ROADWAY GEOTECHNICAL REPORT

Dixie Highway Storm Sewer Replacement,

between Harwood Avenue & Sycamore Avenue

PTB 208-010, Work Order-1

Homewood, Cook County, Illinois

Prepared for:

BLA Inc.
333 Pierce Road,
Suite 200,
Itasca, IL 60143

Prepared by:

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(847) 253-3845

JOB NO. 23074A
May 07, 2024

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Geo Services, Inc.
Geotechnical, Environmental and Civil Engineering
An MBE - DBE Firm

Date: May 07, 2024

BLA, Inc.
333 Pierce Road,
Suite 200
Itasca, IL 60143

Attn: Mr. John P. O'Neill, P.E.
Vice President

Job No. 23074A

Re: Roadway Geotechnical Report (RGR)
Dixie Highway Storm Sewer Replacement between Harwood Avenue and Sycamore Avenue
PTB 208-010
Cook County, Illinois

Dear Mr. O'Neill:

The following report presents the geotechnical analysis and recommendations for the proposed drainage and pavement improvements along Dixie Highway between Harwood Avenue and Sycamore Avenue. A total of twelve (12) Deep Drainage Structure Borings (DDB-01 thru DDB-12) and two (2) Soil Grade Borings (SGB-1 & SGB-2), and four (4) pavement core borings are included with this Roadway Geotechnical Report (RGR) performed by Geo Services Inc (GEO).

If there are any questions regarding the information submitted herein, please do not hesitate to contact us.

Very truly yours,

GEO SERVICES, Inc.

LICENSED PROFESSIONAL ENGINEER
ANDRÉS MATOS-ORTIZ
062-075540
OF ILLINOIS
8-May-24
Exp: 11/25

Qayum Zazai
Project Manager

Andrés Matos-Ortiz, P.E
Senior Project Manager

enc.

SECTION 01: INTRODUCTION

This report presents the results of the geotechnical investigation for the proposed Dixie Highway Storm Sewer Replacement from Harwood Avenue to Sycamore Road in Homewood, Cook County, IL. A total of twelve (12) Deep Drainage Structure Borings, (DDBs) two (2) Soil Grade Borings (SGBs), and four (4) pavement core borings were performed as part of this Roadway Geotechnical Report (RGR) by Geo Services Inc. (GEO) in 2024. Plan and profile drawings provided by BLA for the proposed roadway alignments have been considered in developing the recommendations in this report.

Boring locations were selected by GEO and reviewed by IDOT. Boring locations were laid out in the field by GEO personnel at the proposed locations. Elevations were taken using a survey grade GPS and can be seen on the boring logs.

This report includes description of soil and groundwater conditions encountered and recommendations pertaining to the design and construction of the roadway as well as site location map, boring location diagram, plan & profile drawings, boring logs, BBS 2640 sheets and SSR triangles.

SECTION 02: PROJECT DESCRIPTION

This report refers to the proposed improvements including replacement of the partially collapsed sewer that drains the viaduct underneath the Canadian National Railway/Metra Electric District railroad, as well as making appropriate roadway improvements related to the sewer replacements. The proposed improvements address the project purpose by mitigating observed drainage issues along the corridor. The outlet storm sewer is proposed under the northbound lanes to avoid the railroad right-of-way and high-tension power lines located between Dixie Highway and the railroad. The results of associated soil borings completed by Geo Services, Inc. (GEO), along with general notes in Appendix A, site location map in Appendix B, Pan & Profile in Appendix C, boring and core logs found in Appendix D, lab data found in Appendix E, and BBS 2640 sheets, SSR triangles found in Appendix F and USDA Soil Report in Appendix G are included in this report.

SECTION 03: GEOLOGY AND PEDOLOGY

According to the 1971 ISGS Circular #460: Summary of the Geology of the Chicago Area/ISGS Geologic Materials to a Depth of 20' – Cook County, the surficial soils along Sanders Road are categorized as Tinley Moraine deposits and the surficial soils generally belong to the Wadsworth Member of Wedron Formation. The Wedron Formation is the surface drift in a large part of the Chicagoland area. The Wadsworth Member consists mostly of gray clayey and silty clayey till, relatively low in content of

pebbles, cobbles and boulders and contains local lenses of silt. The Wedron Formation is mostly glacial till with lenses and beds of gravel, sand and silt; it includes all glacial deposits from the top of the surface till to the underlying Morton Loess, Farmdale soil, or Altonian tills which are present locally but are rarely exposed; commonly rests directly on bedrock.

