | 0.16 B | 26 | | | | | | 14 | 1 2 3 | 0.66 B | 27 |
| | | | | | 5 | 1 1 1 | 0.08 B | 28 | | | | | | 15 | 3 8 17 | 3.61 B | 15 |
| | | | | | 6 | 1 1 2 | 0.16 B | 25 | | | | | | 16 | 7 16 32 | 3.44 B | 17 |
| | | | | | 7 | 1 1 1 | 0.16 B | 24 | | 543.9 | Very stiff, gray SILTY CLAY LOAM, trace gravel | | | | | | |
| | | | | | 8 | 0 1 1 | 0.16 B | 28 | | | | | | | | | |
| | | | | | 9 | 1 1 3 | 0.33 B | 26 | | | | | | | | | |
| | | | | | 10 | 1 1 2 | 0.49 B | 25 | | | | | | | | | |

GENERAL NOTES

Begin Drilling **10-17-2013** Complete Drilling **10-18-2013**
 Drilling Contractor **Wang Testing Services** Drill Rig **D-25 ATV**
 Driller **P&N** Logger **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 ∇ **DRY**
 At Completion of Drilling ∇ **MUD (2')**
 Time After Drilling **24 hours**
 Depth to Water ∇ **2.00 ft**

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

WANGENGINC 11000401.GPJ WANGENG.GDT 12/9/13



BORING LOG 1714-B-03

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WEI Job No.: 1100-04-01

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

Datum: NAVD 88
 Elevation: 585.63 ft
 North: 1897874.84 ft
 East: 1171337.66 ft
 Station: 1407+67.90
 Offset: 33.82 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 (%) |
|---------|----------------|---|------------|----------------------|------------|-----------------------|-----------|----------------------|---------|----------------|---|------------|----------------------|------------|-----------------------|-----------|----------------------|
| | 533.9 | Very dense, gray SILTY LOAM, trace gravel | 55 | X | 17 | 16 50/2 | NP | 15 | | 508.9 | Gray, fine SAND --Wet-- | 80 | X | 22 | 10 15 22 | 5.33 B | 23 |
| | 523.9 | Medium stiff to stiff, gray CLAY | 60 | X | 18 | 21 31 36 | NP | 10 | | 503.9 | Hard, gray SILTY CLAY LOAM, trace gravel | 85 | X | 23 | 50/4 | NP | 13 |
| | 513.9 | Hard, gray SILTY CLAY, trace gravel | 65 | X | 19 | 3 9 33 | 1.15 B | 24 | | 498.6 | Very dense, gray SILTY LOAM, trace gravel and dolostone fragments | 90 | | 24 | 50/1 | | |
| | 510.9 | | 70 | X | 20 | 3 4 5 | 0.57 B | 37 | | 496.6 | --HARD DRILLING-- --WEATHERED BEDROCK-- | 95 | | | | | |
| | | | 75 | X | 21 | 9 14 23 | 4.43 B | 15 | | | Boring terminated at 30.00 ft | 100 | | | | | |

GENERAL NOTES

Begin Drilling **10-17-2013** Complete Drilling **10-18-2013**
 Drilling Contractor **Wang Testing Services** Drill Rig **D-25 ATV**
 Driller **P&N** Logger **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 ∇ **DRY**
 At Completion of Drilling \blacktriangledown **MUD (2')**
 Time After Drilling **24 hours**
 Depth to Water ∇ **2.00 ft**

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

WANGENGINC 11000401.GPJ WANGENG.GDT 12/9/13



BORING LOG 1714-B-04

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

WEI Job No.: 1100-04-01

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

Datum: NAVD 88
 Elevation: 575.37 ft
 North: 1897818.98 ft
 East: 1171530.45 ft
 Station: 5238+29.69
 Offset: 63.7269 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 (%) |
|---------|----------------|--|------------|----------------------|------------|-----------------------|-----------|----------------------|---------|----------------|--|------------|----------------------|------------|-----------------------|-------------|----------------------|
| | 575.2 | 22-inch thick ASPHALT --PAVEMENT-- | | | | | | | | | | | | | | | |
| | 574.2 | 12-inch thick CONCRETE --PAVEMENT-- | | | | | | | | | | | | | | | |
| | 573.4 | 10-inch thick CRUSHED STONE --BASE COURSE-- | | | 1 | 13 19 9 | NP | 5 | | | | | | 11 | 1 1 2 | 0.33 B | 26 |
| | 572.4 | Brown SILTY LOAM --FILL-- | | | 2 | 7 6 5 | NP | 13 | | | | | | 12 | 1 2 2 | 0.49 B | 28 |
| | 569.9 | Medium dense, gray SANDY LOAM --FILL-- | | | 3 | 1 2 2 | 0.57 B | 21 | | 543.6 | Stiff, gray SILTY CLAY, trace gravel | | | | | | |
| | | Very soft to soft, gray CLAY to SILTY CLAY, trace gravel | | | 4 | 1 2 2 | 0.57 B | 21 | | | | | | 13 | 3 6 8 | 1.00 B | 15 |
| | | | | | 5 | 0 1 2 | 0.41 B | 25 | | | | | | | | | |
| | | | | | 6 | 0 1 1 | 0.16 B | 27 | | | | | | 14 | 6 5 13 | 1.50 P | 23 |
| | | | | | 7 | 0 1 1 | 0.25 B | 27 | | 533.6 | Hard, gray SILTY CLAY LOAM, trace gravel | | | | | | |
| | | | | | 8 | 1 1 1 | 0.25 B | 27 | | | | | | 15 | 7 10 24 | 7.46 B | 17 |
| | | | | | 9 | 0 1 2 | 0.25 B | 26 | | | | | | | | | |
| | | | | | 10 | 1 1 1 | 0.25 B | 26 | | | | | | 16 | 9 11 18 | 4.67 N/6 | 27 |

GENERAL NOTES

Begin Drilling **10-27-2013** Complete Drilling **10-27-2013**
 Drilling Contractor **Wang Testing Services** Drill Rig **CME-55 TMR**
 Driller **R&J** Logger **A. Tomaras** Checked by **DRAFT**
 Drilling Method **2.25" SSA to 10', mud rotary thereafter, boring backfilled upon completion**

WATER LEVEL DATA

While Drilling ∇ **52.00 ft**
 At Completion of Drilling ∇ **NA**
 Time After Drilling **NA**
 Depth to Water ∇ **NA**

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

WANGENGINC 11000401.GPJ WANGENG.GDT 12/16/13



BORING LOG 1714-B-04

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 Telephone: 630 953-9928
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WEI Job No.: 1100-04-01

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

Datum: NAVD 88
 Elevation: 575.37 ft
 North: 1897818.98 ft
 East: 1171530.45 ft
 Station: 5238+29.69
 Offset: 63.7269 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 (%) | |
|---------|----------------|--|------------|----------------------|------------|-----------------------|-----------|----------------------|---------|----------------|--|------------|----------------------|------------|-----------------------|----------|----------------------|--|
| | 523.6 | Medium dense, gray SILTY LOAM --Saturated-- | 55 | X | 17 | 6 5 5 | NP | 22 | | 498.6 | Medium dense to dense, gray SILT --Saturated-- | 80 | X | 22 | 29 50/5 | NP | 19 | |
| | 518.6 | Dense, gray GRAVELLY SAND --Saturated-- | 60 | X | 18 | 18 40 8 | NP | 14 | | 85 | | 85 | X | 23 | 15 8 15 | NP | 23 | |
| | 513.6 | Hard. gray SILTY CLAY LOAM, trace gravel | 65 | X | 19 | 12 16 33 | 5.66 S | 15 | | 90 | Very dense, gray GRAVELLY SILTY LOAM | 90 | X | 24 | 50/5 | NP | 14 | |
| | 508.6 | Very dense, gray SILTY LOAM, trace gravel | 70 | X | 20 | 22 27 33 | 4.43 S | 11 | | 95 | Strong, light gray, fair rock quality, bedded DOLOSTONE, beds (2" to 12"), joint spacing 2" to 12", joints with >0.2" or no infilling, vuggy, with stylolites. --Run 1 - RECOVERY= 100%-- --RQD= 63%-- | 95 | | | | | | |
| | | | 75 | X | 21 | 15 27 35 | NP | 10 | | 100 | | 100 | | | | | | |

GENERAL NOTES

WATER LEVEL DATA

Begin Drilling **10-27-2013** Complete Drilling **10-27-2013**
 Drilling Contractor **Wang Testing Services** Drill Rig **CME-55 TMR**
 Driller **R&J** Logger **A. Tomaras** Checked by **DRAFT**
 Drilling Method **2.25" SSA to 10', mud rotary thereafter, boring backfilled upon completion**

While Drilling ∇ **52.00 ft**
 At Completion of Drilling ∇ **NA**
 Time After Drilling **NA**
 Depth to Water ∇ **NA**

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

WANGENGINC 11000401.GPJ WANGENG.GDT 12/16/13



BORING LOG 1714-B-04

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

WEI Job No.: 1100-04-01

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

Datum: NAVD 88
 Elevation: 575.37 ft
 North: 1897818.98 ft
 East: 1171530.45 ft
 Station: 5238+29.69
 Offset: 63.7269 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 (%) |
|---------|----------------|--------------------------------|------------|----------------------|------------|-----------------------|----------|----------------------|---------|----------------|---------------------------|------------|----------------------|------------|-----------------------|----------|----------------------|
| 1 | 474.9 | Boring terminated at 100.50 ft | 105 | | | | | | | | | 110 | | | | | |
| | | | 115 | | | | | | | | | 120 | | | | | |
| | | | 125 | | | | | | | | | | | | | | |

