Structural Geotechnical Report

Laramie Avenue Over I-290 Bridge Replacement
Existing SN: 016-2064
Proposed SN: 016-2015
IDOT PTB 204-014
FAI 290 at Laramie Avenue
Cook County, Illinois

Prepared for

Illinois Department of Transportation
Project Number: D-91-156-22

Project Design Engineer Team
Gannett Fleming, Inc.

Geotechnical Consultant:
GSG Consultants, Inc.

GSG CONSULTANTS, INC.
Engineers. Scientists. Construction Managers
735 Remington Road, Schaumburg IL 60173
Tel: 630.994.2600, www.gsg-consultants.com

March 5, 2024
Revised May 14, 2026

GSG CONSULTANTS, INC.

735 Remington Road
Schaumburg, IL 60173
Tel: 630.994.2600
www.gsg-consultants.com

May 14, 2026

Robert Rose, PTOE, PE
Manager - Highways
Gannett Fleming, Inc.
180 N. Stetson Avenue
Chicago, Illinois 60601

Structural Geotechnical Report
Proposed Bridge Carrying Laramie Avenue over I-290
Cook County, IL
IDOT PTB 204-014

Dear Mr. Rose:

Attached is a copy of the Structural Geotechnical Report for the above referenced project. The report provides a description of the site investigation, site conditions, and foundation and construction recommendations. The overall site investigation for the proposed bridge replacement included advancing eight (8) bridge soil borings to depths ranging from 42.5 to 85.5 feet and four (4) rock cores. Sixteen (16) retaining wall soil borings were completed, for the proposed wingwalls, to depths ranging from 43 to 50 feet.

Should you have any questions or require additional information, please call us at 630-994-2600.

Sincerely,

Daniel DiMaggio

Daniel DiMaggio, E.I.T.
Project Engineer

Dawn Edgell.

Dawn Edgell, P.E.
Sr. Project Engineer

TABLE OF CONTENTS

Exhibits

Tables

Appendices

1.0 INTRODUCTION

GSG Consultants, Inc. (GSG) completed a geotechnical investigation for the Phase II design of the proposed Laramie Avenue over I-290 bridge replacement near the South Austin neighborhood of Chicago in Cook County, Illinois. The purpose of the investigation was to explore the subsurface conditions, to determine engineering properties of the subsurface soil, and develop design and construction recommendations for the proposed bridge and retaining walls. **Exhibit 1** shows the general project location.

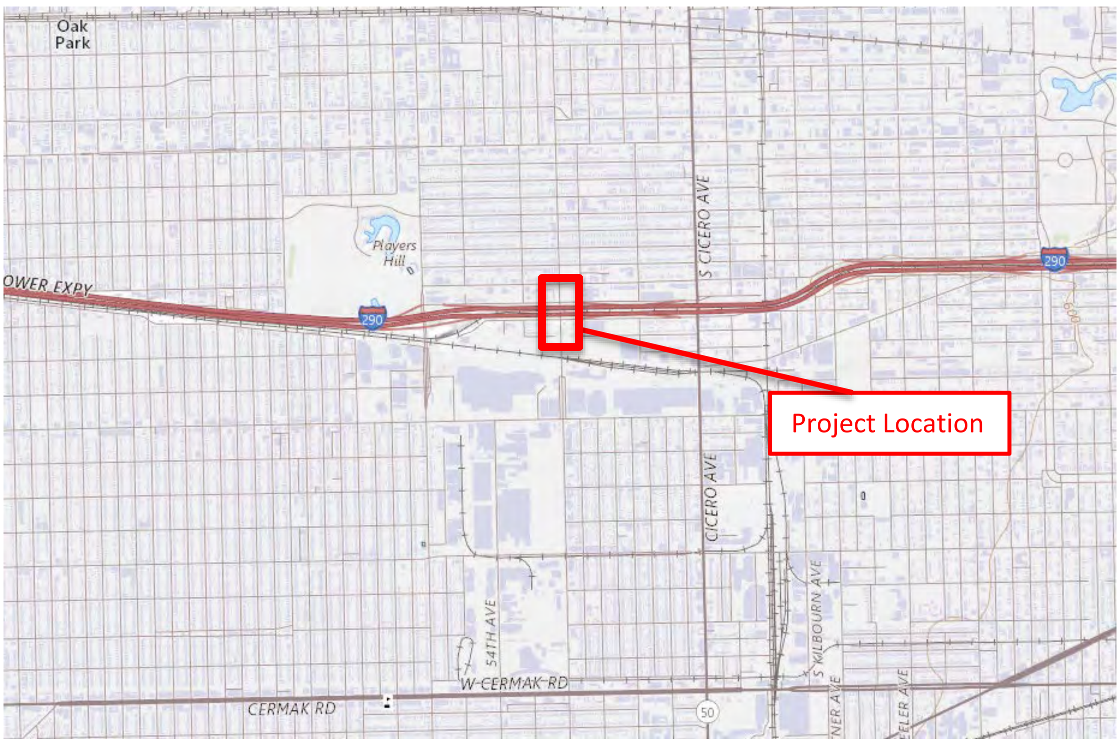


Exhibit 1 – Project Location Map
(Source: USGS Topographic Maps, usgs.gov)

The general scope of the overall project is to reconstruct the Laramie Avenue and I-290 intersection. The overall project will include the following:

- Replacement of the Laramie Avenue bridge over I-290 (SN016-2064). The new bridge will have an increased vertical clearance.
- New retaining walls along the north and south abutments.

- Roadway reconstruction extending approximately 400 feet north along Laramie Avenue; the intersection of Laramie Avenue and W. Lexington Street; the intersection of Laramie Avenue and W. Flournoy Street.

The proposed roadway improvements will be discussed in a separate report.

1.1 Existing Bridge Information

IDOT Structure No. 016-2064 currently supports Laramie Avenue over I-290. The existing bridge was constructed in 1954, with rehabilitation and repairs in 1986. The structure consists of a 3-span continuous non-composite steel bridge carrying two lanes of traffic and sidewalk in the northbound direction and four lanes of traffic and sidewalk in the southbound direction. The bridge is supported on two piers and two abutments. The bridge is about 204.5 feet long from back-to-back of abutments with an out-to-out deck width of 81 feet. Retaining walls are currently in place to support the soil below each abutment. The sides of the existing embankments are sloped, with some vegetated areas. **Exhibits 2a and 2b** generally show the existing site conditions at the existing bridge structure.

Exhibit 2a – Existing Laramie Avenue Bridge, Looking North along Laramie Avenue

Exhibit 2b – Existing Laramie Avenue Bridge, Looking East along I-290

1.2 Proposed Bridge Information

Based on information provided by Gannett Fleming, the SN 016-2064 bridge, carrying Laramie Avenue over I-290 will be replaced to increase vertical clearance and accommodate the future I-290 widening and reconstruction. The bridge will be replaced with a similar structure, with retaining walls along the north and south abutments. The locations of the piers on either side of the CTA tracks will be changed due to the proposed I-290 alignment. Based on the GP&E drawings (Dated 01/10/2025) in **Appendix A**, the proposed bridge will be a three-span structure with an anticipated length of 262.5 feet from back-to-back of abutments. The proposed out-to-out deck width will be 125.0 feet for the bridge deck, and a width of 146.0 feet at the abutments. The vertical clearance above the future I-290 pavement will be 15 feet. During construction, Laramie Avenue will be closed, and traffic will be detoured. Based on design information from Gannett Fleming, it is anticipated that the new bridge will be supported on drilled shafts for the piers and driven piles supported closed abutments.

Wingwall retaining walls will be constructed along the sides of each abutment. Each wall will extend approximately 200 feet and will have a maximum height of 20 feet. Based on the approved GPE, it is anticipated that the wingwalls adjacent to the abutments will be a cast-in-place, pile supported concrete wall. The retaining walls (SN 016-W2545 and SN 016-W2546) being considered extending east of the bridge may be Secant walls, MSE walls, or Soldier Pile walls.

2.0 SITE SUBSURFACE CONDITIONS

This section describes the subsurface exploration program and laboratory testing program completed as part of this project. The proposed locations and depths of the soil borings were selected in accordance with IDOT requirements and reviewed with Gannett Fleming, Inc. The borings were completed in the field based on field conditions and accessibility.

2.1 Subsurface Exploration and Laboratory Testing

The site subsurface exploration for the proposed bridge and retaining wall structures was conducted between September 20 and October 18, 2023. The investigation included advancing eight (8) bridge borings to depths of 42.5 to 85.5 feet and sixteen (16) retaining wall borings to depths of 43 to 50 feet. The locations of these soil borings were adjusted in the field as necessary based on utilities and access. Elevations and as-drilled locations for the borings were gathered by GSG's field crew using GPS surveying equipment. The approximate as-drilled locations of the soil borings are shown on the Soil Boring Location Plan & Subsurface Profiles **(Appendix B)**. **Table 1** presents a summary of the borings used for the proposed bridge and retaining wall analyses.

Table 1 – Summary of Subsurface Exploration Borings

Associated Structure	Boring ID	Station	Offset (ft) / Direction	Depth (ft)	Surface Elevation (ft)
Bridge Borings					
North Abutment	BSB-01	1,521+92.14*	59.23 LT	85.5***	607.67
North Abutment	BSB-02	1,521+92.47*	86.15 RT	71.0	607.55
North Pier	BSB-03	1,520+79.33*	53.40 LT	61.5***	592.00
North Pier	BSB-04	1,520+80.06*	77.69 RT	42.5	591.00
South Pier	BSB-05	1,520+0.95*	55.16 LT	46.0	592.00
South Pier	BSB-06	1,520+3.10*	83.39 RT	63.5***	591.00
South Abutment	BSB-07	1,518+84.64*	53.46 LT	63.0	607.34
South Abutment	BSB-08	1,518+80.63*	79.31 RT	81.0***	607.49
Retaining Wall Borings					
Northwest Wingwall	RWB-01	460+89.79**	32.75 LT	43.0	591.60
Northwest Wingwall	RWB-02	460+36.22**	43.18 LT	50.0	594.76
Northwest Wingwall	RWB-03	459+87.37**	37.32 LT	50.0	593.40

Associated Structure	Boring ID	Station	Offset (ft) / Direction	Depth (ft)	Surface Elevation (ft)
Northwest Wingwall	RWB-04	459+35.80**	44.28 LT	50.0	595.83
Northeast Wingwall	RWB-05	461+97.71**	32.84 LT	50.0	590.83
Northeast Wingwall	RWB-06	462+26.45**	36.24 LT	50.0	588.35
Northeast Wingwall	RWB-07	462+80.25**	36.68 LT	50.0	588.64
Northeast Wingwall	RWB-08	463+34.30**	39.01 LT	47.0	591.78
Southwest Wingwall	RWB-09	460+69.27**	31.09 RT	46.5	591.73
Southwest Wingwall	RWB-10	460+24.94**	32.68 RT	46.0	592.05
Southwest Wingwall	RWB-11	459+73.29**	31.30 RT	43.0	592.89
Southwest Wingwall	RWB-12	459+24.61**	31.48 RT	46.5	593.80
Southeast Wingwall	RWB-13	462+2.37**	33.98 RT	43.5	591.81
Southeast Wingwall	RWB-14	462+14.60**	32.63 RT	44.0	590.90
Southeast Wingwall	RWB-15	462+29.77**	29.77 RT	50.0	591.14
Southeast Wingwall	RWB-16	463+18.18**	32.66 RT	48.5	591.51

*Based on proposed Laramie Avenue stationing

**Based on proposed I-290 stationing

***Including 15-foot rock core

The soil borings were drilled using truck mounted Diedrich D-50 (hammer efficiency 95.5%), B-57 Mobile (hammer efficiency 89%) and CME-75 (hammer efficiency 79.8%) drill rigs, each equipped with 3¼-inch I.D. hollow stem augers and an automatic hammer. Soil sampling was performed according to AASHTO T 206, "Penetration Test and Split Barrel Sampling of Soils." Soil samples were obtained at 2.5-foot intervals to a depth of 30 feet, then at 5-foot intervals to the boring termination depths or upon encountering auger refusal on apparent bedrock. Water level measurements were made in each boring when evidence of free groundwater was detected on the drill rods or in the samples. The boreholes were also checked for free water immediately after auger removal, and before filling the open boreholes with soil cuttings and surface patching with asphalt where necessary to match the existing pavement. Copies of the Soil Boring Logs are provided in **Appendix C**.

GSG's field representative inspected, visually classified and logged the soil samples during the subsurface exploration activities and performed unconfined compressive strength tests on cohesive soil samples using a calibrated Rimac compression tester and a calibrated hand penetrometer in accordance with IDOT procedures and requirements. Representative soil samples were collected from each sample interval and were placed in jars and returned to the laboratory for further testing and evaluation.

GSG also collected rock core runs from four of the soil boring locations with the use of a ten-foot and/or a five-foot, diamond bit, NX-5 split core barrel during the investigation. The bedrock cores were evaluated in the field for texture, physical condition, recovery percentage, and Rock Quality Designation (RQD). The extracted samples were visually inspected and classified, and the Rock Quality Designation (RQD) was determined according to ASTM D 6032, “Standard Test Method for Determining Rock Quality Designation (RQD) of Rock Core” by totaling all sections with a length in excess of four (4) inches and dividing it by the total length of the core run. The RQD is given a classification based upon the numeric value as indicated in **Table 2**.

Table 2 – Rock Quality Designation Summary

Rock Quality Designation	Descriptions
< 25%	Very Poor
25 – 50%	Poor
51 – 75%	Fair
76 – 90%	Good
91 – 100%	Excellent

2.2 Laboratory Testing Program

All samples were inspected in the laboratory to verify the field classifications. A laboratory testing program was undertaken to characterize and determine engineering properties of the subsurface soils encountered in the area of the proposed bridge and retaining walls.

The following laboratory tests were performed on representative soil and rock samples:

- Moisture content ASTM D2216 / AASHTO T-265
- Atterberg Limits ASTM D4318 / AASHTO T-89 / AASHTO T-90
- Dry Unit Weight ASTM D7263
- Unconfined Compression Strength on Rock – ASTM D2938

The laboratory tests were performed in accordance with test procedures outlined in the most current IDOT Geotechnical Manual, and per ASTM and AASHTO requirements. Based on the laboratory test results, the soils encountered were classified according to the AASHTO and the

Illinois Division of Highways (IDH) classification systems. The results of the laboratory testing program are included in the Laboratory Test Results **(Appendix D)** and are also shown along with the field test results in the Soil Boring Logs **(Appendix C)**.

2.3 Subsurface Soil Conditions

This section provides a brief description of the soils encountered in the borings performed in the vicinity of the proposed bridge. Variations in the general subsurface soil profile were noted during the drilling activities. Detailed descriptions of the subsurface soils are provided in the soil boring logs and are shown graphically in the Boring Location Plan & Subsurface Profiles. The soil boring logs provide specific conditions encountered at each boring location and include soil descriptions, stratifications, penetration resistance, elevations, location of the samples, and laboratory test data. Unless otherwise noted, soil descriptions indicated on boring logs are visual identifications. The stratifications shown on the boring logs represent the conditions only at the actual boring locations and represent the approximate boundary between subsurface materials; however, the actual transition may be gradual.

<u>North Abutment and Wingwalls</u>

Borings BSB-01 and BSB-02 were drilled through the roadway along W. Flournoy Street and initially encountered 2 to 5 inches of asphalt, followed by 8 to 12 inches of concrete, followed by 3 to 4 inches of aggregate base. The surface elevations were consistent at both borings at 607.6 feet. Borings BSB-03 and BSB-04 were drilled in the left lane of WB I-290 and initially encountered 6 to 8 inches of asphalt, followed by 8 to 10 inches of concrete; the surface elevations ranged between 591.0 and 592.0 feet. Borings RWB-01 through 08 were drilled along the north shoulder of WB I-290 and initially encountered 2 to 12 inches of asphalt, with boring RWB-01 noting 4 inches of concrete beneath the asphalt and boring RWB-08 noting 10 inches of aggregate base beneath the asphalt; the surface elevations of the borings ranged between 595.8 and 588.3 feet.

Below the pavement materials, the borings encountered various fill soils ranging to depths between 1.5 and 9.0 feet (El. 604.6 to 582.0 feet). The fill materials were predominantly sand. Several borings also encountered silty clay and gravel fill.

Beneath the fill materials, most of the borings encountered brown and gray stiff to very hard silty clay / silty clay loam to depths of 41.0 to 64.5 feet (El. 554.1 to 543.2 feet), followed by gray very dense gravel to the boring termination depths in borings RWB-02, 03, 04, 06 and 07 and highly weathered limestone to the auger refusal depths in the remaining borings. The borings also encountered various layers of interbedded granular soils. Borings BSB-02 through 04 and borings RWB-01 and 08 encountered gray medium dense to very dense silty loam / loam between depths of 6.0 and 28.5 feet (between El. 590.6 and 563.1 feet). Borings BSB-02, RWB-02 and RWB-08 encountered gray medium dense to very dense sandy loam between depths of 28.5 and 63.5 feet (between El. 578.1 and 544.1 feet). Boring BSB-01 encountered brown and gray loose to medium dense sand between depths of 8.5 and 26.0 feet (between El. 599.2 and 581.7 feet). Borings RWB-02 through 05 noted sand seams at depths between 4.0 and 29.0 feet. Borings RWB-05 and 08 noted cobbles at depths of 48.5 and 39.5 feet, respectively.

The unconfined compressive strength of the brown and gray stiff to very hard silty clay / silty clay loam soils ranged between 1.5 and 10.8 tons per square foot (tsf), with most values ranging between 3.0 and 6.0 tsf, and with an average strength of 5.6 tsf. The gray medium dense to very dense silty loam / loam soils had SPT blow count 'N' values ranging from 16 to 54 blows per foot (bpf), with an average value of 35 bpf. The gray medium dense to very dense sandy loam had SPT blow count 'N' values ranging from 20 to 50 bpf, with an average value of 40 bpf. The brown and gray very loose to medium dense sand had SPT blow count 'N' values ranging from 1 to 20 bpf, with an average value of 6 bpf.

South Abutment and Wingwalls

Borings BSB-07 and BSB-08 were drilled through the roadway along W. Lexington Street and initially encountered 3 to 9 inches of asphalt, followed by 6 to 11 inches of concrete, followed by 2 inches of aggregate base in boring BSB-08; the surface elevations of the borings were consistent at 607.4 feet. Borings BSB-05 and BSB-06 were drilled in the north shoulder of EB I-290 and initially encountered 6 to 8 inches of asphalt, followed by 10 to 12 inches of reinforced concrete; the surface elevations ranged between 592.0 and 591.0 feet. Borings RWB-09 through 16 were drilled along the south shoulder of EB I-290 and initially encountered 10 to 12 inches of asphalt, with boring RWB-14 noting 6 inches of aggregate base beneath the asphalt; the surface elevations of the borings ranged between 593.8 and 590.9 feet.

Below the pavement materials, the borings encountered various fill soils ranging to depths between 1.5 and 8.5 feet (El. 604.0 to 582.5 feet). The fill materials were predominantly silty clay. Several borings also encountered sand and gravel fill.

Beneath the fill materials, most of the borings encountered gray stiff to very hard silty clay / silty clay loam to depths of 41.5 to 58.5 feet (El. 551.3 to 542.6 feet), followed by highly weathered limestone until the auger refusal depths. The borings also encountered various layers of interbedded granular soils. Most of the borings encountered gray medium dense to very dense silty loam / loam between depths of 3.5 and 61.0 feet (between El. 598.5 and 544.0 feet). In borings BSB-07, RWB-09 and RWB-13, brown and gray very loose to dense sand was encountered between depths of 1.0 and 49.5 feet (between El. 601.3 and 557.8 feet). Boring BSB-06 encountered gray dense gravel between depths of 19.0 and 21.0 feet (between El. 572 and 570 feet). Boring BSB-05 noted cobbles at depths of 3.5 and 26.0 feet.

The unconfined compressive strength of the gray stiff to very hard silty clay / silty clay loam soils ranged between 1.2 and 11.5 tsf, with most values ranging between 3.0 and 7.0 tsf, and with an average strength of 5.3 tsf. The gray medium dense to very dense silty loam / loam soils had SPT blow count 'N' values ranging from 8 to 50 bpf, with an average value of 41 bpf. The brown and gray very loose to dense sand had SPT blow count 'N' values ranging from 1 to 50 bpf, with an average value of 17 bpf. The gray dense gravel had an SPT blow count 'N' value of 31 bpf.

Rock core samples were collected at several soil boring locations. The bedrock cores generally consisted of light gray limestone, with light to heavy weathering and light to moderate levels of fracturing. Some secondary mineralization and vugs were observed. Unconfined compressive strength tests were completed on representative samples of the rock cores. **Table 3** provides the RQD values and unconfined compression strength values of the rock cores extracted during the site investigation. Photographs of the cores are included with each boring log in **Appendix C**.

Table 3 – Rock Core Summary and Classification

Boring Number	Core Run / Length (ft)	Core Depth (feet)	Type of Rock	RQD (%)	RQD Classification	Depth (ft)/ Compressive Strength (psi)
BSB-01	1 / 10	70.5-80.5	Limestone	83.7	Good	N/A
	2 / 5	80.5-85.5	Limestone	86.6	Good	84.5-85.5 / 7,582
BSB-03	1 / 10	46.5-56.5	Limestone	85.4	Good	54.5-55.5 / 2,834
	2 / 5	56.5-61.5	Limestone	85.8	Good	N/A
BSB-06	1 / 10	48.5-58.5	Limestone	72.9	Fair	55.5-56.5 / 4,379
	2 / 5	58.5-63.5	Limestone	81.6	Good	N/A
BSB-08	1 / 10	66.0-76.0	Limestone	88.5	Good	75.5-76.5 / 4,776
	2 / 5	76.0-81.0	Limestone	78.5	Good	N/A

2.4 Groundwater Conditions

Water levels were checked in each boring to determine the general groundwater conditions present at the site and were measured while drilling and after each boring was completed. Groundwater was observed during drilling at borings BSB-01, BSB-02, BSB-04, BSB-06, BSB-07 and RWB-09 at depths of 3.0 to 13.5 feet (El. 604.5 to 582.0 feet). Groundwater was not encountered during or immediately after drilling at the remaining soil boring locations. None of the borings were left open after leaving the site due to safety concerns.

Based on the color change from brown and gray to gray, it is anticipated that the long-term groundwater level is located near approximate elevations of 590 to 582 feet. Perched water may also be present within the fill materials or confined granular layers observed in the borings. Water level readings were made in the boreholes at times and under conditions shown on the boring logs and stated in the text of this report. However, it should be noted that fluctuations in groundwater level may occur due to variations in the rainfall, other climatic conditions, or other factors not evident at the time measurements were made and reported herein.

3.0 GEOTECHNICAL ANALYSES

This section provides GSG's geotechnical analysis and recommendations for the design of the proposed bridge based on the results of the field exploration, laboratory testing, and geotechnical analysis. Subsurface conditions between borings may vary from those encountered at the boring locations. If structure locations, loadings, or elevations are changed, we request that GSG be contacted so that we may re-evaluate our recommendations.

3.1 Scour

The bridge structure carrying Laramie Avenue over I-290 has no waterways in the vicinity; therefore, scour will not be a concern for this project.

3.2 Settlement

Based on the existing site conditions, it is assumed that minimal cut and fill will be required for the majority of the new bridge construction. Some additional new fill may be required along the sides of the abutments where the bridge will be widened beyond the existing bridge alignment; however, there is already an existing sloped embankment at these locations so new fill is anticipated to be minimal.

3.3 Seismic Parameters

The seismic hazard for the site was evaluated per the IDOT Geotechnical Manual, IDOT Bridge Design Manual, and AASHTO LRFD Bridge Design Specifications. The Seismic Soil Site Class was determined per the requirements of All Geotechnical Manual Users (AGMU) Memo 9.1, Design Guide for Seismic Site Class Determination, and the "Seismic Site Class Determination" Excel spreadsheet provided by IDOT. A global Site Class Definition was determined for this project, and was found to be Soil Site Class D. The Seismic Performance Zone (SPZ) was determined using Figure 2.3.10-2 in the IDOT Bridge Manual and was found to be Seismic Performance Zone 1.

The AASHTO Seismic Design Parameters program was used to determine the peak ground acceleration coefficient (PGA), and the short (S_{DS}) and long (S_{D1}) period design spectral acceleration coefficients for each of the proposed structures. For this section of the project, the S_{DS} and the S_{D1} were determined using 2020 AASHTO Guide Specifications as shown in **Table 4**. Given the site location and materials encountered, the potential for liquefaction is minimal.

Table 4 – Seismic Parameters

Building Code Reference	PGA	S_{DS}	S_{D1}
2020 AASHTO Guide for LRFD Seismic Bridge Design	0.043g	0.148g	0.086g

4.0 GEOTECHNICAL BRIDGE DESIGN RECOMMENDATIONS

The foundations for the proposed bridge must provide sufficient support to resist the dead and live loads, as well as seismic loading. The foundation design recommendations presented within this section were completed per the AASHTO LRFD 9th Edition (2020). The anticipated loads provided by Gannett Fleming for the proposed bridge are shown in **Table 5.**

Table 5 – Proposed Structural Design Loads

Location		Abutments	Piers
Strength I Load (kips)	Dead	4,861	6,761
	Live	1,300	2,224
Service I Load (kips)	Dead	3,889	5,409
	Live	743	1,271

4.1 Bridge Foundation Recommendations

GSG evaluated potential foundation systems for the proposed bridge. GSG's evaluation included shallow foundations, drilled shafts and driven piles. The results of the evaluation are presented below. Based on information provided by Gannett Fleming, drilled shafts are anticipated to be used to support the piers to minimize disruption to the CTA tracks; the abutments will be pile supported closed abutments with concrete wingwalls.

4.1.1 Shallow Foundations

Based on the new span length and the anticipated loads, excessive settlement is anticipated for shallow foundations. Therefore, shallow foundations are not anticipated to be a feasible option for the proposed bridge substructures and will not be discussed further in the report.

4.1.2 Drilled Shaft Foundations

Based on the anticipated loading, drilled shafts could bear on the very stiff to very hard native silty clay / silty clay loam soils, within the underlying granular strata, within the fractured/weathered bedrock, or on top of suitable limestone bedrock. Design recommendations for drilled shafts are provided in Section 4.2 of this report.

4.1.3 Driven Pile Foundations

Driven piles can be used to support the abutments. However, construction related issues may occur based on the proximity of the site to adjacent business centers, and residential homes. If driven piles are selected for the abutments, building monitoring will need to be completed during the pile installation in order to assure no damage is being incurred to the nearby structures from the pile driving activities.

Driven piles will not be feasible for the piers due to the proximity and restrictions of the CTA tracks and significant utilities in the median of I-290. These issues can include the significant utilities along the project corridor and the noise and vibration anticipated during installation. Design recommendations for driven piles are provided in *Section 4.3* of this report.

4.2 Drilled Shaft Foundation Design Recommendation

Drilled shafts are considered a feasible foundation option for the proposed bridge piers. The drilled shafts could be supported upon the very stiff to very hard silty clay / silty clay loam soils, or on top of competent limestone bedrock. It is recommended that the drilled shafts be extended to competent bedrock and that the base of the drilled shafts bear on the solid rock surface. Caissons bearing on bedrock should be straight shaft, with no bell, and should be placed on the top of solid bedrock.

If the bridge loads do not allow for drilled shafts to be designed within the soil or on top of bedrock, rock socketed caissons may be considered. **Tables 6a and 6b** present the drilled shaft end bearing and side resistance values for the group of piers. Resistance factors are based on AASHTO LRFD Table 10.5.5.2.4-1—Resistance Factors for Geotechnical Resistance of Drilled Shafts.

Table 6a – Drilled Shaft End Bearing Parameters (BSB-03 thru 06)

Bearing Elevation	Soil Description	Nominal Tip Resistance (ksf)	Resistance Factor ϕ	Factored Tip Resistance (ksf)
560.0	Gray Very Stiff to Very Hard Silty Clay / Silty Clay Loam	52.2	0.40	20.8
548.5-536.5	Limestone Bedrock	116.0	0.50	58.0

Table 6b – Drilled Shaft Side Resistance Parameters for the Piers (BSB-03 thru 06)

Bearing Elevation	Soil Description	Nominal Side Resistance (ksf)	Side Resistance Factor ϕ	Factored Side Resistance (ksf)
585.5-568	Stiff to Hard Gray Silty Clay / Silty Clay Loam	2.10	0.45	0.94
568-565.5	Dense to Extremely Dense Gray Silty Loam	3.80	0.55	2.09
565.5-548	Very Stiff to Very Hard Gray Silty Clay / Silty Clay Loam	2.56	0.45	1.15
572.5-570.5 ***BSB-06 Only**	Dense Gray Gravel	3.71	0.55	2.04

The top 5 feet of the shaft and periphery of the belled end should not be included in drilled shaft side resistance. If the drilled shafts extend into the weathered limestone, then the drilled shafts should be straight shaft, with no bell. A protective casing will be required for any shafts extending through the silty loam and sand materials. Construction of drilled shafts should be following the recommendations in *Section 6.4*.

We recommend that the minimum shaft diameter be at least 3 feet, and the bell diameter should not exceed three (3) times the shaft diameter. Drilled shafts be installed with a minimum center-to-center spacing of at least 4 shaft diameters (4D) for the vertical loads and 5D for the lateral load analyses, as drilling the shafts at close spacing can reduce the total capacity of the drilled shafts and the group effect must then be considered. The drilled shafts should be spaced such that there is a minimum distance between the edges of the bell of one foot. The bell angle should not be more than 60 degrees from horizontal. The bell size should be oversized by a minimum of 6 to 12 inches, and any excess spoil could be back-bladed to the bell periphery. As it can be expected that the shafts will penetrate through the very hard clay soils, very dense granular soils and cobbles, or bedrock, the contractor should be prepared for hard drilling and be prepared with techniques to properly clean the bottom of the shaft before any concrete is placed.

For drilled shaft cored or socketed one (1) foot into the solid bedrock, the nominal bearing capacity of the bedrock may increase to 150 kips per square foot. This value may be increased by 40 ksf for each additional foot the drilled shaft is socketed into the bedrock, to a maximum of 300 ksf.

Geotechnical losses due to downdrag were not included in the drilled shaft calculations. Downdrag should be considered where drilled shafts will be constructed within areas of new roadway fill. The maximum anticipated settlement due to soil compression under drilled shafts bearing on very stiff clay, for various diameters of shafts, are included in **Table 7**. The maximum total anticipated pier load of 6,680 kips was used. This maximum load was distributed across the total number of shafts which varied with different diameter sizes due to the minimum center-to-center spacing of 4 shaft diameters.

Table 7 – Maximum Anticipated Settlement Drilled Shafts Supported on Hard Clay

Bearing Elevation (feet)	Shaft Diameter (feet)	Bell Diameter (feet)	Maximum Settlement (inches)
560.0	3.0	9	0.96
560.0	4.0	12	0.94
560.0	5.0	15	0.87
560.0	6.0	18	0.89

4.3 Driven Pile Design Recommendations

It is anticipated that pile-supported closed abutments may be utilized for the design of the proposed bridge. The Modified IDOT static method-excel spreadsheet was used to estimate the pile lengths at various axial geotechnical resistances for driven piles per IDOT AGMU Memo 10.2. The factored resistance includes a reduction of 0.55 for the geotechnical resistance for the pile installation. The geotechnical losses due to downdrag or liquefaction were not included in the axial pile resistance calculations.

Tables 9a through 9d summarize the estimated maximum pile lengths for representative pile sections along with the factored resistance available for the piles that are feasible for the proposed substructures. The complete IDOT Pile Design Tables, including factored resistance available (RF) and nominal required bearing (RN), are included in **Appendix G**.

The estimated pile lengths shown in **Tables 9a through 9d** and in **Appendix G** are based on the GP&E (Dated 01/10/2025) in **Appendix A**. The actual pile length and resistance should be evaluated based on test piles installed in accordance with the specifications provided in Section 512.15 of IDOT Standard Specifications for Road and Bridge Construction. Per Section 3.10.1.11 of the IDOT Bridge Manual (2023), the minimum pile spacing should be 3 pile diameters, and the maximum pile spacing should not be more than 3.5 times the effective footing thickness plus one foot, not to exceed a total of 8 feet.

Tables 9a through 9d summarize estimated pile lengths for select H-piles with the factored resistance available that are feasible for the proposed substructures. The complete IDOT Pile Design Tables for each substructure, including factored resistance available (RF) and nominal required bearing (RN), are included in **Appendix G**.

Table 8a – North Abutment Pile Design (BSB-01)

Pile Section	Nominal Required Bearing (Kips)	Factored Resistance Available (Kips)	Estimated Pile Length (FT)
HP10x42 (Max. R_N = 335 Kips)	335	184	48
HP10x57 (Max. R_N = 454 Kips)	454	250	49
HP12x53 (Max. R_N = 418 Kips)	418	230	48
HP12x74 (Max. R_N = 589 Kips)	589	324	49
HP14x73 (Max. R_N = 578 Kips)	578	318	48
HP14x89 (Max. R_N = 705 Kips)	705	388	49

NOTES: Pile cut off elevation = 584.25 feet (assume)
Ground surface elevation against pile during driving = 583.25 feet

Table 8b – North Abutment Pile Design (BSB-02)

Pile Section	Nominal Required Bearing (Kips)	Factored Resistance Available (Kips)	Estimated Pile Length (FT)
HP10x42 (Max. R_N = 335 Kips)	335	184	49
HP10x57 (Max. R_N = 454 Kips)	454	250	50
HP12x53 (Max. R_N = 418 Kips)	418	230	49
HP12x74 (Max. R_N = 589 Kips)	589	324	50
HP14x73 (Max. R_N = 578 Kips)	578	318	49
HP14x89 (Max. R_N = 705 Kips)	705	388	50

NOTES: Pile cut off elevation = 584.25 feet (assume)
Ground surface elevation against pile during driving = 583.25 feet

Table 8c – South Abutment Pile Design (BSB-07)

Pile Section	Nominal Required Bearing (Kips)	Factored Resistance Available (Kips)	Estimated Pile Length (FT)
HP10x42 (Max. R_N = 335 Kips)	335	184	41
HP10x57 (Max. R_N = 454 Kips)	454	250	42
HP12x53 (Max. R_N = 418 Kips)	418	230	41
HP12x74 (Max. R_N = 589 Kips)	589	324	42
HP14x73 (Max. R_N = 578 Kips)	578	318	41
HP14x89 (Max. R_N = 705 Kips)	705	388	42

NOTES: Pile cut off elevation = 584.25 feet (assume)
Ground surface elevation against pile during driving = 583.25 feet

Table 8d – South Abutment Pile Design (BSB-08)

Pile Section	Nominal Required Bearing (Kips)	Factored Resistance Available (Kips)	Estimated Pile Length (FT)
HP10x42 (Max. R_N = 335 Kips)	335	184	44
HP10x57 (Max. R_N = 454 Kips)	454	250	45
HP12x53 (Max. R_N = 418 Kips)	418	230	44
HP12x74 (Max. R_N = 589 Kips)	589	324	45
HP14x73 (Max. R_N = 578 Kips)	578	318	44
HP14x89 (Max. R_N = 705 Kips)	705	388	45

NOTES: Pile cut off elevation = 584.25 feet (assume)
Ground surface elevation against pile during driving = 583.25 feet

4.4 Pile Driving Considerations

The soil borings were completed within 30 feet of the proposed substructure locations. The subsurface condition between borings indicated variable soil conditions. Therefore, it is recommended to complete test piles at each substructure location.

Driving shoes for the piles, in accordance with Section 1006.05 (e) of the IDOT Standard Specifications for Road and Bridge Construction (SSRBC), should be considered due to the presence of medium dense sand and weathered bedrock anticipated near bearing depth, and the anticipated need to extend piles to competent bedrock. Due to fluctuations in the bedrock depth between boring locations, pile lengths may vary; the maximum estimated pile length at each abutment could be used for construction estimating.

Pile setup is a consideration that can contribute to an increase to long-term pile resistance of displacement piles (i.e. driven pile). This increase in resistance is referred to as pile setup which is the gain in pile resistance over time that occurs mainly due to dissipation of pore water pressures and healing of the distorted and remolded soils immediately surrounding the pile. The magnitude of soil setup is function of pile type as well as soil type and consistency. A greater magnitude of soil setup is generally expected for soft clays, dense granular deposits, and displacement type piles than for stiff clays, loose granular deposits, and non-displacement type piles. However, pile setup consideration should not be included in the pile resistance during the design phase of the project, but this may be considered during the construction phase if a pile does not achieve the required bearing during installation. Based on the subsurface soil conditions, we do not anticipate any setup for the driven piles.

4.5 Lateral Load Resistance

Lateral loadings applied to deep foundations are typically resisted by the soil/structure interaction, pile flexure, or a combination of these factors. Section 3.10.1.10 of the 2023 IDOT Bridge Manual requires performing detailed structure interaction analysis if the factored lateral loading per pile exceeds 3 kips. The analysis shall determine actual pile moment and deflection to determine the selected pile adequacy for the existing loadings. **Tables 10a, 10b, 10c and Tables F-1 and F-2 (Appendix F)** provide generalized soil parameters for the site and include recommended lateral soil modulus and soil strain parameters that can be used for deep foundation analysis via the p-y curve method based on the encountered subsurface conditions.

