STRUCTURE GEOTECHNICAL REPORT
CIRCLE INTERCHANGE RECONSTRUCTION
INTERSTATE 290 RETAINING WALL 42
PROPOSED SN 016-1829
SECTION 2014-001R&B
IDOT D-91-227-13, PTB 163-001
COOK COUNTY, ILLINOIS

for

AECOM

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submitted by

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11. Abstract

A new retaining wall will be constructed along the north side of the Canal Street exit ramp from eastbound I-290 in connection with the Circle Interchange Reconstruction program. Two existing retaining walls will be reused to retain the south and east sides of the Canal Street exit ramp. The proposed retaining wall is a 158'-3$^1/_2$" long fill wall with a maximum total height of 11'-1". This report provides geotechnical recommendations for the design and construction of the proposed new retaining wall.

One boring and three hand augers were performed as part of the investigation for the proposed wall. One boring was drilled in 2013 for the proposed reconstruction of the I-290 Congress Viaduct and was used to supplement our analysis.

Below the existing grade depth and up to 13 feet cohesive and granular fill, the foundation soils consists of up to 9 feet of medium stiff to stiff silty clay to silty clay loam crust, up to 41 feet of very soft to medium stiff clay to silty clay lake bottom deposits, 20 to 27 feet of stiff to hard silty clay to silty loam diamictons, up to 5 feet of loose silt to silty loam, followed by 15 feet of medium dense to very dense sand to sandy gravel overlying dolostone bedrock.

A Mechanically Stabilized Earth (MSE) wall is envisioned for this location. Since our investigation revealed loose granular soils at the surface and a thick layer of soft cohesive soils with high moisture contents and low shear strength we provide recommendations for foundation soil treatment and lightweight fill for the MSE wall. With foundation treatment and the use of lightweight fill, the proposed MSE wall is feasible.

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FOR
AECOM

1.0 INTRODUCTION

This report presents the results of the Wang Engineering, Inc. (Wang) subsurface investigation, laboratory testing, geotechnical engineering evaluations, and recommendations for the new retaining wall designated as SN 016-1829 (Retaining Wall 42) proposed along the Canal Street Exit Ramp, Interstate 290 (Eisenhower Expressway), and Congress Parkway in connection with the Circle Interchange Reconstruction program in the City of Chicago, Cook County, Illinois. A *Site Location Map* is presented as Exhibit 1.

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

1.1 Project Description

The Circle Interchange Reconstruction project is along Interstate 90/94 (I-90/94) from south of Roosevelt Road to north of Lake Street, along Interstate 290 (I-290) from Loomis Street to the Circle Interchange; and along Congress Parkway from the Circle Interchange to Canal Street/Old Post Office. The routes typically have three lanes of traffic in each direction with mostly one lane ramps at interchanges. Locally, the north leg is known as the Kennedy Expressway, the south leg as the Dan Ryan Expressway, and the west leg as the Eisenhower Expressway. Within the project area, there are several cross street bridges over I-90/94 and I-290 considered for reconstruction. Along I-90/94, from south to north, the cross street overpasses include Taylor Street, Van Buren

Street, Jackson Boulevard, and Adams Street. Along I-290, from west to east, the cross street overpasses include Morgan Street, Peoria Street, and Halsted Street.

The proposed improvements include additional through lanes in each direction on I-90/94. The horizontal alignments and vertical profiles throughout the interchange will be improved. A new two-lane flyover will be constructed to carry I-90/94 northbound traffic to I-290 westbound. Cross street bridges including, Morgan Street, Harrison Street, Halsted Street, Peoria Street, Taylor Street, Adams Street, Jackson Boulevard, and Van Buren Street will be reconstructed. Various existing ramps will be realigned and reconstructed and up to 50 new retaining walls will be constructed.

1.2 Proposed Structure

Retaining Wall 42 (RW42) is proposed along the north side of the Canal Street exit Ramp from EB I-290, whereas the south side is retained by an existing wall which runs parallel to RW 42. Based on the In-Progress Type, Size, and Location (TSL) plan dated August 9, 2016 and provided by WSP/Parsons Brinckerhoff (PB), the proposed RW 42 will be 123’-11$^{1}/_{2}$” long measured along the wall’s front face and will have a maximum total height of approximately 20’-3”. The proposed wall starts at Station 1717+93.18, 19.627’ RT and continues along the north side of the eastbound I-290 Canal Street exit ramp, turns south at Station 1716+53.55, 20.33’ RT near the existing I-290 pier 14S and ends at Station 1716+53.55, 1.67’ RT. The In-Progress TSL plan dated August 9, 2016 is included in Appendix C.

1.3 Existing Structure

There is no existing structure at this location.

2.0 SITE CONDITIONS AND GEOLOGICAL SETTING

The project area is located within the City of Chicago limits. On the USGS *Chicago Loop 7.5 Minute Series* map, the retaining wall is located in the NW¼ of Section 16, Tier 39 N, Range 14 E of the Third Principal Meridian. A *Site Location Map* is presented as Exhibit 1.

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 site is situated within the northern section of the Chicago/Calumet lacustrine plain (Chrzatowsky and Thompson 1992). The flat, lakeward-sloping surface is a wave-scoured ground moraine covered by thin and discontinuous offshore lacustrine silt and clay (Willman 1971). The wall runs along the north side of the EB I-290 exit ramp to Canal Street. The existing grade elevation along the proposed wall alignment varies from 599 feet at the west end to 593 feet at the east end.

2.2 Surficial Cover

Within the project area, an approximately 100-foot thick Wisconsinan-age glacial 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 of bedded silt and clay, locally laminated, with lenses and/or thin beds of sand and gravel. The Wadsworth Formation consists of relatively homogenous, massive, gray till with clay to silty clay matrix, with dolostone and shale clasts and occasional lenses of sorted and stratified silt. The Wadsworth Formation is underlined by the pebbly silty clay loam to silty loam diamicton of the Yorkville Member of the Lemont Formation, 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 underlying Wadsworth Formation is characterized by low plasticity, low to medium 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 glacigenic deposits unconformably rest over a 325-foot thick Silurian-age dolostone (Leetaru et al 2004). The top of bedrock may be encountered at an elevation of 575 feet or 100 feet below ground surface (bgs). The Silurian dolostone dips gently eastward at a pace of 15 feet per mile. Only inactive faults are known in the area, and the seismic risk to the proposed structure from the existing faults is minimal (Leetaru et al. 2004; Willman 1971). There are no records of mining activity in the area, but deep tunnel excavations are known to exist throughout the Circle

Interchange area.

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 to silty loam diamicton of the Lemont Formation, which in turn is underlain by bedrock. Sound dolostone bedrock was sampled or inferred at depths of 98.5 to 100.0 feet bgs or 496.2 to 501.4 feet elevation, within or close to the range predicted based on published geological data.

3.0 EXISTING GEOTECHNICAL DATA

The existing geotechnical data used in our analysis was obtained from Borings 0461-B-09 performed by Wang in 2013 for the proposed reconstruction of the I-290 Congress Viaduct superstructure.

4.0 METHODS OF INVESTIGATION

The following sections outline the subsurface and laboratory investigations performed by Wang.

4.1 Subsurface Investigation

One retaining wall structure boring, designated as Boring 41-RWB-01, was drilled south of the proposed wall alignment. The boring was drilled by Wang on October 20, 2013. Due to difficult access to the proposed wall site, Wang performed three Geoprobe (hand auger) borings, designated as 1828-HA-01, 1829-HA-01, and 1829-HA-02, in May 2015. Borings 1829-HA-01 and 1829-HA-02 encountered auger refusal at 3.5 to 4.5 bgs possibly due to the presence of construction debris. The borings were drilled from elevations of 594.0 to 598.9 to depths of 3.5 to 98.6 feet bgs. The as-drilled boring locations were surveyed by Dynasty Group Inc. and station and offset information for each boring was provided by AECOM. Boring location data are presented in the *Boring Logs* (Appendix A). The as-drilled boring locations are shown in the *Boring Location Plan* (Exhibit 3).

Truck-mounted drilling rigs equipped with hollow stem augers were used to advance and maintain an open borehole to 10 or 15 feet and mud rotary thereafter to the termination depth or to the top of bedrock. Soil sampling was performed according to AASHTO T 206, "*Penetration Test and*

Split Barrel Sampling of Soils." The soil was sampled at 2.5-foot intervals to 30 feet bgs and at 5-foot intervals to the boring termination depth or bedrock. The soil was continuously sampled in the hand auger borings using jackhammer driven Geoprobe samplers. Soil samples collected from each interval were placed in sealed jars and transported to Wang's Geotechnical Laboratory in Lombard, Illinois for further examination and laboratory testing.

Field boring logs, prepared and maintained by Wang field engineers, included lithological descriptions, visual-manual soil classifications, results of Rimac and pocket penetrometer unconfined compressive strength tests, and results of SPT tests 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 the Illinois Division of Highways (IDH) Textural Classification system. The field logs were finalized by an experienced engineering geologist after verifying the field visual classifications and laboratory test results.

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

4.2 Laboratory Testing

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

5.0 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 *Subsurface Data Profile* (Exhibit 4). Please note that strata contact lines represent approximate boundaries between soil types. The actual transition between soil types in the field may be gradual in horizontal and vertical directions.

5.1 Soil Conditions

The pavement structure measured in the structure borings shows 9 to 10 inches of concrete pavement over 3 to 12 inches of crushed stone base course or sandy loam fill. The hand auger borings mainly encountered granular fill at the surface. In descending order, the general lithologic succession encountered beneath the pavement includes: 1) man-made ground (fill); 2) medium stiff to stiff silty clay to silty clay loam (crust); 3) very soft to medium stiff clay to silty clay (Chicago blue clay); 4) stiff to hard silty clay to silty clay loam diamicton; 5) loose to dense silty loam to silt; 6) medium dense to very dense sand to gravelly sand; and 7) strong dolostone bedrock.

(1) Man-made ground (fill)

Along the proposed retaining wall alignment, below the pavement structure and at the surface, the borings encountered up to 13 feet of cohesive and granular fill. The cohesive fill consists of medium stiff to stiff, brown and gray silty clay loam to clay loam and has unconfined compressive strength (Q_u) values of 0.8 to 1.5 tsf and moisture content (MC) values of 5 to 27%. The granular fill consists of very loose to medium dense, black and brown sand to sandy gravel with construction debris. The granular fill has SPT N values of 3 to 10 blows/foot and MC values of 5 to 33%.

(2) Medium stiff to stiff silty clay to silty clay loam (crust)

At a depth of 15.5 feet bgs (583.5 feet elevation), Boring 41-RWB-01 encountered up to 5.0 feet of medium stiff to stiff, brown and gray silty clay to silty clay loam with Q_u values of 0.9 to 1.8 tsf and MC values of 24 to 28%. This unit is commonly known as the “Crust”.