GENERAL NOTES

Begin Drilling **10-27-2013** Complete Drilling **10-27-2013**
 Drilling Contractor **Wang Testing Services** Drill Rig **CME-55 TMR**
 Driller **R&J** Logger **A. Tomaras** Checked by **DRAFT**
 Drilling Method **2.25" SSA to 10', mud rotary thereafter, boring backfilled upon completion**

WATER LEVEL DATA

While Drilling ∇ **52.00 ft**
 At Completion of Drilling \blacktriangledown **NA**
 Time After Drilling **NA**
 Depth to Water ∇ **NA**

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



0 3 6 9 12 inches

Boring 1714-B-04:
Run 1, 90.5' to 100.5', RECOVERY = 100%, RQD = 63%

| | | |
|---|-----------|---|
| BEDROCK CORE: CIRCLE INTERCHANGE RECONSTRUCTION STRUCTURE SN 016-1714, CHICAGO, IL | | |
| SCALE : GRAPHIC | 1714-B-04 | DRAWN BY: A.Tomaras CHECKED BY: C.Marin |
|  Wang Engineering | | 1145 N. Main Street Lombard, IL 60148 www.wangeng.com |
| FOR AECOM | | 1100-04-01 |



BORING LOG 1714-B-05

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

WEI Job No.: 1100-04-01

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

Datum: NAVD 88
 Elevation: 588.93 ft
 North: 1897789.86 ft
 East: 1171431.16 ft
 Station: 1408+97.61
 Offset: 6.5640 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 (%) | |
|---------|----------------|--|------------|----------------------|------------|-----------------------|-----------|----------------------|---------|----------------|--|------------|----------------------|------------|-----------------------|-------------|----------------------|--|
| | | 15-inch thick, black SILTY LOAM --TOPSOIL-- | | | | | | | | | | | | | | | | |
| | 587.7 | Hard, brown and gray SILTY CLAY LOAM, trace gravel and brick fragments | | | 1 | 8 20 20 | 4.50 P | 15 | | 560.9 | Very stiff (2.0P), gray SILTY CLAY LOAM, little gravel | | | 11 | 1 2 3 | 0.25 B | 28 | |
| | | --FILL-- | 5 | | 2 | 4 6 8 | 4.10 B | 26 | | 559.9 | Loose, gray LOAM, some gravel | 30 | | 12 | 4 5 3 | NP | 12 | |
| | 582.7 | Stiff, gray SILTY CLAY, trace gravel | | | 3 | 3 3 4 | 1.07 B | 22 | | 557.2 | Soft medium stiff, gray CLAY to SILTY CLAY, trace gravel | | | | | | | |
| | 580.9 | Very soft to medium stiff, gray CLAY to SILTY CLAY, trace gravel | 10 | | 4 | 2 2 4 | 0.57 B | 23 | | | | 35 | | 13 | 2 2 4 | 0.25 P | 27 | |
| | | | | | 5 | 1 2 2 | 0.33 B | 25 | | | | | | | | | | |
| | | | 15 | | 6 | 1 2 2 | 0.16 B | 26 | | | | 40 | | 14 | 2 2 3 | 0.83 N/6 | 28 | |
| | | | | | 7 | 2 2 3 | 0.41 B | 21 | | 547.2 | Very stiff to hard, gray SILTY CLAY LOAM, trace to little gravel | | | | | | | |
| | | | 20 | | 8 | 1 2 2 | 0.25 B | 27 | | | | 45 | | 15 | 6 7 7 | 3.03 B | 16 | |
| | | | | | 9 | 1 1 2 | 0.16 B | 27 | | | | | | | | | | |
| | | | 25 | | 10 | 1 1 2 | 0.25 P | 24 | | | | 50 | | 16 | 4 6 8 | 2.30 B | 23 | |

GENERAL NOTES

Begin Drilling **04-18-2014** Complete Drilling **04-21-2014**
 Drilling Contractor **Wang Testing Services** Drill Rig **D-25 ATV**
 Driller **N&J** 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 ∇ **MUD**
 At Completion of Drilling ∇ **NA**
 Time After Drilling **NA**
 Depth to Water ∇ **NA**
 The stratification lines represent the approximate boundary between soil types; the actual transition may be gradual.

WANGENGINC 11000401.GPJ WANGENG.GDT 5/28/14



BORING LOG 1714-B-05

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 Telephone: 630 953-9928
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WEI Job No.: 1100-04-01

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

Datum: NAVD 88
 Elevation: 588.93 ft
 North: 1897789.86 ft
 East: 1171431.16 ft
 Station: 1408+97.61
 Offset: 6.5640 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 (%) |
|---------|----------------|--|------------|----------------------|------------|-----------------------|-----------|----------------------|---------|----------------|---|------------|----------------------|------------|-----------------------|-----------|----------------------|
| | | | 55 | | 17 | 6 10 15 | 4.10 B | 15 | | | | 80 | | 22 | 16 23 31 | 6.07 B | 13 |
| | | | 60 | | 18 | 9 16 23 | 5.33 B | 20 | | 504.9 | Very dense, gray SILTY LOAM, trace gravel and cobbles | 85 | | 23 | 21 35 50.1 | 4.50 P | 13 |
| | 527.2 | Medium stiff, gray CLAY | | | | | | | | | --HARD DRILLING-- --Possible Cobbles-- | | | | | | |
| | | | 65 | | 19 | 4 4 4 | 0.90 B | 29 | | | | 90 | | | | | |
| | 522.2 | Medium dense, gray SILT | | | | | | | | | | | | | | | |
| | | | 70 | | 20 | 9 9 10 | NP | 20 | | | --HARD DRILLING-- --Possible Cobbles-- | | | 1 | | | |
| | 519.9 | Medium dense, gray SANDY LOAM, trace gravel | | | | | | | | | | 95 | | | | | |
| | | | 75 | | 21 | 12 28 29 | 8.69 B | 15 | | 492.9 | --VERY HARD DRILLING-- --WEATHERED BEDROCK-- | | | | | | |
| | 517.2 | Hard, gray SILTY CLAY LOAM to SILTY LOAM, trace gravel | | | | | | | | 490.9 | Strong, light gray, fair rock quality, bedded DOLOSTONE, beds up to 12 inch, vuggy, 6 inch joint spacing, joints with less than 100 | | | | | | |

GENERAL NOTES

WATER LEVEL DATA

Begin Drilling **04-18-2014** Complete Drilling **04-21-2014**
 Drilling Contractor **Wang Testing Services** Drill Rig **D-25 ATV**
 Driller **N&J** Logger **A. Happel** Checked by **C. Marin**
 Drilling Method **2.25" HSA to 10', mud rotary thereafter, boring backfilled upon completion**

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

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

WANGENGINC 11000401.GPJ WANGENG.GDT 5/28/14



BORING LOG 1714-B-05

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

WEI Job No.: 1100-04-01

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

Datum: NAVD 88
 Elevation: 588.93 ft
 North: 1897789.86 ft
 East: 1171431.16 ft
 Station: 1408+97.61
 Offset: 6.5640 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 (%) |
|---------|----------------|---|------------|----------------------|------------|-----------------------|----------|----------------------|---------|----------------|---------------------------|------------|----------------------|------------|-----------------------|----------|----------------------|
| | 483.9 | 0.2 inch or no infilling, and stylolitic surfaces. --Run 1 - RECOVERY= 90%-- --RQD= 62%-- | 105 | | 2 | | | | | | | | | | | | |
| | | Boring terminated at 105.00 ft | | | | | | | | | | | | | | | |

GENERAL NOTES

WATER LEVEL DATA


Begin Drilling **04-18-2014** Complete Drilling **04-21-2014**
 Drilling Contractor **Wang Testing Services** Drill Rig **D-25 ATV**
 Driller **N&J** Logger **A. Happel** Checked by **C. Marin**
 Drilling Method **2.25" HSA to 10', mud rotary thereafter, boring backfilled upon completion**

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

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



Boring 1714-B-05:
 Run 1, 88' to 98', RECOVERY = 4%, RQD = 0%
 Run 2, 98' to 105', RECOVERY = 90%, RQD = 62%

| | | |
|---|-----------|---|
| BEDROCK CORE: CIRCLE INTERCHANGE RECONSTRUCTION STRUCTURE SN 016-1714, CHICAGO, IL | | |
| SCALE : GRAPHIC | 1714-B-05 | DRAWN BY: A. Tomaras CHECKED BY: C. Marin |
|  | | 1145 N. Main Street Lombard, IL 60148 www.wangeng.com |
| FOR AECOM | | 1100-04-01 |