The Wetland Inventory database reviewed online at the US Fish & Wildlife Service website indicates that there is no documented wetland close to the project corridor.

The USDA Natural Resources Conservation Service Soil Survey database indicates that surficial soils in the vicinity of the project corridor are generally associated with various clay loam materials. None of these soils are overly organic and potential frost action ranges from moderate to high.

According to readily available ISGS sources, there are no documented coal mining operations in near vicinity to the project site and seismic activity is noted to be very low.

The available geologic information indicates that the subgrade soils within the limits of the project corridor should generally consist of clay loams.

Appendix (G) of this report contains a Soil Resource Report from the USDA Natural Resource Conservation Services containing soil maps with soil types for the project site. The report included in Appendix (G) provide general information for the soils encountered in the upper 5 to 6 feet including soil units and drainage conditions for the project site. This information will be needed if a NPDES storm water permit is required for construction activities.

SECTION 04: SUBSURFACE INVESTIGATION PROCEDURES

The borings were performed between February 22, 2024 and March 07, 2024 (see boring logs for specific dates), with a truck-mounted drilling rig equipped with a CME automatic hammer, and were advanced by means of hollow stem augers or mud-rotary drilling methods to depths ranging from 10 to 60 feet below grade. Representative soil samples were obtained employing split spoon sampling procedures in accordance with AASHTO Method T-206. Samples obtained in the field were returned to our laboratory for further examination and testing.

Split spoon sampling involves driving a 2.0-inch outside diameter split barrel sampler into the soil with a 140-pound weight falling freely through a distance of 30 inches. Blow counts are recorded at 6" intervals and the blow counts are shown on the boring logs. The number of blows required to advance the sampler the last 12 inches is termed the Standard Penetration Resistance (N). The N value is an indication of the relative density of the soil.

SECTION 05: LAB TESTING PROGRAM

The test procedures were performed in compliance with the Illinois Department of Transportation (IDOT) Geotechnical Manual. All split-spoon samples obtained from the drilling operation were visually classified in the field. Cohesive samples were tested for unconfined compressive strength using an IDOT modified RIMAC test device and/or calibrated penetrometer in the field.

The soil testing program included performing water content, density and unconfined compression and calibrated penetrometer tests on the cohesive samples recovered. These tests were performed upon representative portions of the samples obtained in the field. The results of the above testing, along with a visual classification of the material based upon both the Illinois textural classification and the AASHTO Soil Classification System, are indicated on the boring logs.

In addition to the regular lab testing program, Atterberg Limits (AASHTO T-89/90), and Particle Size Analysis (AASHTO T-88) or Grain Size Analysis (AASHTO T-311) and Organic Content (AASHTO T-267) tests were performed on selected samples from the borings. The tests were performed upon representative portions of the samples obtained in the field. Graphs for the particle size or grain size can be found in Appendix E, and on the following Table 1 is a summary of the test data.

Table 1 - Lab Testing Data Summary

Boring No.	Location (Station)	Sample Depth (ft)	Material Description	LL	PI	P200	Organic Content (%)
SGB-2	112+80	3.5-5.0	Clay Loam (A-7)	29	16	81%	-
DDB-4	118+90	3.5-5.0	Silty Clay (A-6)	27	15	85%	-
DDB-7	124+80	1-2.5	Silty Clay Loam (A-6)	37	20	85%	1.7
DDB-10	129+70	8.5-10.0	Silty Clay Loam (A-7)	42	22	67%	-

SECTION 06: SOIL CONDITIONS

For specific boring information, reference can be made to the individual soil profiles in Appendix C and the soil boring / core logs in Appendix D. Below is a summary of soil conditions found on those logs.

The Dixie Highway pavement cores performed in the roadway between Harwood Avenue Sycamore Avenue (C-2, C-3, C-4 & C-5) generally encountered 4.0 to 11.5 inches of asphalt layer overlying 7.25 to 8.5 inches of concrete. Underlying the

pavement, a base course layer of 4 inches was encountered. In general, the pavement consisted of concrete overlaid by asphalt except C-5 at station 30+00 where the pavement consisted of 11.5 inches thick asphalt. Pavement under the railroad viaduct consisted of concrete only. Underlying the pavement and/or material at the ground surface, borings along Dixie Highway generally encountered 2 to 15 feet of stiff to hard clay loam/silty clay subgrade soils followed by a layer of poorly graded sand up to the top of bedrock. The sub-soils generally can be categorized as very stiff cohesive soils.

