STRUCTURE GEOTECHNICAL REPORT
BARRINGTON ROAD IMPROVEMENT (F.A.P. 362)
RETAINING WALL FROM STA. 80+75 TO 83+43
PTB 194-001
D-91-312-2
COOK COUNTY, ILLINOIS

For
Ardmore Roderick
1500 W Carroll Ave., Suite 300
Chicago, IL 60607
(312) 795-1400

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

Original Report: February 17, 2023
Revised Report: NA

Technical Report Documentation Page

1. Title and Subtitle Structure Geotechnical Report Barrington Road Improvement (F.A.P. 362) Retaining Wall from Sta. 80+75 to Sta. 83+43		**2.Report Date:** February 17, 2023 **3. Report Type** ☒ SGR ☐ RGR ☒ Draft ☐ Final ☐ Revised
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6. PTB / Item No. 194/ 001	**7. Existing Structure Number(s)** 16-1294	**8. Proposed Structure Number(s)** NA
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11. Abstract

As part of the Barrington Road Improvement (F.A.P. 362) project a new retaining wall is proposed along northbound Barrington Road to support the proposed roadway widening. The wall will be about 268 feet long, extending from Station 80+75 to Station 83+43. The face of the wall will be constructed about 52.0 feet west of the existing roadway centerline. The wall will have a maximum total height of 11.8 feet. This report provides geotechnical recommendations for the design and construction of the proposed retaining wall.

Along the proposed wall alignment, the foundation soils consist of up to 11.6 feet of soft to very stiff clay loam to silty clay fill followed by up to 13.7 feet of very soft to stiff organic silty clay, clay, silt, and peat overlying medium stiff to very stiff silty clay to silty clay loam to the boring termination depths. Groundwater was recorded during the investigation at elevations of 843 to 828 feet.

Based on our analyses, we recommend ground improvement along the proposed MSE wall widening, about 268 feet in length, from Stations 80+75.00 to 83+43, and 20 feet in width, from offset -40'LT to -60'LT, to mitigate excessive settlements, insufficient slope stability FOS, insufficient bearing capacity, and possible further deterioration of peat. Ground improvement may consist of removal and replacement **(Option 1),** or pile supported embankments **(option 2)**. The removal and replacement include removal of soft soils (up to 13.5 feet deep below culvert base). The replacement material should consist of IDOT gradation CA-1 or equivalent, capped with a minimum 6 inches of IDOT gradation CA-6 or equivalent.

We understand the proposed MSE wall will be installed in an open cut excavation, with excavation to the top of leveling pad of about 10 feet. We recommend supporting the excavations with temporary steel sheet piling using the geotechnical parameters provided in the report.

Excavations for the construction of the MSE wall type will require dewatering efforts and possibly temporary soil retention systems. The control of groundwater may pose a significant challenge during construction.

12. Path to archived file

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Wang Engineering
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STRUCTURE GEOTECHNICAL REPORT
BARRINGTON ROAD IMPROVEMENT (F.A.P. 362)
RETAINING WALL FROM STA. 80+75 TO 83+43
COOK COUNTY, ILLINOIS
FOR
ARDMORE RODERICK

1.0 INTRODUCTION

This report presents the results of our subsurface investigation, laboratory testing, and geotechnical engineering evaluations in support of a new retaining wall proposed along northbound Barrington Road (F.A.P. 362) from Station 80+75 to Station 83+43. The retaining wall is located about 1,700 feet south of the intersection between Barrington Road and Algonquin Road. The proposed wall is part of the reconstruction of the 2.0-mile-long Barrington Road between Algonquin Road and Central Road in Cook County, Illinois. A *Site Location Map* is presented as Exhibit 1.

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

1.1 Proposed Structure

Based on the *General Plan and Elevation (GPE)* drawings provided by Ardmore Roderick (AR) on January 26, 2023, Wang Engineering, Inc. (Wang) understands that the new Retaining Wall is a fill wall and will measure about 268 feet in length, extending along northbound Barrington Road from Station 80+75 to Station 83+43, where it will meet a proposed new culvert. A Mechanically Stabilized Earth (MSE) wall type is currently shown on the plans. The face of the wall will be constructed at about 54.0 feet west of the existing Barrington Road centerline. The wall reaches a maximum height of 11.8 feet from top of levelling pad, with 8.3 feet retained, and will support the widened portion of the roadway that includes a new 10.0-foot wide shared-use path and a Type “B” gutter.

The retaining wall will connect to the proposed new culvert that will consist of 12 feet by 6 feet, 107.8 feet long, double cell box at Station 83+30. The new culvert will replace an existing culvert and will be constructed before the new wall.

1.2 Existing Structure and Land Use

There is no existing structure along the proposed retaining wall; however, a 7-foot wide by 5-foot high, 86.7 feet long, single cell box culvert is currently present at the wall's limit at Station 83+43. We understand this culvert will be removed and replaced by the larger and longer new culvert. Recommendations for the new culvert will be provided in a separate report. The surrounding land at the proposed wall site are wetlands on the east and west of the existing Barrington roadway, and poplar creek on the north with an existing culvert. Nearby the site are residential homes and the Willow Creek Care Center and Church.

2.0 METHODS OF INVESTIGATION

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

2.1 Field Investigation

The subsurface investigation along the proposed wall alignment consisted of three structure borings, designated as RWB-03 through RWB-05, three peat delineation borings, designated as PT-02, PT-03 and PT-04, and one Shelby tube boring (Boring RWB-03-ST) drilled by Wang in February, June, and July of 2022. The borings were drilled from elevations of 836.1 to 843.7 feet to depths of 20.0 to 30.0 feet below ground surface (bgs). The as-drilled boring coordinates were acquired with a mapping-grade GPS unit. Boring elevations, stations, and offsets were provided by AR. The boring location information is included in the *Boring Logs* (Appendix A) and the as-drilled locations are shown in the *Boring Location Plan* (Exhibit 3).

An ATV-mounted drilling rig equipped with hollow stem augers was used to advance and maintain open boreholes. 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 a depth of 30.0 feet bgs. Jackhammer driven Geoprobe samplers were used to continuously sample the soil in Borings PT-03 and PT-04. Soil samples collected from each sampling interval were placed in sealed jars and transported to the laboratory for further examination and laboratory testing. Undisturbed Shelby tube samples were obtained from Boring RWB-03-ST between depths of 14.0 and 20.0 feet bgs in accordance with AASHTO T 207, "*Thin-Walled Tube Sampling of Soils.*"

Field boring logs, prepared and maintained by a Wang field engineer, included lithological descriptions, visual-manual soil classifications, pocket penetrometer and Rimac unconfined

compressive strength tests, and results of field standard penetration test (SPT) results recorded as blows per 6 inches of penetration.

Groundwater levels were measured while drilling and at completion of the borings. At each boring location, the boreholes were backfilled upon completion with soil cuttings, and the surface was restored as close as possible to its original condition.

2.2 Laboratory Testing

Soil samples were tested in our laboratory for moisture content (AASHTO T 265). Atterberg limits (AASHTO T 89/90), particle size (AASHTO T 88) analysis, and organic content (AASHTO T 267) tests were performed on selected samples. A one-dimensional consolidation test (AASHTO T 216) was performed on an undisturbed sample from Boring RWB-03-ST. Field visual descriptions of soil samples were verified in the laboratory and index tested soils were classified according to the IDH Soil Classification System. The laboratory test results are shown in the *Boring Logs* (Appendix A) and *Laboratory Test Results* (Appendix B).

3.0 INVESTIGATION RESULTS

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). The following sections provide a summary of the soil conditions along the proposed retaining wall alignment. 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.

3.1 Lithological Profile

At the surface, borings encountered 6 to 17 inches of black and brown, silty clay and sandy loam topsoil. In descending order, the general lithologic succession encountered beneath the surface includes: 1) man-made ground (fill); 2) very soft to stiff organic silty clay, clay, silt, and peat; 3) very soft to stiff clay, silty clay to silty clay loam; and 4) medium stiff to very stiff silty clay to silty clay loam.

(1) Man-made ground (fill)

Underneath the topsoil, the borings encountered 7.2 to 11.6 feet of soft to very stiff, black, brown, and gray clay loam to silty clay fill with unconfined compressive strength (Q_u) values of 0.4 to 3.2 tsf and moisture content values of 16 to 26%. Laboratory index testing on a sample from this layer shows a L_L value of 43% and a P_L value of 20%.

(2) Very soft to stiff organic silty clay, clay, silt, and peat

At elevations of 827 to 836 feet (0 to 17.0 feet bgs), the borings advanced through 2.5 to 13.7 feet of very soft to stiff, black, brown, and gray organic silty clay, clay, silt, and peat with moist to saturated, loam to sandy loam interbeds. This layer has Q_u values of less than 0.2 to 1.0 tsf, averaging 0.4 tsf, moisture content values of 43 to 595%, averaging 212%, and organic content values of 44 and 189%.

(3) Very soft to stiff clay, silty clay to silty clay loam

At elevations of 822 to 833 feet (9.3 to 15.5 feet bgs), a 0.9- to 2.5-foot thick layer of very soft to stiff, gray clay, silty clay to silty clay loam was sampled with interbeds of moist to saturated sand. This layer has Q_u values of less than 0.2 to 1.0 tsf, averaging 0.5 tsf, moisture content values of 24 to 33%, averaging 28%, and organic content value of 8%. Laboratory index testing on samples from this layer revealed L_L and P_L values of 43 to 45% and 17 to 20%, respectively.

(4) Medium stiff to very stiff silty clay to silty clay loam

At elevations of 821 to 825 feet (depths of 12.8 to 23.0 feet bgs), the borings advanced through medium stiff to very stiff, gray, silty clay to silty clay loam to the boring termination depths. This layer has Q_u values of 0.5 to 3.0 tsf, averaging 1.7 tsf, and moisture content values of 16 to 23%, averaging 19%.

3.2 Groundwater Conditions

Groundwater was encountered while drilling at elevations of 828 to 843 (1.0 to 8.5 feet bgs). At the completion of drilling, the groundwater was not observed. For the purposes of engineering analyses, the groundwater table is estimated to be at an elevation of 836 feet. The granular interbeds and granular fill was often encountered moist to saturated; if excavations are made into or through these layers, dewatering efforts should be anticipated. Sump pumps should be able to control groundwater flow and maintain a dry working area. During periods of precipitation, we anticipate that perched groundwater may pond within the sag and peat areas and will impact the roadway or pavement design. It should be noted that groundwater levels might change with seasonal rainfall patterns and long-term climate fluctuations or may be influenced by local site conditions.

4.0 FOUNDATION ANALYSIS AND RECOMMENDATIONS

We understand an MSE wall type is proposed to support the widened portion of the roadway with a new 10.0-foot wide shared-use path and a Type "B" gutter retaining a maximum 8.3 feet of wall, to be constructed along the west side of the northbound Barrington Road from Station 80+75 to Station 83+43, where it will meet a new culvert at its north end. We understand the new culvert will be installed before the retaining wall.

The drawings indicate that the wall's top of levelling pad is proposed at about 833.5 and will receive up to 8 feet of new fill along the new wall and existing roadway slope. The finished grade in front of the wall will be graded at a slope of 1: 3 (V: H).

The subgrade soils below the proposed retaining wall levelling pad footprint consist of very soft organic silty clay to peat extending to an elevation of about 820.00 feet, thus about 13.5 feet thick. Highly organic soils are unsuitable for use in subgrades because they are usually unstable and may experience excessive settlement (IDOT 2020). We have undertaken evaluations to determine the settlement, bearing capacity, sliding, and global stability of the proposed MSE wall with standard backfill and provided ground remediation options based on the results.

4.1 Seismic Design Considerations

Seismic design is not required for retaining wall structures located in Seismic Performance Zone (SPZ) 1 in accordance with the IDOT *Bridge Manual* (2012).

