

STRUCTURE GEOTECHNICAL REPORT

Southwest Ramp on I-57 over IL 17, Retaining
Wall at Ramp D

Proposed SN 046-8805

Kankakee County, Illinois

F.A.I. ROUTE 57 (I-57)
SECTION (46-3)HBK
KANKAKEE COUNTY, ILLINOIS
JOB NO. P-93-065-02
PTB 159/20
KEG NO. 11-1017.00



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September 27, 2017
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EXECUTIVE SUMMARY

I-57 and Illinois Route 17, Retaining Wall at Ramp D
F.A.I. Route 57
Section (46-3) HBK
Kankakee County, Illinois
Job No. P-93-065-02
Contract No. 66863
PTB 159/20
Structure No. 046-8805

The proposed structure (SN 046-8805) is a combination of Tangent and Soldier Pile wall near the proposed single-point interchange of I-57 and IL 17. The northern end of the wall will consist of tangent piles to retain the larger amount of fill near the integral abutment. The wall(s) will be new construction and Interstate 57 is to be re-aligned. The traffic on existing Interstate 57 will be shifted onto the new alignment prior to beginning the construction of the wall(s).

Due to proposed fill heights associated with the proposed tangent pile wall, settlement calculations were necessary. Based on the results and the very stiff to hard cohesive soils encountered, settlement is estimated to be less than half an inch. KEG anticipates that any settlement throughout the wall supported embankment will coincide with construction activities.

Global stability of the retaining wall was checked for both the Interim and Ultimate condition at the location of maximum exposed height using SLOPE/W software, the soil properties from Borings BH-24 through BH-29, and the geometrics of the walls. In addition, the resulting fill slope from construction of the roadway embankment was also modeled. Three conditions were modeled: end-of-construction (EOC), long-term, and seismic.

TABLE OF CONTENTS

1.0	PROJECT DESCRIPTION AND PROPOSED STRUCTURE INFORMATION.....	1
1.1	Introduction.....	1
1.2	Project Description.....	1
1.3	Proposed Structure Information	1
2.0	EXISTING SITE INFORMATION.....	1
3.0	SITE INVESTIGATION, SUBSURFACE EXPLORATION, AND GENERALIZED SUBSURFACE CONDITIONS.....	1
3.1	Subsurface Conditions	2
3.3	Groundwater	4
4.0	GEOTECHNICAL EVALUATIONS	4
4.1	Settlement	4
4.2	Global Stability.....	4
4.3	Seismic Considerations	5
4.4	Scour	5
4.5	Mining Activity.....	5
5.0	FOUNDATION EVALUATIONS AND DESIGN RECOMMENDATIONS	6
5.1	General Feasibility	6
5.2	Wall Design Parameters	6
5.3	Foundations on Drilled Shafts.....	6
5.4	Permanent Sheet Pile Installation.....	9
6.0	CONSTRUCTION CONSIDERATIONS.....	9
6.1	Construction Activities.....	9
6.2	Site and Soil Conditions.....	9
7.0	COMPUTATIONS	9
8.0	GEOTECHNICAL DATA.....	9
9.0	LIMITATIONS.....	9

TABLES

	<u>Page</u>
Table 3.1 – Boring Summary.....	2
Table 3.2 – Groundwater	4
Table 4.1 – Global Stability Critical FOS	5
Table 5.1 – Soil Parameters for Soldier Pile Wall	6
Table 5.3.1 – Estimated Bedrock Elevations	7
Table 5.3.2 – Estimated Drilled Shaft Axial Capacity for 36-inch Diameter Shaft.....	7
Table 5.3.3 – Estimated Drilled Shaft Axial Capacity for 42-inch Diameter Shaft.....	8
Table 5.3.4 – Estimated Drilled Shaft Axial Capacity for 48-inch Diameter Shaft.....	8
Table 5.3.5 – Estimated Drilled Shaft Axial Capacity for 60-inch Diameter Shaft.....	8

EXHIBITS

Exhibit A – Location Map
Exhibit B – Type, Size, and Location (TS&L) Plan
Exhibit C – Boring Location Plan and Boring Logs
Exhibit D – Subsurface Profile
Exhibit E – SLOPE/W Global Stability Analysis
Exhibit F – Illinois State Geological Survey Mine Map
Exhibit G – Laboratory Test Results
Exhibit H – Drilled Shaft Axial Capacity Spreadsheet

1.0 PROJECT DESCRIPTION AND PROPOSED STRUCTURE INFORMATION

1.1 Introduction

The geotechnical study summarized in this report was performed for the proposed combination tangent and soldier pile retaining wall at Ramp D in the southwest quadrant of a proposed single-point interchange at Interstate 57 (I-57) over Illinois Route 17 (IL 17) near the City of Kankakee in Kankakee County, Illinois. The purpose of this report is to present design and construction recommendations specifically for the Ramp D retaining wall.

1.2 Project Description

This project consists of constructing a retaining wall for proposed Ramp D for future reconstruction of Interstate 57. A tangent pile wall is being constructed to retain the larger amount of fill near the integral abutment. The remainder of the wall along I-57 will be constructed as a soldier pile wall. The project is located at the interchange of I-57 and IL 17 in Kankakee, Illinois. The general location of the project is shown on a USGS Topographic Location Map, Exhibit A. This portion of the overall I-57 and IL 17 project lies within the limits of the Third Principal Meridian, (Township 31 N, Range 12 E, Section 34) within the Kankakee Plain, of the Till Plains section, of the Central Lowland Province. The overall northern part of the project lies within the Third Principal Meridian (Township 31 N, Range 12 E, Sections 33 and 34), while the southern part of the project lies within the Second Principal Meridian (Township 30 N, Range 13 W, Sections 3 and 4).

1.3 Proposed Structure Information

The proposed structure (SN 046-8805) is a retaining wall to be constructed along proposed Ramp D, near the southwest quadrant of the proposed single-point interchange of I-57 and IL 17. See the Type, Size and Location (TS&L) Plan, Exhibit B.

Structure Number 046-8805 begins at approximately I-57 Sta. 193+66.52 and ends near I-57 Sta. 199+43.89 with the tangent pile wall portion beginning at approximately I-57 Sta. 193+88.04 to Sta. 195+02.81. The highest exposed height of the wall is approximately 13.25 ft at Sta. 194+17.39.

The project will be completed using staged construction to maintain traffic during construction.

2.0 EXISTING SITE INFORMATION

The site currently consists of embankment of the existing I-57 alignment near its intersection with IL 17.

3.0 SITE INVESTIGATION, SUBSURFACE EXPLORATION, AND GENERALIZED SUBSURFACE CONDITIONS

The site investigation plan was developed and performed by IDOT District personnel. A site visit by a KEG representative to observe all or part of the borings, or to make site observations, was not included in the scope of services. Therefore, no site observations have been made relative to current conditions of the structure or immediate surroundings, including the soil samples retained during drilling.

Seven standard penetration test (SPT) borings were utilized in development of this SGR. Six SPT borings, designated BH 24 through BH 29, were drilled between the dates of August 27, 2013

and August 29, 2013. Boring BH 20, drilled on August 21, 2013, is included, as it is located near the northern end of the retaining wall. The boring locations are shown on the Type, Size, and Location plan (TS&L), Exhibit B, as provided by Lochmueller Group. Detailed information regarding the nature and thickness of the soils encountered and the results of the field sampling and laboratory testing are shown on the Boring Logs, Exhibit C. A soil profile can be found under Subsurface Profile, Exhibit D.

Table 3.1 – Boring Summary

Boring Location	Station	Offset	Ground Surface Elevation
BH 20	193+77.84	105.3 RT	673.6
BH 24	195+19.94	105.9 RT	673.5
BH 25	196+03.44	104.2 RT	672.9
BH 26	197+15.10	103.2 RT	672.2
BH 27	198+18.01	100.2 RT	671.2
BH 28	199+11.21	98.6 RT	669.7
BH 29	200+11.32	93.2 RT	668.0

*Stationing and offsets are based off of I-57

3.1 Subsurface Conditions

Boring BH 20 consisted of bituminous shoulder with silty clay loam fill from ground surface (El. 673.6) to El. 668.6. A very stiff to hard silty clay loam/ silty loam fill with layers of silty clay fill followed to El. 655.6 with driving resistances (N-values) ranging from 6 to 8 blows per foot (bpf), unconfined compressive strength (Q_u) values ranging from 3.0 to 4.5 tons per square foot (tsf), and moisture contents ranging from 15 to 22 percent. A hard silty clay followed to El. 641.6 with N-values ranging from 12 to 34 bpf, Q_u values between 4.0 and 10.9 tsf, and moisture contents from 18 to 30 percent. A hard to very stiff silty clay followed to El. 623.6 with N-values ranging from 14 to 24 bpf, Q_u values between 4.0 and 6.4 tsf, and moisture contents from 19 to 24 percent. A hard silty loam till with layers of loamy sand/gravel followed to El. 616.1 with N-values ranging from 14 to 59 bpf, Q_u values between 4.0 and 5.1 tsf, and moisture contents from 10 to 22 percent. A dense limestone layer followed to boring termination at El. 615.8 with an N-value of 100/4-inches and a moisture content of 9 percent.

Boring BH 24 consisted of bituminous shoulder with silty clay loam till fill and silty clay fill from ground surface (El. 673.5) to El. 658.5. A very stiff to hard silty clay followed to El. 634.5 with N-values ranging from 12 to 28 bpf, Q_u values ranging from 3.0 to 8.1 tsf, and moisture contents ranging from 17 to 25 percent. A hard to very stiff silty clay followed to El. 623.5 with N-values ranging from 20 to 21, Q_u values between 3.3 and 5.0 tsf, and moisture contents from 21 to 22 percent. A hard to very stiff silty clay loam with silt layer followed to El. 614.5 with N-values ranging from 22 to 28 bpf, Q_u values between 5.0 and 7.4 tsf, and moisture contents from 18 to 19 percent. A dense limestone layer followed to boring termination at El. 613.0 with an N-value of 100/6-inches and a moisture content of 11 percent.

Boring BH 25 consisted of bituminous shoulder with silty clay loam fill from ground surface (El. 672.9) to El. 662.9. A very stiff silty clay loam fill followed to El. 658.4 with N-values ranging from 14 to 16 bpf, Q_u values between 3.5 and 4.0 tsf, and moisture contents from 18 to 19 percent. A hard silty clay followed to El. 643.4 with N-values ranging from 17 to 28 bpf, Q_u values between 6.1 and 8.4 tsf, and moisture contents from 19 to 25 percent. A hard to very stiff silty clay followed to El. 623.9 with N-values ranging from 14 to 21 bpf, Q_u values between 3.1 and 5.4 tsf, and moisture contents from 21 to 26 percent. A hard to very stiff silty clay loam with silt and silty loam

layers followed to El. 612.9 with N-values ranging from 11 to 22 bpf, Q_u values between 4.0 and 4.5 tsf, and moisture contents from 13 to 21 percent. A dense limestone layer followed to boring termination at El. 612.6 with an N-value of 100/4-inches and a moisture content of 9 percent.

Boring BH 26 consisted of bituminous shoulder with silty clay fill with some silty clay loam fill from ground surface (El. 672.2) to El. 662.2. A hard silty clay followed to El. 645.2 with N-values ranging from 18 to 29 bpf, Q_u values between 4.5 and 9.9 tsf, and moisture contents between 20 and 25 percent. A hard to very stiff silty clay followed to El. 624.2 with N-values ranging from 10 to 26 bpf, Q_u values between 2.7 and 4.3 tsf, and moisture contents between 23 and 26 percent. A hard to very stiff silty clay loam/silty loam till with silty layers followed to El. 612.2 with N-values ranging from 18 to 20 bpf, Q_u values between 4.0 and 5.4 tsf, and moisture contents between 13 and 18 percent. A dense limestone layer followed to boring termination at El. 612.0 with an N-value of 100/2-inches and a moisture content of 8 percent.

Boring BH 27 consisted of bituminous shoulder with silty clay fill from ground surface (El. 671.2) to El. 666.2. A very stiff silty clay with silty clay loam fill followed to El. 664.2 with an N-value of 6 bpf, Q_u value of 3.0 tsf, and a moisture content of 22 percent. A very stiff silty clay loam topsoil layer followed to El. 661.7 with an N-value of 8 bpf, Q_u value of 3.5 tsf, and a moisture content of 24 percent. A hard silty clay with minor silt layer followed to El. 649.2 with N-values ranging from 19 to 28 bpf, Q_u values between 6.2 to 7.1 tsf, and moisture contents between 19 to 20 percent. A hard to very stiff silty clay followed to El. 623.2 with N-values ranging from 11 to 22 bpf, Q_u values between 3.7 and 8.7 tsf, and moisture contents between 20 and 24 percent. A hard silty clay loam/silty loam till with silt layers followed to El. 613.2 with N-values ranging from 20 to 22 bpf, Q_u values between 4.0 to 5.4 tsf, and moisture contents between 14 and 16 percent. A dense limestone layer followed to boring termination at El. 613.1 with an N-value of 100/1-inch.

Boring BH 28 consisted of bituminous shoulder with silty clay fill from ground surface (El. 669.7) to El. 664.7. A very stiff silty clay and silty clay loam fill followed to El. 662.7 with an N-value of 9 bpf, Q_u value of 3.5 tsf, and a moisture content of 22 percent. A very stiff to hard silty clay loam till followed to El. 657.7 with N-values ranging from 13 to 29 bpf, Q_u values between 4.0 and 8.1 tsf, and moisture contents between 13 and 22 percent. A hard silty clay followed to El. 650.2 with N-values ranging from 21 to 24 bpf, Q_u values between 7.4 and 8.9 tsf, and moisture contents between 19 and 21 percent. A hard to very stiff silty clay layer followed to El. 625.7 with N-values ranging from 10 to 18 bpf, Q_u values between 3.1 and 4.0 tsf, and moisture contents between 20 and 23 percent. A hard silty clay loam/ silty loam till with silt layers followed to El. 613.7 with N-values ranging from 21 to 26 bpf, Q_u values between 4.0 and 5.1 tsf, and moisture contents between 10 and 12 percent. A dense limestone layer followed to boring termination at El. 613.5 with an N-value of 100/2-inches.

Boring BH 29 consisted of bituminous shoulder with gray silty clay fill from ground surface (El. 668.0) to El. 663.0. A hard silty clay loam till followed to El. 661.0 with an N-value of 14 bpf, Q_u value of 4.0 tsf, and a moisture content of 22 percent. A hard silty clay followed to El. 648.5 with N-values ranging from 18 to 26 bpf, Q_u values between 5.4 and 8.1 tsf, and moisture contents between 17 and 19 percent. A hard to very stiff silty clay followed to El. 623.0 with N-values ranging from 9 to 15 bpf, Q_u values between 3.1 and 4.1 tsf, and moisture contents between 18 and 22 percent. A hard silty clay loam/ silty loam till with silt pockets and sand layers followed to El. 612.0 with N-values ranging from 28 to 37 bpf, Q_u values between 5.7 and >4.5 tsf, and moisture contents between 12 and 16 percent. A dense limestone layer followed to boring termination at El. 611.9 with an N-value of 100/1-inch.

3.3 Groundwater

Groundwater was encountered in all of the borings. Table 3.3 shows the elevations and the time of the readings. Without extended periods of observation, measurement of true groundwater levels may not be possible. It should be further noted that the groundwater level is subject to seasonal and climatic variations.

Table 3.2 – Groundwater

Boring	First Encounter Elevation (ft.)	Upon Completion Elevation (ft.)
BH 20	621.6	630.6
BH 24	613.5	626.0
BH 25	615.0	618.0
BH 26	612.2	627.2
BH 27	613.2	626.2
BH 28	Dry	619.7
BH 29	613.0	618.0

4.0 GEOTECHNICAL EVALUATIONS

4.1 Settlement

Due to proposed fill heights necessary for the construction of the tangent and soldier pile walls, settlement calculations were performed. Based on the results and the very stiff to hard cohesive soils encountered, settlement was estimated to be less than half an inch. KEG anticipates that any settlement will coincide with construction activities.

4.2 Global Stability

Global stability of the retaining wall was checked at the location of maximum exposed height using SLOPE/W software, the soil properties were from Boring BH-24, and the geometrics of the wall at both interim and ultimate lane configurations. For both alignments, a 250 psf vertical load was included in the models to simulate the induced loads from the roadway. Also in the Ultimate condition, an 800 psf load was included above the wall in order to simulate the applied load from the concrete barrier. In addition, the resulting fill slope from construction of the roadway embankment was analyzed. Three conditions were modeled: end-of-construction (EOC), long-term and seismic. A critical factor of safety (FOS) was calculated for each condition. According to current standard of practice, the target FOS is 1.5 for EOC and long-term and 1.0 for Seismic.

In order to model the EOC condition, full cohesion was used with a friction angle of 0 degrees. Friction angles and nominal values for cohesion were used to model the long-term condition to analyze the theoretical condition where pore water pressure has dissipated.

The Bishop Circular Method, which generates circular-shaped failure surfaces, was used to calculate the critical failure surfaces and FOS for the proposed conditions, as shown in Table 4.1. SLOPE/W program output from this analysis for the retaining wall can be found in SLOPE/W

Table 4.1 – Global Stability Critical FOS

Location	Estimated Ramp D Station	End-of-Construction	Long-Term	Seismic
West Slope (Global Stability) Interim Condition	194+20	8.7	1.8	1.7
West Slope (Global Stability) Ultimate Condition	194+20	11.2	2.1	1.9
East Fill Slope	194+20	4.1	1.9	1.7

Based on the assumptions used in the analysis, a FOS of greater than or equal to 1.5 was achieved for all EOC and Long-term analyses, and a FOS of greater than 1.0 was achieved for all seismic analyses at all modeled locations. The analyses indicate that the existing and proposed soils at the site are suitable for overall support of the proposed construction.

4.3 Seismic Considerations

All new bridges and three sided structures are required to be designed for a seismic event per the 2015 IDOT Geotechnical Manual. The 2012 IDOT BBS Bridge Manual, Section 2.3.10 indicates that retaining walls shall only be designed for a seismic event when the consequences of their failure during a seismic event could cause loss of life as determined by the IDOT BBS. Based on this seismic parameters are not required for this retaining wall.

4.4 Scour

The proposed structure does not cross a river or other tributary; therefore, scour is not an issue.

4.5 Mining Activity

According to the Illinois State Geological Survey (ISGS) website, coal mining has occurred in Kankakee County (<http://isgs.illinois.edu/ilmines>). According to the Coal Mines and Underground Industrial Mines Map of Kankakee County, dated January 28, 2015, most of this activity is located in the western part of the county. No areas of mining are located near the project site.

No visual indications of subsurface mining activities were brought to our attention prior to issuance of this report.

The listed disclaimer indicates locations of some features on the mine map may be offset by 500 ft. or more due to errors in the original source maps, the compilation process, digitizing, or a combination of these factors. Refer to Illinois State Geological Survey Mine Map, Exhibit F.

5.0 FOUNDATION EVALUATIONS AND DESIGN RECOMMENDATIONS

5.1 General Feasibility

Based on the plans provided by Lochmueller Group, we understand that the retaining wall will run from approximate station 193+66.52 to 199+43.89 with the limits of the tangent pile wall from approximate station 193+88.04 to 195+02.81. The results of the subsurface exploration indicates that the underlying stratigraphy is relatively consistent across the site with very stiff to hard cohesive soils available to boring termination on limestone bedrock. The wall design shall be in accordance with AASHTO Standard Specifications, our recommendations are summarized below.

5.2 Wall Design Parameters

The soil parameters presented in Table 5.1 below are recommended to be used for the design of the soldier pile wall. The Permanent Condition parameters should be used behind and below the wall face. These parameters were calculated as per AASHTO Standard Specifications and were based on soil properties from Borings BH 20 and BH 24-29. A traffic surcharge of a minimum of 250 pounds per square foot (psf) should be considered in the wall design calculations, in addition to the properties recommended below. Based on the boring data obtained along the proposed wall alignment, a design groundwater elevation of El. 630.0 should be considered for design of the walls.

Table 5.1 – Soil Parameters for Soldier Pile Wall

Cohesive Soils											
Scenario	Θ (deg)	β (deg)	Φ (deg)	δ (deg)	γ (pcf)	S_u (psf)	K_a	K_o	K_p	K (pci)	ϵ_{80}
Interim Condition	90	18.4	0	0	120	5300	1	1	1	3000	0.005
Permanent Condition	90	18.4	30	0	120	250	0.50	0.56	1.84	n/a	n/a

The surface of a soldier pile is assumed to bear laterally on a width of 3 times its drilled diameter or 3 times its flange width when driven. A Resistance Factor of 0.75 should be applied to any passive earth pressures estimated for the design.