Borings 41-RWB-01 and 1828-HA-01 encountered 4 feet of loose brown silty loam beneath the fill. The silty loam has an average N-value of 5 blows/foot and MC values of 21 to 25%. According to the AASHTO soil classification system the silty loam soil belongs to the A-4 group.

(3) Very soft to medium stiff clay to silty clay (Chicago Blue Clay)

At 13.0 to 20.5 feet bgs (578.5 to 580.5 feet elevation), the borings encountered up to 41 feet of very soft to medium stiff, gray clay to silty clay lake bottom deposits. The unit is characterized by Q_u values of 0.1 to 0.9 tsf with an average of 0.2 tsf and MC values of 15 to 36% with an average of 26%. The soil liquid limit (L_L) values ranges from 28 to 35% and plastic limit (P_L) values ranges from 15 to 17%. According to the AASHTO soil classification, the soils belong to the A-6 group. This layer is commonly known as the “Chicago Blue Clay.”

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

At depths of 52.0 to 62.0 feet bgs (537.2 to 541.2 feet elevation), the borings advanced through 20 to 27 feet of stiff to hard, gray clay to silty clay and silty clay loam diamicton. The diamicton has Q_u values of 1.2 to 7.3 tsf averaging 5.4 tsf and MC values of 12 to 23% with an average of 19%. A sample tested from this layer shows the soil has an L_L value of 24% and a P_L value of 15%. According to the AASHTO soil classification, the soil belongs to the A-4 group.

Within this elevation range, Boring 41-RWB-01 sampled a 7-foot thick layer of medium stiff clay with a Q_u value of 0.7 tsf and MC value of 31%.

(5) Loose to dense silty loam to silt

At depths of 78.0 to 89.0 feet bgs (510.2 to 515.2 feet elevation), the borings advanced through up to 5 feet of loose to dense gray silty loam to silt. This layer has MC values of 21 to 27% and SPT N values of 8 to 32 blows/foot.

(6) Medium dense to very dense sand to gravelly sand

Up to 12-foot thick medium dense to very dense, gray sand to gravelly sand and weathered bedrock was encountered just above the bedrock at elevations of 507.2 to 511.2 feet (82 to 92 feet bgs). Hard drilling was noted in the boring logs indicating the possible presence of cobbles and boulders within this layer. This layer exhibits SPT N values of 23 to greater than 50 blows/foot.

(7) Strong dolostone bedrock

Dolostone bedrock was sampled in Boring 0461-B-09 at an elevation of 501.4 feet (91.5 feet bgs) and the top 10 feet show a strong rock, good rock quality (RQD of 78%), horizontally bedded, slightly fractures, joint breaks with little or no fill, and slightly vuggy.

5.2 Groundwater Conditions

During drilling, groundwater was encountered in Boring 1828-HA-01 at 9.0 feet bgs (elevation 585.0 feet). After drilling, rotary mud water was measured at 31.5 feet bgs (elevation 561.5 feet) in Boring 0461-B-09. Where the groundwater was encountered near the surface, it was found within granular fill and is most likely perched water.

A piezometer, designated as 0461-PZ-01, was installed in December of 2014 near the Canal Street entrance ramp. The piezometer screen was installed at a depth of 80 feet bgs within the granular layers above the bedrock. Piezometer readings measured an approximate water level elevation of 516.3 feet within the silty loam to silt and sand to gravelly sand (layers 5 and 6). The granular units (layers 5 and 6) encountered just above the bedrock at elevations 507.2 to 511.2 feet are saturated and possibly under hydrostatic water pressure.

5.3 Seismic Design Considerations

Seismic data is not required as per 2012 IDOT *Bridge Manual* and 2014 AASHTO *LRFD Bridge Design Specification* and is not identified.

6.0 WALL TYPE ANALYSIS AND RECOMMENDATIONS

RW 42 is a new fill wall proposed along the existing exit ramp from eastbound I-290 to Canal Street. From discussions with PB, Wang understands that IDOT is considering filling the space beneath the ramp structure and below west Congress Parkway. This will also include the spaces between the beams underneath the deck. The new fill will be retained by RW 42 and the existing south concrete retaining wall which runs along west Congress Parkway parallel to the proposed RW 42 and the existing east retaining wall west of Canal Street. The proposed MSE wall is 158'-3$^1/_2$" long with total heights ranging from 7'-5$^1/_2$" to 11'-11". It is understood that the retaining wall design will be based on 2014 AASHTO LRFD Bridge Design Specifications except as modified by the IDOT 2012 Bridge Manual.

During TSL Plan development, we discussed with AECOM/PB various wall types that could be considered based on design and construction issues. Taking into consideration the soil conditions, constructability, and site access difficulty it is our opinion that an MSE Wall constructed with lightweight fill along with some ground improvement is the most suitable option for this location. We analyzed several alternatives for the fill material to be used in the reinforcement zone and between the walls as follows:

1- Using regular fill material for the MSE zone and fill area.
2- Using Controlled Low Strength Material (CLSM) for both the MSE reinforcement zone and fill section.
3- Using CLSM from the ground surface to underneath the beams and Class III Lightweight Cellular Concrete Fill (LCCF) for the area between the beams directly underneath the deck.
4- Using Class III LCCF for the MSE zone as well as for the area between the walls.

5- Using Class III LCCF for the MSE zone as well as for the area between the walls and removing and replacing approximately 3 feet of the loose surficial granular soil and miscellaneous debris for the MSE reinforced zone area and non-reinforced area between the proposed MSE wall and the existing wall. The replacement material should be Class III LCCF as well. LCCF should be as per IDOT District One Special Provisions.

The analyses and evaluations of the field and laboratory test data obtained from the borings indicate that the construction of an MSE wall is feasible at the proposed wall location. Wang analyzed the external stability with respect to bearing capacity, settlement, sliding, overturning, and global stability. The internal sliding resistance along the soil reinforcement and the design of soil reinforcement will have to be performed by the contractor as part of the wall system design. The following sections present the results of our geotechnical engineering analyses and recommendations for the MSE wall design and construction.

6.1 Settlement Analysis

We performed settlement analysis using data from Boring 41-RWB-01since it is conservative and closer to the maximum wall height. Table 1 presents the results of our settlement analyses for the different fill material alternatives considered.

Table 1: Settlement Estimates

Fill Material	Estimated Settlement (inches)
Regular Fill Unit Weight =125 pcf	3.5
CLSM Material Unit Weight= 90 pcf	2.7
CLSM Material Underneath Beams and Class III LCCF Material Underneath Deck	1.5
Class III LCCF Material Cast-In-Place Unit Weight= 40 to 44 pcf	1.2
Class III LCCF Material with Ground Improvement	0.7 (1) 0.9 (2)

(1) MSE Reinforced Zone

(2) Non-reinforced Zone

With the use of Class III LCCF fill for the wall, retained fill, and ground improvement as described in Section 6.3 we estimate a long-term settlement of one inch or less which will be suitable for construction.

It is understood from PB that the existing structure is supported on the existing substructure units and attached to the existing wall as one frame. All the substructure units and walls will remain in place. Therefore settlement of the fill will not impact the existing structure.

6.2 Bearing Resistance

The factored bearing resistance to be considered for the design of the MSE wall was calculated assuming the top of the levelling pad will be established at 3.5 feet below the finished grade on the front face of the wall. We assumed a reinforcement length equal to 70 percent of the total wall height or a minimum of 8 feet.

As per 2014 AASHTO LRFD Bridge Design Specifications, a bearing resistance factor of 0.65 was used. With the use of the Class III LCCF material, we estimate the maximum factored equivalent uniform bearing pressure to be approximately 1,800 psf. The nominal bearing resistance of the foundation soils after ground improvement is calculated to be 3,800 psf and the factored bearing resistance is 2,500 psf. With the removal and replacement described in Section 6.3, we estimate the foundations soils will provide sufficient bearing resistance.

6.3 Foundation Soil Treatment

The borings encountered mainly loose granular fill and construction debris at the surface with high moisture contents indicating the presence of perched groundwater. Beneath the fill, the borings encountered a layer of medium stiff to stiff silty clay loam followed by up to 41 feet of very soft to soft clay to silty clay (Chicago Blue Clay). Based on these soil conditions low soil bearing resistance and intolerable settlement are anticipated. Therefore, an MSE wall with normal weight backfill will not be feasible.

To reduce the settlement to acceptable levels and provide stable foundation support we recommend the following alternatives for the construction of the MSE wall:

1. Using Class III LCCF material with a cast-in-place unit weight of 40 to 44 pcf for the MSE reinforcement zone as well as for the fill between the new MSE wall and the existing retaining

wall.

2. Removing and replacing approximately 3 feet (to an approximate elevation of 587.5 feet) of the loose surficial granular soil and miscellaneous debris for the MSE reinforced zone area and non-reinforced area between the proposed MSE wall and the existing south wall to avoid any differential settlement from occurring. The replacement material should be Class III LCCF as well.

Based on original design drawings provided by PB, the existing south and east retaining wall footing elevations are estimated to be at 583.9 feet (+4 feet Chicago City Datum) and 587.9 feet (+8.0 feet Chicago City Datum), respectively. The estimated footing elevation for the south wall is below the recommended treatment depth, whereas the estimated footing elevation for the east wall is above the recommended depth of ground improvement. Caution should be taken during excavation so as not to expose the existing retaining wall foundations. With the aforementioned recommendations we anticipate the construction of the MSE wall to be feasible.

6.4 Global Stability

With the recommendations mentioned in the previous sections we do not anticipate global stability concerns for the proposed retaining wall.

6.5 Lateral Design Pressure

Lateral earth pressure distribution for the design of MSE walls should be taken as per 2014 AASHTO LRFD Bridge Design Specifications. For Class III LCCF we recommend linearly increasing the unfactored lateral active earth pressure at 9 psf per foot of depth below the grade behind the wall. Additional lateral load from surcharge including live load should be as per 2014 AASHTO LRFD Bridge Design Specifications.

6.6 Sliding and Overturning

Besides bearing resistance and settlement, we checked sliding and overturning/eccentricity. The factored resistance against failure by sliding was calculated to be more than the factored horizontal load without passive pressure in front of the wall. For eccentricity, the location of the resultant of the reaction forces was found to be within the middle two-thirds of the base width.

7.0 CONSTRUCTION CONSIDERATIONS

7.1 Excavation

Any required excavations should be performed in accordance with local, state, and federal regulations including current OSHA regulations. The potential effect of ground movements upon nearby structures and utilities should also be taken into consideration. Any open excavation to a depth of 4 feet should have a slope of 1:1.5 (V: H) for cohesive soils and 1:2 (V: H) for granular soils or flatter.