4.2 Settlement

We performed settlement analyses at the highest wall location in the soft soil and peat areas using the FoSSA computer program. The proposed roadway widening will require the placement of up to 8.3 feet of new fill placement along the proposed MSE wall and the widened portions. Our evaluations show estimated long-term settlements of over 4 inches. It should also be noted that settlement of peat is very difficult to predict and maybe continuing over time due to organic deterioration (secondary compression) over time. Therefore, corrective measures are needed to mitigate the excessive settlements as outlined in section 4.5.

4.3 Bearing Resistance and Sliding

The top of the levelling pad for MSE walls should be established at a minimum of 3.5 feet below the

finished grade at the front face of the wall (IDOT 2012). MSE walls should be constructed in accordance with IDOT Section 522 (IDOT 2022). The width of the MSE reinforcement zone should be taken as 0.7 times the total height or a minimum of 8.0 feet (AASHTO 2020).

From the *GPE* drawings (Appendix D), we evaluated the external stability of the MSE wall with a maximum total height of 11.8 feet. Based on our analysis of the wall with widths of 0.7 times the maximum height, we estimate the sliding along the silty soils has sufficient resistance and the eccentricity lies within the required middle 2/3 of the wall (AASHTO 2020), however, bearing capacity was determined unsatisfactory. The factored bearing resistance available was about 900 psf compared to the applied maximum factored bearing pressure of 4,200 psf. Therefore, corrective measures are needed to mitigate the insufficient bearing capacity as outlined in section 4.5.

4.4 Global Stability

The global stability of the proposed wall was analyzed using *Slide v6* computer software with the Bishop Simplified Method of analysis based on the soil profile described in Section 3.1 and the information provided in the design drawings and cross-sections. The stability was analyzed at the critical section with the maximum exposed height is 8.3 feet. The minimum required factor of safety (FOS) is 1.5 in both short-term (undrained) and long-term (drained) conditions (IDOT 2020). We estimate the wall will have FOSs of 1.7 and 1.0 in the undrained and drained conditions, respectively. Therefore, the global stability of the wall in drained conditions is inadequate, thus corrective measures are needed to improve the stability. Details of the global stability analysis with critical failure surfaces and results are presented in Appendix C.

4.5 Ground Improvement Recommendations

Based on our analyses, we recommend ground improvement along the proposed MSE wall widening, about 268 feet in length, from Stations 80+75.00 to 83+43.00, and 20 feet wide, from -40’LT to -60’LT, to mitigate excessive settlements, insufficient drained Slope Stability FOS, insufficient bearing capacity, and possible further deterioration of peat. The ground improvement methods may consist of the following:

Removal and Replacement – Option 1: This will involve the removal of the weak and compressible soils such as the very soft organic silty clay to peat, then replacement with IDOT gradation CA-1 or equivalent, capped with a minimum 6 inches of IDOT gradation CA-6 or equivalent. It should be noted that the removal and replacement will extend up to an elevation of about 820 feet, that is up to

13.5 feet of removal and replacement which is deep – the economics may be questionable beyond 12 feet of removal (IDOT, 2020). It should be noted that the removal and replacement will extend below the groundwater level that is estimated to elevations of approximately 836 feet, thus dewatering efforts will be required as well as temporary retention systems. A temporary soil retention system will be required for removal and replacement. It should be noted that water can be a significant issue during deep replacement and large shoring systems can be costly. Prior to placement of replacement material, we recommend installing fabric for ground stabilization in accordance with IDOT Section 210 (IDOT 2016). In addition, the following note should be shown in the plans.

"The limits and quantities of removal and replacement shown are based on the boring data may be modified by the District Geotechnical and Field Engineers for variable subsurface conditions encountered in the field"

Pile Supported Embankment (PSE) – Option 2: The PSE system has been used at several locations within the State of Illinois to successfully support both roadway embankments as well as earth retaining structures. The columns support the embankment and load transfer platform above via optional, square, or round pile caps. The load from the embankment is distributed along the load transfer platform, which transfers the system load to the columns. The columns then transmit the load into the more competent strata below. Timber to metal piles or rigid inclusions generally fulfill this role. Timber piles would be the least expensive option while metal piles would be the most expensive option. A Geosynthetic-reinforced Load Transfer Platform (LTP) will be placed above the pile caps and collect the culvert and embankment load and transfer it to the pile caps. The platform consists of compacted, select, granular fill material, typically IDOT aggregate gradation CA-19, with layers of geosynthetics placed at specifically designed levels.

In our opinion, the options are technically feasible; however, we recommend preforming a cost and constructability analysis to choose a preferred option.

4.6 Temporary Shoring Recommendations

We understand the proposed MSE wall will be installed in an open cut excavation, with excavation to the top of leveling pad of about 10 feet. If the soil cannot be graded at a slope of 1:2 (V: H), particularly the organic soils near the base of the excavation, we recommend supporting the excavations with temporary steel sheet piling designed in accordance with the temporary sheet

piling charts provided in IDOT *Design Guide-Simplified Temporary Sheet Piling Design Charts* (IDOT 2020). Due to the presence of groundwater below the base of the excavation where the sheet pile will be installed, significant dewatering efforts may be necessary for groundwater control. If open excavations are proposed, significant pumping efforts may be necessary to maintain a dry subgrade.

A Temporary Soil Retention System (TSRS) may be required during the construction of the proposed MSE wall. Recommended parameters for the design of the TSRS are provided in Table 1.

Table 1: Geotechnical Parameters for Design of Temporary Support System
(Reference Boring RWB-03 to RWB-05, PT-03, PT-04)

Soil Description Elevation	Unit Weight γ (pcf)	Undrained Shear Strength Properties		Earth Pressure Coefficients	
		Cohesion (psf)	Friction Angle (°)	Active Pressure (straight)	Passive Pressure (Straight)
Stiff CL LOAM to SI CLAY FILL EL. 843 to 836 feet	120	1300	0	1.00	1.00
Very Soft Organic SI CLAY and PEAT EL. 836 to 820.7 feet	48 (1)	200	0	1.00	1.00
Stiff SI CLAY to SI CL LOAM EL. 820.7 to 813 feet	58 (1)	1800	0	1.00	1.0

(1) Submerged unit weight

6.0 CONSTRUCTION CONSIDERATIONS

6.1 Excavation, Dewatering, and Utilities

Excavations should be performed in accordance with local, state, and federal regulations. The potential effect of ground movements upon nearby roadways, utilities should be considered during construction. Given the presence of the unstable peat and soft organic soils, any unsupported excavation should be analyzed for stability. Any slope that cannot be graded should be properly shored and dewatering will be necessary. Excavated material should not be stockpiled immediately adjacent to the top of slopes, nor should equipment be allowed to operate too closely to open excavations. We recommend considering Temporary Soil Retention System (TSRS). The TSRS can be included as *Pay Item.*

Excavations for ground improvement and installation of the MSE wall will encounter groundwater and appropriate measures should be taken to remove the water or control the flow into the excavation prior to placing material. If open excavations are proposed, significant pumping efforts may be necessary to maintain a dry subgrade for compaction. Precipitation allowed to enter excavations should be immediately removed via sump pump. Any soils allowed to soften under standing water should be removed and replaced with compacted fill as described in Section 6.3.

6.2 Filling and Backfilling

Fill material used to attain the final design elevations should be structural fill material. Coarse aggregate of IDOT gradation CA-6 or pre-approved, compacted, cohesive or granular soil conforming to Section 204 would be acceptable as structural fill (IDOT, 2022). The fill material should be free of organic matter and debris and should be placed in lifts and compacted according to IDOT Section 205, *Embankment* (IDOT, 2022).

6.3 Reuse of Excavated Materials

Excavated soils and granular subbase material from within the project limits may be reused in embankments if it meets requirements of IDOT Standard Specifications Section 204 and IDOT District One Special Provision *Embankment I*.

6.4 Earthwork Operations

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

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 wall are planned, we should be timely informed so that our recommendations can be adjusted accordingly.

It has been a pleasure to assist Ardmore Roderick 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.
QA/QC Reviewer

Andri A. Kurnia, P.E.
Project Manager

REFERENCES

AMERICAN ASSOCIATION OF STATE HIGHWAY TRANSPORTATION OFFICIALS (2020) *AASHTO LRFD Bridge Design Specification.* United States Depart of Transportation, Washington, D.C.

ILLINOIS DEPARTMENT OF TRANSPORTATION (2020) *Geotechnical Manual.* IDOT Bureau of Materials and Physical Research, Springfield, IL.

ILLINOIS DEPARTMENT OF TRANSPORTATION (2022) *Standard Specifications for Road and Bridge Construction.* IDOT Division of Highways, Springfield, IL.

ILLINOIS DEPARTMENT OF TRANSPORTATION (2012) *Bridge Manual.* IDOT Division of Highways, Springfield, IL.

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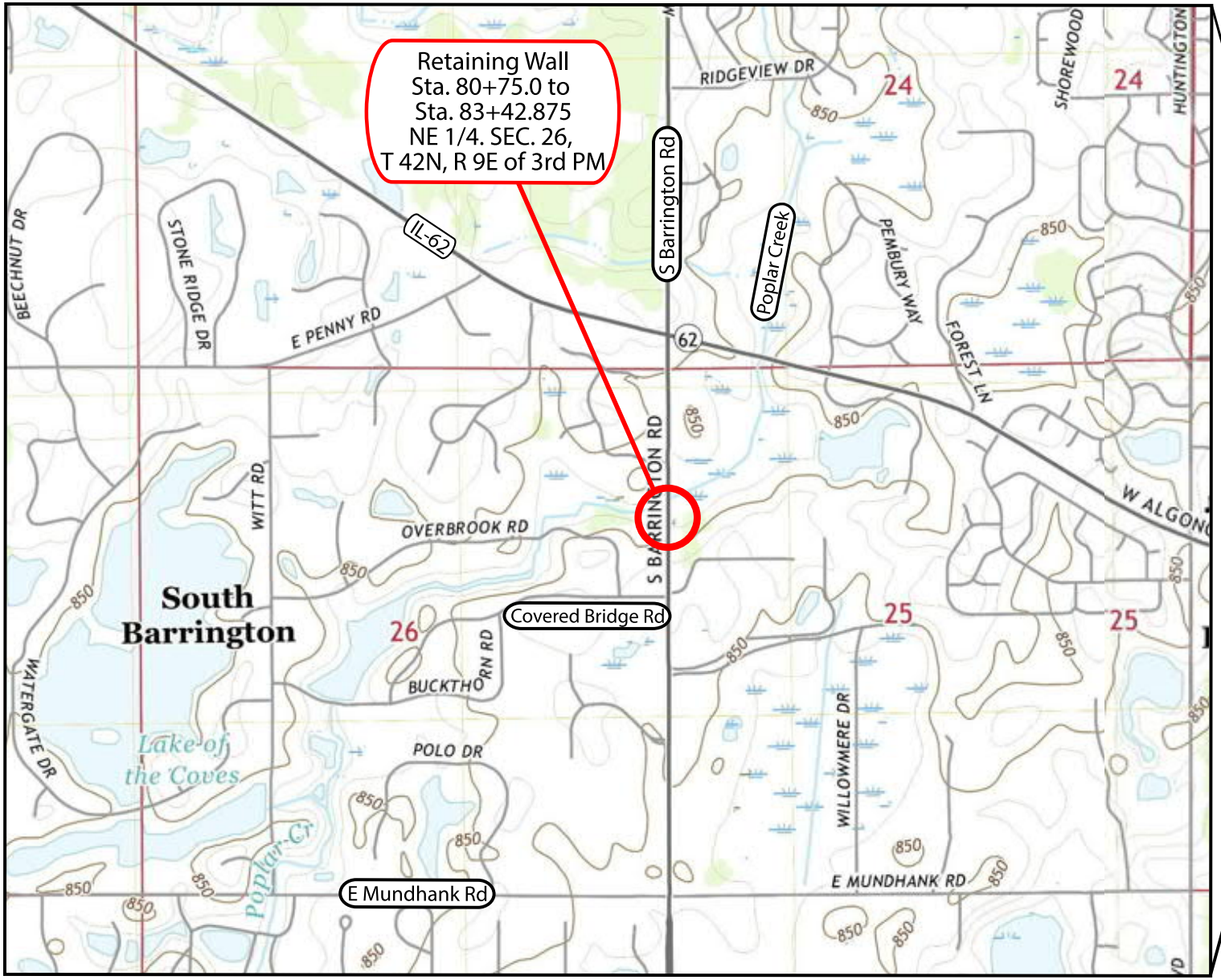
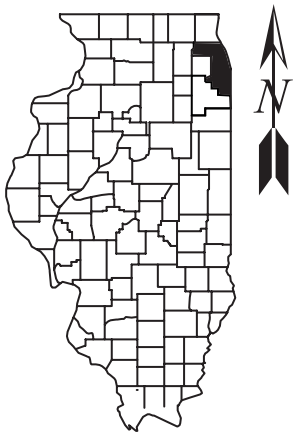
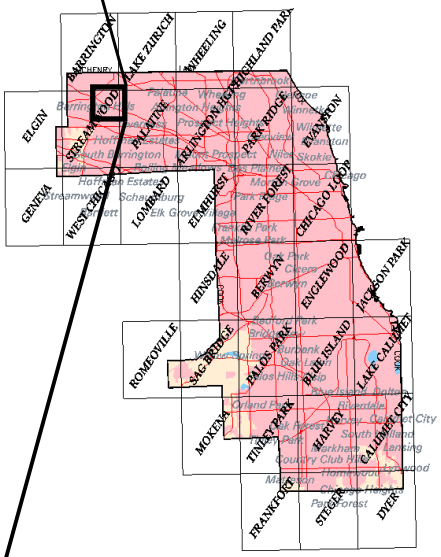
EXHIBITS