Table 10a – Lateral Load Resistance Soil Parameters – North Abutment (BSB-01 & BSB-02)

Depth / Elevation Range (feet)	Soil Description	Lateral Modulus of Subgrade Reaction (pci)	Soil Strain (ε_{50})
	New Engineered Clay Fill	500	0.007
	New Engineered Granular Fill	90	N/A
1.0-3.5 (606.5-604.5)	Brown and Gray Silty Clay Fill	1,000	0.005
3.0-8.5 (604.5-599.0)	Brown and Gray Sand Fill	20	N/A
8.5-63.5 (599.0-544.0)	Gray Very Stiff to Very Hard Silty Clay / Silty Clay Loam	2,000	0.004
63.5-71.0 (544.0-536.5)	Weathered Limestone	125	N/A
8.5-26.0 (599.0-581.5) ***BSB-01 Only**	Brown and Gray Very Loose to Medium Dense Sand	20	N/A
17.0-28.5 (590.5-579.0) ***BSB-02 Only**	Gray Medium Dense to Very Dense Silty Loam	125	N/A
29.5-63.5 (578.0-544.0) ***BSB-02 Only**	Gray Medium Dense to Very Dense Sandy Loam	125	N/A

*The initial p-y modulus, E_{py} , varies linearly with depth. To obtain E_{py} use the equation $E_{py} = k_{py} * z$, where k_{py} is the subgrade modulus given in the table and z is the distance from the surface to the center point of the layer in inches.

Table 10b – Lateral Load Resistance Soil Parameters - Piers
(BSB-03 through 06)

Depth / Elevation Range (feet)	Soil Description	Lateral Modulus of Subgrade Reaction (pci)	Soil Strain (ε_{50})
	New Engineered Clay Fill	500	0.007
	New Engineered Granular Fill	90	N/A
1.0-3.5 (590.5-588.0)	Brown and Gray Sand Fill	90	N/A
3.5-6.0 (588.0-585.5)	Brown and Gray Silty Clay Fill	1,000	0.005
6.0-43.5 (585.5-548.0)	Brown and Gray Stiff to Very Hard Silty Clay / Silty Clay Loam	2,000	0.004
43.5-46.0 (548.0-545.5)	Weathered Limestone	125	N/A
19.0-21.0 (572.0-570.0) ***BSB-06 Only**	Gray Dense Gravel	125	N/A
21.5-44.0 (570.0-547.5) ***BSB-03, 04, 06 Only**	Gray Dense to Very Dense Silty Loam	125	N/A

*The initial p-y modulus, E_{py} , varies linearly with depth. To obtain E_{py} use the equation $E_{py} = k_{py} * z$, where k_{py} is the subgrade modulus given in the table and z is the distance from the surface to the center point of the layer in inches.

Table 10c – Lateral Load Resistance Soil Parameters - South Abutment (BSB-07 & 08)

Depth / Elevation Range (feet)	Soil Description	Lateral Modulus of Subgrade Reaction (pci)	Soil Strain (ε_{50})
	New Engineered Clay Fill	500	0.007
	New Engineered Granular Fill	90	N/A
1.0-6.0 (606.5-601.5) ***BSB-08 Only**	Brown and Gray Silty Clay Fill	1,000	0.005
1.0-6.0 (606.5-601.5) ***BSB-07 Only**	Gray Gravel Fill	25	N/A
6.0-60.0 (601.5-547.5)	Gray Stiff to Very Hard Silty Clay / Silty Clay Loam	2,000	0.004
60.0-66.0 (547.5-541.5)	Weathered Limestone	125	N/A
Various Depths	Gray Medium Dense to Very Dense Silty Loam / Loam	60	N/A
6.0-16.0 (601.5-591.5) ***BSB-07 Only**	Brown Very Loose to Loose Sand	20	N/A

*The initial p-y modulus, E_{py} , varies linearly with depth. To obtain E_{py} use the equation $E_{py} = k_{py} * z$, where k_{py} is the subgrade modulus given in the table and z is the distance from the surface to the center point of the layer in inches.

5.0 GEOTECHNICAL RETAINING WALL DESIGN RECOMMENDATIONS

This section provides retaining wall design parameters, foundation type, bearing capacity, settlement, and lateral earth pressures. The magnitude of the anticipated loads for the retaining walls were not provided to GSG. The foundations for the proposed retaining walls must provide sufficient support to resist the dead and live loads. The foundation design recommendations presented within this section were completed per the AASHTO LRFD 9th Edition (2020).

5.1 Retaining Wall Foundation Recommendations

Based on the information provided by Gannett Fleming, wingwalls are anticipated to be constructed along the east and west sides of each of the abutments. It is anticipated that the wingwalls will have a maximum exposed height of 21.2 feet for the north wall and 21.9 feet for the south wall. It is anticipated that the walls will be in a fill area to build up the widened bridge. The finished ground elevations adjacent to the walls are anticipated to be about El. 593 to El. 590 feet +/-, and the base of the walls are anticipated to be about 3.5 feet below the ground surface, at about El. 589.5 to El. 586.5 feet (approx. El. 586.5 at max wall height locations).

The actual wall width and total height of the walls should be based on structural analysis performed by a Licensed Structural Engineer in the State of Illinois.

GSG evaluated shallow and deep foundation systems for the proposed retaining wall types. GSG's evaluation included Secant walls, MSE walls and Soldier Pile walls. The results of the evaluation are presented below.

5.2 Retaining Wall Design Recommendations

The engineering analyses performed for the evaluation of the retaining wall options followed the current AASHTO Load and Resistance Factor Design (LRFD) Methodology as required by IDOT. LRFD methodology incorporates the use of load factors and resistance factors to account for uncertainty in applied loads and load resistance of structure elements separately. The AASHTO LRFD Bridge Design Specifications outline load factors and combinations for various strength, extreme event, service, and fatigue limit states. Section 11, which outlines geotechnical criteria for retaining walls, of the AASHTO specifications requires the evaluation of bearing resistance failure, lateral sliding, and overturning at the strength limit state and excessive vertical displacement, excessive lateral displacement, and overall stability at the service limit state. The selected walls should also be evaluated with respect to the collision load. **Table 11** outlines the load factors used in the evaluation of the retaining walls in accordance with AASHTO Specification Tables 3.4.1-1 and 3.4.1-2.

Table 11 - LRFD Load Factors for Retaining Wall Analyses

	Type of Load	Sliding and Eccentricity Strength Ia	Bearing Resistance Strength Ib	Sliding and Eccentricity Extreme IIa	Bearing Resistance Extreme IIb	Settlement Service I
Load Factors for Vertical Loads	Dead Load of Structural Components (DC)	0.90	1.25	1.00	1.00	1.00
	Vertical Earth Pressure Load (EV)	1.00	1.35	1.00	1.00	1.00
	Earth Surcharge Load (ES)		1.50			
	Live Load Surcharge (LS)		1.75		0.50	1.00
Load Factors for Horizontal Loads	Horizontal Earth Pressure Load (EH)	1.50		1.00	1.00	1.00
	Active		1.50			
	At-Rest		1.35			
	AEP for anchored walls		1.35			
	Earth Surcharge (ES)	1.50	1.50			
	Live Load Surcharge (LS)	1.75	1.75	0.50	0.50	1.00
Load Factor for Vehicular Collision				1.00	1.00	

5.2.1 Lateral Earth Pressures and Loading

The walls should be designed to withstand earth and live lateral earth pressures. The lateral earth pressures on retaining walls depend on the type of wall (i.e. restrained or unrestrained), the type of backfill and the method of placement against the wall, and the magnitude of surcharge weight on the ground surface adjacent to the wall. The active earth pressure coefficients (Ka), and the passive earth pressure coefficients (Kp) were determined in accordance with AASHTO Section 3.11.5.3 and 3.11.5.4. **Appendix F** presents the soil design properties for the retaining walls at the north and south abutments for the anticipated soil types at the site.

Traffic and other surcharge loads should be included in the retaining wall design as applicable. A live load surcharge shall be applied where vehicular load is expected to act on the surface of the backfill within a distance equal to one-half the wall height behind the back face of the wall in accordance with AASHTO 3.11.6.4. The live load surcharge may be estimated as a uniform horizontal earth pressure due to an equivalent height (Heq) of soil. **Table 12** provides the equivalent heights of soil for vehicular loadings on retaining walls.

Table 12 - Equivalent Height of Soil for Vehicular Loading on Retaining Walls Parallel to Traffic

Retaining Wall Height (ft)	H_{eq} Distance from Wall Back face to Edge of Traffic	
	0 feet	1.0 feet or Further
5	5.0 feet	2.0 feet
10	3.5 feet	2.0 feet
≥20	2.0 feet	2.0 feet

Reference: AASHTO LRFD Table 3.11.6.4-2

GSG recommends designing each of the retaining walls using the drained condition for a long-term, permanent design. This could be accomplished by placing a Geocomposite Wall Drain over the entire length of the back face of the wall connected to a minimum of 4-inch diameter perforated drainpipe and backfilling a minimum of 2 feet of free draining materials, Porous Granular Embankment, as measured laterally from the back of the wall. The backfill should be placed in accordance with the IDOT SSRBC. Heavy compaction equipment should not be allowed closer than five (5) feet to the retaining wall to prevent inducing high lateral earth pressures and causing wall yielding and/or other damage. The passive lateral earth pressure coefficient (Kp) from the upper 3.5 feet of level backfill at the toe of the wall should be neglected unless the soil is confined or protected by a concrete slab or well drained pavement. The passive lateral earth pressure coefficient from the upper 3.5 feet of soil for a descending slope at the wall toe should also be neglected, regardless of any surface protection.

5.2.2 Bearing Resistance

It is anticipated that the MSE retaining walls will bear on suitable existing silty clay fill soils and native silty clay soils. Bearing resistance for the retaining walls shall be evaluated at the strength limit state using load factors (See **Table 11**), and factored bearing resistance. The bearing resistance factor, ϕ_b, is 0.65 for a MSE wall per AASHTO Table 11.5.7-1. The bearing resistance shall be checked for the extreme limit state with a resistance factor of 1.0. **Table 13** presents the proposed bearing elevations and recommended bearing resistances for suitable materials to support a MSE wall system.

Table 13 – Recommended Bearing Resistance (MSE Wall)

Location	Elevation* (feet)	Nominal Resistance (ksf)	Factored Bearing Resistance (ksf)	Bearing Resistance for 1-inch Settlement Service Limit (ksf)	Bearing Resistance for 2-inch Settlement Service Limit (ksf)	Anticipated Bearing Soil
North Abutment	586.6 - 589.7	28.9	18.8	1.7	4.2	Stiff to Hard Silty Clay
South Abutment	586.4 - 589.3	28.7	18.6	1.8	4.2	Stiff to Hard Silty Clay

*Elevations estimated from assumption that footings are to be placed 3.5 feet below boring depths

The minimum depth of the walls should be 3.5 feet below the final exterior grade to alleviate the effects of frost. The subgrade soils encountered at the bearing elevations should be cleared of any unsuitable material, such as topsoil or unsuitable debris-laden fill materials. Based on the results of the subsurface exploration, we anticipate the walls would be supported upon the soil types noted in **Table 13.**

5.3 Wall Embankment Settlement

Settlement of the walls depends on the foundation size and bearing resistance, as well as the strength and compressibility characteristics of the underlying bearing soil. Assuming the foundation subgrade has been prepared as recommended in *Section 6.2* and the service bearing resistances for different settlements are used, settlement of the walls can be further evaluated when final site grading information is available.

5.4 Sliding and Overturning Stability

The wall base width should be sufficient to resist sliding. The frictional resistance shall include the friction between granular backfill for the wall and supportive cohesive or granular soils, and the friction between the wall foundation and bearing soils.

The factored resistance against sliding should be calculated using equation 10.6.3.4-1 in the AASHTO LRFD manual. A sliding resistance factor, ϕ, of 1.0 (Table 11.5.7-1) shall be applied to the nominal sliding resistance of soil-on-soil beneath the retaining wall. A maximum frictional coefficient of 0.53 (tan 28 degrees) could be used for determining the sliding resistance for the soil-to-soil interfaces. The width of the retaining wall must be wide enough to resist overturning forces. The location of the resultant of the forces shall be within the middle two-thirds of the base width.

5.5 Soldier Pile and Lagging

Soldier pile walls are generally constructed at 8 to 10-foot centers along the retaining wall alignment into the bearing stratum. The soldier piles could either be driven or drilled. Driving piles is normally less expensive but the designs are limited to H-pile and small W-sections. Drilled soldier piles can utilize larger W-sections, built up plate sections or multiple W-sections. For drilled piles, the pile will be placed into the hole and centered, and the annular space around each pile section will be filled with flowable grout. The lagging and piles should be designed based on structural analysis.

Resistance to lateral movement or overturning of the soldier pile is furnished by passive resistance of the soil below the depth of excavation. The design should include a structural evaluation of the pile section to meet applied shear and moment, and an evaluation of overturning to determine embedment depth and other design requirements. The walls shall be designed to withstand earth and live lateral earth pressures. The lateral earth pressures on retaining walls depend on the type of wall (i.e. restrained or unrestrained), the type of backfill and the method of placement against the wall, and the magnitude of surcharge weight on the ground surface adjacent to the wall. Soldier pile walls are considered flexible and as such, the earth loads may be calculated using active earth pressure for the load above the design grade, and both active and passive earth pressures below the design grade. The active earth pressure coefficient (Ka), and the passive earth pressure coefficient (Kp) are shown in **Appendix F**.

The simplified earth pressure distributions shown in the AASHTO Standard Specifications for Highway Bridges could be used for the design of the walls. **Appendix F** also provides recommended lateral soil modulus and soil strain parameters that can be used for laterally loaded pile analysis via the p-y curve method based on the encountered subsurface conditions. The passive resistance in front of the wall should be ignored for the upper 3.5 feet due to excavation activities and frost-heave conditions. Construction equipment surcharge loads should be added to the lateral earth pressure.

In order to limit wall deflections and provide additional resistance, the soldier pile and lagging retention system could be restrained with tie-back anchors. The soldier pile and lagging retention system restrained with tie-backs will be subjected to “trapezoidal” lateral soil pressures. For tall retaining walls, the “trapezoidal” pressure will result in greater lateral forces and moments compared to the cantilever design.

Soldier pile and lagging walls over 15 feet in height typically require additional lateral resistance to maintain stability and/or limit wall movements. This lateral resistance can be provided using ground anchors, buried deadmen or soil nails. Anchor terminology, minimum anchor length and embedment guidelines are shown in AASHTO Figure 11.9.1-1. Anchor spacing is controlled by many factors including anchor (or deadmen) capacity, temporary (unsupported) cut slope stability, subsurface obstructions in the anchorage zone, and the structural capacity of lagging or facing elements. Performance or proof testing shall be performed on every production anchor in accordance with the requirements in AASHTO Section 11.9.8.1. Excavation shall not proceed more than 3.0 feet below the level of ground anchors until the ground anchors have been accepted by the Engineer. Where backfill is placed behind an anchored wall, either above or around the unbonded length, special designs and construction specifications shall be provided to prevent anchor damage.

Tiebacks typically consist of steel strands placed into predrilled holes. The holes are normally drilled at an inclination of about 10 to 45 degrees from the horizontal depending on the bonded zone soil conditions. The minimum length of the unbonded portion of the anchor is 15 feet. The bonded zone of the tieback anchors should be located outside the no-load zone, which is located a minimum of 5 feet beyond the critical failure surface as shown in AASHTO 11.9.1-1. The frictional pullout of the installed anchor is dependent on many factors, including the method of installation. Consequently, the final length of production anchors should be based on a series of test anchors.

Permanent tieback anchors should be installed using pressure grout at a minimum depth of 6 to 15 feet below the finished grade. For tremi-grouted anchors, the minimum overburden cover is 15 feet. Based on the expected soil conditions within the bonded zone as very stiff to hard silty clay or medium dense to dense silty loam for the NE and SE walls, and assuming the use of pressure-grouted anchors, the tiebacks could be designed using a nominal unit bond stress of 5.0 kips per square foot, according to AASHTO Table C11.9.4.2-1. A resistance factor of 0.70 for the clay and 0.65 for the cohesionless (silt) should be applied to the nominal anchor bond stress. The minimum length of the unbonded section shall be 15 feet. It is recommended to perform load tests on the anchors to 125 to 150 percent of the unfactored loads to verify the resistance.

5.6 Secant Walls

Secant walls are another potentially suitable option for excavations close to adjacent buildings and roads. Secant walls are formed by a series of interlocking drilled shafts installed through a concrete guide wall. Shafts are typically 36-inch diameter shafts installed at 30-inch centers, though this may vary based on site conditions. However, the installation of secant retaining walls may be costly compared to the soldier pile and lagging wall, and MSE wall options. The aforementioned wall types may be cheaper alternatives, provided that there is sufficient room in the ROW for tie-backs and/or MSE wall reinforcement strap lengths.

5.7 Global Slope Stability

Based on the information provided by Gannett Fleming, the retaining wall should be designed for external stability of the wall system. The parameters in **Table 14** were used to evaluate the proposed MSE and Soldier Pile wall types to reach a minimum Factor of Safety of 1.5.

Table 14 – Wall Description

Description	Value	
Abutment	North	South
Exposed height of the retaining wall*	17.7 feet	18.4 feet
Unit weight of the existing retained soil (embankment)	138 pcf	
MSE Wall Design		
Minimum length of reinforcement (MSE Wall) [0.7*H]**	15 feet	15.5 feet
Unit weight of the reinforced soil mass	120 pcf	
Assumed friction angle for granular backfill (MSE wall)	34 degrees	
Soldier Pile Wall Design		
Estimated embedment length below bottom of concrete facing for soldier pile**	17.7 feet	18.4 feet
Estimated Pile tip elevation – soldier pile wall	572.3 feet	571.6 feet

*Based on Proposed Structure Drawings and Cross-section
**Additional length may be required for lateral pressures and structural design of the wall system

The actual wall widths, and total heights of the walls should be based on structural analysis performed by a Licensed Structural Engineer in the State of Illinois.

5.8 Global Slope Stability Results

Slide2 is a comprehensive slope stability analysis software used to evaluate the proposed walls for the project based on the limit equilibrium method. Circular failure analyses were evaluated for both a short-term (undrained) and long-term (drained) condition based on the proposed geometry (**Table 14**) for the proposed retaining wall types. The analyses were performed at the sections of the assumed maximum wall heights for each proposed abutment. The results of the analyses are shown in **Tables 15a and 15b**.

Table 15a – MSE Wall Global Slope Stability Analysis Results

Analysis Exhibit	Location*	Analysis Type	Factor of Safety	Minimum Factor of Safety
Exhibit a	North Abutment	Circular – Short-Term	10.0	1.5
Exhibit b		Circular – Long-Term	2.7	1.5
Exhibit c	South Abutment	Circular – Short-Term	10.4	1.5
Exhibit d		Circular – Long-Term	2.9	1.5

Table 15b – Soldier Pile Wall Global Slope Stability Analysis Results

Analysis Exhibit	Location	Analysis Type	Factor of Safety	Minimum Factor of Safety
Exhibit e	North Abutment	Circular – Short-Term	11.6	1.5
Exhibit f		Circular – Long-Term	3.3	1.5
Exhibit g	South Abutment	Circular – Short-Term	11.3	1.5
Exhibit h		Circular – Long-Term	3.2	1.5

Based on the analyses performed, the proposed retaining walls meet the minimum factor of safety of 1.5. Copies of the slope stability analyses are included in the Slope Stability Analyses Exhibits (**Appendix E**).

5.9 Drainage Recommendations

The retaining walls should be designed to prevent the buildup of hydrostatic forces. This can be done with the construction of a base drain and back drain to collect and remove surface water away from the faces of the wall. A Geocomposite Wall Drain or open grade stone with a geotextile fabric system should be placed over the entire length of the back face of the wall.

6.0 CONSTRUCTION CONSIDERATIONS

All work performed for the proposed project should conform to the requirements in the IDOT Standard Specifications for Road and Bridge Construction (2022). Any deviation from the requirements in the manuals above should be approved by the design engineer.

6.1 Existing Utilities and Structures

Based on the existing site conditions, utilities exist along the project corridor. Before proceeding with construction, all existing underground utility lines or structures that will interfere with construction should be completely relocated from the proposed construction areas. Where possible, existing utility lines that are to be abandoned in place should be removed and/or plugged with cement grout. All excavations resulting from underground utilities or structure removal activities should be cleaned of loose and disturbed materials, including all previously placed backfill, and backfilled with suitable fill materials in accordance with the requirements of this section. During the clearing and stripping operations, positive surface drainage should be maintained to prevent the accumulation of water.

6.2 Site Excavation

If borrow material is to be used for onsite construction, it should conform to Section 204 “Borrow and Furnished Excavation” of the IDOT Construction Manual (2021). The fill material should be free of organic matter and debris. Earth-moving operations should be avoided during excessively cold or wet weather to avoid freezing of softening subgrade soils.

Structural fill shall consist of crushed limestone or recycled concrete consistent with IDOT CA-6 gradation or medium plasticity silty clays. Structural fill should be placed in lifts not to exceed 8 inches in loose thickness and compacted to a minimum of 95% of the material’s standard proctor maximum dry density obtained according to the ASTM D698/AASHTO T 99 method.

Materials unsatisfactory for use as structural fill include soils classified as silt or organic silt (ML, MH, PT, OL, and OH) in the Unified Classification System (ASTM D2487). Soils with these classifications may be used for general purpose landscaping and in areas where uncontrolled settlement is acceptable.

Should fill be placed during cool, wet seasons, the use of granular fill may be necessary since weather conditions will make compaction of cohesive soils more difficult. If water seepage while excavating and backfilling procedures, or where wet conditions are encountered such that the water cannot be removed with conventional sump and pump procedures, GSG recommends placing open grade stone similar to IDOT CA-7 to stabilize the bottom of the excavation. The CA-7 stone should be placed 12 inches above the water level, in 12-inch lifts, and should be compacted with the use of a heavy smooth drum roller or heavy vibratory plate compactor until stable. The remaining portion of the excavation should be backfilled using approved engineered fill.

GSG recommends that foundation excavations, subgrade preparation, and structural fill placement and compaction be inspected by a GSG geotechnical engineer to verify the type and strength of soil materials present at the site and their conformance with the geotechnical recommendations in this report.

6.3 Groundwater Management

Based on the color change of the native soils from brown and gray to gray, it is anticipated that the long-term groundwater level is located near approximate elevations of 590 to 582 feet. Perched water may also be present within the fill materials or confined granular layers. If rainwater run-off or groundwater is accumulated at the base of excavations, the contractor should remove accumulated water using conventional sump pit and pump procedures and maintain a dry and stable excavation. The location of the sump should be determined by the contractor based on field conditions. During earthmoving activities at the site, grading should be performed to ensure that drainage is maintained throughout the construction period. Water should not be allowed to accumulate in the foundation area either during or after construction. Undercut and excavated areas should be sloped toward one corner to facilitate removal of any collected rainwater or surface run-off. Grades should be sloped away from the excavations to minimize runoff from entering.

If water seepage occurs during excavations or where wet conditions are encountered such that the water cannot be removed with conventional sumping, we recommend placing open grade stone similar to IDOT CA-7 to stabilize the bottom of the excavation below the water table. The CA-7 stone should be placed to 12 inches above the water table, in 12-inch lifts, and should be compacted with the use of a heavy smooth drum roller or heavy vibratory plate compactor until stable. The remaining portion of the excavation beneath the foundations should be backfilled using approved structural fill.

6.4 Drilled Shafts Construction

Any drilled shaft construction should be completed in accordance with Section 516, Drilled Shafts, in the IDOT SSRBC (2022).

For the drilled shaft installation, a temporary steel casing will be required from the top of the shaft to a minimum depth of 62 feet for the belled drilled shaft and full depth of the drilled shafts for shafts extending to the bedrock. Water should be removed from the base of the drilled shaft base prior to placing any concrete. The bottom cleanliness of the drilled shafts should be observed from the ground surface with the use of flood light since the workers should not enter the shaft to manually clean the bell for safety reasons. In cases where an over-sized bell is not possible due to bell encroachment on property lines or conflict with other foundations, the over-sizing can be eliminated by using a down-hole camera to directly observe the effectiveness of the cleaning operations. The placement method of concrete for the drilled shaft foundation should be based on the amount of water present at the base of the shaft just prior to placing the concrete. Concrete may be placed using the free fall method, provided less than 2 inches of water is present at the base of the shaft at the time the concrete is being placed. If more than 2 inches of water is present, a tremie should be used to displace the water to the surface for removal.

GSG recommends that the drilled shaft concrete be ready on site as the drilled shaft excavation is completed, so that the concrete can be placed immediately after completing the excavation. This will reduce the potential of water accumulation in the bottom of the shaft. Bottom cleanliness of the drilled shaft excavation should be observed from the ground surface with the use of flood light or down-hole camera. Workers should not enter the shaft to manually clean the base of the shaft due to safety reasons.

6.5 Pile Installation

IDOT standard practice requires driving one (1) test pile for each substructure element. The test piles are installed based on the preliminary driving criteria in order to evaluate site conditions and are inspected in accordance with the IDOT Standard for Road and Bridge Construction. All pile installation should be completed in accordance with the IDOT SSRBC Section 512.15.

6.6 Temporary Earth Structure Lateral Earth Pressures

A temporary soil retention system (TSRS) is proposed for the abutment construction on the GP&E. However, based on the soil profile, a cantilevered sheet pile system is likely not feasible due to the presence of layers of hard clay and dense granular soils. The Temporary Soil Retention System shall be designed by an Illinois licensed structural engineer in accordance with the IDOT Bridge Design Manual. The design of the Temporary Soil Retention System is the responsibility of the contractor. The contractor should submit the TSRS plans to the structural design team for review prior to commencing construction of the TSRS.

6.7 Potential Effect of Excavations on Existing Structures and Utilities

Excavations adjacent to existing structures and utilities will reduce support to these structures and utilities. Excavations should not extend below the level of adjacent existing building foundations or utilities unless underpinning or other support is installed. It is the responsibility of the contractor to determine applicable conditions in the field and provide adequate shoring for all excavation activities.

Driving sheet piles around the perimeter of the existing building could be challenging and cause vibration and noise for the nearby structures and utilities. The impact of this installation method on the existing structure should be evaluated by the design engineer.

6.8 Building Condition Survey and Construction Monitoring

The existing structures could be impacted by construction activities such as ground vibration during foundation installation or ground vibration due to operation of heavy construction equipment. GSG recommends completing a pre-construction condition survey for all structures located around the site to document the existing conditions of the structures. The survey should include documentation of cracks, opening of joints, and other defects and deficiencies.

7.0 LIMITATIONS

This report has been prepared for the exclusive use of the Illinois Department of Transportation (IDOT) and its Design Section Engineer consultant. The recommendations provided in the report are specific to the project described herein and are based on the information obtained at the soil boring locations within the proposed bridge area. The analyses have been performed and the recommendations provided in this report are based on subsurface conditions determined at the locations of the borings. This report may not reflect all variations that may occur between boring locations or at some other time, the nature and extent of which may not become evident until the time of construction. If variations in subsurface conditions become evident after submission of this report, it will be necessary to evaluate their nature and review the recommendations presented herein.

APPENDIX A

GP&E DRAWINGS
DATED (01/10/2025)

Bench Mark: BM 728: Aluminum disk in parapet wall near SE Abutment. Elev. 612.28, and BM 741: Aluminum disk on top of retaining wall at NE Corner of Laramie Bridge. Elev. 612.20.

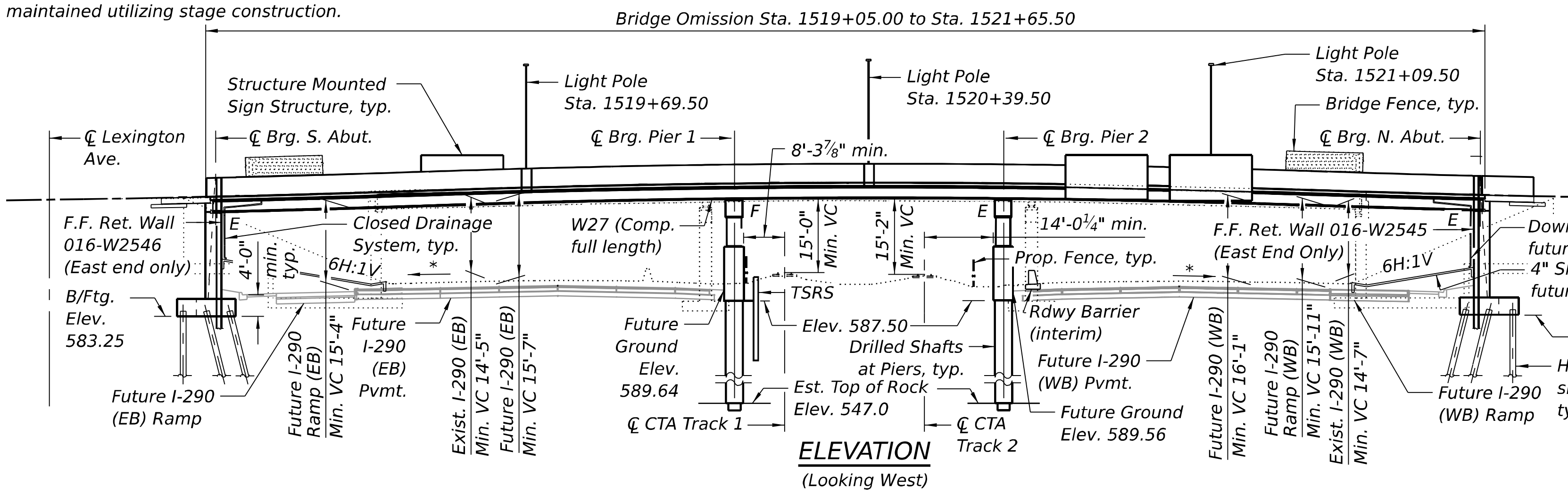
Existing Structure: SN 016-2064 carrying Laramie Avenue over I-290 was orginally constructed in 1954 as F.A. Route 131, Section 062-3030-2-MFT. In 1987 the bridge was rehabilitated including replacement of the deck, exp jts, bearings, parapets, and approach slabs, substructure repairs, and steel beam painting. The structure consists of a three span continuous non-composite steel beam bridge supported on closed abutments founded on spread footing, and concrete wall piers founded on spreadfooting. The overall structure is 204'-6" back to back of abutments with a 0° skew (relative to I-290 skew of 0°-37'), with an out to out structure width of 81'-0".

Laramie Avenue will be closed to traffic during construction.
I-290 traffic lanes will be maintained utilizing stage construction.

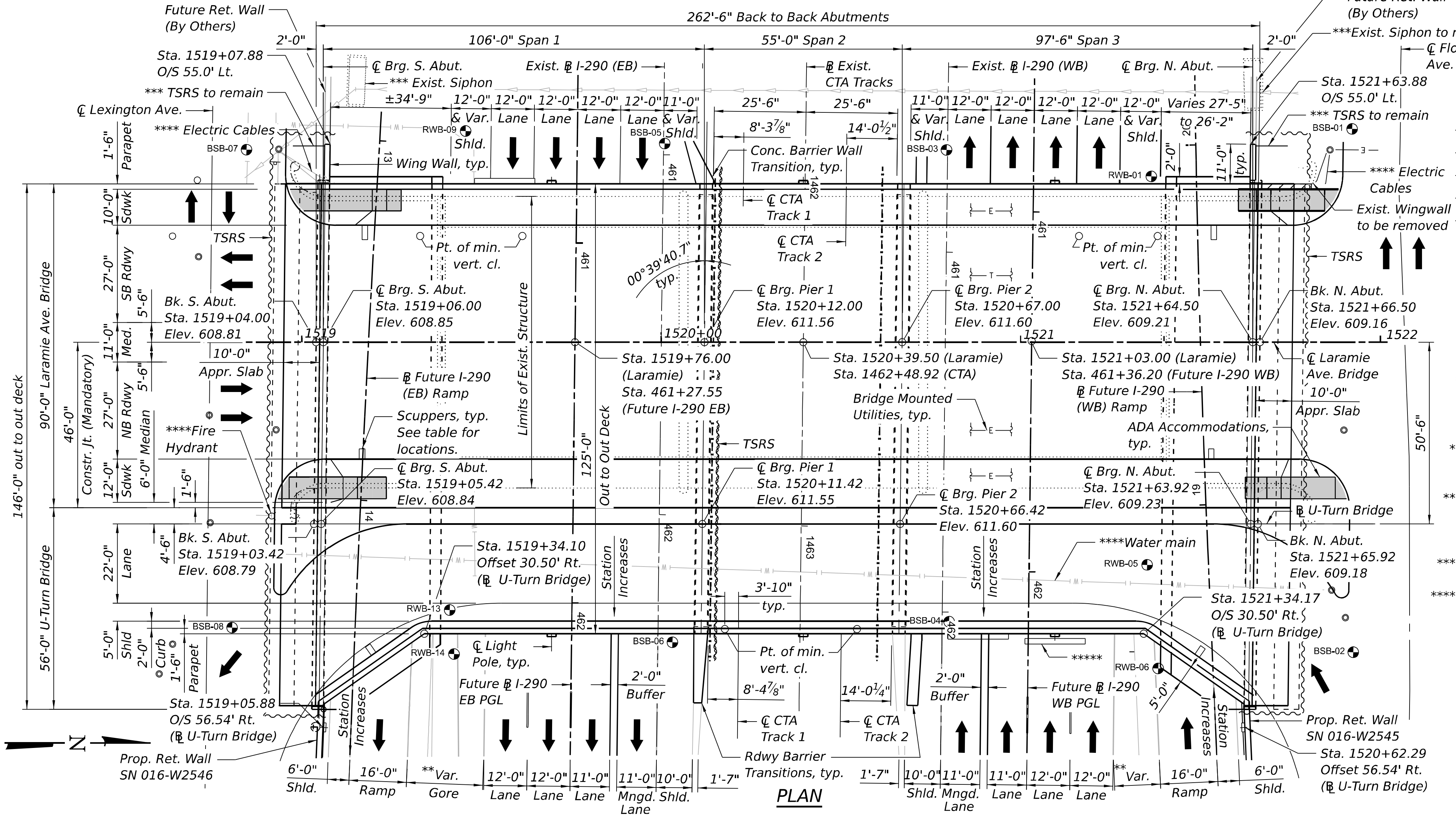
No Salvage

APPROVED
February 19, 2025

AS A BASIS FOR
PREPARATION OF DETAILED PLANS



ELEVATION
(Looking West)



PLAN

HIGHWAY CLASSIFICATION

F.A.I. Rte. 290
Functional Class: Interstate
ADT: 98,650 (EB & WB) (2015); 118,800 (2040, EB); 104,000 (2040, WB)
ADTT: 3,946 (EB & WB) (2015); 4,752 (2040, EB); 4,160 (2040, WB)
DHV: 8,485 (2040, EB); 5,870 (2040, WB)
Design Speed: 60 m.p.h.
Posted Speed: 55 m.p.h.
Two-Way Traffic
Directional Distribution: 53/47

F.A.U. Rte. 2803 (Laramie Avenue)
Functional Class: Major Collector
ADT: 10,400 (2015); 9,680 (2040)
ADTT: 728 (2015); 678 (2040)
DHV: 1,021 (2040)
Design Speed: 30 m.p.h.
Posted Speed: 30 m.p.h.
Two-Way Traffic
Directional Distribution: 50/50

SCUPPER LOCATIONS

Sta.	Offset	Type
Laramie Ave. Bridge		
1519+17.50	32.50' Lt.	DS-33
1519+16.80	32.50' Rt.	DS-11
1521+53.70	32.50' Lt.	DS-33
1521+52.90	32.50' Rt.	DS-11
U-Turn Bridge		
1519+20.00	86.60' Rt.	DS-11
1521+44.00	87.11' Rt.	DS-11

DESIGN SPECIFICATIONS

2020 AASHTO LRFD Bridge Design Specifications, 9th Edition

DESIGN STRESSES

FIELD UNITS

f'c = 4,000 psi (Superstructure)
f'c = 3,500 psi (Substructure)
fy = 60,000 psi (Reinforcement)
fy = 50,000 psi (M270 Grade 50)

SEISMIC DATA

Seismic Performance Zone (SPZ) = 1
Design Spectral Acceleration at 1.0 sec. (SD1) = 0.086g
Design Spectral Acceleration at 0.2 sec. (SDS) = 0.148g
Soil Site Class = D

LOADING HL-93

Allow 50#/sq. ft. for future wearing surface.
Live Load Max. Deflections = L/1000 (Laramie Bridge)

LEGEND

- Soil Boring
- Exist. Electric
- Exist. Telephone
- Exist. Water Main
- Exist. Buried Cable
- Exist. Storm Sewer
- Exist. Fence
- Exist. Manhole
- Exist. Fire Hydrant
- Exist. Sign
- Prop. Fence
- Prop. ADA Ramp

* See roadway typical section for existing and future cross slope information

** Varies 15'-5⅞" to 20'-3⅜" (EB)
Varies 5'-4⅛" to 10'-11⅛" (WB)

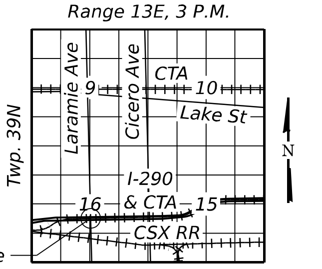
*** To be removed in future construction. TSRS to remain shall be designed for a 10-year service life.

**** To be relocated by others

***** Bridge mounted sign structure, typ., shall accommodate wider parapet at light pole foundations

Notes:
1. All structural steel shall be metalized.
2. See Roadway details for alignment geometry.
3. Bridge mounted sign structure required to accommodate current lane configuration. Future signing locations are not known and may require future field retrofit of the beams to support future bridge mounted sign structures or removal of mounted signs.
4. Future retaining walls shall be constructed from end of prop. wingwalls.

Range 13E, 3 P.M.



