Structural Geotechnical Report

Minkler Road Retaining Wall
KCHD Collins Road Extension Project
Oswego, Illinois

Prepared For:

Kendall County Highway Department

Design Engineer:
HR Green
2363 Sequoia Drive, Suite 101
Aurora, IL 60506

Submitted By:
Chicago Testing Laboratory, Inc.
30W114 Butterfield Road
Warrenville, Illinois 60555

Chicago Testing Laboratory, Inc.

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Testing • Inspection • Training • Consulting • Research • Geotechnical
Founded 1912

December 17, 2021

Mr. Jason Roitburd, PE
Project Manager
HR Green
2363 Sequoia Drive, Suite 101
Aurora, IL 60506

Re: Structural Geotechnical Report
Minkler Road Retaining Wall
KCHD Collins Road Extension Project
Oswego, Illinois

CTL Project Number 21F202

Dear Mr. Roitburd,

Enclosed are the results of the subsurface exploration and geotechnical engineering evaluation for the above referenced project. The report provides a description of the site investigation, site condition and analysis and recommendations for the proposed retaining wall. The site investigation included advancing three (3) soil borings to depths of 30 feet below ground surface (bgs).

Chicago Testing Laboratory, Inc. (CTL) appreciates the opportunity to work with you on this project and look forward to serving as your Geotechnical Engineering Consultant on future projects. We would be pleased to discuss any questions you have about the contents of this report.

Respectfully Submitted,
CHICAGO TESTING LABORATORY, INC.

Jeffrey Rothamer, P.E.
Director of Technical Services

Riyad Wahab, PhD, P.E.
Senior Geotechnical Engineer

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<u>Appendices:</u>

1.0 Introduction

Chicago Testing Laboratory, Inc. (CTL) completed a geotechnical investigation for the proposed retaining wall for the relocation of Minkler Road as part of the Kendall County Highway Department (KCHD) Collins Road Extension project in Oswego, IL. This portion of the project is located along the proposed northbound right-of-way of Minkler Road approximately 700 feet south of Illinois Route 71 (IL 71). The Site Location Map, located in Appendix A, shows the project location and the overall project limits.

The objective and scope of the subsurface exploration and geotechnical analysis were to characterize the subsurface soil conditions in order to provide information regarding the physical characteristics and engineering properties of the subsurface soils, and to provide geotechnical recommendations regarding the design and construction of the proposed improvements.

1.1 Project Information

Based on the preliminary cross sections provided by HR Green, this portion of the proposed project will include the realignment of Minkler Road to the east of the existing roadway which will include the construction of up to 10 feet of new embankment fill. Due to right-of-way constraints on the east side of the proposed realignment from an existing pond, a sheet pile retaining wall will be necessary at the toe of the proposed embankment at an approximate elevation of 639 feet MSL. A summary of the proposed retaining wall and its location is shown in the table below.

Table 1: Retaining Wall Information

Structure Designation	Approximate Wall Location	Proposed Wall Type	Approximate Length (ft)	Maximum Exposed Wall Height (ft)
Minkler Road Retaining Wall	STA 168+00 to STA 170+40	Sheet Pile	240	5

1.2 Geological Summary

A review of available geologic information was completed to provide a general platform from which to perform our exploration. The best source from which to find this information is the Illinois State Geological Survey (ISGS) including the 'Bulletin' and 'Circular' series' as well as other readily available maps online.

Generally, the project area consists of deposits from the Batavia Member of the Henry Formation deposited during the Wisconsin Glacial Age. The subject area consists of well-sorted deposits of sand and gravel of glacial meltwater in outwash plains extending from the surface to approximately 30 to 50 feet deep. The formation overlies the Maquoketa Formation of the Ordovician System which varies from shale to limestone to sandstone with an average depth of generally 30 to 50 feet below ground surface (bgs) in the subject area.

2.0 Subsurface Exploration

This section describes the subsurface exploration and laboratory testing programs completed as part of this project. The subsurface investigation program was performed in accordance with applicable IDOT and AASHTO manuals and procedures.

2.1 Subsurface Site Investigation

The subsurface investigation was conducted on September 1, 2021 and included advancing a total of three (3) soil borings to depths of 30 feet bgs within the vicinity of the proposed improvements. The boring locations were selected by CTL, with approval from HR Green, and completed in the field based on site conditions and accessibility. The borings were performed within the existing aggregate shoulder due to site access. Ground surface elevations of the boring locations were estimated using internet resources. Table 2 below presents a summary of the borings completed for the proposed improvements.

Table 2: Summary of Soil Borings

Boring	Location	Ground Surface Elevation (ft MSL)	Depth (ft)
B-1	STA 168+30, 10' LT	650	30
B-2	STA 169+10, 1'LT	650	30
B-3	STA 170+00, 8' RT	650	30

The soil borings were conducted by Rubino Engineering, a subcontracted drilling firm, under the field supervision by a CTL engineer using a track mounted GeoProbe 7822DT drill rig equipped with 3-1/4-inch hollow stem augers and an automatic hammer. Soil sampling was performed according to AASHTO T206, "Penetration Test and Split Barrel Sampling of Soils" using the Standard Penetration Test (SPT). In this procedure, a 2-inch O.D. split barrel or split spoon sampler is driven 18 inches into undisturbed soil using a 30-inch drop of a 140-pound hammer. The number of hammer drops (blow counts) is recorded in 6-inch intervals for each sample collected. The number of blow counts to advance the sampler the final 12 inches is called the SPT "N-value". The N-values are shown on the Soil Boring Logs in Appendix B.

Soil samples were obtained with the split barrel sampler at 2.5-foot intervals to the boring termination depths. A CTL field engineer inspected, visually classified and logged the soil samples throughout the subsurface exploration. Unconfined compressive strength (UCS) values (Qp and Qu) of the cohesive soils encountered during the subsurface investigation were obtained in the field using a calibrated hand penetrometer to determine the "Qp" and a calibrated Rimac compressive tester to determine the "Qu" according to IDOT procedures. Representative soil samples were collected from each split spoon sampler, then placed in sealed glass jars and returned to the laboratory for further evaluation and testing.

2.2 Laboratory Testing Program

All soil samples collected during the subsurface exploration were inspected in the laboratory to verify the field classifications. A laboratory testing program was conducted on the soils encountered to characterize and determine the engineering properties for the design of the proposed improvements. All laboratory tests were performed according to AASHTO standards and procedures which included Moisture Contents (AASHTO T265).

All laboratory testing was performed in accordance with test procedures outlined in the IDOT Geotechnical Manual (2020) and per ASTM and AASHTO requirements. Based on the laboratory test results, soil samples were classified according to the Illinois Division of Highways (IDH) classification system. The laboratory and field test results are shown on the Soil Boring Logs (Appendix B).

2.3 General Subsurface Conditions

General subsurface conditions are described below and are grouped based on similar soils encountered throughout the proposed improvements.