Cook County

Legend

Site Locations

Scale

0 0.5 1.0 Miles

SITE LOCATION MAP: BARRINGTON ROAD FROM ALGONQUIN ROAD TO CENTRAL ROAD; RETAINING WALL, STA. 80+75.0 TO STA. 83+42.875, COOK COUNTY, ILLINOIS

SCALE: GRAPHICAL	EXHIBIT 1	DRAWN BY: D. You CHECKED BY: A. Kurnia

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FOR ARDMORE RODERICK

KE225002
1064-01-01

Legend

- Retaining Wall Boring
- Peat Boring

Scale

0 — 100 — 200 feet

BORING LOCATION PLAN: BARRINGTON ROAD FROM ALGONQUIN ROAD TO CENTRAL ROAD; RETAINING WALL, STA. 80+75.0 TO STA. 83+42.875, COOK COUNTY, ILLINOIS

SCALE: GRAPHICAL	EXHIBIT 2	DRAWN BY: D. You CHECKED BY: A. Kurnia

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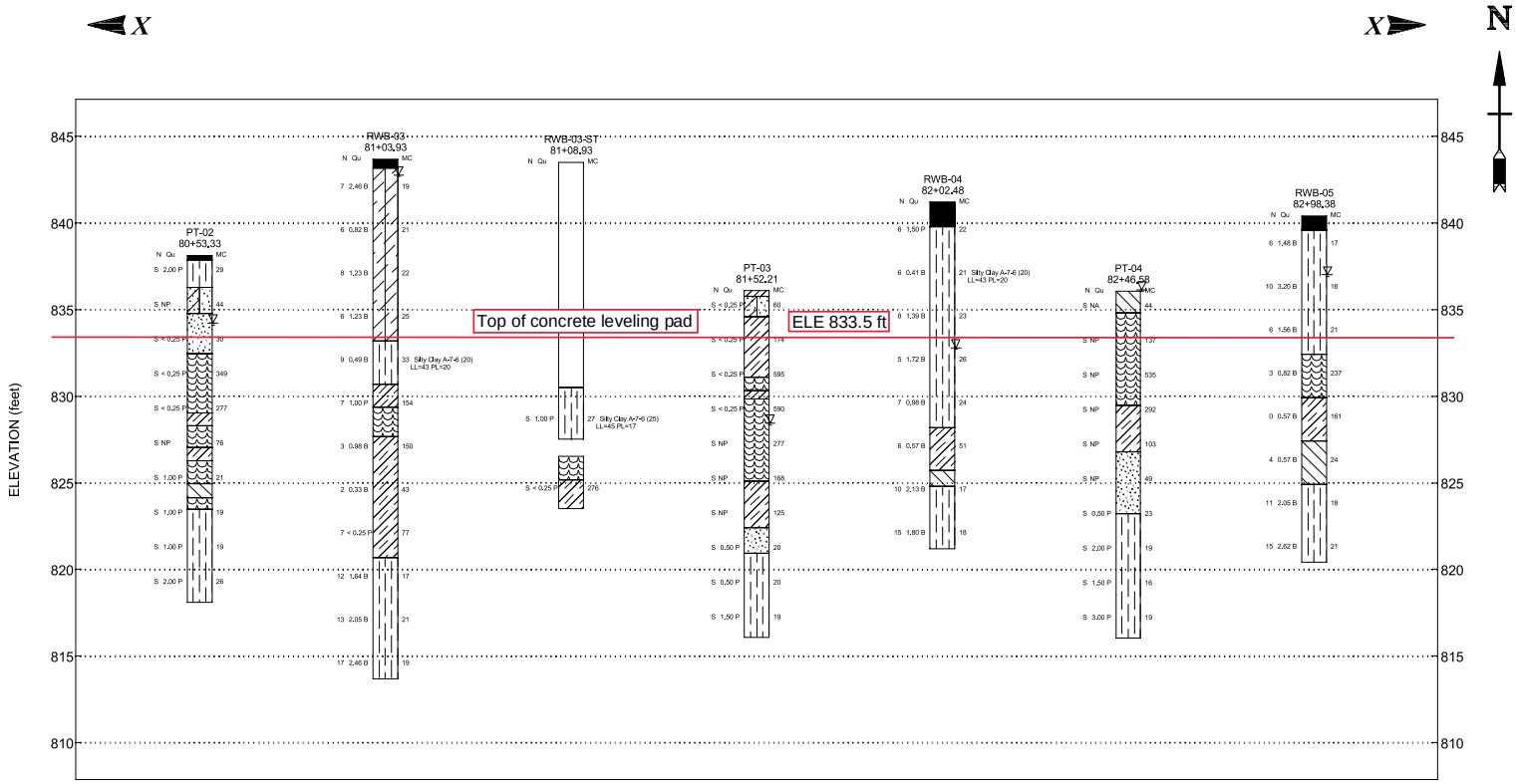
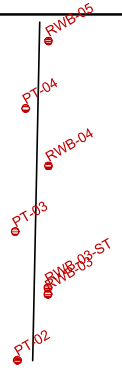
FOR ARDMORE RODERICK

KE225002
1064-01-01



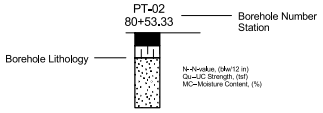
Lithology Graphics

- Topsoil
- USCS Peat
- IDH Silty Clay, Silty Clay Loam
- USCS High Plasticity Organic silt or clay
- IDH Loam
- IDH Clay
- IDH Sand, Sandy Loam
- IDH Clay Loam



Site Map Scale 1 inch equals 95 feet

Explanation:



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

0 29

Horizontal Scale (feet)

Vertical Exaggeration: 4x

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Sta.81+00
SOIL PROFILE

WEI SINCE 1982

Barrington Rd from Algonquin Rd to Central Rd
Cook County, IL

JOB NUMBER	PLATE NUMBER
1064-01-01	EXHIBIT 3

WEI 11X17 10640101-1.GPJ WANGENG.GDT 2/13/23

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APPENDIX A

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BORING LOG PT-02

WEI Job No.: 1064-01-01

Client: **Ardmore Roderick**
Project: **Barrington Rd from Algonquin Rd to Central Rd**
Location: **Cook County, IL**

Datum: NAVD 88
Elevation: 838.12 ft
North: 1975993.57 ft
East: 1036372.61 ft
Station: 80+53.33
Offset: 67.22 LT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type / recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	837.9	3-inch thick, dark brown SILTY CLAY LOAM; damp --TOPSOIL--			1	PUSH	2.00 P	29
	836.3	Very stiff, gray SILTY CLAY, trace gravel; damp --FILL--			2	PUSH	NP	44
	834.8	Black LOAM to SANDY LOAM, trace gravel; moist						
		Gray, medium to coarse SAND, trace gravel; damp to saturated	5		3	PUSH	< 0.25 P	30
	832.5	Very soft, black PEAT, trace gravel and organics; moist to wet			4	PUSH	< 0.25 P	349
	829.0	Gray, organic SILT; moist			5	PUSH	< 0.25 P	277
	828.3	Very soft (<0.25P), black PEAT; wet	10		6	PUSH	NP	76
	827.0	Gray, organic SILT; moist						
	826.3	Very soft (<0.25P), dark brown PEAT; wet			7	PUSH	1.00 P	21
	825.0	Stiff, gray CLAY to SILTY CLAY; moist						
	824.1	Very soft (<0.25P), black PEAT; wet			8	PUSH	1.00 P	19
	823.5	Stiff to very stiff, gray SILTY CLAY, trace gravel; moist	15		9	PUSH	1.00 P	19
					10	PUSH	2.00 P	26
	818.1	Boring terminated at 20.00 ft	20					

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

GENERAL NOTES

Begin Drilling: **06-28-2022** Complete Drilling: **06-28-2022**
Drilling Contractor: **Wang Testing Services** Drill Rig: **Geoprobe HA**
Driller: **KS&PH** Logger: **A. Scifers** Checked by: **C. Marin**
Drilling Method: **1" ID HSA; Boring backfilled upon completion**

WATER LEVEL DATA

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

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BORING LOG PT-03

WEI Job No.: 1064-01-01

Client: **Ardmore Roderick**
Project: **Barrington Rd from Algonquin Rd to Central Rd**
Location: **Cook County, IL**

Datum: NAVD 88
Elevation: 836.08 ft
North: 1976092.45 ft
East: 1036370.94 ft
Station: 81+52.21
Offset: 68.46 LT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type / recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	835.8	Very soft, gray Organic SILTY CLAY, trace gravel; moist			1	PUSH	< 0.25 P	60
	834.6	Black LOAM to SANDY LOAM, trace gravel and organic matter; moist						
		Very soft, black Organic SILTY CLAY LOAM; moist			2	PUSH	< 0.25 P	174
	831.1		5		3	PUSH	< 0.25 P	595
		Very soft, black PEAT; wet						
	830.3							
	829.8	Black Organic SILT; wet						
		Very soft, brown and black PEAT, some methane odor; moist ▽			4	PUSH	< 0.25 P	590
					5	PUSH	NP	277
			10					
	825.1				6	PUSH	NP	168
		Gray, black and brown Organic SILT; wet to saturated --alternating beds of sand and silt seams-- --silty clay seams--			7	PUSH	NP	125
	822.4							
		Gray, medium SAND, trace gravel; saturated			8	PUSH	0.50 P	20
	820.9		15					
		Medium stiff to stiff, gray SILTY CLAY, trace gravel; moist			9	PUSH	0.50 P	20
					10	PUSH	1.50 P	19
	816.1		20					
		Boring terminated at 20.00 ft						

GENERAL NOTES

Begin Drilling: **06-28-2022** Complete Drilling: **06-28-2022**
Drilling Contractor: **Wang Testing Services** Drill Rig: **Geoprobe HA**
Driller: **KS&PH** Logger: **A. Scifers** Checked by: **C. Marin**
Drilling Method: **1" ID HSA; Boring backfilled upon completion**

