
**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: August 9, 2024**

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 August 9, 2024
		3. Report Type ☒ SGR ☐ RGR ☐ Draft ☒ Final ☐ Revised
4. Route / Section / County FAP 362/ 2019-161-W / Cook		5. Contract 62K33
6. PTB / Item No. 194/ 001	7. Existing Structure Number(s) 16-1294	8. Proposed Structure Number(s) NA
9. Prepared by Wang Engineering, Inc. 1145 N Main Street Lombard, IL 60148	Contributor(s) Author: Metin W. Seyhun, PE QA/QC: Corina T. Farez, PE, PG PM: Andri Kurnia, PE	Contact Information (630) 785-6226 akurnia@wangeng.com
10. Prepared for Ardmore Roderick 1500 W Carroll Ave Suite 300 Chicago, IL 60607	Design Engineer/ Project Manager Jeffrey Ehrhart, PE Carmen Dean, PE	Contact Information (312) 795-1400 jehrhart@ardmoreroderick.com cdean@ardmoreroderick.com
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 N:_WANGLegacy\SHARED\Netprojects\10640101\Reports\Wall Sta 81 to 83\V2_SGR\RPT_Wang_AAK_10640101_RetWallSta81to83SGR_V02_20240809.doc		

TABLE OF CONTENTS

1.0	INTRODUCTION	1
1.1	PROPOSED STRUCTURE	1
1.2	EXISTING STRUCTURE AND LAND USE.....	2
2.0	METHODS OF INVESTIGATION.....	2
2.1	FIELD INVESTIGATION.....	2
2.2	LABORATORY TESTING	3
3.0	INVESTIGATION RESULTS.....	3
3.1	LITHOLOGICAL PROFILE	3
3.2	GROUNDWATER CONDITIONS	4
4.0	FOUNDATION ANALYSIS AND RECOMMENDATIONS.....	5
4.1	SEISMIC DESIGN CONSIDERATIONS	5
4.2	SETTLEMENT.....	5
4.3	BEARING RESISTANCE AND SLIDING.....	5
4.4	GLOBAL STABILITY	6
4.5	GROUND IMPROVEMENT RECOMMENDATIONS	6
4.6	TEMPORARY SHORING RECOMMENDATIONS	7
6.0	CONSTRUCTION CONSIDERATIONS	8
6.1	EXCAVATION, DEWATERING AND UTILITIES	8
6.2	FILLING AND BACKFILLING	8
6.3	REUSE OF EXCAVATED MATERIALS	9
6.4	EARTHWORK OPERATIONS	9
7.0	QUALIFICATIONS.....	9
REFERENCES		
EXHIBITS		
1. SITE LOCATION MAP		
2. SITE AND REGIONAL GEOLOGY		
3. BORING LOCATION PLAN		
4. SOIL PROFILE		

APPENDIX A

BORING LOGS

APPENDIX B

LABORATORY TEST RESULTS

APPENDIX C

GLOBAL STABILITY ANALYSIS

APPENDIX D

GENERAL PLAN AND ELEVATION

**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 Ardmere 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 performing 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.

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

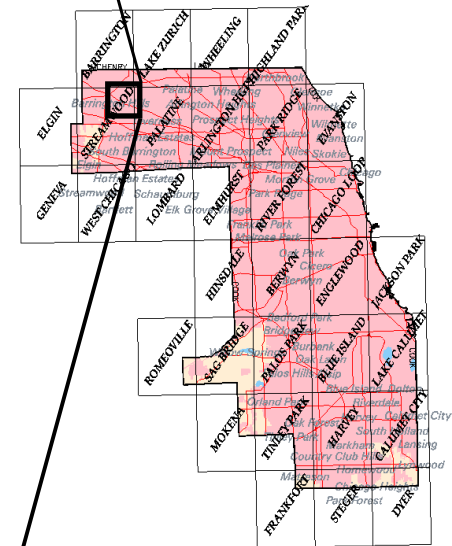
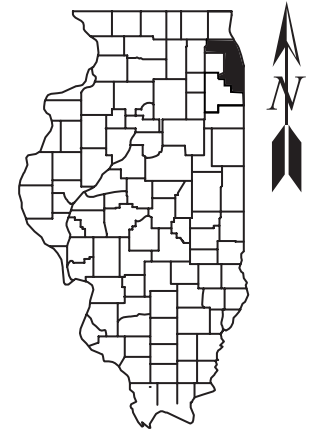
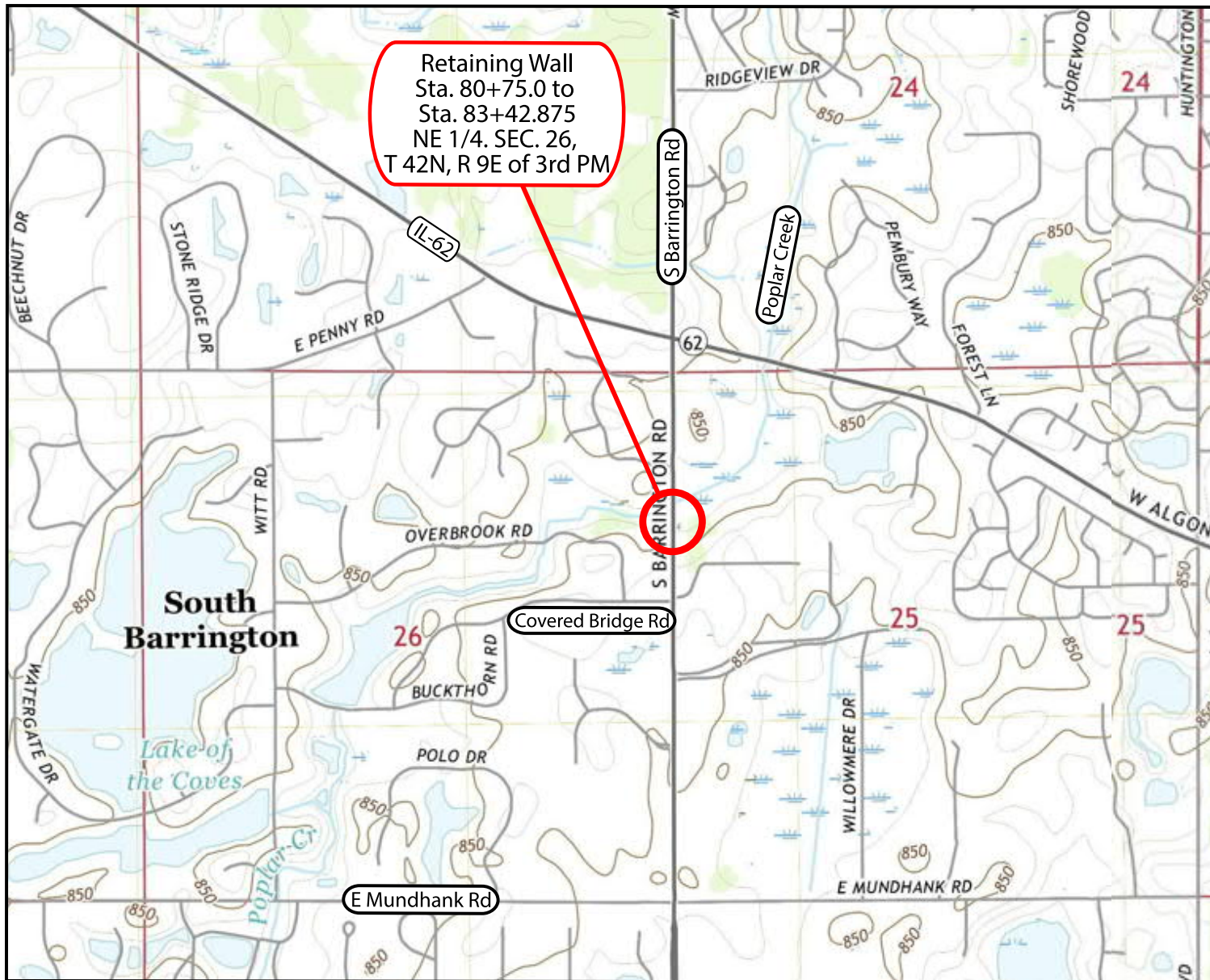
AMERICAN ASSOCIATION OF STATE HIGHWAY TRANSPORTATION OFFICIALS (2020) *AASHTO LRFD Bridge Design Specification*. United States Department of Transportation, Washington, D.C.