SECTION 07: BURIED TOPSOIL CONDITIONS

Areas with buried topsoil were not encountered along the alignment. The actual soil conditions may vary from boring to boring and the conditions at the specific boring locations are noted on the boring logs. Variations in soil conditions between boring locations should be expected during construction.

SECTION 08: GROUND WATER CONDITIONS

Groundwater was observed at three borings (DDB-3, DDB-7 and DDB-9) at approximate depths ranging from 3 to 8.5 feet below the ground surface as outlined in the Table below.

Table 2 – Water Table

Boring No.	Northings	Eastings	Ground Surface El. (ft)	Boring Depth (ft)	Water Table Depth (ft)
DDB-03	1785088.644	1166623.382	650.5	60	3.0
DDB-07	1785812.754	1166906.970	645.6	59	8.5
DDb-09	1786104.444	1167019.218	642.1	57	4.0

Underground water was encountered at 3-ft depth for DDB-3, at 8.5-ft depth for DDB-7 and at 4-ft for DDB-9. Based the on the soil and boring conditions at DDB-3 and DDB-9, it is believed that the shallow water encountered was not the actual water table, possibly due to the existing storm sewer nearby. The rest of the borings were dry to a depth of 10 feet before the introduction of rotary drills, however average water table can be estimated by the presence of a color shift from brown to gray. We estimate the long-term water table depth to be between 8 and 12 feet on average from the surface based on change in the soil color from brown to gray. Fluctuations in the amount of water accumulated and in the hydrostatic water table can be estimated depending on variations in precipitation and surface runoff.

SECTION 09: ANALYSIS

9.1 Drainage Conditions Analysis

The stratification lines shown on the boring logs in Appendix D represent the approximate boundary between soil types, and the actual transition may be gradual. Soils consisted of predominately stiff to hard clay loam/silty clay within the top 15 to 20 feet of the borings. Moisture contents for the clay soils were typically in the lower-teens to lower-twenties. Due to the silty clay/clay loam (more than 3 feet of A-6 and A-7 soil and constructed to the IDOT Standard Specifications manual), greater than 0.5% grade slope and anticipated sloped ditches, we rate drainage conditions as “Poor”.

SECTION 10: ROADWAY RECOMMENDATIONS

10.1 Roadway Recommendations

Based on the boring logs the subgrade soils beneath the existing roadway, consisting of clay loam/silty clay soils, are considered suitable for support of the proposed roadway with exception of the areas outlined on the following Table 3 – Recommended Remedial Treatments.

Table 3 – Recommended Remedial Treatments

Station (Boring)	Cut or Fill	Subgrade Description (Water content)	Unconfined Compressive Strength (tsf)	Reason of Remedial Treatment	Remedial Treatment, Depth (inches)	Remedial Treatment [1]
116+00 to 117+50 (DDB-03)	Cut	Clay Loam-brown-medium stiff (25%)	0.5	Low strength at design subgrade elevation	14 [1]	Remove 14” soil and replace with approved structural (granular) fill

Notes: 1. Conditions should be verified in the field at time of construction

It is recommended that the unsuitable soils be removed and replaced with structural (granular) fill. Selection of fill material and placement should conform to the IDOT District 1 Special Provision Section 303: Aggregate Subgrade Improvement.

The actual need for treatment should be determined in the field at the time of construction based on guidelines presented in the Illinois Department of Transportation Geotechnical Manual under the direction of a licensed geotechnical engineer. Evaluation of soils in the field should be performed based on the guidelines presented in

the IDOT Subgrade Stability Manual. If poor soil conditions (very soft, organic or peat soils) are encountered at the time construction, differing than those encountered in this report, the Geotechnical Engineer should be consulted. Heavy equipment traffic directly on the undercut subgrade should be minimized.

For excavations wherever deeper undercuts (≥ 4 feet below design bearing elevations) are necessary, a temporary soil retention system to be designed by the Contractor (or as directed by the Engineer, as specified in IDOT GBSP 44) will likely also be required to support the embankment during excavation and wall construction.