WATER LEVEL DATA

While Drilling ▽: **7.75 ft**
At Completion of Drilling ▼: **Dry**
Time After Drilling: **NA**
Depth to Water ▼: **NA**

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BORING LOG PT-04

WEI Job No.: 1064-01-01

Client: **Ardmore Roderick**
Project: **Barrington Rd from Algonquin Rd to Central Rd**
Location: **Cook County, IL**

Datum: NAVD 88
Elevation: 836.05 ft
North: 1976186.85 ft
East: 1036378.86 ft
Station: 82+46.58
Offset: 60.13 LT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type / recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
		Gray CLAY to SILTY CLAY, trace organic matter; moist			1	PUSH	NA	44
	834.8	Black to dark brown PEAT; moist			2	PUSH	NP	137
			5		3	PUSH	NP	535
	829.5	Brown and gray ORGANIC SILT, few sand seams; moist			4	PUSH	NP	292
	826.8	Gray SAND, trace gravel; moist to saturated			5	PUSH	NP	103
			10		6	PUSH	NP	49
	823.2	Medium stiff to very stiff, gray SILTY CLAY, trace gravel; moist			7	PUSH	0.50 P	23
			15		8	PUSH	2.00 P	19
					9	PUSH	1.50 P	16
					10	PUSH	3.00 P	19
	816.1	Boring terminated at 20.00 ft	20					

GENERAL NOTES

Begin Drilling: **07-05-2022** Complete Drilling: **07-05-2022**
Drilling Contractor: **Wang Testing Services** Drill Rig: **Geoprobe HA**
Driller: **AG&TC** Logger: **A. Scifers** Checked by: **C. Marin**
Drilling Method: **1" ID HSA; Boring backfilled upon completion**

WATER LEVEL DATA

While Drilling: **0.00 ft**
At Completion of Drilling: **NA**
Time After Drilling: **NA**
Depth to Water: **NA**

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BORING LOG RWB-03

WEI Job No.: 1064-01-01

Client: **Ardmore Roderick**
Project: **Barrington Rd from Algonquin Rd to Central Rd**
Location: **Cook County, IL**

Datum: NAVD 88
Elevation: 843.68 ft
North: 1976044.28 ft
East: 1036395.93 ft
Station: 81+03.93
Offset: 43.67 LT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type / recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	843.2	6-inch thick, brown SANDY LOAM, trace gravel						
		--TOPSOIL--						
		Medium stiff to very stiff, gray CLAY LOAM to SILTY CLAY, trace gravel; moist			1	4 3 4	2.46 B	19
		--FILL--						
		--RDR 2--			2	2 2 4	0.82 B	21
			5					
		--silt seams--			3	3 3 5	1.23 B	22
					4	3 3 3	1.23 B	25
			10					
	833.2	Soft, gray SILTY CLAY, trace gravel; moist			5	3 4 5	0.49 B	33
		--RDR 2--						
		--L_L(%)=43, P_L(%)=20--						
		--%Gravel=2.0--						
	830.7	--%Sand=12.8--						
		--%Silt=52.2--						
		--%Clay=33.0--						
		--A-7-6 (20)--						
	829.4	Stiff, gray Organic SILTY CLAY; moist			6	3 4 3	1.00 P	154
			15					
		--RDR 2--						
	827.7	Very soft (<0.25P), black PEAT; moist						
		Very soft to medium stiff, dark gray to gray Organic SILTY CLAY, few peat lenses; moist			7	3 1 2	0.98 B	150
		--RDR 2--						
					8	1 1 1	0.33 B	43
			20					
	820.7	Stiff to very stiff, gray SILTY CLAY to SILTY CLAY LOAM, trace gravel; moist			9	2 3 4	< 0.25 P	77
		--RDR 2--			10	4 6 6	1.64 B	17
			25					
					11	4 5 8	2.05 B	21
					12	6 7 10	2.46 B	19
	813.7		30					
		Boring terminated at 30.00 ft						
			35					
			40					

GENERAL NOTES

Begin Drilling: **02-08-2022** Complete Drilling: **02-08-2022**
Drilling Contractor: **Wang Testing Services** Drill Rig: **21D50A [84%]**
Driller: **KS&AP** Logger: **A. Scifers** Checked by: **C. Marin**
Drilling Method: **2.25" ID HSA; Boring backfilled upon completion**

WATER LEVEL DATA

While Drilling: **1.00 ft**
At Completion of Drilling: **Dry**
Time After Drilling: **NA**
Depth to Water: **NA**

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BORING LOG RWB-03-ST

WEI Job No.: 1064-01-01

Client: **Ardmore Roderick**
Project: **Barrington Rd from Algonquin Rd to Central Rd**
Location: **Cook County, IL**

Datum: NAVD 88
Elevation: 843.51 ft
North: 1976049.28 ft
East: 1036395.93 ft
Station: 81+08.93
Offset: 43.65 LT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type / recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
		--blind drilling, 0 to 14 feet --						
	830.5	Stiff, gray SILTY CLAY, trace gravel; moist --organic content: 7.9%-- --L_L(%)=45, P_L(%)=17-- --%Gravel=1.2-- --%Sand=11.4-- --%Silt=50.2-- --%Clay=37.2-- --A-7-6 (25)--	15		1	PUSH	1.00 P	27
	827.5	Very soft, black and gray PEAT --organic content: 189%--						
	825.2	Very soft, gray Orgnaic SILTY CLAY, trace gravel; moist --organic content: 43.8%--			2	PUSH	< 0.25 P	276
	823.5	Boring terminated at 20.00 ft	20					

GENERAL NOTES

Begin Drilling: **02-15-2022** Complete Drilling: **02-15-2022**
Drilling Contractor: **Wang Testing Services** Drill Rig: **21D50A [84%]**
Driller: **KS&AP** Logger: **A. Scifers** Checked by: **C. Marin**
Drilling Method: **3.25" ID HSA; Boring backfilled upon completion**

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 RWB-04

WEI Job No.: 1064-01-01

Client: **Ardmore Roderick**
Project: **Barrington Rd from Algonquin Rd to Central Rd**
Location: **Cook County, IL**

Datum: NAVD 88
Elevation: 841.20 ft
North: 1976142.83 ft
East: 1036396.44 ft
Station: 82+02.48
Offset: 42.74 LT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type / recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
		17-inch thick, black SILTY CLAY; moist						
		--TOPSOIL--						
	839.8							
		Soft to stiff, brown and gray SILTY CLAY, trace gravel; moist						
		--FILL--						
		--RDR 1 to 2--						
		--L_L(%)=43, P_L(%)=20--						
		--%Gravel=2.7--						
		--%Sand=11.0--						
		--%Silt=53.0--						
		--%Clay=33.3--	5					
		--A-7-6 (20)--						
					1	2 3 3	1.50 P	22
					2	2 3 3	0.41 B	21
					3	3 4 4	1.39 B	23
		--wet spoon--			4	4 3 2	1.72 B	26
			10					
					5	3 3 4	0.98 B	24
	828.2							
		Medium stiff, dark gray SILTY CLAY LOAM, some organic matter; wet						
		--sand seams--			6	2 3 3	0.57 B	51
		--RDR 2--	15					
	825.7							
		Very soft (<0.25P), dark gray CLAY to SILTY CLAY; moist						
	824.8							
		--silt seams; saturated--						
		--RDR 1--			7	3 4 6	2.13 B	17
		Stiff to very stiff, gray SILTY CLAY to SILTY CLAY LOAM, trace gravel; moist						
		--RDR 2--			8	4 6 9	1.80 B	18
	821.2		20					
		Boring terminated at 20.00 ft						

GENERAL NOTES

Begin Drilling: **02-08-2022** Complete Drilling: **02-08-2022**
Drilling Contractor: **Wang Testing Services** Drill Rig: **21D50A [84%]**
Driller: **KS&AP** Logger: **A. Scifers** Checked by: **C. Marin**
Drilling Method: **2.25" ID HSA; Boring backfilled upon completion**

WATER LEVEL DATA

While Drilling: **8.50 ft**
At Completion of Drilling: **Dry**
Time After Drilling: **NA**
Depth to Water: **NA**

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BORING LOG RWB-05

WEI Job No.: 1064-01-01

Client: **Ardmore Roderick**
Project: **Barrington Rd from Algonquin Rd to Central Rd**
Location: **Cook County, IL**

Datum: NAVD 88
Elevation: 840.41 ft
North: 1976238.74 ft
East: 1036396.46 ft
Station: 82+98.38
Offset: 42.30 LT

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type / recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	839.6	10-inch thick, black SANDY LOAM; moist --TOPSOIL--						
		Stiff to very stiff, black and gray CLAY LOAM to SILTY CLAY, trace to some gravel; moist --FILL-- --RDR 2-- --wet spoon--			1	5 2 4	1.48 B	17
			5		2	3 6 4	3.20 B	16
					3	3 3 3	1.56 B	21
	832.4	Medium stiff, black PEAT; interbedded with Organic Silty Clay; wet --RDR 2--	10		4	3 1 2	0.82 B	237
	829.9	Medium stiff, gray Organic SILTY CLAY; wet --RDR 1--			5	0 0 0	0.57 B	161
	827.4	Medium stiff, light gray CLAY to SILTY CLAY LOAM, trace gravel; moist --RDR 2--	15		6	2 2 2	0.57 B	24
	824.9	Very stiff, gray SILTY CLAY, trace gravel; moist --RDR 2--			7	4 5 6	2.05 B	18
					8	5 6 9	2.62 B	21
	820.4	Boring terminated at 20.00 ft	20					

GENERAL NOTES

Begin Drilling: **02-08-2022** Complete Drilling: **02-08-2022**
Drilling Contractor: **Wang Testing Services** Drill Rig: **21D50A [84%]**
Driller: **KS&AP** Logger: **A. Scifers** Checked by: **C. Marin**
Drilling Method: **2.25" ID HSA; Boring backfilled upon completion**

WATER LEVEL DATA

While Drilling: **3.50 ft**
At Completion of Drilling: **Dry**
Time After Drilling: **NA**
Depth to Water: **NA**