BORING LOG 1705-B-07

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

WEI Job No.: 1100-04-01

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

Datum: NAVD 88
 Elevation: 576.23 ft
 North: 1897855.27 ft
 East: 1171688.90 ft
 Station: 1828+55.18
 Offset: 28.83 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 (%) |
|---------|----------------|---|------------|----------------------|------------|-----------------------|-----------|----------------------|---------|----------------|---|------------|----------------------|------------|-----------------------|-----------|----------------------|
| | 575.3 | 11-inch thick, ASPHALT --PAVEMENT-- | | | | | | | | | | | | | | | |
| | | 25-inch thick SANDY GRAVEL --BASE COURSE-- | | | 1 | 18 22 15 | NP | 4 | | | | | | 11 | 0 0 3 | NA | |
| | 573.2 | Stiff, gray SILTY CLAY, trace gravel | | | 2 | 2 3 4 | 1.48 B | 22 | | | | | | 12 | 0 0 0 | 0.49 B | 26 |
| | 570.7 | Soft to medium stiff, gray CLAY to SILTY CLAY, trace gravel | | | 3 | 1 2 3 | 0.66 B | 19 | | 544.5 | --L _L (%)=38, P _L (%)=17-- --%Gravel=2.0-- --%Sand=13.4--30 --%Silt=51.3-- --%Clay=33.2-- --A-6 (17)-- | | | | | | |
| | | | | | 4 | 0 1 2 | 0.49 B | 26 | | | Stiff to hard, gray SILTY CLAY LOAM, trace gravel | | | 13 | 2 3 6 | 1.75 P | 16 |
| | | | | | 5 | 0 0 0 | 0.33 B | 26 | | | | | | | | | |
| | | | | | 6 | 0 0 0 | NA | | | | | | | 14 | 4 6 11 | 3.12 B | 18 |
| | | | | | 7 | 0 0 0 | 0.25 B | 27 | | | | | | | | | |
| | | | | | 8 | 0 0 0 | 0.25 B | 28 | | | | | | 15 | 5 8 13 | 4.92 B | 15 |
| | | | | | 9 | 0 0 0 | 0.33 B | 26 | | | | | | | | | |
| | | | | | 10 | 2 2 2 | 0.33 B | 27 | | | | | | 16 | 6 13 17 | 6.07 B | 18 |

GENERAL NOTES

Begin Drilling **07-24-2013** Complete Drilling **07-25-2013**
 Drilling Contractor **Wang Testing Services** Drill Rig **D-50 TMR**
 Driller **R&N** Logger **F. Bozga** Checked by **C. Marin**
 Drilling Method **2.25" SSA to 10', mud rotary thereafter, boring**
backfilled upon completion

WATER LEVEL DATA

While Drilling **NA**
 At Completion of Drilling **MUD (11')**
 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 12/9/13



BORING LOG 1705-B-07

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

WEI Job No.: 1100-04-01

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

Datum: NAVD 88
 Elevation: 576.23 ft
 North: 1897855.27 ft
 East: 1171688.90 ft
 Station: 1828+55.18
 Offset: 28.83 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 (%) |
|---------|----------------|--|------------|----------------------|------------|-----------------------|-----------|----------------------|---------|----------------|--|------------|----------------------|------------|-----------------------|----------|----------------------|
| | 524.5 | Medium dense, gray SILT | | | | | | | | 499.5 | Dense, gray SILT | | | | | | |
| | | | 55 | X | 17 | 4 7 9 | NP | 23 | | | | 80 | X | 22 | 11 18 25 | NP | 20 |
| | 519.5 | Hard, gray SILTY CLAY LOAM, trace gravel | | | | | | | | | --%Gravel=0.4-- --%Sand=3.9-- --%Silt=88.1--85 --%Clay=7.7-- --A-4 (0)-- | | | | | | |
| | | | 60 | X | 18 | 13 15 20 | 4.84 B | 14 | | | | 90 | X | 23 | 14 19 24 | NP | 23 |
| | | | 65 | X | 19 | 8 16 24 | 7.05 B | 14 | | 489.5 | Very dense, gray SILTY LOAM, little gravel | | | | | | |
| | | | 70 | X | 20 | 24 36 42 | 4.50 P | 15 | | 482.5 | ROCK FRAGMENTS --HARD DRILLING-- --AUGER REFUSAL-- | | | | | | |
| | | | 75 | X | 21 | 12 16 50/3 | 5.33 B | 16 | | 481.2 | Boring terminated at 95.00 ft | | | | 95 | NP | 15 |

GENERAL NOTES

WATER LEVEL DATA

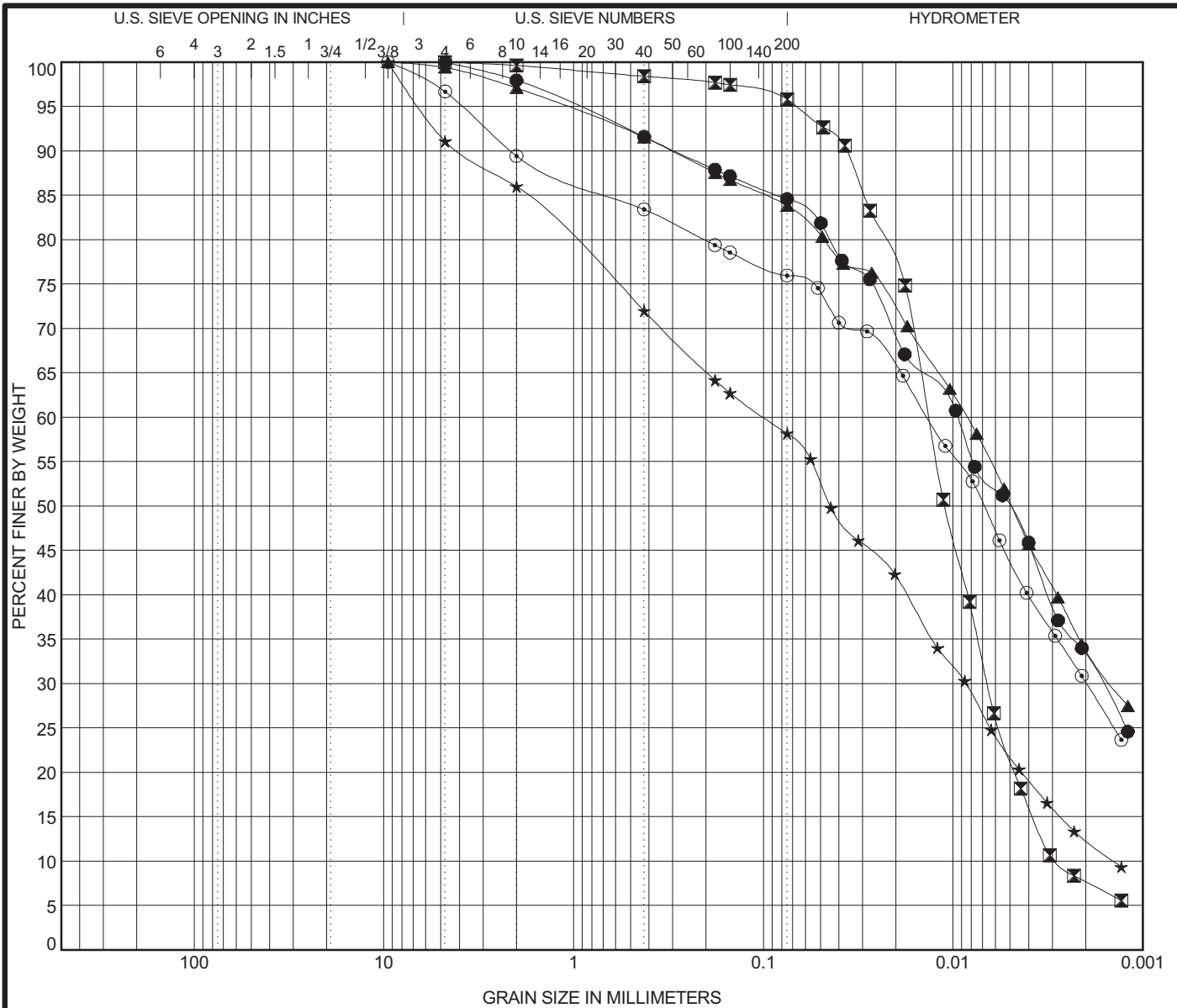
Begin Drilling **07-24-2013** Complete Drilling **07-25-2013**
 Drilling Contractor **Wang Testing Services** Drill Rig **D-50 TMR**
 Driller **R&N** Logger **F. Bozga** Checked by **C. Marin**
 Drilling Method **2.25" SSA to 10', mud rotary thereafter, boring backfilled upon completion**

While Drilling **NA**
 At Completion of Drilling **MUD (11')**
 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 12/9/13