7.2 Dewatering

Groundwater was encountered at elevations ranging from 516.3 to 585.0 feet which are below the proposed excavation depths for the placement of the MSE wall and ground improvement. However, perched water may be present in the granular fill within the exacavtion level. We do not anticipate any special methods will be needed for dewatering efforts other than the sump-pump method. During times of heavy precipitation, water allowed to accumulate in open excavations should be immediately removed by the sump and pump method.

7.3 Wall Construction

The MSE wall should be constructed as per Section 522 *Retaining Walls* of the IDOT Standard Specifications. Select fill material should be Class III LCCF material, as per IDOT District One Special Provisions.

7.4 Construction Monitoring

The TSL plan states that the ramp will be closed during wall construction and traffic will be detoured via local roads. There is no need for special construction monitoring for the retaining wall except normally required by the IDOT Standard Specifications for Roadway and Bridge Construction and special provisions.

8.0 QUALIFICATIONS

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

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License Expires: 11-30-2017

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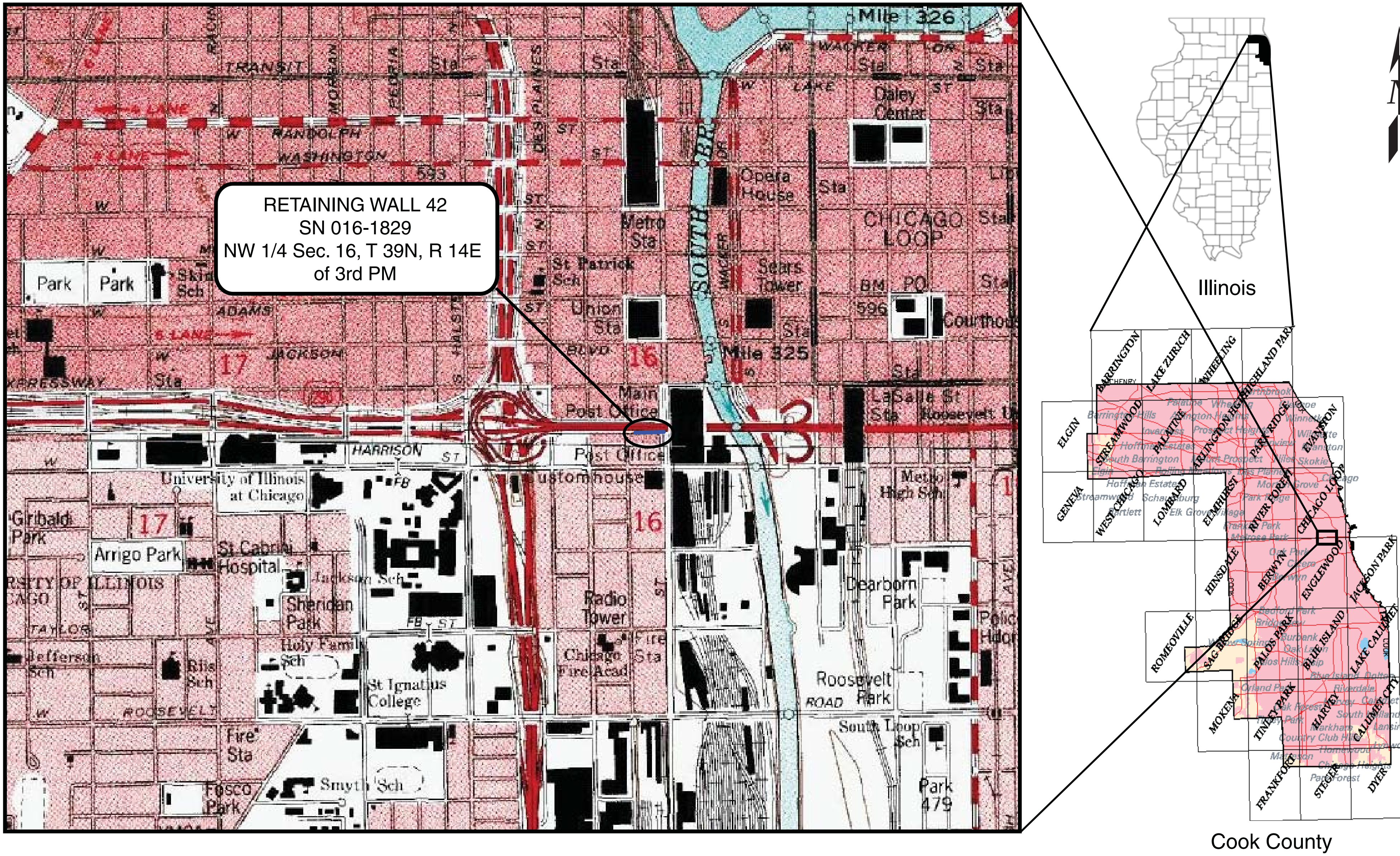
EXHIBITS



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SITE LOCATION MAP: CIRCLE INTERCHANGE RECONSTRUCTION
RETAINING WALL 42, SN 016-1829, COOK COUNTY

SCALE: GRAPHICAL	EXHIBIT 1	DRAWN BY: A. Hamad CHECKED BY: M. Kothawala

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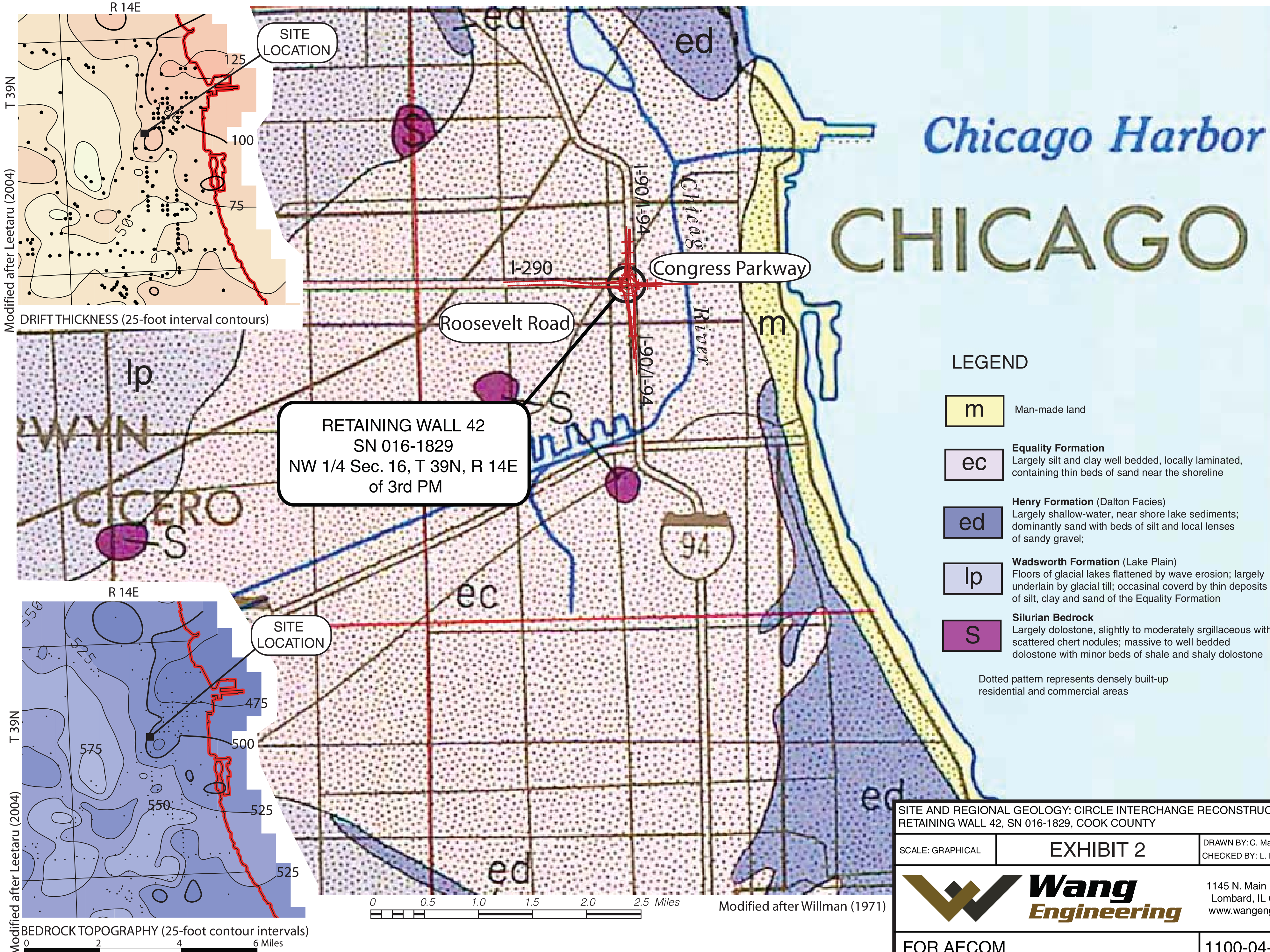
1100-04-01



SITE AND REGIONAL GEOLOGY: CIRCLE INTERCHANGE RECONSTRUCTION
RETAINING WALL 42, SN 016-1829, COOK COUNTY

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

Wang Engineering

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

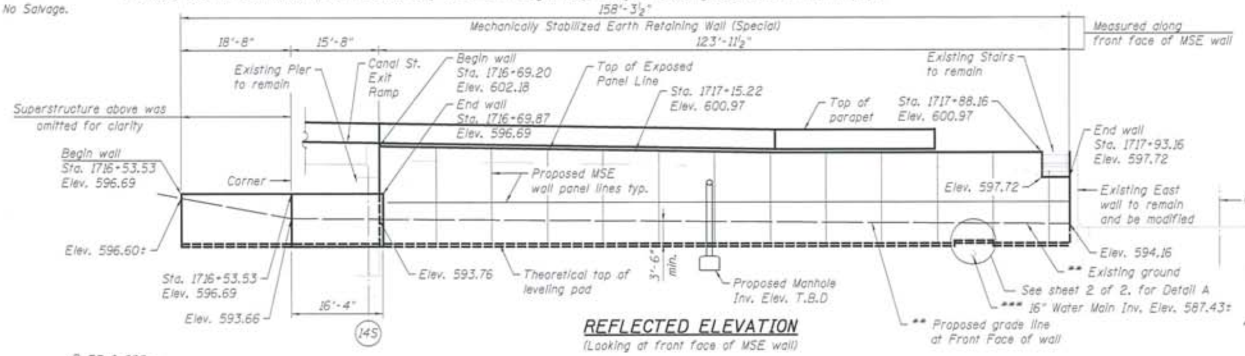
FOR AECOM | 1100-04-01

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

Traffic Control: Canal Street Exit Ramp will be closed during construction of the proposed wall. Ramp traffic will be detoured via local roads.