Generally, the borings encountered near surface material consisting of 12 to 12 inches of aggregate base course shoulders. Below the surficial layers, boring B-2 encountered fill soils consisting of clay to depths of 7 to 10 feet bgs underlain by medium dense to dense, brown gravel with sand to depths of 13.5 to 14.5 feet bgs with SPT N-Values ranging from 9 to 38 blows per foot. Below the gravel with sand, the borings encountered intermittent layers of loose to medium dense sand, sandy loam, and sand with gravel to depths of 22 to 26 feet bgs with SPT N-Values ranging from 7 to 15 blows per foot underlain by very soft gray loam to depths of 26.5 to 29 feet bgs with an unconfined compressive strength below 0.25 tsf. Below these layers, boring B-1 encountered very hard gray silty clay loam with an unconfined compressive strength of 6.3 tsf while borings B-2 and B-3 encountered dense gray gravel with SPT N-Values of 13 and 37 blows per foot to the boring termination depths of 30 feet.

Variations in the general subsurface soil profile were noted during the field investigation. Detailed descriptions of the soil borings are provided in Appendix B (Soil Boring Logs) which provides specific conditions encountered at each soil boring location. The stratifications shown on the soil boring logs represent the conditions only at the actual soil boring locations and represent the approximate boundary between subsurface materials; however, the actual transition may be gradual.

2.4 Groundwater Conditions

Water level measurements were taken in the soil borings when water was encountered while drilling and after the completion of the soil borings. None of the borings were left open to collect delayed water readings after leaving the site due to safety concerns. Groundwater was observed in all the borings at a depth of 14 to 19 feet bgs during drilling and at a depth of 23 feet after drilling in boring B-3.

Water level readings were made in the boreholes at times and under conditions shown in the boring logs and stated in the text of the report. However, it should be noted that the groundwater levels could fluctuate based on seasonal precipitation and surface run-off.

3.0 Geotechnical Analysis

This section provides the geotechnical analysis for the proposed retaining wall improvements based on the results of the field exploration and laboratory testing. It is recommended that all of the proposed improvements be designed according to the IDOT, Bureau of Design and Environment (BDE), and Bureau of Bridges and Structures (BBS) standards.

3.1 Soil Parameters for Design

The geotechnical parameters to be used for the proposed project were determined based on the results of field and laboratory test data on the soil borings completed as well as geotechnical best practices and experience. Cohesionless soil parameters were determined by the SPT N value results while the cohesive soil parameters were determined by the in-situ and laboratory test results. The SPT N values used for design are a based on the hammer efficiency of a rope or cat-head system with a general hammer efficiency of 60% (known as the N_{60} value). Since an automatic hammer was used during the field investigation, the SPT N values should be corrected for the different hammer efficiencies. The efficiency of an automatic hammer is estimated to be 80%. The correlation of hammer efficiency is a direct ration of relative efficiencies and should be calculated as $N_{60} = N * (80/60)$, where the N value is the field recorded blow counts. Table 3 presents the generalized soil parameters for the proposed project.

Table 3: Soil Parameters

Elevation (feet)	Soil Description	In Situ Unit Weight γ (pcf)	Undrained		Drained	
			Cohesion, c (psf)	Friction Angle, ϕ (deg)	Cohesion, c (psf)	Friction Angle, ϕ (deg)
	New Engineered Clay Fill	125	1,000	0	75	26
649-642	Brown and Gray Clay Fill	130	1,550	0	75	26
642-636	Medium Dense to Dense Brown Gravel with Sand	130	0	38	0	38

Elevation (feet)	Soil Description	In Situ Unit Weight γ (pcf)	Undrained		Drained	
			Cohesion, c (psf)	Friction Angle, ϕ (deg)	Cohesion, c (psf)	Friction Angle, ϕ (deg)
636-626	Medium Dense Gray Sand / Sandy Loam	122	0	34	0	34
626-622	Very Soft Gray Loam	114	250	0	0	22
622-620*	Very Hard Gray Silty Clay Loam	145	6,300	0	150	32
622-620**	Medium Dense to Dense Gravel with Sand	130	0	38	0	38

* Layer in boring B-1 only
** Layer in borings B-2 and B-3 only

3.2 Slope Stability

Based on the preliminary plans provided by HR Green, the proposed retaining wall exposed height and the new fill will be less than 15 feet. Therefore, a global stability analysis will not be required according to the IDOT Geotechnical Manual (2020). Based on this information, a global stability analysis will not be completed.

3.3 Seismic Parameters

Per Section 2.3.10 of the IDOT Bridge Design Manual (2012), retaining walls are not typically designed for seismic loading unless when the consequences of their failure during a seismic event could cause loss of life. Therefore, seismic parameters will not be provided for this report.

4.0 Geotechnical Recommendations

This section provides the geotechnical recommendations for the proposed improvements based on the results of the subsurface investigation, laboratory testing and geotechnical analysis. Based on the preliminary information provided by HR Green, the proposed retaining wall will be a sheet pile wall.

4.1 Sheet Pile Wall Design Recommendations

Sheet pile walls are typically used in cut areas where the existing ground surface needs to be maintained during construction or when a near vertical excavation is needed. The depth of the sheet pile wall is normally estimated to be two times the wall exposed height. The wall section should be analyzed to determine that adequate factors of safety relative to sliding and overturning failure. The contractor is responsible for providing detailed internal and external stability design for the wall. The wall should be designed, and constructed, in accordance with the proprietary contractor's construction manual. The final wall design should be submitted to the structural design team for review prior to commencing construction of the wall.

The sheet pile wall design should be performed using effective stress soil parameters and should not be designed based on the IDOT published temporary sheet pile spreadsheet. The proposed sheet pile wall should be designed as stiff as possible with enough embedment to resist lateral loads and hydrostatic pressure long-term. An anchoring system might be considered to restrain the long-term movement at the top of the sheet piles and ensure no additional lateral movement if a cantilevered sheet pile wall shows excessive lateral movement.

4.2 Sheet Pile Wall Lateral Load Resistance

The proposed sheet pile walls should be designed using relevant LRFD strength limit and service limit states as well as load combinations to resist lateral earth loads. Lateral earth pressures for permanent underground structures will be dependent on the type of backfill used, drained or undrained, and the loading conditions.

Table 5 presents the recommended lateral earth pressure soil parameters to be used for the proposed sheet pile wall design based on the anticipated soil types at this site. This assumes onsite materials behind the wall and a level backslope. The at-rest earth pressure coefficient (K_o), active earth pressure coefficient (K_a), and the passive earth pressure coefficient (K_p) determined using the Rankine theory. In general, the undrained friction angle should be used for granular soils and the drained friction angle should be used for cohesive soils in calculating the earth pressure coefficients for the long-term conditions. However, during short term or temporary conditions, undrained parameters can be used for both granular and cohesive soils.