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.

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



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

FOR ARDMORE RODERICK

KE225002
1064-01-01



Legend

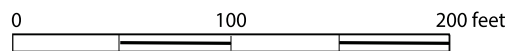


Retaining Wall Boring



Peat Boring

Scale



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

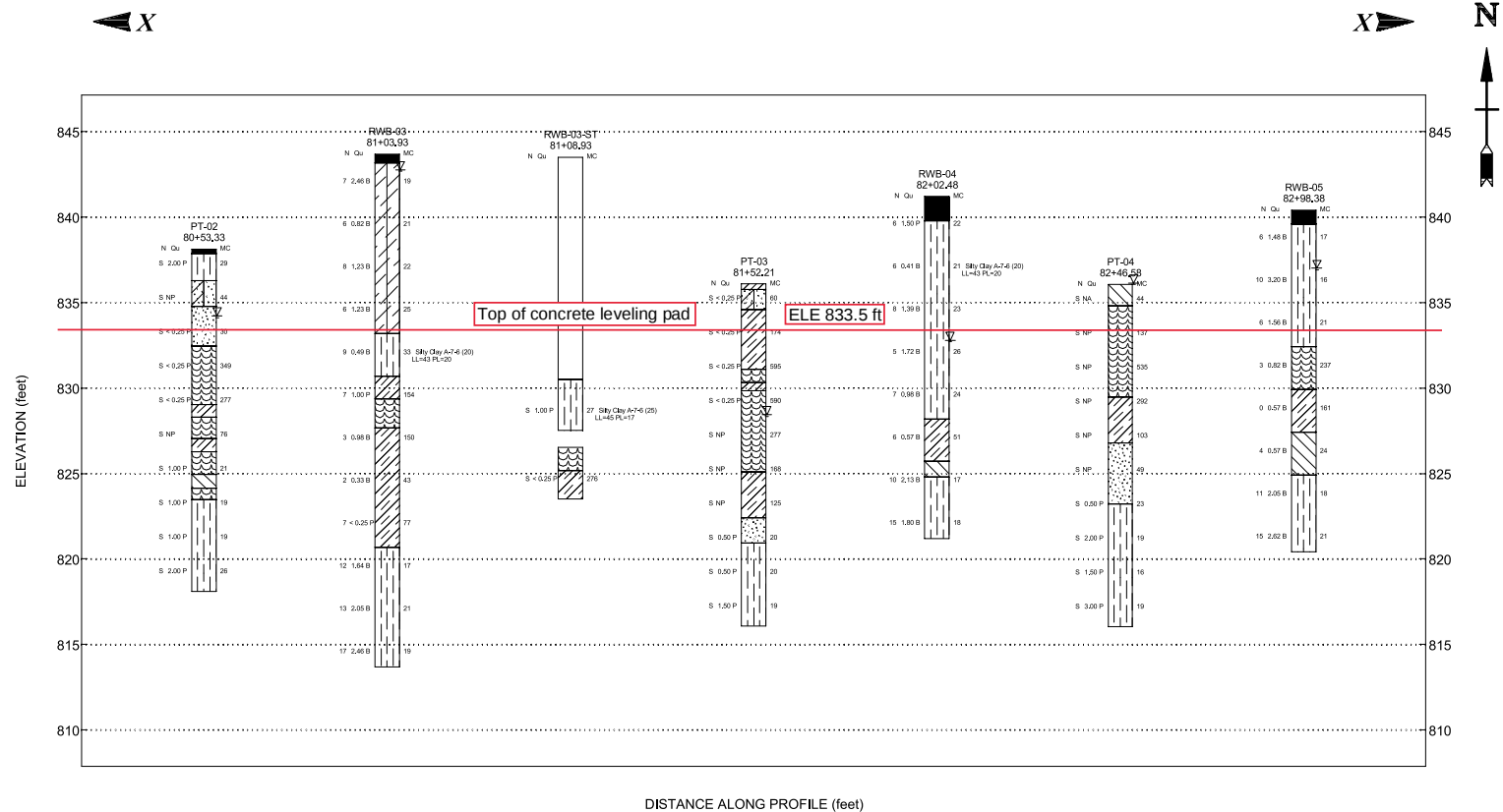
DRAWN BY: D. You
CHECKED BY: A. Kurnia



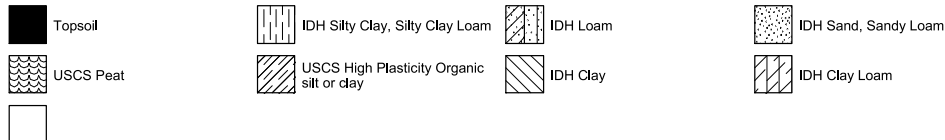
1145 N. Main Street
Lombard, IL 60148
www.wangeng.com