APPENDIX B



| | | | | |
|---------|--------|--------|------|---------------|
| COBBLES | GRAVEL | SAND | | SILT AND CLAY |
| | | coarse | fine | |

| Specimen Identification | | | IDH Classification | | | | | LL | PL | PI | Cc | Cu |
|-------------------------|--------------|---------|--------------------|-------|-------|-------|---------|-------|-------|-------|------|-------|
| ● | 1705-B-07#12 | 28.5 ft | Silty Clay | | | | | 38 | 17 | 21 | | |
| ☒ | 1705-B-07#23 | 83.5 ft | Silt | | | | | NP | NP | NP | 1.14 | 4.74 |
| ▲ | 1705-B-10#11 | 26.0 ft | Silty Clay | | | | | 35 | 17 | 18 | | |
| ★ | 1714-B-02#3 | 6.0 ft | Silty Loam | | | | | 24 | 15 | 9 | 0.52 | 69.46 |
| ⊙ | 1714-B-02#6 | 13.5 ft | Silty Clay | | | | | 33 | 18 | 15 | | |
| Specimen Identification | | | D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay | | |
| ● | 1705-B-07#12 | 28.5 ft | 4.75 | 0.009 | 0.002 | | 2.0 | 13.4 | 51.3 | 33.2 | | |
| ☒ | 1705-B-07#23 | 83.5 ft | 4.75 | 0.013 | 0.007 | 0.003 | 0.4 | 3.9 | 88.1 | 7.7 | | |
| ▲ | 1705-B-10#11 | 26.0 ft | 9.5 | 0.008 | 0.001 | | 2.9 | 13.3 | 49.9 | 33.9 | | |
| ★ | 1714-B-02#3 | 6.0 ft | 9.5 | 0.099 | 0.009 | 0.001 | 14.0 | 28.0 | 45.7 | 12.4 | | |
| ⊙ | 1714-B-02#6 | 13.5 ft | 9.5 | 0.014 | 0.002 | | 10.6 | 13.5 | 45.8 | 30.1 | | |

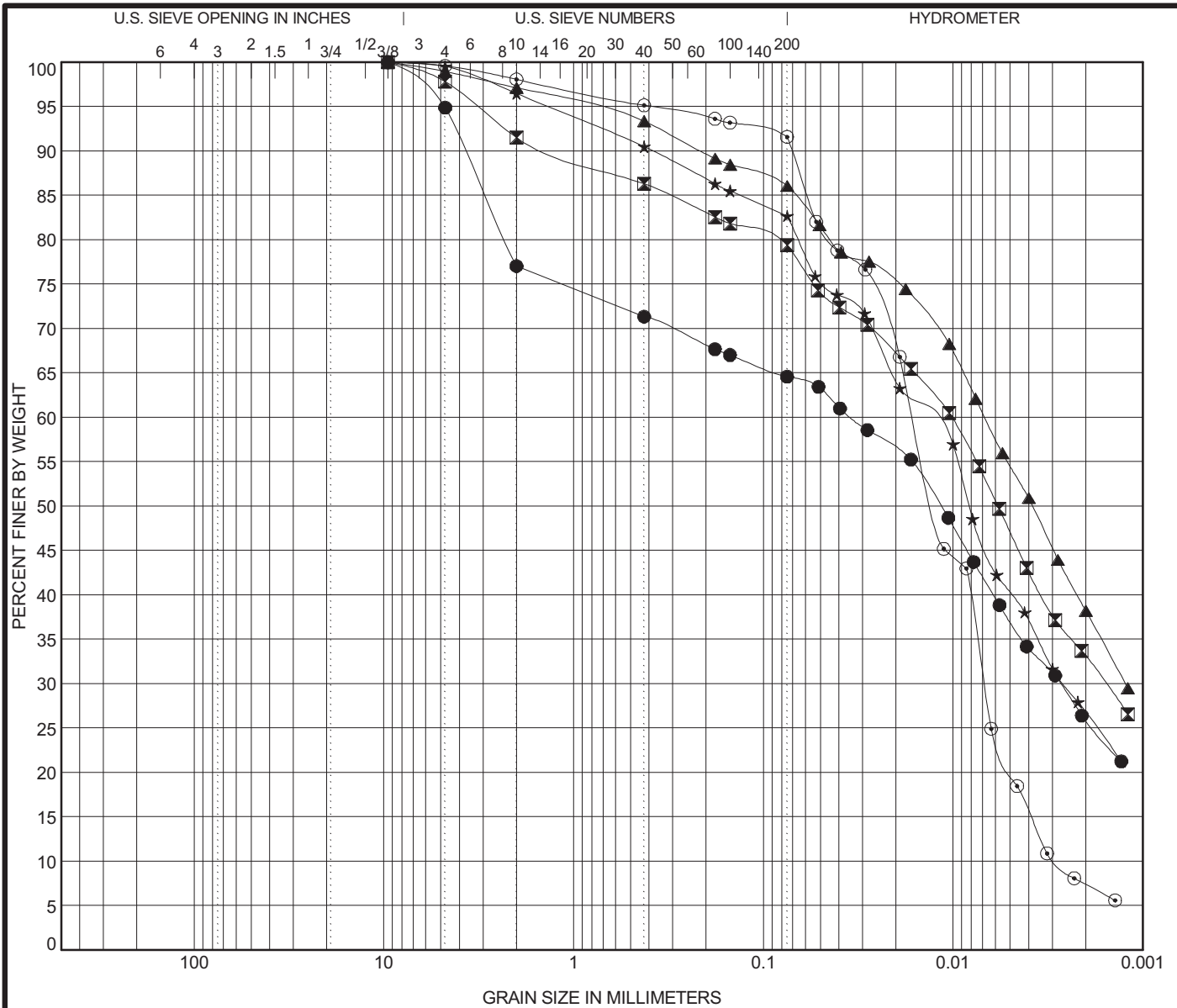
WEI GRAIN SIZE IDH 11000401.GPJ US_LAB.GDT 12/9/13



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

GRAIN SIZE DISTRIBUTION

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



| | | | | |
|---------|--------|--------|------|---------------|
| COBBLES | GRAVEL | SAND | | SILT AND CLAY |
| | | coarse | fine | |

| Specimen Identification | | | IDH Classification | | | | | LL | PL | PI | Cc | Cu |
|-------------------------|--------------|---------|----------------------------|-------|-------|-------|---------|-------|-------|-------|------|------|
| ● | 1714-B-02#12 | 28.5 ft | Gravelly Silty Clay | | | | | 33 | 17 | 16 | | |
| ☒ | 1714-B-02#15 | 43.5 ft | Silty Clay | | | | | 33 | 17 | 16 | | |
| ▲ | 1714-B-02#18 | 58.5 ft | Clay | | | | | 35 | 17 | 18 | | |
| ★ | 1714-B-02#20 | 68.5 ft | Silty Clay Loam | | | | | 31 | 17 | 14 | | |
| ◎ | 1714-B-02#24 | 88.5 ft | Silt | | | | | NP | NP | NP | 1.01 | 5.59 |
| Specimen Identification | | | D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay | | |
| ● | 1714-B-02#12 | 28.5 ft | 9.5 | 0.034 | 0.003 | | 23.0 | 12.5 | 38.7 | 25.9 | | |
| ☒ | 1714-B-02#15 | 43.5 ft | 9.5 | 0.01 | 0.002 | | 8.5 | 12.3 | 46.1 | 33.1 | | |
| ▲ | 1714-B-02#18 | 58.5 ft | 9.5 | 0.007 | 0.001 | | 2.9 | 11.2 | 47.7 | 38.2 | | |
| ★ | 1714-B-02#20 | 68.5 ft | 9.5 | 0.014 | 0.003 | | 3.5 | 14.1 | 55.7 | 26.7 | | |
| ◎ | 1714-B-02#24 | 88.5 ft | 9.5 | 0.016 | 0.007 | 0.003 | 1.9 | 6.8 | 83.8 | 7.4 | | |

WEI GRAIN SIZE IDH 11000401.GPJ US LAB.GDT 12/9/13



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

GRAIN SIZE DISTRIBUTION

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



Unconfined Compressive Strength of Intact Rock Core Specimens

Project: Circle Interchange

Client: AECOM

WEI Job No.: 1100-04-01

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

| Field Sample ID | Lab Specimen ID | Depth (ft) | Location | Sample Description | Length (in) | | Diameter (in) | Total Load (lbs) | Total Pressure (psi) | Fracture Type* | Break Date | Tested By | Area (in ²) |
|--------------------|-----------------|------------|----------|--------------------|----------------|---------------|---------------|------------------|----------------------|----------------|------------|-----------|-------------------------|
| | | | | | Before Capping | After Capping | | | | | | | |
| 1714-B-02 RUN 1 | 9766 | 100.5 | | Dolomite | 3.83 | 4.03 | 2.05 | 31300 | 9480 | 3 | 6/12/14 | AM | 3.30 |
| 1714-B-04 RUN 1 | 9764 | 94.0 | | Dolomite | 3.79 | 3.99 | 2.03 | 37780 | 11660 | 3 | 6/12/14 | AM | 3.24 |
| 1714-B-05 RUN 2 | 9765 | 100.5 | | Dolomite | 3.79 | 3.96 | 2.03 | 32790 | 10120 | 3 | 6/12/14 | AM | 3.24 |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

*** Fracture Types:**

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

Prepared by: Jerry

Checked by: Alf

APPENDIX C

Bench Mark: Cut "X" on C of East Pier at C of Van Buren. Elev. 582.68.

Existing Structure: SN 016-2452. Constructed in 1960 under F.A.I. Route 1, Section 2424.28-B. Fourteen span bridge that measures 787'-4" from back of north abutment to centerline of east pier. Out-to-out width of 29'-0". The spans are supported by 36" wide flange beams, concrete T-beams and a reinforced concrete slab. Substructure is reinforced concrete closed abutment, multi-column and solid wall piers founded on bell caissons. The existing bridge is to be removed and replaced.

The existing bridge will be closed to traffic and detoured during construction.