Table 5 – Lateral Earth Pressure Parameters

Soil Description	Active Earth Pressure Coefficient (K_a)	Passive Earth Pressure Coefficient (K_p)	At-Rest Earth Pressure Coefficient (K_o)
New Engineered Clay Fill	0.39	2.56	0.56
Brown and Gray Clay Fill	0.39	2.56	0.56
Medium Dense to Dense Brown Gravel with Sand	0.24	4.20	0.38

Soil Description	Active Earth Pressure Coefficient (K_a)	Passive Earth Pressure Coefficient (K_p)	At-Rest Earth Pressure Coefficient (K_o)
Medium Dense Gray Sand / Sandy Loam	0.28	3.53	0.44
Very Soft Gray Loam	0.46	2.20	0.63
Very Hard Gray Silty Clay Loam	0.31	3.25	0.47
Medium Dense to Dense Gravel with Sand	0.24	4.20	0.38

5.0 Construction Recommendations

This section provides the construction recommendations for the proposed improvements based on the results of the subsurface investigation, laboratory testing and the geotechnical analysis and recommendations. All work performed for the proposed project should confirm with requirements in the IDOT Standard Specifications for Road and Bridge Construction (SSRBC).

5.1 Site Preparation

Prior to construction of the proposed embankment and retaining wall, all vegetation and topsoil should be cleared and removed from the vicinity of the proposed improvements. After stripping and excavations, areas intended to support new foundations should be carefully evaluated by a geotechnical engineer. The contractor should not mix the existing base course materials with existing subgrade soils during the stripping and stockpiling activities. The subgrade below the base course should be evaluated in accordance with the Pavement Subgrade Preparation section of this report. Where possible, the engineer may require proof-rolling of the subgrade with a 20 to 30-ton loaded truck or other pneumatic-tired vehicle of similar size and weight. The purpose of the proof-rolling is to locate soft, weak, or excessively wet soils present at the time of construction. Proof-rolling should be performed during a time of good weather and not while the site is wet, frozen, or severely desiccated. Also, to ensure proper compaction of the new fill material in the widening section, the subgrade soil should be prepared according to SSRBC and IDOT's Subgrade Stability Manual. Any unsuitable materials observed during the evaluation and proof-rolling operations should be undercut and replaced with compacted structural fill and/or stabilized in-place. The possible need for, and extent of, undercutting and/or in-place stabilization required can best be determined by the geotechnical engineer at the time of construction. Once the site has been properly prepared, at grade construction may proceed. The new embankment fill will be constructed at a 2:1 slope and will require the new fill to be keyed into the existing embankment either by stepping or benching the existing embankment slope.

Structural fill should not be placed upon wet or frozen subgrade soils. If the subgrade or structural fill becomes frozen, desiccated, wet, disturbed, softened, or loose, the affected materials should be scarified, dried and moisture conditioned, and compacted to the full depth of the affected area or the soils should be removed. Rainfall and runoff can soften soils and affect the load bearing capacity of the soils.

5.2 Existing Utilities

Based on the existing site conditions, some utilities exist along the project corridor that will interfere with construction of the proposed retaining wall. Before proceeding with construction, all existing underground utility lines that will interfere with construction should be completely relocated from beneath the proposed construction areas. Where possible, existing utility lines that are to be abandoned in place should be removed and/or plugged with a minimum of 2 feet of cement grout. All excavations resulting from underground utilities 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.

5.3 Site Excavation

The contractor will be responsible to provide a safe excavation during the construction activities of the project. All excavations should be conducted in accordance with applicable federal, state, and local safety regulations, including, but not limited to the Occupational Safety and Health Administration (OSHA) excavation safety standards. Excavation stability and soil pressures on temporary shoring are dependent on soil conditions, depth of excavations, installation procedures, and the magnitude of any surcharge loads on the ground surface adjacent to the excavation. Excavation near existing structures and underground utilities should be performed with extreme care to avoid undermining existing structures. Excavations should not extend below the level of adjacent existing foundations or utilities unless underpinning or other support is installed. It is the responsibility of the contractor for field determinations of applicable conditions and providing adequate shoring for all excavation activities.

5.4 Groundwater Management

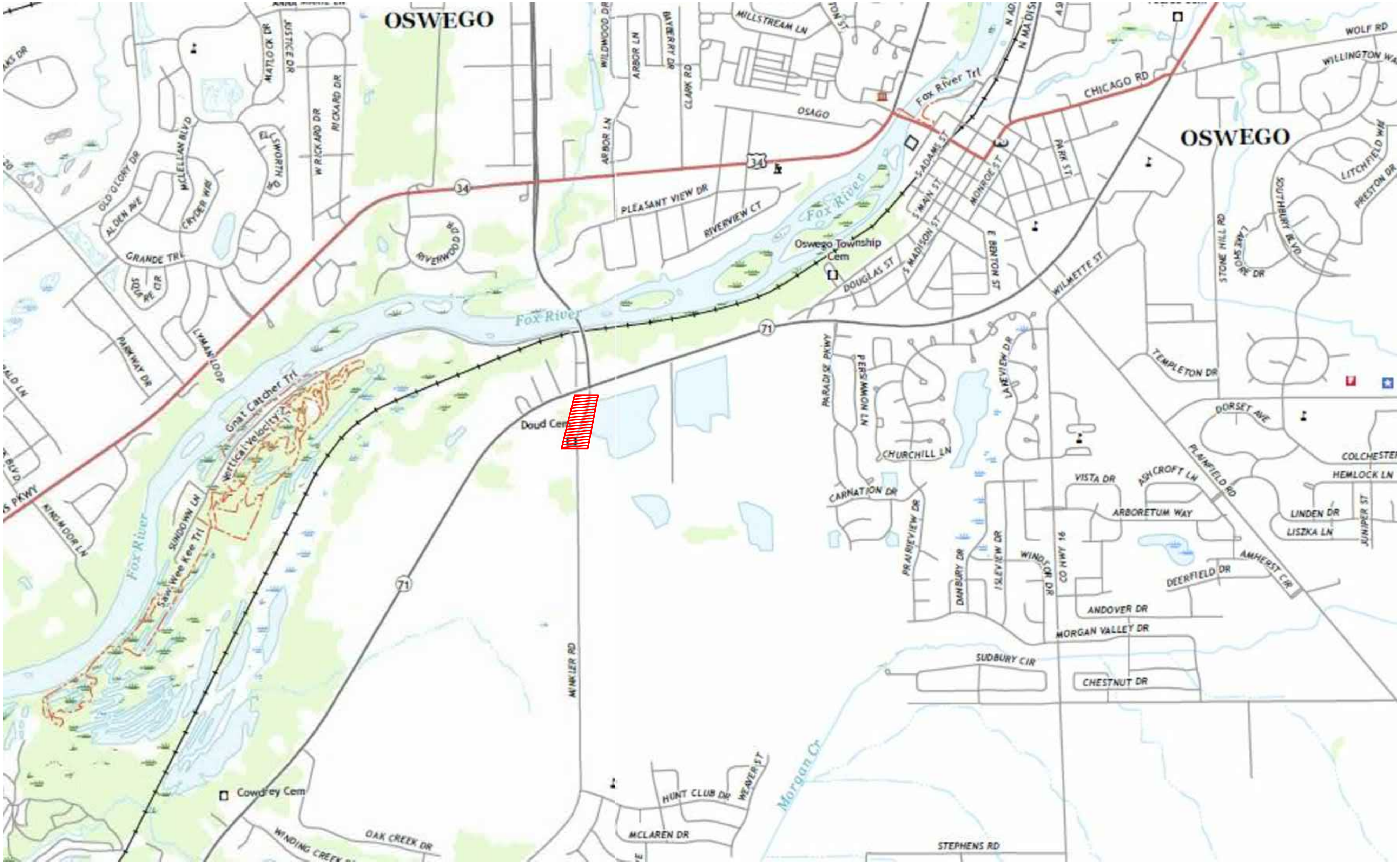
The contractor should control groundwater and surface water infiltration to provide a dry condition for construction. Temporary ditches, sumps, granular drainage blankets, stone ditch protection, or hand-laid riprap with geotextile underlayment could be used to divert groundwater if significant seepage is encountered during construction. If water seepage occurs during excavation 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 footings should be backfilled using approved structural fill.