FOR ARDMORE RODERICK

KE225002
1064-01-01

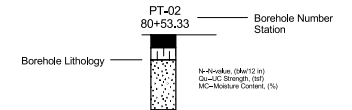


Lithology Graphics

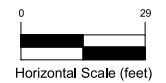


Site Map Scale 1 inch equals 95 feet

Explanation:



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



Vertical Exaggeration: 4x

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

**Sta.81+00
SOIL PROFILE**



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

JOB NUMBER	PLATE NUMBER
1064-01-01	EXHIBIT 3

APPENDIX A



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

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	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	837.93	3-inch thick, dark brown SILTY CLAY LOAM; damp			1	PUSH	2.00 P	29									
		--TOPSOIL--															
	836.3	Very stiff, gray SILTY CLAY, trace gravel; damp				PUSH	NP	44									
		--FILL--			2	PUSH											
	834.8	Black LOAM to SANDY LOAM, trace gravel; moist				PUSH											
		Gray, medium to coarse SAND, trace gravel; damp to saturated			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									
					5	PUSH	< 0.25 P	277									
	829.0	Gray, organic SILT; moist			6	PUSH	NP	76									
	828.3	Very soft (<0.25P), black PEAT; wet			7	PUSH	1.00 P	21									
	827.0	Gray, organic SILT; moist			8	PUSH	1.00 P	19									
	826.3	Very soft (<0.25P), dark brown PEAT; wet			9	PUSH	1.00 P	19									
	825.0	Stiff, gray CLAY to SILTY CLAY; moist			10	PUSH	2.00 P	26									
	824.1	Very soft (<0.25P), black PEAT; wet															
	823.5	Stiff to very stiff, gray SILTY CLAY, trace gravel; moist															
	818.1	Boring terminated at 20.00 ft	20														

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**

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



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

BORING LOG 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	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type	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			2	PUSH	< 0.25 P	174									
	831.1	Very soft, black Organic SILTY CLAY LOAM; moist			3	PUSH	< 0.25 P	595									
	830.3	Black Organic SILT; wet			4	PUSH	< 0.25 P	590									
	829.8	Very soft, brown and black PEAT, some methane odor; moist			5	PUSH	NP	277									
			10		6	PUSH	NP	168									
	825.1	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	Medium stiff to stiff, gray SILTY CLAY, trace gravel; moist			9	PUSH	0.50 P	20									
					10	PUSH	1.50 P	19									
	816.1	Boring terminated at 20.00 ft	20														

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**

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



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

BORING LOG 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 (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
	834.8	Gray CLAY to SILTY CLAY, trace organic matter; moist			1	PUSH	NA	44									
		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				5	PUSH	NP	103									
		Gray SAND, trace gravel; moist to saturated	10		6	PUSH	NP	49									
	823.2				7	PUSH	0.50 P	23									
		Medium stiff to very stiff, gray SILTY CLAY, trace gravel; moist	15		8	PUSH	2.00 P	19									
					9	PUSH	1.50 P	16									
					10	PUSH	3.00 P	19									
	816.1		20														

Boring terminated at 20.00 ft

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**

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



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

BORING LOG 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	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type	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						9	2 3 4	< 0.25 P	77
		--FILL--															
		--RDR 2--			2	2 2 4	0.82 B	21		820.7	Stiff to very stiff, gray SILTY CLAY to SILTY CLAY LOAM, trace gravel; moist			10	4 6 6	1.64 B	17
			5								--RDR 2--	25					
		--silt seams--			3	3 3 5	1.23 B	22						11	4 5 8	2.05 B	21
					4	3 3 3	1.23 B	25						12	6 7 10	2.46 B	19
			10							813.7	Boring terminated at 30.00 ft	30					
	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--															
		--%Sand=12.8--															
		--%Silt=52.2--															
		--%Clay=33.0--															
		--A-7-6 (20)--			6	3 4 3	1.00 P	154									
	830.7	Stiff, gray Organic SILTY CLAY; moist															
		--RDR 2--															
	829.4	Very soft (<0.25P), black PEAT; moist			7	3 1 2	0.98 B	150									
		Very soft to medium stiff, dark gray to gray Organic SILTY CLAY, few peat lenses; moist															
		--RDR 2--															
	827.7				8	1 1 1	0.33 B	43									
			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 **1.00 ft**
At Completion of Drilling **Dry**
Time After Drilling **NA**
Depth to Water **NA**

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



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

BORING LOG 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

Page 1 of 1

Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)	Profile	Elevation (ft)	SOIL AND ROCK DESCRIPTION	Depth (ft)	Sample Type recovery	Sample No.	SPT Values (blw/6 in)	Qu (tsf)	Moisture Content (%)
		--blind drilling, 0 to 14 feet --															
			5														
			10														
	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		1.00	27									
	827.5																
	825.2	Very soft, black and gray PEAT --organic content: 189%--															
	823.5	Very soft, gray Orgnaic SILTY CLAY, trace gravel; moist --organic content: 43.8%--	20		2		< 0.25	276									
		Boring terminated at 20.00 ft															

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**

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



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

BORING LOG 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 (%)	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															
	839.8	--TOPSOIL--															
		Soft to stiff, brown and gray SILTY CLAY, trace gravel; moist			1	2 3 3	1.50 P	22									
		--FILL--															
		--RDR 1 to 2--															
		--L _L (%)=43, P _L (%)=20--															
		--%Gravel=2.7--			2	2 3 3	0.41 B	21									
		--%Sand=11.0--															
		--%Silt=53.0--															
		--%Clay=33.3--															
		--A-7-6 (20)--															
					3	3 4 4	1.39 B	23									
		--wet spoon--															
					4	4 3 2	1.72 B	26									
					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--															
	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**

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



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

BORING LOG 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 (%)	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			1	5 2 4	1.48 B	17									
		--FILL--															
		--RDR 2--			2	3 6 4	3.20 B	16									
		--wet spoon--															
			5														
					3	3 3 3	1.56 B	21									
	832.4	Medium stiff, black PEAT; interbedded with Organic Silty Clay; wet			4	3 1 2	0.82 B	237									
		--RDR 2--	10														
	829.9	Medium stiff, gray Organic SILTY CLAY; wet			5	0 0 0	0.57 B	161									
		--RDR 1--															
	827.4	Medium stiff, light gray CLAY to SILTY CLAY LOAM, trace gravel; moist			6	2 2 2	0.57 B	24									
		--RDR 2--	15														
	824.9	Very stiff, gray SILTY CLAY, trace gravel; moist			7	4 5 6	2.05 B	18									
		--RDR 2--															
					8	5 6 9	2.62 B	21									
	820.4		20														
		Boring terminated at 20.00 ft															