No Salvage.

SEISMIC DATA

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

DESIGN SPECIFICATIONS

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

DESIGN STRESSES

FIELD UNITS

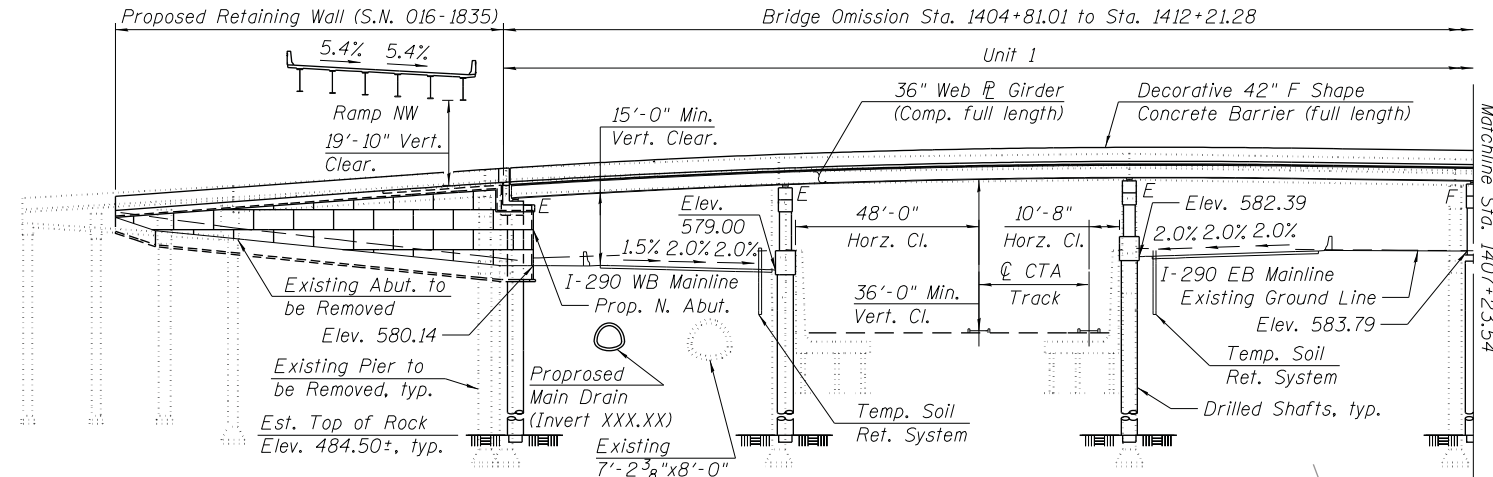
f'c = 3,500 psi
 fy = 60,000 psi (Reinforcement)
 fy = 50,000 psi (M270 Grade 50)

LOADING HL-93

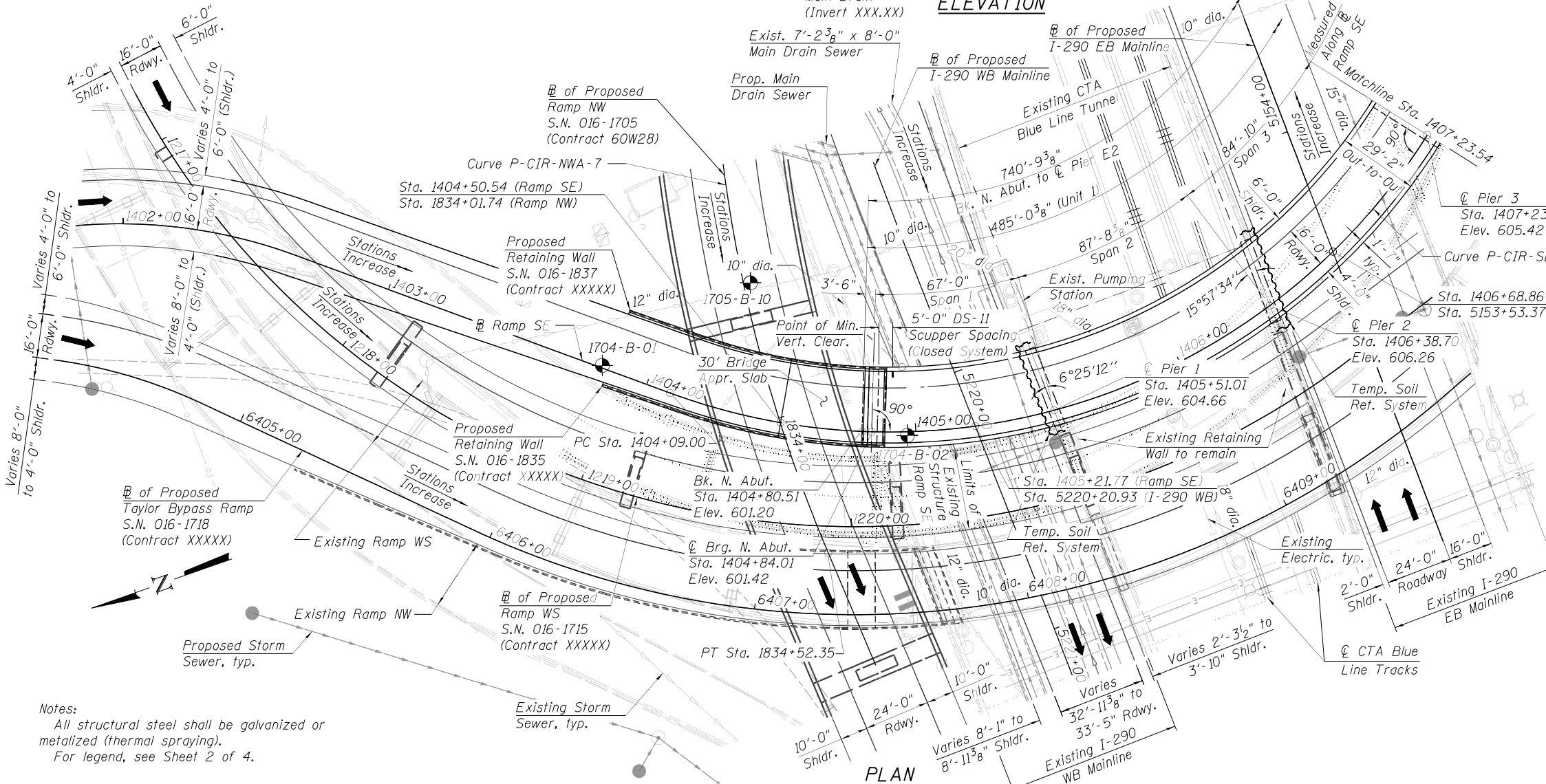
Allow 50#/sq. ft. for future wearing surface.

HIGHWAY CLASSIFICATION

| Ramp SE | Ramp NW |
|------------------------------------|-----------------------------------|
| Functional Class: Interstate | Functional Class: Interstate |
| ADT: 4,600 (2010); 5,000 (2040) | ADT: 32,500 (2012); 36,000 (2040) |
| ADTT: 123 (2012); 134 (2040) | ADTT: 2,403 (2012); 2,750 (2040) |
| DHV: 440 (2040) | DHV: 2,790 (2040) |
| Design Speed: 25 m.p.h. | Design Speed: 35 m.p.h. |
| Posted Speed: 25 m.p.h. | Posted Speed: 25 m.p.h. |
| One-Way Traffic | One-Way Traffic |
| Directional Distribution: 100% | Directional Distribution: 100% |
| F.A.I. Rte. 290 EB | F.A.I. Rte. 290 WB |
| Functional Class: Interstate | Functional Class: Interstate |
| ADT: 32,500 (2012); 33,000 (2040) | ADT: 29,700 (2012); 31,000 (2040) |
| ADTT: 380 (2012); 386 (2040) | ADTT: 520 (2012); 543 (2040) |
| DHV: 2,610 (2040) | DHV: 2,130 (2040) |
| Design Speed: 50 m.p.h. | Design Speed: 45 m.p.h. |
| Posted Speed: 45 m.p.h. | Posted Speed: 45 m.p.h. |
| One-Way Traffic | One-Way Traffic |
| Directional Distribution: 100% | Directional Distribution: 100% |
| F.A.I. Rte. 90/94 SB | F.A.I. Rte. 90/94 NB |
| Functional Class: Interstate | Functional Class: Interstate |
| ADT: 100,100 (2012); 98,000 (2040) | ADT: 96,700 (2012); 81,000 (2040) |
| ADTT: 11,351 (2012); 11,113 (2040) | ADTT: 11,217 (2012); 9,393 (2040) |
| DHV: 6,340 (2040) | DHV: 4,780 (2040) |
| Design Speed: 60 m.p.h. | Design Speed: 60 m.p.h. |
| Posted Speed: 45 m.p.h. | Posted Speed: 45 m.p.h. |
| One-Way Traffic | One-Way Traffic |
| Directional Distribution: 100% | Directional Distribution: 100% |

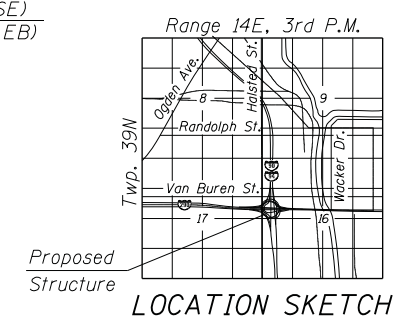


ELEVATION



PLAN

Notes:
 All structural steel shall be galvanized or metalized (thermal spraying).
 For legend, see Sheet 2 of 4.