Structure Location

LOCATION SKETCH

GENERAL PLAN AND ELEVATION
F.A.U. 2803 (LARAMIE AVENUE) OVER
F.A.I. RTE. 290 (EISENHOWER EXPWY) AND CTA
SECTION 22 STRUCTURE 1
COOK COUNTY
STATION 1520+39.50
S.N. 016-2015

USER NAME = mzelisko	DESIGNED - MZ	REVISED -	
	CHECKED - DF	REVISED -	
PLOT SCALE = 18.000 ' / in.	DRAWN - SS	REVISED -	
PLOT DATE = 01/10/2025	CHECKED - DF	REVISED -	

GANNETT FLEMING

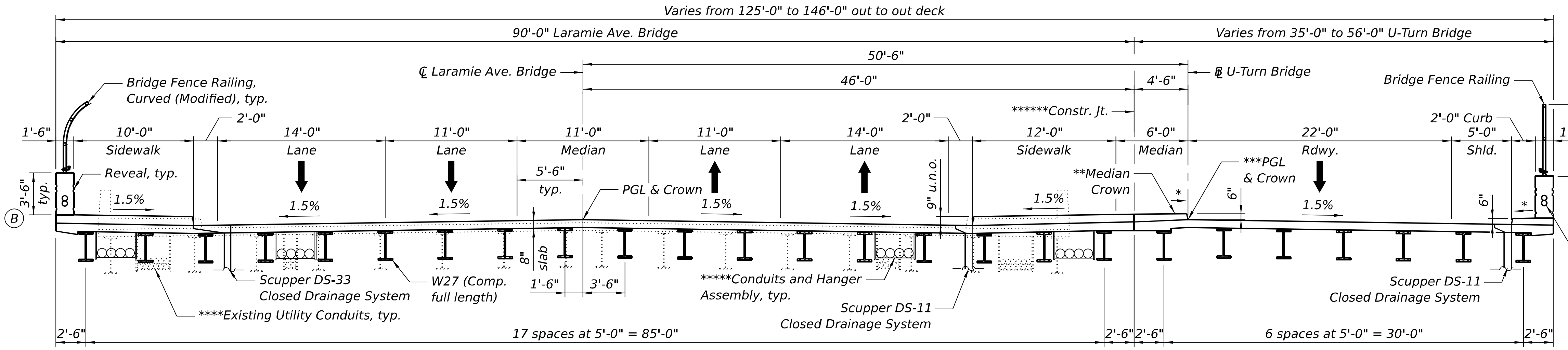
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

STRUCTURE NO. 016-2015
SHEET 1 OF 4 SHEETS

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
290	22 STRUCTURE 1	COOK		

CONTRACT NO. 62R61
ILLINOIS FED. AID PROJECT

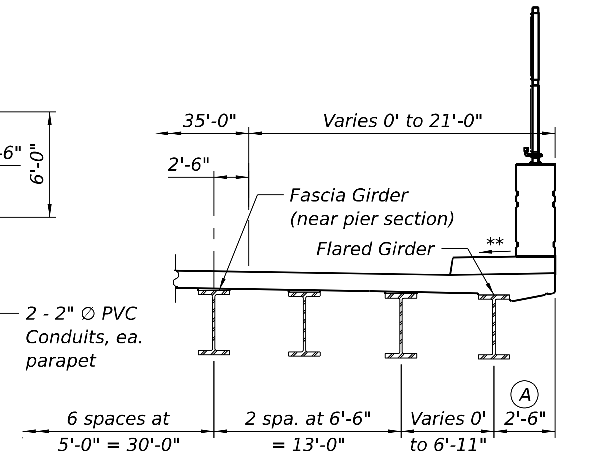
MODEL: Default
FILE NAME: pw:\\gfnet-pw.bentley.com:gfnet-pw-01\Documents\Projects\76028\Project Working\A_CADD\Sheets\TSL-0162015-62R61-TSL-001.dgn
2/18/2025 7:56:28 PM



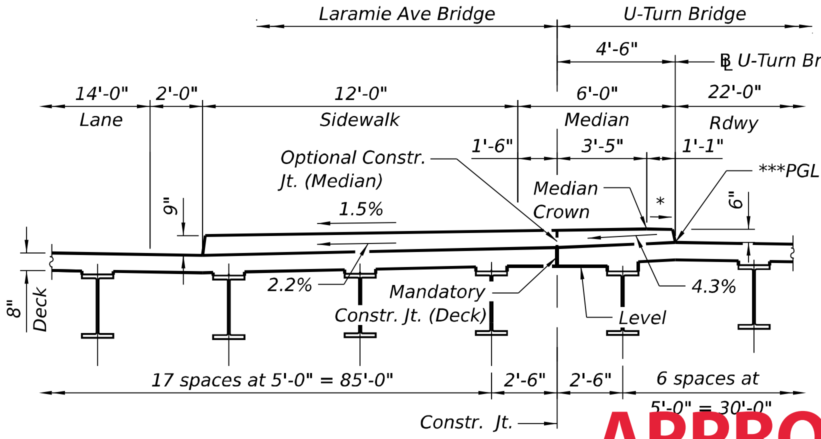
FINAL CROSS SECTION
(Looking North near Piers)

(B) To be determined in Final Design. Ongoing coordination with CDOT may reduce the parapet height.

* 1.5% slope
** See Section Thru Median on this sht for more details
*** Laramie Ave. Bridge Profile Grade Line (Translated 50'-6")
**** To be supported or relocated during construction
***** Number, size and type of conduits to be determined by Owner in final design
****** Shrinkage and thermal effects shall be considered in the design and detailing of the bridge deck during final design.

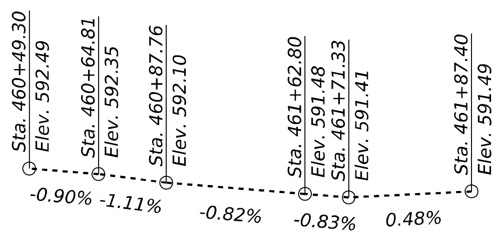


PARTIAL CROSS SECTION
(Looking North at Abutments)
(Flared girder frames into fascia girder shown in section near piers)
(Dimensions are at rt. L's to ℄ Laramie Ave. U.N.O.)
(A) Perpendicular from edge of flared parapet.

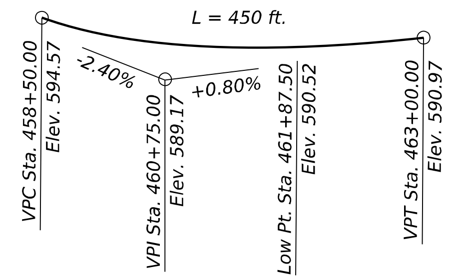


SECTION THRU MEDIAN
(Between Bridges)

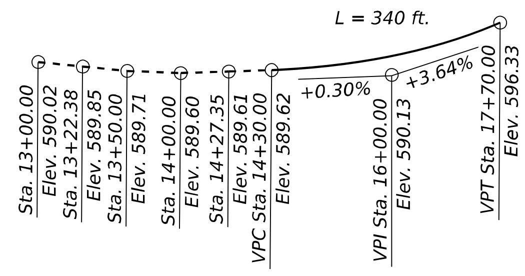
APPROVED
February 19, 2025
AS A BASIS FOR PREPARATION OF DETAILED PLANS



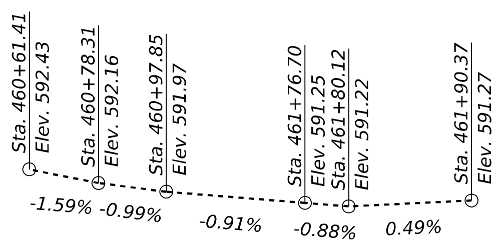
PROFILE GRADE EXISTING EB I-290
(Looking North along Future EB I-290 PGL)



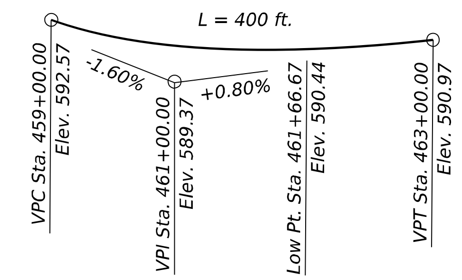
PROFILE GRADE FUTURE EB I-290
(Looking North along PGL)
(For Information Only)



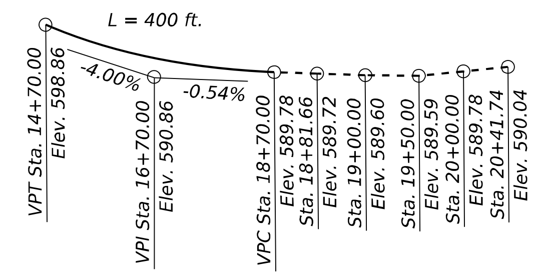
PROFILE GRADE FUTURE EB I-290 RAMP
(Looking North along PGL)
(For Information Only)



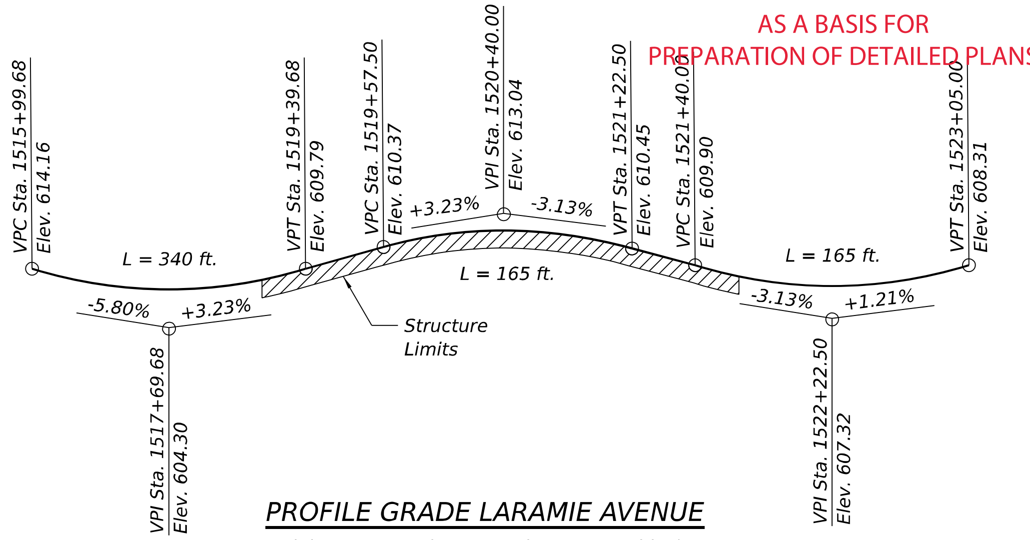
PROFILE GRADE EXISTING WB I-290
(Looking South along Future WB I-290 PGL)



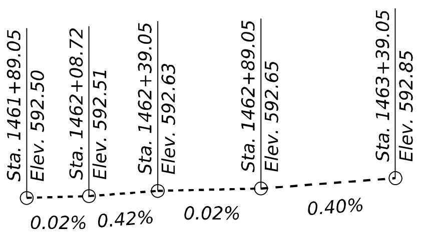
PROFILE GRADE FUTURE WB I-290
(Looking South along PGL)
(For Information Only)



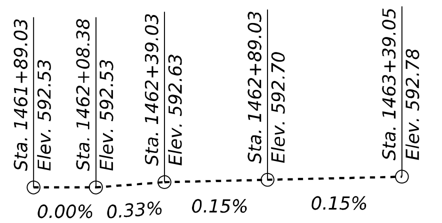
PROFILE GRADE FUTURE WB I-290 RAMP
(Looking South along PGL)
(For Information Only)



PROFILE GRADE LARAMIE AVENUE
(Along ℄ Laramie Ave. and ℞ U-Turn Bridge)



PROFILE GRADE CTA TRACK 1
(Looking North along South T/Rail)



PROFILE GRADE CTA TRACK 2
(Looking North along North T/Rail)

SECTION AND DATA
F.A.U. 2803 (LARAMIE AVENUE) OVER
F.A.I RTE. 290 (EISENHOWER EXPWY) AND CTA
SECTION 22 STRUCTURE 1
COOK COUNTY
STATION 1520+39.50
S.N. 016-2015

GANNETT FLEMING

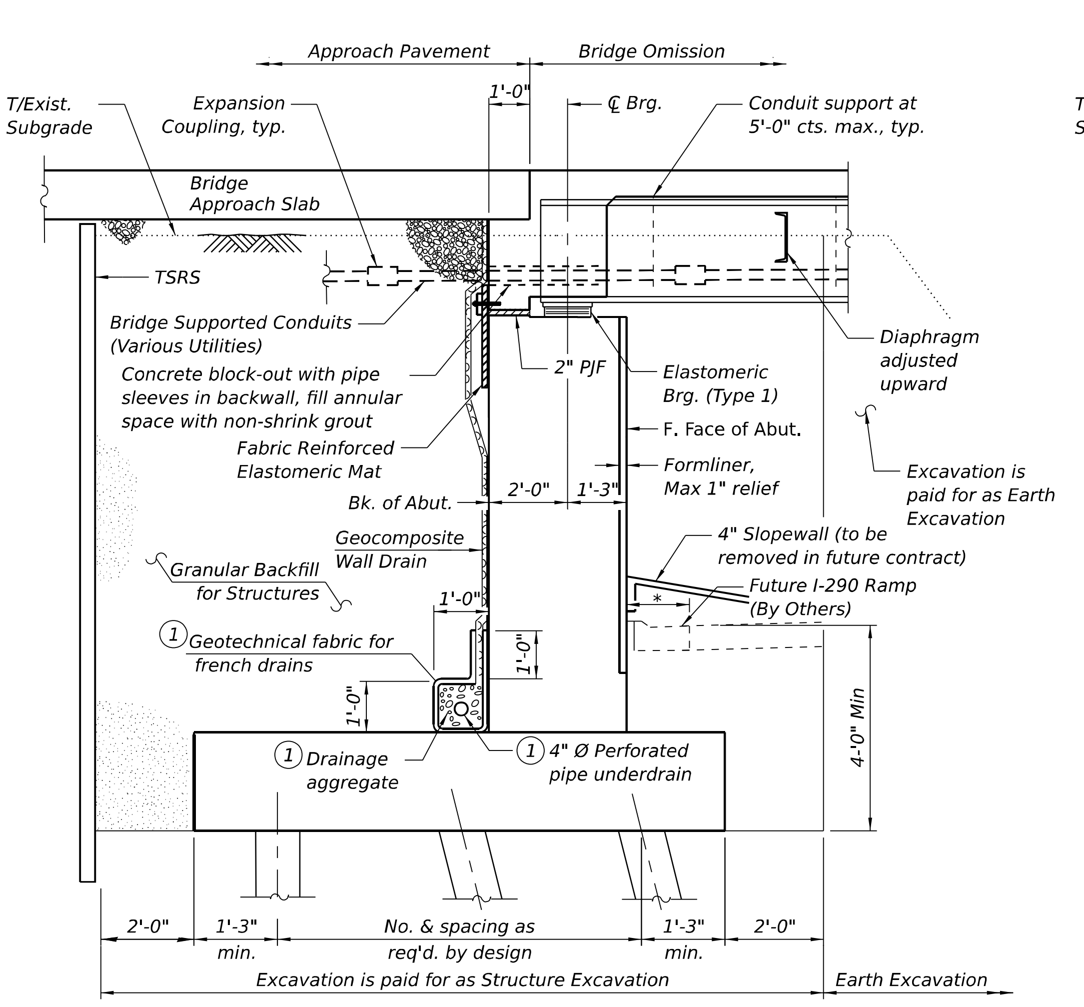
USER NAME = mzelisko	DESIGNED - MZ	REVISED -
	CHECKED - DF	REVISED -
PLOT SCALE = 5.333 ' / in.	DRAWN - SS	REVISED -
PLOT DATE = 01/10/2025	CHECKED - DF	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

STRUCTURE NO. 016-2015
SHEET 2 OF 4 SHEETS

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
290	22 STRUCTURE 1	COOK		

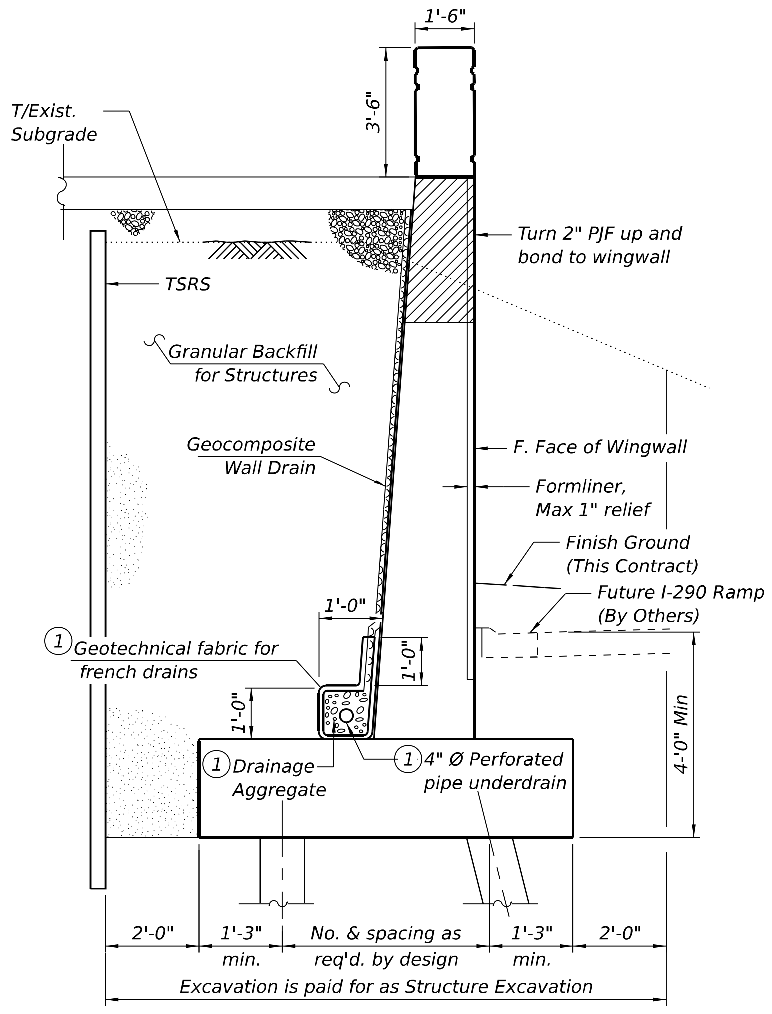
CONTRACT NO. 62R61
ILLINOIS FED. AID PROJECT



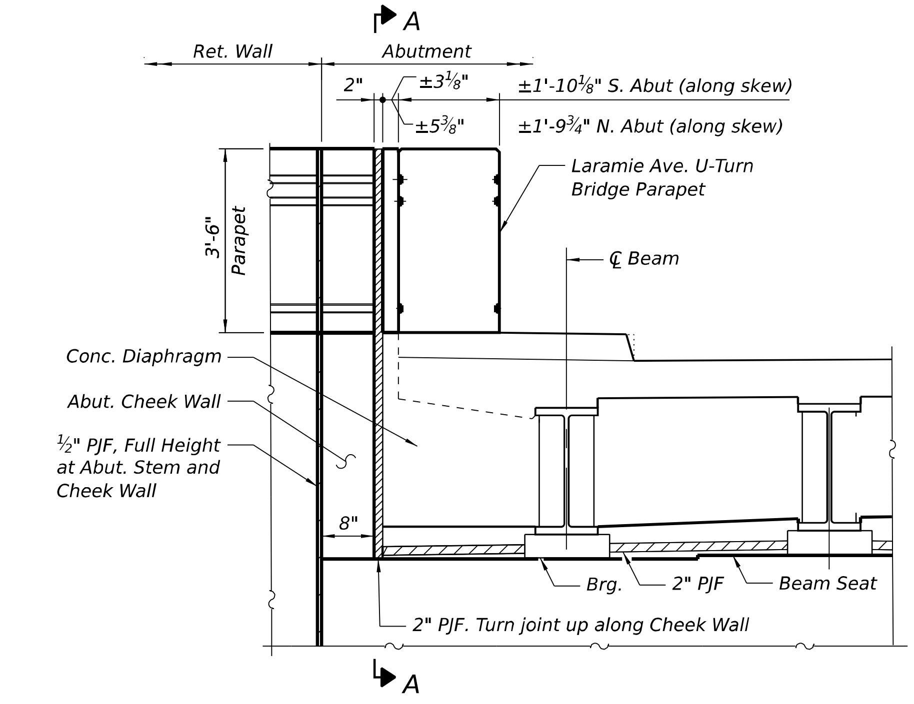
SECTION THRU ABUTMENT
(Dim. at Rt. L to ℄ Abut.)

* 1'-11" min. at S. Abut.
2'-2¾" min. at N. Abut.

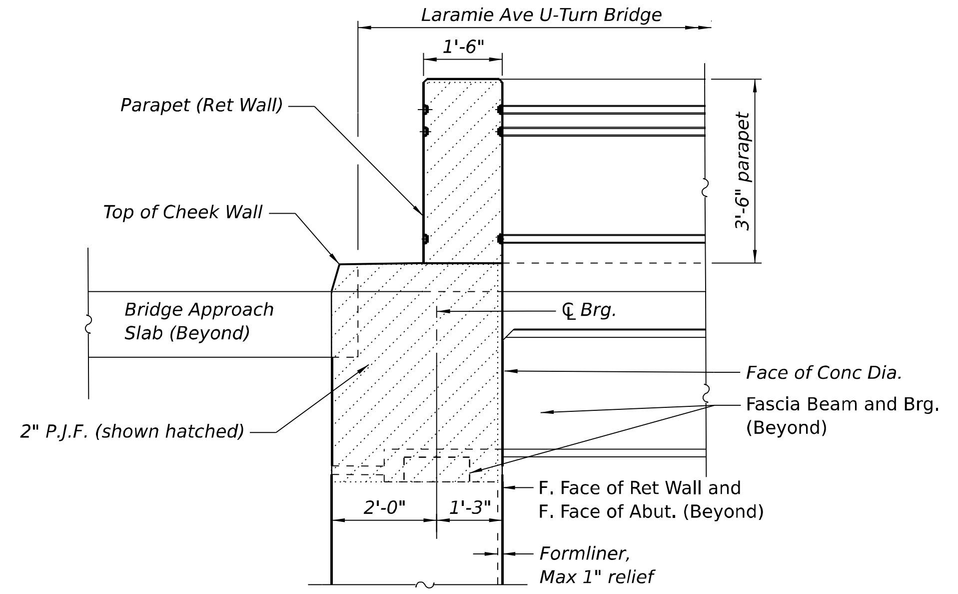
1 Included in the cost of Pipe Underdrains for Structures, 4"



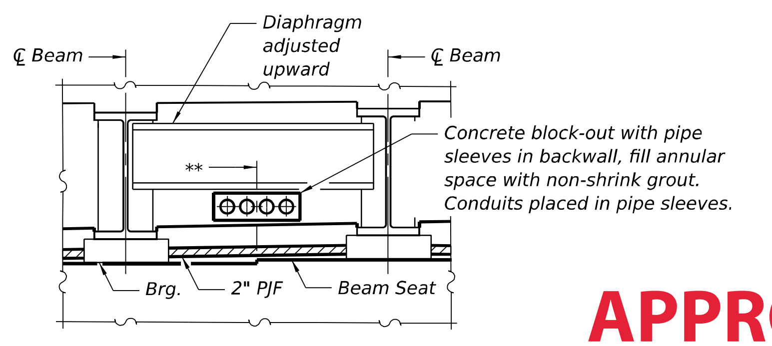
SECTION THRU WINGWALL
(Dim. at Rt. L to ℄ Wingwall)



ABUTMENT ELEVATION SHOWING CHEEK WALL
(East side at Retaining Wall shown, West side at Wingwall similar)



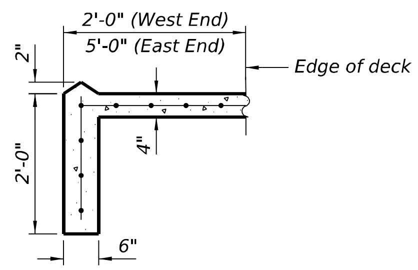
SECTION A-A
(Dim. at Rt. L to ℄ Retaining wall)
(Drilled Shaft/Soldier Pile not shown for clarity)



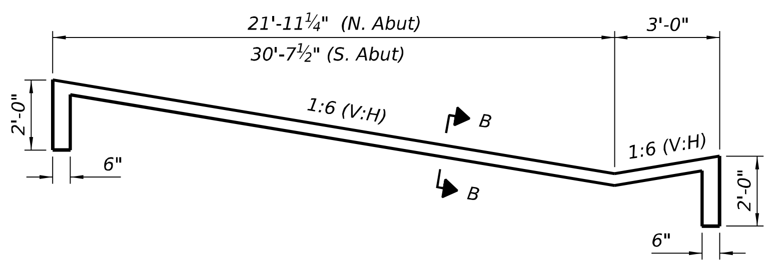
SECTION THRU UTILITIES
** Number, size and type of conduits to be determined by Owner in final design

APPROVED
February 19, 2025

AS A BASIS FOR
PREPARATION OF DETAILED PLANS



SECTION B-B



SECTION THRU SLOPEWALL

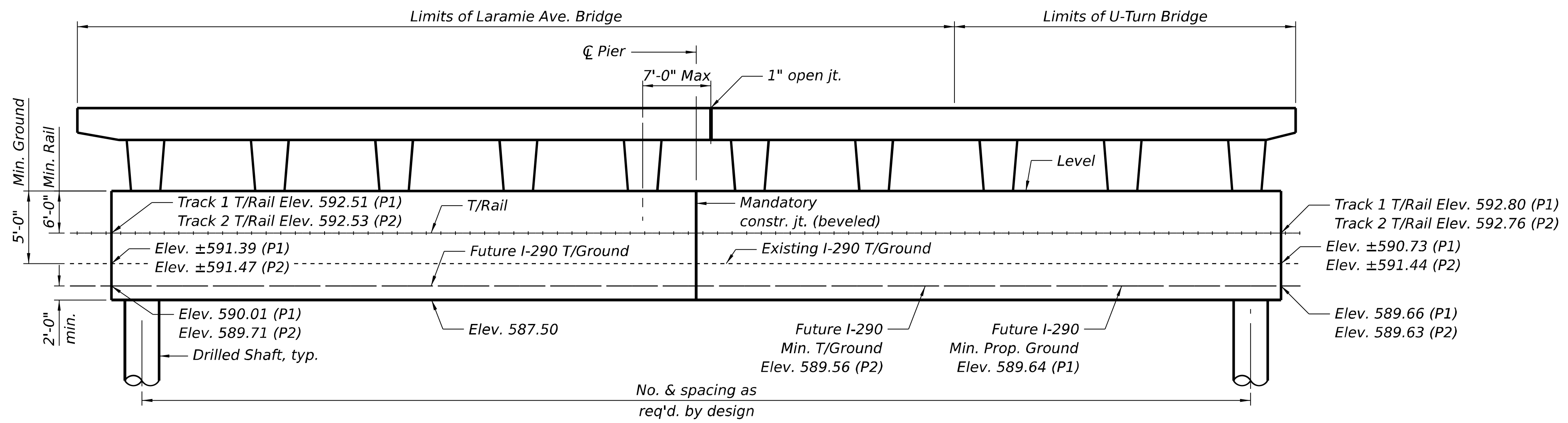
DETAILS I
F.A.U. 2803 (LARAMIE AVENUE) OVER
F.A.I RTE. 290 (EISENHOWER EXPWY) AND CTA
SECTION 22 STRUCTURE 1
COOK COUNTY
STATION 1520+39.50
S.N. 016-2015

GANNETT FLEMING	USER NAME = mzelisko	DESIGNED - MZ	REVISED -	STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION	STRUCTURE NO. 016-2015
		CHECKED - DF	REVISED -		
	PLOT SCALE = 5.333 ' / in.	DRAWN - MA	REVISED -		
	PLOT DATE = 01/10/2025	CHECKED - DF	REVISED -		SHEET 3 OF 4 SHEETS

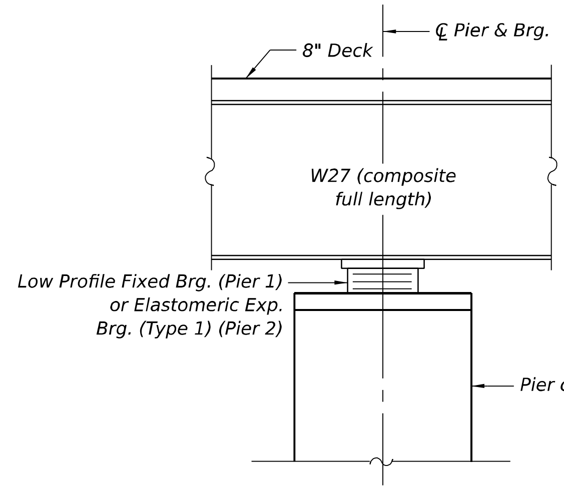
F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
290	22 STRUCTURE 1	COOK		
		CONTRACT NO. 62R61		
	ILLINOIS	FED. AID PROJECT		

MODEL: Default
FILE NAME: pw://gfnet-pw.bentley.com:gfnet-pw-01/Documents/Projects/76028/Project Working/A_CADD/Sheets/TSL/0162015-62R61-TSL-003.dgn

2/18/2025 7:56:42 PM



PIER SKETCH
(Looking North)

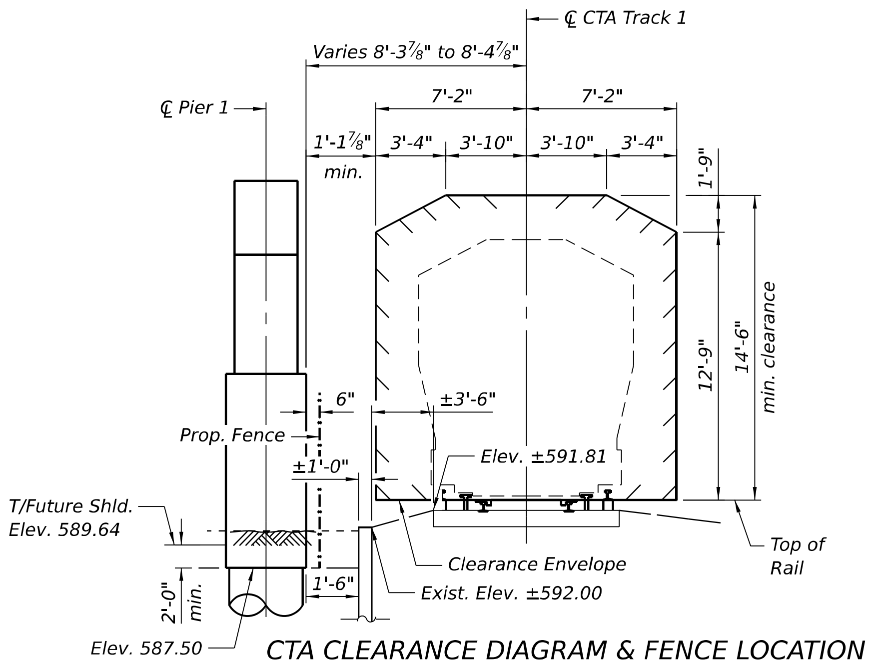


SECTION THRU PIER

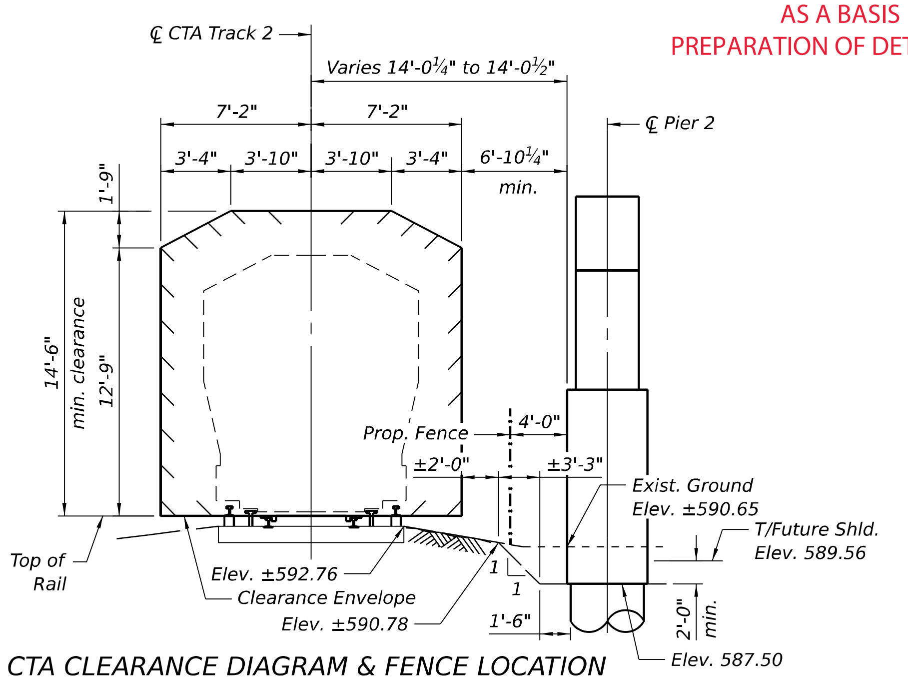
APPROVED

February 19, 2025

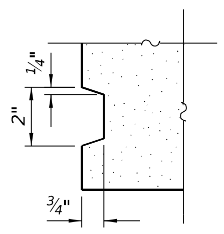
AS A BASIS FOR
PREPARATION OF DETAILED PLANS



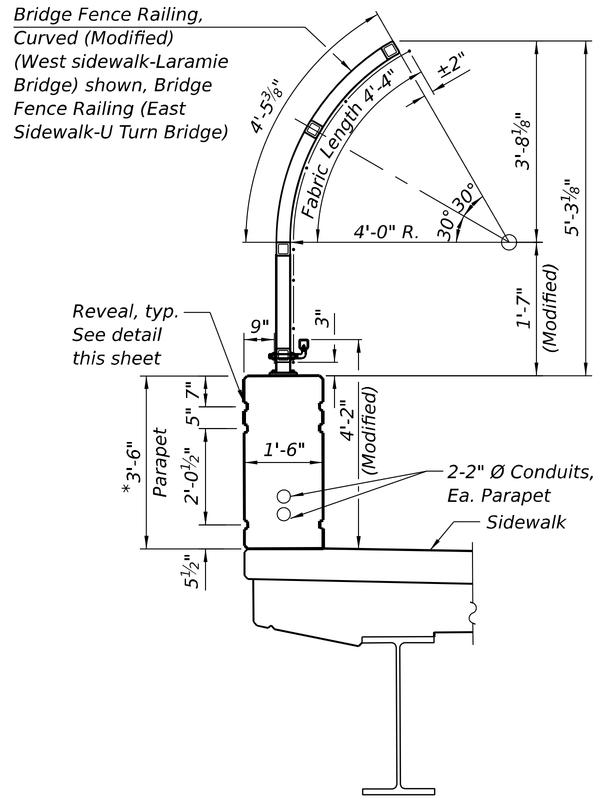
CTA CLEARANCE DIAGRAM & FENCE LOCATION
(CTA Track 1)



CTA CLEARANCE DIAGRAM & FENCE LOCATION
(CTA Track 2)



REVEAL DETAIL



SECTION THRU WEST SIDEWALK
(Section thru Laramie Bridge shown,
Section thru U-Turn Bridge similar)

* To be determined in final design,
Ongoing coordination with CDOT
may reduce the parapet height.