GENERAL NOTES

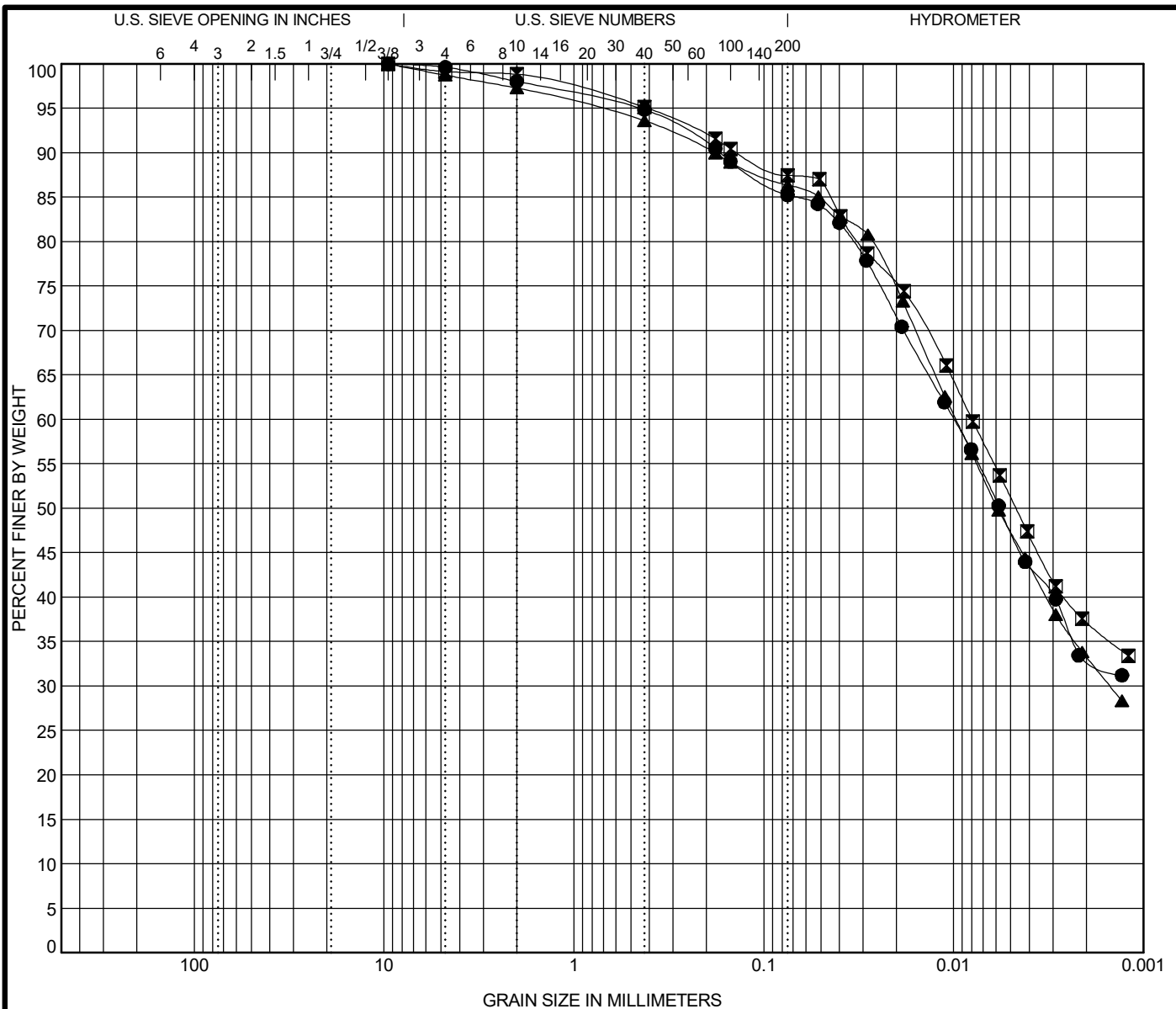
Begin Drilling **02-08-2022** Complete Drilling **02-08-2022**
Drilling Contractor **Wang Testing Services** Drill Rig **21D50A [84%]**
Driller **KS&AP** Logger **A. Scifers** Checked by **C. Marin**
Drilling Method **2.25" ID HSA; Boring backfilled upon completion**

WATER LEVEL DATA

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

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

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	



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

GRAIN SIZE DISTRIBUTION

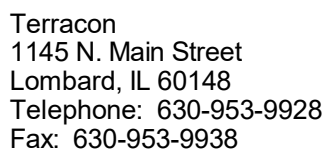
Project: Barrington Rd from Algonquin Rd to Central Rd

Location: Cook County, IL

Number: 1064-01-01



1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	-----



Project: Barrington Rd from Algonquin Rd to Central Rd
Location: Cook County, IL
Number: 1064-01-01

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
 Initial sample mass = 73.22 g
 Initial water content = 533.94%
 Initial dry unit weight = 8.97 pcf
 Initial void ratio = 12.906
 Initial degree of saturation = 82.74%

 Final sample mass = 53.23 g
 Final dry sample mass = 11.55 g
 Final water content = 360.87%
 Final dry unit weight = 15.54 pcf
 Final void ratio = 7.032
 Final degree of saturation = 100.00%
 Estimated specific gravity = 2.00

Ring diameter = 2.500 in
 Ring mass = 109.43 g
 Initial sample and ring mass = 182.65 g
 Tare mass = 14.35 g
 Final ring and sample mass = 162.71 g
 Mass of wet sample and tare = 67.58 g
 Mass of dry sample and tare = 25.90 g
 Initial dial reading = 0.01000 in
 Final dial reading = 0.43200 in
 LL = n.a. %
 PL = n.a. %
 % Sand = n.a.
 % Silt = n.a.
 % Clay = n.a.

In-Situ Vertical Effective Stress = 300 psf

Compression and Swelling Indices

Compression index C_c = 7.774
 Field corrected C_c = 17.268
 Swelling index C_s = 0.454