10.2 Topsoil Recommendations

All borings were performed along the existing pavement. We do not expect any topsoil to be present under the existing pavement.

It is expected that topsoil and/or higher moisture soils will be encountered in areas where road widening is included in the project scope. For quantity estimation, in areas where road widening is included, we recommend topsoil stripping to an average depth of 8 inches be included in the construction plans.

10.3 Subgrade Rating and Borrow Fill Recommendations

The majority of the subgrade consists of clay loam/ silty clay cohesive soils. The roadway should be designed with a Subgrade Support Rating (SSR) of Poor. We recommend that the pavement design be performed utilizing a Poor rating, with an Illinois Bearing Ratio (IBR) of 2.0. Also, we recommend a shrinkage factor of 15% for cohesive or granular soils.

Prior to placing any borrow fill at the site, it is recommended that the exposed surface at or near grade be proofrolled with the heaviest available equipment to determine if there are any localized deposits of soft or unsuitable materials. During the proofrolling procedure, the exposed surface is rolled with the heaviest piece of construction equipment available at the site, such as a heavily loaded tandem axle dump truck having a gross weight of not less than 25 tons. Any such deposits, as observed by deflection of the subgrade under the wheels of the proofrolling equipment, should be removed and replaced with an approved fill free of organic matter and debris under the supervision of the Illinois Licensed Geotechnical Engineer. The silt and silty clay loam soils are sensitive to moisture changes and some softening/disturbance of the exposed soils should be expected following periods of precipitation. If any remediation is required at the time of construction, it may include undercutting and placement of a stabilization stone such as IDOT gradation CA-1 or PGEs materials or approved fill material.

Additionally, borrow and excavation material should be in accordance with Section 8.4 of the IDOT Geotechnical Manual. In particular, soils should be tested and conform to

the required testing and permissible limits as defined in the following table (taken from Table 8.4-1 in the IDOT Geotechnical Manual). Materials that do not meet the permissible limits should be confined to the embankment core with at least 24-inches of cover material which meets the testing requirements in the following Table 4.

Table 4 – Requirements of Borrow Soils for Top 24-in Subgrade

Required Test	AASHTO Method	Permissible Limit
SDD (at OMC)	T-99 (Method C)	90 pcf min [1]
Organic Content	T-194	10% max
Percent Silt and Fine Sand	T-88	65% max [2]
PI	T-90	12% min
LL	T-89	50% max
Shear Strength © at 95% SDD	T-208 or T-234	1,000 psf min [3]
SO_3 [4]	ASTM C-618	5% max

Notes: 1. As Per Standard Specification.
2. Frost Susceptibility Criteria.
3. For Engineered Embankments which are greater than 15ft in height or greater.
4. Only for CCB.

Fill materials placed at the site should consist of an inorganic approved material, compacted to a minimum 95% of AASHTO T-99 (ASTM D-698), Standard Proctor method. Moisture levels for fill material should be maintained within a maximum +/- 3% of the optimal moisture content or as directed by the engineer.

Construction of the proposed roadway improvements should be performed in accordance with the current Illinois Department of Transportation (IDOT) “Standard Specifications for Road and Bridge Construction. In particular, refer to Section 202, “Earth and Rock Excavation”, Section 205, “Embankment” and Section 301, “Subgrade Preparation”.

10.4 Drainage Recommendations

As noted in Appendix F, the majority of the roadway is considered to have a drainage class of “Poor”. Underdrains are required at low areas in the profiles to properly drain the 12-inch aggregate subgrade as per the drainage classification of IDOT Geotechnical Manual. Transverse underdrains should be installed at the low points of the alignments, and then continued at an interval of 500-ft between low points, except at high points.

The drains should be 4-inch diameter, placed at a depth of 30 inches and installed in accordance with IDOT Standard Specifications Section 601.

10.5 Lateral Resistance Recommendations

The following table may be used for design of the lateral forces on foundations.

Table 5 – Soil Parameters for Lateral Resistance at DDB-1 through DDB-12

Material (Elevation)	Unit Weight (pcf)	Drained Friction Angle (°)	Undrained Cohesion (psf)	Lateral Modulus of Subgrade Reaction (pci)	Active Earth Pressure Coefficient Ka	Passive Earth Pressure Coefficient Kp	Strain (E50)
Stiff to Hard Clay Loam (EL 638 to EL 628)	125	28	2,500	850	0.36	2.77	0.005
Medium Dense to Very Dense Sand (EL 628 to EL 586)	130	32	-	90	0.31	3.25	-

Note: 1. Values recommended in Table-5 for use in design from L-pile Software Manual.