LOCATION SKETCH

GENERAL PLAN & ELEVATION - 1
RAMP SE OVER
F.A.I. 290 (EISENHOWER EXPRESSWAY),
F.A.I. 90/94 (KENNEDY EXPRESSWAY) AND CTA
F.A.I. 94 (I-90/94 SB to I-290 EB)
SECTION 2013-010R
COOK COUNTY
STATION 1408+50.90
STRUCTURE NO. 016-1714

1/7/2014 10:50:31AM - 8FILES



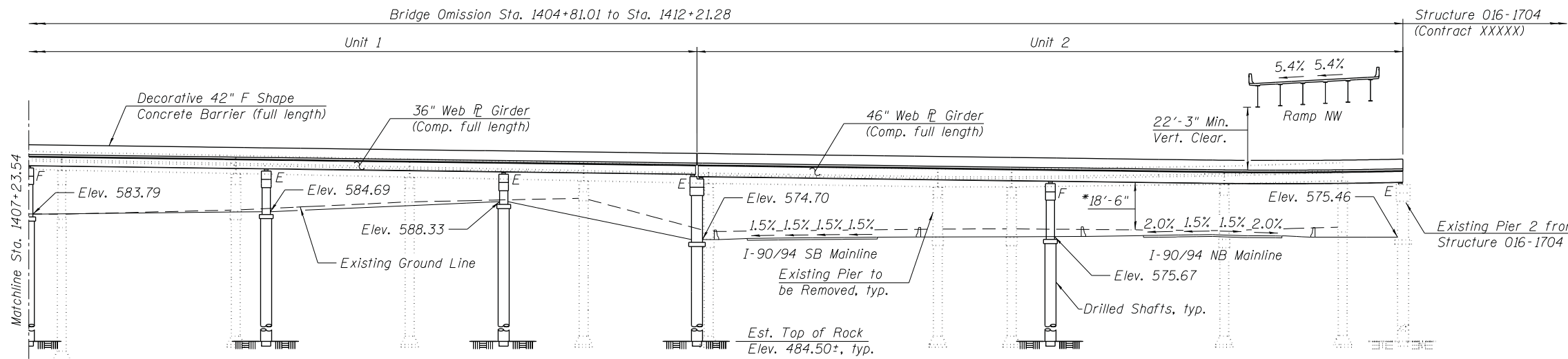
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|------------------------|----------------|-----------|
| USER NAME = wjcolletti | DESIGNED - WJC | REVISED - |
| PLOT SCALE = 48:0 "/> | | |

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

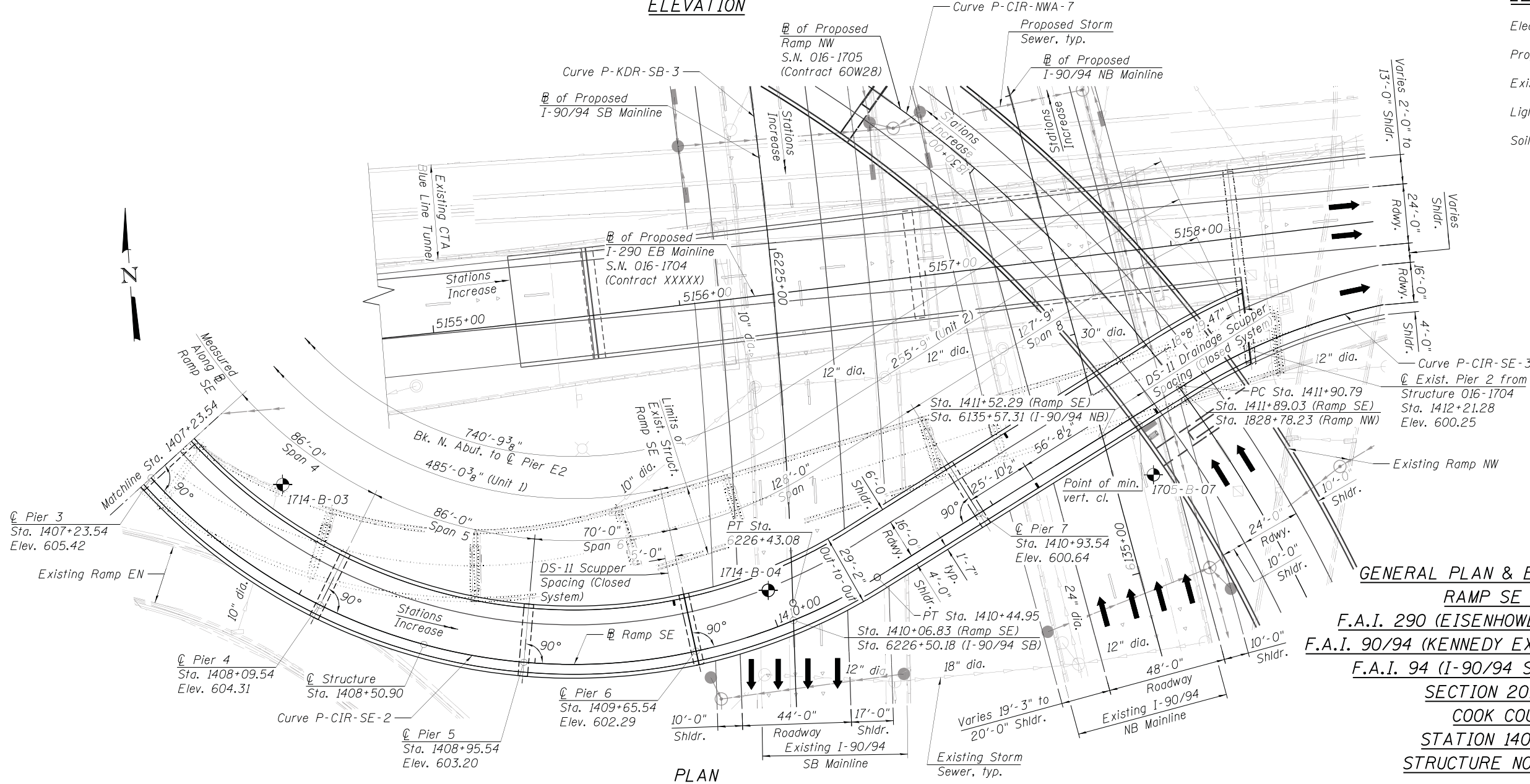
SHEET NO. 1 OF 4 SHEETS

| F.A.I. RTE. | SECTION | COUNTY | TOTAL SHEETS | SHEET NO. |
|--------------------|-----------|--------|--------------|-----------|
| 0094 | 2013-010R | COOK | 4 | 1 |
| CONTRACT NO. XXXXX | | | | |

ILLINOIS FED. AID PROJECT



ELEVATION



PLAN

LEGEND

- Electric ——— E ———
- Prop. Storm Sewer ———>———
- Exist. Storm Sewer ———>———
- Light Pole ———>———
- Soil Boring ———>———

GENERAL PLAN & ELEVATION - 2
RAMP SE OVER
F.A.I. 290 (EISENHOWER EXPRESSWAY),
F.A.I. 90/94 (KENNEDY EXPRESSWAY) AND CTA
F.A.I. 94 (I-90/94 SB to I-290 EB)
SECTION 2013-010R
COOK COUNTY
STATION 1408+50.90
STRUCTURE NO. 016-1714

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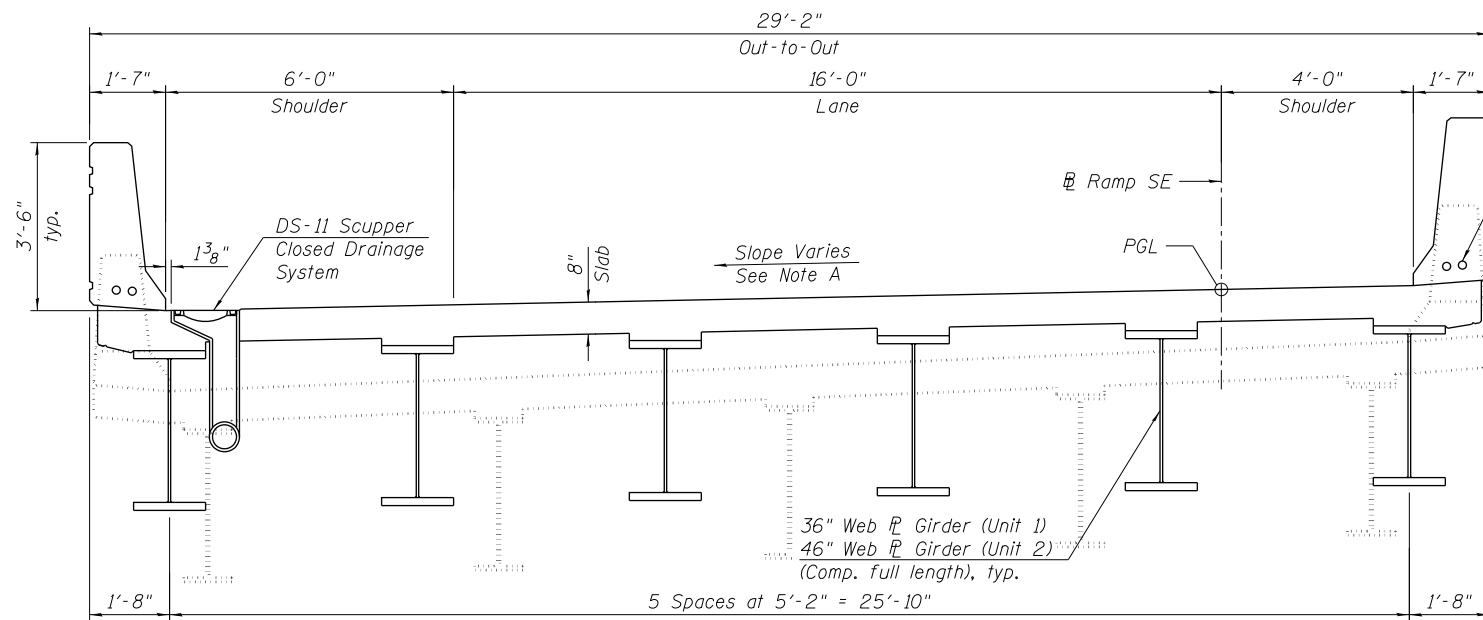
| | | |
|------------------------|----------------|-----------|
| USER NAME = wjcolletti | DESIGNED - WJC | REVISED - |
| | CHECKED - KAH | REVISED - |
| PLOT SCALE = 48:0 "/> | | |