Preconsolidation pressure, s_c

Casagrande Method = 1421 psf

Over-Consolidation Ratio (OCR) = 4.74

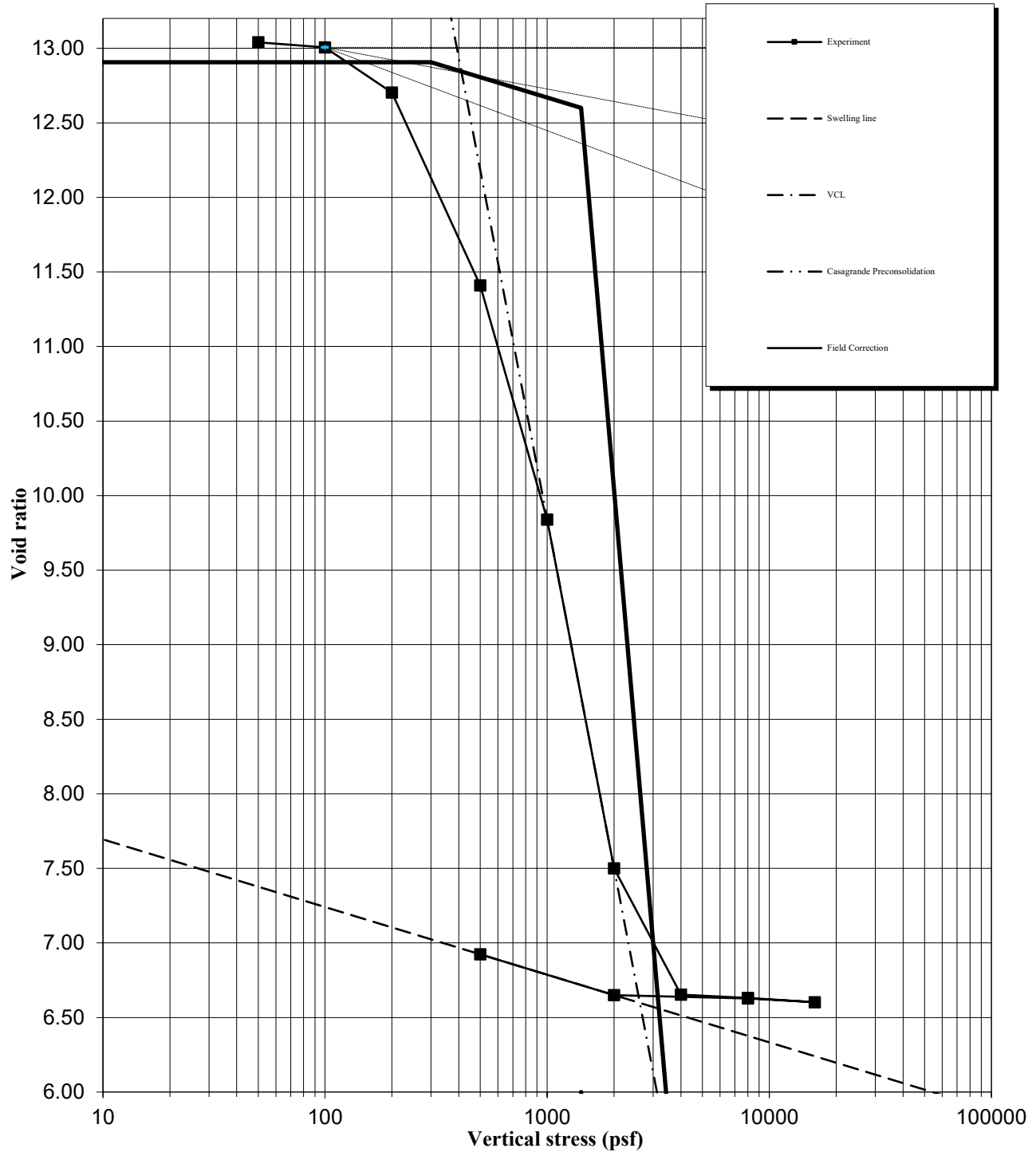
Load number	Vertical stress psf	Dial reading in	System deflection in	Vertical strain %	Void ratio	C_v ft ² /day	C_{ae} %	Elapsed time min
1	50.0	0.00032	0.00010	-0.96	13.040	N/A	N/A	480
2	100.0	0.00260	0.00023	-0.72	13.006	0.1110	0.06	720
3	200.0	0.02402	0.00058	1.46	12.703	0.1392	0.44	720
4	500.0	0.11661	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: _____

CONSOLIDATION CURVE

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



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
Initial sample mass = 92.29 g
Initial water content = 244.49%
Initial dry unit weight = 20.85 pcf
Initial void ratio = 5.583
Initial degree of saturation = 96.34%

Final sample mass = 60.07 g
Final dry sample mass = 26.79 g
Final water content = 124.23%
Final dry unit weight = 40.97 pcf
Final void ratio = 2.351
Final degree of saturation = 100.00%
Estimated specific gravity = 2.20

Ring diameter = 2.499 in
Ring mass = 109.79 g
Initial sample and ring mass = 202.08 g
Tare mass = 11.99 g
Final ring and sample mass = 169.95 g
Mass of wet sample and tare = 72.06 g
Mass of dry sample and tare = 38.78 g
Initial dial reading = 0.01000 in
Final dial reading = 0.50000 in
LL = n.a. %
PL = n.a. %
% Sand = n.a.
% Silt = n.a.
% Clay = n.a.

In-Situ Vertical Effective Stress = 400 psf

Compression and Swelling Indices

Compression index C_c = 4.070
Field corrected C_c = 4.111
Swelling index C_s = 0.667