5.3 Foundations on Drilled Shafts

Based off of the subsurface exploration, competent limestone bedrock is generally encountered below elevation El. 612.0. Table 5.3 below lists Top of Rock, based off exploration and laboratory testing.

Table 5.3.1 – Estimated Bedrock Elevations

Reference Boring(s)	Top of Rock Depth-bgs (Ft)	Top of Rock Elevation (Ft)
BH 20 (S. Abut)	57.5	616.1
BH 24	59.0	614.5
BH 25	60.3	612.6
BH 26	60.2	612.0
BH 27	58.0	613.2
BH 28	56.0	613.7
BH 29	56.0	612.0

Recommendations for drilled shafts with sockets extending various depths into the underlying limestone, developing capacity from tip and side resistance, are provided for design support of the walls. The provided capacities are based on competent rock encountered at or below El. 612.0 as summarized in Table 5.3 above, and laboratory unconfined compressive strength test data performed on rock core samples from borings taken as recently as December of 2017 for the proposed retaining walls and bridge replacements for the KB&S Railroad over I-57 and Waldron Road over I-57, beginning at Station 215+18 along the I-57 corridor. Based on this recent bedrock data, unconfined compressive strengths of the bedrock at or below Elevation 612.0, generally range from 300 tsf to greater than 480 tsf with RQD's of 39 to 58, with increasing depth into the bedrock.

Based on the recent bedrock data and the IDOT Drilled Shaft Axial Capacity in Limestone or Dolostone spreadsheet as provided by IDOT BBS Foundations and Geotechnical Unit, Tables 5.3.1 thru 5.3.4 – Drilled Shaft Axial Capacity below contain a summary of Factored Shaft Resistances available for various shaft diameters based on socket depths into the underlying bedrock. The IDOT Drilled Axial Capacity Input sheet and Design Table are included in Exhibit H, for additional information. LRFD Resistance Factors of 0.55 for side resistance and 0.5 for tip resistance are incorporated into the allowable capacities, respectively.

Table 5.3.2 – Estimated Drilled Shaft Axial Capacity for 36-inch Diameter Shaft

Substructure Unit	Socket Depth (ft.)	Nominal Shaft Resistance Available (kips) TIP	Factored Shaft Resistance Available (kips) TIP	Nominal Shaft Resistance Available (kips) SIDE	Factored Shaft Resistance Available (kips) SIDE	Tip Elevation (ft.)
Ramp D Retaining Wall	1	2156	1078	308	169	611.0
	2	2303	1151	616	339	610.0
	3	2449	1225	924	508	609.0

Table 5.3.3 – Estimated Drilled Shaft Axial Capacity for 42-inch Diameter Shaft

Substructure Unit	Socket Depth (ft.)	Nominal Shaft Resistance Available (kips) TIP	Factored Shaft Resistance Available (kips) TIP	Nominal Shaft Resistance Available (kips) SIDE	Factored Shaft Resistance Available (kips) SIDE	Tip Elevation (ft.)
Ramp D Retaining Wall	1	3032	1516	359	198	611.0
	2	3207	1604	719	395	610.0
	3	3382	1691	1078	593	609.0

Table 5.3.4 – Estimated Drilled Shaft Axial Capacity for 48-inch Diameter Shaft

Substructure Unit	Socket Depth (ft.)	Nominal Shaft Resistance Available (kips) TIP	Factored Shaft Resistance Available (kips) TIP	Nominal Shaft Resistance Available (kips) SIDE	Factored Shaft Resistance Available (kips) SIDE	Tip Elevation (ft.)
Ramp D Retaining Wall	1	4056	2028	411	226	611.0
	2	4260	2130	822	452	610.0
	3	--	--	1232	678	609.0

Table 5.3.5 – Estimated Drilled Shaft Axial Capacity for 60-inch Diameter Shaft

Substructure Unit	Socket Depth (ft.)	Nominal Shaft Resistance Available (kips) TIP	Factored Shaft Resistance Available (kips) TIP	Nominal Shaft Resistance Available (kips) SIDE	Factored Shaft Resistance Available (kips) SIDE	Tip Elevation (ft.)
Ramp D Retaining Wall	1	--	--	513	282	611.0
	2	--	--	1027	565	610.0
	3	--	--	1540	847	609.0

It should be noted that as the diameter of the drilled shaft increases so does the potential for increased settlement.

Minimum center-to-center spacing is three times the shaft diameter. There is no reduction in Factored Resistance Available with this or larger shaft spacing, and the grouping effect can be ignored.

Temporary smooth steel pipe casing should be considered during construction from the top of

shaft to the top of the limestone during excavation, allowing for inspection of the end bearing surface during construction. Due to the presence of hard limestone, the contractor must be prepared to core the drilled shaft during installation.

5.4 Permanent Sheet Pile Installation

As indicated on the borings logs, very stiff to hard cohesive soils are present within the embedment depths necessary. It should be assumed that vibratory installation of the sheet pile sections may not be sufficient, and that hammering may be necessary. Prior to production driving, KEG recommends the installation of test sections of sheet pile to determine that the required design embedment depths are achievable.

6.0 CONSTRUCTION CONSIDERATIONS

6.1 Construction Activities

The construction activities should be performed in accordance with the current *IDOT Standard Specifications for Road and Bridge Construction* and any pertinent *Special Provisions* or policies.

6.2 Site and Soil Conditions

Should any wall design considerations assumed by either IDOT or KEG change, KEG should be contacted to determine if the recommendations stated in this report still apply.

7.0 COMPUTATIONS

Computations and analyses for special circumstances, if any, are included as exhibits. Please refer to each section of the report for reference to the exhibit containing any such calculations or analysis used.

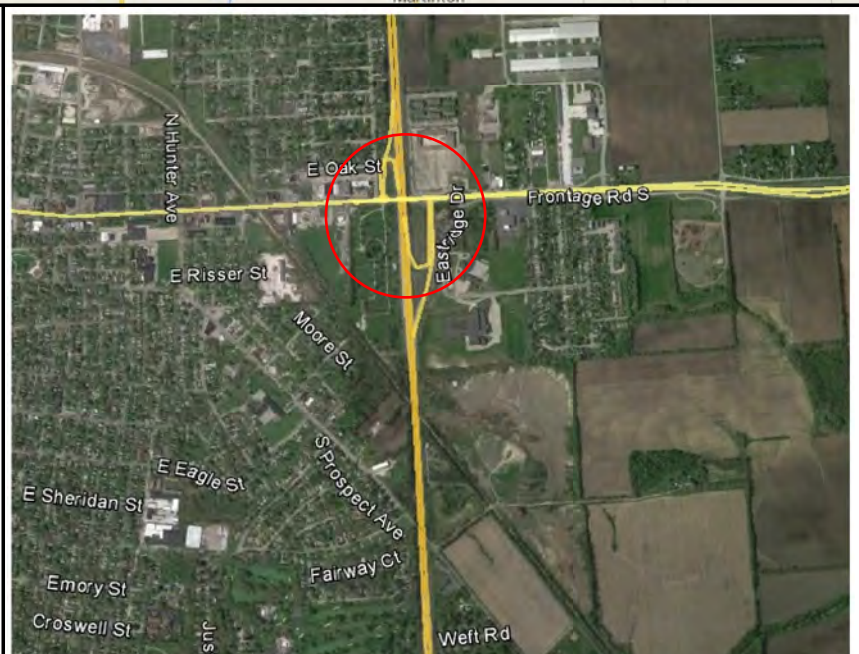
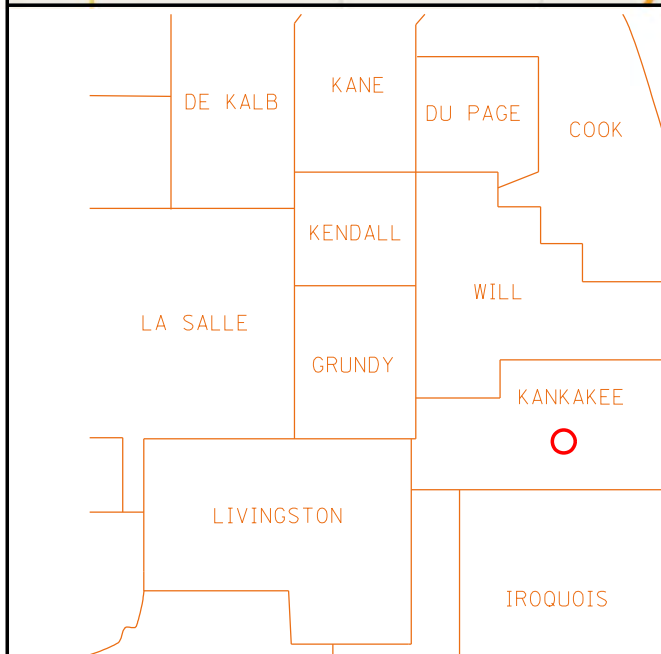
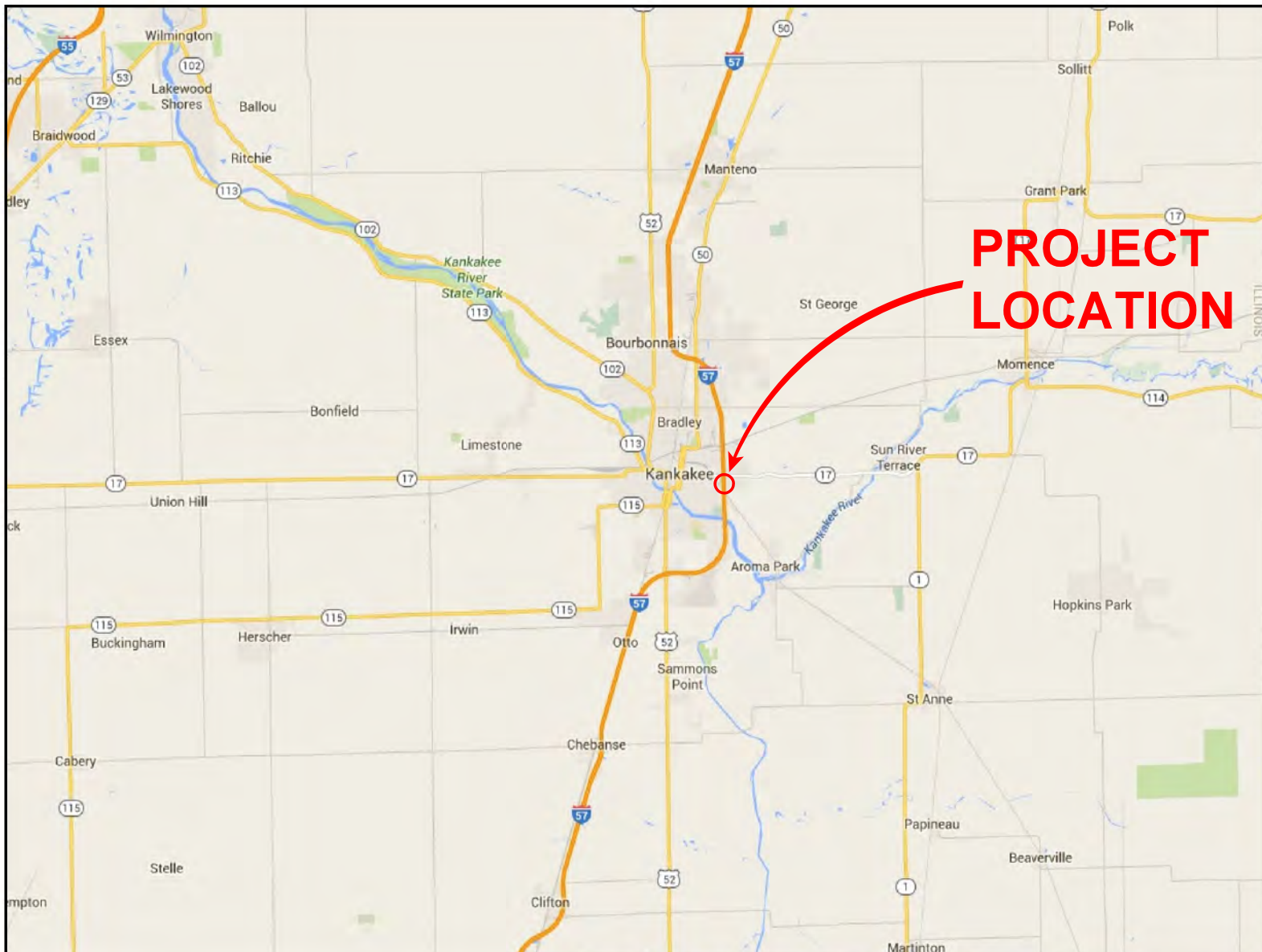
8.0 GEOTECHNICAL DATA

Soil borings can be found in Exhibit C. The Subsurface Profile can be found in Exhibit D. Laboratory test results can be found in Exhibit G.

9.0 LIMITATIONS

The recommendations provided herein are for the exclusive use of Lochmueller and IDOT. They are specific only to the project described and are based on subsurface information obtained at seven boring locations within the project area, KEG's understanding of the project as described herein, and geotechnical engineering practice consistent with the standard of care. No other warranty is expressed or implied. KEG should be contacted if conditions encountered during construction are not consistent with those described.

EXHIBIT A
LOCATION MAP



Kaskaskia
Engineering Group, LLC

208 E. Main St., Suite 100
Belleville, Illinois 62220
618.233.5877 phone
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www.kaskaskiaeng.com

PROFESSIONAL REGISTRATIONS
Illinois Professional Design Firm
Professional Engineering Group

LICENSE NO.
184.004773
20-5080586

LOCATION MAP

**SOUTHWEST RAMP ON I-57 OVER IL ROUTE 17
RETAINING WALL AT RAMP D
KANKAKEE COUNTY, ILLINOIS**

EXHIBIT NO.

A

KEG JOB # 11-1017

EXHIBIT B

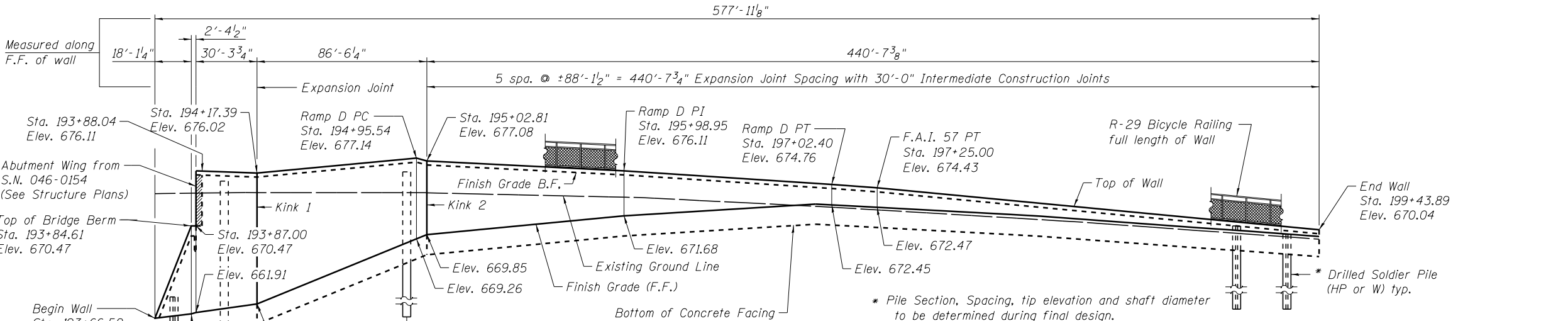
TYPE, SIZE, AND LOCATION (TS&L) PLAN

Benchmark: Point 8528, Northing 1621955.641 & Easting 1121273.357, Cut "X" in concrete Median on IL Route 17 approximately 50' west of Existing Southbound Interstate 57 Structure 046-0007 over Illinois Route 17. Elev. 654.97

Existing Structure: None, Existing Interstate 57 is to be re-aligned. The traffic on existing Interstate 57 is to be shifted on a new alignment prior to wall construction.

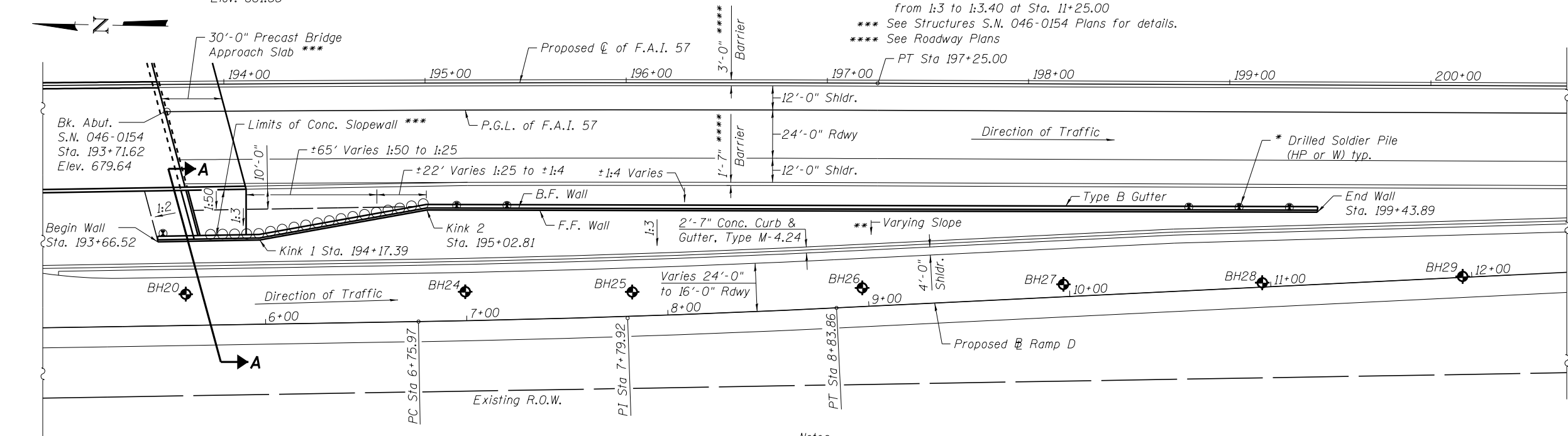
Future Structure: The proposed wall for Ramp D will satisfy the Interim and Ultimate Lane Configurations for F.A.I. 57. For the Interim Condition, F.A.I. Northbound and Southbound will consist of 2 lanes and 2 shoulders in each direction. This configuration will be constructed under this contract. At a future date, both Northbound and Southbound will be constructed to an Ultimate Condition which will have an additional lane added. The location and height of the wall is set to accommodate both conditions. The wall shall be designed to accommodate loads for both the Interim and Ultimate Conditions.

No Salvage.



ELEVATION
(Looking at F.F. of Wall)

- * Pile Section, Spacing, tip elevation and shaft diameter to be determined during final design.
- ** For Interim at approximately Sta. 9+00.00 for Ramp D Finish Grade Slope off F.F. of wall begins to vary from 1:3 to 1:9.75 at Sta. 11+25.00
- ** For Ultimate at approximately Sta. 9+00.00 for Ramp D Finish Grade Slope off F.F. of wall begins to vary from 1:3 to 1:3.40 at Sta. 11+25.00
- *** See Structures S.N. 046-0154 Plans for details.
- **** See Roadway Plans



PLAN

- Notes:
- F.F. - Front Face.
 - B.F. - Back Face.
 - For Expansion Joint Details & Wall Control Points see sheet 2 of 6.
 - For Section A-A see sheet 3 of 6.
 - Plan and Elevation views depict the lane configuration, slopes, and elevations for the Interim Condition.
 - Stations taken along $\mathcal{C}$ F.A.I. 57. See Wall Control Point Table for Offsets sheet 2 of 6.
 - Plan slopes and horizontal dimensions shown on the B.F. of the wall are at Rt. L's to F.A.I. 57 unless otherwise noted.
 - Plan slopes and horizontal dimensions shown on the F.F. of the wall are at Rt. L's to $\mathcal{C}$ Ramp D unless otherwise noted.
 - Wall deflection criteria for wall Station 194+59.065 to 199+43.89, the maximum total lateral deflection for the top of the wall from the proposed or temporary grade shall not exceed the lesser of 1.0 inch or 1% of the exposed wall height.