DETAILS II
F.A.U. 2803 (LARAMIE AVENUE) OVER
F.A.I RTE. 290 (EISENHOWER EXPWY) AND CTA
SECTION 22 STRUCTURE 1
COOK COUNTY
STATION 1520+39.50
S.N. 016-2015

MODEL: Default
FILE NAME: pw:\\gfnet-pw.bentley.com:gfnet-pw-01\Documents\Projects\76028\Project Working\A_CADD\Sheets\TSL\0162015-62R61-TSL-004.dgn

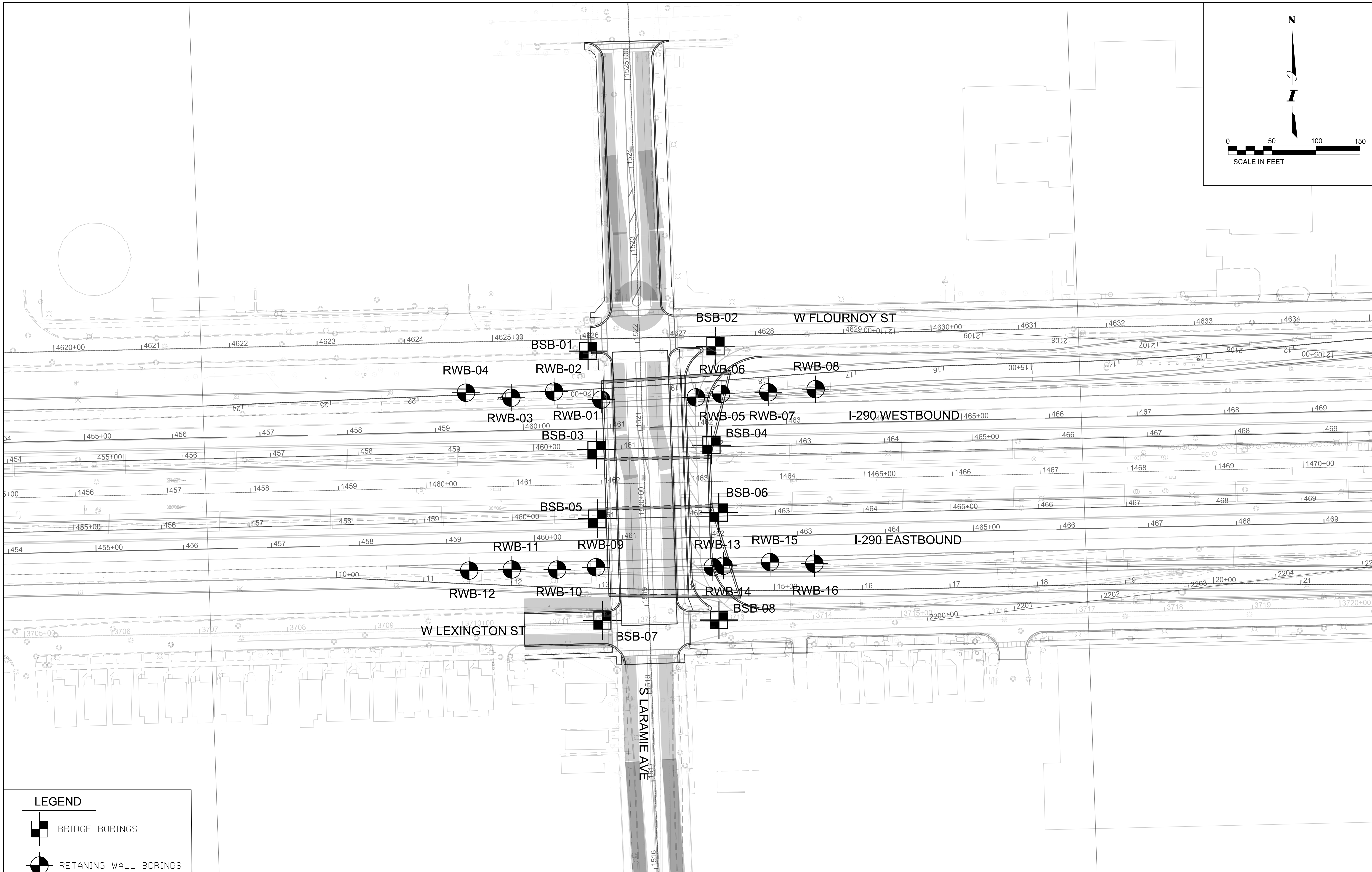
GANNETT FLEMING	USER NAME = mzelisko	DESIGNED - MZ	REVISED -	STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION	STRUCTURE NO. 016-2015	F.A.I. RTE. 290 / SECTION 22 STRUCTURE 1 / COUNTY COOK / TOTAL SHEETS / SHEET NO.
		CHECKED - DF	REVISED -			CONTRACT NO. 62R61
	PLOT SCALE = 5.333 ' / in.	DRAWN - MA	REVISED -			
	PLOT DATE = 01/10/2025	CHECKED - DF	REVISED -		SHEET 4 OF 4 SHEETS	ILLINOIS FED. AID PROJECT

2/18/2025 7:56:48 PM

APPENDIX B

SOIL BORING LOCATION PLAN

AND SUBSURFACE PROFILES



MODEL: $MODELNAME$
FILE NAME: $FILEL$

GSG CONSULTANTS, INC.
735 E. REMINGTON RD, SCHAUMBURG, IL 60173
TEL: +1630.994.2600 | WWW.GSG-CONSULTANTS.COM

USER NAME = $USER$	DESIGNED - DD	REVISED -	
	DRAWN - NN	REVISED -	
PLOT SCALE = $SCALE$	CHECKED - DE	REVISED -	
PLOT DATE = $DATE$	DATE - 01/05/2024	REVISED -	

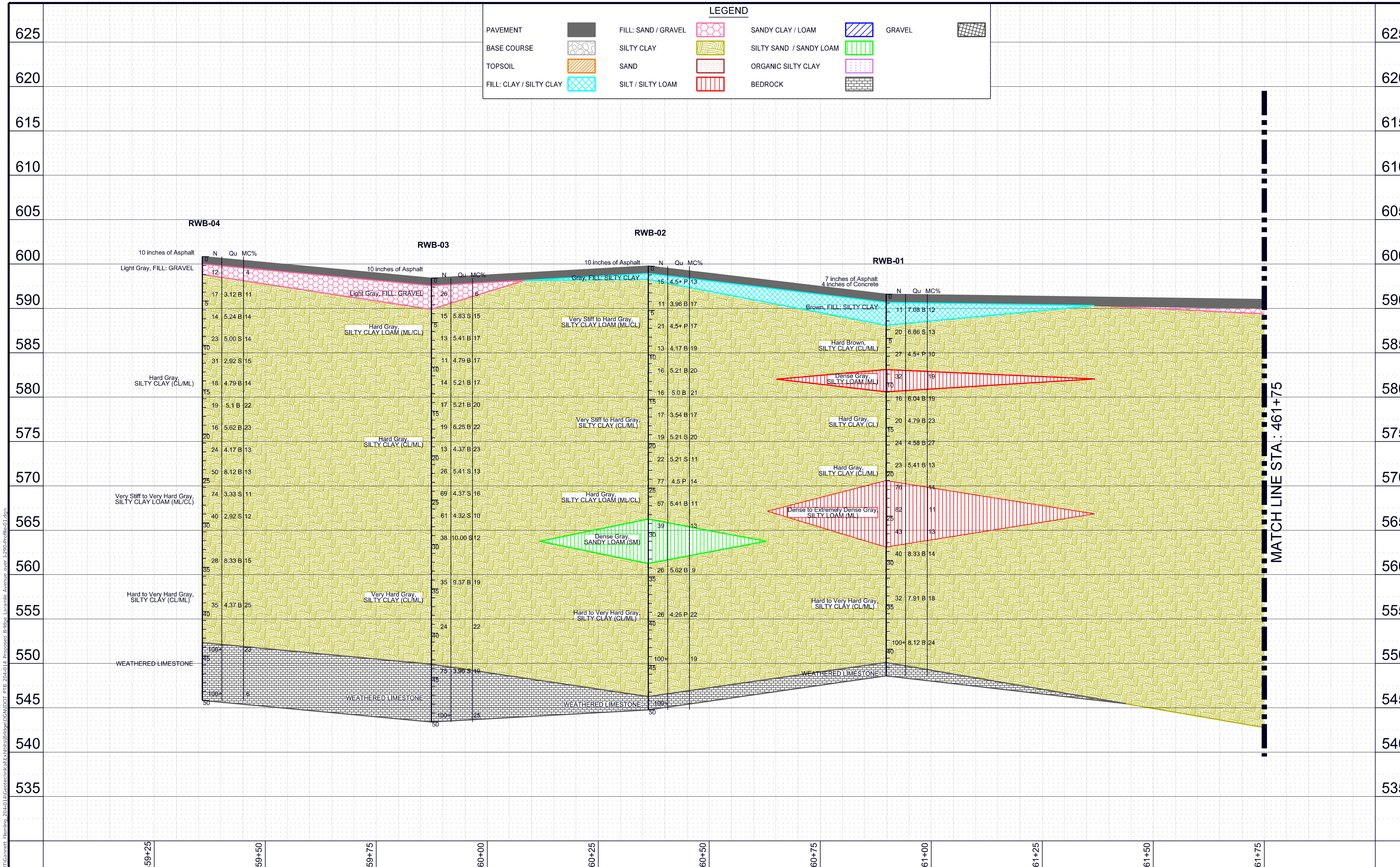
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

IDOT PTB 204-014
PROPOSED BRIDGE LARAMIE AVENUE OVER I-290
BORING LOCATION PLAN

SCALE: 1:50 | SHEET 1 OF 1 SHEETS | STA. | TO STA.

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		COOK	9	1

CONTRACT NO. PTB 204-014
ILLINOIS | FED. AID PROJECT



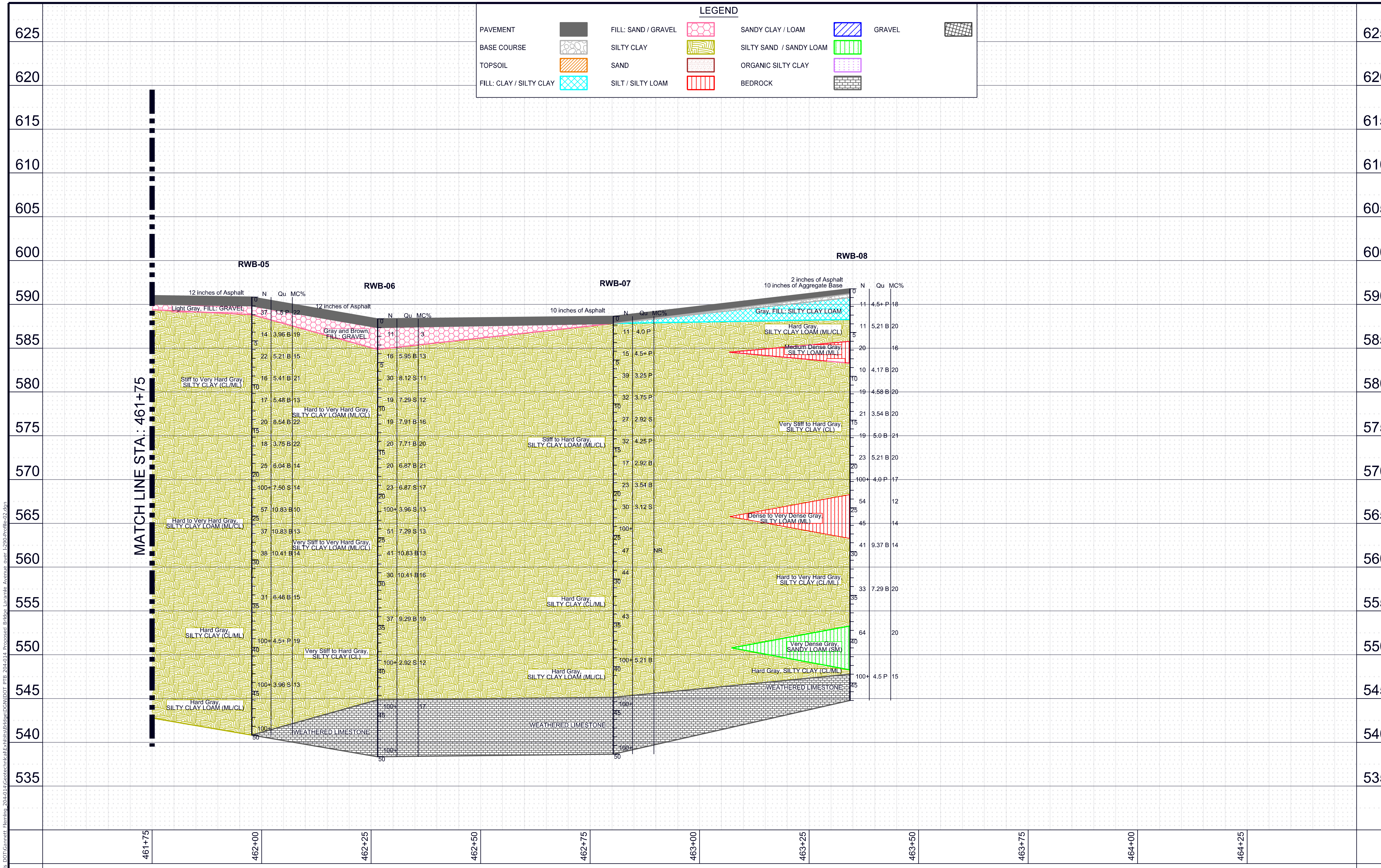
GSG CONSULTANTS, INC. 735 E. REMINGTON RD, SCHAUMBURG, IL 60173 TEL: +1630.994.2600 | WWW.GSG-CONSULTANTS.COM	USER NAME = nnano	DESIGNED - DD	REVISED -	STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION
		DRAWN - NN	REVISED -	
	PLOT SCALE = 240.0000 ' / ft.	CHECKED - DE	REVISED -	
	PLOT DATE = 2/19/2024	DATE - 01/05/2024	REVISED -	

IDOT PTB 204-014
PROPOSED BRIDGE LARAMIE AVENUE OVER I-290 – NORTHWEST WINGWALL
BORING PROFILE

SCALE: AS NOTED | SHEET 1 OF 8 SHEETS | STA. 459+25 TO STA. 461+75

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		COOK	9	2

CONTRACT NO. PTB 204-014
ILLINOIS | FED. AID PROJECT



GSG CONSULTANTS, INC. 735 E. REMINGTON RD, SCHAUMBURG, IL 60173 TEL: +1630.994.2600 | WWW.GSG-CONSULTANTS.COM	USER NAME = nnano	DESIGNED - DD	REVISED -
		DRAWN - NN	REVISED -
	PLOT SCALE = 240.0000 ' / ft.	CHECKED - DE	REVISED -
	PLOT DATE = 2/19/2024	DATE - 01/05/2024	REVISED -

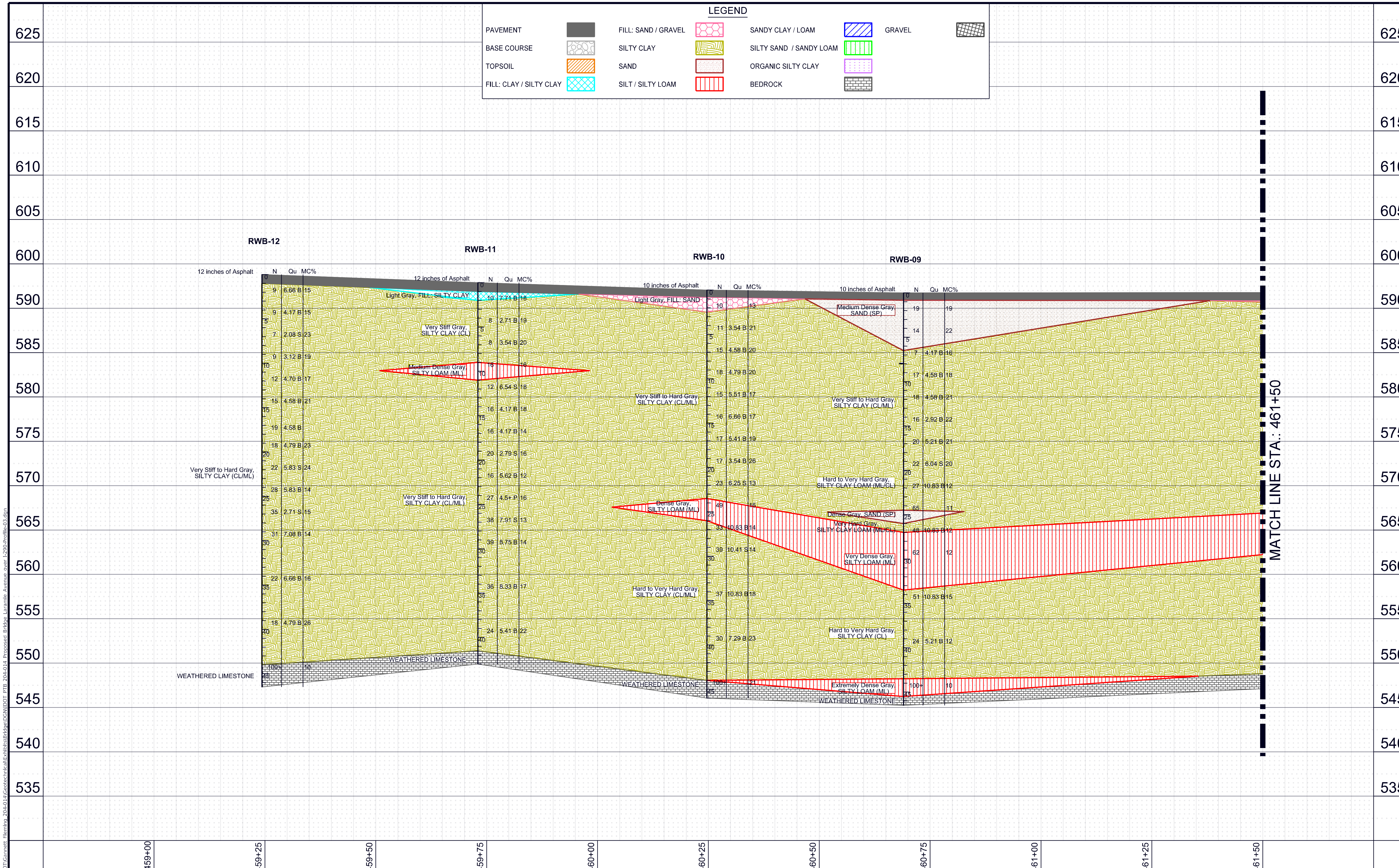
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

IDOT PTB 204-014
PROPOSED BRIDGE LARAMIE AVENUE OVER I-290 - NORTHEAST WINGWALL
BORING PROFILE

SCALE: AS NOTED | SHEET 2 OF 8 SHEETS | STA. 461+75 TO STA. 464+25

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		COOK	9	3
		CONTRACT NO. PTB 204-014		
		ILLINOIS	FED. AID PROJECT	

MODEL: Default
FILE NAME: I:\Illinois DOT\Gannett Fleming 204-014 Proposed Bridge Laramie Avenue over I-290\Geotechnical\Exhibits\Bridge\DGN\IDOT PTB 204-014 Proposed Bridge Laramie Avenue over I-290-Profile-02.dgn



MODEL: Default
FILE NAME: T:\Illinois DOT\Gannett Fleming 204-014\Geotechnical\Exhibits\Bridge\DGN\IDOT PTB 204-014 Proposed Bridge Laramie Avenue over I-290-Profile-03.dgn

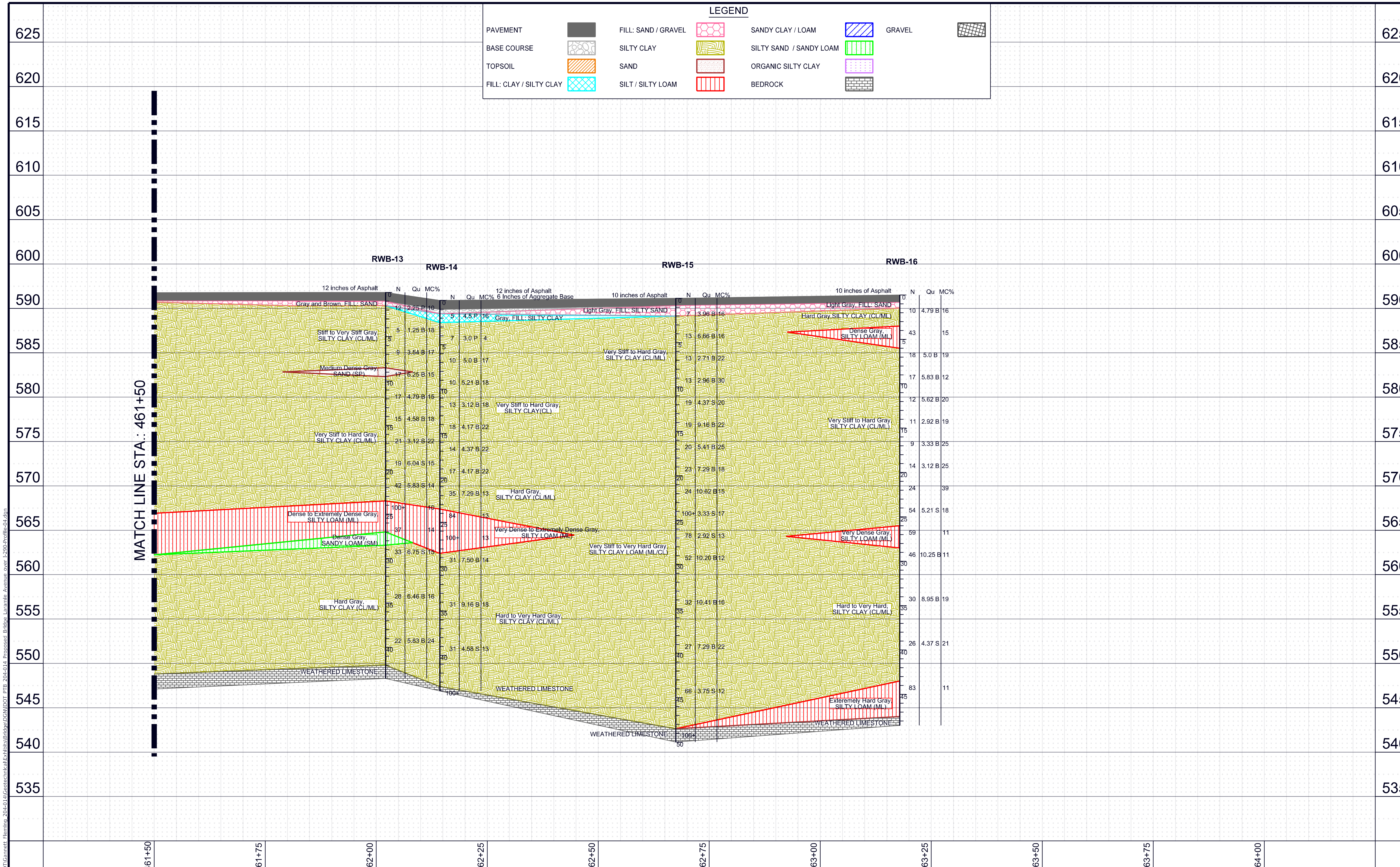
GSG CONSULTANTS, INC. 735 E. REMINGTON RD, SCHAUMBURG, IL 60173 TEL: +1630.994.2600 | WWW.GSG-CONSULTANTS.COM	USER NAME = nnano	DESIGNED - DD	REVISED -
		DRAWN - NN	REVISED -
	PLOT SCALE = 240.0000 ' / ft.	CHECKED - DE	REVISED -
	PLOT DATE = 2/19/2024	DATE - 01/05/2024	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

IDOT PTB 204–014
PROPOSED BRIDGE LARAMIE AVENUE OVER I–290 – SOUTHWEST WINGWALL
BORING PROFILE

SCALE: AS NOTED | SHEET 3 OF 8 SHEETS | STA. 459+00 TO STA. 461+50

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		COOK	9	4
		CONTRACT NO. PTB 204-014		
		ILLINOIS	FED. AID PROJECT	



GSG CONSULTANTS, INC. 735 E. REMINGTON RD, SCHAUMBURG, IL 60173 TEL: +1630.994.2600 | WWW.GSG-CONSULTANTS.COM	USER NAME = nnano	DESIGNED - DD	REVISED -
		DRAWN - NN	REVISED -
	PLOT SCALE = 240.0000 ' / ft.	CHECKED - DE	REVISED -
	PLOT DATE = 2/19/2024	DATE - 01/05/2024	REVISED -

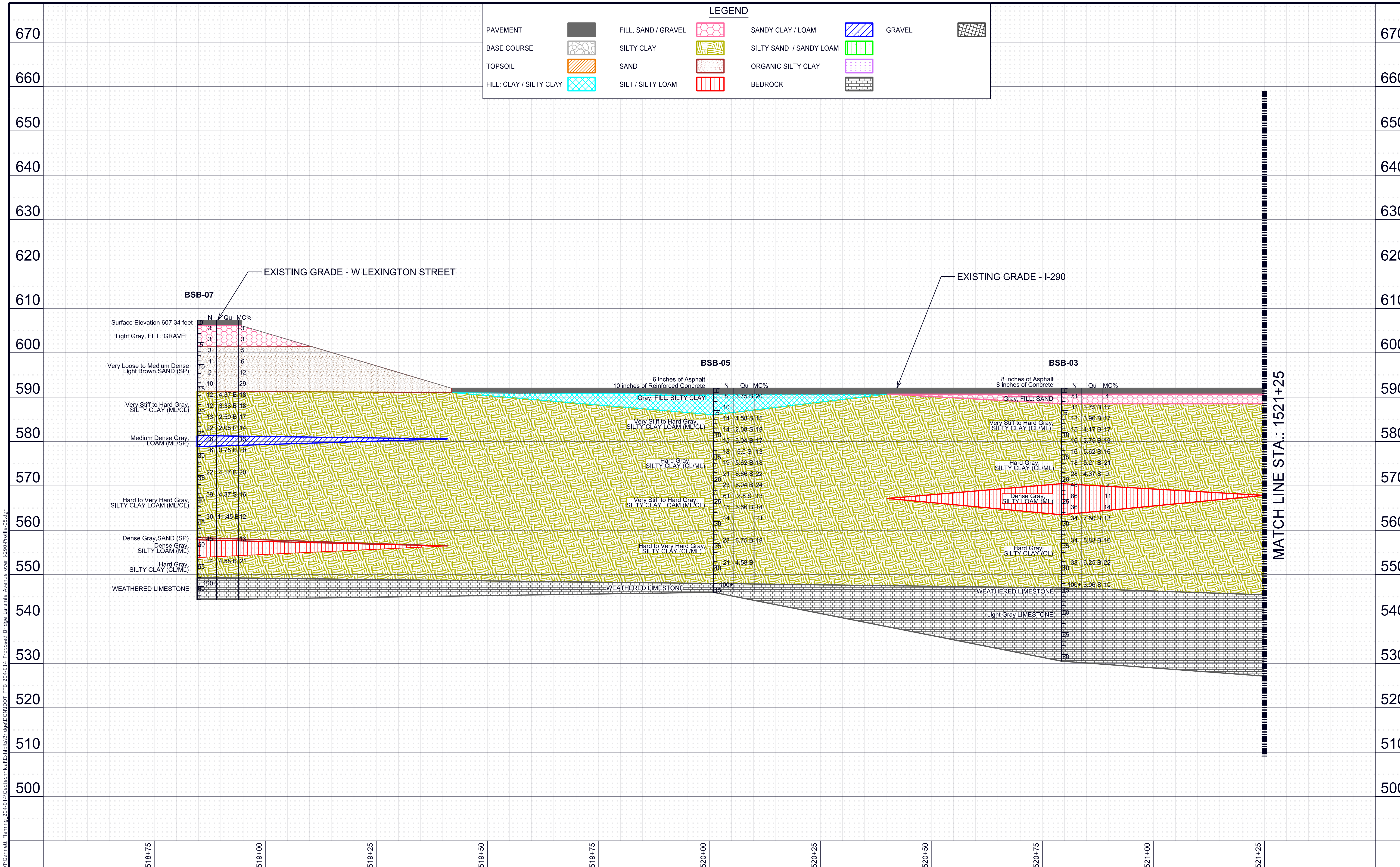
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

IDOT PTB 204-014
PROPOSED BRIDGE LARAMIE AVENUE OVER I-290 - SOUTHEAST WINGWALL
BORING PROFILE

SCALE: AS NOTED | SHEET 4 OF 8 SHEETS | STA. 459+00 TO STA. 464+00

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		COOK	9	5
		CONTRACT NO. PTB 204-014		
		ILLINOIS FED. AID PROJECT		

MODEL: Default
FILE NAME: I:\Illinois DOT\Gannett Fleming 204-014\Geotechnical\Exhibits\Bridge\DGN\IDOT PTB 204-014 Proposed Bridge Laramie Avenue over I-290-Profile-04.dgn



GSG CONSULTANTS, INC. 735 E. REMINGTON RD. SCHAUMBURG, IL 60173 TEL: +1630.994.2600 | WWW.GSG-CONSULTANTS.COM	USER NAME = nnano	DESIGNED - DD	REVISED -
		DRAWN - NN	REVISED -
	PLOT SCALE = 240.0000 ' / ft.	CHECKED - DE	REVISED -
	PLOT DATE = 2/26/2024	DATE - 01/05/2024	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

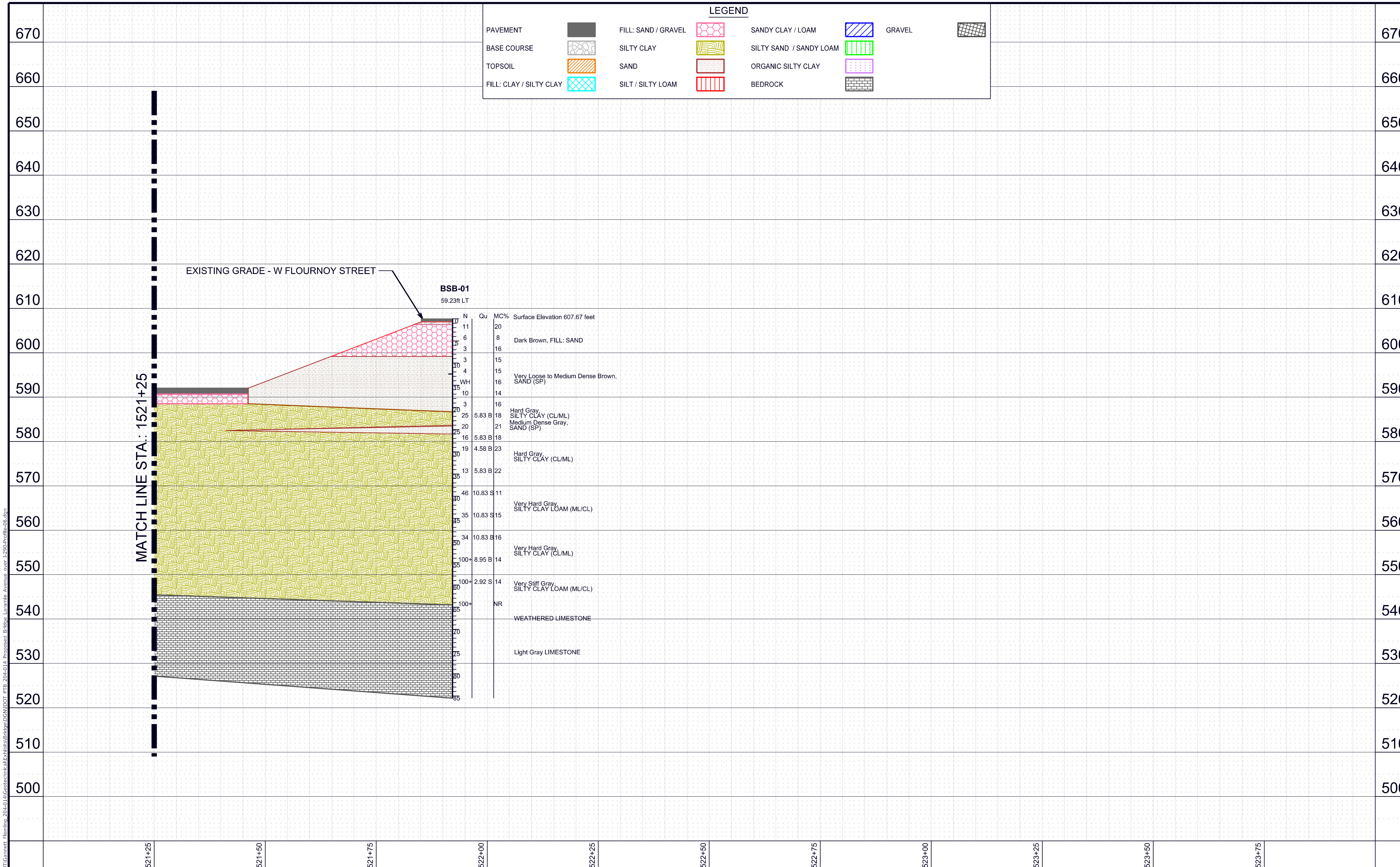
IDOT PTB 204-014
PROPOSED BRIDGE LARAMIE AVENUE OVER I-290 - EAST LARAMIE
BORING PROFILE

SCALE: AS NOTED | SHEET 5 OF 8 SHEETS | STA. 1518+75 TO STA. 1521+25

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		COOK	9	6

CONTRACT NO. PTB 204-014
ILLINOIS | FED. AID PROJECT

MODEL: Default
FILE NAME: ...\Illinois DOT\Gannett Fleming 204-014\Geotechnical\Exhibits\Bridge\DGN\IDOT PTB 204-014 Proposed Bridge Laramie Avenue over I-290-Profile-05.dgn



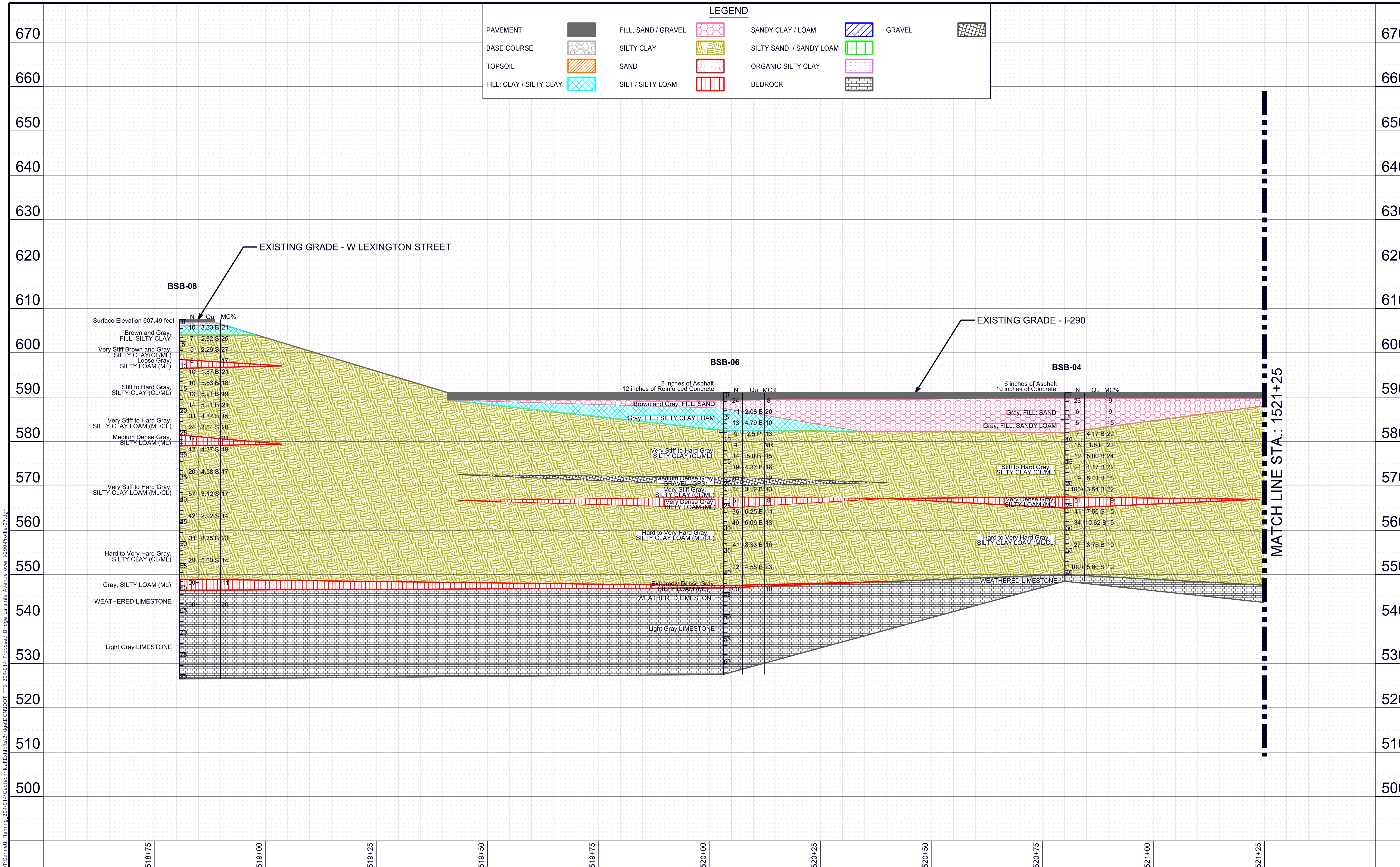
GSG CONSULTANTS, INC. 735 E. REMINGTON RD, SCHAUMBURG, IL 60173 TEL: +1630.994.2600 | WWW.GSG-CONSULTANTS.COM	USER NAME = nnano	DESIGNED - DD	REVISED -	STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION
		DRAWN - NN	REVISED -	
	PLOT SCALE = 240.0000 ' / ft.	CHECKED - DE	REVISED -	
	PLOT DATE = 2/26/2024	DATE - 01/05/2024	REVISED -	

IDOT PTB 204-014
PROPOSED BRIDGE LARAMIE AVENUE OVER I-290 - EAST LARAMIE
BORING PROFILE

SCALE: AS NOTED | SHEET 6 OF 8 SHEETS | STA. 1521+25 TO STA. 1523+75

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		COOK	9	7
		CONTRACT NO. PTB 204-014		
		ILLINOIS FED. AID PROJECT		

MODEL: Default
FILE NAME: I:\Illinois DOT\Gannett Fleming 204-014\Geotechnical\Exhibits\Bridge\DGN\IDOT PTB 204-014 Proposed Bridge Laramie Avenue over I-290-Profile-06.dgn



GSG CONSULTANTS, INC.
735 E. REMINGTON RD. SCHAUMBURG, IL 60173
TEL: +1630.994.2600 | WWW.GSG-CONSULTANTS.COM

USER NAME = nnano	DESIGNED - DD	REVISED -	
	DRAWN - NN	REVISED -	
PLOT SCALE = 240.0000 ' / ft.	CHECKED - DE	REVISED -	
PLOT DATE = 2/26/2024	DATE - 01/05/2024	REVISED -	

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

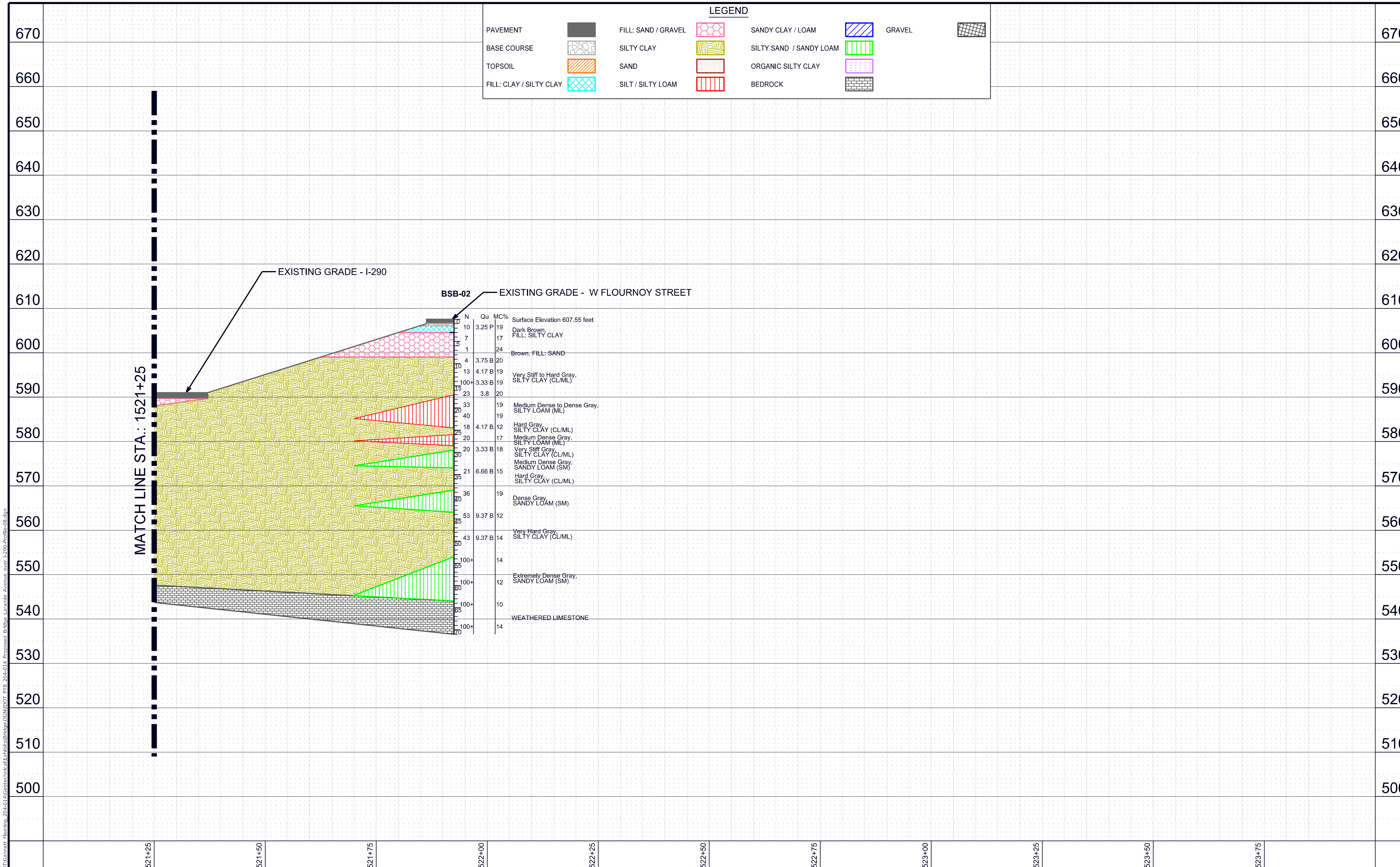
IDOT PTB 204-014
PROPOSED BRIDGE LARAMIE AVENUE OVER I-290 – WEST LARAMIE
BORING PROFILE

SCALE: AS NOTED | SHEET 7 OF 8 SHEETS | STA. 1518+75 TO STA. 1521+25

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		COOK	9	8

CONTRACT NO. PTB 204-014
ILLINOIS | FED. AID PROJECT

MODEL: Default
FILE NAME: T:\Illinois DOT\Gannett Fleming 204-014 Proposed Bridge Laramie Avenue over I-290\Geotechnical\Exhibits\Bridge\DGN\IDOT PTB 204-014-I-290-Profile-07.dgn



MODEL: Default
FILE NAME: T:\Illinois DOT\Gannett Fleming 204-014\Geotechnical\Exhibits\Bridge\DGN\IDOT PTB 204-014 Proposed Bridge Laramie Avenue over I-290-Profile-08.dgn

GSG CONSULTANTS, INC.
735 E. REMINGTON RD, SCHAUMBURG, IL 60173
TEL: +1630.994.2600 | WWW.GSG-CONSULTANTS.COM

USER NAME = nnano	DESIGNED - DD	REVISED -	
	DRAWN - NN	REVISED -	
PLOT SCALE = 240.0000 ' / ft.	CHECKED - DE	REVISED -	
PLOT DATE = 2/26/2024	DATE - 01/05/2024	REVISED -	

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

IDOT PTB 204–014
PROPOSED BRIDGE LARAMIE AVENUE OVER I–290 – WEST LARAMIE
BORING PROFILE

SCALE: AS NOTED | SHEET 8 OF 8 SHEETS | STA. 1521+25 TO STA. 1523+75

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		COOK	9	9

CONTRACT NO. PTB 204-014

ILLINOIS | FED. AID PROJECT

APPENDIX C

SOIL BORING LOGS

Illinois Department of Transportation
Division of Highways
GSG Consultants, Inc.