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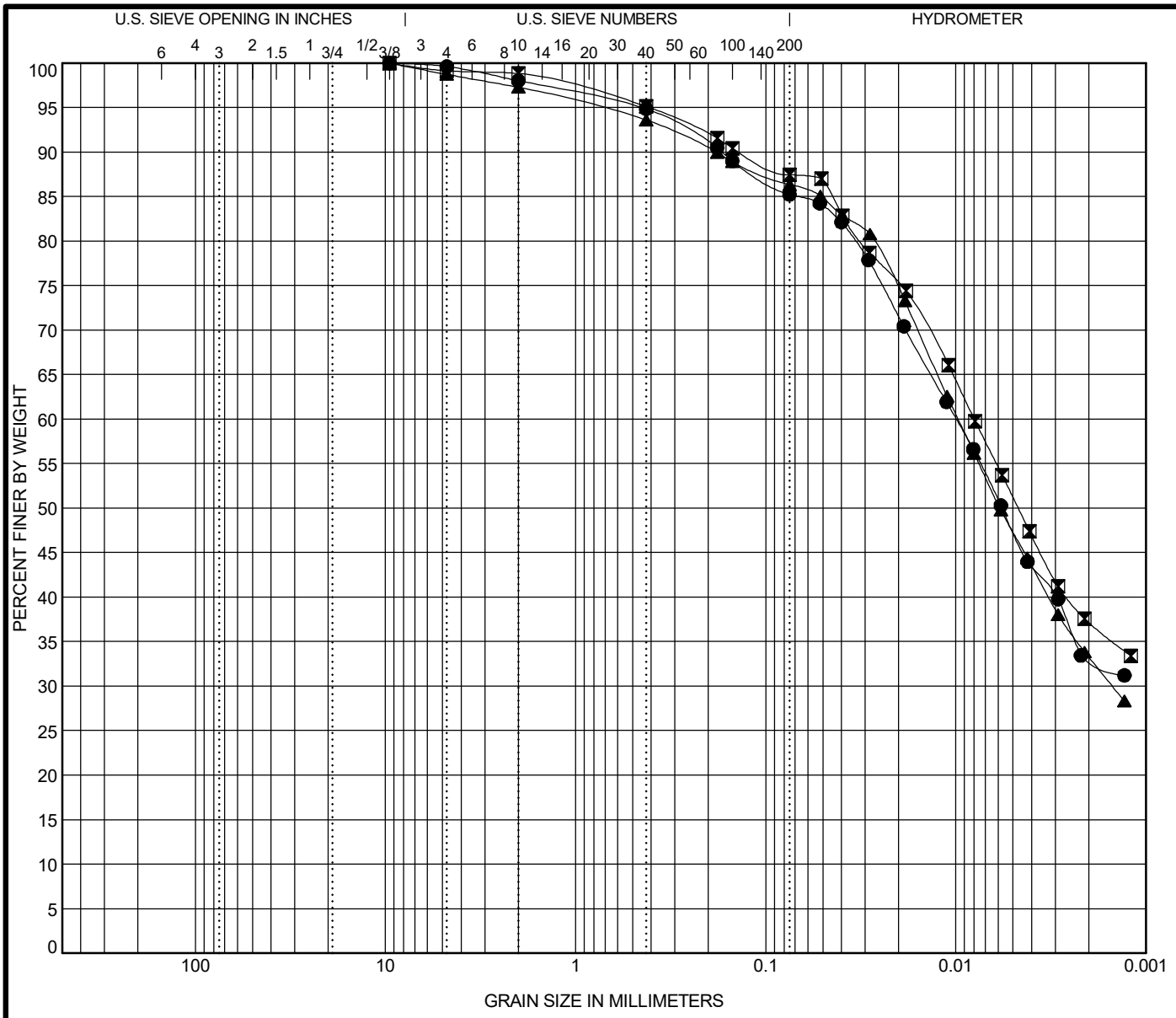
APPENDIX B



COBBLES	GRAVEL	SAND		SILT AND CLAY
		coarse	fine	

	Specimen Identification		IDH Classification	LL	PL	PI	Cc	Cu
●	RWB-03#5	11.0 ft	Silty Clay	43	20	23		
⊠	RWB-03-ST#1	14.0 ft	Silty Clay	45	17	28		
▲	RWB-04#2	3.5 ft	Silty Clay	43	20	23		

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	RWB-03#5	11.0 ft	9.5	0.01			2.0	12.8	52.2	33.0
⊠	RWB-03-ST#1	14.0 ft	9.5	0.008			1.2	11.4	50.2	37.2
▲	RWB-04#2	3.5 ft	9.5	0.01	0.002		2.7	11.0	53.0	33.3

WEI SINCE 1982
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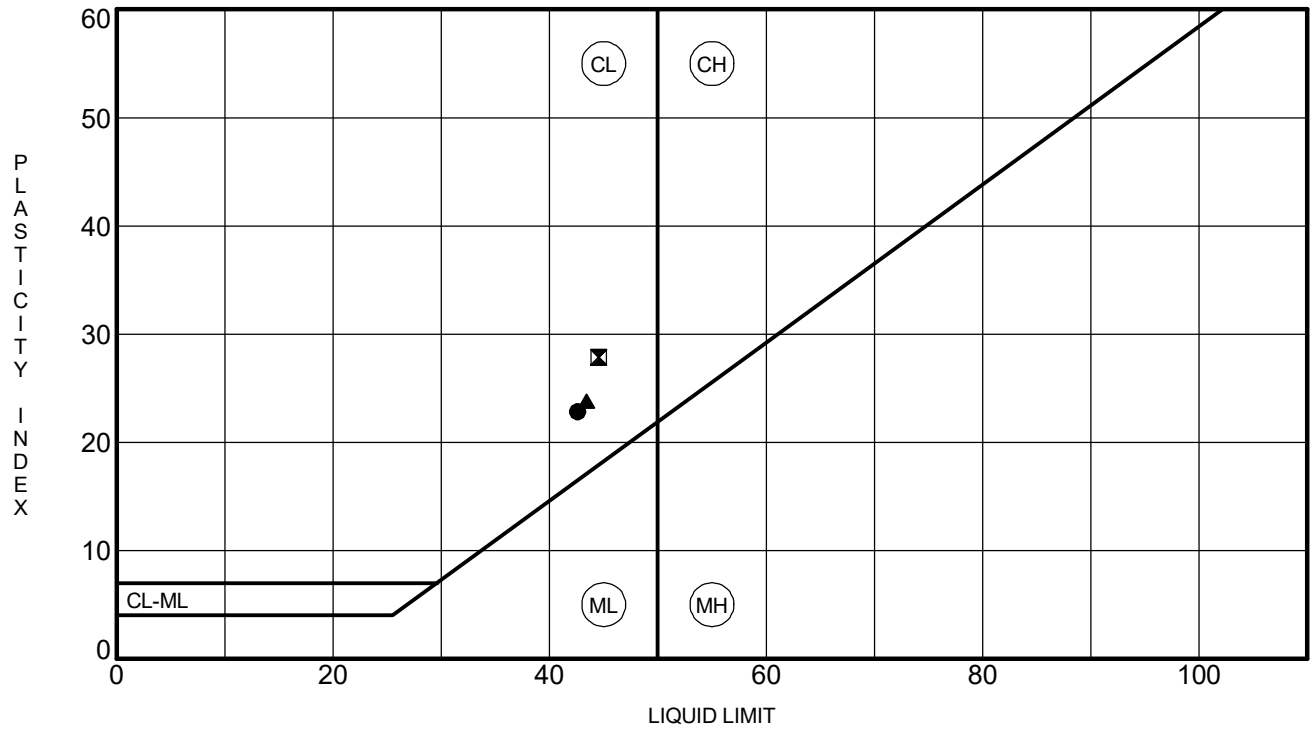
GRAIN SIZE DISTRIBUTION

Project: Barrington Rd from Algonquin Rd to Central Rd

Location: Cook County, IL

Number: 1064-01-01



Specimen Identification			LL	PL	PI	Fines	IDH Classification
●	**RWB-03#5**	**11.0 ft**	**43**	**20**	**23**	**85**	**Silty Clay**
⊠	**RWB-03-ST#1**	**14.0 ft**	**45**	**17**	**28**	**87**	**Silty Clay**
▲	**RWB-04#2**	**3.5 ft**	**43**	**20**	**23**	**86**	**Silty Clay**

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ATTERBERG LIMITS' RESULTS

Project: Barrington Rd from Algonquin Rd to Central Rd

Location: Cook County, IL

Number: 1064-01-01

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ONE-DIMENSIONAL CONSOLIDATION TEST

AASHTO T 216 / ASTM D 2435

Project: Barrington Road
Client: Ardmore Rodrick
Soil Sample ID: Boring DPB-02, ST#2, 6 to 8 feet
Sample Description: Black PEAT

Tested by: M. Snider
Prepared by: M. Snider
Test date: 4/11/2022
WEI: 1064-01-01

Initial sample height =	0.999	in	Ring diameter =	2.500	in
Initial sample mass =	73.22	g	Ring mass =	109.43	g
Initial water content =	533.94%		Initial sample and ring mass =	182.65	g
Initial dry unit weight =	8.97	pcf	Tare mass =	14.35	g
Initial void ratio =	12.906		Final ring and sample mass =	162.71	g
Initial degree of saturation =	82.74%		Mass of wet sample and tare =	67.58	g
			Mass of dry sample and tare =	25.90	g
Final sample mass =	53.23	g	Initial dial reading =	0.01000	in
Final dry sample mass =	11.55	g	Final dial reading =	0.43200	in
Final water content =	360.87%		LL =	n.a.	%
Final dry unit weight =	15.54	pcf	PL =	n.a.	%
Final void ratio =	7.032		% Sand =	n.a.	
Final degree of saturation =	100.00%		% Silt =	n.a.	
Estimated specific gravity =	2.00		% Clay =	n.a.	
			In-Situ Vertical Effective Stress =	300	psf

Compression and Swelling Indices

Compression index C_c =	7.774	**Preconsolidation pressure,s_C**	
Field corrected C_c =	17.268	Casagrande Method =	1421 psf
Swelling index C_s =	0.454	**Over-Consolidation Ratio (OCR) =**	4.74

Load number	Vertical stress	Dial reading	System deflection	Vertical strain	Void ratio	C_v	Cae	Elapsed time
	psf	in	in	%		ft^2/day	%	min
1	50.0	0.00032	0.00010	-0.96	13.040	N/A	N/A	480
2	100.0	0.00260	0.00023	-0.72	13.006	0.1110	0.06	720
3	200.0	0.02402	0.00058	1.46	12.703	0.1392	0.44	720
4	500.0	0.11661	0.00090	10.76	11.410	0.1789	1.49	720
5	1000.0	0.22896	0.00135	22.05	9.840	0.1403	2.11	720
6	2000.0	0.39650	0.00193	38.88	7.499	0.0898	3.21	720
7	4000.0	0.45674	0.00253	44.97	6.652	0.0853	0.05	1440
8	8000.0	0.45754	0.00324	45.12	6.631	0.1164	0.01	1440
9	16000.0	0.45872	0.00413	45.33	6.603	0.0041	0.01	1440
10	8000.0	0.45811	0.00295	45.15	6.627	N/A	N/A	480
11	2000.0	0.45746	0.00198	44.99	6.650	N/A	N/A	720
12	500.0	0.43858	0.00123	43.02	6.923	N/A	N/A	485

Prepared by: _____ Date: _____

Checked by: _____ Date: _____

AASHTO ACCREDITATION PROGRAM

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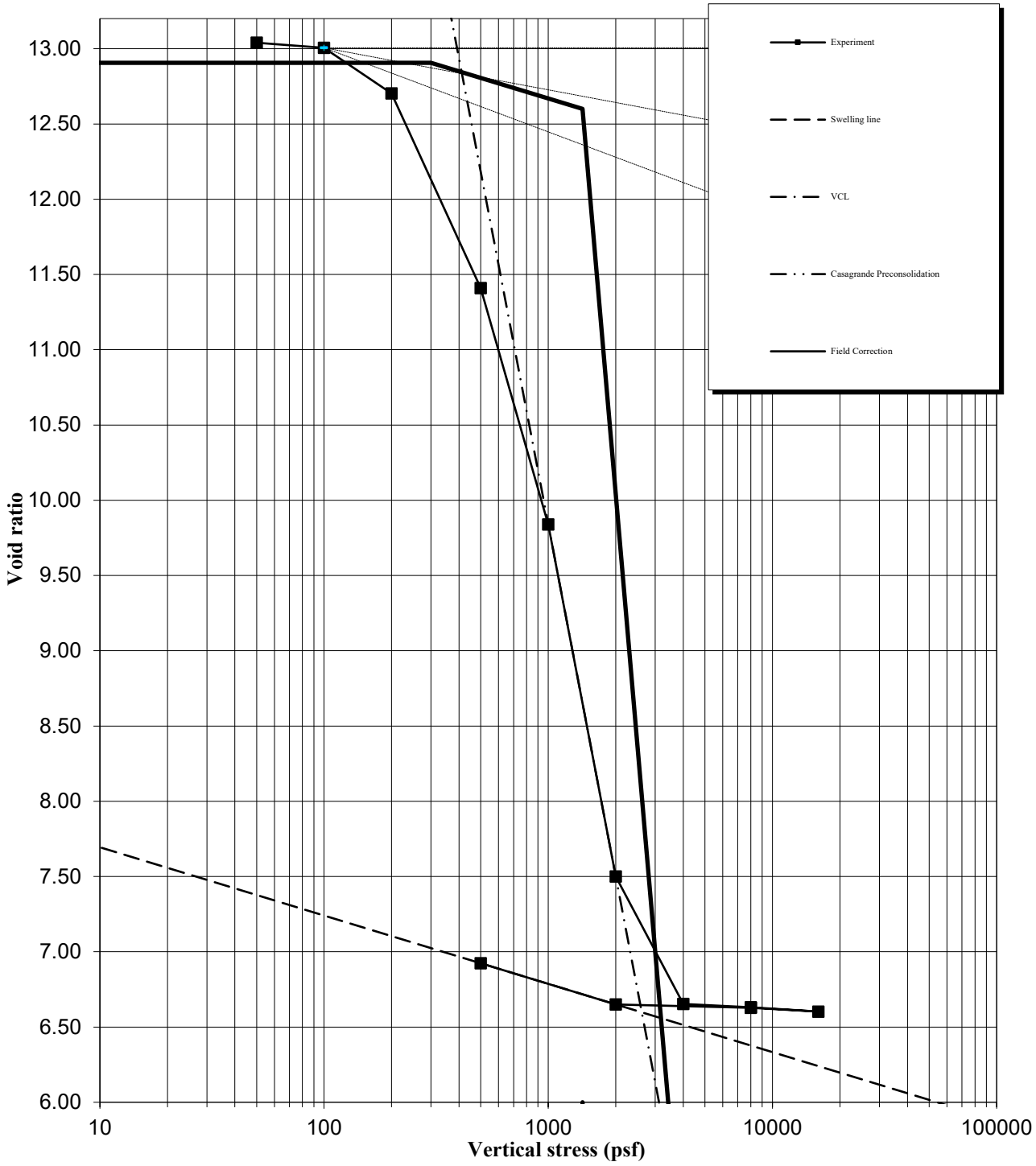
CONSOLIDATION CURVE