USER NAME = chadf	DESIGNED - CJF	REVISED
Illinois Design Firm Number 184.001670	CHECKED - ACS	REVISED
PLOT SCALE =	DRAWN - EDW	REVISED
PLOT DATE = 6/26/2017 11:55:58 AM	CHECKED - CJF	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

SHEET NO. 1 OF 6 SHEETS

DESIGN SPECIFICATIONS

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

DESIGN STRESSES

FIELD UNITS
 f'_c = 3,500 psi
 f_y = 60,000 psi (Reinforcement)
 f_y = 50,000 psi (M270 Grade 50)

HIGHWAY CLASSIFICATION

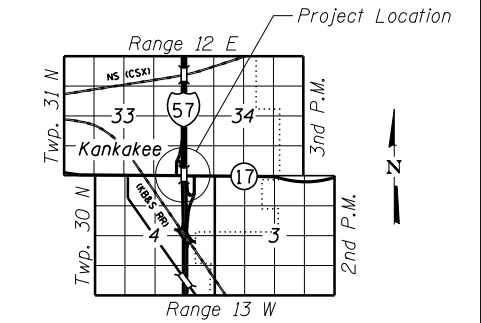
F.A.I. Route 57
Functional Class: Interstate
ADT: 28,000 (2016); 37,675 (2040)
DHV: 2,205 (2016); 2,636 (2040)
ADTT: 32% (2016); 28% (2040)
Design Speed: 75 m.p.h.
Posted Speed: 70 m.p.h.
2-Way Traffic
Directional Distribution: 49 (SB); 51 (NB)

HIGHWAY CLASSIFICATION

F.A.I. 57 Ramp D
Functional Class: Ramp
ADT: 2,150 (2016); 3,185 (2040)
DHV: 180 (2016); 248 (2040)
ADTT: 17% (2016); 17% (2040)
Design Speed: 35 m.p.h.
Posted Speed: 30 m.p.h.
1-way Traffic
Directional Distribution: 100

HIGHWAY CLASSIFICATION

F.A.P. Rte. 330 (Illinois Rte. 17)
Functional Class: Other Principal Arterial
ADT: 15,200 (2016); 24,500 (2040)
DHV: 1,274 (2016); 1,869 (2040)
ADTT: 11% (2016); 17% (2040)
Design Speed: 35 m.p.h.
Posted Speed: 30 m.p.h.
2-Way Traffic
Directional Distribution: 57 (SB); 43 (NB)

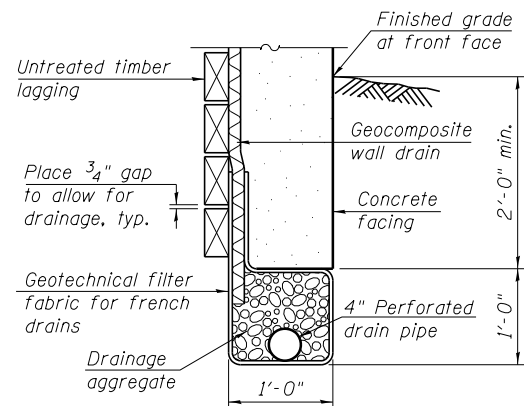


LOCATION SKETCH

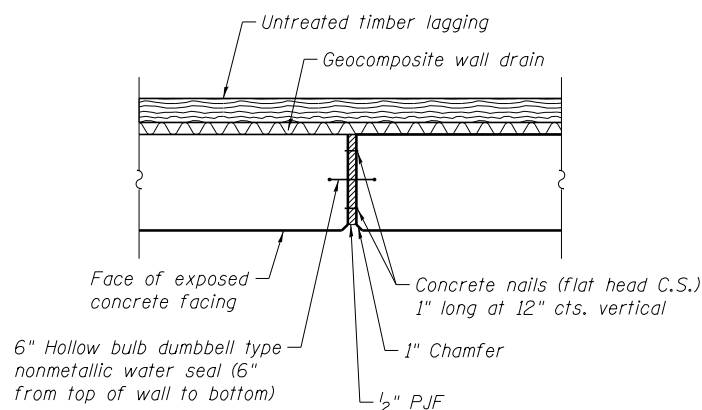
GENERAL PLAN
RETAINING WALL AT RAMP D
(SOUTHWEST RAMP ON I-57 OVER
IL 17 AT SN 046-0154)
F.A.I. RTE. 57 - SEC. (46-3) HBK
KANKAKEE COUNTY
STATION 193+66.52 TO 199+43.89
STRUCTURE NO. 046-8805

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
57	(46-3)HBK	KANKAKEE	XX	
S.N. 046-8805		CONTRACT NO. 66863		

ILLINOIS FED. AID PROJECT



DRAIN DETAILS BETWEEN SOLDIER PILES



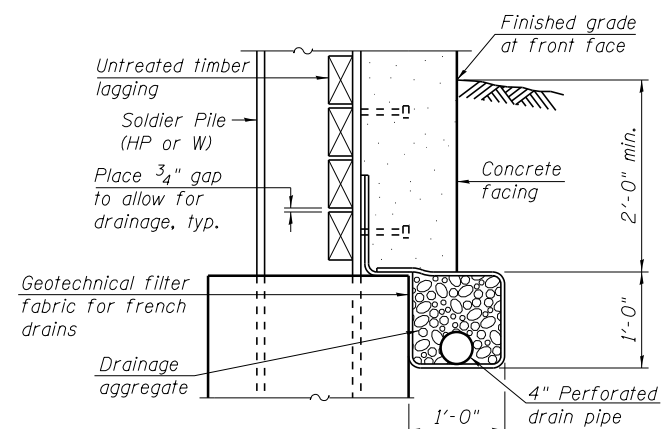
EXPANSION JOINT DETAIL

WALL CONTROL POINTS

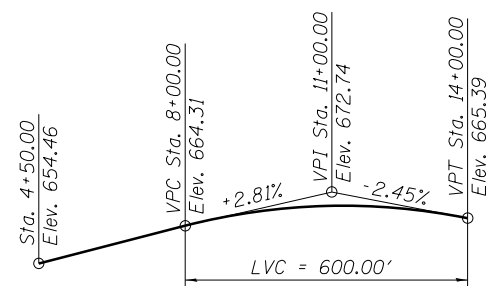
Description	℄ I-57 Station	℄ I-57 Offset	℄ Ramp D Station	℄ Ramp D Offset	Interim Top of Wall Elev	Interim Finished Grade Front Face Elev	Ultimate Top of Wall Elev	Ultimate Finished Grade Front Face Elev
Begin Wall	193+66.52	78.21	5+47.00	41.86	661.84	661.28	661.84	661.28
Top Bridge Berm	193+84.61	78.21	5+65.11	41.86	670.47	661.81	670.47	661.81
Abut Wall Intersect Low	193+87.00	78.21	5+67.44	41.86	670.47	661.88	670.47	661.88
* Abut Wall Intersect High	193+88.04	78.21	5+68.47	41.86	676.11	661.91	676.11	661.91
Kink Point 1	194+17.39	77.72	5+97.75	41.86	676.02	662.77	676.02	662.77
PC Ramp D (Hrz. Curve)	194+95.54	64.03	6+75.97	54.61	677.14	669.26	678.76	669.26
Kink Point 2	195+02.81	62.75	6+83.21	55.79	677.08	669.85	678.70	669.85
PI Ramp D (Hrz. Curve)	195+98.95	63.15	7+79.92	53.12	676.11	671.68	677.74	671.68
PT Ramp D (Hrz. Curve)	197+02.40	63.24	8+83.86	48.66	674.76	672.45	676.39	672.45
PT FAI 57 (Hrz. Curve)	197+25.00	63.21	9+06.42	47.50	674.43	672.47	676.05	672.56
End Wall	199+43.89	62.86	11+25.00	36.29	670.33	670.04	671.95	671.33

Stations & Offsets in table measured along front face of wall to ℄ of F.A.I. 57 & ℄ Ramp D

* At Back of Abutment

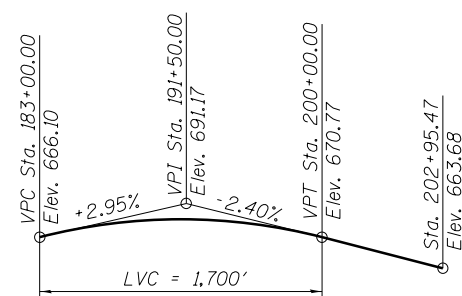


DRAIN DETAILS AT SOLDIER PILES



PROFILE GRADE

(℄ Ramp D)



PROFILE GRADE

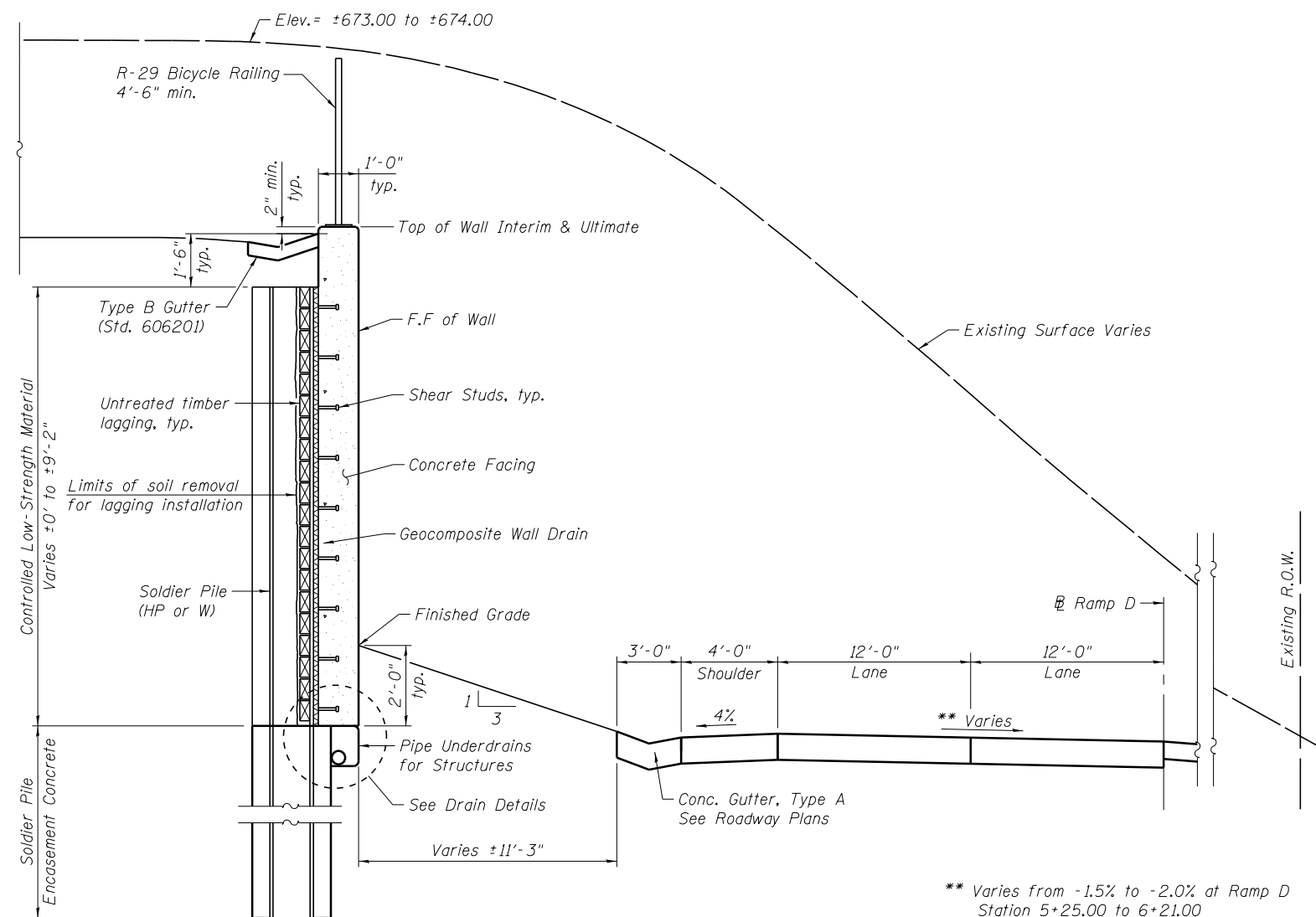
(Proposed F.A.I. 57)
(Stationing along ℄ F.A.I. 57)

CURVE DATA

(Ramp D)
PI Sta. = 7+79.92
Δ = 1°49'57" (LT)
D = 0°52'53"
R = 6,500.00'
T = 103.95'
L = 207.89'
E = 0.83'
e = 2.0%
T.R. = NA
S.E. Run = NA
PC Sta. = 6+75.97
PT Sta. = 8+83.86

CURVE DATA

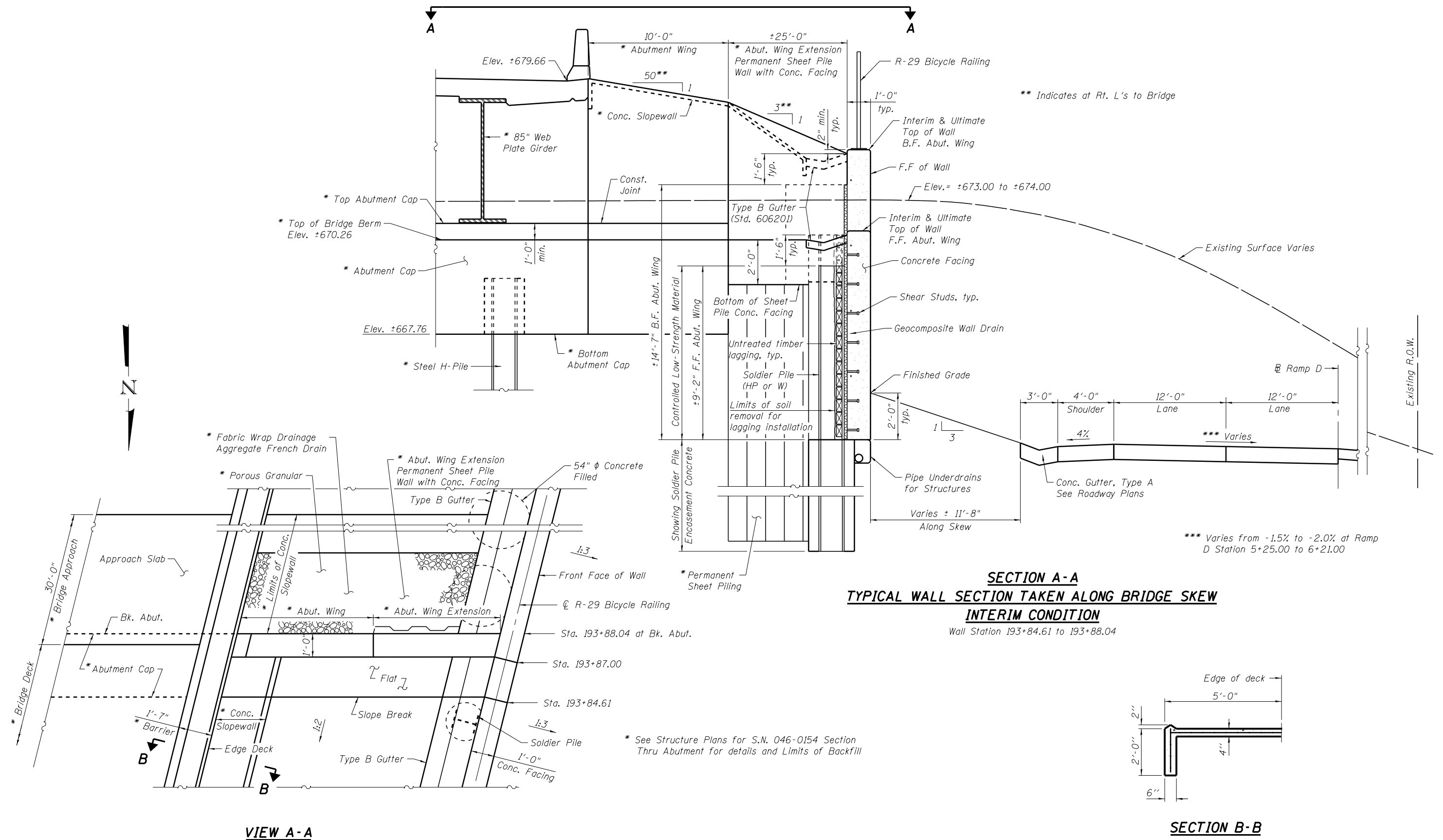
(F.A.I. Route 57)
PI Sta. = 189+74.14
Δ = 2°52'07" (RT)
D = 0°11'28"
R = 30,000.00'
T = 751.18'
L = 1,502.04'
E = 9.40'
e = NC
T.R. = NA
S.E. Run = NA
PC Sta. = 182+22.96
PT Sta. = 197+25.00

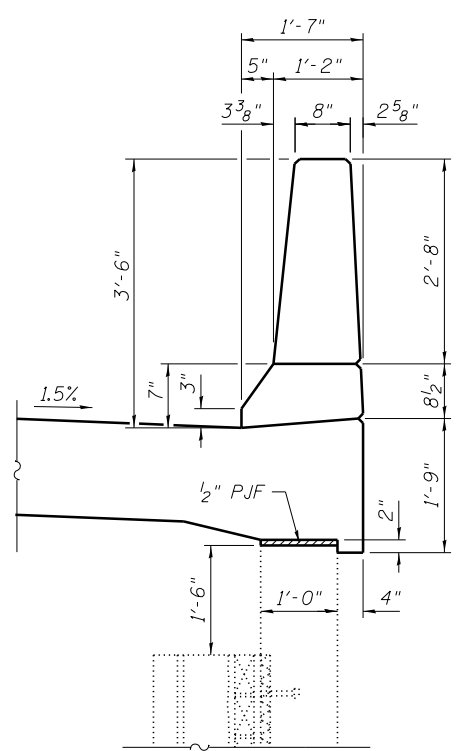
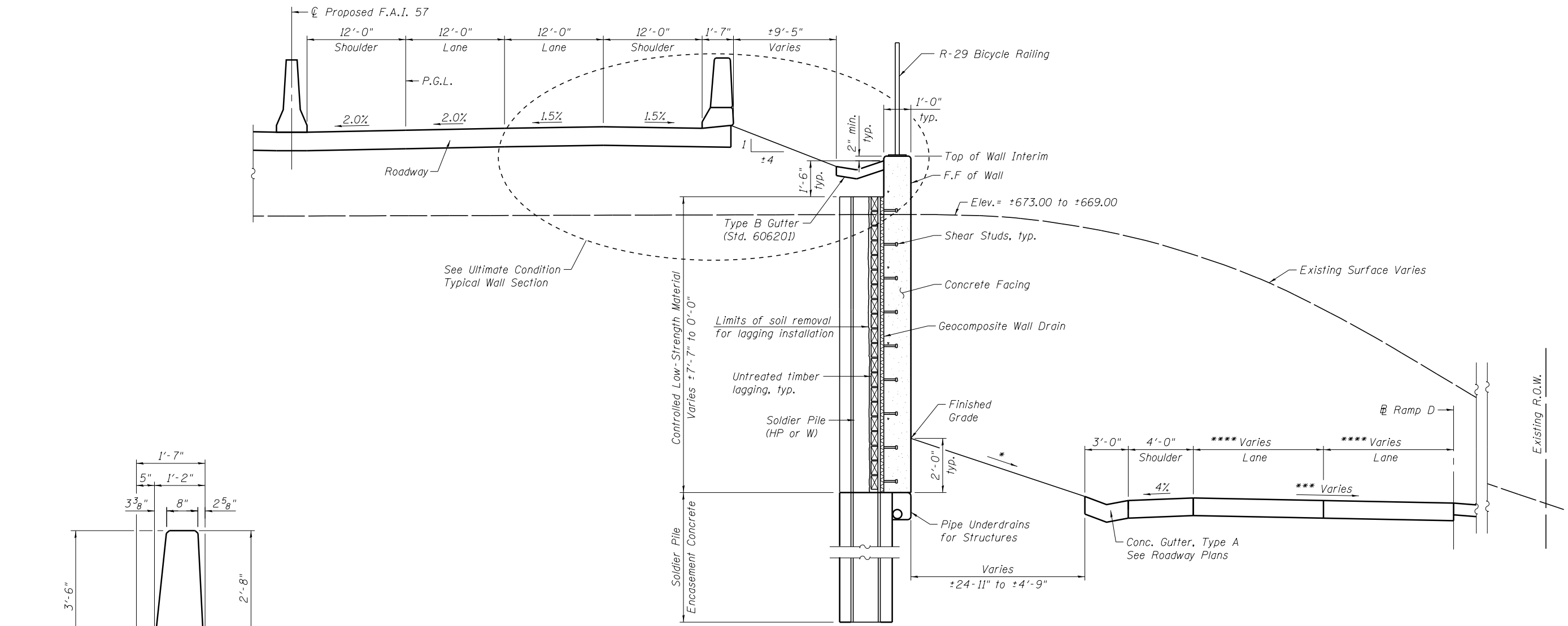