SOIL BORING LOG

Date 10/18/23

ROUTE	FAI 290	**DESCRIPTION**	Bridge Boring	**LOGGED BY**	DV
SECTION	FAI 290 22	**LOCATION**	, **SEC.** 16, **TWP.** 39N, **RNG.** 13E, **Latitude** , **Longitude**		
COUNTY	Cook	**DRILLING RIG**	Diedrich D-50	**HAMMER TYPE**	Auto
		DRILLING METHOD	HSA	**HAMMER EFF (%)**	99.5

STRUCT. NO.	SN 016-2064
Station	N/A
BORING NO.	BSB-01
Station	1521+92.14
Offset	59.23ft LT
Ground Surface Elev.	607.67 ft
Surface Water Elev.	N/A ft
Stream Bed Elev.	N/A ft
Groundwater Elev.:	
First Encounter	595.2 ft ▼
Upon Completion	N/A ft
After ___ Hrs.	N/A ft

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
5 inches of Asphalt	607.25				
8 inches of Concrete	606.59				
3 inches of Aggregate Base	606.34		5, 5, 6		20
Dark Brown, Moist to Wet FILL: SAND, trace asphalt, brick, gravel		-5	4, 3, 3		8
			1, 2, 1		16
	599.17				
Very Loose to Medium Dense Brown, Moist to Wet SAND, trace gravel (SP)		-10	2, 1, 2		15
▼			2, 2, 2		15
		-15	1, WH, WH		16
			7, 4, 6		14
		-20	2, 2, 1		16

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
	586.67				
Hard Gray, Moist SILTY CLAY, trace gravel (CL/ML)			6, 9, 16	5.8 B	18
	583.67				
Medium Dense Gray, Wet SAND, trace gravel, clay (SP)		-25	10, 10, 10		21
	581.67				
Hard Gray, Moist SILTY CLAY, trace gravel (CL/ML)			6, 7, 9	5.8 B	18
		-30	5, 7, 12	4.6 B	23
		-35	4, 5, 8	5.8 B	22
	569.17				
		-40	23, 17, 29	10.8 S	11

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
GSG Consultants, Inc.

SOIL BORING LOG

Date 10/18/23

ROUTE FAI 290 **DESCRIPTION** Bridge Boring **LOGGED BY** DV

SECTION FAI 290 22 **LOCATION** , **SEC.** 16, **TWP.** 39N, **RNG.** 13E, **Latitude** , **Longitude**

COUNTY Cook **DRILLING RIG** Diedrich D-50 **HAMMER TYPE** Auto
DRILLING METHOD HSA **HAMMER EFF (%)** 99.5

STRUCT. NO. SN 016-2064
Station N/A

BORING NO. BSB-01
Station 1521+92.14
Offset 59.23ft LT
Ground Surface Elev. 607.67 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter 595.2 ft
Upon Completion N/A ft
After ___ **Hrs.** N/A ft

Description	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Very Hard Gray, Moist SILTY CLAY LOAM, trace gravel, sand (ML/CL) *(continued)*		12 14 21	10.8 S	15
	-45			
559.17		10 13 21	10.8 B	16
Very Hard Gray, Moist SILTY CLAY, trace gravel (CL/ML)	-50			
		10 15 50/5"	9.0 B	14
	-55			
549.17		21 50/5"	2.9 S	14
	-60			

Description	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Very Stiff Gray, Moist SILTY CLAY LOAM, trace gravel (ML/CL) *(continued)*		50/1"		NR
543.17				
WEATHERED LIMESTONE	-65			
	-70			
537.17				
Light Gray LIMESTONE, lightly weathered, lightly fractured, occasional vugs Run 1: 70.5' - 80.5' Recovery: 100% RQD: 83.7% (Good)				
	-75			
	-80			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
GSG Consultants, Inc.

SOIL BORING LOG

Date 10/18/23

ROUTE FAI 290 DESCRIPTION Bridge Boring LOGGED BY DV

SECTION FAI 290 22 LOCATION , SEC. 16, TWP. 39N, RNG. 13E, Latitude , Longitude

COUNTY Cook DRILLING RIG Diedrich D-50 HAMMER TYPE Auto
DRILLING METHOD HSA HAMMER EFF (%) 99.5

STRUCT. NO. SN 016-2064
Station N/A

BORING NO. BSB-01
Station 1521+92.14
Offset 59.23ft LT
Ground Surface Elev. 607.67 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter 595.2 ft ▼
Upon Completion N/A ft
After ___ Hrs. N/A ft

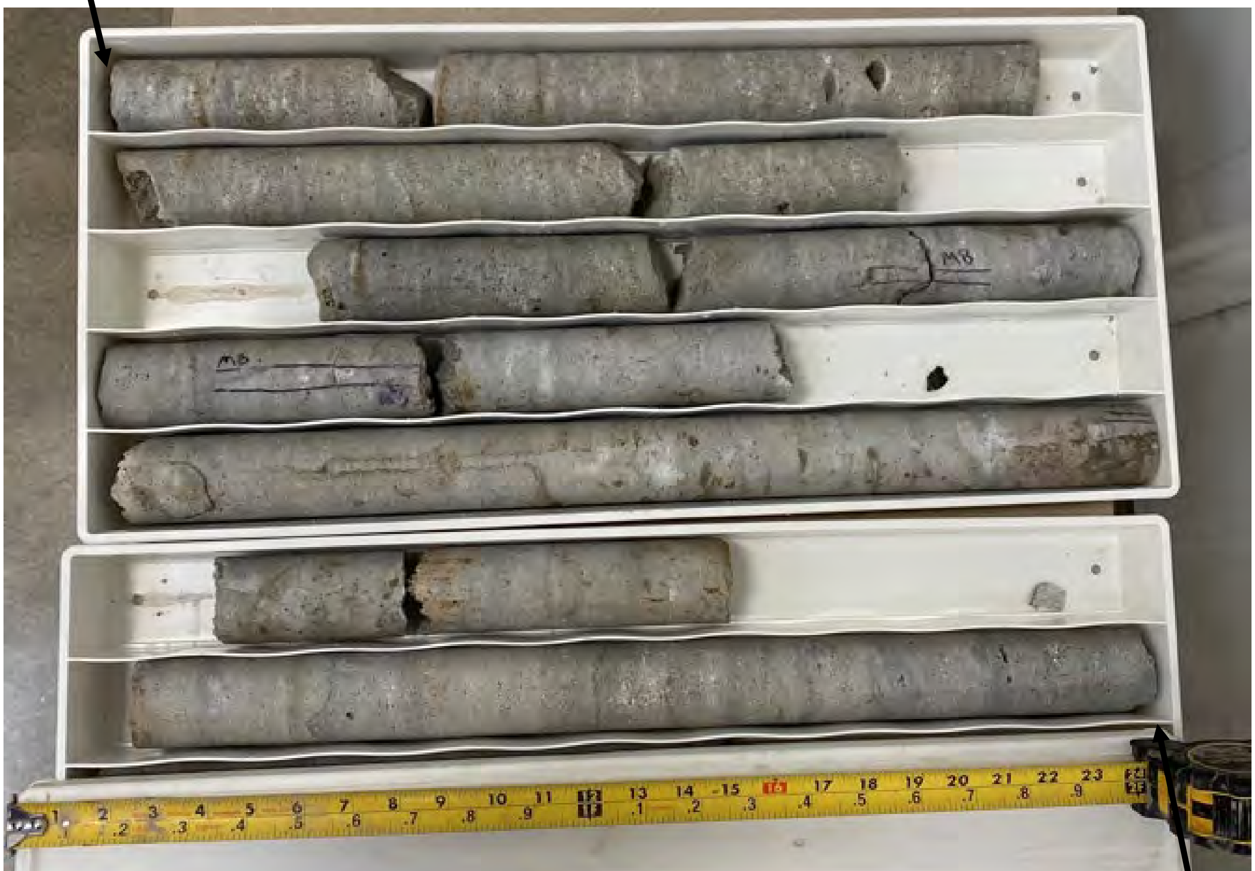
Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
	527.17				
Light Gray LIMESTONE, lightly weathered, lightly fractured, occasional vugs Run 2: 80.5' - 85.5' Recovery: 100% RQD: 86.6% (Good)		-85			
	522.17				
End of Boring		-90			
		-95			
		-100			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Laramie Avenue over I-290
Boring Number: BSB-01
Chicago, IL

Top

Depth = 70.5 ft
Elev. = 537.2 ft



Depth = 80.5 ft
Elev. = 527.7 ft

Bottom

Boring No.	Run	Depth (ft)	Recovery (%)	RQD (%)	RQD Classification	Description
BSB-01	1	70.5' – 80.5	100.0	83.7	Good	Light Gray Limestone Lightly Weathered, Lightly Fractured, Occasional Vugs

Laramie Avenue over I-290
Boring Number: BSB-01
Chicago, IL

Top

Depth = 80.5 ft
Elev. = 527.7 ft

Bottom

Depth = 85.5 ft
Elev. = 522.7 ft

Boring No.	Run	Depth (ft)	Recovery (%)	RQD (%)	RQD Classification	Compressive Strength (psi)	Description
BSB-01	2	80.5' – 85.5'	100.0	86.6	Good	7,582	Light Gray Limestone Lightly Weathered, Lightly Fractured, Occasional Vugs

Illinois Department of Transportation
Division of Highways
GSG Consultants, Inc.

SOIL BORING LOG

Date 10/3/23

ROUTE FAI 290 **DESCRIPTION** Bridge Boring **LOGGED BY** DF

SECTION FAI 290 22 **LOCATION** , **SEC.** 16, **TWP.** 39N, **RNG.** 13E, Latitude , Longitude

COUNTY Cook **DRILLING RIG** Diedrich D-50 **HAMMER TYPE** Auto
DRILLING METHOD HSA **HAMMER EFF (%)** 95.5

STRUCT. NO. SN 016-2064
Station N/A

BORING NO. BSB-02
Station 1521+92.47
Offset 86.15ft RT
Ground Surface Elev. 607.55 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter 604.6 ft ▼
Upon Completion N/A ft
After ___ **Hrs.** N/A ft

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
2 inches of Asphalt	607.39				
12 inches of Concrete					
4 inches of Aggregate Base	606.39 / 606.05		4		
Dark Brown, Moist FILL: SILTY CLAY, trace gravel			5 5	3.3 P	19
	604.55 ▼				
Brown, Wet FILL: SAND			2		
		-5	3 4		17
			0		
			0 1		24
	599.05				
Very Stiff to Hard Gray, Moist SILTY CLAY, trace gravel (CL/ML)			0		
		-10	1 3	3.8 B	20
			4		
			5 8	4.2 B	19
			8		
		-15	30 50/1	3.3 B	19
			5		
	590.55		9 14	3.8	20
Medium Dense to Dense Gray, Moist SILTY LOAM (ML)			7		
		-20	11 22		19

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Medium Dense to Dense Gray, Moist SILTY LOAM (ML) *(continued)*			12		
			18 22		19
			10		
	583.05	-25	8 10	4.2 B	12
Hard Gray, Moist SILTY CLAY, trace gravel (CL/ML)	581.55		9		
Medium Dense Gray, Moist SILTY LOAM, trace gravel (ML)			10 10		17
	579.05				
Very Stiff Gray, Moist SILTY CLAY, trace gravel (CL/ML)			4		
	578.05	-30	5 15		18
Medium Dense Gray, Wet SANDY LOAM, trace gravel (SM)					
	574.05				
Hard Gray, Moist SILTY CLAY, trace gravel (CL/ML)			7		
		-35	8 13	6.7 B	15
	569.05				
Dense Gray, Wet SANDY LOAM, trace gravel (SM)			10		
		-40	12 24		19

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, form 137 (Rev. 8-99)

Illinois Department of Transportation
Division of Highways
GSG Consultants, Inc.

SOIL BORING LOG

Date 10/3/23

ROUTE FAI 290 **DESCRIPTION** Bridge Boring **LOGGED BY** DF

SECTION FAI 290 22 **LOCATION** , **SEC.** 16, **TWP.** 39N, **RNG.** 13E, **Latitude** , **Longitude**

COUNTY Cook **DRILLING RIG** Diedrich D-50 **HAMMER TYPE** Auto
DRILLING METHOD HSA **HAMMER EFF (%)** 95.5

STRUCT. NO. SN 016-2064
Station N/A

BORING NO. BSB-02
Station 1521+92.47
Offset 86.15ft RT
Ground Surface Elev. 607.55 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter 604.6 ft ▼
Upon Completion N/A ft
After ___ **Hrs.** N/A ft

Description	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Dense Gray, Wet SANDY LOAM, trace gravel (SM) *(continued)*				
564.05				
Very Hard Gray, Moist SILTY CLAY, with sand, trace gravel (CL/ML)		16		
		19	9.4	12
	-45	34	B	
		10		
		18	9.4	14
	-50	25	B	
554.05				
Extremely Dense Gray, Moist SANDY LOAM, trace gravel (SM)		17		
		17		14
	-55	50/6"		
		33		
		50/4:		12
	-60			

Description	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Extremely Dense Gray, Moist SANDY LOAM, trace gravel (SM) *(continued)*				
544.05				
WEATHERED LIMESTONE		50/6"		
				10
	-65			
		2		
		50/4"		14
	-70			
536.55				
Auger Refusal at 71 feet End of Boring				
	-75			
	-80			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
GSG Consultants, Inc.

SOIL BORING LOG

Date 9/27/23

ROUTE FAI 290 **DESCRIPTION** Bridge Boring **LOGGED BY** TS

SECTION FAI 290 22 **LOCATION** , **SEC.** 16, **TWP.** 39N, **RNG.** 13E, **Latitude** , **Longitude**

COUNTY Cook **DRILLING RIG** CME-75 **DRILLING METHOD** HSA **HAMMER TYPE** Auto **HAMMER EFF (%)** 79.8

STRUCT. NO. SN 016-2064
Station N/A

BORING NO. BSB-03
Station 1520+79.33
Offset 53.40ft LT
Ground Surface Elev. 592.00 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter None ft
Upon Completion N/A ft
After ___ **Hrs.** N/A ft

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
8 inches of Asphalt	591.33				
8 inches of Concrete	590.67				
Gray, Dry FILL: SAND, with gravel			17 41 10		4
Very Stiff to Hard Gray, Moist SILTY CLAY, trace gravel (CL/ML)	588.50	-5	8 6 5	3.8 B	17
			5 6 7	4.0 B	17
		-10	7 6 9	4.2 B	17
			4 7 9	3.8 B	19
Hard Gray, Moist SILTY CLAY, with gravel (CL/ML)	578.50	-15	4 7 9	5.6 B	16
			9 8 10	5.2 B	21
		-20	9 14 14	4.4 S	9
Hard Gray, Moist SILTY CLAY, with gravel (CL/ML) *(continued)*	570.50		9 16 32		9
Dense Gray, Moist SILTY LOAM, with gravel (ML)		-25	17 41 45		11
			17 17 19		14
Hard Gray, Moist SILTY CLAY, with gravel (CL)	563.50	-30	10 14 20	7.5 B	13
		-35	11 15 19	5.8 B	16
		-40	11 15 23	6.3 B	22

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
GSG Consultants, Inc.

SOIL BORING LOG

Date 9/27/23

ROUTE FAI 290 **DESCRIPTION** Bridge Boring **LOGGED BY** TS

SECTION FAI 290 22 **LOCATION** , **SEC.** 16, **TWP.** 39N, **RNG.** 13E, **Latitude** , **Longitude**

COUNTY Cook **DRILLING RIG** CME-75 **HAMMER TYPE** Auto
DRILLING METHOD HSA **HAMMER EFF (%)** 79.8

STRUCT. NO. SN 016-2064
Station N/A

BORING NO. BSB-03
Station 1520+79.33
Offset 53.40ft LT
Ground Surface Elev. 592.00 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter None ft
Upon Completion N/A ft
After ___ **Hrs.** N/A ft

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Hard Gray, Moist SILTY CLAY, with gravel (CL) *(continued)*			29 41 50/4"	4.0 S	10
	547.00	-45			
WEATHERED LIMESTONE					
	545.50				
Light Gray LIMESTONE, lightly weathered, lightly fractured, occasional vugs Granite seam from 46.5 to to 46.75 feet Run 1: 46.5' - 56.5' Recovery: 94.6% RQD: 85.4% (Good)		-50			
		-55			
	535.50				
Light Gray LIMESTONE, lightly weathered, moderately fractured, occasional vugs Run 2: 56.5' - 61.5' Recovery: 100% RQD: 85.8% (Good)		-60			

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
	530.50				
End of Boring					
		-65			
		-70			
		-75			
		-80			

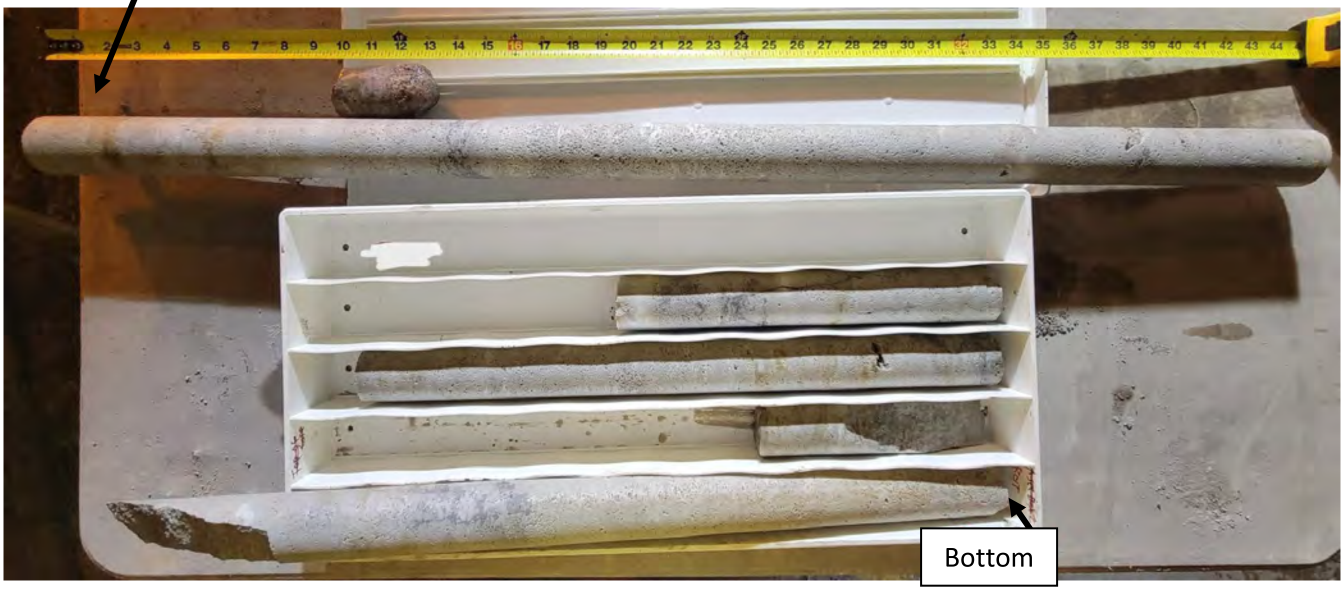
The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, form 137 (Rev. 8-99)

Laramie Avenue over I-290
Boring Number: BSB-03
Chicago, IL

Top

Depth = 46.5 ft
Elev. = 545.5 ft



Bottom

Depth = 56.5 ft
Elev. = 535.5 ft

Boring No.	Run	Depth (ft)	Recovery (%)	RQD (%)	RQD Classification	Compressive Strength (psi)	Description
BSB-03	1	46.5' – 56.5'	94.6	85.4	Good	2,834	Light Gray Limestone Lightly Weathered, Lightly Fractured, Occasional Vugs, Secondary Mineralization

Laramie Avenue over I-290
Boring Number: BSB-03
Chicago, IL

Top

Depth = 56.5 ft
Elev. = 535.5 ft

Depth = 61.5 ft
Elev. = 530.5 ft

Bottom

Boring No.	Run	Depth (ft)	Recovery (%)	RQD (%)	RQD Classification	Description
BSB-03	2	56.5’ – 61.5.’	100.0	85.8	Good	Light Gray Limestone Moderately Weathered, Moderately Fractured, Occasional Vugs, Secondary Mineralization

Illinois Department of Transportation
Division of Highways
GSG Consultants, Inc.

SOIL BORING LOG

Date 9/27/23

ROUTE	FAI 290	**DESCRIPTION**	Bridge Boring	**LOGGED BY**	DV
SECTION	FAI 290 22	**LOCATION**	, **SEC.** 16, **TWP.** 39N, **RNG.** 13E, **Latitude** , **Longitude**		
COUNTY	Cook	**DRILLING RIG**	Mobile B-57	**HAMMER TYPE**	Auto
		DRILLING METHOD	HSA	**HAMMER EFF (%)**	89.0

STRUCT. NO.	SN 016-2064
Station	N/A
BORING NO.	BSB-04
Station	4624+86.24
Offset	8.27ft LT
Ground Surface Elev.	591.00 ft
Surface Water Elev.	N/A ft
Stream Bed Elev.	N/A ft
Groundwater Elev.:	
First Encounter	585.0 ft ▼
Upon Completion	N/A ft
After ___ Hrs.	N/A ft

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
6 inches of Asphalt	590.50				
10 inches of Concrete	589.67		40		
Gray, Moist FILL: SAND, with gravel			16		9
			7		
			6		
			3		9
		-5	3		
	585.00 ▼		1		
Gray, Moist FILL: SANDY LOAM, with gravel			2		15
			3		
	582.00		3		
Stiff to Hard Gray, Moist SILTY CLAY, trace gravel (CL/ML)			2	4.2	22
		-10	5	B	
			6		
			8	1.5	22
			10	P	
			4		
			4	5.0	24
		-15	8	B	
			5		
			8	4.2	22
			13	B	
			5		
			8	5.4	18
		-20	11	B	

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Stiff to Hard Gray, Moist SILTY CLAY, trace gravel (CL/ML) *(continued)*			50/4"		
				3.5	22
				B	
	567.50				
Very Dense Gray, Moist SILTY LOAM, trace gravel (ML)			23		
			25		19
		-25	26		
	565.00				
Hard to Very Hard Gray, Moist SILTY CLAY LOAM, trace gravel (ML/CL)			16		
			19	7.5	15
			22	S	
			10		
			14	10.6	15
		-30	20	B	
			8		
			11	8.8	19
		-35	16	B	
			13		
			20	5.0	12
		-40	50/5"	S	

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
GSG Consultants, Inc.

SOIL BORING LOG

Date 9/27/23

ROUTE	FAI 290	DESCRIPTION	Bridge Boring	LOGGED BY	DV
SECTION	FAI 290 22	LOCATION	, SEC. 16, TWP. 39N, RNG. 13E, Latitude , Longitude		
COUNTY	Cook	DRILLING RIG	Mobile B-57	HAMMER TYPE	Auto
		DRILLING METHOD	HSA	HAMMER EFF (%)	89.0

STRUCT. NO.	SN 016-2064
Station	N/A
BORING NO.	BSB-04
Station	4624+86.24
Offset	8.27ft LT
Ground Surface Elev.	591.00 ft

Surface Water Elev.	N/A ft
Stream Bed Elev.	N/A ft
Groundwater Elev.:	
First Encounter	585.0 ft ▼
Upon Completion	N/A ft
After ___ Hrs.	N/A ft

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
	550.00				
WEATHERED LIMESTONE	548.50				
Auger Refusal at 42.5 feet End of Boring					
		-45			
		-50			
		-55			
		-60			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
GSG Consultants, Inc.

SOIL BORING LOG

Date 9/24/23

ROUTE	FAI 290	**DESCRIPTION**	Bridge Boring	**LOGGED BY**	DV
SECTION	FAI 290 22	**LOCATION**	, SEC. 16, TWP. 39N, RNG. 13E, Latitude , Longitude		
COUNTY	Cook	**DRILLING RIG**	Mobile B-57	**HAMMER TYPE**	Auto
		DRILLING METHOD	HSA	**HAMMER EFF (%)**	89.0

STRUCT. NO.	SN 016-2064	**Surface Water Elev.**	N/A ft
Station	N/A	**Stream Bed Elev.**	N/A ft
BORING NO.	BSB-05	**Groundwater Elev.:**	
Station	4628+34.71	**First Encounter**	None ft
Offset	14.53ft LT	**Upon Completion**	N/A ft
Ground Surface Elev.	592.00 ft	**After ___ Hrs.**	N/A ft

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
6 inches of Asphalt	591.50				
10 inches of Reinforced Concrete	590.67		13		
Gray, Moist FILL: SILTY CLAY, trace gravel			4 4	3.8 B	20
Push Rock at 3.5 feet			5 5 5		
	586.00	-5			
Very Stiff to Hard Gray, Moist SILTY CLAY LOAM, trace gravel (ML/CL)			3 7 7	4.6 S	15
			2 7 7	2.1 S	19
	581.00	-10			
Hard Gray, Moist SILTY CLAY, trace gravel (CL/ML)			4 6 9	6.0 B	17
			8 8 10	5.0 S	13
		-15			
			4 8 11	5.6 B	18
			5 9 12	6.7 S	22
		-20			
Hard Gray, Moist SILTY CLAY, trace gravel (CL/ML) *(continued)*			6 11 12	6.0 B	24
	568.50				
Very Stiff to Hard Gray, Moist SILTY CLAY LOAM, trace gravel (ML/CL)			18 28 33	2.5 S	13
		-25			
Push Rock at 26 feet			13 22 23	6.7 B	14
	563.50				
Hard to Very Hard Gray, Moist SILTY CLAY, trace gravel (CL/ML)			12 18 26		21
		-30			
			7 9 19	8.8 B	19
		-35			
			5 8 13	4.6 B	
		-40			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
GSG Consultants, Inc.

SOIL BORING LOG

Date 9/24/23

ROUTE FAI 290 **DESCRIPTION** Bridge Boring **LOGGED BY** DV

SECTION FAI 290 22 **LOCATION** , **SEC.** 16, **TWP.** 39N, **RNG.** 13E, **Latitude** , **Longitude**

COUNTY Cook **DRILLING RIG** Mobile B-57 **HAMMER TYPE** Auto
DRILLING METHOD HSA **HAMMER EFF (%)** 89.0

STRUCT. NO. SN 016-2064
Station N/A

BORING NO. BSB-05
Station 4628+34.71
Offset 14.53ft LT
Ground Surface Elev. 592.00 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter None ft
Upon Completion N/A ft
After ___ **Hrs.** N/A ft

Description	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Hard to Very Hard Gray, Moist SILTY CLAY, trace gravel (CL/ML) *(continued)*				
548.00		50/1"		
WEATHERED LIMESTONE	-45			
546.00				
Auger Refusal at 46 feet End of Boring	-50			
	-55			
	-60			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, form 137 (Rev. 8-99)

Illinois Department of Transportation
Division of Highways
GSG Consultants, Inc.

SOIL BORING LOG

Date 9/24/23

ROUTE FAI 290 **DESCRIPTION** Bridge Boring **LOGGED BY** DD

SECTION FAI 290 22 **LOCATION** , **SEC.** 16, **TWP.** 39N, **RNG.** 13E, **Latitude** , **Longitude**

COUNTY Cook **DRILLING RIG** CME-75 **HAMMER TYPE** Auto
DRILLING METHOD HSA **HAMMER EFF (%)** 79.8

STRUCT. NO. SN 016-2064
Station N/A

BORING NO. BSB-06
Station 3710+26.55
Offset 15.15ft RT
Ground Surface Elev. 591.00 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter 582.0 ft ▼
Upon Completion N/A ft
After ___ **Hrs.** N/A ft

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
8 inches of Asphalt					
12 inches of reinforced concrete	590.33		14		
	589.33		14		8
Brown and Gray, Moist FILL: SAND, with gravel			10		
	587.50				
Gray, Moist FILL: SILTY CLAY LOAM, trace gravel, wood			7		
			6	2.1	20
		-5	5	B	
			7		
			7	4.8	10
			6	B	
	582.50				
Very Stiff to Hard Gray, Moist SILTY CLAY, trace sand, gravel (CL/ML)	▼		5		
			3	2.5	13
		-10	6	P	
			5		
			2		NR
			2		
			6		
			6	5.0	15
		-15	8	B	
			7		
			8	4.4	16
			11	B	
	572.00		13		
			18		22
		-20	13		

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Dense Gray, Wet GRAVEL, with clay, sand (GPS) *(continued)*	570.00		8		
Very Stiff Gray, Moist SILTY CLAY, trace sand, gravel (CL/ML)			12	3.1	13
			22	B	
	567.50				
Very Dense Gray, Moist SILTY LOAM, trace gravel (ML)			35		
			27		9
		-25	34		
	565.00				
Hard to Very Hard Gray, Moist SILTY CLAY LOAM, trace gravel, sand (ML/CL)			16		
			18	6.3	11
			18	B	
			18		
			23	6.7	13
		-30	26	B	
			10		
			17	8.3	16
		-35	24	B	
			6		
			9	4.6	23
		-40	13	B	

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
GSG Consultants, Inc.

SOIL BORING LOG

Date 9/24/23

ROUTE FAI 290 **DESCRIPTION** Bridge Boring **LOGGED BY** DD

SECTION FAI 290 22 **LOCATION** , **SEC.** 16, **TWP.** 39N, **RNG.** 13E, **Latitude , Longitude**

COUNTY Cook **DRILLING RIG** CME-75 **HAMMER TYPE** Auto
DRILLING METHOD HSA **HAMMER EFF (%)** 79.8

STRUCT. NO. SN 016-2064
Station N/A

BORING NO. BSB-06
Station 3710+26.55
Offset 15.15ft RT
Ground Surface Elev. 591.00 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter 582.0 ft ▼
Upon Completion N/A ft
After ___ **Hrs.** N/A ft

Description	Elev. (ft)	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Hard to Very Hard Gray, Moist SILTY CLAY LOAM, trace gravel, sand (ML/CL) *(continued)*	547.50				
Extremely Dense Gray, Moist SILTY LOAM, with gravel (ML)	547.00		30 50/5"		10
WEATHERED LIMESTONE	542.50	-45			
Light Gray LIMESTONE, moderately weathered, lightly fractured, occasional vugs Run 1: 48.5' - 58.5' Recovery: 100% RQD: 72.9% (Fair)	532.50	-50 -55			
		-60			
Light Gray LIMESTONE, moderately weathered, lightly fractured, occasional vugs Run 2: 58.5' - 63.5' Recovery: 100% RQD: 81.6% (Good) *(continued)*	527.50				
End of Boring		-65 -70 -75 -80			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Laramie Ave Over I-290
Boring Number: BSB-06
Chicago, IL

Top

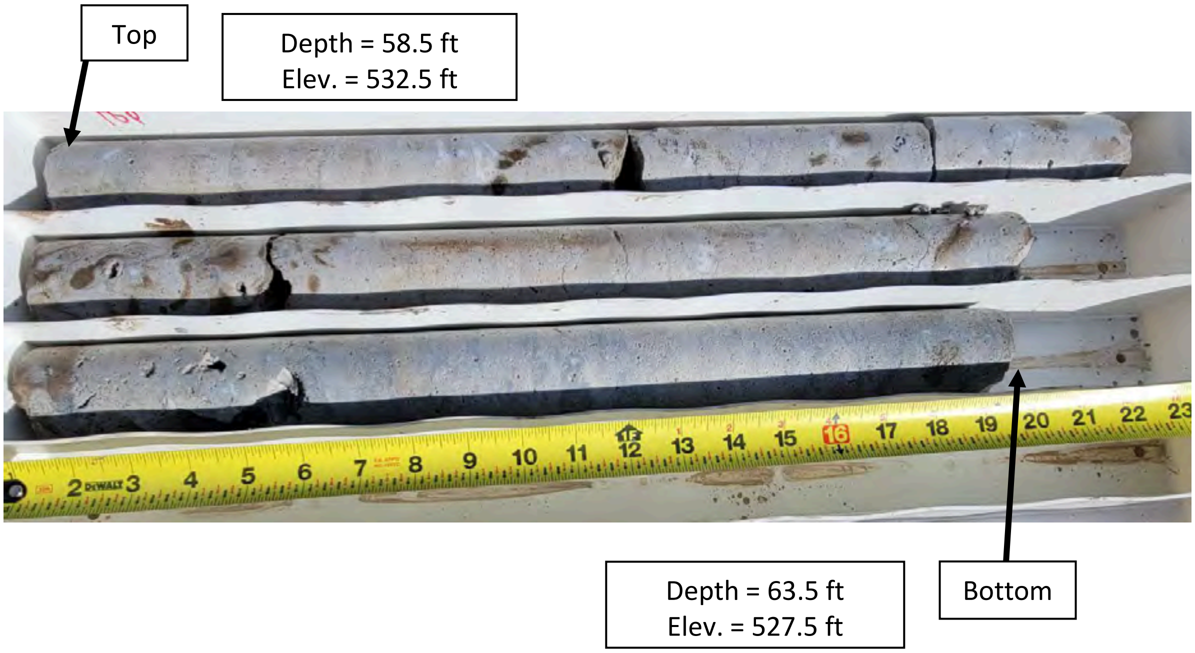
Depth = 48.5 ft
Elev. = 542.5 ft

Depth = 58.5 ft
Elev. = 532.5 ft

Bottom

Boring No.	Run	Depth (ft)	Recovery (%)	RQD (%)	RQD Classification	Compressive Strength (psi)	Description
BSB-06	1	48.5’ – 58.5’	100.0	72.9	Fair	4,379	Light Gray Limestone Moderately Weathered, Lightly Fractured, Occasional Vugs

Laramie Ave Over I-290
Boring Number: BSB-06
Chicago, IL



Boring No.	Run	Depth (ft)	Recovery (%)	RQD (%)	RQD Classification	Description
BSB-06	2	58.5' – 63.5'	100.0	81.6	Good	Light Gray Limestone Moderately Weathered, Lightly Fractured, Occasional Vugs

Illinois Department of Transportation
Division of Highways
GSG Consultants, Inc.