6.0 Professional Disclaimer

This report was prepared on the basis of the project information supplied by the client and is intended only for use on this project. This report was prepared by interpreting the data from the soil borings and field tests made during the field investigation and from the results of the laboratory tests obtained from the samples taken. The report gives a representative, but not exhaustive, picture of the project subsurface conditions. The geotechnical engineer warrants that the findings, recommendations, specifications, and professional advice given within this report have been prepared using generally accepted professional engineering practices. The recommendations provided in the report are specific to the project described herein and are based on the information obtained from the soil boring locations within the proposed improvements. Changes involving the proposed improvements from those enumerated within this report should be submitted for our review to evaluate our recommendations.

APPENDIX A

SITE LOCATION MAP AND SOIL BORING LOCATION PLAN



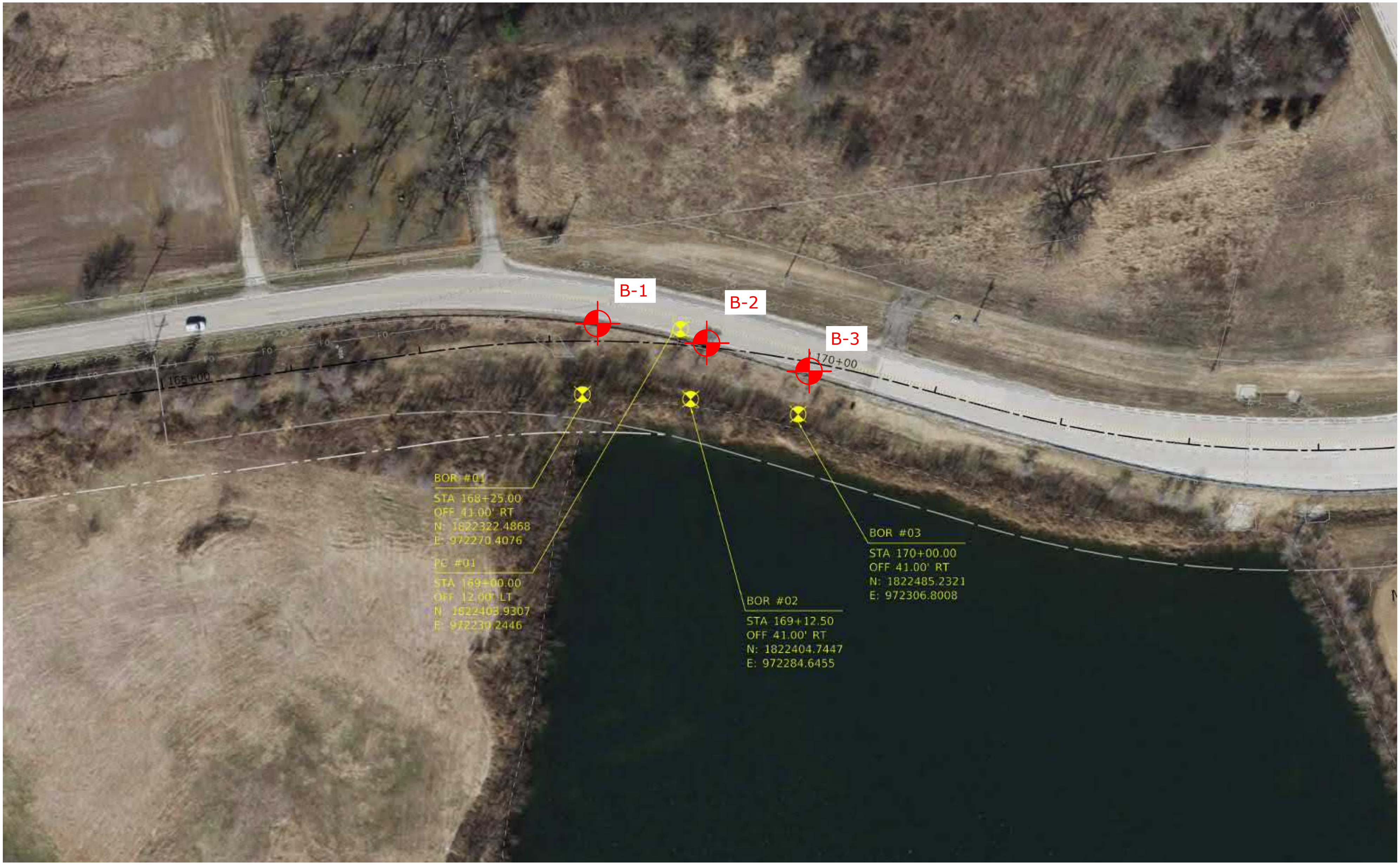
SITE LOCATION

CHICAGO TESTING LABORATORY, INC.

30W114 BUTTERFIELD ROAD
WARRENVILLE, IL 60555
PHONE: (630) 393-2851
FAX : (630) 393-2857

DRAWN BY: JAR	
CHECKED BY: RW	
SCALE: NTS	DATE: 9/16/21

SITE LOCATION MAP
21F202 - KCHD COLLINS ROAD
MINKLER ROAD RETAINING WALL
OSWEGO, ILLINOIS



AS-DRILLED BORING LOCATION

CHICAGO TESTING LABORATORY, INC.
30W114 BUTTERFIELD ROAD
WARRENVILLE, IL 60555
PHONE: (630) 393-2851
FAX : (630) 393-2857

DRAWN BY:	CHECKED BY:	SCALE:	DATE:
JAR	RW	NTS	9/16/21

BORING LOCATION PLAN
21F202 - KCHD COLLINS ROAD
MINKLER ROAD RETAINING WALL
OSWEGO, ILLINOIS

APPENDIX B

SOIL BORING LOGS AND SOIL PROFILE

Illinois Department of Transportation

Division of Highways
Chicago Testing Laboratory, Inc.