SECTION THRU INTERIM & ULTIMATE

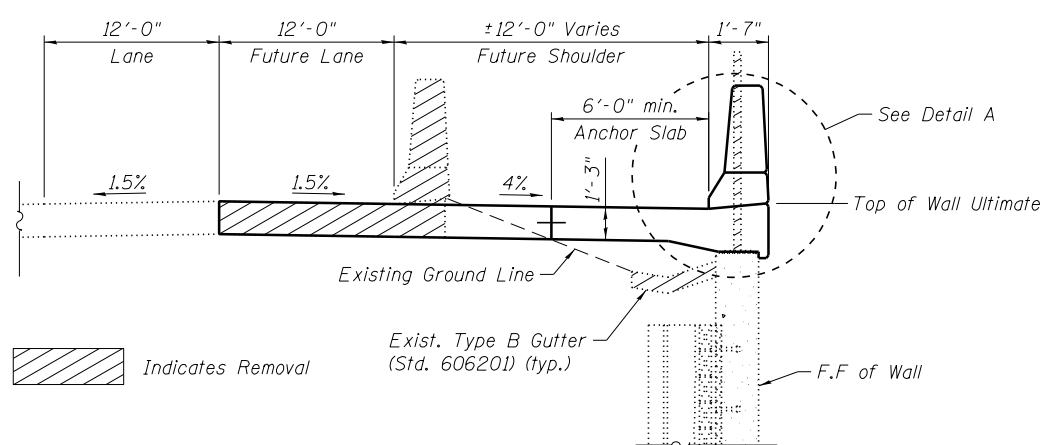
Wall Station 193+66.52 to 193+84.61
(Looking South)

**Varies from -1.5% to -2.0% at Ramp D Station 5+25.00 to 6+21.00





DETAIL A
SECTION THRU BARRIER FOR SOLDIER
PILE WALL WITH C.I.P. FACING
ULTIMATE CONDITION



TYPICAL WALL SECTION
ULTIMATE CONDITION
 Wall Station 195+02.81 to 199+43.89
 (Looking South)

TYPICAL WALL SECTION
INTERIM CONDITION
 Wall Station 195+02.81 to 199+43.84
 (Looking South)

- * For Interim, Slope Varies at Ramp D Station 9+00 from 1:3 to 1:9.75 at Station 11+25.00
- * For Ultimate, Slope Varies at Ramp D Station 9+00 from 1:3 to 1:3.40 at Station 11+25.00
- ** Roadway Varies from 24'-0" to 16'-0" at Ramp D Station 10+53.05 to 14+53.05
- *** Slope Varies from -1.5% to -2.0% at Ramp D Station 5+25.00 to 6+21.00
- **** Maximum Pavement Joint Spacing = 14'-0"

S:\Projects\411\0005-01\1-57 SPUNBridg\QNT SL Retaining Wall Ramp DO468805-66863-006-T58L.dgn



USER NAME = chadf	DESIGNED - CJF	REVISED
Illinois Design Firm Number 184.001670	CHECKED - ACS	REVISED
PLOT SCALE =	DRAWN - EDW	REVISED
PLOT DATE = 6/26/2017 11:59:50 AM	CHECKED - CJF	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

SHEET NO. 6 OF 6 SHEETS

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
57	(46-3)HBK	KANKAKEE	XX	
S.N. 046-8805		CONTRACT NO. 66863		
		ILLINOIS FED. AID PROJECT		

EXHIBIT C
BORING LOGS

Page 1 of 2

Date 8/21/13

	10	5.0	24
—	14	S	

BBS, form 137 (Rev. 8-99)



SOIL BORING LOG

ROUTE I-57 (FAI 57) DESCRIPTION I-57 over IL 17 in Kankakee LOGGED BY Larry Myers

SECTION (46-3)R, HBK, 5HBR, 6HBR LOCATION NE 1/4, SEC. 4, TWP. 30N, RNG. 13W, 2nd PM,
Latitude 41.118186, Longitude -87.835804

COUNTY Kankakee DRILLING METHOD Hollow Stem Auger HAMMER TYPE CME Automatic

STRUCT. NO. 046-0006/0007 (EX)
046-0154 (PR)
Station 190+92.05 (EX) 190+94.06 (PR)

BORING NO. BH 20 (S. Abut.)
Station 193+77.84
Offset 105.3 ft Rt.
Ground Surface Elev. 673.62 ft

D E P T H	B L O W S	U C S Qu	M O I S T
(ft)	(/6")	(tsf)	(%)

Surface Water Elev. _____ ft
Stream Bed Elev. _____ ft

Groundwater Elev.:
First Encounter 621.6 ft ▼
Upon Completion 630.6 ft ▼
After _____ Hrs. _____ ft

Hard to Very Stiff Gray Silty Clay
(continued)

5			
6	4.1	23	
9	B		

▽

4			
5	4.0	22	
10	B		

-45

5			
5	4.6	22	
9	B		

5

6	4.1	19	
9	B		

623.62 -50

Hard Gray Silty Loam Till with
Layers of Loamy Sand/Gravel

4			
6	4.0	22	
8	B		

▼

6			
9	5.1	10	
14	S		

-55

16			
28		10	
31			

616.12

615.79

Dense Gray Limestone
Weathered Surface

100/4"		9	
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End of Boring

-60

SOIL BORING I-57 & IL 17 INTERCHANGE.GPJ IL_DOT.GDT 1/20/17

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)



SOIL BORING LOG

Date 8/27/13

ROUTE I-57 (FAI 57) DESCRIPTION Retaining Wall in Southwest Quadrant of I-57 & IL 17 Interchange in Kankakee LOGGED BY Larry Myers

SECTION (46-3)R, HBK, 5HBR, 6HBR LOCATION NE 1/4, SEC. 4, TWP. 30N, RNG. 13W, 2nd PM, Latitude 41.117798, Longitude -87.835799

COUNTY Kankakee DRILLING METHOD Hollow Stem Auger HAMMER TYPE CME Automatic

STRUCT. NO. Station	DEPTH H	BLOW S	UCS Qu	MOIST T	Surface Water Elev. _____ ft Stream Bed Elev. _____ ft Groundwater Elev.: First Encounter _____ 613.5 ft ▼ Upon Completion _____ 626.0 ft ▼ After _____ Hrs. _____ ft	DEPTH H	BLOW S	UCS Qu	MOIST T
BORING NO. _____ BH 24 Station _____ 195+19.71 Offset _____ 106.7 ft Rt. Ground Surface Elev. _____ 673.50 ft	(ft)	(/6")	(tsf)	(%)		(ft)	(/6")	(tsf)	(%)
Augered Bituminous Shoulder, Gray Silty Clay Loam Till Fill & Brown and Gray Silty Clay Fill					Very Stiff to Hard Brown & Gray Silty Clay (<i>continued</i>)	9			
						9	4.5	23	
						12	P		
						10			
						12	8.1	21	
						16	S		
	-5					-25			
						7			
						10	8.1	21	
						16	S		
						7			
						10	7.4	21	
						14	S		
	-10					-30			
						8			
						9	6.1	22	
						12	S		
						9			
						12	6.7	21	
						10	S		
	658.50 -15					-35			
Very Stiff to Hard Brown & Gray Silty Clay		4				8			
		5	3.0	18		12	5.1	25	
		7	P			11	S		
		6				6			
		8	4.0	17		9	4.7	22	
		9	P			10	S		
					634.50				
					Hard to Very Stiff Gray Silty Clay				
	-20					-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
IDOT

SOIL BORING LOG

Page 2 of 2

Date 8/27/13

ROUTE I-57 (FAI 57) DESCRIPTION Retaining Wall in Southwest Quadrant of I-57 & IL 17 Interchange in Kankakee LOGGED BY Larry Myers

SECTION (46-3)R, HBK, 5HBR, 6HBR LOCATION NE 1/4, SEC. 4, TWP. 30N, RNG. 13W, 2nd PM, Latitude 41.117798, Longitude -87.835799

COUNTY Kankakee DRILLING METHOD Hollow Stem Auger HAMMER TYPE CME Automatic

STRUCT. NO. _____
Station _____

BORING NO. BH 24
Station 195+19.71
Offset 106.7 ft Rt.
Ground Surface Elev. 673.50 ft

D E P T H (ft)	B L O W S (/6")	U C S (tsf)	M O I S T (%)
-----------------------------------	------------------------------------	--------------------------	----------------------------------

Surface Water Elev. _____ ft	Stream Bed Elev. _____ ft
Groundwater Elev.: First Encounter <u>613.5</u> ft ▼	
Upon Completion <u>626.0</u> ft ▼	
After _____ Hrs. _____ ft	

D E P T H (ft)	B L O W S (/6")	U C S (tsf)	M O I S T (%)
-----------------------------------	------------------------------------	--------------------------	----------------------------------

Hard to Very Stiff Gray Silty Clay
(continued)

8			
9	5.0	21	
13	B		

613.00

100/6"

End of Boring

-45			
9			
10	3.3	22	
10	B		

▽

623.50 -50

Hard to Very Stiff Gray Silty Clay
Loam with Silt Layers

8			
10	5.0	19	
12	S		

-55			
10			
12	7.4	18	
16	S		

614.50

Dense Gray Limestone -
Weathered in top 1'

▼-60

-80

SOIL BORING I-57 & IL 17 INTERCHANGE.GPJ IL_DOT.GDT 1/20/17

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)

BBS, form 137 (Rev. 8-99)



SOIL BORING LOG

ROUTE I-57 (FAI 57) DESCRIPTION Retaining Wall in Southwest Quadrant of I-57 & IL 17 Interchange in Kankakee LOGGED BY Larry Myers

SECTION (46-3)R, HBK, 5HBR, 6HBR LOCATION NE 1/4, SEC. 4, TWP. 30N, RNG. 13W, 2nd PM, Latitude 41.11757, Longitude -87.835788

COUNTY Kankakee DRILLING METHOD Hollow Stem Auger HAMMER TYPE CME Automatic

STRUCT. NO. Station	DEPTH (ft)	BLOW S (/6")	UCS Qu (tsf)	MOIST T (%)	Surface Water Elev. Stream Bed Elev. Groundwater Elev.: First Encounter Upon Completion After Hrs.	DEPTH (ft)	BLOW S (/6")	UCS Qu (tsf)	MOIST T (%)
BORING NO. <u>BH 25</u> Station <u>196+03.11</u> Offset <u>104.9 ft Rt.</u> Ground Surface Elev. <u>672.98</u> ft									
Augered Bituminous Shoulder, Brown & Gray Silty Clay Loam Fill					Hard Brown & Gray Silty Clay (continued)		10		
							12	8.4	20
							16	S	
							8		
							10	7.4	21
							12	S	
	-5					-25			
							5		
							7	6.1	24
							10	S	
							6		
							9	6.1	25
							9	S	
662.98 -10					643.48				
Very Stiff Gray & Brown Silty Clay Loam Fill		4			Hard to Very Stiff Gray Silty Clay	-30	5		
		6	3.5	18			7	5.4	21
		8	P				10	S	
		5							
		7	4.0	19					
		9	P						
658.48									
Hard Brown & Gray Silty Clay	-15	4				-35	6		
		8	6.1	19			9	5.1	22
		10	S				12	S	
		8							
		10	7.1	20					
		13	S						
	-20					-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
IDOT

SOIL BORING LOG

Page 2 of 2

Date 8/27/13

ROUTE I-57 (FAI 57) DESCRIPTION Retaining Wall in Southwest Quadrant of I-57 & IL 17 Interchange in Kankakee LOGGED BY Larry Myers

SECTION (46-3)R, HBK, 5HBR, 6HBR LOCATION NE 1/4, SEC. 4, TWP. 30N, RNG. 13W, 2nd PM, Latitude 41.11757, Longitude -87.835788

COUNTY Kankakee DRILLING METHOD Hollow Stem Auger HAMMER TYPE CME Automatic

STRUCT. NO. _____
Station _____

BORING NO. BH 25
Station 196+03.11
Offset 104.9 ft Rt.
Ground Surface Elev. 672.98 ft

D E P T H (ft)	B L O W S (/6")	U C S (tsf)	M O I S T (%)
-----------------------------------	------------------------------------	--------------------------	----------------------------------

Surface Water Elev. _____ ft	Stream Bed Elev. _____ ft
Groundwater Elev.: First Encounter <u>615.0</u> ft ▼	
Upon Completion <u>618.0</u> ft ▼	
After _____ Hrs. _____ ft	

D E P T H (ft)	B L O W S (/6")	U C S (tsf)	M O I S T (%)
-----------------------------------	------------------------------------	--------------------------	----------------------------------

Hard to Very Stiff Gray Silty Clay
(continued)

4			
8	4.6		26
12	B		

Dense Gray Limestone 612.65
End of Boring

100/4"			9
--------	--	--	---

-45			
4			
5	3.1		23
9	B		

623.98

Hard to Very Stiff Gray Silty Clay
Loam with Silt Layers & Silty
Loam Layers

-50			
4			
5	4.0		21
6	P		

-55			
8			
10	4.5		13
12	P		

612.98 -60

-70

-75

-80

SOIL BORING I-57 & IL 17 INTERCHANGE.GPJ IL_DOT.GDT 1/20/17

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)

BBS, form 137 (Rev. 8-99)



SOIL BORING LOG

ROUTE I-57 (FAI 57) DESCRIPTION Retaining Wall in Southwest Quadrant of I-57 & IL 17 Interchange in Kankakee LOGGED BY Larry Myers

SECTION (46-3)R, HBK, 5HBR, 6HBR LOCATION NE 1/4, SEC. 4, TWP. 30N, RNG. 13W, 2nd PM, Latitude 41.117265, Longitude -87.835779

COUNTY Kankakee DRILLING METHOD Hollow Stem Auger HAMMER TYPE CME Automatic

STRUCT. NO. Station	DEPTH H S	BLOW W S	UCS Qu	MOIST S T	Surface Water Elev. _____ ft Stream Bed Elev. _____ ft	DEPTH H S	BLOW W S	UCS Qu	MOIST S T	Groundwater Elev.: First Encounter _____ ft ▼ Upon Completion _____ ft ▼ After _____ Hrs. _____ ft
BORING NO. _____ Station _____ Offset _____ Ground Surface Elev. _____ ft	(ft)	(/6")	(tsf)	(%)		(ft)	(/6")	(tsf)	(%)	
Augered Bituminous Shoulder, Brown & Gray Silty Clay Fill with some Black Silty Clay Loam Fill					Hard Brown & Gray Silty Clay (continued)		8			
							11	6.7	22	
							15	S		
							8			
							11	6.9	22	
							14	S		
	-5					-25	8			
							12	5.4	23	
							15	S		
					645.24					
					Hard to Very Stiff Gray Silty Clay		8			
							10	4.3	24	
							13	B		
						-30	8			
							12	4.1	25	
							14	B		
662.24 -10										
Hard Brown & Gray Silty Clay	6						8			
	8	4.5	25				12	4.1	25	
	10	P					14	B		
	8									
	12	7.1	20							
	15	S								
	-15					-35	4			
	10						6	3.1	26	
	12	9.9	20				8	B		
	17	S								
	8									
	11	8.7	21							
	15	S								
	-20					-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
IDOT

SOIL BORING LOG

Page 2 of 2

Date 8/28/13

ROUTE I-57 (FAI 57) DESCRIPTION Retaining Wall in Southwest Quadrant of I-57 & IL 17 Interchange in Kankakee LOGGED BY Larry Myers

SECTION (46-3)R, HBK, 5HBR, 6HBR LOCATION NE 1/4, SEC. 4, TWP. 30N, RNG. 13W, 2nd PM, Latitude 41.117265, Longitude -87.835779

COUNTY Kankakee DRILLING METHOD Hollow Stem Auger HAMMER TYPE CME Automatic

STRUCT. NO. _____
Station _____

BORING NO. BH 26
Station 197+14.65
Offset 103.8 ft Rt.
Ground Surface Elev. 672.24 ft

D E P T H (ft)	B L O W S (/6")	U C S (tsf)	M O I S T (%)
-----------------------------------	------------------------------------	--------------------------	----------------------------------

Surface Water Elev. _____ ft	Stream Bed Elev. _____ ft
Groundwater Elev.: First Encounter <u>612.2</u> ft ▼	
Upon Completion <u>627.2</u> ft ▼	
After _____ Hrs. _____ ft	

D E P T H (ft)	B L O W S (/6")	U C S (tsf)	M O I S T (%)
-----------------------------------	------------------------------------	--------------------------	----------------------------------

Hard to Very Stiff Gray Silty Clay
(continued)

3			
4	2.7		25
6	B		

Dense Gray Limestone 612.07
End of Boring

100/2		8
-------	--	---

▽ -45

6			
8	3.4		23
10	B		

624.24

Hard to Very Stiff Gray Silty Clay
Loam/Silty Loam Till with Silt
Layers

6			
8	4.0		13
10	P		

-50

5			
8	5.4		18
12	S		

-55

612.24 ▼ -60

-70

-75

-80

SOIL BORING I-57 & IL 17 INTERCHANGE.GPJ IL_DOT.GDT 1/20/17

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)

BBS, form 137 (Rev. 8-99)



SOIL BORING LOG

ROUTE I-57 (FAI 57) DESCRIPTION Retaining Wall in Southwest Quadrant of I-57 & IL 17 Interchange in Kankakee LOGGED BY Larry Myers

SECTION (46-3)R, HBK, 5HBR, 6HBR LOCATION NE 1/4, SEC. 4, TWP. 30N, RNG. 13W, 2nd PM, Latitude 41.116983, Longitude -87.835765

COUNTY Kankakee DRILLING METHOD Hollow Stem Auger HAMMER TYPE CME Automatic

STRUCT. NO. Station	DEPTH H S	BLOW S Qu	UCS Qu	MOIST S T	Surface Water Elev. _____ ft Stream Bed Elev. _____ ft	DEPTH H S	BLOW S Qu	UCS Qu	MOIST S T
BORING NO. _____ Station _____ Offset _____ Ground Surface Elev. _____ ft	(ft)	(/6")	(tsf)	(%)	Groundwater Elev.: First Encounter _____ ft Upon Completion _____ ft After _____ Hrs. _____ ft	(ft)	(/6")	(tsf)	(%)
Augered Bituminous Shoulder, Brown & Gray Silty Clay Fill	_____	_____	_____	_____	Hard Brown & Gray Silty Clay with Minor Silt Layers @ 18' (continued)	6	_____	_____	_____
_____	_____	_____	_____	_____	_____	8	6.9	20	_____
_____	_____	_____	_____	_____	_____	11	S	_____	_____
_____	_____	_____	_____	_____	649.21	_____	_____	_____	_____
_____	_____	_____	_____	_____	Hard to Very Stiff Gray Silty Clay	8	_____	_____	_____
_____	_____	_____	_____	_____	_____	9	8.7	20	_____
_____	_____	_____	_____	_____	_____	13	S	_____	_____
666.21 -5	_____	_____	_____	_____	_____	_____	_____	_____	_____
Very Stiff Brown & Gray Silty Clay with some Black Silty Clay Loam Fill	3	_____	_____	_____	_____	5	_____	_____	_____
_____	2	3.0	22	_____	_____	7	5.0	20	_____
_____	4	P	_____	_____	_____	11	B	_____	_____
664.21	_____	_____	_____	_____	_____	_____	_____	_____	_____
Very Stiff Black to Dark Brown Silty Clay Loam Topsoil	4	_____	_____	_____	_____	_____	_____	_____	_____
_____	5	3.5	24	_____	_____	_____	_____	_____	_____
_____	3	P	_____	_____	_____	_____	_____	_____	_____
661.71	_____	_____	_____	_____	_____	_____	_____	_____	_____
Hard Brown & Gray Silty Clay Till	-10	_____	_____	_____	_____	-30	_____	_____	_____
_____	3	_____	_____	_____	_____	4	_____	_____	_____
_____	5	4.0	18	_____	_____	5	4.4	22	_____
_____	9	P	_____	_____	_____	9	B	_____	_____
659.21	_____	_____	_____	_____	_____	_____	_____	_____	_____
Hard Brown & Gray Silty Clay with Minor Silt Layers @ 18'	8	_____	_____	_____	_____	_____	_____	_____	_____
_____	12	7.1	19	_____	_____	_____	_____	_____	_____
_____	16	S	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
-15	8	_____	_____	_____	_____	-35	_____	_____	_____
_____	9	6.2	19	_____	_____	4	_____	_____	_____
_____	13	S	_____	_____	_____	4	4.9	23	_____
_____	_____	_____	_____	_____	_____	7	B	_____	_____
_____	9	_____	_____	_____	_____	_____	_____	_____	_____
_____	9	6.2	19	_____	_____	_____	_____	_____	_____
_____	14	S	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
-20	_____	_____	_____	_____	_____	-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
IDOT