SOIL BORING LOG

Date 9/29/23

ROUTE FAI 290 **DESCRIPTION** Bridge Boring **LOGGED BY** DF

SECTION FAI 290 22 **LOCATION** , **SEC.** 16, **TWP.** 39N, **RNG.** 13E,
Latitude , **Longitude**

COUNTY Cook **DRILLING RIG** Diedrich D-50 **HAMMER TYPE** Auto
DRILLING METHOD HSA **HAMMER EFF (%)** 95.5

STRUCT. NO. SN 016-2064
Station N/A

BORING NO. BSB-07
Station 3713+55.41
Offset 14.04ft RT
Ground Surface Elev. 607.34 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter 593.8 ft ▼
Upon Completion N/A ft
After ___ **Hrs.** N/A ft

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
9 inches of Asphalt 6 inches of Concrete	606.59 606.09				
Light Gray, Dry FILL: GRAVEL			1 1 2		3
		-5	2 1 2		3
	601.34				
Very Loose to Loose Light Brown, Dry to Wet SAND, trace gravel (SP)			1 1 2		5
		-10	1 0 1		6
			1 1 1		12
		▼			
		-15	17 7 3		29
	591.34				
Very Stiff to Hard Gray, Moist SILTY CLAY, trace gravel (CL/ML)			5 5 7	4.4 B	18
		-20	4 5 7	3.3 B	18

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Very Stiff to Hard Gray, Moist SILTY CLAY, trace gravel (CL/ML) *(continued)*			4 6 7	2.5 B	17
		-25	5 7 15	2.1 P	14
	581.34				
Medium Dense Gray, Moist SILTY LOAM, trace gravel (ML)			17 15 13		13
	578.84				
Very Stiff to Very Hard Gray, Moist SILTY CLAY LOAM, trace gravel (ML/CL)		-30	9 11 15	3.8 B	20
		-35	6 9 13	4.2 B	20
		-40	18 21 38	4.4 S	16

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
GSG Consultants, Inc.

SOIL BORING LOG

Date 9/29/23

ROUTE FAI 290 **DESCRIPTION** Bridge Boring **LOGGED BY** DF

SECTION FAI 290 22 **LOCATION** , **SEC.** 16, **TWP.** 39N, **RNG.** 13E, **Latitude** , **Longitude**

COUNTY Cook **DRILLING RIG** Diedrich D-50 **HAMMER TYPE** Auto
DRILLING METHOD HSA **HAMMER EFF (%)** 95.5

STRUCT. NO. SN 016-2064
Station N/A

BORING NO. BSB-07
Station 3713+55.41
Offset 14.04ft RT
Ground Surface Elev. 607.34 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter 593.8 ft ▼
Upon Completion N/A ft
After ___ **Hrs.** N/A ft

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Very Stiff to Very Hard Gray, Moist SILTY CLAY LOAM, trace gravel (ML/CL) *(continued)*			13 21 29	11.5 B	12
		-45			
	558.34		17		
Dense Gray, Moist SAND, trace gravel (SP)	557.84		21 24		13
		-50			
Dense Gray, Very Moist SILTY LOAM, trace gravel (ML)	553.84				
Hard Gray, Moist SILTY CLAY, trace gravel (CL/ML)			10 11 13	4.6 B	21
		-55			
	549.34				
WEATHERED LIMESTONE			50/4"		
		-60			

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
WEATHERED LIMESTONE *(continued)*	544.34				
Auger Refusal at 63 feet End of Boring					
		-65			
		-70			
		-75			
		-80			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
GSG Consultants, Inc.

SOIL BORING LOG

Date 10/16/23

ROUTE FAI 290 **DESCRIPTION** Bridge Boring **LOGGED BY** DV

SECTION FAI 290 22 **LOCATION** , **SEC.** 16, **TWP.** 39N, **RNG.** 13E,
Latitude , **Longitude**

COUNTY Cook **DRILLING RIG** Diedrich D-50 **HAMMER TYPE** Auto
DRILLING METHOD HSA **HAMMER EFF (%)** 99.5

STRUCT. NO. SN 016-2064
Station N/A

BORING NO. BSB-08
Station 1518+80.63
Offset 79.31ft RT
Ground Surface Elev. 607.49 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter None ft
Upon Completion N/A ft
After ___ **Hrs.** N/A ft

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
3 inches of Asphalt	607.24				
11 inches of Concrete					
2 inches of Aggregate Base	606.33 / 606.16		5		
Brown and Gray, Moist FILL: SILTY CLAY, trace gravel			5 5	3.3 B	21
			4		
		-5	3 4	2.9 S	25
Very Stiff Brown and Gray, Very Moist SILTY CLAY, trace gravel, sand (CL/ML)	601.49		2 2 3	2.3 S	27
Loose Gray, Moist SILTY LOAM, trace gravel (ML)	598.49	-10	3 3 5		17
Stiff to Hard Gray, Moist SILTY CLAY, trace gravel (CL/ML)	596.49		3 4 6	1.9 B	21
		-15	4 4 6	5.8 B	18
			4 5 8	5.2 B	19
		-20	5 5 9	5.2 B	21
Very Stiff to Hard Gray, Moist SILTY CLAY LOAM, trace gravel (ML/CL)	586.49		12 14 17	4.4 S	15
		-25	13 14 10	3.5 S	20
Medium Dense Gray, Very Moist SILTY LOAM, trace gravel (ML)	581.49		8 7 10		21
Very Stiff to Hard Gray, Moist SILTY CLAY LOAM, trace gravel (ML/CL)	578.99	-30	5 5 7	4.4 S	19
		-35	5 8 12	4.6 S	17
		-40	14 18 39	3.1 S	17

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
GSG Consultants, Inc.

SOIL BORING LOG

Date 10/16/23

ROUTE FAI 290	**DESCRIPTION** Bridge Boring		**LOGGED BY** DV
SECTION FAI 290 22	**LOCATION** , **SEC.** 16, **TWP.** 39N, **RNG.** 13E, **Latitude** , **Longitude**		
COUNTY Cook	**DRILLING RIG** Diedrich D-50	**DRILLING METHOD** HSA	**HAMMER TYPE** Auto; **HAMMER EFF (%)** 99.5

STRUCT. NO. SN 016-2064
Station N/A

BORING NO. BSB-08
Station 1518+80.63
Offset 79.31ft RT
Ground Surface Elev. 607.49 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter None ft
Upon Completion N/A ft
After ___ **Hrs.** N/A ft

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Very Stiff to Hard Gray, Moist SILTY CLAY LOAM, trace gravel (ML/CL) *(continued)*			18 / 25 / 17	2.9 S	14
		-45			
Hard to Very Hard Gray, Moist SILTY CLAY, trace gravel (CL/ML)	558.99		11 / 13 / 18	8.8 B	23
		-50			
			8 / 12 / 17	5.0 S	14
		-55			
Extremely Dense Gray, Moist SILTY LOAM, with gravel (ML)	548.99		35 / 35 / 50/5"		11
		-60			

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
WEATHERED LIMESTONE	546.49		50/1"		20
		-65			
Light Gray LIMESTONE, heavily weathered, moderately fractured, occasional vugs Run 1: 66' - 76' Recovery: 100% RQD: 88.5% (Good)	541.49				
		-70			
		-75			
Light Gray LIMESTONE, heavily weathered, lightly fractured, occasional vugs Run 2: 76' - 81' Recovery: 100% RQD: 78.5% (Good)	531.49				
		-80			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation

Division of Highways
GSG Consultants, Inc.

SOIL BORING LOG

Date 10/16/23

ROUTE FAI 290 DESCRIPTION Bridge Boring LOGGED BY DV

SECTION FAI 290 22 LOCATION , **SEC.** 16, **TWP.** 39N, **RNG.** 13E,
Latitude , Longitude

COUNTY Cook DRILLING RIG Diedrich D-50 HAMMER TYPE Auto
DRILLING METHOD HSA HAMMER EFF (%) 99.5

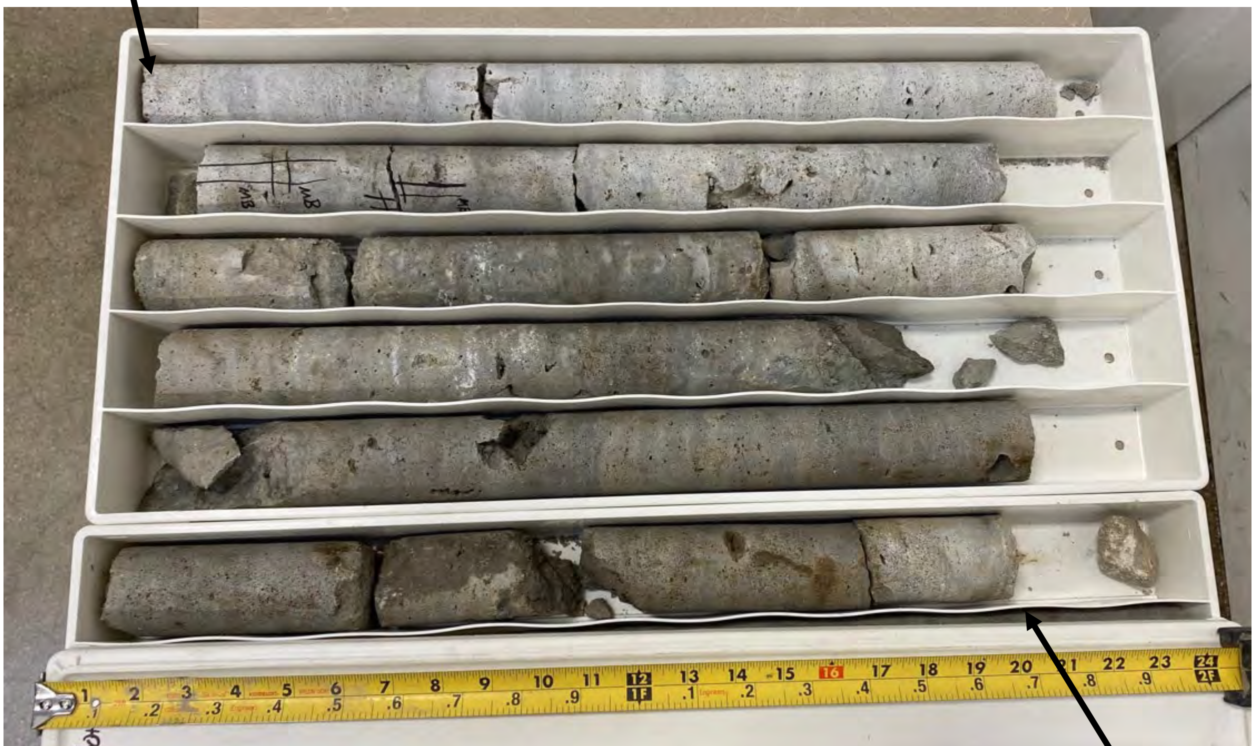
	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	
STRUCT. NO. SN 016-2064 Station N/A BORING NO. BSB-08 Station 1518+80.63 Offset 79.31ft RT Ground Surface Elev. 607.49 ft					Surface Water Elev. N/A ft Stream Bed Elev. N/A ft Groundwater Elev.: First Encounter None ft Upon Completion N/A ft After ___ Hrs. N/A ft
526.49					
End of Boring					
	-85				
	-90				
	-95				
	-100				

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Laramie Ave over I-290
Boring Number: BSB-08
Chicago, IL

Top

Depth = 66.0 ft
Elev. = 541.5 ft



Depth = 76.0 ft
Elev. = 531.5 ft

Bottom

Boring No.	Run	Depth (ft)	Recovery (%)	RQD (%)	RQD Classification	Compressive Strength (psi)	Description
BSB-08	1	66.0’ – 76.0’	100.0	88.5	Good	4,776	Light Gray Limestone Heavily Weathered, Moderately Fractured, Occasional Vugs

Laramie Ave over I-290
Boring Number: BSB-08
Chicago, IL

Top

Depth = 76.0 ft
Elev. = 531.5 ft

Depth = 81.0 ft
Elev. = 526.5 ft

Bottom

Boring No.	Run	Depth (ft)	Recovery (%)	RQD (%)	RQD Classification	Description
BSB-08	2	76.0' – 81.0'	100.0	78.5	Good	Light Gray Limestone Heavily Weathered, Lightly Fractured, Occasional Vugs

Illinois Department of Transportation
Division of Highways
GSG Consultants, Inc.

SOIL BORING LOG

Date 10/4/23

ROUTE FAI 290 **DESCRIPTION** Retaining Wall Boring **LOGGED BY** TS

SECTION FAI 290 22 **LOCATION** , **SEC.** 16, **TWP.** 39N, **RNG.** 13E,
Latitude , **Longitude**

COUNTY Cook **DRILLING RIG** Diedrich D-50 **HAMMER TYPE** Auto
DRILLING METHOD HSA **HAMMER EFF (%)** 95.5

STRUCT. NO. N/A
Station N/A

BORING NO. RWB-01
Station 460+89.79
Offset 32.75ft LT
Ground Surface Elev. 591.60 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter None ft
Upon Completion N/A ft
After ___ **Hrs.** N/A ft

Description	Elev. (ft)	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
7 inches of Asphalt	591.02				
4 inches of Concrete	590.68				
Brown, Moist FILL: SILTY CLAY, trace gravel			4 4 7	7.1 B	12
	588.10				
Hard Brown, Moist SILTY CLAY, trace gravel (CL/ML)		-5	6 9 11	6.7 S	13
			6 9 18	4.5 P	10
	583.10				
Dense Gray, Moist SILTY LOAM, trace gravel (ML)		-10	6 18 14		19
	580.60				
Hard Gray, Moist to Very Moist SILTY CLAY (CL)			4 7 9	6.0 B	19
		-15	6 8 12	4.8 B	23
			5 10 14	4.6 B	27
	573.10				
Hard Gray, Moist SILTY CLAY, with gravel (CL/ML)		-20	8 10 13	5.4 B	13
	570.60				
Dense to Extremely Dense Gray, Moist SILTY LOAM, with gravel (ML)			13 40 36		14
		-25	26 40 42		11
			18 19 24		13
	563.10				
Hard to Very Hard Gray, Moist SILTY CLAY, trace gravel (CL/ML)		-30	15 16 24	8.3 B	14
		-35	8 13 19	7.9 B	18
		-40	50/5"	8.1 B	24

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
GSG Consultants, Inc.

SOIL BORING LOG

Date 10/4/23

ROUTE FAI 290 **DESCRIPTION** Retaining Wall Boring **LOGGED BY** TS

SECTION FAI 290 22 **LOCATION** , **SEC.** 16, **TWP.** 39N, **RNG.** 13E, **Latitude** , **Longitude**

COUNTY Cook **DRILLING RIG** Diedrich D-50 **HAMMER TYPE** Auto
DRILLING METHOD HSA **HAMMER EFF (%)** 95.5

STRUCT. NO. N/A
Station N/A

BORING NO. RWB-01
Station 460+89.79
Offset 32.75ft LT
Ground Surface Elev. 591.60 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter None ft
Upon Completion N/A ft
After ____ **Hrs.** N/A ft

Description	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
550.10				
WEATHERED LIMESTONE				
548.60				
Auger Refusal at 43 feet End of Boring				
	-45			
	-50			
	-55			
	-60			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
GSG Consultants, Inc.

SOIL BORING LOG

Date 9/22/23

ROUTE FAI 290 **DESCRIPTION** Retaining Wall Boring **LOGGED BY** MA

SECTION FAI 290 22 **LOCATION** , **SEC.** 16, **TWP.** 39N, **RNG.** 13E, **Latitude** , **Longitude**

COUNTY Cook **DRILLING RIG** CME-75 **HAMMER TYPE** Auto
DRILLING METHOD HSA **HAMMER EFF (%)** 79.8

STRUCT. NO. N/A
Station N/A

BORING NO. RWB-02
Station 460+36.22
Offset 43.18ft LT
Ground Surface Elev. 594.76 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter None ft
Upon Completion N/A ft
After ______ **Hrs.** N/A ft

Description	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
10 inches of Asphalt				
593.93				
Gray, Moist FILL: SILTY CLAY, trace gravel		5		
593.26		7	4.5	13
Very Stiff to Hard Gray, Moist SILTY CLAY LOAM, trace gravel (ML/CL)		8	P	
		5		
		5	4.0	17
	-5	6	B	
		7		
		12	4.5	17
		9	P	
		3		
		6	4.2	19
	-10	7	B	
		3		
		7	5.2	20
		9	B	
581.26				
Very Stiff to Hard Gray, Moist SILTY CLAY, trace gravel (CL/ML)		3		
		7	5.0	21
	-15	9	B	
		4		
		7	3.5	17
		10	B	
		5		
		7	5.2	20
	-20	12	S	

Description	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Very Stiff to Hard Gray, Moist SILTY CLAY, trace gravel (CL/ML) *(continued)*		11		
Sand Seam at 21 feet		11	5.2	11
		11	S	
571.26				
Hard Gray, Moist SILTY CLAY LOAM, trace gravel (ML/CL)		8		
		27	4.5	14
	-25	50	P	
		17		
		25	5.4	11
		32	B	
566.26				
Dense Gray, Moist SANDY LOAM, trace gravel (SM)		14		
		15		13
	-30	24		
561.26				
Hard to Very Hard Gray, Moist SILTY CLAY (CL/ML)		6		
		10	5.6	9
	-35	16	B	
		9		
		11	4.3	22
	-40	15	P	

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation

Division of Highways
GSG Consultants, Inc.

SOIL BORING LOG

Date 9/22/23

ROUTE FAI 290 DESCRIPTION Retaining Wall Boring LOGGED BY MA

SECTION FAI 290 22 LOCATION , SEC. 16, TWP. 39N, RNG. 13E, Latitude , Longitude

COUNTY Cook DRILLING RIG CME-75 HAMMER TYPE Auto

DRILLING METHOD HSA HAMMER EFF (%) 79.8

STRUCT. NO. N/A
Station N/A

BORING NO. RWB-02
Station 460+36.22
Offset 43.18ft LT
Ground Surface Elev. 594.76 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter None ft
Upon Completion N/A ft
After ___ Hrs. N/A ft

Description	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Hard to Very Hard Gray, Moist SILTY CLAY (CL/ML) *(continued)*		50/1"		19
	-45			
546.26				
WEATHERED LIMESTONE		50/3"		
544.76	-50			
End of Boring				
	-55			
	-60			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation

Division of Highways
GSG Consultants, Inc.

SOIL BORING LOG

Date 9/21/23

ROUTE FAI 290 **DESCRIPTION** Retaining Wall Boring **LOGGED BY** DV

SECTION FAI 290 22 **LOCATION** , **SEC.** 16, **TWP.** 39N, **RNG.** 13E, **Latitude** , **Longitude**

COUNTY Cook **DRILLING RIG** CME-75 **HAMMER TYPE** Auto
DRILLING METHOD HSA **HAMMER EFF (%)** 79.8

STRUCT. NO. N/A
Station N/A

BORING NO. RWB-03
Station 459+87.37
Offset 37.32ft LT
Ground Surface Elev. 593.40 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter None ft
Upon Completion N/A ft
After ___ **Hrs.** N/A ft

Description	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
10 inches of Asphalt (592.57)				
Light Gray, Moist FILL: GRAVEL, with sand, trace asphalt (589.90)		9 19 7		6
Hard Gray, Moist SILTY CLAY LOAM, trace gravel (ML/CL)	-5	7 9 6	5.8 S	15
		5 5 8	5.4 B	17
(584.40)		4		
Hard Gray, Moist SILTY CLAY, trace gravel (CL-ML)	-10	5 6	4.8 B	17
		4 5 9	5.2 B	17
	-15	4 7 10	5.2 B	20
		5 7 12	6.3 B	22
	-20	3 6 7	4.4 B	23

Description	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Hard Gray, Moist SILTY CLAY, trace gravel (CL-ML) *(continued)*		5 10 16	5.4 S	13
	-25	13 27 42	4.4 S	16
		18 31 30	4.3 S	10
(564.90)		13		
Hard to Very Hard Gray, Moist SILTY CLAY, trace gravel (CL/ML) Sand Seam at 29 feet	-30	18 20	10.0 S	12
	-35	9 12 23	9.4 B	19
	-40	6 11 13		22

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
GSG Consultants, Inc.

SOIL BORING LOG

Date 9/21/23

ROUTE FAI 290 DESCRIPTION Retaining Wall Boring LOGGED BY DV

SECTION FAI 290 22 LOCATION , SEC. 16, TWP. 39N, RNG. 13E, Latitude , Longitude

COUNTY Cook DRILLING RIG CME-75 HAMMER TYPE Auto
DRILLING METHOD HSA HAMMER EFF (%) 79.8

STRUCT. NO. N/A
Station N/A

BORING NO. RWB-03
Station 459+87.37
Offset 37.32ft LT
Ground Surface Elev. 593.40 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter None ft
Upon Completion N/A ft
After ___ Hrs. N/A ft

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Hard to Very Hard Gray, Moist SILTY CLAY, trace gravel (CL/ML) *(continued)*	549.90				
WEATHERED LIMESTONE		-45	5 28 47	4.0 S	19
			50/1"		25
	543.40	-50			
End of Boring		-55			
		-60			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
GSG Consultants, Inc.

SOIL BORING LOG

Date 9/21/23

ROUTE FAI 290 **DESCRIPTION** Retaining Wall Boring **LOGGED BY** DV

SECTION FAI 290 22 **LOCATION** , **SEC.** 16, **TWP.** 39N, **RNG.** 13E, **Latitude** , **Longitude**

COUNTY Cook **DRILLING RIG** CME-75 **HAMMER TYPE** Auto
DRILLING METHOD HSA **HAMMER EFF (%)** 79.8

STRUCT. NO. N/A
Station N/A

BORING NO. RWB-04
Station 459+35.80
Offset 44.28ft LT
Ground Surface Elev. 595.83 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter None ft
Upon Completion N/A ft
After ___ **Hrs.** N/A ft

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
10 inches of Asphalt	595.00				
Light Gray, Dry FILL: GRAVEL, with sand, trace asphalt	593.83		8 5 7		4
Very Stiff to Hard Gray, Moist SILTY CLAY LOAM, trace gravel (ML/CL)					
Sand Seam at 4 feet		-5	6 8 9	3.1 B	11
			5 7 7	5.2 B	14
		-10	8 12 11	5.0 S	14
	582.33		9 11 20	2.9 S	15
Hard Gray, Moist SILTY CLAY, trace gravel (CL/ML)		-15	6 7 11	4.8 B	14
			4 7 12	5.1 B	22
		-20	4 6 10	5.6 B	23
Hard Gray, Moist SILTY CLAY, trace gravel (CL/ML) *(continued)*			4 6 18	4.2 B	13
	572.33				
Very Stiff to Very Hard Gray, Moist SILTY CLAY LOAM, trace gravel (ML/CL)		-25	11 14 36	8.1 B	13
			38 38 36	3.3 S	11
		-30	27 22 18	2.9 S	12
	562.33				
Hard to Very Hard Gray, Moist to Very Moist SILTY CLAY, trace gravel (CL/ML)		-35	10 12 16	8.3 B	15
		-40	8 19 16	4.4 B	25

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
GSG Consultants, Inc.

SOIL BORING LOG

Date 9/21/23

ROUTE FAI 290 **DESCRIPTION** Retaining Wall Boring **LOGGED BY** DV

SECTION FAI 290 22 **LOCATION** , **SEC.** 16, **TWP.** 39N, **RNG.** 13E, **Latitude** , **Longitude**

COUNTY Cook **DRILLING RIG** CME-75 **HAMMER TYPE** Auto
DRILLING METHOD HSA **HAMMER EFF (%)** 79.8

STRUCT. NO. N/A
Station N/A

BORING NO. RWB-04
Station 459+35.80
Offset 44.28ft LT
Ground Surface Elev. 595.83 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter None ft
Upon Completion N/A ft
After ___ **Hrs.** N/A ft

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Hard to Very Hard Gray, Moist to Very Moist SILTY CLAY, trace gravel (CL/ML) *(continued)*	552.33				
WEATHERED LIMESTONE			50/1"		23
		-45			
			50/3"		6
	545.83	-50			
End of Boring					
		-55			
		-60			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
GSG Consultants, Inc.

SOIL BORING LOG

Date 9/20/23

ROUTE FAI 290 **DESCRIPTION** Retaining Wall Boring **LOGGED BY** DV

SECTION FAI 290 22 **LOCATION** , **SEC.** 16, **TWP.** 39N, **RNG.** 13E, **Latitude** , **Longitude**

COUNTY Cook **DRILLING RIG** CME-75 **DRILLING METHOD** HSA **HAMMER TYPE** Auto **HAMMER EFF (%)** 79.8

STRUCT. NO. N/A
Station N/A

BORING NO. RWB-05
Station 461+97.71
Offset 32.84ft LT
Ground Surface Elev. 590.83 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter None ft
Upon Completion N/A ft
After ____ **Hrs.** N/A ft

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
12 inches of Asphalt	589.83				
Light Gray, Moist FILL: GRAVEL, with sand	588.83		13 26 11	1.5 P	22
Stiff to Very Hard Gray, Moist SILTY CLAY, trace gravel (CL/ML)		-5	5 5 9	4.0 B	19
Sand Seam at 6.5 feet			6 12 10	5.2 B	15
		-10	4 6 10	5.4 B	21
			5 8 9	5.5 B	13
		-15	4 7 13	8.5 B	22
			5 6 12	3.8 B	22
	572.33	-20	7 11 14	6.0 B	14

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Hard to Very Hard Gray, Moist SILTY CLAY LOAM, trace gravel (ML/CL) *(continued)*			20 34 50/4"	7.5 S	14
		-25	25 21 36	10.8 B	10
			13 17 20	10.8 B	13
		-30	10 17 21	10.4 B	14
	557.33				
Hard Gray, Moist SILTY CLAY, trace gravel (CL/ML)		-35	10 14 17	6.5 B	15
Push Rock at 48.5 feet		-40	50/1"	4.5 P	19

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
GSG Consultants, Inc.

SOIL BORING LOG

Date 9/20/23

ROUTE FAI 290 DESCRIPTION Retaining Wall Boring LOGGED BY DV

SECTION FAI 290 22 LOCATION , SEC. 16, TWP. 39N, RNG. 13E, Latitude , Longitude

COUNTY Cook DRILLING RIG CME-75 HAMMER TYPE Auto
DRILLING METHOD HSA HAMMER EFF (%) 79.8

STRUCT. NO. N/A
Station N/A

BORING NO. RWB-05
Station 461+97.71
Offset 32.84ft LT
Ground Surface Elev. 590.83 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter None ft
Upon Completion N/A ft
After ___ Hrs. N/A ft

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Hard Gray, Moist SILTY CLAY, trace gravel (CL/ML) *(continued)*	547.33				
Hard Gray, Moist SILTY CLAY LOAM, with gravel (ML/CL)		-45	35 46 50/3	4.0 S	13
			50/1"		
	540.83	-50			
End of Boring		-55 -60			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
GSG Consultants, Inc.

SOIL BORING LOG

Date 9/20/23

ROUTE FAI 290 **DESCRIPTION** Retaining Wall Boring **LOGGED BY** DV

SECTION FAI 290 22 **LOCATION** , **SEC.** 16, **TWP.** 39N, **RNG.** 13E, **Latitude** , **Longitude**

COUNTY Cook **DRILLING RIG** CME-75 **DRILLING METHOD** HSA **HAMMER TYPE** Auto **HAMMER EFF (%)** 79.8

STRUCT. NO. N/A
Station N/A

BORING NO. RWB-06
Station 462+26.45
Offset 36.24ft LT
Ground Surface Elev. 588.35 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter None ft
Upon Completion N/A ft
After ___ **Hrs.** N/A ft

Description	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
12 inches of Asphalt				
587.35				
Gray and Brown, Dry FILL: GRAVEL, with sand, trace debris		7 6 5		3
584.85				
Hard to Very Hard Gray, Moist SILTY CLAY, trace gravel, sand (CL/ML)	-5	8 8 8	6.0 B	13
		8 12 18	8.1 S	11
	-10	8 10 9	7.3 S	12
		8 10 9	7.9 B	16
	-15	5 8 12	7.7 B	20
		6 9 11	6.9 B	21
569.85				
	-20	8 12 11	6.9 S	17

Description	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Very Stiff to Very Hard Gray, Moist SILTY CLAY LOAM, trace gravel (ML/CL) *(continued)*		12 36 50/5"	4.0 S	13
	-25	24 26 25	7.3 S	13
		15 19 22	10.8 B	13
	-30	10 13 17	10.4 B	16
554.85				
Very Stiff to Hard Gray, Moist SILTY CLAY, trace gravel (CL)	-35	9 13 24	9.3 B	19
	-40	29 50/5"	2.9 S	12

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
GSG Consultants, Inc.

SOIL BORING LOG

Date 9/20/23

ROUTE FAI 290 **DESCRIPTION** Retaining Wall Boring **LOGGED BY** DV

SECTION FAI 290 22 **LOCATION** , **SEC.** 16, **TWP.** 39N, **RNG.** 13E, **Latitude** , **Longitude**

COUNTY Cook **DRILLING RIG** CME-75 **HAMMER TYPE** Auto
DRILLING METHOD HSA **HAMMER EFF (%)** 79.8

STRUCT. NO. N/A
Station N/A

BORING NO. RWB-06
Station 462+26.45
Offset 36.24ft LT
Ground Surface Elev. 588.35 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter None ft
Upon Completion N/A ft
After ___ **Hrs.** N/A ft

Description	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Very Stiff to Hard Gray, Moist SILTY CLAY, trace gravel (CL) *(continued)*				
544.85				
WEATHERED LIMESTONE		50/4"		17
	-45			
		50/2"		
538.35	-50			
End of Boring				
	-55			
	-60			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
GSG Consultants, Inc.

SOIL BORING LOG

Date 9/22/23

ROUTE FAI 290 DESCRIPTION Retaining Wall Boring LOGGED BY MA

SECTION FAI 290 22 LOCATION , SEC. 16, TWP. 39N, RNG. 13E, Latitude , Longitude

COUNTY Cook DRILLING RIG CME-75 HAMMER TYPE Auto
DRILLING METHOD HSA HAMMER EFF (%) 79.8

STRUCT. NO. N/A
Station N/A

BORING NO. RWB-07
Station 462+80.25
Offset 36.68ft LT
Ground Surface Elev. 588.64 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter None ft
Upon Completion N/A ft
After ___ Hrs. N/A ft

Description	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
10 inches of Asphalt 587.81				
Stiff to Hard Gray, Moist SILTY CLAY LOAM, trace gravel, sand (ML/CL)		6 4 7	4.0 P	16
	-5	5 7 8	4.5 P	14
		10 17 22	3.3 P	15
	-10	11 16 16	3.8 P	15
		7 10 17	2.9 S	18
	-15	14 16 16	4.3 P	12
		5 7 10	2.9 B	15
	-20	5 8 15	3.5 B	13

Description	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Stiff to Hard Gray, Moist SILTY CLAY LOAM, trace gravel, sand (ML/CL) *(continued)*		11 15 15	3.1 S	12
	-25	15 37 50/6"		11
		18 22 25		NR
560.14				
Hard Gray, Moist SILTY CLAY, with gravel (CL/ML)	-30	15 21 23		20
Push Rock at 33.5 feet	-35	14 17 26		23
550.14				
	-40	10 50/5"	5.2 B	19

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
GSG Consultants, Inc.

SOIL BORING LOG

Date 9/22/23

ROUTE FAI 290	**DESCRIPTION** Retaining Wall Boring			**LOGGED BY** MA	
SECTION FAI 290 22	**LOCATION** , **SEC.** 16, **TWP.** 39N, **RNG.** 13E, **Latitude** , **Longitude**				
COUNTY Cook	**DRILLING RIG** CME-75			**HAMMER TYPE** Auto	
	DRILLING METHOD HSA			**HAMMER EFF (%)** 79.8	

STRUCT. NO. N/A
Station N/A

BORING NO. RWB-07
Station 462+80.25
Offset 36.68ft LT
Ground Surface Elev. 588.64 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter None ft
Upon Completion N/A ft
After ___ **Hrs.** N/A ft

Description	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Hard Gray, Moist SILTY CLAY LOAM, trace gravel (ML/CL) *(continued)*				
545.14				
WEATHERED LIMESTONE		50/3"		
				6
	-45			
		50/1"		
				16
538.64	-50			
End of Boring				
	-55			
	-60			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
GSG Consultants, Inc.

SOIL BORING LOG

Date 9/20/23

ROUTE FAI 290 **DESCRIPTION** Retaining Wall Boring **LOGGED BY** AA

SECTION FAI 290 22 **LOCATION** , **SEC.** 16, **TWP.** 39N, **RNG.** 13E,
Latitude , **Longitude**

COUNTY Cook **DRILLING RIG** Diedrich D-50 **HAMMER TYPE** Auto
DRILLING METHOD HSA **HAMMER EFF (%)** 99.5

STRUCT. NO. N/A
Station N/A

BORING NO. RWB-08
Station 463+34.30
Offset 39.01ft LT
Ground Surface Elev. 591.78 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter None ft
Upon Completion N/A ft
After ___ **Hrs.** N/A ft

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
2 inches of Asphalt	591.62				
10 inches of Aggregate Base	590.78				
Gray, Moist FILL: SILTY CLAY LOAM, trace gravel			5, 5, 6	4.5 P	18
	588.28				
Hard Gray, Moist SILTY CLAY LOAM, trace gravel (ML/CL)		-5	4, 5, 6	5.2 B	20
	585.78				
Medium Dense Gray, Moist SILTY LOAM, trace gravel (ML)			5, 11, 9		16
	583.28				
Very Stiff to Hard Gray, Moist SILTY CLAY, trace gravel (CL)		-10	4, 4, 6	4.2 B	20
			5, 7, 12	4.6 B	20
		-15	6, 8, 13	3.5 B	20
			6, 7, 12	5.0 B	21
		-20	6, 9, 14	5.2 B	20
Very Stiff to Hard Gray, Moist SILTY CLAY, trace gravel (CL) *(continued)*			23, 50/3"	4.0 P	17
	568.28				
Dense to Very Dense Gray, Moist SILTY LOAM, trace gravel (ML)		-25	26, 27, 27		12
			23, 23, 22		14
	563.28				
Hard to Very Hard Gray, Moist SILTY CLAY, trace gravel (CL/ML)		-30	11, 18, 23	9.4 B	14
		-35	8, 13, 20	7.3 B	20
	553.28				
Very Dense Gray, Wet SANDY LOAM, trace gravel (SM)		-40	10, 26, 38		20

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
GSG Consultants, Inc.

SOIL BORING LOG

Date 9/20/23

ROUTE FAI 290 **DESCRIPTION** Retaining Wall Boring **LOGGED BY** AA

SECTION FAI 290 22 **LOCATION** , **SEC.** 16, **TWP.** 39N, **RNG.** 13E,
Latitude , **Longitude**

COUNTY Cook **DRILLING RIG** Diedrich D-50 **HAMMER TYPE** Auto
DRILLING METHOD HSA **HAMMER EFF (%)** 99.5

STRUCT. NO. N/A
Station N/A

BORING NO. RWB-08
Station 463+34.30
Offset 39.01ft LT
Ground Surface Elev. 591.78 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter None ft
Upon Completion N/A ft
After ____ **Hrs.** N/A ft

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Cobbles at 39.5 feet Very Dense Gray, Wet SANDY LOAM, trace gravel (SM) *(continued)*	548.28				
Hard Gray, Moist SILTY CLAY, with gravel (CL/ML)	547.78		50/4"	4.5 P	15
WEATHERED LIMESTONE	544.78	-45			
End of Boring		-50			
		-55			
		-60			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, form 137 (Rev. 8-99)

Illinois Department of Transportation
Division of Highways
GSG Consultants, Inc.

SOIL BORING LOG

Date 9/25/23

ROUTE FAI 290 **DESCRIPTION** Retaining Wall Boring **LOGGED BY** DV

SECTION FAI 290 22 **LOCATION** , **SEC.** 16, **TWP.** 39N, **RNG.** 13E, **Latitude** , **Longitude**

COUNTY Cook **DRILLING RIG** CME-75 **DRILLING METHOD** HSA **HAMMER TYPE** Auto **HAMMER EFF (%)** 79.8

STRUCT. NO. N/A
Station N/A

BORING NO. RWB-09
Station 460+69.27
Offset 31.09ft RT
Ground Surface Elev. 591.73 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter 583.7 ft ▼
Upon Completion N/A ft
After ___ **Hrs.** N/A ft

Description	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
10 inches of Asphalt				
590.90				
Medium Dense Gray, Wet SAND, trace gravel (SP)		10		
		10		19
		9		
		6		
		8		22
	-5	6		
585.23		1		
Very Stiff to Hard Gray, Moist SILTY CLAY, trace gravel (CL/ML)		3	4.2	16
		4	B	
▼				
		4		
		7	4.6	18
	-10	10	B	
		4		
		7	4.6	21
		11	B	
		4		
		6	2.9	22
	-15	10	B	
		4		
		8	5.2	21
		12	B	
573.23		8		
Hard to Very Hard Gray, Moist SILTY CLAY LOAM, trace gravel (ML/CL)		9	6.0	20
	-20	13	S	

Description	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Hard to Very Hard Gray, Moist SILTY CLAY LOAM, trace gravel (ML/CL) *(continued)*		12		
		11	10.8	12
		16	B	
		18		
567.23		29		11
Dense Gray, Moist SAND, trace gravel (SP)	-25	36		
565.73		13		
Very Hard Gray, Moist SILTY CLAY LOAM, trace gravel (ML/CL)		20	10.8	12
564.73		28	B	
Very Dense Gray, Moist SILTY LOAM, trace gravel, sand (ML)		25		
		29		12
	-30	33		
558.23		15		
Hard to Very Hard Gray, Moist SILTY CLAY, trace gravel (CL)		19	10.8	15
	-35	32	B	
		11		
		10	5.2	12
	-40	14	B	

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, form 137 (Rev. 8-99)

Illinois Department of Transportation
Division of Highways
GSG Consultants, Inc.