SOIL BORING LOG

Date 9/1/21

ROUTE Minkler Road **DESCRIPTION** Minkler Road Retaining Wall **LOGGED BY** DB

SECTION 16-00133-01-EG **LOCATION** NE 1/4, **SEC.** 24, **TWP.** 37N, **RNG.** 7E

COUNTY Kendall **DRILLING METHOD** Hollow Stem Auger **HAMMER TYPE** Auto

STRUCT. NO. N/A
Station N/A

BORING NO. B-1
Station 168+30
Offset 10.00ft LT
Ground Surface Elev. 650.00 ft

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

Groundwater Elev.:
First Encounter 631.0 ft ▼
Upon Completion None ft
After N/A **Hrs.** N/A ft

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
2 inches of Topsoil	649.83				
10 inches of Aggregate Shoulder	649.00				
Brown and Gray, Moist FILL: CLAY trace gravel			2 3 6	2.3 B	17.2
			2 3 4	2.1 B	14.8
		-5	2 2 4		26.8
	643.00				
Loose to Medium Dense Brown, Moist SAND with gravel (SPG)			6 12 9		8.5
		-10	4 4 5		5.7
	636.50				
Loose Gray, Wet SANDY LOAM (SM)			4 6 6		5.6
		-15	5 7 8		11.7
		▼	4 5 7		23.8
		-20			

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Loose Gray, Wet SANDY LOAM (SM) *(continued)*			3 4 5		32.2
	628.00				
Very Soft Gray, Wet LOAM trace gravel (SC-SM)			2 3 11	0.3 P	22.5
		-25	4 5 10		15.8
	623.50				
Very Hard Gray, Moist SILTY CLAY LOAM trace gravel (CL/ML)			11 24 48	6.3 B	9.1
	620.00	-30			
End of Boring					
		-35			
		-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
Chicago Testing Laboratory, Inc.

SOIL BORING LOG

Date 9/1/21

ROUTE Minkler Road **DESCRIPTION** Minkler Road Retaining Wall **LOGGED BY** DB

SECTION 16-00133-01-EG **LOCATION** NE 1/4, **SEC.** 24, **TWP.** 37N, **RNG.** 7E

COUNTY Kendall **DRILLING METHOD** Hollow Stem Auger **HAMMER TYPE** Auto

STRUCT. NO. N/A
Station N/A

BORING NO. B-2
Station 169+10
Offset 1.00ft LT
Ground Surface Elev. 650.00 ft

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

Groundwater Elev.:
First Encounter 634.0 ft ▼
Upon Completion None ft
After N/A **Hrs.** N/A ft

Description	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
12 inches of Aggregate Shoulder (649.00)				
Brown, Moist FILL: CLAY trace gravel		1 5 8	1.3 S	10.4
	-5	2 4 5	0.8 B	15.5
(641.50)		3 4 5		22.3
Medium Dense Gray, Moist GRAVEL with sand (GP)	-10	7 8 6		10.3
(636.50)		9 11 12		
Medium Dense Brown, Moist SANDY CLAY LOAM (SC) (635.50)	-15	2 4 6		14.7
Medium Dense Gray, Moist SAND (SP) ▼		5 6 7		16.8
	-20	5 7 6		15.8

Description	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Medium Dense Gray, Moist SAND (SP) *(continued)* (628.00)		6 7 8		21.8
Medium Dense Gray, Wet SANDY LOAM (SM) (625.50)	-25	0 2 3		28.4
Very Soft Gray, Wet LOAM trace gravel (SC-SM)		2 4 5	0.3 P	23.2
(621.00)		2		
Dense Gray, Moist GRAVEL with sand (GPS) (620.00)	-30	12 25		14.5
End of Boring	-35			
	-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
Chicago Testing Laboratory, Inc.

SOIL BORING LOG

Date 9/1/21

ROUTE Minkler Road **DESCRIPTION** Minkler Road Retaining Wall **LOGGED BY** DB

SECTION 16-00133-01-EG **LOCATION** NE 1/4, **SEC.** 24, **TWP.** 37N, **RNG.** 7E

COUNTY Kendall **DRILLING METHOD** Hollow Stem Auger **HAMMER TYPE** Auto

STRUCT. NO. N/A
Station N/A

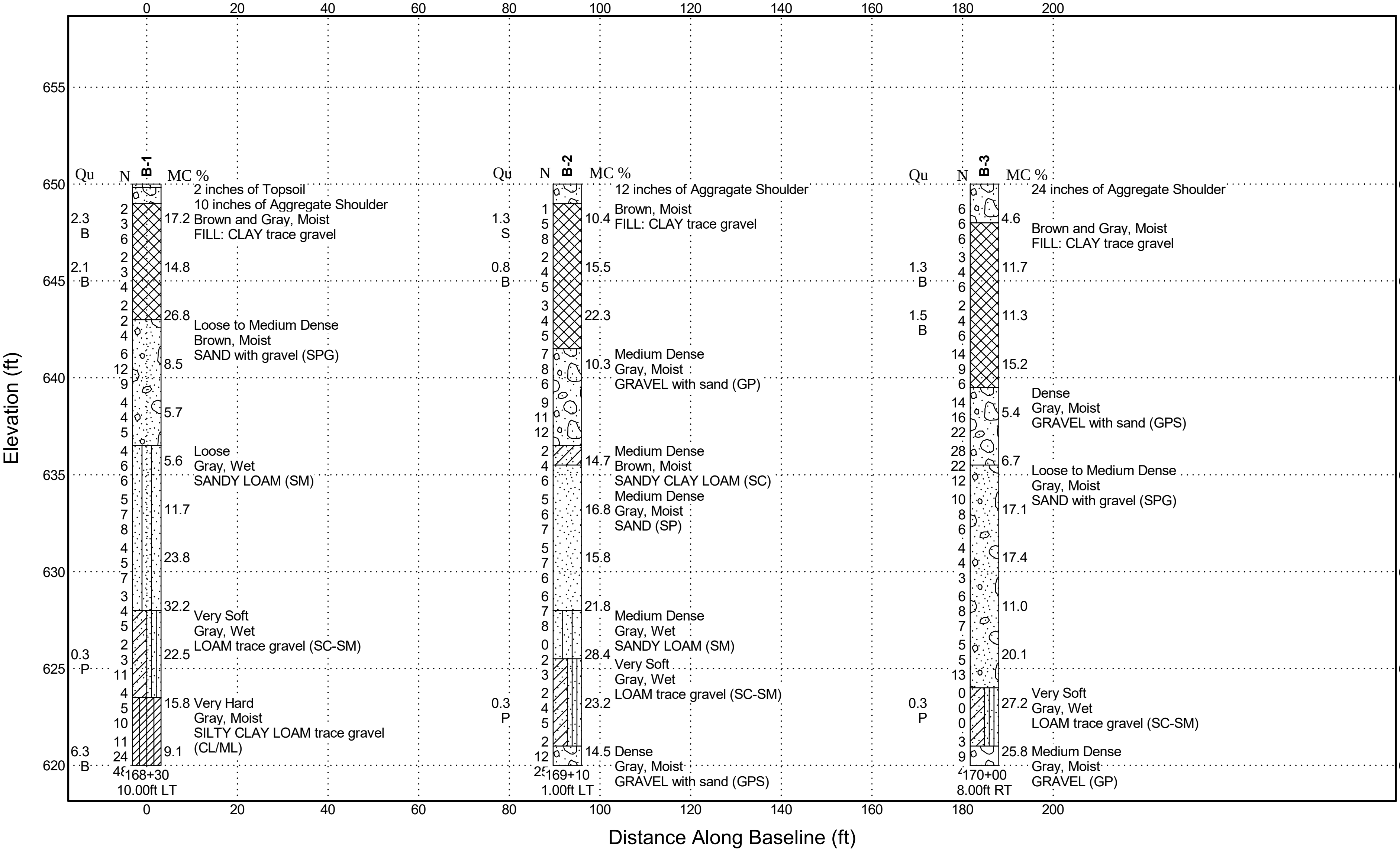
BORING NO. B-3
Station 170+00
Offset 8.00ft RT
Ground Surface Elev. 650.00 ft