Sample DPB-02, ST#2, 6 to 8 feet



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ONE-DIMENSIONAL CONSOLIDATION TEST

AASHTO T 216 / ASTM D 2435

Project: Barrington Road
Client: Ardmore Rodrick
Soil Sample ID: Boring DPB-01, ST#2, 6 to 8 feet
Sample Description: Black PEAT and Organic SILT

Tested by: M. Snider
Prepared by: M. Snider
Test date: 4/11/2022
WEI: 1064-01-01

Initial sample height =	0.998	in	Ring diameter =	2.499	in
Initial sample mass =	92.29	g	Ring mass =	109.79	g
Initial water content =	244.49%		Initial sample and ring mass =	202.08	g
Initial dry unit weight =	20.85	pcf	Tare mass =	11.99	g
Initial void ratio =	5.583		Final ring and sample mass =	169.95	g
Initial degree of saturation =	96.34%		Mass of wet sample and tare =	72.06	g
			Mass of dry sample and tare =	38.78	g
Final sample mass =	60.07	g	Initial dial reading =	0.01000	in
Final dry sample mass =	26.79	g	Final dial reading =	0.50000	in
Final water content =	124.23%		LL =	n.a.	%
Final dry unit weight =	40.97	pcf	PL =	n.a.	%
Final void ratio =	2.351		% Sand =	n.a.	
Final degree of saturation =	100.00%		% Silt =	n.a.	
Estimated specific gravity =	2.20		% Clay =	n.a.	
			In-Situ Vertical Effective Stress =	400	psf

Compression and Swelling Indices

Compression index C_c =	4.070	**Preconsolidation pressure,s_C**	
Field corrected C_c =	4.111	Casagrande Method =	1063 psf
Swelling index C_s =	0.667	**Over-Consolidation Ratio (OCR) =**	2.66

Load number	Vertical stress	Dial reading	System deflection	Vertical strain	Void ratio	C_v	Cae	Elapsed time
	psf	in	in	%		ft^2/day	%	min
1	50.0	0.00519	0.00010	-0.47	5.614	N/A	N/A	480
2	100.0	0.00589	0.00023	-0.39	5.609	0.0559	0.02	720
3	200.0	0.01161	0.00058	0.22	5.569	0.0897	0.11	720
4	500.0	0.03845	0.00090	2.94	5.390	0.0686	0.45	720
5	1000.0	0.08804	0.00135	7.96	5.059	0.0192	2.36	480
6	2000.0	0.22480	0.00193	21.72	4.154	0.0091	7.99	720
7	4000.0	0.40994	0.00253	40.33	2.928	0.0046	13.15	1440
8	8000.0	0.53020	0.00324	52.45	2.130	0.0023	10.34	1440
9	16000.0	0.61046	0.00413	60.58	1.595	0.0022	6.74	1440
10	8000.0	0.61290	0.00295	60.71	1.587	N/A	N/A	480
11	2000.0	0.56050	0.00198	55.36	1.939	N/A	N/A	900
12	500.0	0.50035	0.00123	49.26	2.341	N/A	N/A	1440

Prepared by: _____ Date: _____

Checked by: _____ Date: _____

Wang Engineering

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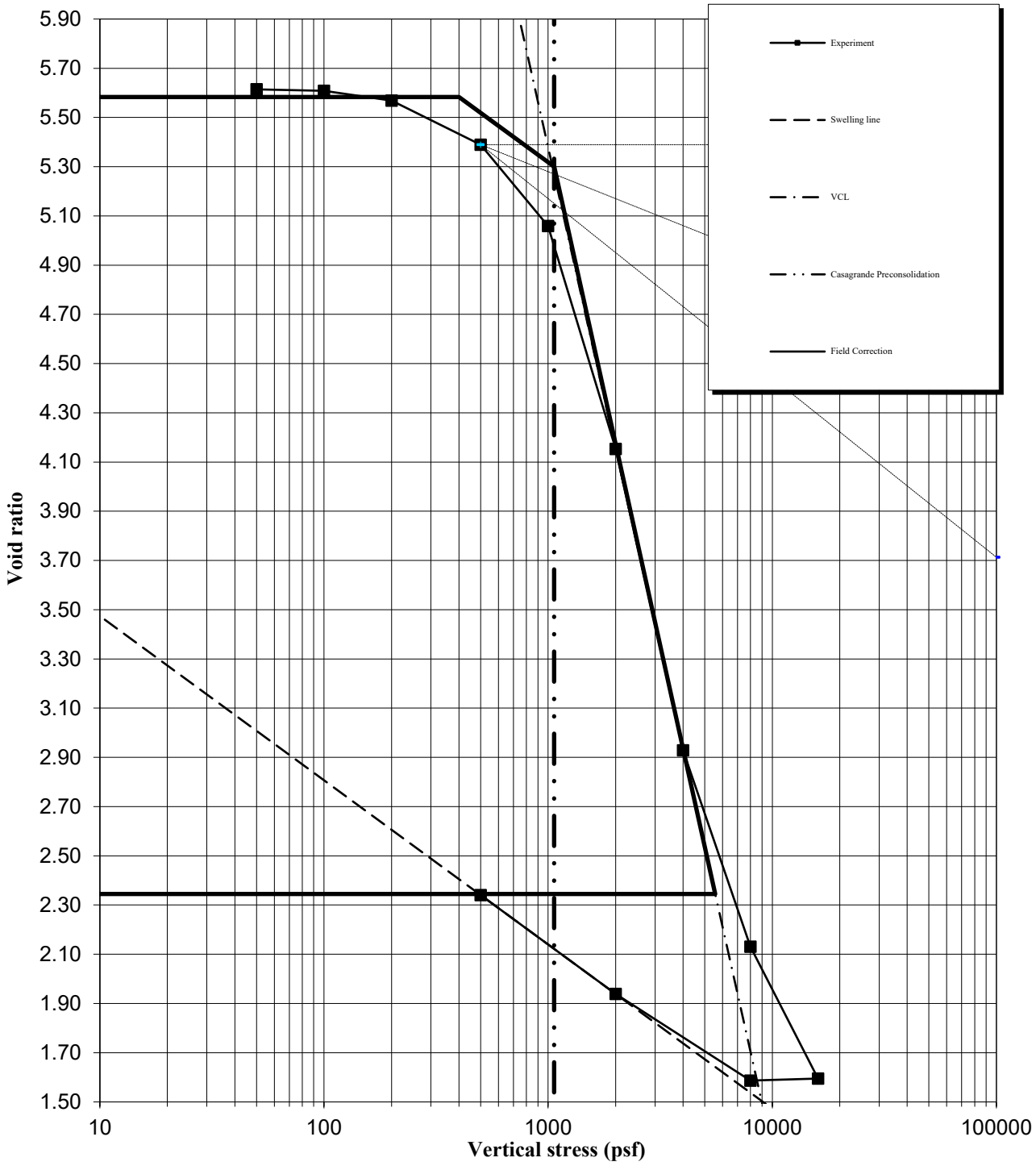
CONSOLIDATION CURVE

Sample DPB-01, ST#2, 6 to 8 feet



AASHTO ACCREDITATION PROGRAM

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ONE-DIMENSIONAL CONSOLIDATION TEST

AASHTO T 216 / ASTM D 2435

Project: Barrington Road
Client: Ardmore Rodrick
Soil Sample ID: Boring RWB-03, ST#1, 14 to 16 feet
Sample Description: Brown CLAY LOAM

Tested by: M. Snider
Prepared by: M. Snider
Test date: 4/11/2022
WEI: 1064-01-01

Initial sample height =	0.770	in	Ring diameter =	2.506	in
Initial sample mass =	125.23	g	Ring mass =	62.30	g
Initial water content =	23.98%		Initial sample and ring mass =	187.53	g
Initial dry unit weight =	101.34	pcf	Tare mass =	11.64	g
Initial void ratio =	0.663		Final ring and sample mass =	183.81	g
Initial degree of saturation =	97.72%		Mass of wet sample and tare =	132.96	g
			Mass of dry sample and tare =	112.65	g
Final sample mass =	121.32	g	Initial dial reading =	0.01000	in
Final dry sample mass =	101.01	g	Final dial reading =	0.09772	in
Final water content =	20.11%		LL =	n.a.	%
Final dry unit weight =	114.37	pcf	PL =	n.a.	%
Final void ratio =	0.473		% Sand =	n.a.	
Final degree of saturation =	100.00%		% Silt =	n.a.	
Estimated specific gravity =	2.70		% Clay =	n.a.	
			In-Situ Vertical Effective Stress =	1400	psf

Compression and Swelling Indices

Compression index C_c =	0.180	**Preconsolidation pressure,s_C**	
Field corrected C_c =	0.192	Casagrande Method =	1612 psf
Swelling index C_s =	0.049	**Over-Consolidation Ratio (OCR) =**	1.15

Load number	Vertical stress	Dial reading	System deflection	Vertical strain	Void ratio	C_v	Cae	Elapsed time
	psf	in	in	%		ft^2/day	%	min
1	100.0	0.01024	0.00010	0.04	0.662	N/A	N/A	720
2	200.0	0.01114	0.00023	0.18	0.660	0.0861	0.04	720
3	500.0	0.01655	0.00058	0.93	0.647	0.0764	0.11	720
4	1000.0	0.02439	0.00090	1.99	0.630	0.0785	0.17	678
5	2000.0	0.03900	0.00135	3.94	0.597	0.0768	0.17	720
6	4000.0	0.05670	0.00193	6.32	0.558	0.0774	0.25	1440
7	8000.0	0.07759	0.00253	9.11	0.511	0.0719	0.28	1440
8	16000.0	0.10197	0.00324	12.36	0.457	0.0736	0.30	1440
9	32000.0	0.12615	0.00413	15.62	0.403	0.0831	0.33	720
10	8000.0	0.12395	0.00295	15.18	0.410	N/A	N/A	480
11	2000.0	0.11117	0.00198	13.40	0.440	N/A	N/A	720
12	500.0	0.09819	0.00123	11.61	0.469	N/A	N/A	480