SOIL BORING LOG

Date 9/25/23

ROUTE FAI 290 **DESCRIPTION** Retaining Wall Boring **LOGGED BY** DV

SECTION FAI 290 22 **LOCATION** , **SEC.** 16, **TWP.** 39N, **RNG.** 13E, **Latitude** , **Longitude**

COUNTY Cook **DRILLING RIG** CME-75 **HAMMER TYPE** Auto
DRILLING METHOD HSA **HAMMER EFF (%)** 79.8

STRUCT. NO. N/A
Station N/A

BORING NO. RWB-09
Station 460+69.27
Offset 31.09ft RT
Ground Surface Elev. 591.73 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter 583.7 ft ▼
Upon Completion N/A ft
After ___ **Hrs.** N/A ft

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Hard to Very Hard Gray, Moist SILTY CLAY, trace gravel (CL) *(continued)*	548.23				
Extremely Dense Gray, Moist SILTY LOAM, with gravel (ML)			42		
			50/5"		10
	546.23	-45			
WEATHERED LIMESTONE	545.23				
End of Boring		-50			
		-55			
		-60			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
GSG Consultants, Inc.

SOIL BORING LOG

Date 9/25/23

ROUTE FAI 290 **DESCRIPTION** Retaining Wall Boring **LOGGED BY** DV

SECTION FAI 290 22 **LOCATION** , **SEC.** 16, **TWP.** 39N, **RNG.** 13E,
Latitude , **Longitude**

COUNTY Cook **DRILLING RIG** CME-75 **HAMMER TYPE** Auto
DRILLING METHOD HSA **HAMMER EFF (%)** 79.8

STRUCT. NO. N/A
Station N/A

BORING NO. RWB-10
Station 460+24.94
Offset 32.68ft RT
Ground Surface Elev. 592.05 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter None ft
Upon Completion N/A ft
After ______ **Hrs.** N/A ft

Description	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
10 inches of Asphalt				
591.22				
Light Gray, Moist FILL: SAND, with gravel		8 5 5		13
589.55				
Very Stiff to Hard Gray, Moist to Very Moist SILTY CLAY, trace gravel (CL/ML)	-5	5 5 6	3.5 B	21
		4 6 9	4.6 B	20
	-10	5 7 11	4.8 B	20
		5 7 8	5.5 B	17
	-15	5 8 8	6.7 B	17
		4 8 9	5.4 B	19
	-20	4 7 10	3.5 B	26

Description	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Very Stiff to Hard Gray, Moist to Very Moist SILTY CLAY, trace gravel (CL/ML) *(continued)*		15 9 14	6.3 S	13
568.55				
Dense Gray, Moist SILTY LOAM, trace gravel, sand (ML)	-25	29 27 22		16
566.05				
Hard to Very Hard Gray, Moist SILTY CLAY, trace gravel (CL/ML)		11 14 19	10.8 B	14
	-30	10 15 24	10.4 S	14
	-35	11 17 20	10.8 B	18
	-40	10 13 17	7.3 B	23

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation

Division of Highways
GSG Consultants, Inc.

SOIL BORING LOG

Date 9/25/23

ROUTE FAI 290 **DESCRIPTION** Retaining Wall Boring **LOGGED BY** DV

SECTION FAI 290 22 **LOCATION** , **SEC.** 16, **TWP.** 39N, **RNG.** 13E, **Latitude** , **Longitude**

COUNTY Cook **DRILLING RIG** CME-75 **HAMMER TYPE** Auto

DRILLING METHOD HSA **HAMMER EFF (%)** 79.8

STRUCT. NO. N/A
Station N/A

BORING NO. RWB-10
Station 460+24.94
Offset 32.68ft RT
Ground Surface Elev. 592.05 **ft**

Surface Water Elev. N/A **ft**
Stream Bed Elev. N/A **ft**

Groundwater Elev.:
First Encounter None **ft**
Upon Completion N/A **ft**
After ____ **Hrs.** N/A **ft**

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Hard to Very Hard Gray, Moist SILTY CLAY, trace gravel (CL/ML) *(continued)*	548.05		50/1"		
WEATHERED LIMESTONE		-45			21
	546.05				
End of Boring		-50			
		-55			
		-60			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
GSG Consultants, Inc.

SOIL BORING LOG

Date 9/25/23

ROUTE FAI 290 **DESCRIPTION** Retaining Wall Boring **LOGGED BY** TS

SECTION FAI 290 22 **LOCATION** , **SEC.** 16, **TWP.** 39N, **RNG.** 13E, **Latitude** , **Longitude**

COUNTY Cook **DRILLING RIG** Mobile B-57 **HAMMER TYPE** Auto
DRILLING METHOD HSA **HAMMER EFF (%)** 89.0

STRUCT. NO. N/A
Station N/A

BORING NO. RWB-11
Station 459+73.29
Offset 31.30ft RT
Ground Surface Elev. 592.89 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter None ft
Upon Completion N/A ft
After ___ **Hrs.** N/A ft

Description	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
12 inches of Asphalt				
591.89				
Light Gray, Moist FILL: SILTY CLAY, with gravel 590.89		4 5 5	7.7 B	18
Very Stiff Gray, Moist SILTY CLAY, trace gravel (CL)	-5	2 4 4	2.7 B	19
		2 3 5	3.5 B	20
583.89				
Medium Dense Gray, Moist SILTY LOAM, trace gravel (ML)	-10	2 7 9		16
581.89				
Very Stiff to Very Hard Gray, Moist SILTY CLAY, trace gravel (CL/ML)		6 5 7	6.5 S	18
	-15	3 7 9	4.2 B	18
		4 6 10	4.2 B	14
	-20	10 12 8	2.8 S	16

Description	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Very Stiff to Very Hard Gray, Moist SILTY CLAY, trace gravel (CL/ML) *(continued)*		5 7 9	5.6 B	12
	-25	9 14 13	4.5 P	16
		9 18 20	7.9 S	13
	-30	10 17 22	8.8 B	14
	-35	8 14 22	8.3 B	17
	-40	5 10 14	5.4 B	22

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
GSG Consultants, Inc.

SOIL BORING LOG

Date 9/25/23

ROUTE FAI 290 DESCRIPTION Retaining Wall Boring LOGGED BY TS

SECTION FAI 290 22 LOCATION , SEC. 16, TWP. 39N, RNG. 13E, Latitude , Longitude

COUNTY Cook DRILLING RIG Mobile B-57 HAMMER TYPE Auto
DRILLING METHOD HSA HAMMER EFF (%) 89.0

STRUCT. NO. N/A
Station N/A

BORING NO. RWB-11
Station 459+73.29
Offset 31.30ft RT
Ground Surface Elev. 592.89 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter None ft
Upon Completion N/A ft
After ___ Hrs. N/A ft

Description	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
551.39				
WEATHERED LIMESTONE				
549.89				
End of Boring				
	-45			
	-50			
	-55			
	-60			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, form 137 (Rev. 8-99)

Illinois Department of Transportation

Division of Highways
GSG Consultants, Inc.

SOIL BORING LOG

Date 9/25/23

ROUTE FAI 290 **DESCRIPTION** Retaining Wall Boring **LOGGED BY** TS

SECTION FAI 290 22 **LOCATION** , **SEC.** 16, **TWP.** 39N, **RNG.** 13E, **Latitude** , **Longitude**

COUNTY Cook **DRILLING RIG** Mobile B-57 **HAMMER TYPE** Auto

DRILLING METHOD HSA **HAMMER EFF (%)** 89.0

STRUCT. NO. N/A
Station N/A

BORING NO. RWB-12
Station 459+24.61
Offset 31.48ft RT
Ground Surface Elev. 593.80 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter None ft
Upon Completion N/A ft
After ___ **Hrs.** N/A ft

Description	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
12 inches of Asphalt				
592.80				
Very Stiff to Hard Gray, Moist to Very Moist SILTY CLAY, trace gravel (CL/ML)		3 4 5	6.7 B	15
	-5	5 4 5	4.2 B	15
		3 3 4	2.1 S	23
	-10	2 4 5	3.1 B	19
		2 5 7	4.7 B	17
	-15	3 6 9	4.6 B	21
				19
		3 8 11	4.6 B	
	-20	4 7 11	4.8 B	23

Description	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Very Stiff to Hard Gray, Moist to Very Moist SILTY CLAY, trace gravel (CL/ML) *(continued)*		6 7 15	5.8 S	24
	-25	7 13 15	5.8 B	14
		19 15 20	2.7 S	15
	-30	9 12 19	7.1 B	14
	-35	6 9 13	6.7 B	16
	-40	5 8 10	4.8 B	26

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
GSG Consultants, Inc.

SOIL BORING LOG

Date 9/25/23

ROUTE FAI 290 DESCRIPTION Retaining Wall Boring LOGGED BY TS

SECTION FAI 290 22 LOCATION , SEC. 16, TWP. 39N, RNG. 13E, Latitude , Longitude

COUNTY Cook DRILLING RIG Mobile B-57 HAMMER TYPE Auto
DRILLING METHOD HSA HAMMER EFF (%) 89.0

STRUCT. NO. N/A
Station N/A

BORING NO. RWB-12
Station 459+24.61
Offset 31.48ft RT
Ground Surface Elev. 593.80 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter None ft
Upon Completion N/A ft
After ____ Hrs. N/A ft

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Very Stiff to Hard Gray, Moist to Very Moist SILTY CLAY, trace gravel (CL/ML) *(continued)*					
	549.80		38		
WEATHERED LIMESTONE			50/6"		10
		-45			
	547.30				
End of Boring					
		-50			
		-55			
		-60			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
GSG Consultants, Inc.

SOIL BORING LOG

Date 9/26/23

ROUTE FAI 290 **DESCRIPTION** Retaining Wall Boring **LOGGED BY** TS

SECTION FAI 290 22 **LOCATION** , **SEC.** 16, **TWP.** 39N, **RNG.** 13E, **Latitude** , **Longitude**

COUNTY Cook **DRILLING RIG** Mobile B-57 **HAMMER TYPE** Auto
DRILLING METHOD HSA **HAMMER EFF (%)** 89.0

STRUCT. NO. N/A
Station N/A

BORING NO. RWB-13
Station 462+2.37
Offset 33.98ft RT
Ground Surface Elev. 591.81 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter None ft
Upon Completion N/A ft
After ____ **Hrs.** N/A ft

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
12 inches of Asphalt	590.81				
Gray and Brown, Moist FILL: SAND, with gravel	590.31		6 5 7	2.3 P	10
Stiff to Very Stiff Gray, Moist SILTY CLAY, trace gravel (CL/ML)			1 2 3	1.3 B	18
		-5			
			2 3 6	3.5 B	17
	583.31				
Medium Dense Gray, Wet SAND, trace gravel (SP)	582.31		4 5 12	6.3 B	15
Very Stiff to Hard Gray, Moist SILTY CLAY, trace gravel (CL/ML)		-10			
			10 7 10	4.8 B	15
			5 6 9	4.6 B	18
		-15			
			4 11 10	3.1 S	22
			8 9 10	6.0 S	15
		-20			

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Very Stiff to Hard Gray, Moist SILTY CLAY, trace gravel (CL/ML) *(continued)*			5 10 32	5.8 S	14
	568.31				
Dense to Extremely Dense Gray, Moist SILTY LOAM, trace gravel (ML)			33 50/5"		10
		-25			
			16 18 19		14
	564.81				
Dense Gray, Moist SANDY LOAM, trace gravel (SM)	563.31				
Hard Gray, Moist to Very Moist SILTY CLAY, trace gravel (CL/ML)			13 15 18	6.8 S	15
		-30			
			9 12 16	6.5 B	16
		-35			
			7 9 13	5.8 B	24
		-40			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
GSG Consultants, Inc.

SOIL BORING LOG

Date 9/26/23

ROUTE FAI 290 **DESCRIPTION** Retaining Wall Boring **LOGGED BY** TS

SECTION FAI 290 22 **LOCATION** , **SEC.** 16, **TWP.** 39N, **RNG.** 13E, **Latitude** , **Longitude**

COUNTY Cook **DRILLING RIG** Mobile B-57 **HAMMER TYPE** Auto
DRILLING METHOD HSA **HAMMER EFF (%)** 89.0

STRUCT. NO. N/A
Station N/A

BORING NO. RWB-13
Station 462+2.37
Offset 33.98ft RT
Ground Surface Elev. 591.81 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter None ft
Upon Completion N/A ft
After ___ **Hrs.** N/A ft

Description	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Hard Gray, Moist to Very Moist SILTY CLAY, trace gravel (CL/ML) *(continued)* 549.81				
WEATHERED LIMESTONE 548.31				
End of Boring	-45			
	-50			
	-55			
	-60			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
GSG Consultants, Inc.

SOIL BORING LOG

Date 9/26/23

ROUTE FAI 290 **DESCRIPTION** Retaining Wall Boring **LOGGED BY** TS

SECTION FAI 290 22 **LOCATION** , **SEC.** 16, **TWP.** 39N, **RNG.** 13E, **Latitude** , **Longitude**

COUNTY Cook **DRILLING RIG** Mobile B-57 **HAMMER TYPE** Auto
DRILLING METHOD HSA **HAMMER EFF (%)** 89.0

STRUCT. NO. N/A
Station N/A

BORING NO. RWB-14
Station 462+14.60
Offset 32.63ft RT
Ground Surface Elev. 590.90 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter None ft
Upon Completion N/A ft
After ___ **Hrs.** N/A ft

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
12 inches of Asphalt 6 Inches of Aggregate Base	589.90				
	589.40		6		
Gray, Moist FILL: SILTY CLAY, with gravel			4 1	4.5 P	16
	587.40				
Very Stiff to Hard Gray, Dry to Moist SILTY CLAY, trace gravel (CL)		-5	3 4 3	3.0 P	4
			3 4 6	5.0 B	17
		-10	2 5 5	5.2 B	18
			4 6 7	3.1 B	18
		-15	5 6 12	4.2 B	22
			4 6 8	4.4 B	22
		-20	6 7 10	4.2 B	22

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
	569.90				
Hard Gray, Moist SILTY CLAY, with gravel (CL/ML)			6 10 25	7.3 B	13
	567.40				
Very Dense to Extremely Dense Gray, Moist SILTY LOAM, trace gravel (ML)		-25	31 40 44		13
			15 17 50/4"		13
	562.40				
Hard to Very Hard Gray, Moist to Wet SILTY CLAY, with gravel (CL/ML)		-30	11 13 18	7.5 B	14
		-35	8 14 17	9.2 B	18
		-40	13 12 19	4.6 S	13

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, form 137 (Rev. 8-99)

Illinois Department of Transportation
Division of Highways
GSG Consultants, Inc.

SOIL BORING LOG

Date 9/26/23

ROUTE FAI 290 **DESCRIPTION** Retaining Wall Boring **LOGGED BY** TS

SECTION FAI 290 22 **LOCATION** , **SEC.** 16, **TWP.** 39N, **RNG.** 13E, **Latitude** , **Longitude**

COUNTY Cook **DRILLING RIG** Mobile B-57 **HAMMER TYPE** Auto
DRILLING METHOD HSA **HAMMER EFF (%)** 89.0

STRUCT. NO. N/A
Station N/A

BORING NO. RWB-14
Station 462+14.60
Offset 32.63ft RT
Ground Surface Elev. 590.90 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter None ft
Upon Completion N/A ft
After ____ **Hrs.** N/A ft

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Hard to Very Hard Gray, Moist to Wet SILTY CLAY, with gravel (CL/ML) *(continued)*	547.40				
WEATHERED LIMESTONE	546.90		50/1"		
End of Boring		-45			
		-50			
		-55			
		-60			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
GSG Consultants, Inc.

SOIL BORING LOG

Date 9/26/23

ROUTE FAI 290 **DESCRIPTION** Retaining Wall Boring **LOGGED BY** DV

SECTION FAI 290 22 **LOCATION** , **SEC.** 16, **TWP.** 39N, **RNG.** 13E, **Latitude** , **Longitude**

COUNTY Cook **DRILLING RIG** CME-75 **HAMMER TYPE** Auto
DRILLING METHOD HSA **HAMMER EFF (%)** 79.8

STRUCT. NO. N/A
Station N/A

BORING NO. RWB-15
Station 462+29.77
Offset 29.77ft RT
Ground Surface Elev. 591.14 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter None ft
Upon Completion N/A ft
After ____ **Hrs.** N/A ft

Description	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
10 inches of Asphalt 590.31				
Light Gray, Wet FILL: SILTY SAND, with gravel 589.14		5 3 4	4.0 B	16
Very Stiff to Hard Gray, Moist to Very Moist SILTY CLAY, trace gravel (CL/ML)	-5	4 6 7	6.7 B	16
		5 5 8	2.7 B	22
	-10	3 5 8	3.0 B	30
580.14 Very Stiff to Very Hard Gray, Moist SILTY CLAY LOAM, trace gravel (ML/CL)		4 8 11	4.4 S	20
	-15	5 8 11	9.2 B	22
		4 6 14	5.4 B	25
	-20	6 9 14	7.3 B	18

Description	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Very Stiff to Very Hard Gray, Moist SILTY CLAY LOAM, trace gravel (ML/CL) *(continued)*		14 12 12	10.6 B	15
	-25	21 50/6"	3.3 S	17
		33 44 34	2.9 S	13
	-30	17 21 31	10.2 B	12
	-35	11 14 18	10.4 B	16
	-40	8 12 15	7.3 B	22

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
GSG Consultants, Inc.

SOIL BORING LOG

Date 9/26/23

ROUTE FAI 290 **DESCRIPTION** Retaining Wall Boring **LOGGED BY** DV

SECTION FAI 290 22 **LOCATION** , **SEC.** 16, **TWP.** 39N, **RNG.** 13E,
Latitude , **Longitude**

COUNTY Cook **DRILLING RIG** CME-75 **HAMMER TYPE** Auto
DRILLING METHOD HSA **HAMMER EFF (%)** 79.8

STRUCT. NO. N/A
Station N/A

BORING NO. RWB-15
Station 462+29.77
Offset 29.77ft RT
Ground Surface Elev. 591.14 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter None ft
Upon Completion N/A ft
After ___ **Hrs.** N/A ft

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Very Stiff to Very Hard Gray, Moist SILTY CLAY LOAM, trace gravel (ML/CL) *(continued)*					
			32		
			32	3.8	12
		-45	34	S	
	542.64				
WEATHERED LIMESTONE			50/1"		
	541.14	-50			
End of Boring					
		-55			
		-60			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, form 137 (Rev. 8-99)

Illinois Department of Transportation
Division of Highways
GSG Consultants, Inc.

SOIL BORING LOG

Date 9/26/23

ROUTE FAI 290 DESCRIPTION Retaining Wall Boring LOGGED BY DV

SECTION FAI 290 22 LOCATION , SEC. 16, TWP. 39N, RNG. 13E, Latitude , Longitude

COUNTY Cook DRILLING RIG CME-75 HAMMER TYPE Auto
DRILLING METHOD HSA HAMMER EFF (%) 79.8

STRUCT. NO. N/A
Station N/A

BORING NO. RWB-16
Station 463+18.18
Offset 32.66ft RT
Ground Surface Elev. 591.51 ft

Surface Water Elev. N/A ft
Stream Bed Elev. N/A ft

Groundwater Elev.:
First Encounter None ft
Upon Completion N/A ft
After ___ Hrs. N/A ft

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
10 inches of Asphalt	590.68				
Light Gray, Wet FILL: SAND, with gravel	590.01		7, 4, 6	4.8 B	16
Hard Gray, Moist SILTY CLAY, trace gravel (CL/ML)	588.01				
Dense Gray, Moist SILTY LOAM, trace gravel (ML)	585.51	-5	18, 23, 20		15
Very Stiff to Hard Gray, Moist to Very Moist SILTY CLAY, trace gravel (CL/ML)			7, 8, 10	5.0 B	19
		-10	5, 7, 10	5.8 B	12
			6, 6, 6	5.6 B	20
		-15	4, 5, 6	2.9 B	19
			2, 4, 5	3.3 B	25
		-20	4, 6, 8	3.1 B	25

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Very Stiff to Hard Gray, Moist to Very Moist SILTY CLAY, trace gravel (CL/ML) *(continued)*			11, 12, 12		39
	565.51	-25	19, 21, 33	5.2 S	18
Very Dense Gray, Moist SILTY LOAM, trace gravel (ML)	563.01		29, 28, 31		11
Hard to Very Hard Gray, Moist SILTY CLAY, trace gravel (CL/ML)		-30	15, 20, 26	10.3 B	11
		-35	8, 11, 19	9.0 B	19
		-40	11, 13, 13	4.4 S	21

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
GSG Consultants, Inc.

SOIL BORING LOG

Date 9/26/23

ROUTE FAI 290 **DESCRIPTION** Retaining Wall Boring **LOGGED BY** DV

SECTION FAI 290 22 **LOCATION** , **SEC.** 16, **TWP.** 39N, **RNG.** 13E, **Latitude** , **Longitude**

COUNTY Cook **DRILLING RIG** CME-75 **DRILLING METHOD** HSA **HAMMER TYPE** Auto **HAMMER EFF (%)** 79.8

STRUCT. NO. N/A
Station N/A

BORING NO. RWB-16
Station 463+18.18
Offset 32.66ft RT
Ground Surface Elev. 591.51 **ft**

Surface Water Elev. N/A **ft**
Stream Bed Elev. N/A **ft**

Groundwater Elev.:
First Encounter None **ft**
Upon Completion N/A **ft**
After ____ **Hrs.** N/A **ft**

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Hard to Very Hard Gray, Moist SILTY CLAY, trace gravel (CL/ML) *(continued)*	548.01				
Exteremely Hard Gray, Moist SILTY LOAM, with gravel (ML)			44		
			43		11
		-45	40		
	544.01				
WEATHERED LIMESTONE	543.01				
Auger Refusal at 48.5 feet End of Boring		-50			
		-55			
		-60			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

APPENDIX D

LABORATORY TEST RESULTS

GSG CONSULTANTS, INC.

735 Remington Road
Schaumburg, IL 60173
Tel: 630.994.2600
www.gsg-consultants.com

Table D-1 – Atterberg Limits

Boring ID	Sample Depth (ft)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Soil Classification
RWB-01	16.0-17.5	26.0	17.0	9.0	CL
RWB-03	26.0-27.5	18.0	14.0	4.0	CL-ML
RWB-06	33.5-35.0	36.0	18.0	18.0	CL
RWB-08	8.5-10.0	35.0	18.0	17.0	CL
RWB-09	33.5-35.0	30.0	16.0	14.0	CL
RWB-11	6.0-7.5	30.0	16.0	14.0	CL
RWB-14	16.0-17.5	34.0	18.0	16.0	CL
RWB-16	28.5-30.0	28.0	16.0	12.0	CL
BSB-03	38.5-40.0	35.0	18.0	17.0	CL
BSB-08	26.0-27.5	25.0	23.0	2.0	ML

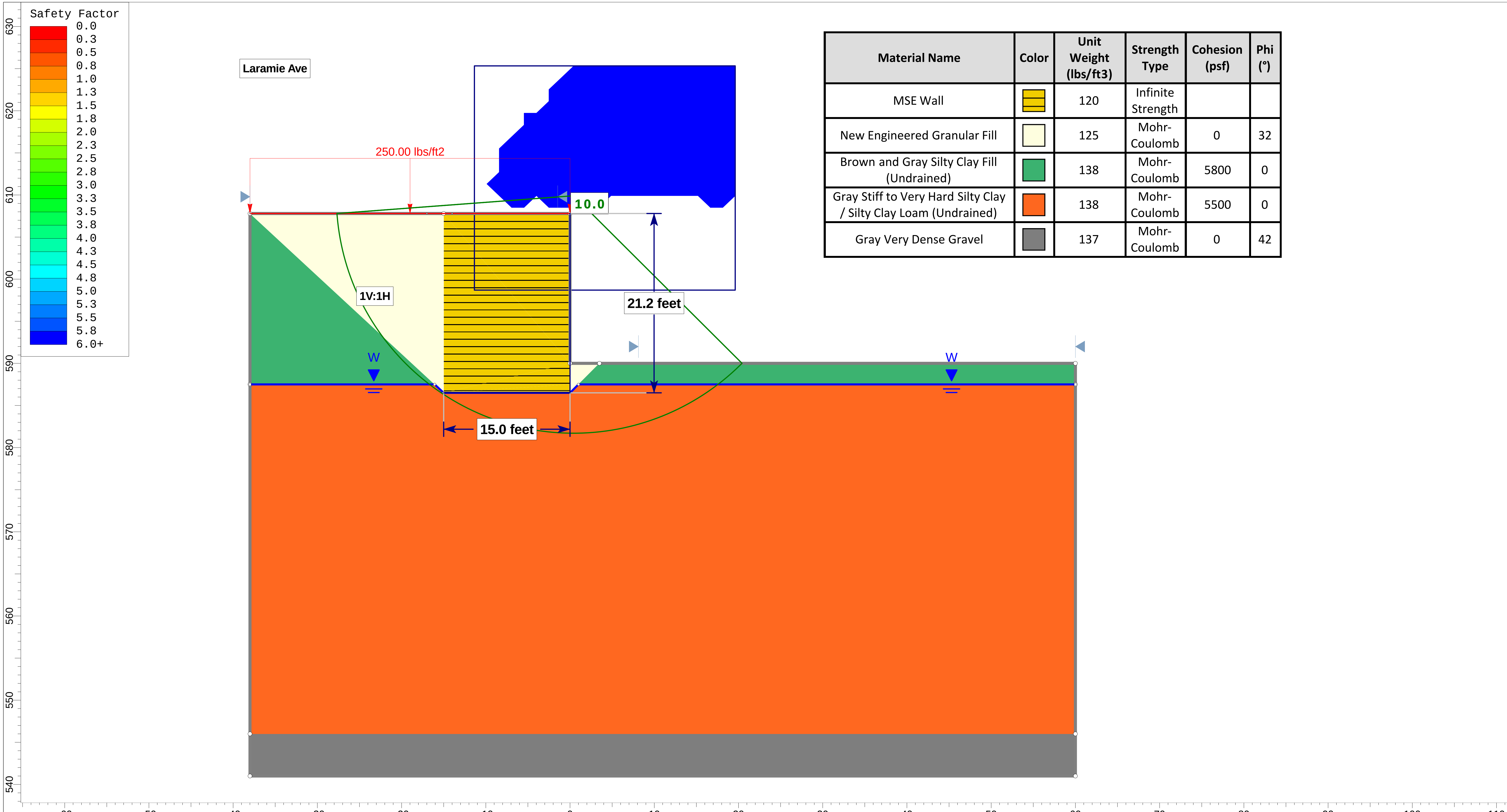
Table D-2 – Dry Unit Weight

Boring ID	Sample Depth (ft)	Dry Unit Weight (pcf)	Wet Unit Weight (pcf)
BSB-01	48.5-50.0	119.0	138.2
BSB-03	16.0-17.5	107.7	130.6
BSB-04	8.5-10.0	106.2	129.7
BSB-05	21.0-22.5	106.7	132.4
BSB-06	38.5-40.0	108.6	134.0
BSB-08	48.5-50.0	105.5	129.8
RWB-05	33.5-35.0	121.0	138.6
RWB-10	28.5-30.0	117.5	133.4

APPENDIX E

SLOPE STABILITY

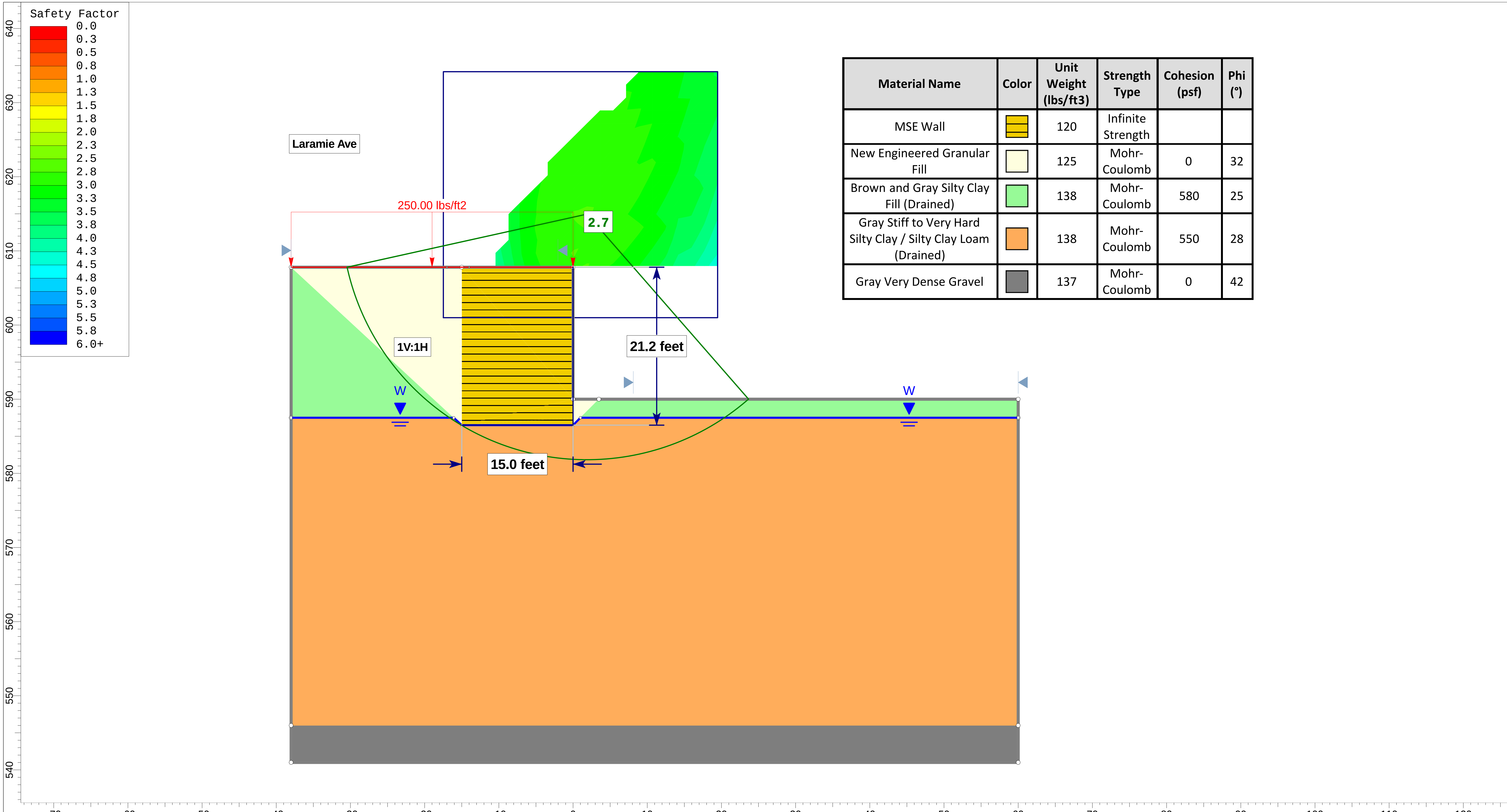
ANALYSES EXHIBITS



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (°)
MSE Wall		120	Infinite Strength		
New Engineered Granular Fill		125	Mohr-Coulomb	0	32
Brown and Gray Silty Clay Fill (Undrained)		138	Mohr-Coulomb	5800	0
Gray Stiff to Very Hard Silty Clay / Silty Clay Loam (Undrained)		138	Mohr-Coulomb	5500	0
Gray Very Dense Gravel		137	Mohr-Coulomb	0	42

GSG CONSULTANTS, INC.
735 Remington Road, Schaumburg, IL 60173
Tel: 630.994.2600, www.gsg-consultants.com

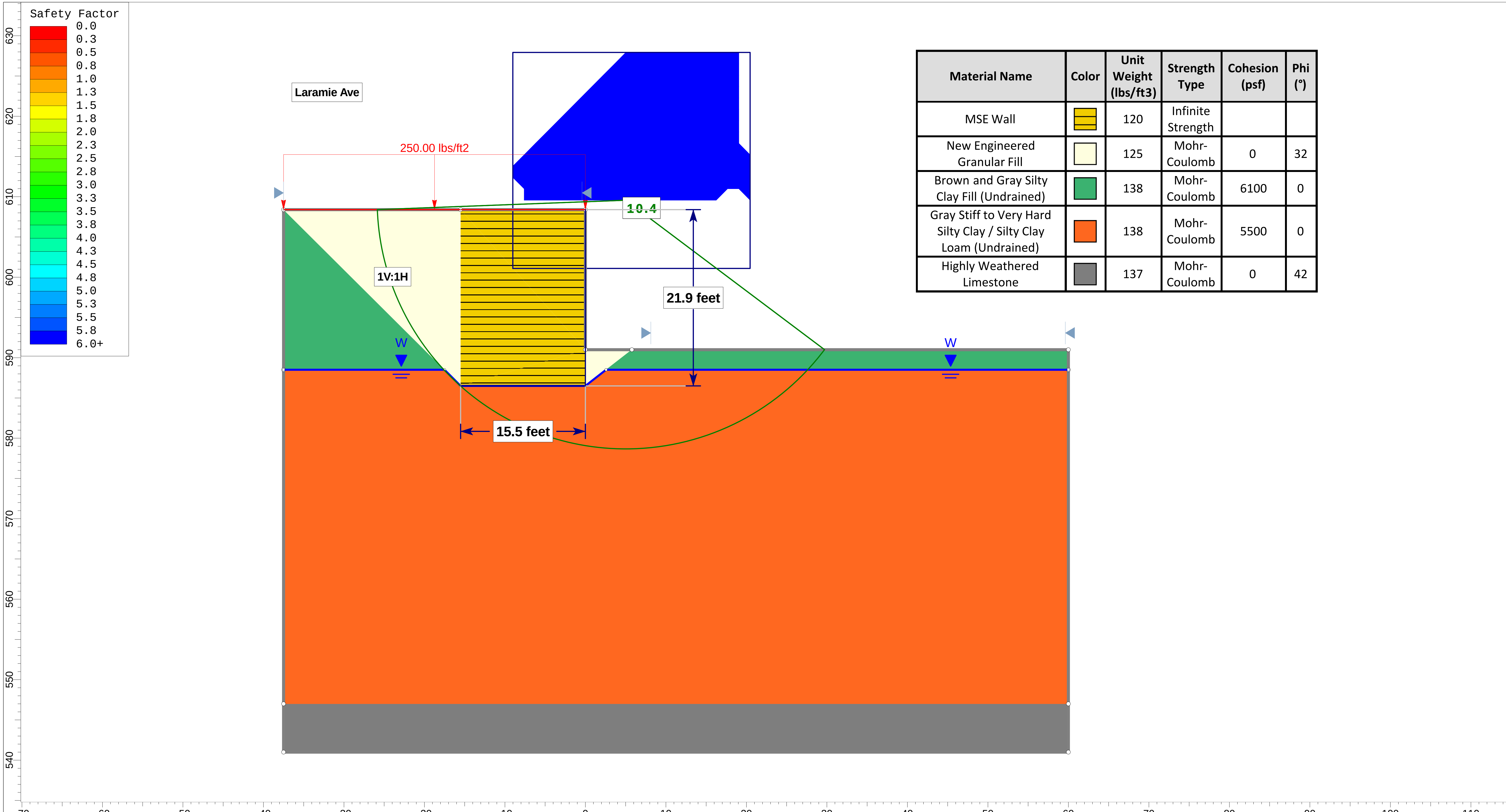
Project	PTB 204-014 Laramie Ave Bridge over I-290
Analysis Description	Exhibit a - Circular Failure Short Term - MSE Wall - Undrained (North Abutment)
Drawn By	DD
Company	GSG Consultants, Inc.
Date	01/17/2024
File Name	1. North Abutment MSE Wall.slmd



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (°)
MSE Wall		120	Infinite Strength		
New Engineered Granular Fill		125	Mohr-Coulomb	0	32
Brown and Gray Silty Clay Fill (Drained)		138	Mohr-Coulomb	580	25
Gray Stiff to Very Hard Silty Clay / Silty Clay Loam (Drained)		138	Mohr-Coulomb	550	28
Gray Very Dense Gravel		137	Mohr-Coulomb	0	42

GSG CONSULTANTS, INC.
735 Remington Road, Schaumburg, IL 60173
Tel: 630.994.2600, www.gsg-consultants.com