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

SHEET NO. 2 OF 4 SHEETS

| | | | | |
|--------------------|-------------------|-------------|---------------------------|-------------|
| F.A.I. RTE. 0094 | SECTION 2013-010R | COUNTY COOK | TOTAL SHEETS 4 | SHEET NO. 2 |
| CONTRACT NO. XXXXX | | | ILLINOIS FED. AID PROJECT | |

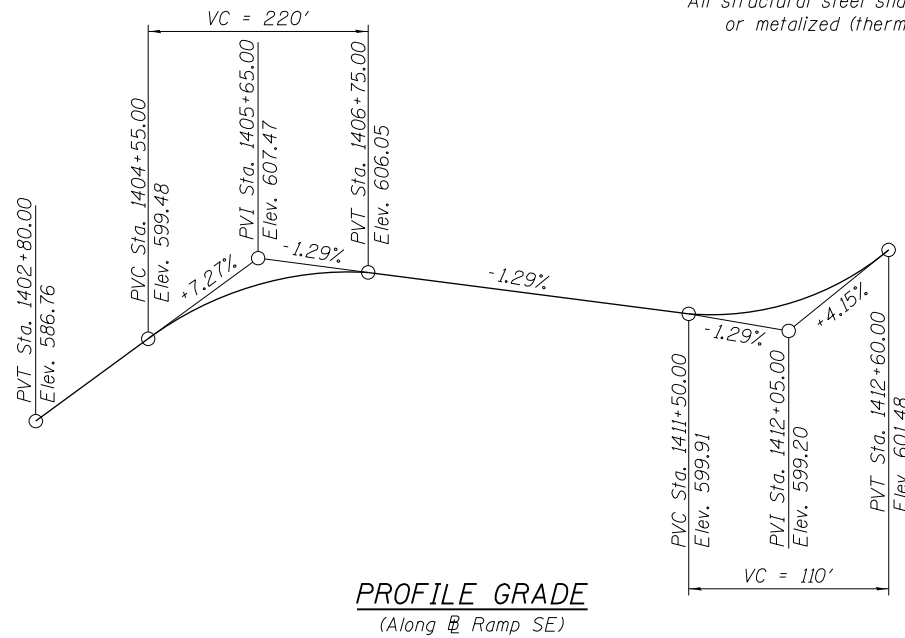
Note A: (Direction of slope referenced from right edge of pavement)
 Cross Slope (-5.60%) Sta. 1404+66.81 to Sta. 1409+91.41
 Transition (-5.60% to 0.00%) Sta. 1409+91.41 to Sta. 1411+19.41
 Transition (0.00% to 5.40%) Sta. 1411+19.41 to Sta. 1412+42.41



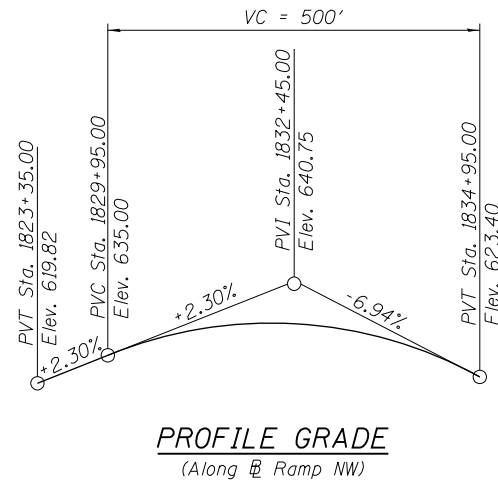
CROSS SECTION

(Looking Upstation)

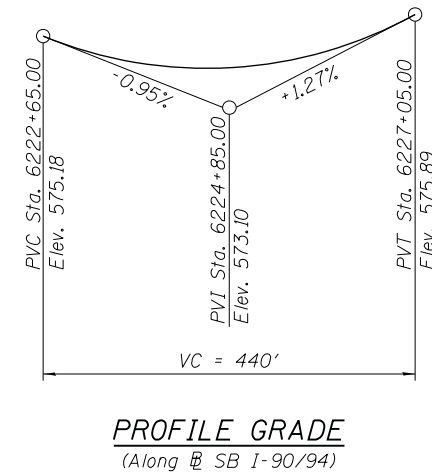
All structural steel shall be galvanized or metalized (thermal spraying)



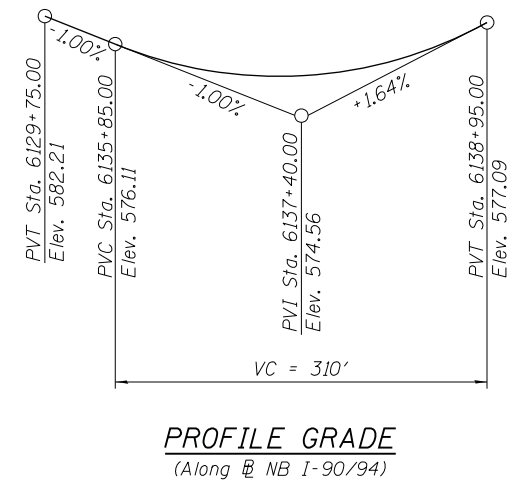
PROFILE GRADE
(Along EB I-290)



PROFILE GRADE
(Along WB I-290)



PROFILE GRADE
(Along Ramp SE)



PROFILE GRADE
(Along Ramp NW)

CURVE DATA

(Ramp SE)

| | |
|------------------------------------|-----------------------------------|
| P-CIR-SE-2 | P-CIR-SE-3 |
| P.I. Sta. = 1415+83.08 | P.I. Sta. = 1412+44.91 |
| $\Delta = 157^\circ 44' 18''$ (LT) | $\Delta = 24^\circ 25' 53''$ (RT) |
| D = 24°48'12" | D = 22°55'06" |
| R = 231.00' | R = 250.00' |
| T = 1174.08' | T = 54.12' |
| L = 635.96' | L = 106.60' |
| E = 965.59' | E = 5.79' |
| e = 5.6% | e = 5.4% |
| T.R. = NA | T.R. = NA |
| S.E. Run = 128' | S.E. Run = 78' |
| P.C. Sta. = 1404+09.00 | P.C. Sta. = 1411+90.79 |
| P.T. Sta. = 1410+44.95 | P.T. Sta. = 1412+97.39 |

CURVE DATA

(Ramp NW)

| | |
|-----------------------------------|-----------------------------------|
| P-CIR-NWA-7 | P-KDR-SB-3 |
| P.I. Sta. = 1831+44.30 | P.I. Sta. = 6224+30.06 |
| $\Delta = 88^\circ 30' 25''$ (LT) | $\Delta = 11^\circ 28' 39''$ (RT) |
| D = 10°36'37" | D = 2°41'06" |
| R = 540.00' | R = 2,134.00' |
| T = 526.11' | T = 214.46' |
| L = 834.16' | L = 427.48' |
| E = 213.92' | E = 10.75' |
| e = 5.4% | e = 4.2% |
| T.R. = 39' | T.R. = NA |
| S.E. Run = 105' | S.E. Run = 203' |
| P.C. Sta. = 1826+18.19 | P.C. Sta. = 6222+15.60 |
| P.T. Sta. = 1834+52.35 | P.T. Sta. = 6226+43.08 |

CURVE DATA

(F.A.I. Rte. SB 90/94)

CROSS SECTION, PROFILE GRADES AND CURVE DATA

**RAMP SE OVER
 F.A.I. 290 (EISENHOWER EXPRESSWAY),
 F.A.I. 90/94 (KENNEDY EXPRESSWAY) AND CTA
 F.A.I. 94 (I-90/94 SB to I-290 EB)
 SECTION 2013-010R
 COOK COUNTY
 STATION 1408+50.90
 STRUCTURE NO. 016-1714**