SOIL BORING LOG

Page 2 of 2

Date 8/28/13

ROUTE I-57 (FAI 57) DESCRIPTION Retaining Wall in Southwest Quadrant of I-57 & IL 17 Interchange in Kankakee LOGGED BY Larry Myers

SECTION (46-3)R, HBK, 5HBR, 6HBR LOCATION NE 1/4, SEC. 4, TWP. 30N, RNG. 13W, 2nd PM, Latitude 41.116983, Longitude -87.835765

COUNTY Kankakee DRILLING METHOD Hollow Stem Auger HAMMER TYPE CME Automatic

STRUCT. NO. _____
Station _____

BORING NO. BH 27
Station 198+17.78
Offset 100.8 ft Rt.
Ground Surface Elev. 671.21 ft

D E P T H (ft)	B L O W S (/6")	U C S (tsf)	M O I S T (%)
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Surface Water Elev. _____ ft
Stream Bed Elev. _____ ft
Groundwater Elev.:
First Encounter 613.2 ft ▼
Upon Completion 626.2 ft ▼
After _____ Hrs. _____ ft

Hard to Very Stiff Gray Silty Clay
(continued)

4			
5	3.9		24
7	B		

▽ -45

4			
7	3.7		22
8	B		

623.21

Hard Gray Silty Clay Loam/Silty
Loam Till with Silt Layers

-50

5			
8	4.0		16
12	P		

-55

6			
9	5.4		14
13	S		

613.21 ▼

613.13

Dense Gray Limestone
End of Boring

-60

SOIL BORING I-57 & IL 17 INTERCHANGE.GPJ IL_DOT.GDT 1/20/17

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)

BBS, form 137 (Rev. 8-99)



SOIL BORING LOG

ROUTE I-57 (FAI 57) DESCRIPTION Retaining Wall in Southwest Quadrant of I-57 & IL 17 Interchange in Kankakee LOGGED BY Larry Myers

SECTION (46-3)R, HBK, 5HBR, 6HBR LOCATION NE 1/4, SEC. 4, TWP. 30N, RNG. 13W, 2nd PM, Latitude 41.116729, Longitude -87.835758

COUNTY Kankakee DRILLING METHOD Hollow Stem Auger HAMMER TYPE CME Automatic

STRUCT. NO. Station	DEPTH H	BLOW S	UCS Qu	MOIST T	Surface Water Elev. _____ ft	Stream Bed Elev. _____ ft	DEPTH H	BLOW S	UCS Qu	MOIST T
BORING NO. _____ Station _____ Offset _____ Ground Surface Elev. _____ ft	(ft)	(/6")	(tsf)	(%)	Groundwater Elev.: First Encounter _____ Dry ft Upon Completion _____ 619.7 ft After _____ Hrs. _____ ft		(ft)	(/6")	(tsf)	(%)
Augered Bituminous Shoulder, Brown & Gray Silty Clay Fill	664.72	-5			Hard to Very Stiff Gray Silty Clay (continued)		6			
							8	4.0	21	
							10	B		
							5			
							7	3.7	20	
							10	B		
							-25			
							4			
Very Stiff Brown & Gray Silty Clay & Black Silty Clay Loam Fill	662.72		3				6	3.3	21	
			4	3.5			9	B		
			5	P						
Very Stiff to Hard Gray & Brown Silty Clay Loam Till			3				4			
			6	4.0			6	3.5	19	
			7	B			8	B		
			-10				-30			
			7				4			
			13	8.1			5	3.7	20	
			16	S			7	B		
	657.72									
Hard Brown & Gray Silty Clay			7							
			9	8.9						
			12	S						
			-15				-35			
			6				4			
			10	8.2			5	3.7	23	
			14	S			7	B		
			7							
			9	7.4						
			12	S						
	650.22									
Hard to Very Stiff Gray Silty Clay		-20					-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)



SOIL BORING LOG

ROUTE I-57 (FAI 57) DESCRIPTION Retaining Wall in Southwest Quadrant of I-57 & IL 17 Interchange in Kankakee LOGGED BY Larry Myers

SECTION (46-3)R, HBK, 5HBR, 6HBR LOCATION NE 1/4, SEC. 4, TWP. 30N, RNG. 13W, 2nd PM, Latitude 41.116729, Longitude -87.835758

COUNTY Kankakee DRILLING METHOD Hollow Stem Auger HAMMER TYPE CME Automatic

STRUCT. NO. _____
Station _____

BORING NO. BH 28
Station 199+10.03
Offset 99.9 ft Rt.
Ground Surface Elev. 669.72 ft

D E P T H (ft)	B L O W S (/6")	U C S Qu (tsf)	M O I S T (%)
-------------------------------	--------------------------------	----------------------------	------------------------------

Surface Water Elev. _____ ft
Stream Bed Elev. _____ ft
Groundwater Elev.:
First Encounter Dry ft
Upon Completion 619.7 ft ∇
After _____ Hrs. _____ ft

Hard to Very Stiff Gray Silty Clay
(continued)

3			
4	3.1	21	
6	B		

625.72

Hard Gray Silty Clay Loam/Silty
Loam Till with Silt Layers

-45			
8			
12	4.0	10	
14	P		

∇ -50

8			
10	5.1	12	
11	S		

-55

613.72

613.55

Dense Gray Limestone

End of Boring

24			
26	4.0	15	
100/2"	P		

-60

SOIL BORING I-57 & IL 17 INTERCHANGE.GPJ IL_DOT.GDT 1/20/17

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)



SOIL BORING LOG

ROUTE I-57 (FAI 57) DESCRIPTION Retaining Wall in Southwest Quadrant of I-57 & IL 17 Interchange in Kankakee LOGGED BY Larry Myers

SECTION (46-3)R, HBK, 5HBR, 6HBR LOCATION NE 1/4, SEC. 4, TWP. 30N, RNG. 13W, 2nd PM, Latitude 41.116454, Longitude -87.835737

COUNTY Kankakee DRILLING METHOD Hollow Stem Auger HAMMER TYPE CME Automatic

STRUCT. NO. Station	DEPTH H S	BLOW S Qu	UCS Qu	MOIST S T	Surface Water Elev. _____ ft Stream Bed Elev. _____ ft	DEPTH H S	BLOW S Qu	UCS Qu	MOIST S T	Groundwater Elev.: First Encounter _____ ft Upon Completion _____ ft After _____ Hrs. _____ ft	DEPTH H S	BLOW S Qu	UCS Qu	MOIST S T
BORING NO. <u>BH 29</u> Station <u>200+10.28</u> Offset <u>95.1 ft Rt.</u> Ground Surface Elev. <u>668.01</u> ft	(ft)	(/6")	(tsf)	(%)		(ft)	(/6")	(tsf)	(%)		(ft)	(/6")	(tsf)	(%)
Augered Bituminous Shoulder, Brown & Gray Silty Clay Fill							4			Hard to Very Stiff Gray Silty Clay (continued)		4		
							6	4.1	20			6		
							10	B				10		
							5					5		
							6	3.7	18			6		
							8	B				8		
663.01 -5							-25					-25		
Hard Gray & Brown Silty Clay Loam Till		4					3					3		
		6	4.0	22			4	3.1	20			4		
		8	P				5	B				5		
661.01														
Hard Brown & Gray Silty Clay		8					4					4		
		12	8.1	17			5	3.4	18			5		
		14	S				7	B				7		
							-30					-30		
		8					5					5		
		10	6.1	18			6	3.4	17			6		
		12	S				7	B				7		
		8												
		8	7.4	18										
		10	S											
							-35					-35		
		6					6					6		
		8	6.4	19			7	4.1	21			7		
		12	S				8	B				8		
		6												
		8	5.4	18										
		10	S											
648.51														
Hard to Very Stiff Gray Silty Clay	-20						-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
IDOT

SOIL BORING LOG

Page 2 of 2

Date 8/29/13

ROUTE I-57 (FAI 57) DESCRIPTION Retaining Wall in Southwest Quadrant of I-57 & IL 17 Interchange in Kankakee LOGGED BY Larry Myers

SECTION (46-3)R, HBK, 5HBR, 6HBR LOCATION NE 1/4, SEC. 4, TWP. 30N, RNG. 13W, 2nd PM, Latitude 41.116454, Longitude -87.835737

COUNTY Kankakee DRILLING METHOD Hollow Stem Auger HAMMER TYPE CME Automatic

STRUCT. NO. _____
Station _____

BORING NO. BH 29
Station 200+10.28
Offset 95.1 ft Rt.
Ground Surface Elev. 668.01 ft

D E P T H	B L O W S	U C S Qu	M O I S T
(ft)	(/6")	(tsf)	(%)

Surface Water Elev. _____ ft
Stream Bed Elev. _____ ft

Groundwater Elev.:
First Encounter 613.0 ft ▼
Upon Completion 618.0 ft ▼
After _____ Hrs. _____ ft

Hard to Very Stiff Gray Silty Clay
(continued)

4			
5	3.3		22
7	B		

623.01 -45

Hard Gray Silty Clay Loam/Silty
Loam Till with Silt Pockets & Sand
Layers

8			
12	>4.5		12
16	P		

▽ -50

10			
16	5.7		16
21	S		

▼ -55

612.01

611.93

Dense Gray Limestone
End of Boring

23			
23	>4.5		10
100/1"	P		

-60

SOIL BORING I-57 & IL 17 INTERCHANGE.GPJ IL_DOT.GDT 1/20/17

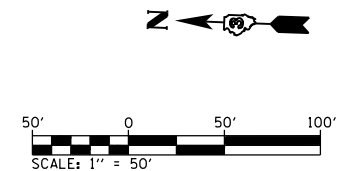
The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, form 137 (Rev. 8-99)

EXHIBIT D

SUBSURFACE PLAN AND PROFILE

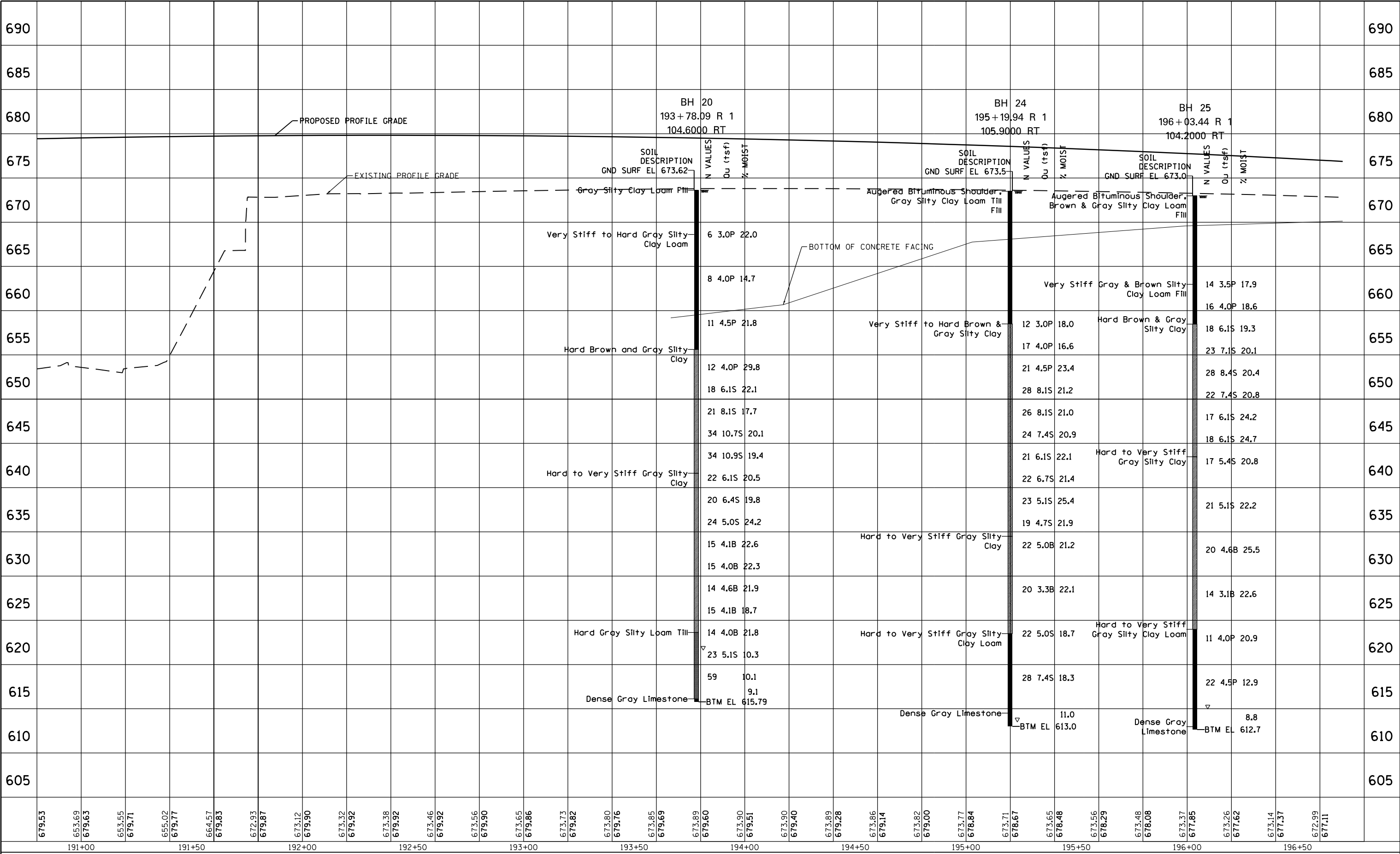
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	PLOTTED _____		
NOTE BOOK	GRADES CHECKED _____		
	B.M. NOTED _____		
NO. _____	STRUCTURE NOTATIONS CH'KD _____		



 300 West Main Street, Suite 100 Kaskaskia, Illinois 62401 618.333.1007 phone 618.333.1008 fax www.kaskaskia.com PROFESSIONAL REGISTRATION: ILLINOIS Professional Engineering Company 14-0000050 14-0000050 20-0000000	PREPARED BY: USER NAME = \$USER\$ MODEL NAME = \$MODELNAME\$ PLOT SCALE = \$SCALE\$ PLOT DATE = \$DATE\$	DESIGNED - DRAWN - CHECKED - DATE -	REVISED - REVISED - REVISED - REVISED -	STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION	WALDRON ROAD RETAINING WALLS PLAN AND PROFILE				F.A.I. RTE. 57	SECTION (46+3) HBK	COUNTY KANKAKEE	TOTAL SHEETS 150	SHEET NO. 1
	SCALE: 1"=50' SHEET 1 OF SHEETS STA 190+00 to STA 204+00								CONTRACT NO. 668623				
						ILLINOIS FED. AID PROJECT							