Existing Structure: The West, South & East retaining walls were built in 1953 are part of existing concrete ramp structure that carries Canal St. exit ramp from EB I-290. The West, South & East walls are 34'-0", 129'-10¼" & 61'-0" in length, respectively. All existing walls are to remain in place.

No Salvage.



REFLECTED ELEVATION
(Looking at front face of MSE wall)

TABLE

Station	Existing ground and Proposed Grade at F.F. of Wall
1717+93.16	594.16
1717+88.16	594.16
1717+70.00	595.04
1717+50.00	593.78
1717+30.00	593.48
1717+10.00	593.26
1716+90.00	593.80
1716+69.20	593.76

APPROVED

DEC 22 2016

AS A BASIS FOR PREPARATION OF DETAILED PLANS

** See Table for Station and Elevation of Existing ground and Proposed grade line at Front Face of wall

*** Elevation taken from record drawings provided by Department of Water Management. Field verify as necessary.

DESIGN SPECIFICATIONS

2014 AASHTO LRFD Bridge Design Specifications, 7th Edition, with 2015 and 2016 Interims

DESIGN STRESSES

FIELD UNITS (New Construction)

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

PRECAST UNITS

f'c = 4,500 psi (Precast Panels)
fy = 60,000 psi (Reinforcement)

LIGHTWEIGHT CELLULAR CONCRETE FILL

Class III
Maximum Cast Density 42±2 pcf
f'c = 120 psi

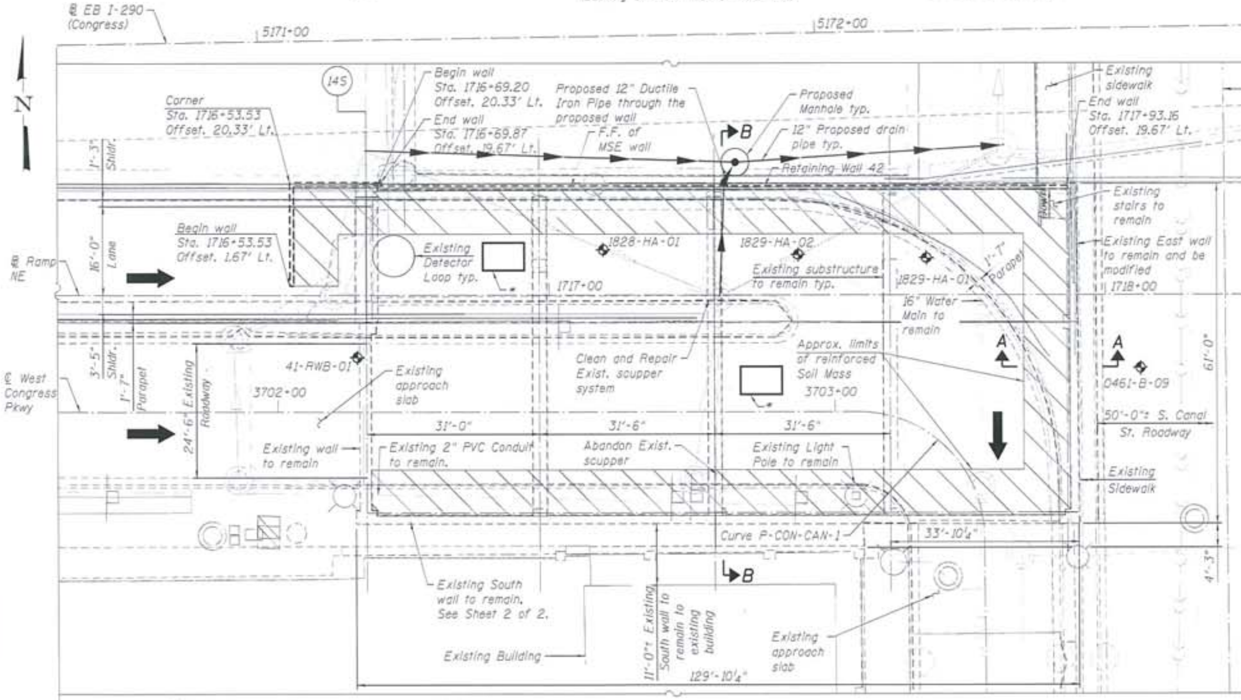
FIELD UNITS (Exist. Construction)

f'c = 3,500 psi
fy = 60,000 psi (Deck Reinforcement)
fy = 40,000 psi (Pier Reinforcement)
fy = 33,000 psi (ASTM A7)

HIGHWAY CLASSIFICATION

EB I-290 (Congress)
Functional Class: Interstate
ADT: 35,900 (2012); 37,000 (2040)
ADTT: 539 (2012); 555 (2040)
DHV: 2,820 (2040)
Design Speed: 50 m.p.h.
Posted Speed: 45 m.p.h.
One-Way Traffic
Directional Distribution: NA

S. Canal St.
Functional Class: Major Collector
ADT: N/A (2015); N/A (2040)
ADTT: N/A (2015); N/A (2040)
DHV: N/A (2040)
Design Speed: 30 m.p.h.
Posted Speed: 30 m.p.h.
Two-Way Traffic
Directional Distribution: 50:50



* Optional proposed access hole between existing beams to facilitate the construction of the proposed wall. Location and number to be determined during construction.

PLAN

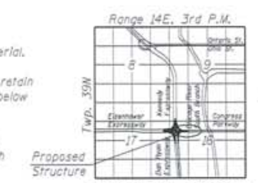
Note:
Station and offsets are referenced to the Baseline of Ramp NE. Offsets are measured to the front face of the wall.

Notes:

1. See Sheet 2 of 2 for section Detail A, Section A-A, Section B-B and profile sketches.
2. The existing detector loop/conduit/cables on the ramp from EB I-290 to Canal Street are to be abandoned.

SCOPE OF WORK

1. Remove approximately 3'-0" of unsuitable material.
2. Construct a new MSE Wall (S.N. 016-1829) to retain Lightweight Cellular Concrete Fill in the area below the existing concrete ramp structure.
3. Perform concrete repair and crack sealing on existing South and East retaining walls. Attach Soil Reinforcement to the existing South and East retaining walls that are part of the existing concrete ramp structure.



LOCATION SKETCH

LEGEND:

— W —	Water Line
— E —	Electric
— T —	Telephone line
— CTV —	Television line
	Combined Sewer
	Storm Sewer
◆	Soil Boring Location
F.F.	Front Face
T.B.D	To Be Determined

GENERAL PLAN
RETAINING WALL 42
F.A.I. ROUTE 90/94/290

BORING LOCATION PLAN: CIRCLE INTERCHANGE RECONSTRUCTION RETAINING WALL 42, SN 016-1829, COOK COUNTY
SCALE: GRAPHICAL | EXHIBIT 3 | DRAWN BY: RKC CHECKED BY: M. Kothawala
Wang Engineering — 1145 N. Main Street, Lombard, IL 60148, www.wangeng.com
FOR AECOM | 1100-04-01

PARSONS BRINCKERHOFF

USER NAME = alkhatib	DESIGNED - HA	REVISED -
	CHECKED - MS	REVISED -
PLOT SCALE = N.T.S.	DRAWN - DCP	REVISED -
PLOT DATE = 12/20/2016	CHECKED - JJG	REVISED -

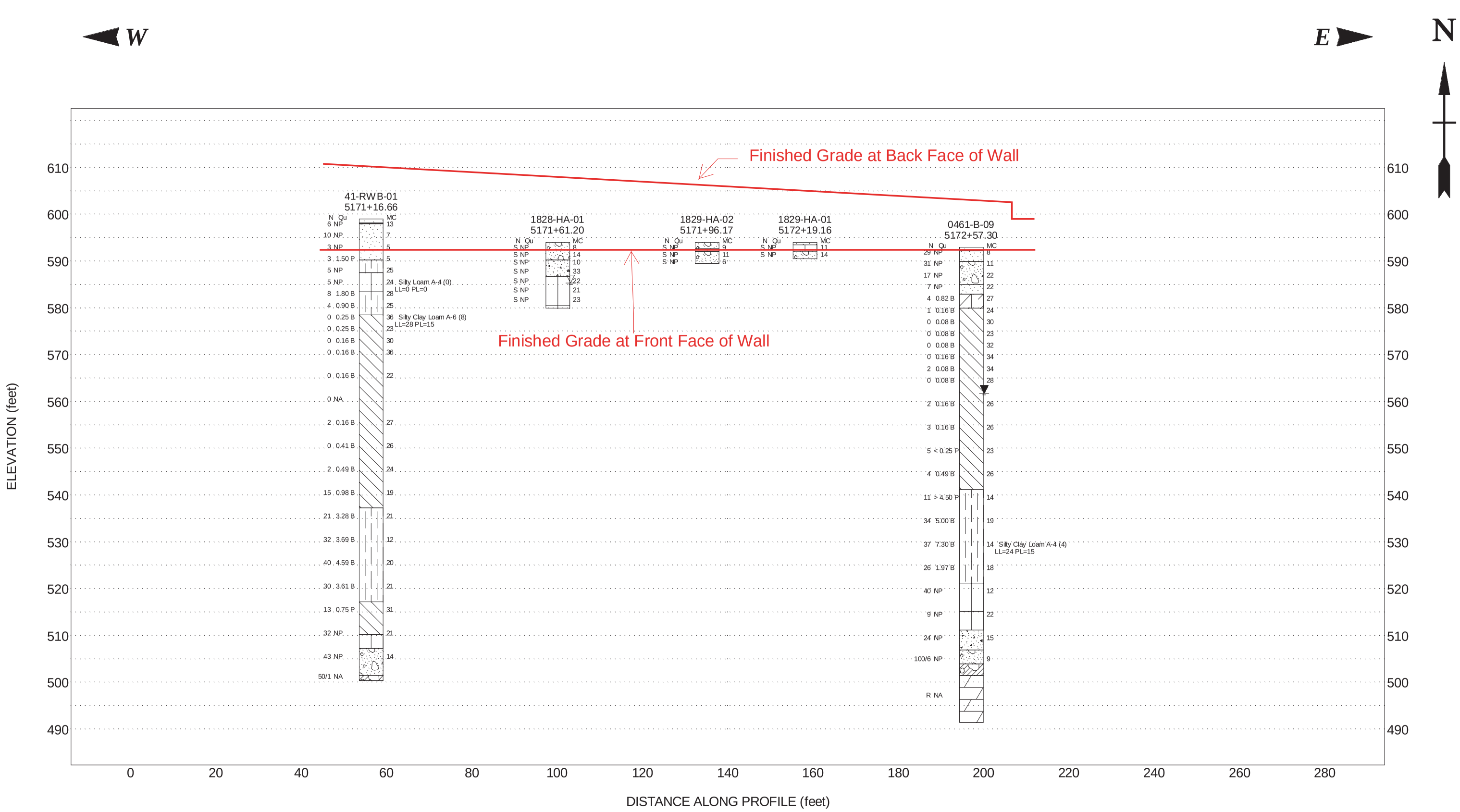
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