1/7/2014 10:22:51AM - 8FILES

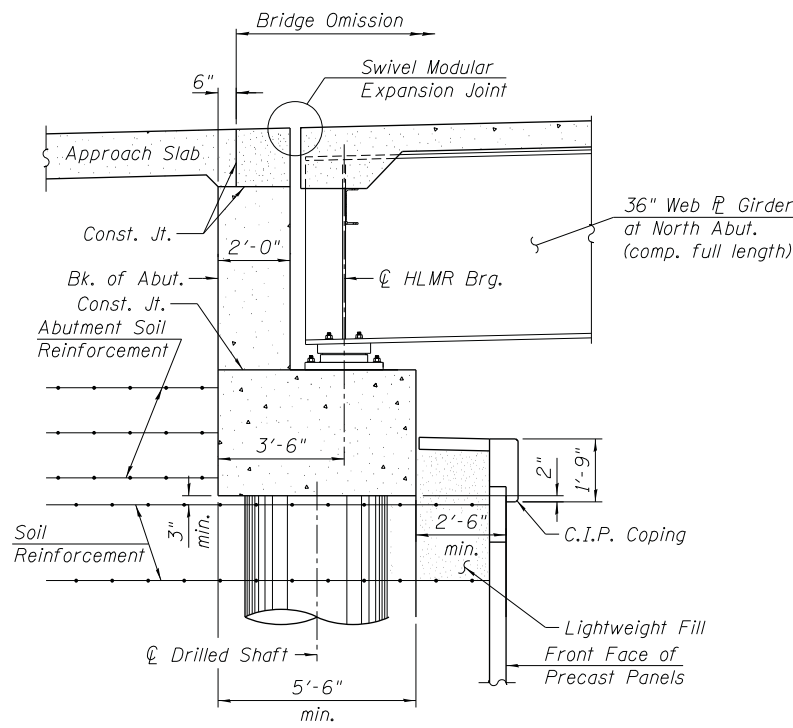


| | | |
|---------------------------|------------------|-----------|
| USER NAME = wjcolletti | DESIGNED - WJC | REVISED - |
| PLOT SCALE = 48:0' / 1" = | CHECKED - KAH | REVISED - |
| PLOT DATE = 1/7/2014 | DRAWN - WJC | REVISED - |
| | CHECKED - KAH/DL | REVISED - |

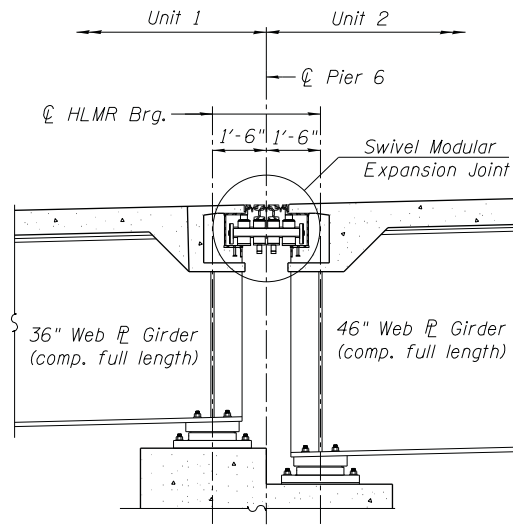
**STATE OF ILLINOIS
 DEPARTMENT OF TRANSPORTATION**

SHEET NO. 3 OF 4 SHEETS

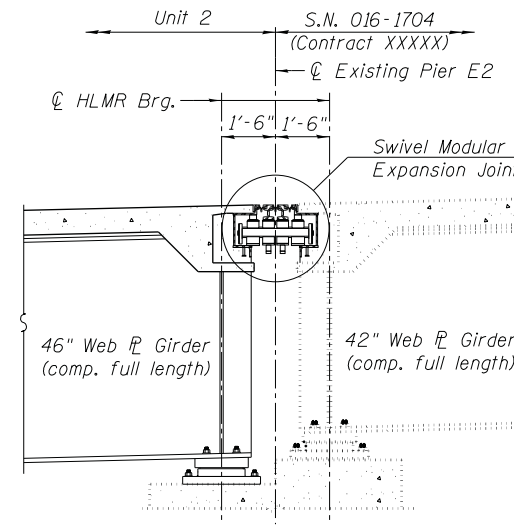
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|--------------------|-------------------|-------------|---------------------------|-------------|
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| CONTRACT NO. XXXXX | | | ILLINOIS FED. AID PROJECT | |



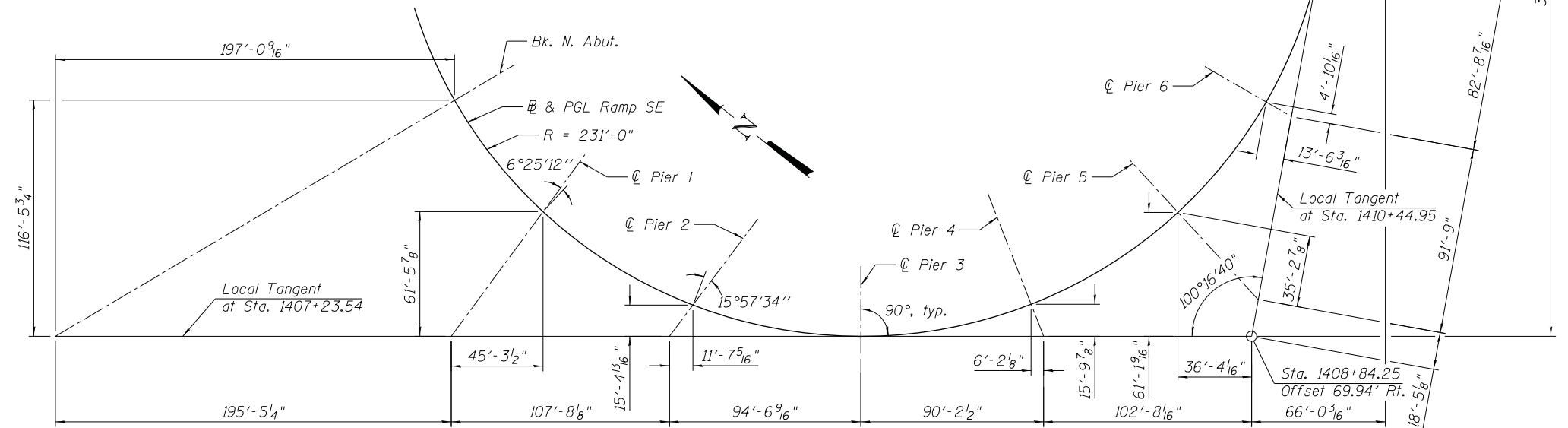
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(Horiz. Dim. @ Rt. L's)



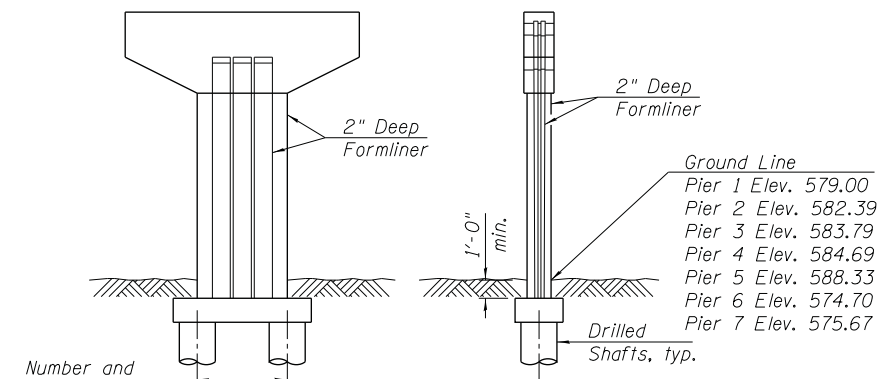
SECTION THRU EXP. PIER
(Horiz. Dim. @ Rt. L's)



SECTION THRU EXP. PIER
(Horiz. Dim. @ Rt. L's)



OFFSET SKETCH



PIER SKETCH

SECTION THRU ABUTMENT, PIER AND OFFSET SKETCH
RAMP SE OVER
F.A.I. 290 (EISENHOWER EXPRESSWAY),
F.A.I. 90/94 (KENNEDY EXPRESSWAY) AND CTA
F.A.I. 94 (I-90/94 SB to I-290 EB)
SECTION 2013-010R
COOK COUNTY
STATION 1408+50.90
STRUCTURE NO. 016-1714

1/7/2014 10:47:48 AM - \$FILES



| | | |
|--------------------------------|------------------|-----------|
| USER NAME = wjcolletti | DESIGNED - WJC | REVISED - |
| | CHECKED - KAH | REVISED - |
| PLOT SCALE = 7/20 1/2" = 1'-0" | DRAWN - WJC | REVISED - |
| PLOT DATE = 1/7/2014 | CHECKED - KAH/DL | REVISED - |

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

SHEET NO. 4 OF 4 SHEETS

| | | | | |
|--------------------|-------------------|-------------|---------------------------|-------------|
| F.A.I. RTE. 0094 | SECTION 2013-010R | COUNTY COOK | TOTAL SHEETS 4 | SHEET NO. 4 |
| CONTRACT NO. XXXXX | | | ILLINOIS FED. AID PROJECT | |