Prepared by: _____ Date: _____

Checked by: _____ Date: _____

AASHTO ACCREDITATION PROGRAM

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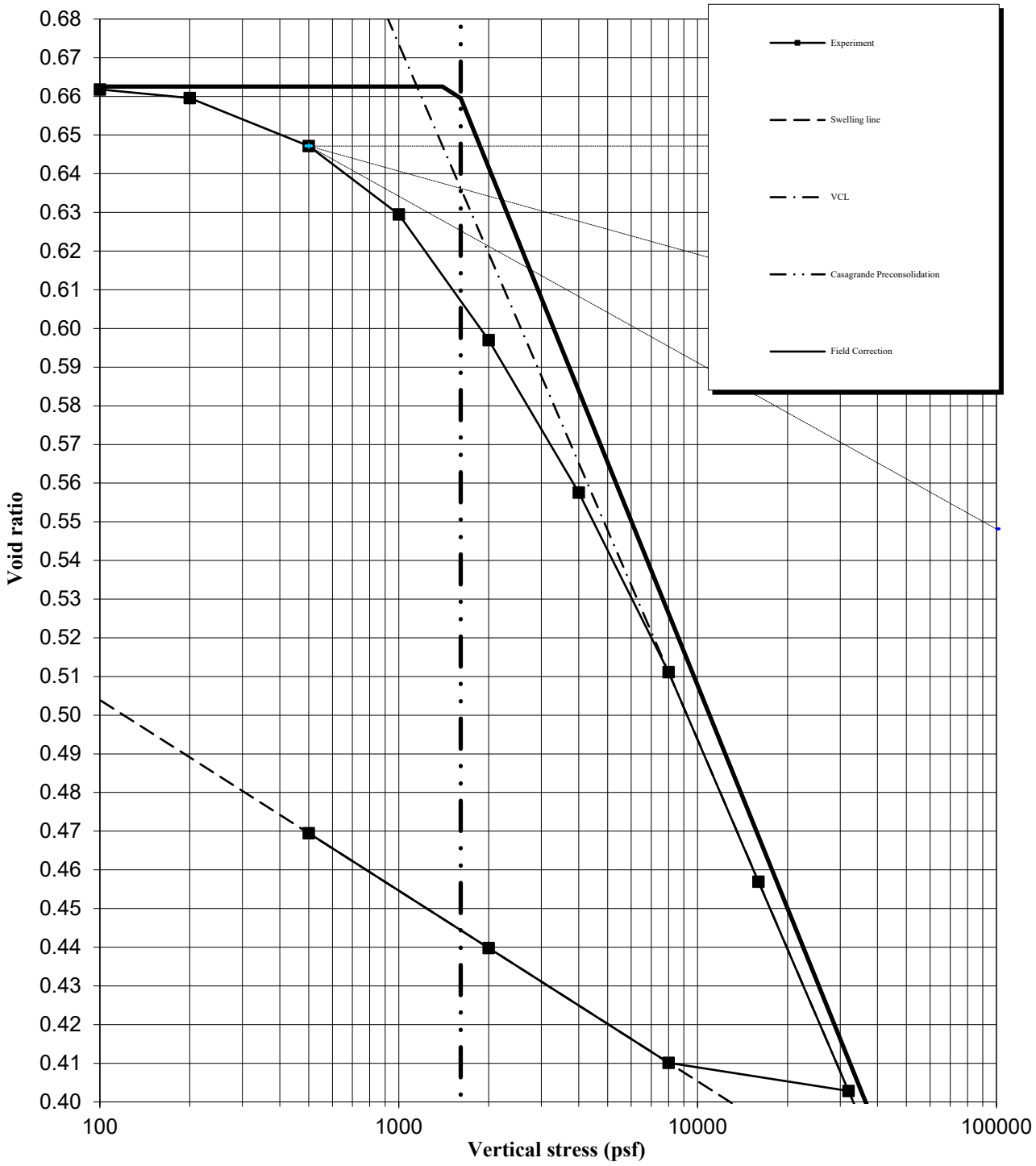
CONSOLIDATION CURVE

Sample RWB-03, ST#1, 14 to 16 feet



AASHTO R18

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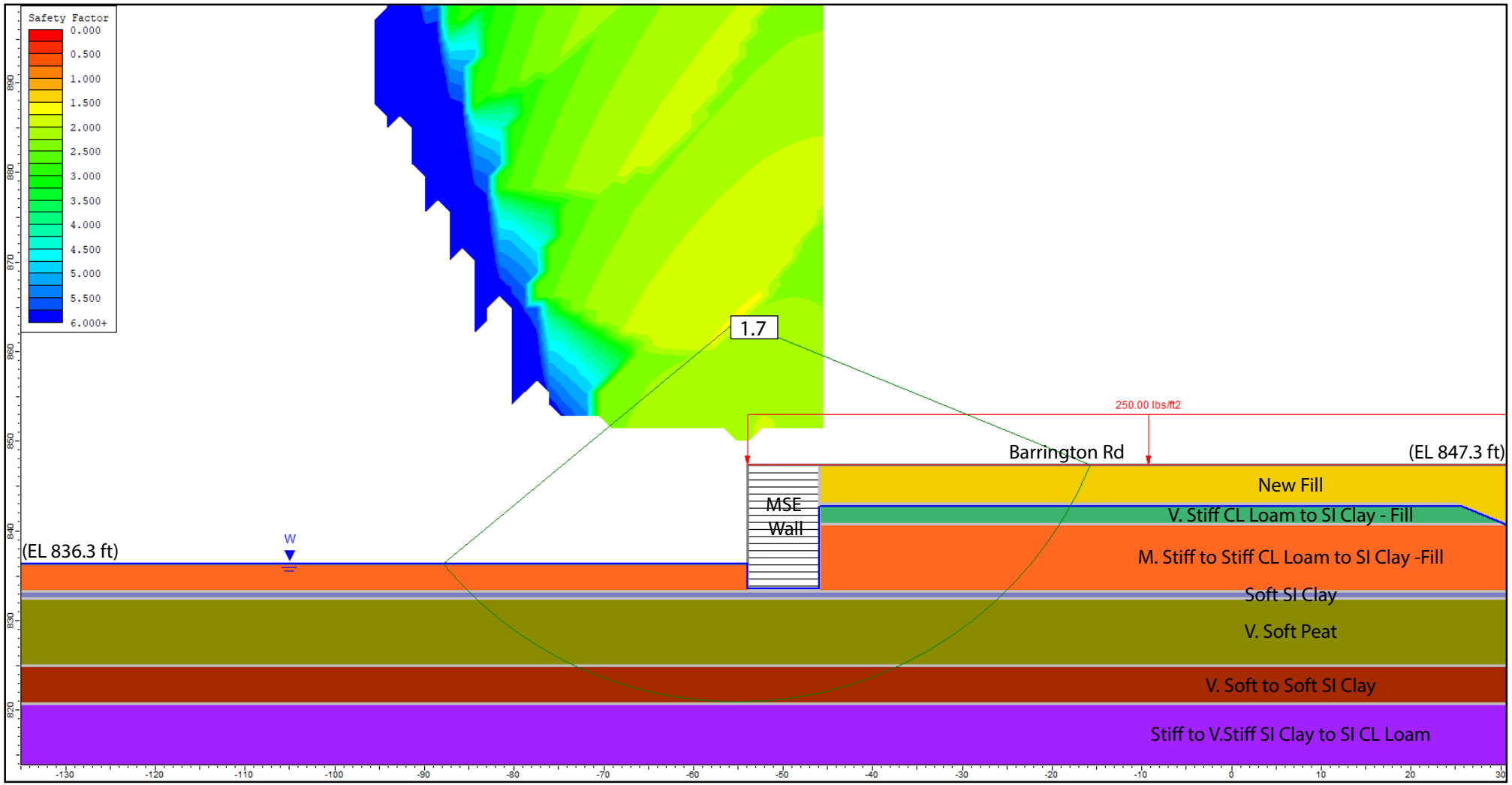
APPENDIX C



Undrained Analysis, MSE Wall, Sta.81+00.00, Ref Boring: RWB-03, PT-02 and PT-03

Layer ID	Description	Total Unit Weight (pcf)	Undrained Cohesion (psf)	Undrained Friction Angle (degrees)
1	New Fill	125	1000	0
2	V. Stiff CL Loam to SI Clay - Fill	120	2400	0
3	M. Stiff to Stiff CL Loam to SI Clay -Fill	120	1100	0
4	Soft SI Clay	115	490	0
5	V. Soft Peat	50	250	0
6	V. Soft to Soft SI Clay	110	280	0
7	Stiff to V.Stiff SI Clay to SI CL Loam	120	2000	0

GLOBAL STABILITY: BARRINGTON ROAD FROM ALGONQUIN ROAD TO CENTRAL ROAD; RETAINING WALL, STA. 81 TO 83, COOK COUNTY, ILLINOIS

SCALE: GRAPHICAL | APPENDIX C-1 | DRAWN BY: D. You, CHECKED BY: M. Seyhun

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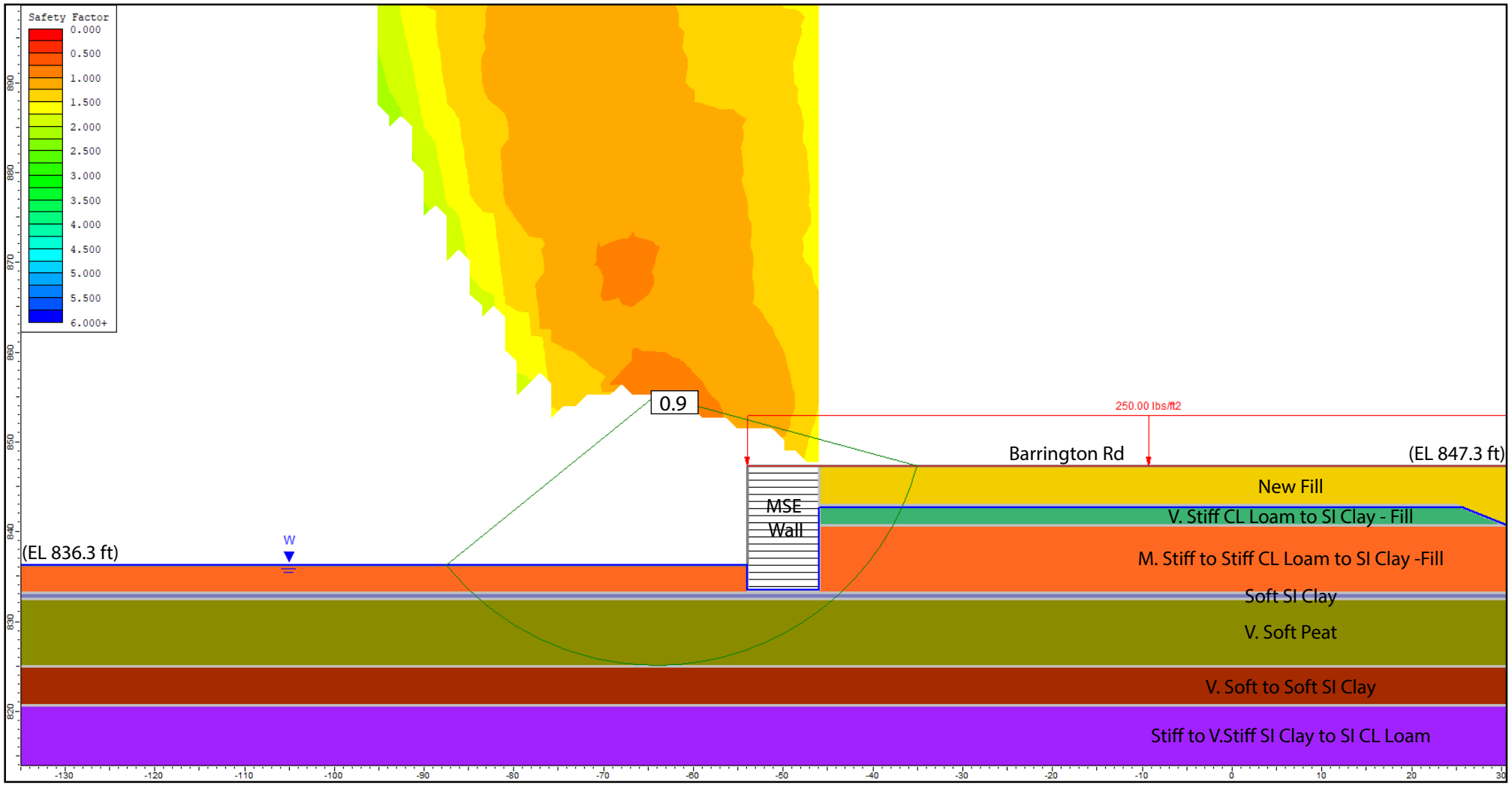
FOR ARDMORE RODERICK | KE225002 1064-01-01