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

Groundwater Elev.:
First Encounter 636.0 ft ▼
Upon Completion 627.0 ft ▽
After N/A **Hrs.** N/A ft

Description	Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
24 inches of Aggregate Shoulder	648.00		6, 6, 6		4.6
Brown and Gray, Moist FILL: CLAY trace gravel		-5	3, 4, 6	1.3 B	11.7
			2, 4, 6	1.5 B	11.3
	639.50	-10	14, 9, 6		15.2
Dense Gray, Moist GRAVEL with sand (GPS)			14, 16, 22		5.4
▼	635.50	-15	28, 22, 12		6.7
Loose to Medium Dense Gray, Moist SAND with gravel (SPG)			10, 8, 6		17.1
		-20	4, 4, 3		17.4
Loose to Medium Dense Gray, Moist SAND with gravel (SPG) *(continued)*			6, 8, 7		11.0
▽		-25	5, 5, 13		20.1
	624.00				
Very Soft Gray, Wet LOAM trace gravel (SC-SM)			0, 0, 0	0.3 P	27.2
	621.00				
Medium Dense Gray, Moist GRAVEL (GP)	620.00	-30	3, 9, 4		25.8
End of Boring		-35			
		-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
Chicago Testing Laboratory, Inc.

SUBSURFACE DIAGRAM Minkler Ret Wall

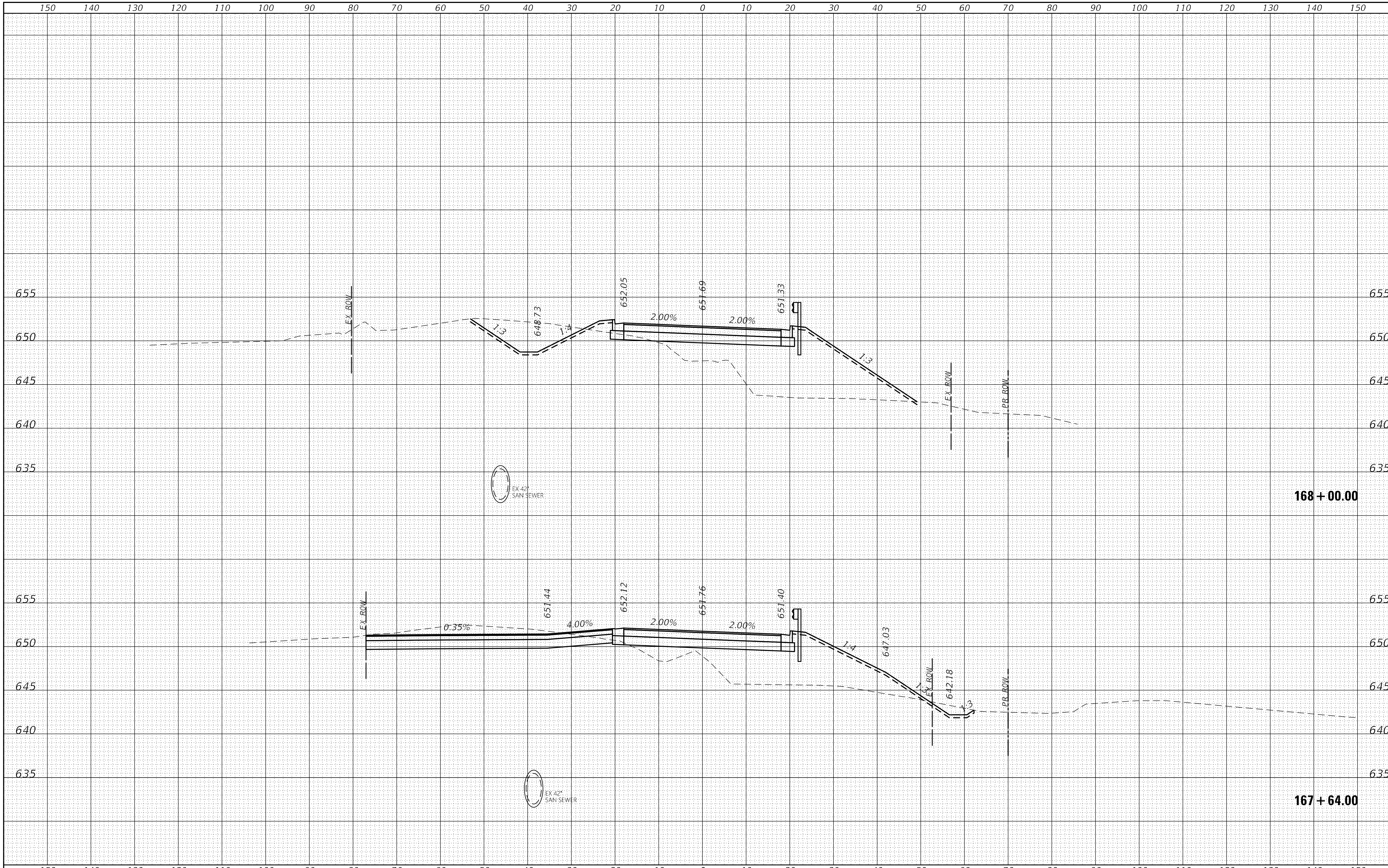
Route: Minkler Road

Section: 16-00133-01-EG

County: Kendall

APPENDIX C

PRELIMINARY RETAINING WALL CROSS SECTIONS



FINAL SURVEY | SURVEYED | PLOTTED | TEMPLATE | AREAS | AREAS CHECKED | NOTE BOOK NO. | BY | DATE

ORIGINAL SURVEY | SURVEYED | PLOTTED | TEMPLATE | AREAS | AREAS CHECKED | NOTE BOOK NO. | BY | DATE

HRG PROJECT NO.: 19152
HRG PROJ. CONTACT:
FILE NAME: 19152_xssheets002_minkler.dgn
PLOT DRIVER: IL_pdf_bw.pltcfg
PEN TABLE: plotlabel.tbl