Preconsolidation pressure, s_c

Casagrande Method = 1063 psf

Over-Consolidation Ratio (OCR) = 2.66

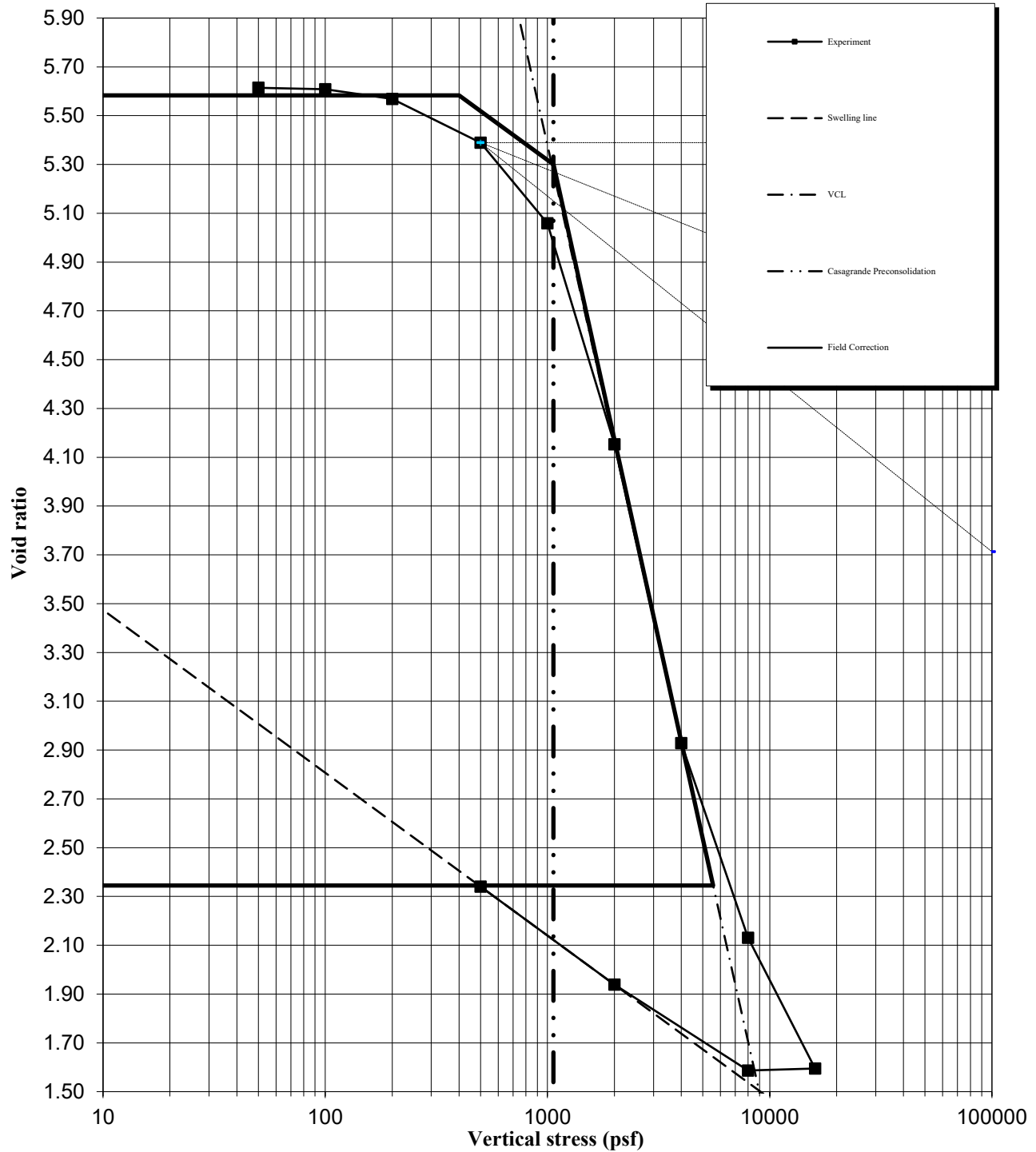
Load number	Vertical stress psf	Dial reading in	System deflection in	Vertical strain %	Void ratio	C_v ft ² /day	C_{ae} %	Elapsed time min
1	50.0	0.00519	0.00010	-0.47	5.614	N/A	N/A	480
2	100.0	0.00589	0.00023	-0.39	5.609	0.0559	0.02	720
3	200.0	0.01161	0.00058	0.22	5.569	0.0897	0.11	720
4	500.0	0.03845	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: _____

CONSOLIDATION CURVE

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



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
Initial sample mass = 125.23 g
Initial water content = 23.98%
Initial dry unit weight = 101.34 pcf
Initial void ratio = 0.663
Initial degree of saturation = 97.72%

Final sample mass = 121.32 g
Final dry sample mass = 101.01 g
Final water content = 20.11%
Final dry unit weight = 114.37 pcf
Final void ratio = 0.473
Final degree of saturation = 100.00%
Estimated specific gravity = 2.70

Ring diameter = 2.506 in
Ring mass = 62.30 g
Initial sample and ring mass = 187.53 g
Tare mass = 11.64 g
Final ring and sample mass = 183.81 g
Mass of wet sample and tare = 132.96 g
Mass of dry sample and tare = 112.65 g
Initial dial reading = 0.01000 in
Final dial reading = 0.09772 in
LL = n.a. %
PL = n.a. %
% Sand = n.a.
% Silt = n.a.
% Clay = n.a.

In-Situ Vertical Effective Stress = 1400 psf

Compression and Swelling Indices

Compression index C_c = 0.180
Field corrected C_c = 0.192
Swelling index C_s = 0.049

Preconsolidation pressure, s_c

Casagrande Method = 1612 psf

Over-Consolidation Ratio (OCR) = 1.15

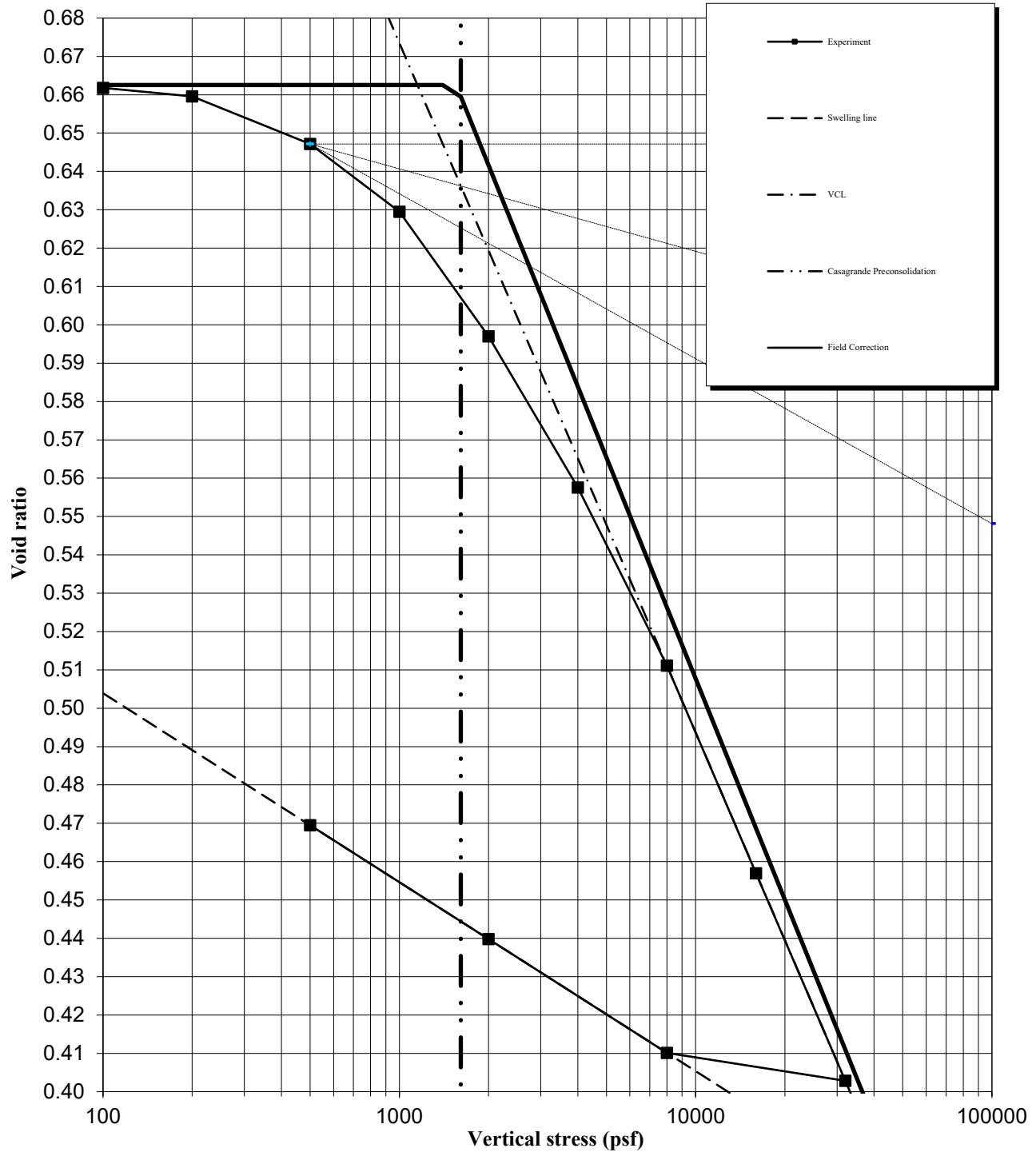
Load number	Vertical stress psf	Dial reading in	System deflection in	Vertical strain %	Void ratio	C_v ft ² /day	C_{ae} %	Elapsed time min
1	100.0	0.01024	0.00010	0.04	0.662	N/A	N/A	720
2	200.0	0.01114	0.00023	0.18	0.660	0.0861	0.04	720
3	500.0	0.01655	0.00058	0.93	0.647	0.0764	0.11	720
4	1000.0	0.02439	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: _____