Drained Analysis, MSE Wall, Sta.81+00.00, Ref Boring: RWB-03, PT-02 and PT-03

Layer ID	Description	Total Unit Weight (pcf)	Drained Cohesion (psf)	Drained Friction Angle (degrees)
1	New Fill	125	100	30
2	V. Stiff CL Loam to SI Clay - Fill	120	100	30
3	M. Stiff to Stiff CL Loam to SI Clay -Fill	120	100	28
4	Soft SI Clay	115	0	26
5	V. Soft Peat	50	0	20
6	V. Soft to Soft SI Clay	110	0	25
7	Stiff to V.Stiff SI Clay to SI CL Loam	120	100	30

GLOBAL STABILITY: BARRINGTON ROAD FROM ALGONQUIN ROAD TO CENTRAL ROAD; RETAINING WALL, STA. 81 TO 83, COOK COUNTY, ILLINOIS

SCALE: GRAPHICAL | APPENDIX C-2 | DRAWN BY: D. You, CHECKED BY: M. Seyhun

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FOR ARDMORE RODERICK | KE225002 1064-01-01

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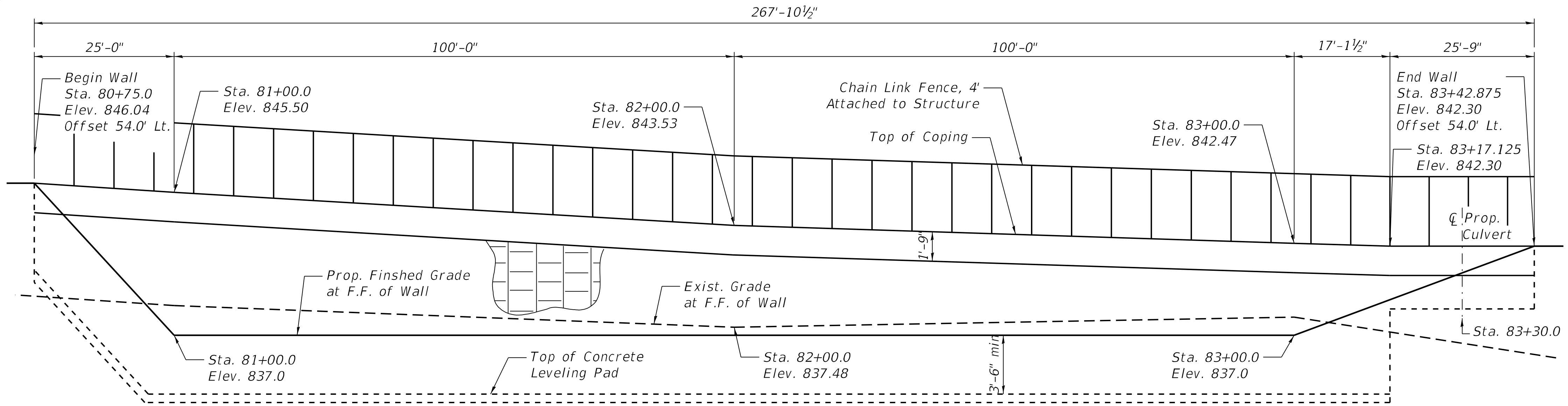
APPENDIX D

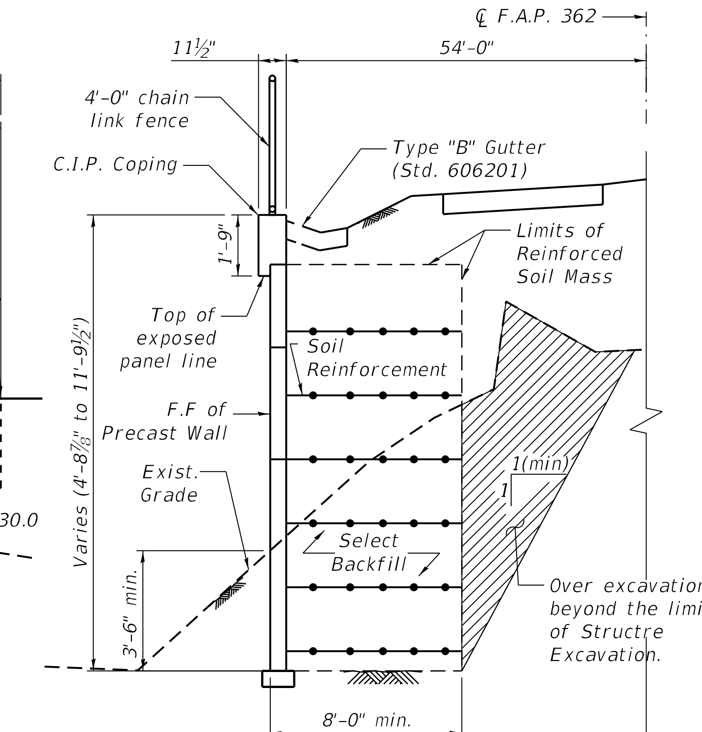
Bench Mark:
Existing Structure: None
No Salvage



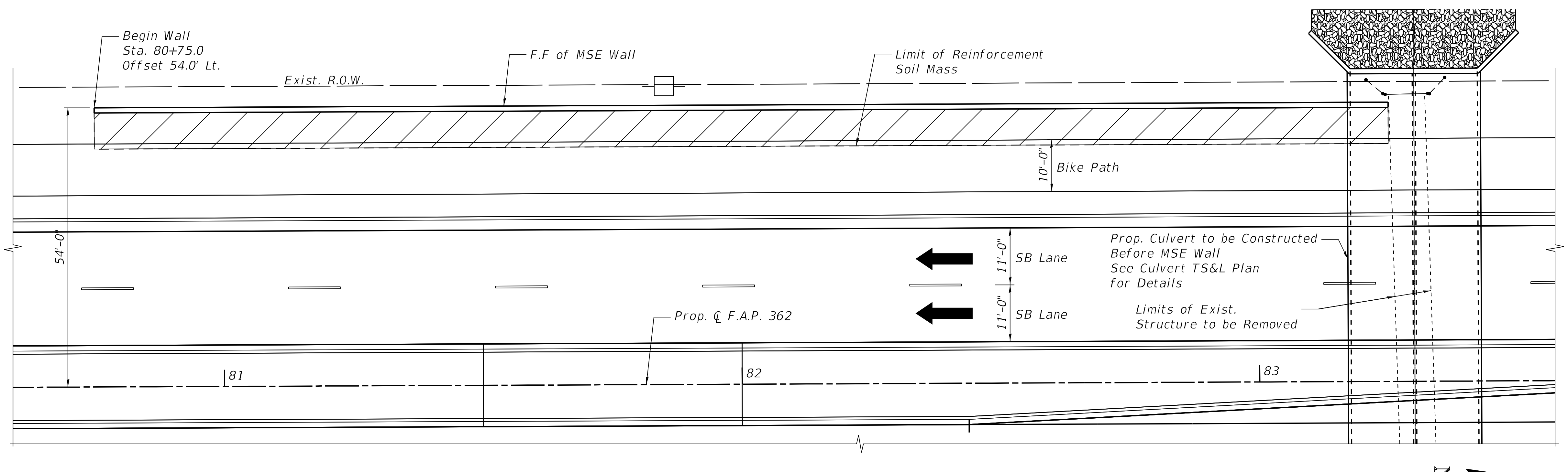
NOTE:

Wall offset are measured from the proposed ℄ of F.A.P. 362 to the front face of precast panels.

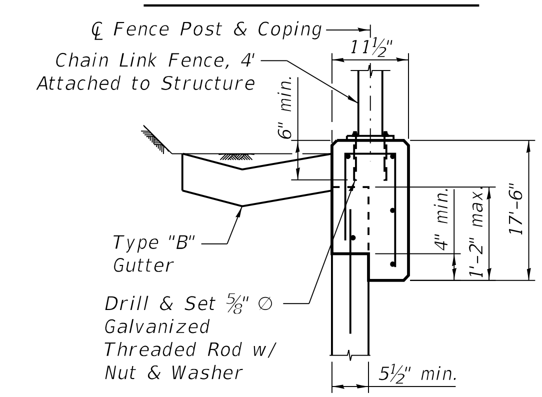
ELEVATION
(Looking @ F.F. of Wall)



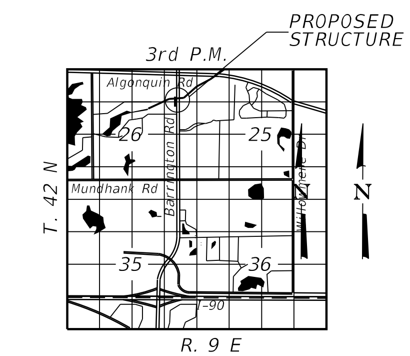
TYPICAL WALL SECTION



PLAN



C.I.P. COPING DETAIL



LOCATION SKETCH

SEISMIC DATA

SEISMIC PERFORMANCE ZONE (SPZ) = 1
DESIGN SPECTRAL ACCELERATION
AT 1.0 SEC (SD1) = 0.096g
DESIGN SPECTRAL ACCELERATION
AT 0.2 SEC (SDS) = 0.16g
SOIL SITE CLASS = D

DESIGN STRESSES

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

DESIGN SPECIFICATIONS

2020 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION

LOADING HL-93

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

HIGHWAY CLASSIFICATION

FAP 362 (Barrington Rd)
Functional Class:
A.D.T.: 21000 (2014) xxxx (2032)
A.D.T.T.: 5%
Speed: 45 M.P.H (posted); 50 M.P.H (design)
Two-way Traffic Directional Dist. 50:50

GENERAL PLAN & ELEVATION
BARRINGTON ROAD
F.A.P. 362
COOK COUNTY
STATION 83+30.00
STRUCTURE NO. XXXXXXX

MODEL: Default
FILE NAME: pw://hqs-pwlnt01.ae.transyscorp.com:transyscorp-pw1/Documents/Projects_2020/CH401401200018/CAD/02 - Sheets/20-Structural/TS&L (Culvert & Retaining Wall)/D162K33-SHT-TSL_Wall

Ardmore Roderick
Ardmore Roderick
1500 West Carroll Avenue, Suite 300
Chicago, Illinois 60607
312-795-1400

USER NAME = allsharghi	DESIGNED - AS	REVISED -	
	DRAWN - AS	REVISED -	
PLOT SCALE = 23.999 ' / in.	CHECKED - SB	REVISED -	
PLOT DATE = 1/26/2023	DATE - SB	REVISED -	

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

GENERAL PLAN AND SECTIONS
STRUCTURE NO. XX-XXXXX

SCALE: | SHEET | OF | SHEETS | STA. | TO STA.

F.A.P RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
362	2019-161-W	COOK		

CONTRACT NO. 62K33
ILLINOIS | FED. AID PROJECT