SHEET NO. 1 OF 2 SHEETS

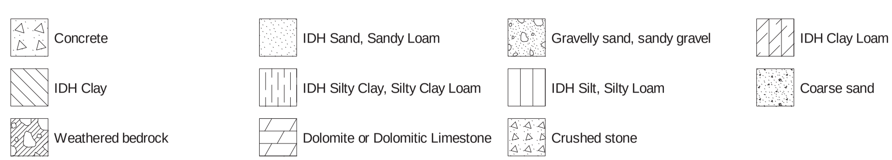
F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
90/94/290	2014-001R&B	COOK	2	1

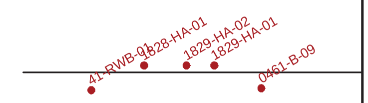
CONTRACT NO. 60X75
ILLINOIS FED. AID PROJECT

016-1829-CIRCLE100-SHT-PH-ST-TSL-001.dgn



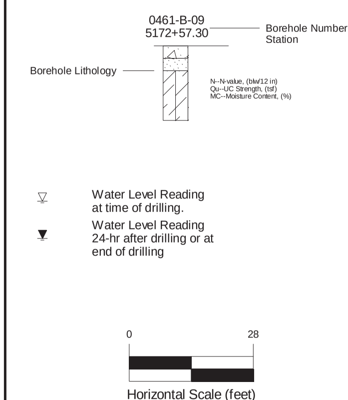
Lithology Graphics





Site Map Scale 1 inch equals 105 feet

Explanation:



Vertical Exaggeration: 1x

Wang Engineering, Inc.
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Lombard, IL 60148

Subsurface Data Profile
Retaining Wall 42
(SN 016-1829)

WEI SINCE 1982

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

JOB NUMBER	PLATE NUMBER
1100-04-01	EXHIBIT 4

APPENDIX A

Wang Engineering
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BORING LOG 1828-HA-01

WEI Job No.: 1100-04-01

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

Datum: NAVD 88
Elevation: 594.00 ft
North: 1897944.89 ft
East: 1173064.57 ft
Station: 5171+61.20
Offset: 43.47 RT

Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	Black and brown GRAVELLY SILTY LOAM, some construction debris --FILL--			1	PUSH	NP	8
590.3				2	PUSH	NP	14
	Black, medium to coarse SAND, some gravel, slag, cinders, and brick fragments --FILL-- --Moist--	5		3	PUSH	NP	10
586.7				4	PUSH	NP	33
	Brown and black SILT; saturated			5	PUSH	NP	22
		10		6	PUSH	NP	21
580.5				7	PUSH	NP	23
580.0	Soft (0.25P), brown SILTY CLAY, trace gravel						
	Boring terminated at 14.00 ft	15					
		20					
		25					

GENERAL NOTES

Begin Drilling **05-15-2015** Complete Drilling **05-15-2015**
Drilling Contractor **Wang Testing Services** Drill Rig **Geoprobe HA**
Driller **F&J** Logger **R. KC** Checked by **C. Marin**
Drilling Method **1" IDA Pneumatic Geoprobe LB Sampler**

WATER LEVEL DATA

While Drilling ▽ **9.00 ft**
At Completion of Drilling ▼ **caved in**
Time After Drilling **NA**
Depth to Water ▼ **NA**

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

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BORING LOG 1829-HA-01

WEI Job No.: 1100-04-01

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

Datum: NAVD 88
Elevation: 594.00 ft
North: 1897944.89 ft
East: 1173122.57 ft
Station: 5172+19.16
Offset: 45.85 RT

Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
593.5	6-inch thick, gray CRUSHED STONE --FILL--						
592.1	Brown SILTY LOAM, little brick and concrete fragments --FILL--			1	PUSH	NP	11
590.5	Brown SANDY GRAVEL, some construction debris --FILL--			2	PUSH	NP	14
	--AUGER REFUSAL at 3.5'-- Boring terminated at 3.50 ft						
		5					
		10					
		15					

GENERAL NOTES

Begin Drilling **05-15-2015** Complete Drilling **05-15-2015**
Drilling Contractor **Wang Testing Services** Drill Rig **Geoprobe HA**
Driller **F&J** Logger **D. Kolpacki** Checked by **C. Marin**
Drilling Method **1" IDA Pneumatic Geoprobe LB Sampler**

WATER LEVEL DATA

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

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BORING LOG 1829-HA-02

WEI Job No.: 1100-04-01

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

Datum: NAVD 88
Elevation: 594.00 ft
North: 1897944.89 ft
East: 1173099.57 ft
Station: 5171+96.17
Offset: 44.91 RT

Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	Black and brown SANDY GRAVEL, trace wood fragments --FILL--			1	PUSH	NP	9
592.7	Very stiff (2.0P), dark brown SILTY CLAY, trace brick fragments --FILL--						
592.1	Black and brown SANDY GRAVEL, trace construction debris; moist --FILL--			2	PUSH	NP	11
				3	PUSH	NP	6
589.5	--AUGER REFUSAL at 4.5'-- Boring terminated at 4.50 ft	5					
		10					
		15					

GENERAL NOTES

Begin Drilling **05-15-2015** Complete Drilling **05-15-2015**
Drilling Contractor **Wang Testing Services** Drill Rig **Geoprobe HA**
Driller **F&J** Logger **RKC** Checked by **C. Marin**
Drilling Method **1" IDA Pneumatic Geoprobe LB Sampler**

WATER LEVEL DATA

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

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BORING LOG 41-RWB-01

WEI Job No.: 1100-04-01

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

Datum: NAVD 88
Elevation: 598.99 ft
North: 1897924.42 ft
East: 1173020.83 ft
Station: 5171+16.66
Offset: 62.1317 RT

Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
598.2	10-inch thick CONCRETE --PAVEMENT--					
598.0	CRUSHED STONE --BASE COURSE--		1	2 3 3	NP	13
	Very loose to medium dense, yellowish brown, fine to medium SAND, trace gravel and brick fragments --FILL--	5	2	5 6 4	NP	7
			3	1 2 1	NP	5
590.2	Stiff, brown and gray SILTY CLAY LOAM, trace gravel --FILL--	10	4	1 1 2	1.50 P	5
587.5	Loose, brown SILTY LOAM --Moist--		5	1 2 3	NP	25
	--%Gravel=0.3-- --%Sand=22.4-- --%Silt=72.2-- --%Clay=5.2-- --A-4 (0)--	15	6	1 2 3	NP	24
583.5	Medium stiff to stiff, gray SILTY CLAY, trace gravel		7	2 3 5	1.80 B	28
		20	8	2 2 2	0.90 B	25
578.5	Very soft to medium stiff, gray CLAY to SILTY CLAY, trace gravel --L_L(%)=28, P_L(%)=15--		9	0 0 0	0.25 B	36
	--%Gravel=2.9-- --%Sand=19.1-- --%Silt=49.3-- --%Clay=28.7--	25	10	0 0 0	0.25 B	23

Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	--A-6 (8) --		11	0 0 0	0.16 B	30
		30	12	0 0 0	0.16 B	36
		35	13	0 0 0	0.16 B	22
		40	14	0 0 0	NA	
		45	15	0 0 2	0.16 B	27
		50	16	0 0 0	0.41 B	26

GENERAL NOTES

Begin Drilling **10-20-2013** Complete Drilling **10-20-2013**
Drilling Contractor **Wang Testing Services** Drill Rig **CME-55 TMR**
Driller **R&J** Logger **A. Happel** Checked by **C. Marin**
Drilling Method **2.25" HSA to 15', mud rotary thereafter, boring backfilled upon completion**

WATER LEVEL DATA

While Drilling **Rotary wash**
At Completion of Drilling **unable to measure**
Time After Drilling **NA**
Depth to Water **NA**

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

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BORING LOG 41-RWB-01

WEI Job No.: 1100-04-01

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

Datum: NAVD 88
Elevation: 598.99 ft
North: 1897924.42 ft
East: 1173020.83 ft
Station: 5171+16.66
Offset: 62.1317 RT

Elevation (ft)	Soil and Rock Description	Depth (ft)	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
		55	17	0, 0, 2	0.49 B	24
		60	18	3, 7, 8	0.98 B	19
537.2	Very stiff to hard, gray SILTY CLAY, trace gravel					
		65	19	4, 8, 13	3.28 B	21
		70	20	8, 16, 16	3.69 B	12
		75	21	12, 16, 24	4.59 B	20
		80	22	8, 16, 14	3.61 B	21
517.2	Medium stiff, gray CLAY					
		85	23	4, 5, 8	0.75 P	31
510.2	Dense, gray SILTY LOAM					
		90	24	11, 11, 21	NP	21
507.2	Dense, gray GRAVELLY SAND --Wet--					
		95	25	12, 25, 18	NP	14
501.5	--DIFFICULT DRILLING-- --WEATHERED BEDROCK--					
500.4	Boring terminated at 98.60 ft		26	50/1	NA	
		100				

GENERAL NOTES

Begin Drilling **10-20-2013** Complete Drilling **10-20-2013**
Drilling Contractor **Wang Testing Services** Drill Rig **CME-55 TMR**
Driller **R&J** Logger **A. Happel** Checked by **C. Marin**
Drilling Method **2.25" HSA to 15', mud rotary thereafter, boring backfilled upon completion**

WATER LEVEL DATA

While Drilling **Rotary wash**
At Completion of Drilling **unable to measure**
Time After Drilling **NA**
Depth to Water **NA**

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BORING LOG 0461-B-09

WEI Job No.: 1100-04-01

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

Datum: NAVD 88
Elevation: 592.95 ft
North: 1897926.04 ft
East: 1173161.53 ft
Station: 5172+57.30
Offset: 66.2870 RT

Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	9-inch thick CONCRETE --PAVEMENT--					
592.2	Medium dense, brown SANDY LOAM, little gravel --FILL--		1	10 17 12	NP	8
589.9	Medium dense to dense, brown GRAVELLY SAND, some brick fragments and construction debris --FILL--	5	2	3 12 19	NP	11
			3	3 6 11	NP	22
584.9	Loose, brown, SILT and fine SAND --FILL--	10	4	5 4 3	NP	22
582.9	Medium stiff, brown CLAY LOAM, trace gravel --FILL--		5	1 2 2	0.82 B	27
579.9	Very soft to soft, gray CLAY to SILTY CLAY, trace gravel	15	6	0 0 1	0.16 B	24
			7	0 0 0	0.08 B	30
		20	8	0 00 0	0.08 B	23
			9	0 0 0	0.08 B	32
		25	10	0 0 0	0.16 B	34
			11	0 1 1	0.08 B	34
		30	12	0 0 0	0.08 B	28
		35	13	0 0 2	0.16 B	26
		40	14	0 1 2	0.16 B	26
		45	15	1 2 3	< 0.25 P	23
		50	16	0 1 3	0.49 B	26

GENERAL NOTES

Begin Drilling **10-30-2013** Complete Drilling **11-07-2013**
Drilling Contractor **Wang Testing Services** Drill Rig **D-50 TMR**
Driller **R&N** Logger **F. Bozga** Checked by **C. Marin**
Drilling Method **3.25" HSA to 10', mud rotary thereafter, boring backfilled upon completion**

WATER LEVEL DATA

While Drilling **Rotary wash**
At Completion of Drilling **31.50 ft**
Time After Drilling **NA**
Depth to Water **NA**

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BORING LOG 0461-B-09

WEI Job No.: 1100-04-01

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

Datum: NAVD 88
Elevation: 592.95 ft
North: 1897926.04 ft
East: 1173161.53 ft
Station: 5172+57.30
Offset: 66.2870 RT

Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type *recovery*	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
541.2	Stiff to hard, gray SILTY CLAY LOAM, trace gravel						
		55		17	3 5 6	> 4.50 P	14
		60		18	7 14 20	5.00 B	19
	--L_L(%)=24, P_L(%)=15-- --%Gravel=3.4-- --%Sand=19.3-- --%Silt=56.9-- --%Clay=20.4-- --A-4 (4)--	65		19	8 15 22	7.30 B	14
		70		20	7 10 16	1.97 B	18
521.2	Dense, gray SILTY LOAM						
		75		21	10 20 20	NP	12

Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type *recovery*	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
515.2	Loose, gray SILT with fine SAND interbeds						
		80		22	3 4 5	NP	22
511.2	Medium dense, gray, medium SAND						
		85		23	14 11 13	NP	15
506.9	Very dense, gray GRAVELLY SANDY LOAM --HARD DRILLING-- *--Possible Cobbles--*			24	100/6	NP	9
503.9	--WEATHERED BEDROCK--	90					
	--DIFFICULT DRILLING--						
501.4	Strong, light gray and white, good rock mass quality, bedded fresh DOLOSTONE, up to 18-inch beds, 7-inch joints spacing, horizontal and oblique joints with less than 0.1-inch infilling, hard joint wall, with stylolitic surfaces, and slightly vuggy porosity.	95		1	CORE		
	--Run 1 - RECOVERY=98%-- --RQD=78%--	100					

GENERAL NOTES

Begin Drilling **10-30-2013** Complete Drilling **11-07-2013**
Drilling Contractor **Wang Testing Services** Drill Rig **D-50 TMR**
Driller **R&N** Logger **F. Bozga** Checked by **C. Marin**
Drilling Method **3.25" HSA to 10', mud rotary thereafter, boring backfilled upon completion**

WATER LEVEL DATA

While Drilling ▽ **Rotary wash**
At Completion of Drilling ▼ **31.50 ft**
Time After Drilling **NA**
Depth to Water ▼ **NA**

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

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BORING LOG 0461-B-09

WEI Job No.: 1100-04-01

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

Datum: NAVD 88
Elevation: 592.95 ft
North: 1897926.04 ft
East: 1173161.53 ft
Station: 5172+57.30
Offset: 66.2870 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	491.4							
		Boring terminated at 101.50 ft						
			105					
			110					
			115					
			120					
			125					

GENERAL NOTES

Begin Drilling **10-30-2013** Complete Drilling **11-07-2013**
Drilling Contractor **Wang Testing Services** Drill Rig **D-50 TMR**
Driller **R&N** Logger **F. Bozga** Checked by **C. Marin**
Drilling Method **3.25" HSA to 10', mud rotary thereafter, boring backfilled upon completion**

WATER LEVEL DATA

While Drilling ▽ **Rotary wash**
At Completion of Drilling ▼ **31.50 ft**
Time After Drilling **NA**
Depth to Water ▼ **NA**

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

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BORING LOG 0461-PZ-01

WEI Job No.: 1100-04-01

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

Datum: NAVD 88
Elevation: 593.34 ft
North: 1898117.80 ft
East: 1173154.48 ft
Station: 5201+00.24
Offset: 80.2997 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type *recovery*	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
		--Drilled without sampling to 79 feet--						
			5					
		Piezometer Data: *--Installed in Dec. 2, 2014* *--Bentonite Seal 73 to 77 feet* *--Top of Sand Pack at 77 feet* *--Top of Screen at 80 feet* *--Screen Length 15 feet* *--Bottom of Screen at 95 feet*						
			10					
			15					
			20					
			25					

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type *recovery*	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
			30					
			35					
			40					
			45					
			50					

GENERAL NOTES

Begin Drilling **11-21-2014** Complete Drilling **12-02-2014**
Drilling Contractor **Wang Testing Services** Drill Rig **B-57 TMR**
Driller **R&J** Logger **D. Kolpacki** Checked by **CLM**
Drilling Method **4.25" HSA, monitoring water well**

WATER LEVEL DATA

While Drilling ▽ **77.00 ft**
At Completion of Drilling ▼ **77.00 ft**
Time After Drilling **NA**
Depth to Water ▽ **NA**

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

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BORING LOG 0461-PZ-01

WEI Job No.: 1100-04-01

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

Datum: NAVD 88
Elevation: 593.34 ft
North: 1898117.80 ft
East: 1173154.48 ft
Station: 5201+00.24
Offset: 80.2997 RT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
			55					
			60					
			65					
			70					
			75					

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	514.3	Medium dense, gray SILTY LOAM, little gravel --Wet--	80		1	5 6 12	NP	19
	511.1	Medium dense to very dense, gray GRAVELLY SAND --Saturated--	85		2	2 5 24	NP	11
			90		3	26 50/6	NR	
		--HARD DRILLING-- *--Possible Cobbles--*						
		--ROLLER BIT REFUSAL--	95		4	50/4	NP	9
	497.3	Boring terminated at 96.00 ft						
			100					

GENERAL NOTES

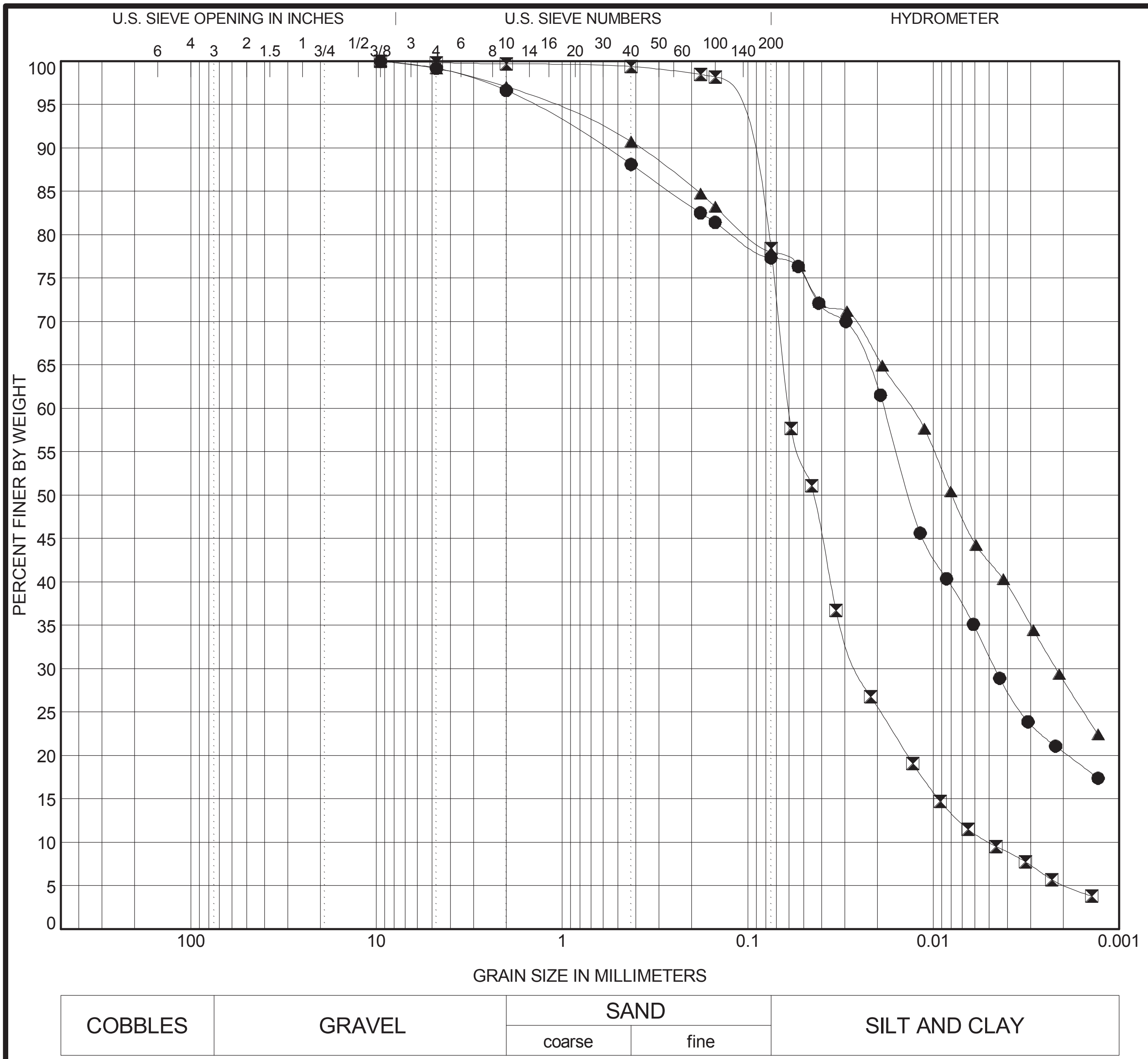
Begin Drilling	**11-21-2014**	Complete Drilling	**12-02-2014**
Drilling Contractor	**Wang Testing Services**	Drill Rig	**B-57 TMR**
Driller	**R&J**	Logger	**D. Kolpacki**
Checked by	**CLM**		
Drilling Method	**4.25" HSA, monitoring water well**		