PLAN	SURVEYED	BY	DATE
	PLOTTED		
	NOTE BOOK NO.		
	CHECKED		
	FILE NAME		

PROFILE	SURVEYED	BY	DATE
	PLOTTED		
	NOTE BOOK NO.		
	GRADES CHECKED		
	STRUCTURE NOTATIONS CHKD		



PLAN	NO.	NOTE BOOK	SURVEYED	BY	DATE	ALIGNED	CHECKED	CADD FILE NAME

PROFILE	NO.	NOTE BOOK	SURVEYED	BY	DATE	GRADES	CHECKED	STRUCTURE	NOTATNS	CHNG

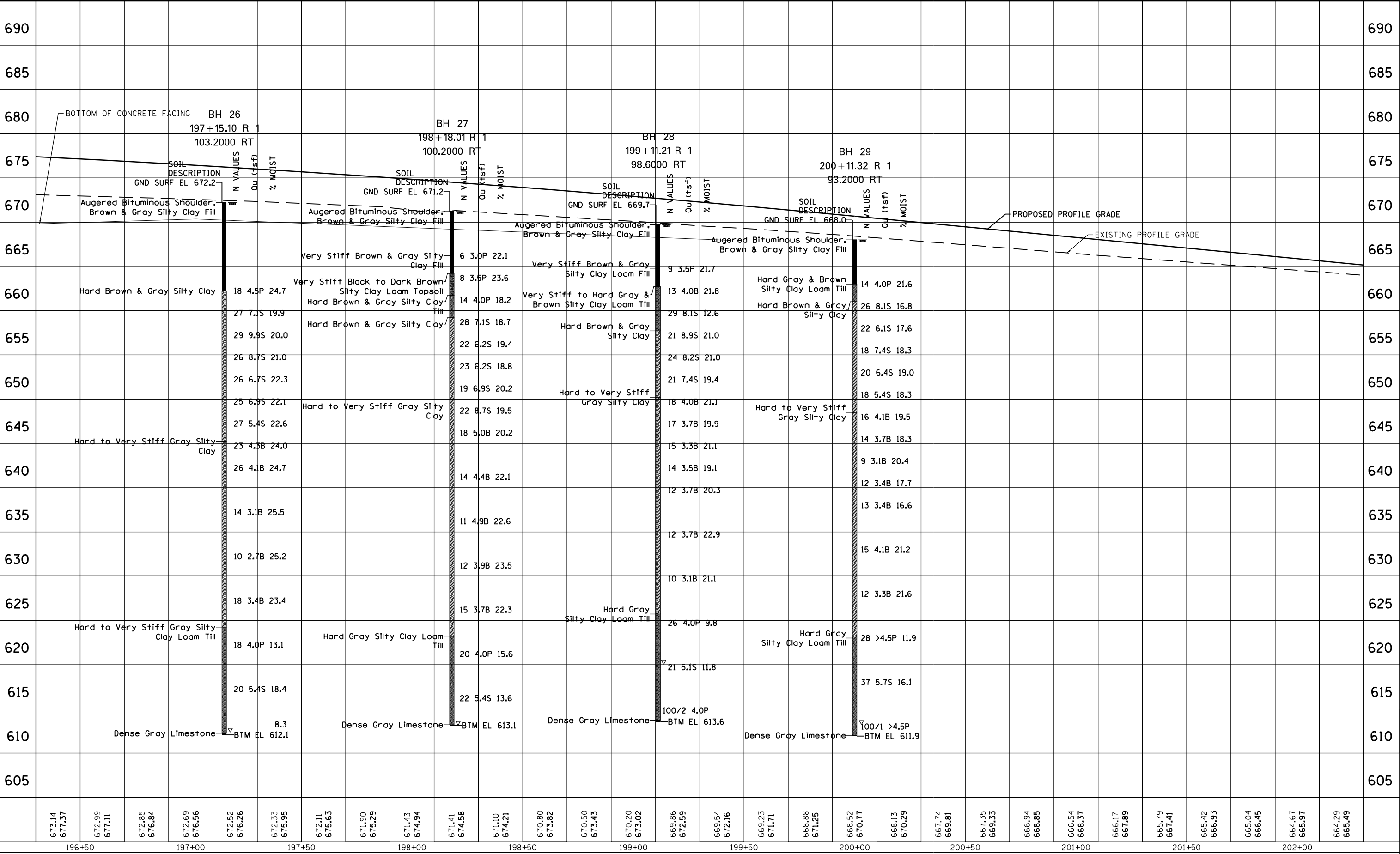
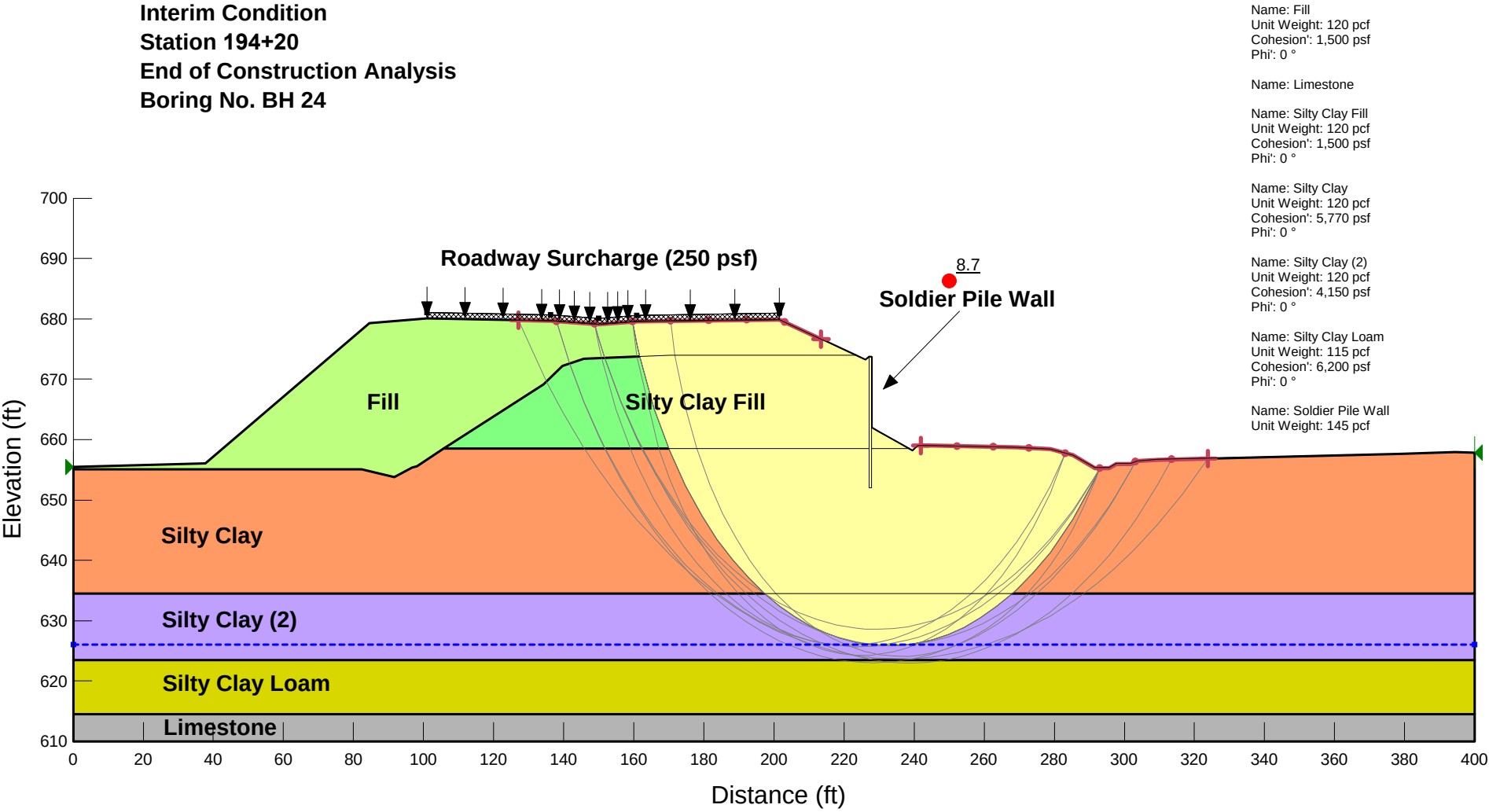
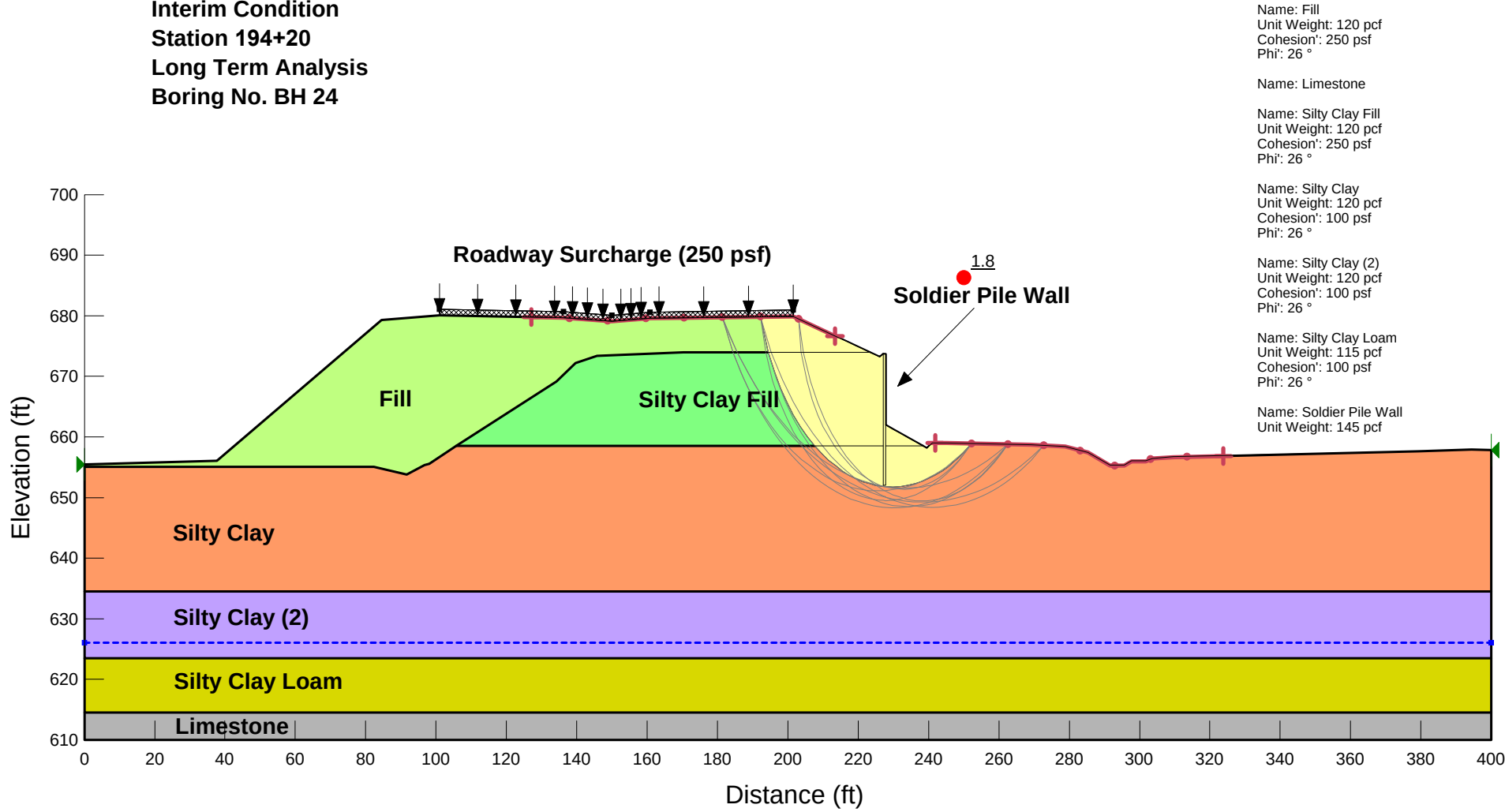


EXHIBIT E
SLOPE/W STABILITY ANALYSIS

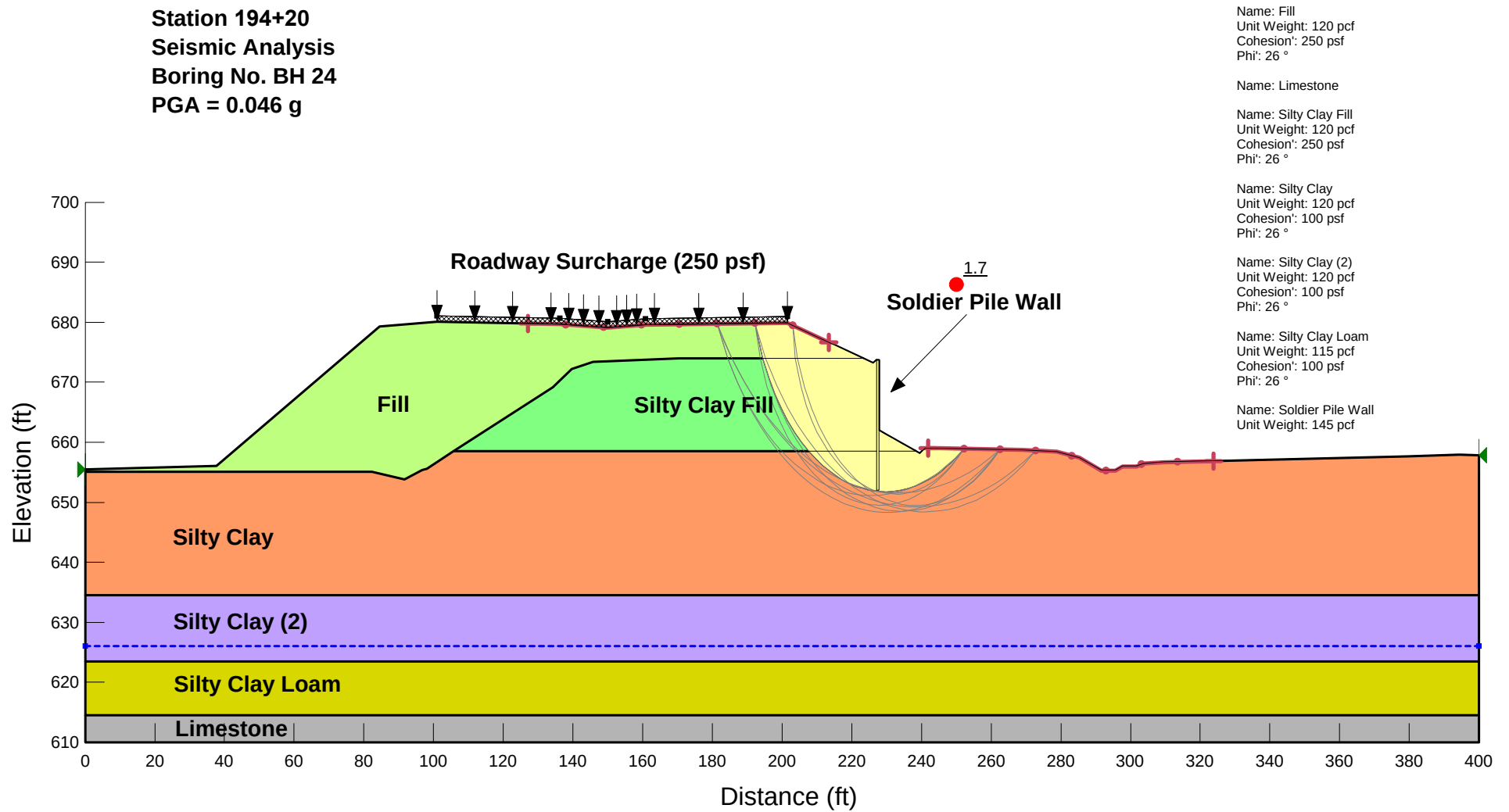
Southwest Ramp on I-57 over IL 17
Retaining Wall at Ramp D
Interim Condition
Station 194+20
End of Construction Analysis
Boring No. BH 24



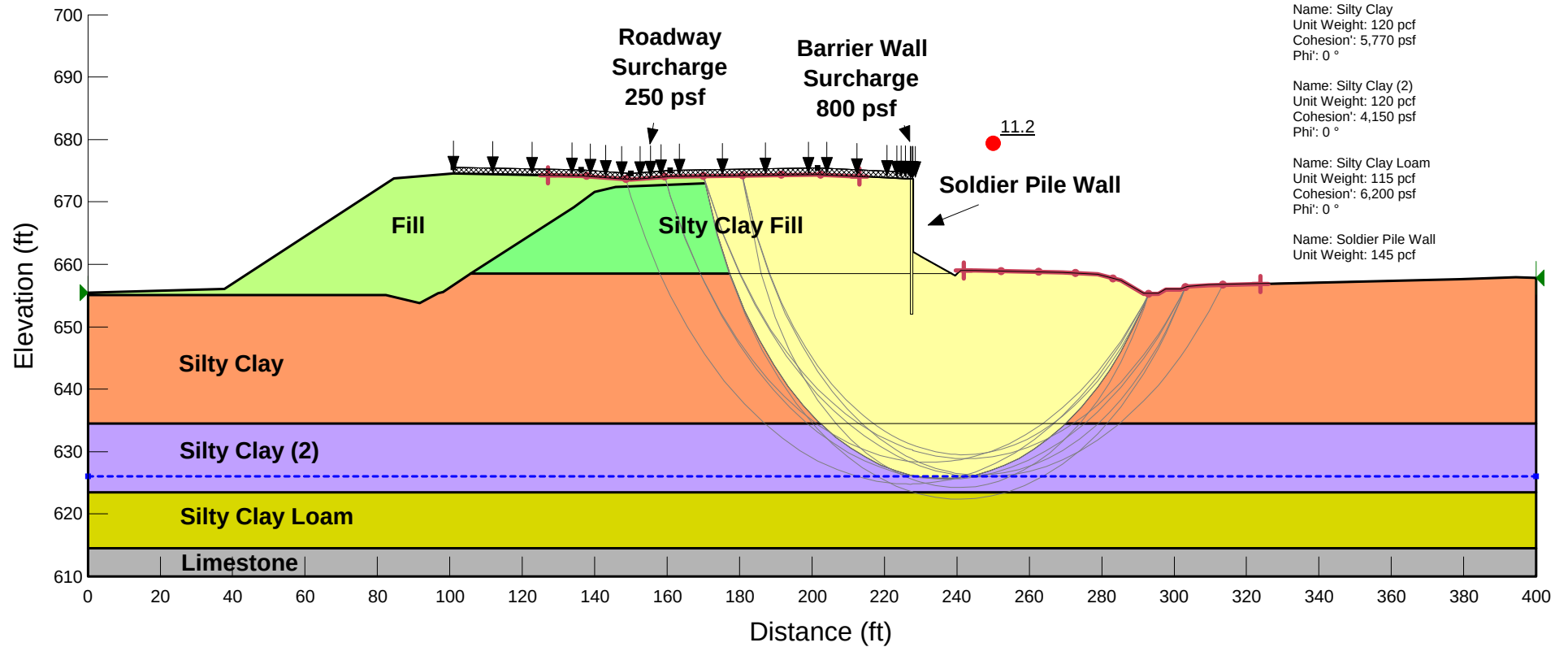
Southwest Ramp on I-57 over IL 17
Retaining Wall at Ramp D
Interim Condition
Station 194+20
Long Term Analysis
Boring No. BH 24



Southwest Ramp on I-57 over IL 17
 Retaining Wall at Ramp D
 Interim Condition
 Station 194+20
 Seismic Analysis
 Boring No. BH 24
 PGA = 0.046 g



Southwest Ramp on I-57 over IL 17
Retaining Wall at Ramp D
Ultimate Condition
Station 194+20
End of Construction Analysis
Boring No. BH 24



Southwest Ramp on I-57 over IL 17
Retaining Wall at Ramp D
Ultimate Condition
Station 194+20
Long Term Analysis
Boring No. BH 24

Name: Fill
Unit Weight: 120 pcf
Cohesion: 250 psf
Phi: 26 °

Name: Limestone

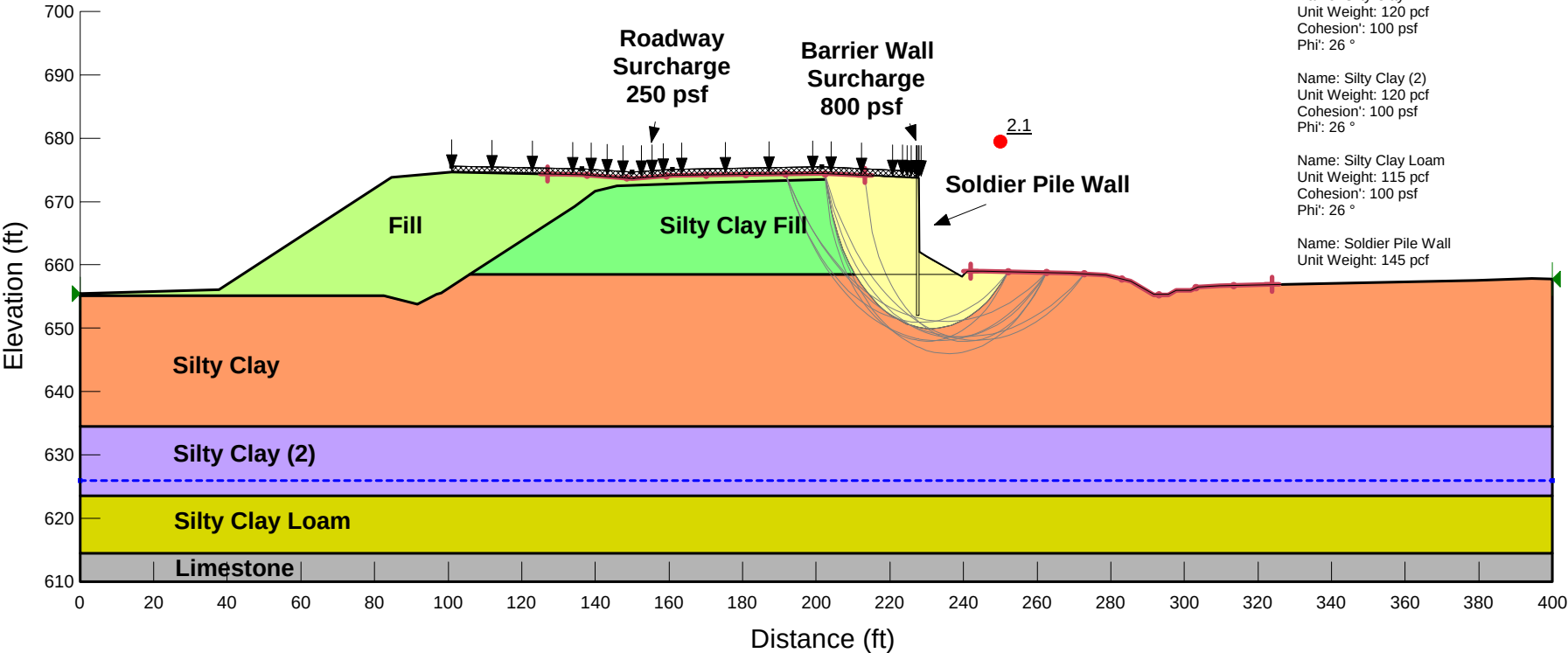
Name: Silty Clay Fill
Unit Weight: 120 pcf
Cohesion: 250 psf
Phi: 26 °

Name: Silty Clay
Unit Weight: 120 pcf
Cohesion: 100 psf
Phi: 26 °

Name: Silty Clay (2)
Unit Weight: 120 pcf
Cohesion: 100 psf
Phi: 26 °

Name: Silty Clay Loam
Unit Weight: 115 pcf
Cohesion: 100 psf
Phi: 26 °

Name: Soldier Pile Wall
Unit Weight: 145 pcf



Southwest Ramp on I-57 over IL 17
Retaining Wall at Ramp D
Ultimate Condition
Station 194+20
Long Term Analysis
Boring No. BH 24
PGA = 0.046 g

Name: Fill
Unit Weight: 120 pcf
Cohesion: 250 psf
Phi: 26 °

Name: Limestone

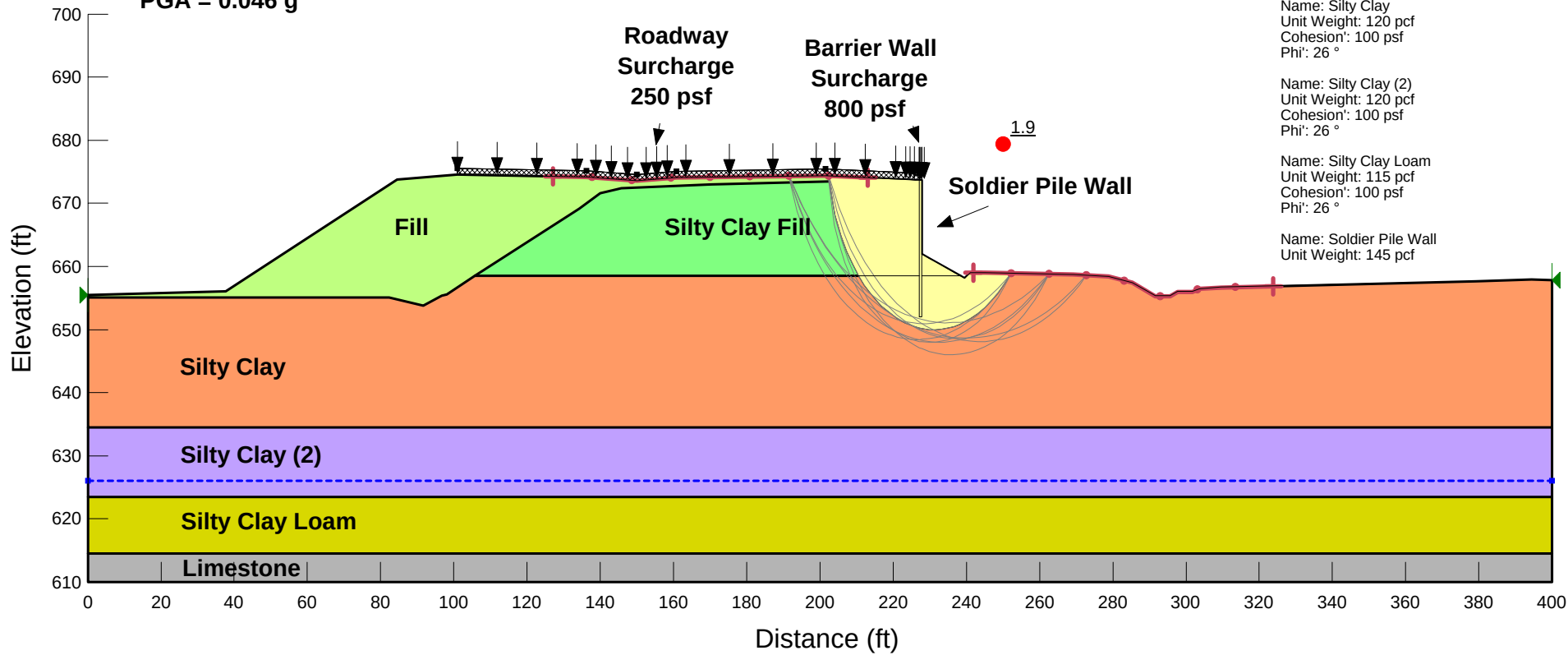
Name: Silty Clay Fill
Unit Weight: 120 pcf
Cohesion: 250 psf
Phi: 26 °