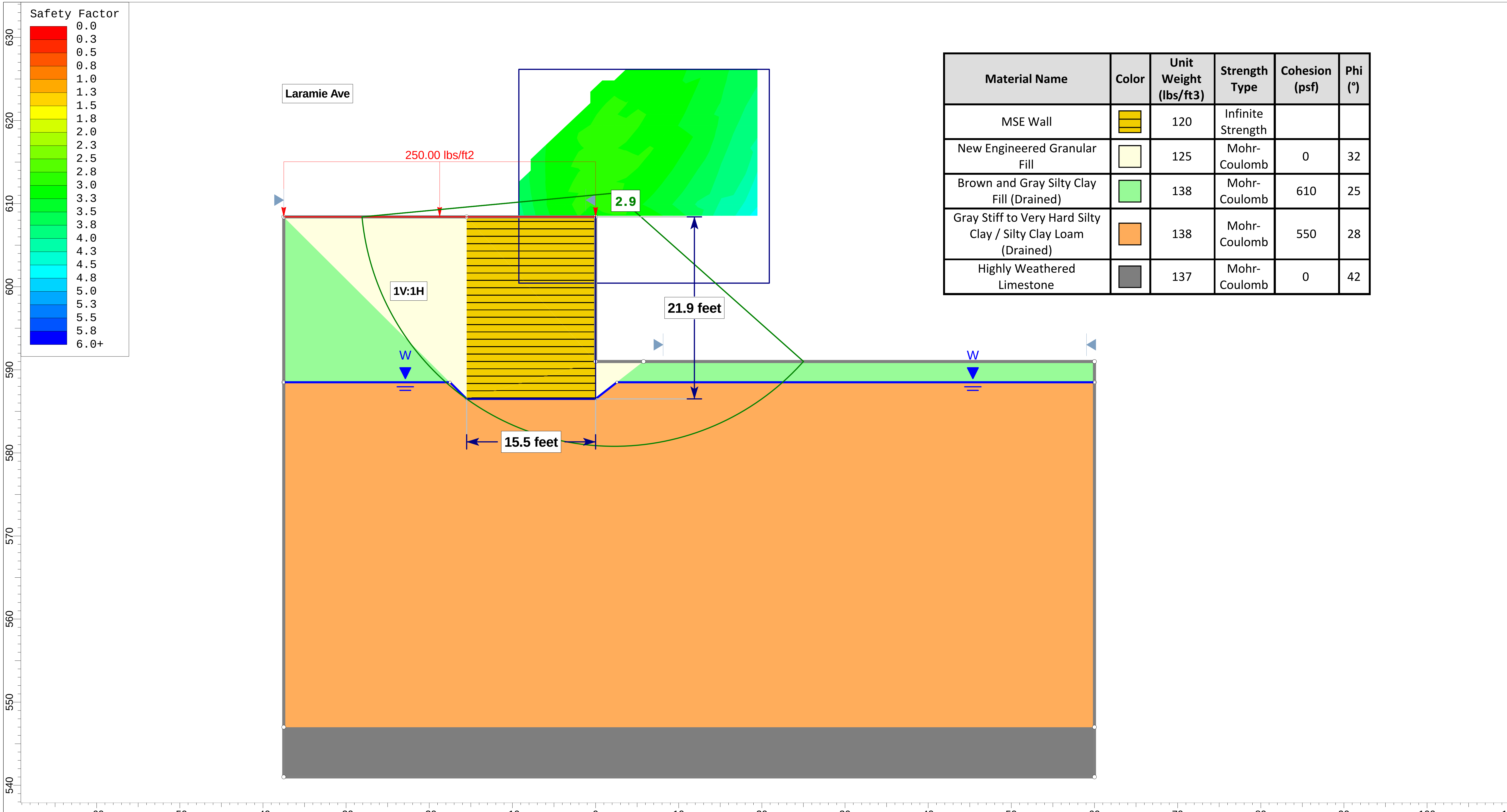
Project	PTB 204-014 Laramie Ave Bridge over I-290		
Analysis Description	Exhibit b - Circular Failure Long Term - MSE Wall - Drained (North Abutment)		
Drawn By	DD	Company	GSG Consultants, Inc.
Date	01/17/2024	File Name	1. North Abutment MSE Wall.slmd



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (°)
MSE Wall		120	Infinite Strength		
New Engineered Granular Fill		125	Mohr-Coulomb	0	32
Brown and Gray Silty Clay Fill (Undrained)		138	Mohr-Coulomb	6100	0
Gray Stiff to Very Hard Silty Clay / Silty Clay Loam (Undrained)		138	Mohr-Coulomb	5500	0
Highly Weathered Limestone		137	Mohr-Coulomb	0	42

GSG CONSULTANTS, INC.
735 Remington Road, Schaumburg, IL 60173
Tel: 630.994.2600, www.gsg-consultants.com

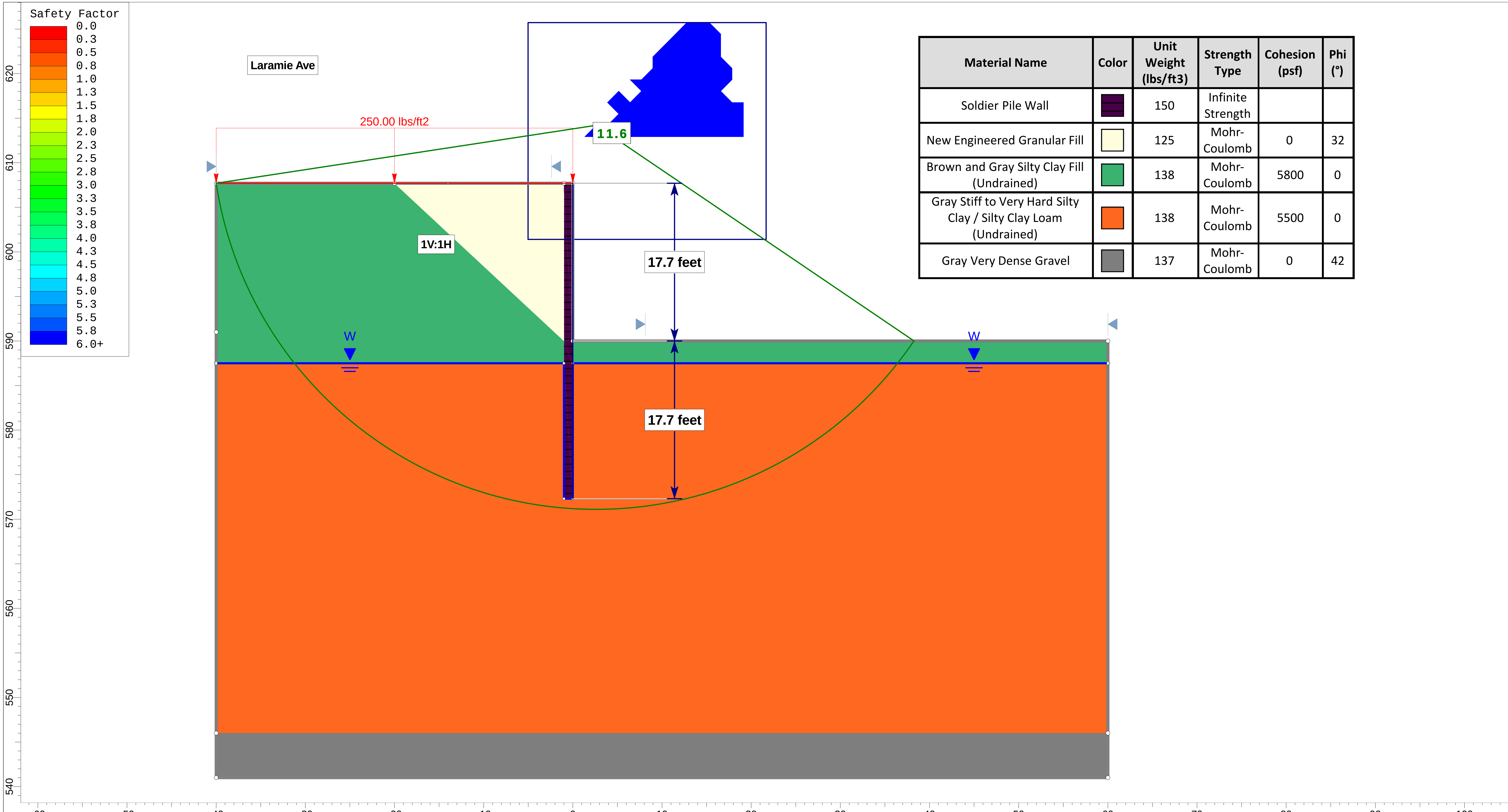
Project	PTB 204-014 Laramie Ave Bridge over I-290
Analysis Description	Exhibit c - Circular Failure Short Term - MSE Wall - Undrained (South Abutment)
Drawn By	DD
Company	GSG Consultants, Inc.
Date	01/17/2024
File Name	2. South Abutment MSE Wall.slmd



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (°)
MSE Wall		120	Infinite Strength		
New Engineered Granular Fill		125	Mohr-Coulomb	0	32
Brown and Gray Silty Clay Fill (Drained)		138	Mohr-Coulomb	610	25
Gray Stiff to Very Hard Silty Clay / Silty Clay Loam (Drained)		138	Mohr-Coulomb	550	28
Highly Weathered Limestone		137	Mohr-Coulomb	0	42

GSG CONSULTANTS, INC.
735 Remington Road, Schaumburg, IL 60173
Tel: 630.994.2600, www.gsg-consultants.com

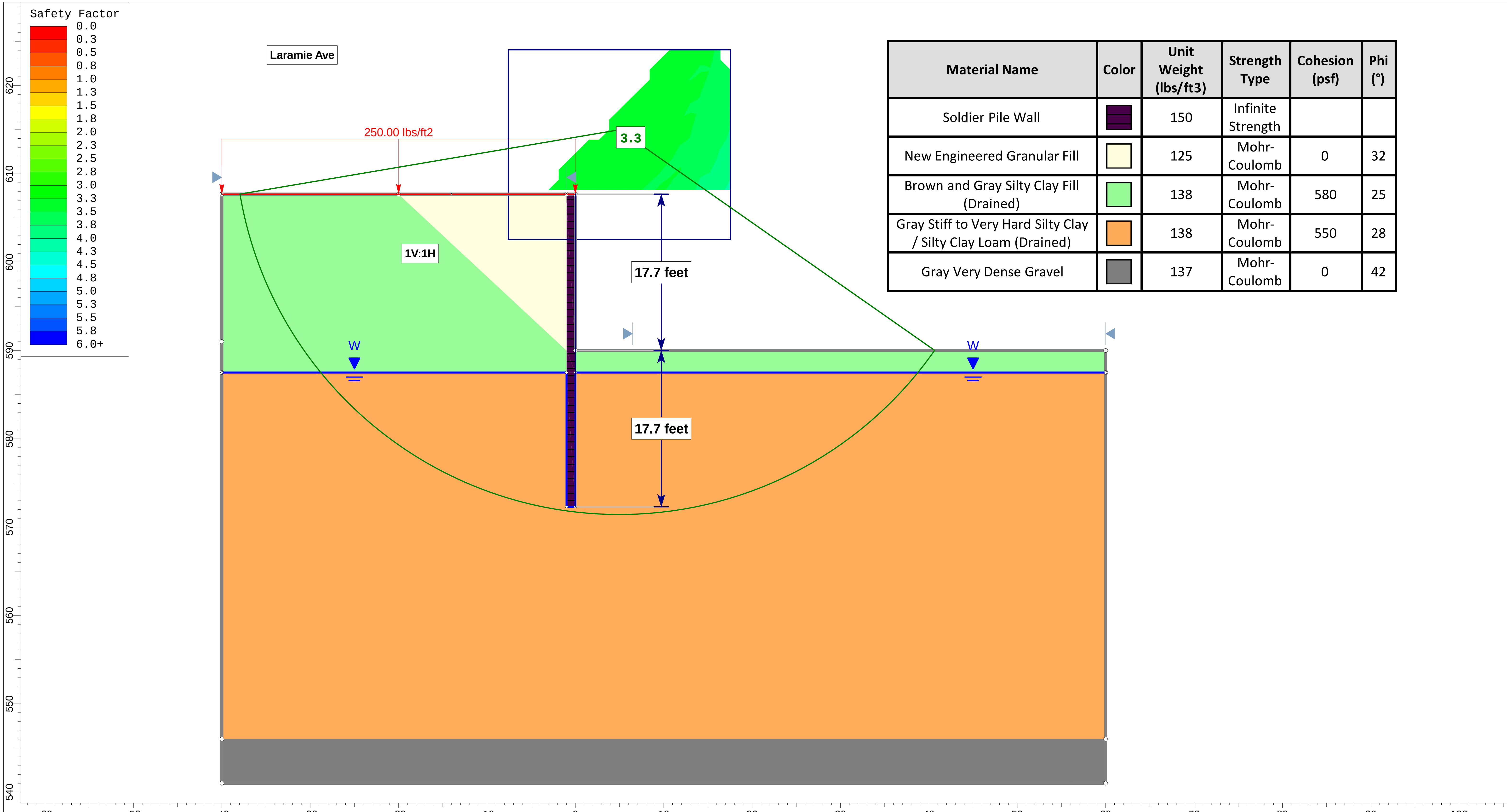
Project	PTB 204-014 Laramie Ave Bridge over I-290
Analysis Description	Exhibit d - Circular Failure Long Term - MSE Wall - Drained (South Abutment)
Drawn By	DD
Company	GSG Consultants, Inc.
Date	01/17/2024
File Name	2. South Abutment MSE Wall.slmd



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (°)
Soldier Pile Wall		150	Infinite Strength		
New Engineered Granular Fill		125	Mohr-Coulomb	0	32
Brown and Gray Silty Clay Fill (Undrained)		138	Mohr-Coulomb	5800	0
Gray Stiff to Very Hard Silty Clay / Silty Clay Loam (Undrained)		138	Mohr-Coulomb	5500	0
Gray Very Dense Gravel		137	Mohr-Coulomb	0	42

GSG CONSULTANTS, INC.
735 Remington Road, Schaumburg, IL 60173
Tel: 630.994.2600, www.gsg-consultants.com

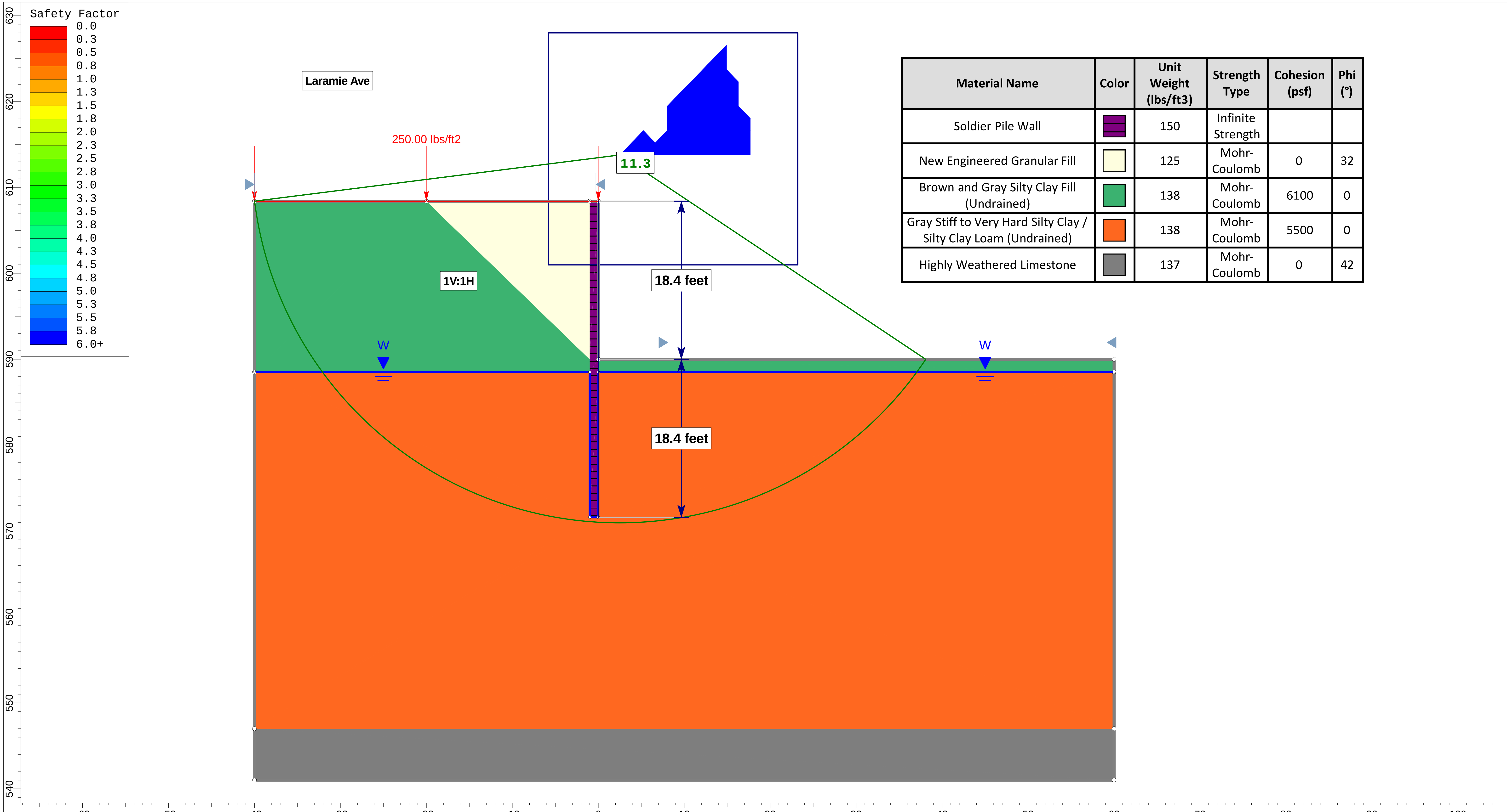
Project	PTB 204-014 Laramie Ave Bridge over I-290
Analysis Description	Exhibit e - Circular Failure Short Term - Soldier Pile Wall - Undrained (North Abutment)
Drawn By	DD
Company	GSG Consultants, Inc.
Date	01/17/2024
File Name	3. North Abutment Soldier Pile Wall.slmd



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (°)
Soldier Pile Wall		150	Infinite Strength		
New Engineered Granular Fill		125	Mohr-Coulomb	0	32
Brown and Gray Silty Clay Fill (Drained)		138	Mohr-Coulomb	580	25
Gray Stiff to Very Hard Silty Clay / Silty Clay Loam (Drained)		138	Mohr-Coulomb	550	28
Gray Very Dense Gravel		137	Mohr-Coulomb	0	42

GSG CONSULTANTS, INC.
735 Remington Road, Schaumburg, IL 60173
Tel: 630.994.2600, www.gsg-consultants.com

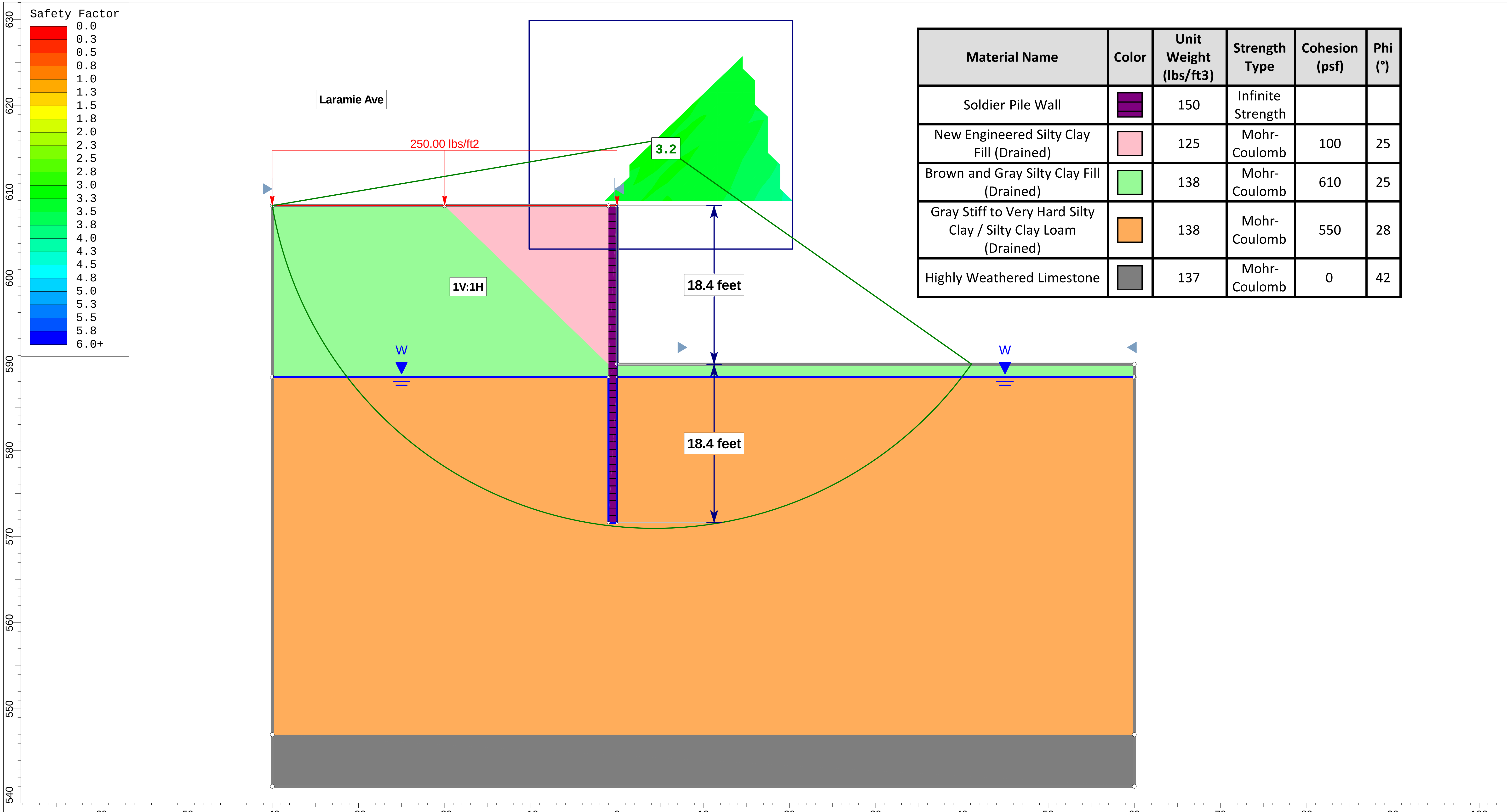
Project	PTB 204-014 Laramie Ave Bridge over I-290		
Analysis Description	Exhibit f - Circular Failure Long Term - Soldier Pile Wall - Drained (North Abutment)		
Drawn By	DD	*Company*	GSG Consultants, Inc.
Date	01/17/2024	*File Name*	3. North Abutment Soldier Pile Wall.slmd



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (°)
Soldier Pile Wall		150	Infinite Strength		
New Engineered Granular Fill		125	Mohr-Coulomb	0	32
Brown and Gray Silty Clay Fill (Undrained)		138	Mohr-Coulomb	6100	0
Gray Stiff to Very Hard Silty Clay / Silty Clay Loam (Undrained)		138	Mohr-Coulomb	5500	0
Highly Weathered Limestone		137	Mohr-Coulomb	0	42

GSG CONSULTANTS, INC.
735 Remington Road, Schaumburg, IL 60173
Tel: 630.994.2600, www.gsg-consultants.com

Project	PTB 204-014 Laramie Ave Bridge over I-290
Analysis Description	Exhibit g - Circular Failure Short Term - Soldier Pile Wall - Undrained (South Abutment)
Drawn By	DD
Company	GSG Consultants, Inc.
Date	01/17/2024
File Name	4. South Abutment Soldier Pile Wall.slmd



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (°)
Soldier Pile Wall		150	Infinite Strength		
New Engineered Silty Clay Fill (Drained)		125	Mohr-Coulomb	100	25
Brown and Gray Silty Clay Fill (Drained)		138	Mohr-Coulomb	610	25
Gray Stiff to Very Hard Silty Clay / Silty Clay Loam (Drained)		138	Mohr-Coulomb	550	28
Highly Weathered Limestone		137	Mohr-Coulomb	0	42

GSG CONSULTANTS, INC.
735 Remington Road, Schaumburg, IL 60173
Tel: 630.994.2600, www.gsg-consultants.com

Project	PTB 204-014 Laramie Ave Bridge over I-290		
Analysis Description	Exhibit h - Circular Failure Long Term - Soldier Pile Wall - Drained (South Abutment)		
Drawn By	DD	Company	GSG Consultants, Inc.
Date	01/17/2024	File Name	4. South Abutment Soldier Pile Wall.slmd

APPENDIX F

SOIL DESIGN PARAMETERS

Table F1: Summary of Soil Parameters – North Wingwalls

Depth Range (Elevation, feet)	Soil Description	In situ Unit Weight γ (pcf)	Undrained Cohesion c (psf)	Undrained Friction Angle ϕ (°)	Drained Cohesion c (psf)	Drained Friction Angle ϕ (°)	Active Earth Pressure Coefficient (K_a)	Passive Earth Pressure Coefficient (K_p)	At Rest Earth Pressure Coefficient (K_o)	Lateral Modulus of Subgrade Reaction (pci)	Soil Strain (ε_{50})	Soil Type
	New Engineered Clay Fill	125	1,000	0	100	25	0.41	2.46	0.58	100	0.01	Stiff Clay w/o free water (Reese)
	New Engineered Granular Fill	125	0	32	0	32	0.33	3.00	0.50	90	N/A	Sand (Reese)
1.0 to 3.5 (591.0 – 588.5)	Gray Gravel Fill	129	0	27	0	27	0.20	5.04	0.33	60	N/A	Sand (Reese)
3.5 to 43.5 (588.5 – 548.5)	Gray Stiff to Very Hard Silty Clay / Silty Clay Loam	138	5,500	0	550	28	0.36	2.77	0.53	2,000	0.004	Stiff Clay w/o free water (Reese)
43.5 to 50.0 (548.5 – 542.0)	Weathered Limestone	137	0	42	0	42	0.20	5.04	0.33	N/A	125	Weak Rock (Reese)
1.0 to 3.5 (591.0 – 588.5) ***RWB-01, 02, 08 Only**	Brown and Gray Silty Clay Fill	138	5,800	0	580	28	0.36	2.77	0.53	2,000	0.004	Stiff Clay w/o free water (Reese)
6.0 to 28.5 (586.0 – 563.5) ***RWB-01 & 08 Only**	Gray Medium Dense to Very Dense Silty Loam	131	0	37	0	37	0.25	4.02	0.40	60	N/A	Silt
28.5 to 43.5 (563.5 – 548.5) ***RWB-02 & 08 Only**	Gray Dense to Very Dense Sandy Loam	136	0	40	0	40	0.22	4.60	0.36	125	N/A	Sand (Reese)

Table F2: Summary of Soil Parameters – South Wingwalls

Depth Range (Elevation, feet)	Soil Description	In situ Unit Weight γ (pcf)	Undrained		Drained		Active Earth Pressure Coefficient (K_a)	Passive Earth Pressure Coefficient (K_p)	At Rest Earth Pressure Coefficient (K_o)	Lateral Modulus of Subgrade Reaction (pci)	Soil Strain (ε_{50})	Soil Type
			Cohesion c (psf)	Friction Angle ϕ (°)	Cohesion c (psf)	Friction Angle ϕ (°)						
	New Engineered Clay Fill	125	1,000	0	100	25	0.41	2.46	0.58	100	0.01	Stiff Clay w/o free water (Reese)
	New Engineered Granular Fill	125	0	32	0	32	0.33	3.00	0.50	90	N/A	Sand (Reese)
1.0 to 3.5 (591.0 – 588.5)	Brown and Gray Sand Fill	122	0	37	0	37	0.25	4.02	0.40	20	0	Sand (Reese)
3.5 to 45.0 (588.5 – 547.0)	Gray Stiff to Very Hard Silty Clay / Silty Clay Loam	138	5,500	0	550	28	0.36	2.77	0.53	2000	0.004	Stiff Clay w/o free water (Reese)
45.0 to 50.0 (547.0 – 542.0)	Weathered Limestone	137	0	42	0	42	0.20	5.04	0.33	N/A	125	Weak Rock (Reese)
Various Depths	Gray Medium Dense to Very Dense Silty Loam	136	0	41	0	41	0.21	4.81	0.34	125	N/A	Silt
1.0 to 3.5 (591.0 – 588.5) ***RWB-11 & 14 Only**	Brown and Gray Silty Clay Fill	138	6,100	0	610	25	0.41	2.46	0.58	2,000	0.004	Stiff Clay w/o free water (Reese)
1.0 to 28.5 (591.0 – 563.5) ***RWB-09 & 13 Only**	Gray Medium Dense to Very Dense Sand	129	0	34	0	34	0.28	3.54	0.44	60	N/A	Sand (Reese)

APPENDIX G

IDOT DRIVEN PILE TABLES

Pile Design Table for North Abutment utilizing Boring #BSB-1 with No Downdrag

	Nominal Required Bearing (Kips)	Factored Resistance Available (Kips)	Estimated Pile Length (Ft.)
Steel HP 8 X 36			
	69	38	10
	109	60	20
	112	62	25
	116	64	35
	160	88	40
	176	97	41
	246	135	47
	286	157	48

	Nominal Required Bearing (Kips)	Factored Resistance Available (Kips)	Estimated Pile Length (Ft.)
Steel HP 10 X 42			
	34	18	5
	86	47	10
	136	75	15
	141	78	20
	145	80	25
	147	81	35
	208	114	40
	226	125	41
	305	168	47
	335	184	48
Steel HP 10 X 57			
	36	20	5
	88	49	10
	140	77	15
	145	80	20
	149	82	25
	151	83	35
	213	117	40
	231	127	41
	314	173	47
	454	250	49
Steel HP 12 X 53			
	40	22	5
	103	56	10
	163	90	15
	177	98	20
	184	101	35
	264	145	40
	271	149	41
	366	201	47
	418	230	48
Steel HP 12 X 63			
	42	23	5
	106	58	10
	167	92	15
	181	100	20
	186	102	35
	268	148	40
	277	152	41
	375	206	47
	497	273	48
Steel HP 12 X 74			
	44	24	5
	108	59	10
	170	93	15
	183	101	20
	189	104	35
	273	150	40
	281	155	41
	383	211	47
	589	324	49

	Nominal Required Bearing (Kips)	Factored Resistance Available (Kips)	Estimated Pile Length (Ft.)
Steel HP 12 X 84			
	45	25	5
	110	60	10
	172	95	15
	186	102	20
	191	105	35
	276	152	40
	285	157	41
	390	214	47
	664	365	49
Steel HP 14 X 73			
	50	27	5
	125	69	10
	198	109	15
	215	118	20
	227	125	35
	319	175	40
	328	180	41
	444	244	47
	578	318	48
Steel HP 14 X 89			
	52	29	5
	128	71	10
	202	111	15
	218	120	20
	230	126	35
	325	179	40
	335	184	41
	456	251	47
	705	388	49
Steel HP 14 X 102			
	54	30	5
	131	72	10
	205	113	15
	221	121	20
	233	128	35
	328	181	40
	339	187	41
	464	255	47
	810	445	49
Steel HP 14 X 117			
	56	31	5
	134	74	10
	210	115	15
	225	124	20
	236	130	35
	334	184	40
	346	190	41
	475	261	47
	929	511	50

Pile Design Table for North Abutment utilizing Boring #BSB-2 with No Downdrag

	Nominal Required Bearing (Kips)	Factored Resistance Available (Kips)	Estimated Pile Length (Ft.)
Steel HP 8 X 36			
	79	43	20
	90	50	25
	103	57	30
	126	69	35
	148	82	40
	226	124	48
	286	157	49

	Nominal Required Bearing (Kips)	Factored Resistance Available (Kips)	Estimated Pile Length (Ft.)
Steel HP 10 X 42			
	33	18	10
	82	45	15
	98	54	20
	112	62	25
	128	71	30
	157	86	35
	185	101	40
	280	154	48
	335	184	49
Steel HP 10 X 57			
	36	20	10
	84	46	15
	101	56	20
	115	63	25
	133	73	30
	161	89	35
	189	104	40
	289	159	48
	454	250	50
Steel HP 12 X 53			
	40	22	10
	98	54	15
	117	65	20
	134	74	25
	154	85	30
	187	103	35
	221	122	40
	336	185	48
	418	230	49
Steel HP 12 X 63			
	43	23	10
	100	55	15
	121	66	20
	138	76	25
	159	87	30
	192	106	35
	226	125	40
	345	190	48
	497	273	50
Steel HP 12 X 74			
	45	25	10
	102	56	15
	124	68	20
	140	77	25
	162	89	30
	196	108	35
	230	127	40
	353	194	48
	589	324	50

	Nominal Required Bearing (Kips)	Factored Resistance Available (Kips)	Estimated Pile Length (Ft.)
Steel HP 12 X 84			
	47	26	10
	104	57	15
	126	69	20
	143	78	25
	165	91	30
	200	110	35
	234	129	40
	359	198	48
	664	365	51
Steel HP 14 X 73			
	50	28	10
	119	65	15
	143	79	20
	163	90	25
	188	103	30
	228	125	35
	268	147	40
	409	225	48
	578	318	49
Steel HP 14 X 89			
	54	30	10
	122	67	15
	147	81	20
	167	92	25
	193	106	30
	234	129	35
	274	151	40
	420	231	48
	705	388	50
Steel HP 14 X 102			
	56	31	10
	124	68	15
	150	83	20
	170	93	25
	197	108	30
	238	131	35
	278	153	40
	428	235	48
	810	445	51
Steel HP 14 X 117			
	60	33	10
	127	70	15
	154	85	20
	174	95	25
	202	111	30
	243	134	35
	284	156	40
	439	241	48
	929	511	51

Pile Design Table for South Abutment utilizing Boring #BSB-7 with No Downdrag

	Nominal Required Bearing (Kips)	Factored Resistance Available (Kips)	Estimated Pile Length (Ft.)
Steel HP 8 X 36			
	76	42	13
	82	45	14
	94	52	15
	106	58	20
	118	65	25
	120	66	25
	122	67	30
	174	96	35
	234	128	40
	286	157	41

	Nominal Required Bearing (Kips)	Factored Resistance Available (Kips)	Estimated Pile Length (Ft.)
Steel HP 10 X 42			
	75	41	11
	85	47	12
	94	52	13
	104	57	14
	117	64	15
	132	73	20
	147	81	25
	149	82	25
	157	86	30
	223	123	35
	290	160	40
	335	184	41
Steel HP 10 X 57			
	78	43	11
	87	48	12
	97	53	13
	106	58	14
	120	66	15
	136	75	20
	151	83	25
	153	84	25
	161	89	30
	228	125	35
	299	165	40
	454	250	42
Steel HP 12 X 53			
	79	43	10
	90	50	11
	102	56	12
	113	62	13
	124	68	14
	140	77	15
	158	87	20
	176	97	25
	179	98	25
	199	110	30
	267	147	35
	348	191	40
	418	230	41
Steel HP 12 X 63			
	27	15	5
	81	45	10
	93	51	11
	104	57	12
	116	64	13
	127	70	14
	143	79	15
	162	89	20
	180	99	25
	183	101	25
	202	111	30
	273	150	35
	357	197	40
	497	273	41
Steel HP 12 X 74			
	28	15	5
	83	46	10
	94	52	11
	106	58	12
	118	65	13
	129	71	14
	146	80	15
	165	91	20
	183	101	25
	187	103	25
	205	113	30
	277	152	35
	365	201	40
	589	324	42

	Nominal Required Bearing (Kips)	Factored Resistance Available (Kips)	Estimated Pile Length (Ft.)
Steel HP 12 X 84			
	29	16	5
	84	46	10
	96	53	11
	108	59	12
	119	66	13
	131	72	14
	149	82	15
	168	92	20
	186	102	25
	190	104	25
	208	115	30
	281	154	35
	371	204	40
	664	365	42
Steel HP 14 X 73			
	32	17	5
	96	53	10
	110	60	11
	123	68	12
	137	75	13
	151	83	14
	170	93	15
	192	106	20
	214	118	25
	217	119	25
	249	137	30
	323	178	35
	423	233	40
	578	318	41
Steel HP 14 X 89			
	33	18	5
	99	54	10
	112	62	11
	126	69	12
	140	77	13
	154	85	14
	174	96	15
	196	108	20
	218	120	25
	222	122	25
	253	139	30
	330	181	35
	434	239	40
	705	388	42
Steel HP 14 X 102			
	35	19	5
	100	55	10
	114	63	11
	128	71	12
	142	78	13
	156	86	14
	177	97	15
	200	110	20
	222	122	25
	226	124	25
	255	141	30
	334	184	35
	442	243	40
	810	445	43
Steel HP 14 X 117			
	37	20	5
	103	57	10
	117	64	11
	131	72	12
	145	80	13
	159	87	14
	181	100	15
	204	112	20
	226	124	25
	231	127	25
	259	143	30
	340	187	35
	453	249	40
	929	511	43

Pile Design Table for South Abutment utilizing Boring #BSB-8 with No Downdrag

	Nominal Required Bearing (Kips)	Factored Resistance Available (Kips)	Estimated Pile Length (Ft.)		Nominal Required Bearing (Kips)	Factored Resistance Available (Kips)	Estimated Pile Length (Ft.)		Nominal Required Bearing (Kips)	Factored Resistance Available (Kips)	Estimated Pile Length (Ft.)
Steel HP 8 X 36				**Steel HP 10 X 42**				**Steel HP 12 X 84**			
	59	32	10		73	40	10		32	18	5
	101	56	15		126	69	15		94	51	10
	107	59	25		138	76	25		160	88	15
	117	64	30		152	84	30		177	97	20
	156	86	35		202	111	35		184	101	25
	176	97	38		226	124	38		200	110	30
	236	130	43		293	161	43		265	146	35
	286	157	44		335	184	44		285	157	38
				Steel HP 10 X 57					375	206	43
					75	41	10		664	365	45
					129	71	15	**Steel HP 14 X 73**			
					142	78	25		35	19	5
					156	86	30		106	59	10
					207	114	35		183	101	15
					231	127	38		203	112	20
					302	166	43		217	120	25
					454	250	45		231	127	30
				Steel HP 12 X 53					307	169	35
					28	15	5		328	180	38
					87	48	10		428	235	43
					151	83	15		578	318	44
					168	92	20	**Steel HP 14 X 89**			
					176	97	25		37	20	5
					191	105	30		109	60	10
					254	139	35		188	103	15
					270	149	38		207	114	20
					352	193	43		221	122	25
					418	230	44		235	129	30
				Steel HP 12 X 63					312	172	35
					30	16	5		334	184	38
					90	49	10		439	241	43
					155	85	15		705	388	45
					172	94	20	**Steel HP 14 X 102**			
					178	98	25		39	21	5
					195	107	30		111	61	10
					259	142	35		191	105	15
					277	152	38		210	116	20
					361	199	43		223	123	25
					497	273	44		238	131	30
				Steel HP 12 X 74					316	174	35
					31	17	5		339	186	38
					92	50	10		447	246	43
					158	87	15		810	445	46
					174	96	20	**Steel HP 14 X 117**			
					181	99	25		41	22	5
					197	109	30		114	63	10
					262	144	35		195	107	15
					281	154	38		214	118	20
					369	203	43		227	125	25
					589	324	45		242	133	30
									321	177	35
									345	190	38
									458	252	43
									929	511	46