WATER LEVEL DATA

While Drilling	**77.00 ft**
At Completion of Drilling	**77.00 ft**
Time After Drilling	**NA**
Depth to Water	**NA**

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

APPENDIX B



	Specimen Identification		IDH Classification	LL	PL	PI	Cc	Cu
●	0461-B-09#19	63.5 ft	**Silty Clay Loam**	24	15	9		
⧗	41-RWB-01#6	13.5 ft	**Silty Loam**	NP	NP	NP	2.09	11.99
▲	41-RWB-01#9	21.0 ft	**Silty Clay Loam**	28	15	13		

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	0461-B-09#19	63.5 ft	9.5	0.018	0.005		3.4	19.3	56.9	20.4
⧗	41-RWB-01#6	13.5 ft	9.5	0.06	0.025	0.005	0.3	22.4	72.2	5.2
▲	41-RWB-01#9	21.0 ft	9.5	0.013	0.002		2.9	19.1	49.3	28.7

WEI GRAIN SIZE IDH 11000401.GPJ US LAB.GDT 8/9/16

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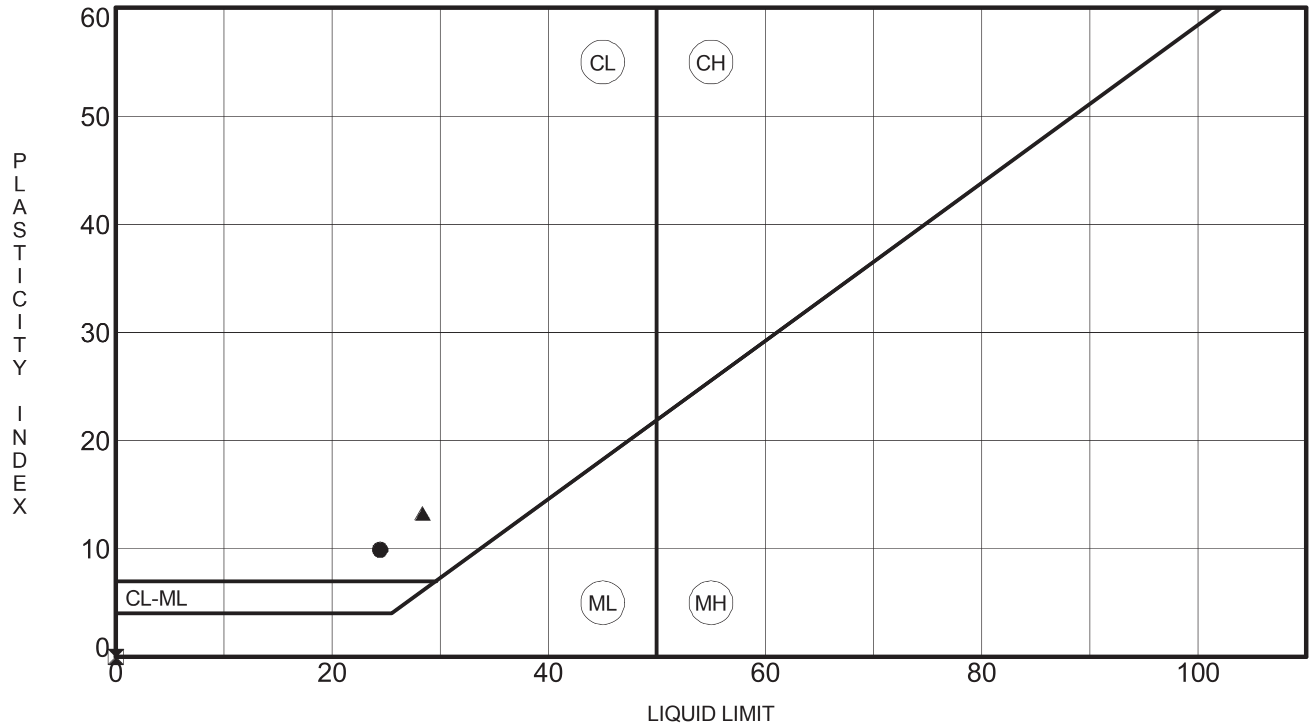
GRAIN SIZE DISTRIBUTION

Project: Circle Interchange Reconstruction

Location: Section 17, T39N, R14E of 3rd PM

Number: 1100-04-01



	Specimen Identification		LL	PL	PI	Fines	IDH Classification
●	**0461-B-09#19**	**63.5 ft**	**24**	**15**	**9**	**77**	**Silty Clay Loam**
⧗	**41-RWB-01#6**	**13.5 ft**	**NP**	**NP**	**NP**	**78**	**Silty Loam**
▲	**41-RWB-01#9**	**21.0 ft**	**28**	**15**	**13**	**78**	**Silty Clay Loam**

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ATTERBERG LIMITS' RESULTS

Project: Circle Interchange Reconstruction

Location: Section 17, T39N, R14E of 3rd PM

Number: 1100-04-01

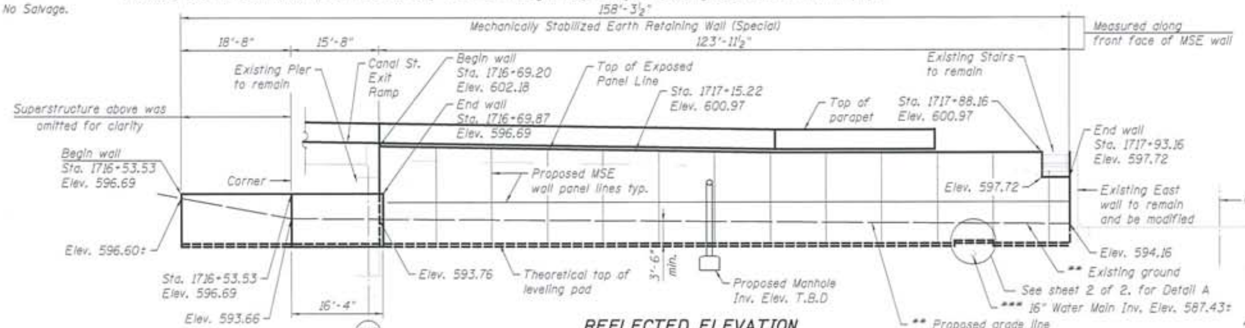
APPENDIX C

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

Traffic Control: Canal Street Exit Ramp will be closed during construction of the proposed wall. Ramp traffic will be detoured via local roads.

Existing Structure: The West, South & East retaining walls were built in 1953 are part of existing concrete ramp structure that carries Canal St. exit ramp from EB I-290.
The West, South & East walls are 34'-0", 129'-10¼" & 61'-0" in length, respectively. All existing walls are to remain in place.

No Salvage.



REFLECTED ELEVATION
(Looking at front face of MSE wall)

TABLE

Station	Existing ground and Proposed Grade at F.F. of Wall
1717+93.16	594.16
1717+88.16	594.16
1717+70.00	595.04
1717+50.00	593.78
1717+30.00	593.48
1717+10.00	593.26
1716+90.00	593.80
1716+69.20	593.76

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** See Table for Station and Elevation of Existing ground and Proposed grade line at Front Face of wall

*** Elevation taken from record drawings provided by Department of Water Management. Field verify as necessary.

DESIGN SPECIFICATIONS

2014 AASHTO LRFD Bridge Design Specifications, 7th Edition, with 2015 and 2016 Interims

DESIGN STRESSES

FIELD UNITS (New Construction)

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

PRECAST UNITS

f'c = 4,500 psi (Precast Panels)
fy = 60,000 psi (Reinforcement)

LIGHTWEIGHT CELLULAR CONCRETE FILL

Class III
Maximum Cast Density 42±2 pcf
f'c = 120 psi

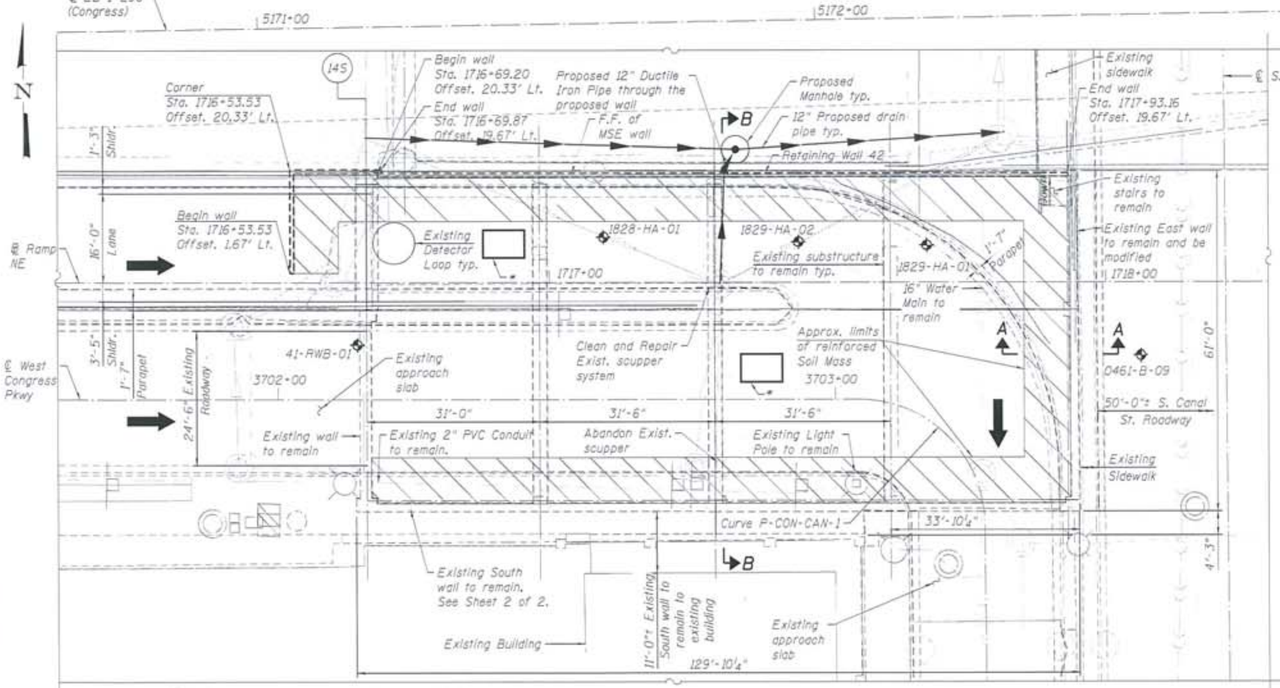
FIELD UNITS (Exist. Construction)

f'c = 3,500 psi
fy = 60,000 psi (Deck Reinforcement)
fy = 40,000 psi (Pier Reinforcement)
fy = 33,000 psi (ASTM A7)

HIGHWAY CLASSIFICATION

EB I-290 (Congress)
Functional Class: Interstate
ADT: 35,900 (2012); 37,000 (2040)
ADTT: 539 (2012); 555 (2040)
DHV: 2,820 (2040)
Design Speed: 50 m.p.h.
Posted Speed: 45 m.p.h.
One-Way Traffic
Directional Distribution: NA

S. Canal St.
Functional Class: Major Collector
ADT: N/A (2015); N/A (2040)
ADTT: N/A (2015); N/A (2040)
DHV: N/A (2040)
Design Speed: 30 m.p.h.
Posted Speed: 30 m.p.h.
Two-Way Traffic
Directional Distribution: 50:50



* Optional proposed access hole between existing beams to facilitate the construction of the proposed wall. Location and number to be determined during construction.