Name: Silty Clay
Unit Weight: 120 pcf
Cohesion: 100 psf
Phi: 26 °

Name: Silty Clay (2)
Unit Weight: 120 pcf
Cohesion: 100 psf
Phi: 26 °

Name: Silty Clay Loam
Unit Weight: 115 pcf
Cohesion: 100 psf
Phi: 26 °

Name: Soldier Pile Wall
Unit Weight: 145 pcf



**Southwest Ramp on I-57 over IL 17
East Fill Slope
Retaining Wall at Ramp D
Station 194+20
End of Construction Analysis
Boring No. BH 24**

Name: Fill
Unit Weight: 120 pcf
Cohesion': 1,500 psf
Phi': 0 °

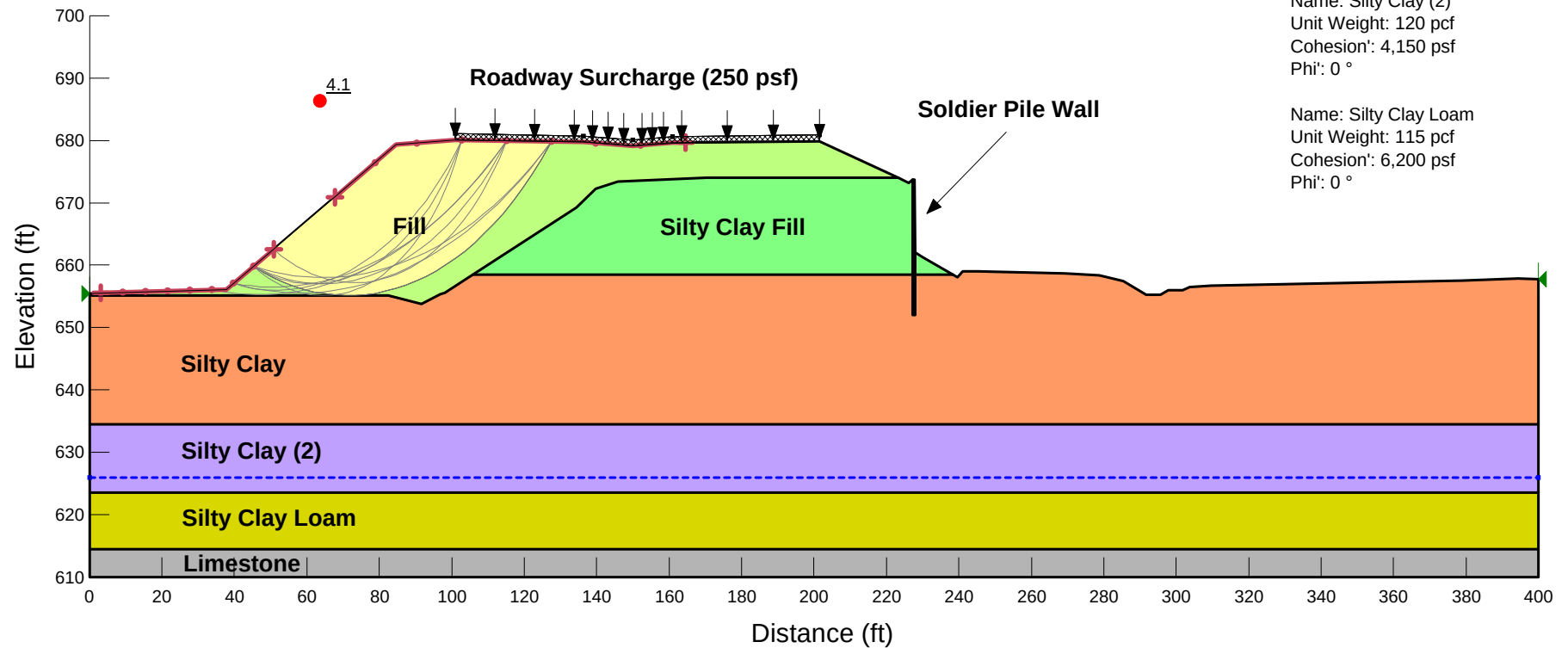
Name: Limestone

Name: Silty Clay Fill
Unit Weight: 120 pcf
Cohesion': 1,500 psf
Phi': 0 °

Name: Silty Clay
Unit Weight: 120 pcf
Cohesion': 5,770 psf
Phi': 0 °

Name: Silty Clay (2)
Unit Weight: 120 pcf
Cohesion': 4,150 psf
Phi': 0 °

Name: Silty Clay Loam
Unit Weight: 115 pcf
Cohesion': 6,200 psf
Phi': 0 °



Southwest Ramp on I-57 over IL 17
East Fill Slope
Retaining Wall at Ramp D
Station 194+20
Long Term Analysis
Boring No. BH 24

Name: Fill
 Unit Weight: 120 pcf
 Cohesion': 250 psf
 Phi': 26 °

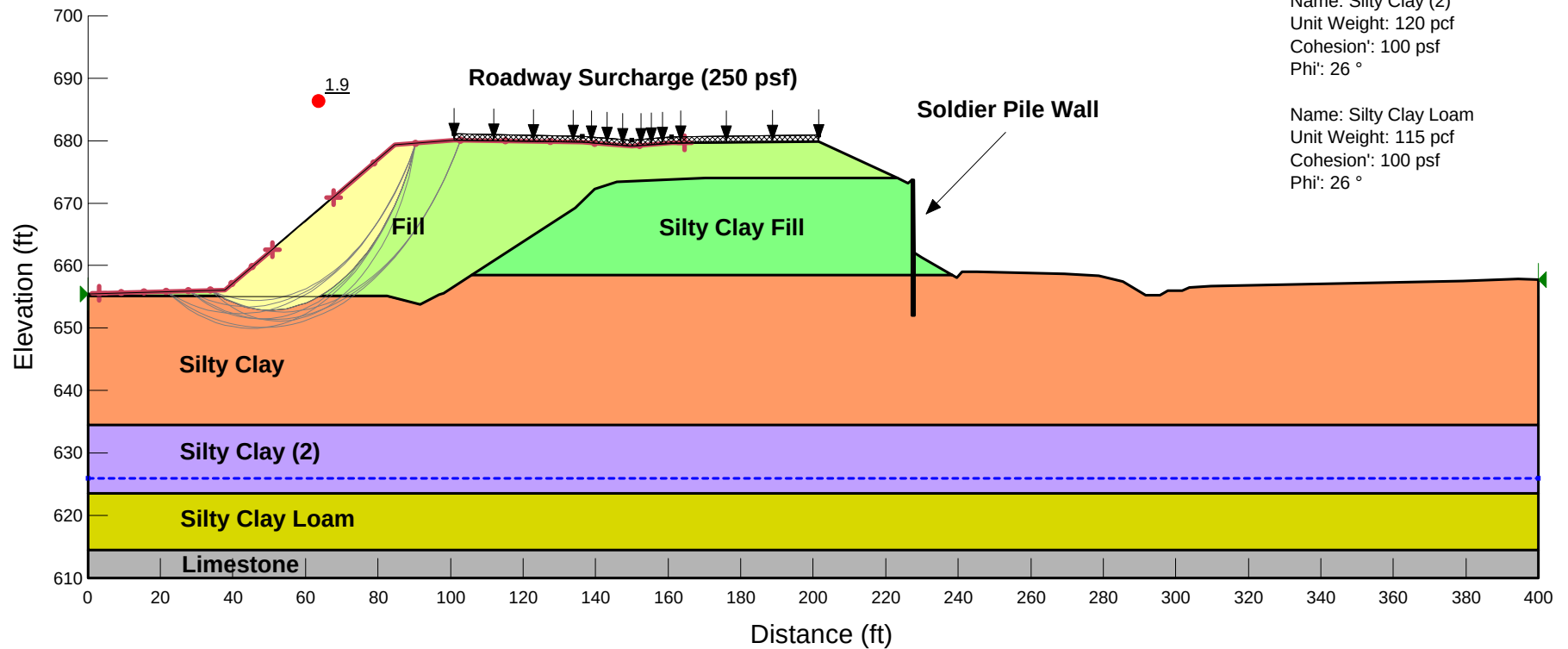
Name: Limestone

Name: Silty Clay Fill
 Unit Weight: 120 pcf
 Cohesion': 250 psf
 Phi': 26 °

Name: Silty Clay
 Unit Weight: 120 pcf
 Cohesion': 100 psf
 Phi': 26 °

Name: Silty Clay (2)
 Unit Weight: 120 pcf
 Cohesion': 100 psf
 Phi': 26 °

Name: Silty Clay Loam
 Unit Weight: 115 pcf
 Cohesion': 100 psf
 Phi': 26 °



Southwest Ramp on I-57 over IL 17
East Fill Slope
Retaining Wall at Ramp D
Station 194+20
Seismic Analysis
Boring No. BH 24
PGA = 0.046 g

Name: Fill
Unit Weight: 120 pcf
Cohesion': 250 psf
Phi': 26 °

Name: Limestone

Name: Silty Clay Fill
Unit Weight: 120 pcf
Cohesion': 250 psf
Phi': 26 °

Name: Silty Clay
Unit Weight: 120 pcf
Cohesion': 100 psf
Phi': 26 °

Name: Silty Clay (2)
Unit Weight: 120 pcf
Cohesion': 100 psf
Phi': 26 °

Name: Silty Clay Loam
Unit Weight: 115 pcf
Cohesion': 100 psf
Phi': 26 °

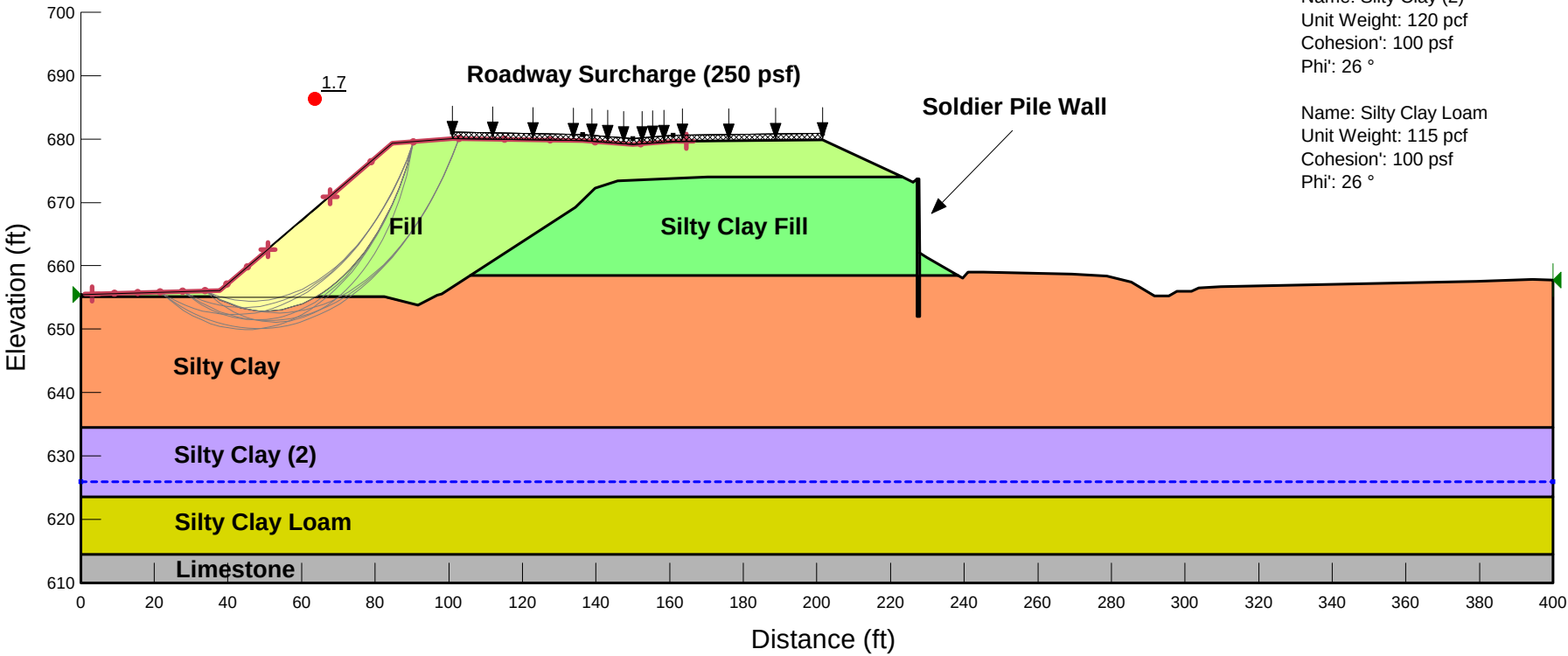


EXHIBIT F

ILLINOIS STATE GEOLOGICAL AND SURVEY MINE MAP

Coal Mines and Underground Industrial Mines

KANKAKEE County

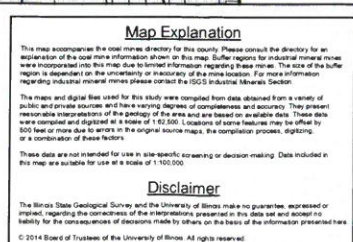
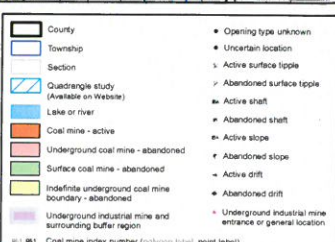
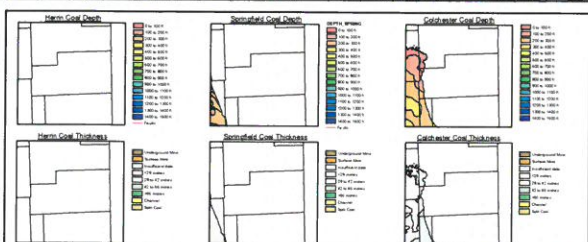
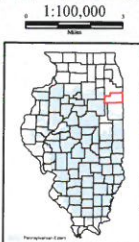
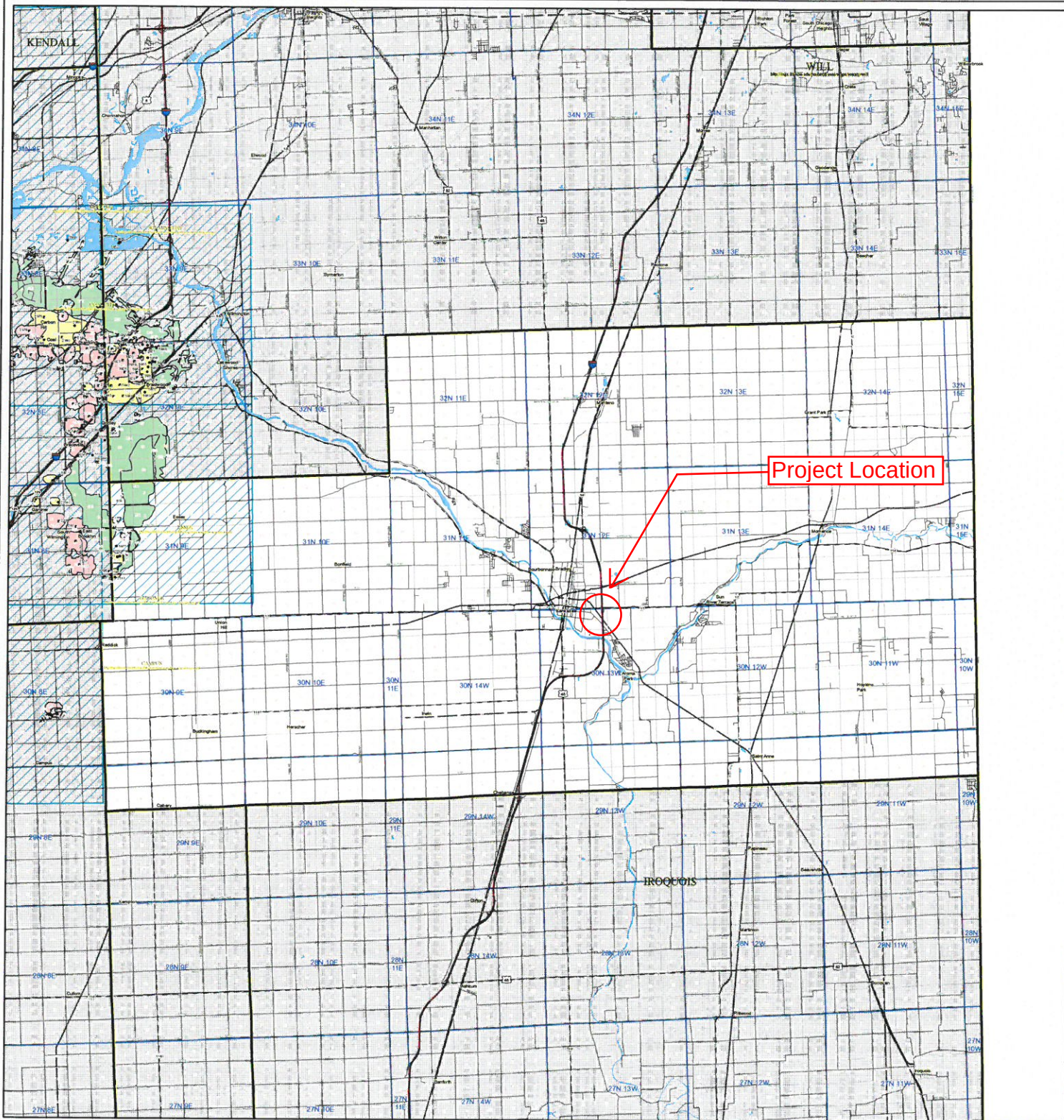
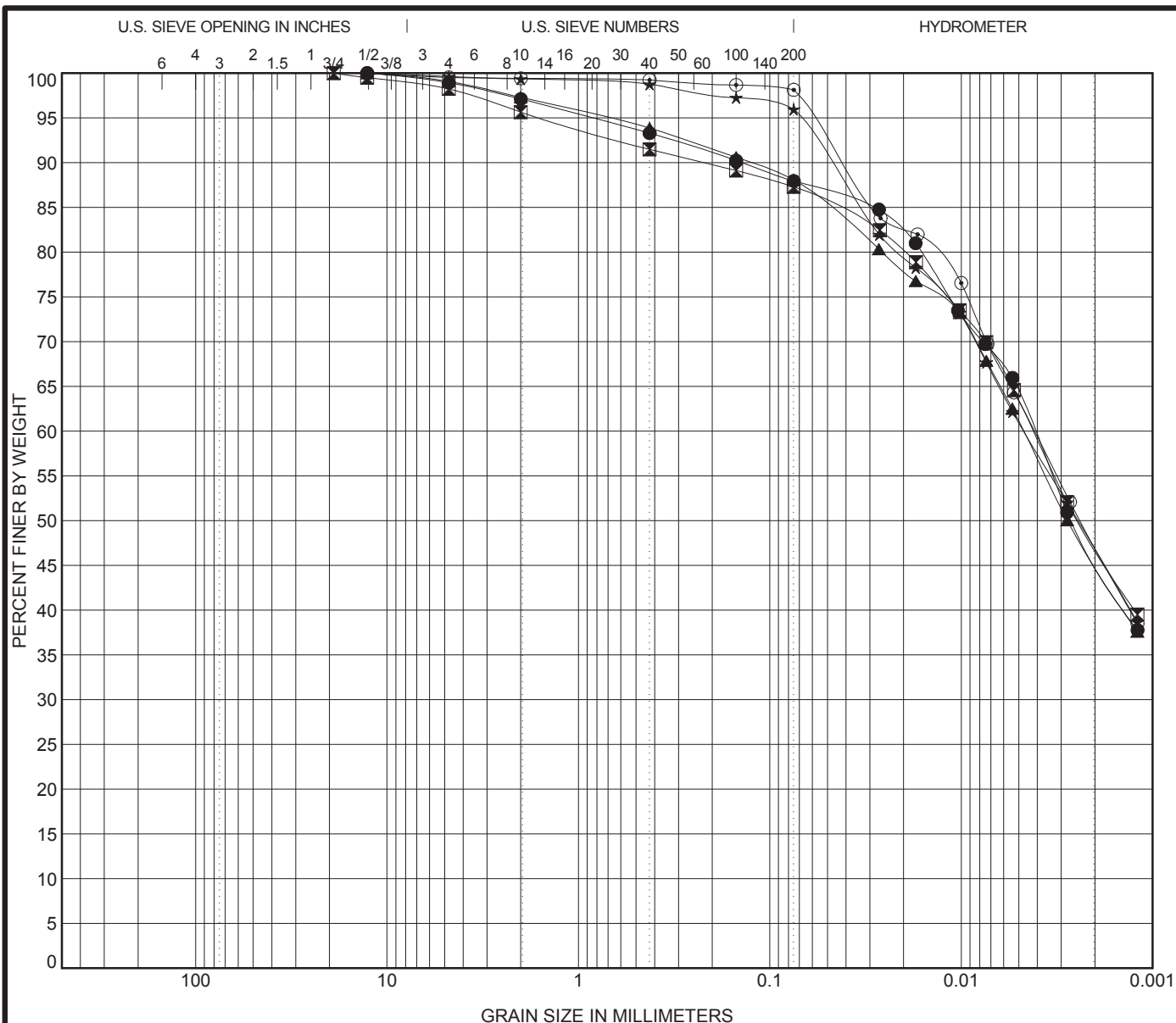