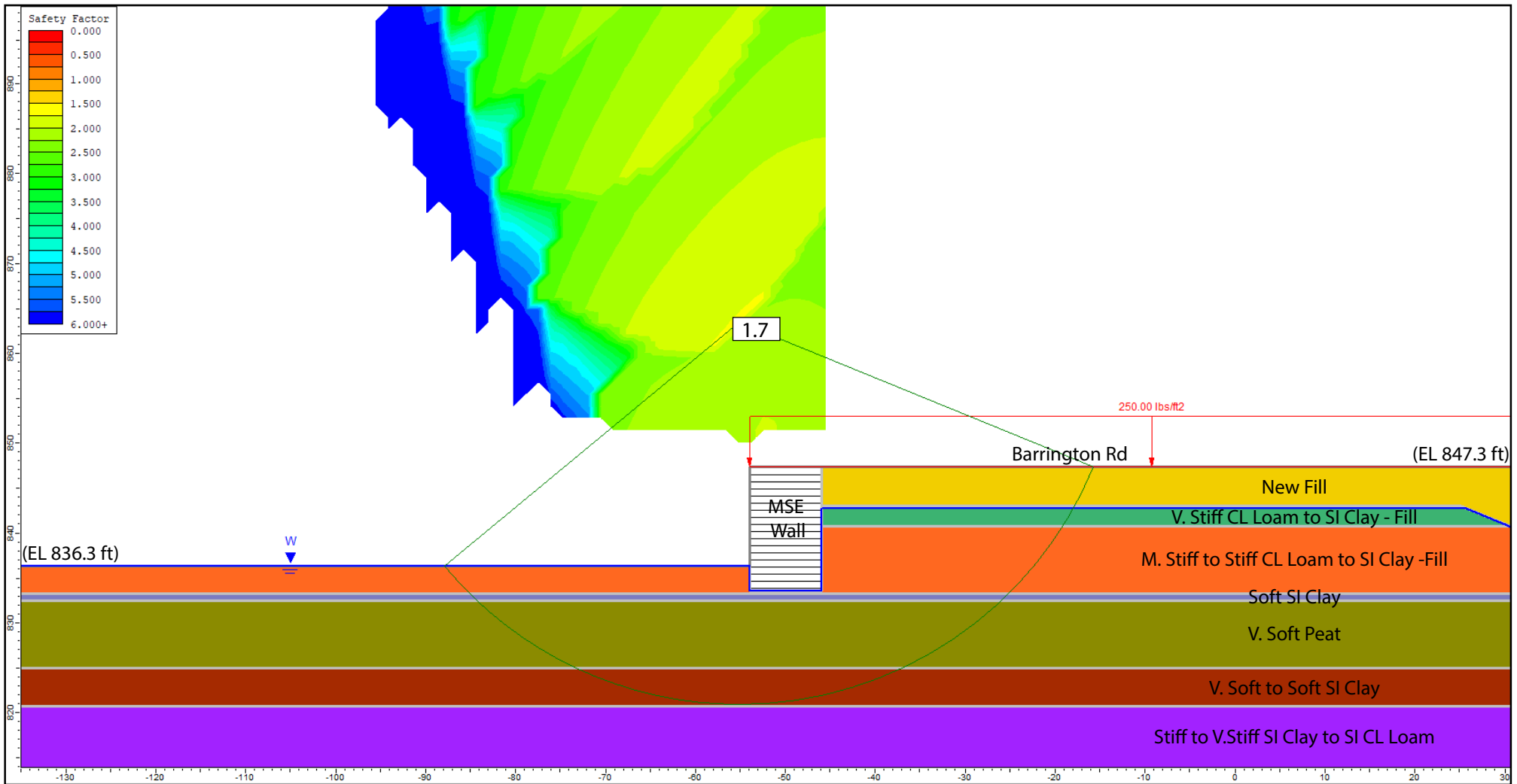
Checked by: _____ Date: _____

CONSOLIDATION CURVE

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



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

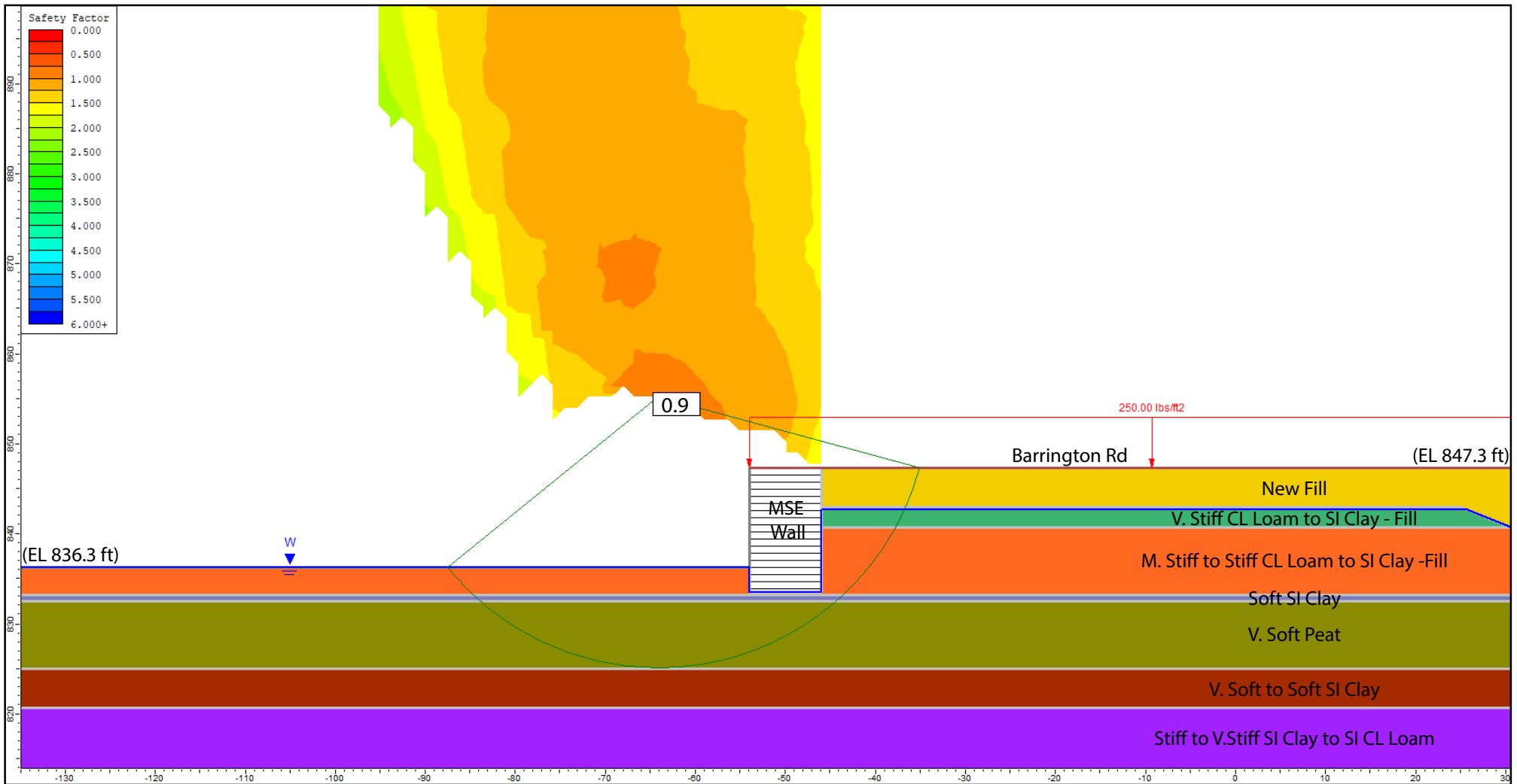
DRAWN BY: D. You
CHECKED BY: M. Seyhun



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

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

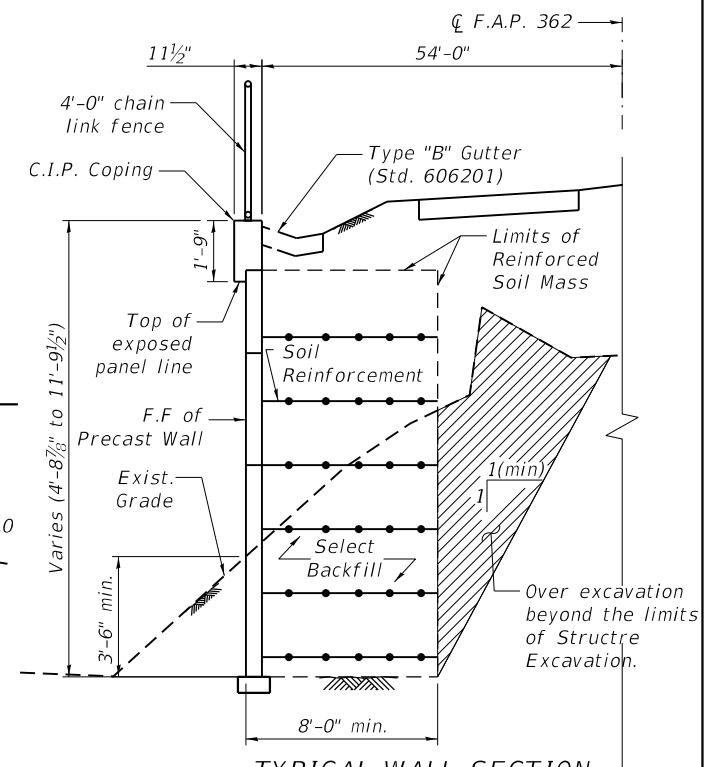


1145 N. Main Street
Lombard, IL 60148
www.wangeng.com

FOR ARDMORE RODERICK

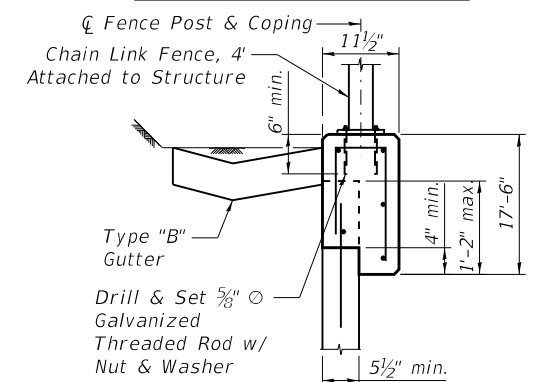
KE225002
1064-01-01

APPENDIX D



Wall offset are measured from the proposed $\mathcal{Q}$ of F.A.P. 362 to the front face of precast panels.

TYPICAL WALL SECTION



3rd P.M.

PROPOSED STRUCTURE

Algonquin Rd

26

25

Munthank Rd

35

36

I-90

R. 9 E

LOCATION SKETCH



GENERAL PLAN & ELEVATION

BARRINGTON ROAD

F.A.P. 362

COOK COUNTY

STATION 83+30.00

STRUCTURE NO. XXXXXXX

 Ardmore Roderick 1500 West Carroll Avenue, Suite 300 Chicago, Illinois 60607 312-755-1400	USER NAME = allshargh1	DESIGNED - AS	REVISED -	STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION	GENERAL PLAN AND SECTIONS STRUCTURE NO. XX-XXXXX	F.A.P RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		DRAWN - AS	REVISED -			362	2019-161-W	COOK		
	PLOT SCALE = 23,999' / 1 in.	CHECKED - SB	REVISED -			CONTRACT NO. 62K33				
	PLOT DATE = 1/26/2023	DATE - SB	REVISED -							
				SCALE:	SHEET	OF	SHEETS	STA.	TO STA.	