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USER NAME = amiller	DESIGNED -	REVISED -	STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION	CROSS SECTIONS MINKLER ROAD	F.A.U RTE.	SECTION NO.	COUNTY	TOTAL SHEETS	SHEET NO.
	DRAWN -	REVISED -					KENDALL	259	210
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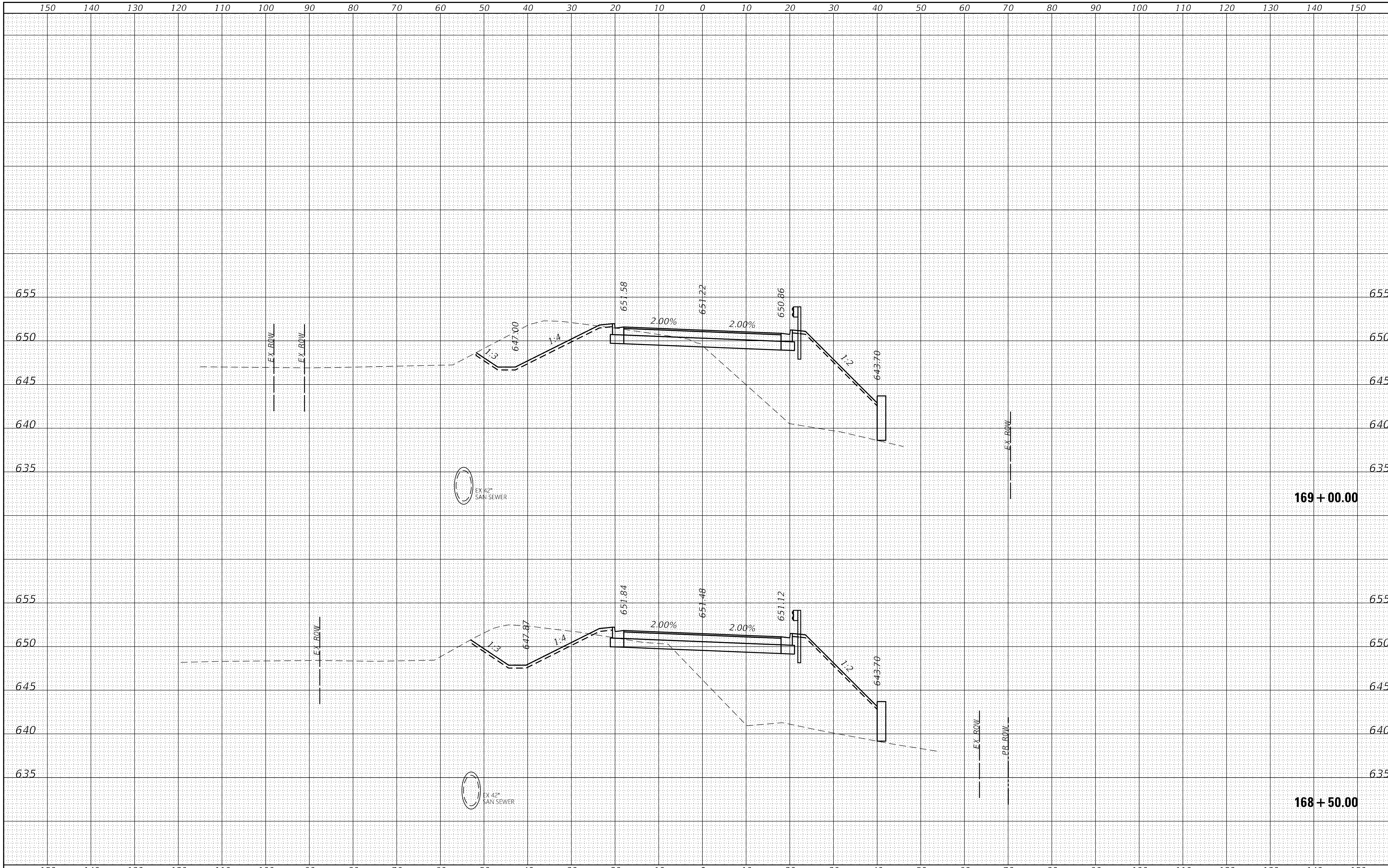

FINAL SURVEY
NOTE BOOK NO.
SURVEYED
PLOTTED
TEMPLATE
AREAS
AREAS CHECKED
BY
DATE

ORIGINAL SURVEY
NOTE BOOK NO.
SURVEYED
PLOTTED
TEMPLATE
AREAS
AREAS CHECKED
BY
DATE

HRG PROJECT NO.: 19152
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PLOT DATE = 9/7/2021	DATE -	REVISED -	

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

CROSS SECTIONS
MINKLER ROAD

SCALE: | SHEET 37 OF 42 SHEETS | STA. 168+50.00 TO STA. 169+00.00

F.A.U RTE.	SECTION NO.	COUNTY	TOTAL SHEETS	SHEET NO.
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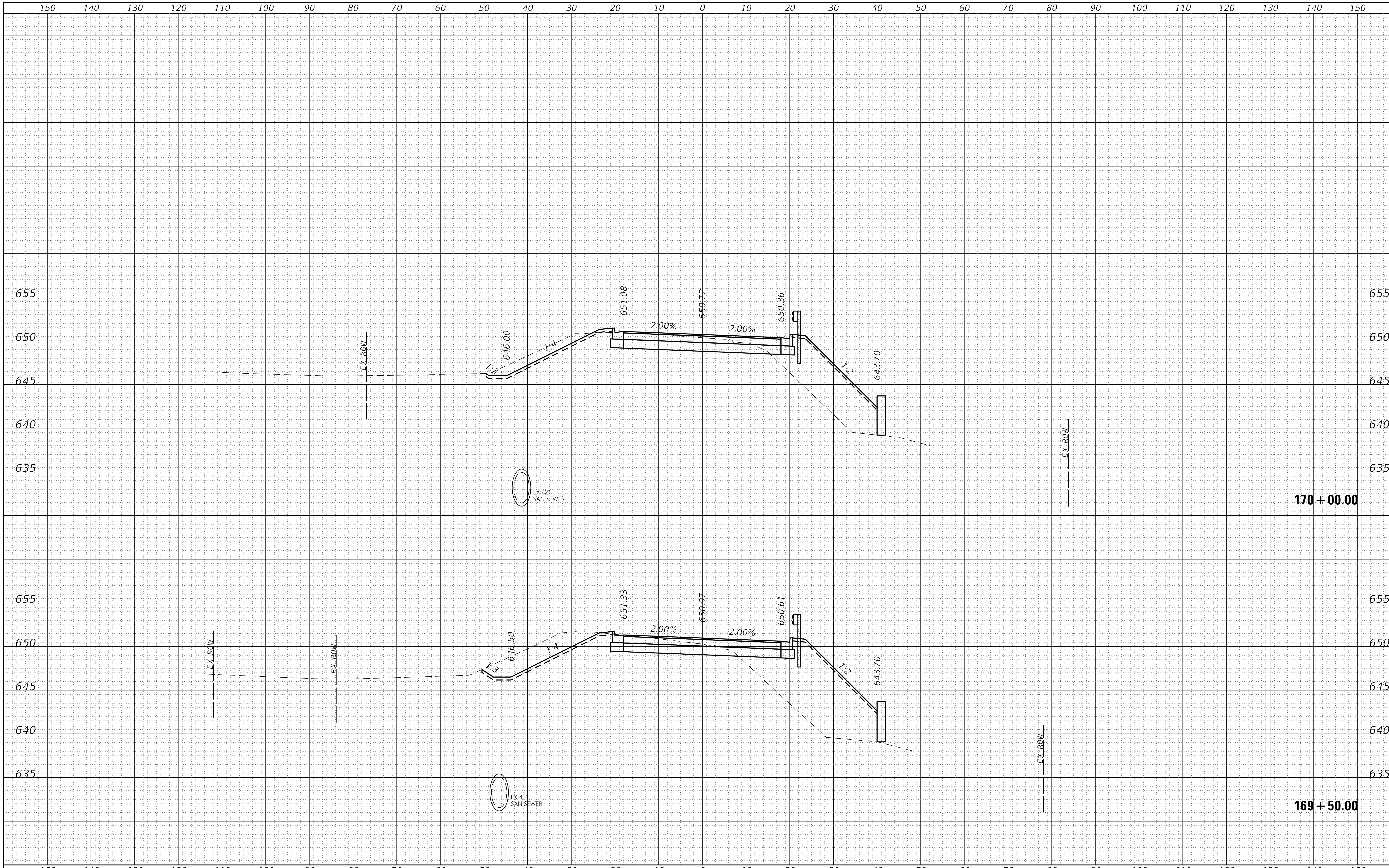
FED. ROAD DIST. NO.	ILLINOIS	FED. AID PROJECT		