EXHIBIT G

LABORATORY TEST AND RESULTS



COBBLES	GRAVEL	SAND		SILT	CLAY
		coarse	fine		

Specimen Identification			Classification			LL	PL	PI	Cc	Cu
●	BH 18	10.00	A-6 (14) CLAY			35.0	18.5	16.5		
☒	BH 18	15.00	A-6 (13) CLAY			33.8	17.7	16.1		
▲	BH 19	2.00	A-6 (14) CLAY			35.3	18.3	17.0		
★	BH 24	15.00	A-7-6 (22) CLAY			40.8	19.4	21.4		
◎	BH 24	20.00	A-6 (16) SILTY CLAY			34.8	19.5	15.3		
Specimen Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	BH 18	10.00	12.7	0.004			2.9	9.2	42.2	45.7
☒	BH 18	15.00	19	0.004			4.4	8.3	40.2	47.1
▲	BH 19	2.00	12.7	0.005			2.7	9.2	43.0	45.1
★	BH 24	15.00	12.7	0.005			0.7	3.4	49.2	46.7
◎	BH 24	20.00	12.7	0.004			0.6	1.3	51.1	47.1



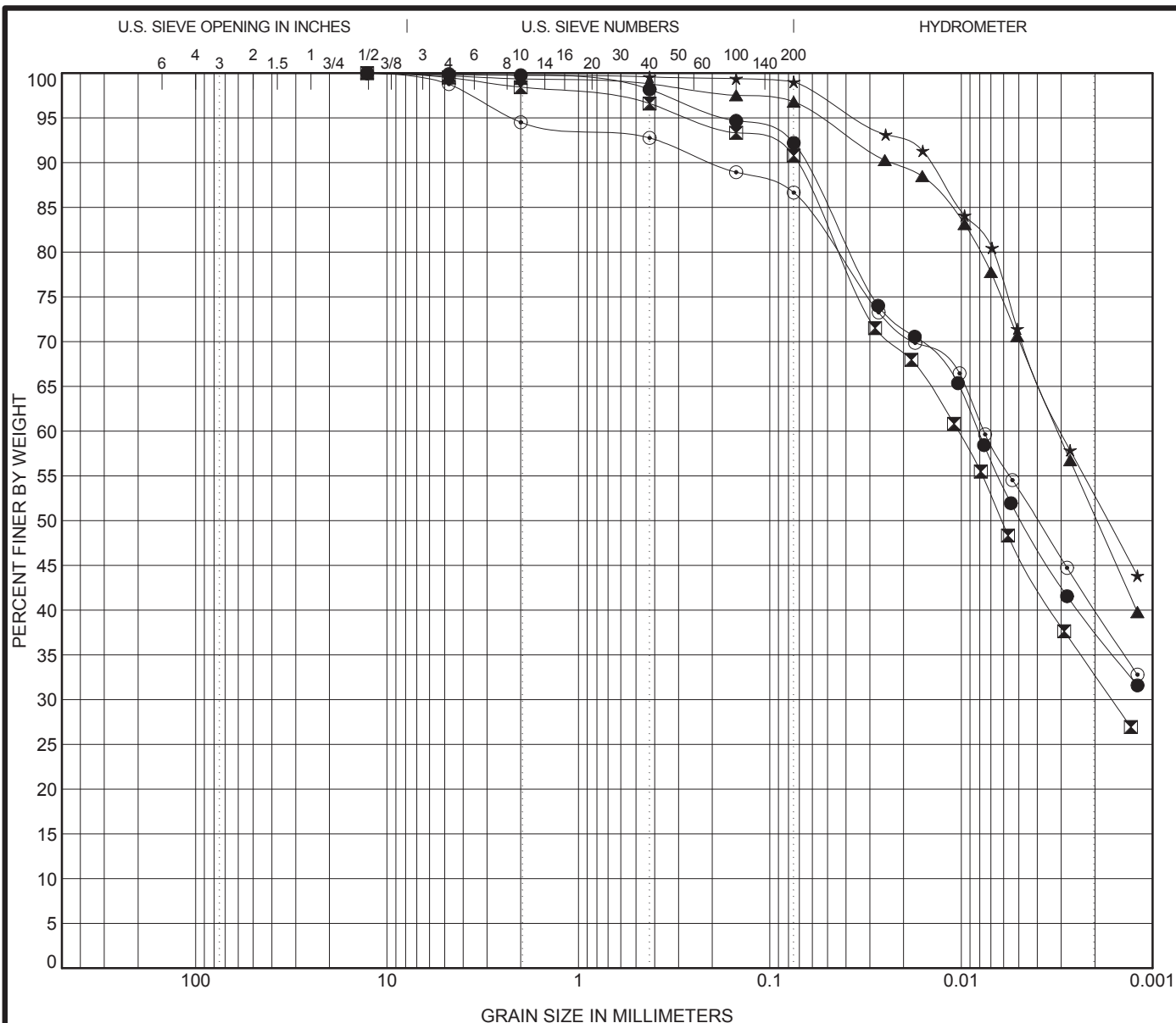
**Illinois Department
of Transportation**
Division of Highways
IDOT

IDH GRAIN SIZE DISTRIBUTION

Route: I-57 (FAI 57)

Section: (46-3)R, HBK, 5HBR, 6HBR

County: Kankakee



COBBLES	GRAVEL	SAND		SILT	CLAY
		coarse	fine		

Specimen Identification			Classification			LL	PL	PI	Cc	Cu
●	BH 25	30.00	A-6 (16) SILTY CLAY			36.6	20.0	16.6		
☒	BH 26	2.00	A-6 (14) SILTY CLAY			34.5	18.2	16.3		
▲	BH 26	10.00	A-6 (16) CLAY			37.2	20.7	16.5		
★	BH 26	30.00	A-6 (16) CLAY			36.2	20.6	15.6		
◎	BH 28	7.00	A-6 (17) CLAY			38.1	17.6	20.5		
Specimen Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	BH 25	30.00	12.7	0.008			0.2	7.6	54.6	37.6
☒	BH 26	2.00	12.7	0.01	0.002		1.6	7.6	58.1	32.7
▲	BH 26	10.00	12.7	0.003			0.6	2.6	46.3	50.5
★	BH 26	30.00	12.7	0.003			0.2	0.7	46.3	52.7
◎	BH 28	7.00	12.7	0.008			5.5	7.8	46.7	40.0



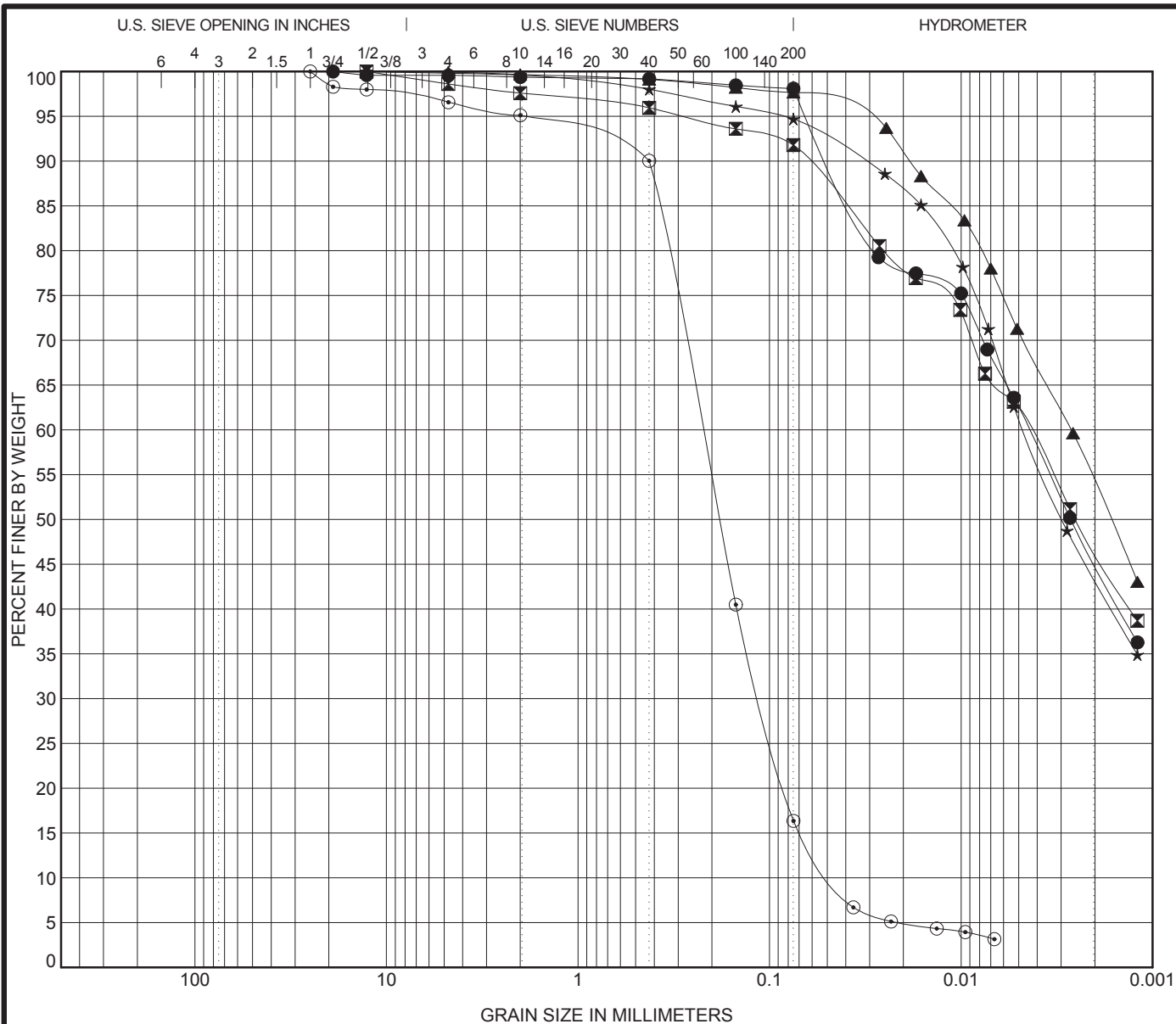
Illinois Department of Transportation
Division of Highways
IDOT

IDH GRAIN SIZE DISTRIBUTION

Route: I-57 (FAI 57)

Section: (46-3)R, HBK, 5HBR, 6HBR

County: Kankakee



COBBLES	GRAVEL	SAND		SILT	CLAY
		coarse	fine		

Specimen Identification			Classification			LL	PL	PI	Cc	Cu
●	BH 28	20.00	A-6 (14) SILTY CLAY			32.8	19.5	13.3		
✕	BH 29	2.00	A-6 (18) CLAY			38.5	19.6	18.9		
▲	BH 29	7.50	A-6 (20) CLAY			39.7	20.7	19.0		
★	BH 36	2.50	A-6 (12) SILTY CLAY			30.6	17.6	13.0		
⊙	BH 37	2.50	SAND						1.17	4.84
Specimen Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	BH 28	20.00	19	0.004			0.6	1.3	53.1	45.0
✕	BH 29	2.00	12.7	0.004			2.4	5.8	45.2	46.5
▲	BH 29	7.50	12.7	0.003			0.3	2.0	43.6	54.0
★	BH 36	2.50	12.7	0.005			0.4	4.9	51.4	43.3
⊙	BH 37	2.50	25	0.226	0.111	0.047	4.9	78.8		



**Illinois Department
of Transportation**
Division of Highways
IDOT

IDH GRAIN SIZE DISTRIBUTION

Route: I-57 (FAI 57)

Section: (46-3)R, HBK, 5HBR, 6HBR

County: Kankakee

EXHIBIT H

DRILLED SHAFT AXIAL CAPACITY SPREADSHEET



**DRILLED SHAFT AXIAL CAPACITY IN ROCK -
DOLOMITE, LIMESTONE, SANDSTONE, AND HARD SHALE**

STRUCTURE ===== SN 046-8805
 SUBSTRUCTURE & REFERENCE BORING ===== Retaining Wall at Ramp D B 205 -2'
 GROUND SURFACE ELEVATION ===== 668.00 FT
 GROUND WATER ELEVATION ===== 630.00 FT
 ESTIMATED TOP OF ROCK ELEVATION ===== 612.00 FT
 DRILLED SHAFT DIAMETER IN ROCK ===== 36 IN.
 FACTORED AXIAL LOAD ===== 1000 KIPS
 DRILLED SHAFT CONCRETE STRENGTH, f_c ===== 3.5 KSI

FOUNDATION REDUNDANCY ===== REDUNDANT

SOCKET DEPTH (FT)	TIP ELEV. (FT)	LAYER THICK. (FT)	UNCONFINED COMPRESSIVE STRENGTH (q _u) (KSF)	ROCK TYPE	GSI	ROCK CONDITION	RQD (%)	JOINT TYPE	ROCK INTACT OR TIGHTLY JOINTED?	SIDE RESISTANCE						AVG. q _u W/IN 2 - SHAFT DIA. (KSF)	TIP RESISTANCE			COMBINED SIDE & TIP RESISTANCE					
										NOM. RESIST. (KIPS)	Σ NOM. RESIST. (KIPS)	Σ FACT. RESIST. (KIPS)	SETTLEMENT				NOM. RESIST. (KIPS)	FACT. RESIST. (KIPS)	SETTL. W _{Rn} (IN.)	R _p /R _n	NOM. RESIST. (KIPS)	FACT. RESIST. (KIPS)	SETTLEMENT		
													Q _{C1} (KIPS)	W _{C1} (IN.)	W _{Rn} (IN.)								Q _{C1} (KIPS)	W _{C1} (IN.)	W _{Rn} (IN.)
1.00	611.00	1.00	600.0	Limestone	40	Normal	39	Closed	Yes	308	308	169	87	0.007	0.674	720.0	2156	1078	0.409	0.89	2420	1223	124	0.007	0.418
2.00	610.00	1.00	600.0	Limestone	40	Normal	39	Closed	Yes	308	616	339	176	0.023	0.719	780.0	2303	1151	0.406	0.82	2814	1433	307	0.024	0.425
3.00	609.00	1.00	600.0	Limestone	40	Normal	39	Closed	Yes	308	924	508	266	0.032	0.743	840.0	2449	1225	0.426	0.76	3207	1641	471	0.035	0.430
4.00	608.00	1.00	600.0	Limestone	40	Normal	39	Closed	Yes	308	1232	678	359	0.040	0.759	900.0	2595	1297	0.417	0.72	3598	1849	632	0.044	0.432
5.00	607.00	1.00	600.0	Limestone	40	Normal	39	Closed	Yes	308	1540	847	453	0.046	0.770										
6.00	606.00	1.00	960.0	Limestone	50	Normal	58	Closed	Yes	308	1848	1017	589	0.051	0.660										
7.00	605.00	1.00	960.0	Limestone	50	Normal	58	Closed	Yes	308	2157	1186	730	0.056	0.595										
8.00	604.00	1.00	960.0	Limestone	50	Normal	58	Closed	Yes	308	2465	1356	878	0.062	0.554										
9.00	603.00	1.00	960.0	Limestone	50	Normal	58	Closed	Yes	308	2773	1525	1032	0.068	0.526										
10.00	602.00	1.00	960.0	Limestone	50	Normal	58	Closed	Yes	308	3081	1694	1192	0.074	0.505										



Drilled Shaft Design Table for Retaining Wall at Ramp D B 205 -214

Estimated Top of Rock Elevation: 612.00

(Page 1 of 1)

SOCKET DEPTH (FT)	TIP ELEV. (FT)	NOMINAL SHAFT RESIST. (KIPS)	FACTORED SHAFT RESIST. (KIPS)	RESIST. METHOD	SETTLEMENT DATA		
					Q _{C1} (KIPS)	W _{C1} (IN.)	W _{Rn} (IN.)
36 in. Diameter Drilled Shaft							
1	611	2420	1223	SIDE + TIP	124	0.007	0.418
2	610	2814	1433	SIDE + TIP	307	0.024	0.425
3	609	3207	1641	SIDE + TIP	471	0.035	0.430
4	608	3598	1849	SIDE + TIP	632	0.044	0.432
5	607	1540	847	SIDE	453	0.046	0.770
6	606	1848	1017	SIDE	589	0.051	0.660
7	605	2157	1186	SIDE	730	0.056	0.595
8	604	2465	1356	SIDE	878	0.062	0.554
9	603	2773	1525	SIDE	1032	0.068	0.526
10	602	3081	1694	SIDE	1192	0.074	0.505
42 in. Diameter Drilled Shaft							
1	611	3345	1688	SIDE + TIP	129	0.004	0.482
2	610	3809	1935	SIDE + TIP	360	0.023	0.488
3	609	4269	2179	SIDE + TIP	561	0.036	0.492
4	608	1438	791	SIDE	416	0.042	0.876
5	607	1797	988	SIDE	525	0.049	0.890
6	606	2157	1186	SIDE	680	0.054	0.762
7	605	2516	1384	SIDE	841	0.059	0.688
8	604	2875	1581	SIDE	1008	0.065	0.640
9	603	3235	1779	SIDE	1180	0.070	0.606
10	602	3594	1977	SIDE	1360	0.076	0.582
48 in. Diameter Drilled Shaft							
1	611	4416	2226	SIDE + TIP	123	0.001	0.546
2	610	4952	2511	SIDE + TIP	408	0.022	0.551
3	609	1232	678	SIDE	352	0.034	0.969
4	608	1643	904	SIDE	473	0.043	0.991
5	607	2054	1130	SIDE	596	0.051	1.007
6	606	2465	1356	SIDE	771	0.056	0.863
7	605	2875	1581	SIDE	951	0.062	0.779
8	604	3286	1807	SIDE	1138	0.067	0.725
9	603	3697	2033	SIDE	1330	0.073	0.687
10	602	4108	2259	SIDE	1528	0.079	0.659
60 in. Diameter Drilled Shaft							
1	611	513	282	SIDE	0	0.000	1.064
2	610	1027	565	SIDE	291	0.019	1.144
3	609	1540	847	SIDE	439	0.034	1.188
4	608	2054	1130	SIDE	588	0.045	1.217
5	607	2567	1412	SIDE	740	0.054	1.239
6	606	3081	1694	SIDE	954	0.060	1.062
7	605	3594	1977	SIDE	1173	0.066	0.959
8	604	4108	2259	SIDE	1398	0.072	0.892
9	603	4621	2542	SIDE	1629	0.078	0.846
10	602	5135	2824	SIDE	1865	0.084	0.812