PLAN

Note:
Station and offsets are referenced to the Baseline of Ramp NE. Offsets are measured to the front face of the wall.

Notes:

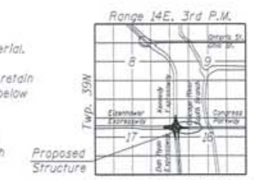
1. See Sheet 2 of 2 for section Detail A, Section A-A, Section B-B and profile sketches.
2. The existing detector loop/conduit/cables on the ramp from EB I-290 to Canal Street are to be abandoned.

SCOPE OF WORK

1. Remove approximately 3'-0" of unsuitable material.
2. Construct a new MSE Wall (S.N. 016-1829) to retain Lightweight Cellular Concrete Fill in the area below the existing concrete ramp structure.
3. Perform concrete repair and crack sealing on existing South and East retaining walls. Attach Soil Reinforcement to the existing South and East retaining walls that are part of the existing concrete ramp structure.

LEGEND:

Water Line
Electric
Telephone line
Television line
Combined Sewer
Storm Sewer
Soil Boring Location
F.F. Front Face
T.B.D To Be Determined



LOCATION SKETCH

GENERAL PLAN
RETAINING WALL 42
F.A.I. ROUTE 90/94/290
SECTION 2014-001R&B
COOK COUNTY
STATION 1716+69.20 TO 1717+93.16
STRUCTURE NO. 016-1829

PARSONS BRINCKERHOFF	USER NAME = aiknatib	DESIGNED - HA	REVISED -	STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION	F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
	PLOT SCALE = N.T.S.	CHECKED - MS	REVISED -		90/94/290	2014-001R&B	COOK	2	1
	PLOT DATE = 12/20/2016	DRAWN - DCP	REVISED -	SHEET NO. 1 OF 2 SHEETS			CONTRACT NO. 60X75		
		CHECKED - JJG	REVISED -		ILLINOIS FED. AID PROJECT				

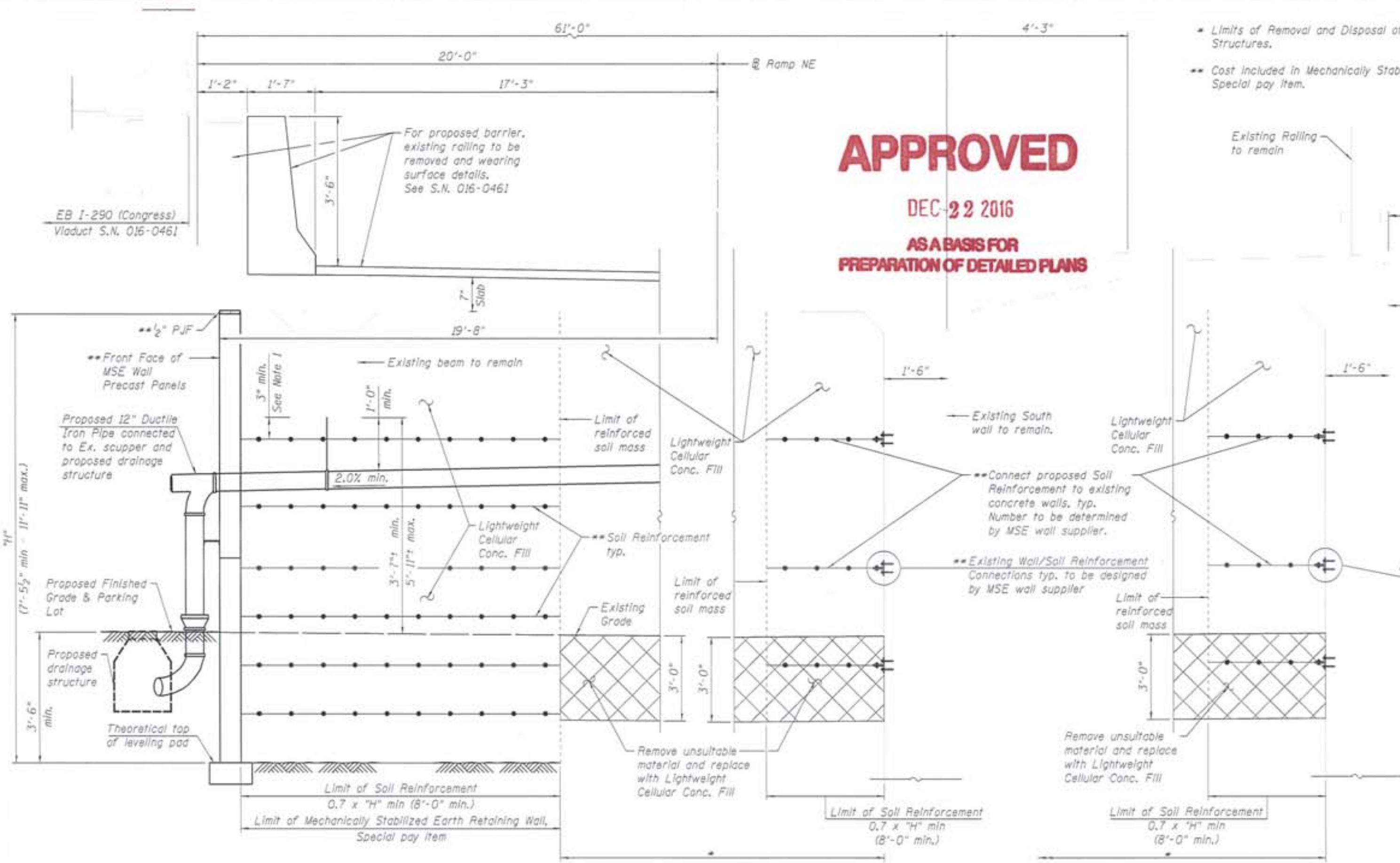
016-1829-CIRCLE100-SHT-PH-ST-TSL-001.dgn

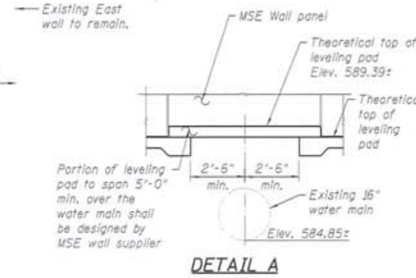
* Limits of Removal and Disposal of Unsuitable Material for Structures.

** Cost included in Mechanically Stabilized Earth Retaining Wall. Special pay item.

CURVE DATA
(Along ℄ W. Congress Pkwy)

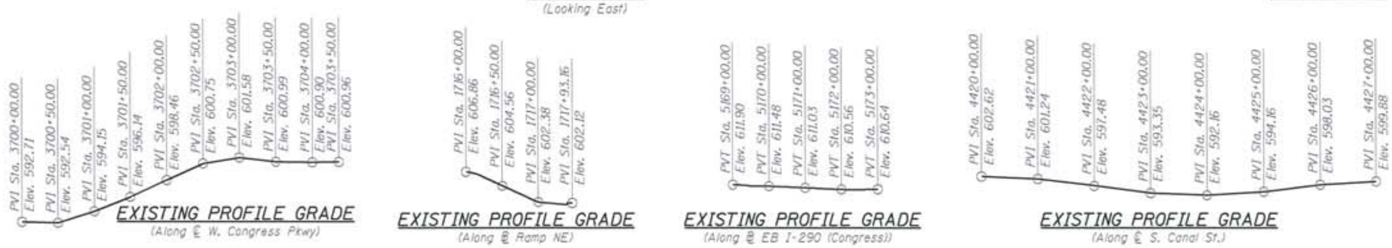
PROP. CURVE P-CON-CAN-1
PI Sta. = 3703+26.50
Δ = 89° 34' 44" (RT)
D = 254° 38' 52"
R = 22.50'
T = 22.34'
L = 35.18'
E = 9.20'
T.R. = NA
P.C. Sta. = 3703+04.17
P.T. Sta. = 3703+39.34





Notes.

1. MSE Wall supplier to design soil reinforcement to avoid conflict with existing beams.
2. Mechanically Stabilized Earth Retaining Wall. Special will use lightweight Cellular Concrete Fill as select backfill.
3. MSE Wall supplier shall design MSE Wall using properties of granular reinforced mass with minimum effective internal friction angle of 34 degrees & unit weight of 120 lbs/cu. ft. For embankment behind reinforced mass: an embankment consisting of Lightweight Cellular Concrete Fill with a unit weight of 120 lbs/cu.ft & an effective friction angle of 30 degrees shall be used in the wall system design.
4. Provide a min. of 2'-6" gap on either side of water main in the soil reinforcement to allow for any future maintenance/replacement of water main, see detail A.
5. For location of Section A-A & Detail A, see sheet 1 of 2.



APPROVED
DEC 22 2016
AS A BASIS FOR PREPARATION OF DETAILED PLANS

DETAILS
RETAINING WALL 42
F.A.I. ROUTE 90/94/290
SECTION 2014-001R&B
COOK COUNTY
STATION 1716+69.20 TO 1717+93.16
STRUCTURE NO. 016-1829

PARSONS BRINCKERHOFF	USER NAME = alkhatib	DESIGNED - HA	REVISED -	STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION	SHEET NO. 2 OF 2 SHEETS
	PLOT SCALE = N.T.S.	CHECKED - MS	REVISED -		
	PLOT DATE = 12/20/2016	DRAWN - DCP	REVISED -		
		CHECKED - JJG	REVISED -		

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
90/94/290	2014-001R&B	COOK	2	2
		CONTRACT NO. 60X75		
ILLINOIS FED. AID PROJECT				

016-1829-CIRCLE100-SHT-PB-ST-TSL-002.dgn