FINAL SURVEY	SURVEYED
	PLOTTED
NOTE BOOK	TEMPLATE
	AREAS
NO.	AREAS CHECKED

BY | DATE

ORIGINAL SURVEY	SURVEYED
	PLOTTED
NOTE BOOK	TEMPLATE
	AREAS
NO.	AREAS CHECKED

BY | DATE

HRG PROJECT NO.: 19152
HRG PROJ. CONTACT:
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PEN TABLE: plottable.tbl

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USER NAME = amiller	DESIGNED -	REVISED -
	DRAWN -	REVISED -
PLOT SCALE = 20.0000 ' / in.	CHECKED -	REVISED -
PLOT DATE = 9/7/2021	DATE -	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

CROSS SECTIONS
MINKLER ROAD

SCALE: | SHEET 38 OF 42 SHEETS | STA. 169+50.00 TO STA. 170+00.00

F.A.U RTE.	SECTION NO.	COUNTY	TOTAL SHEETS	SHEET NO.
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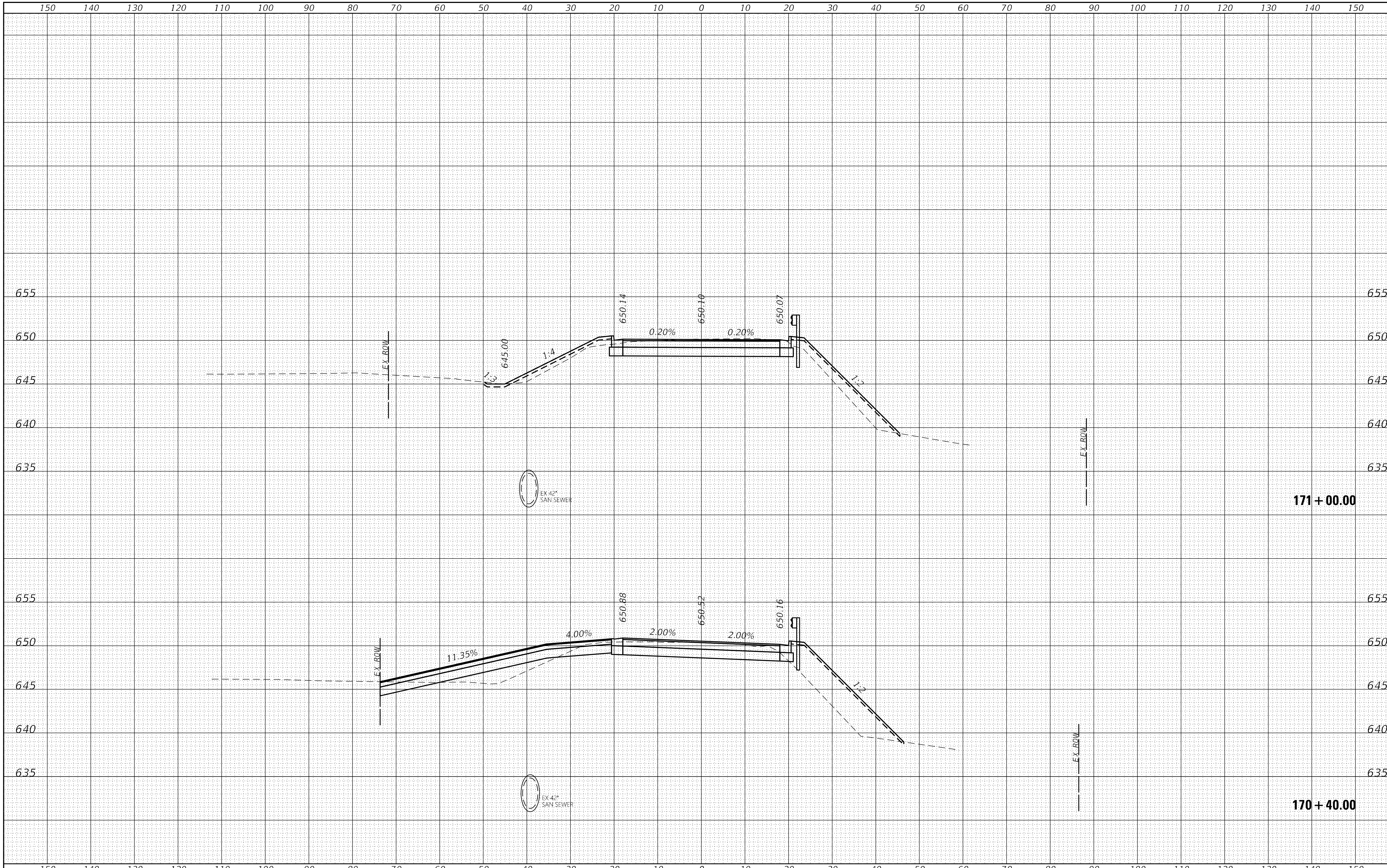
		CONTRACT NO.		
FED. ROAD DIST. NO.	ILLINOIS	FED. AID PROJECT		



FINAL SURVEY — NOTE BOOK NO. ___ — SURVEYED, PLOTTED, TEMPLATE, AREAS, AREAS CHECKED — BY — DATE

ORIGINAL SURVEY — NOTE BOOK NO. ___ — SURVEYED, PLOTTED, TEMPLATE, AREAS, AREAS CHECKED — BY — DATE

HRG PROJECT NO.: 191152
HRG PROJ. CONTACT:
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PLOT DRIVER: IL_pdf_bw.pltcfg
PEN TABLE: plotlabel.tbl

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USER NAME = amiller	DESIGNED -	REVISED -
	DRAWN -	REVISED -
PLOT SCALE = 20.0000 ' / in.	CHECKED -	REVISED -
PLOT DATE = 9/7/2021	DATE -	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

CROSS SECTIONS
MINKLER ROAD

SCALE: | SHEET 39 OF 42 SHEETS | STA. 170+40.00 TO STA. 171+00.00

F.A.U RTE.	SECTION NO.	COUNTY	TOTAL SHEETS	SHEET NO.
		KENDALL	259	213
		CONTRACT NO.		

FED. ROAD DIST. NO. | ILLINOIS | FED. AID PROJECT