10.6 Storm Sewer Recommendations

Based on the data from DDB-1 through DDB-12, the first 15-20 ft of the soil below the existing pavement consist of stiff to hard clay loam. We recommend that the storm sewers be constructed using conventional open cut and trench box method. The excavation should be backfilled with trench backfill as soon as possible after the sewer has been placed in the excavation.

If the excavations encounter sand or silt layers, it may be necessary to use the sand-box method. The sand-box method involves backfilling the pipe laid in the trench box to within 4-ft of existing grade prior to excavating for the next trench box movement, keeping the excavation for the next trench box movement to a minimum beyond the sides of the trench box. Then move the trench box as soon as the excavation is performed and backfilling the annular space between the trench box and surrounding earth with Trench Backfill immediately after the trench box is moved. In addition, all excavations should be backfilled to within 4-ft of existing grade at the end of each workday.
It is important to note that any and all earth retention devices must be in good working

condition and comply with the Occupational Safety and Health Administration (OSHA) standards and specifications. Any Earth Retention System must be designed by a Licensed Structural Engineer (SE) in the State of Illinois. This report does not constitute a standard design for Earth Retention System.

Soils should be verified in the field at the time of construction by a Licensed Geotechnical Engineer or his/her representative. The actual extent of any remedial treatments, if any, will be determined at this time based on guidelines presented in the Illinois Department of Transportation (IDOT) Geotechnical Manual. If soils with less than adequate bearing strength are noted at the foundation level during sewer construction, the weaker soils encountered at the base of the footings should be undercut to reach suitable bearing soils, and the undercut area filled with lean concrete or an approved compacted structural (granular) fill material.

Structural fill should be placed in maximum 8-inch loose lifts. CA-6 is recommended for use and should be compacted to a minimum of 95% of the maximum dry density obtained in accordance with AASHTO T-99 (ASTM D-1557), modified Proctor method. The moisture content of the CA-6 fill should be controlled within ± 2% of the optimum moisture content. Excavation and backfilling should conform to Section 502 and Section 208 of IDOT Standard Specifications for Road and Bridge Construction (2022).
For the design of the excavation support system and assuming level back slopes, the lateral properties in the following table maybe utilized for design.

SECTION 11: GENERAL QUALIFICATIONS

The analysis and recommendations presented in this report are based upon the data obtained from the soil borings performed at the indicated locations and from any other information discussed in this report. This report does not reflect any variations that may occur between borings or across the site. In addition, the soil samples cannot be relied on to accurately reflect the strata variations that usually exist between sampling locations. The nature and extent of such variations may not become evident until construction. If variations appear evident, it will be necessary to reevaluate the recommendations of the report. In addition, it is recommended that Geo Services Inc. be retained to perform construction observation and thereby provide a complete professional geotechnical engineering service through the observational method.

This report has been prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted geotechnical engineering practices. No other warranties, either expressed or implied, are intended or made. In the event that any changes in the nature, design or location of the project as outlined in this report are planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and the conclusions of this report modified or verified in writing by the geotechnical

engineer. Also note that Geo Services Inc. is not responsible for any claims, damages, or liability associated with any other party's interpretation of this report's subsurface data or reuse of the report's subsurface data or engineering analyses without the express written authorization of Geo Services Inc.

APPENDIX A

GENERAL NOTES

GENERAL NOTES

CLASSIFICATION

American Association of State Highway & Transportation Officials (AASHTO) System used for soil classification.

Cohesionless Soils

Relative Density	No. of Blows per foot N
Very Loose	0 to 4
Loose	4 to 10
Medium Dense	10 to 30
Dense	30 to 50
Very Dense	Over 50

Cohesive Soils

Consistency	Unconfined Compressive Strength - qu (tsf)
Very Soft	Less than 0.25
Soft	0.25 - 0.5
Medium Stiff	0.5 - 1.0
Stiff	1.0 - 2.0
Very Stiff	2.0 - 4.0
Hard	Over 4.0

TERMINOLOGY

Streaks are considered to be paper thick. **Lenses** are considered to be less than 2 inches thick. **Layers** are considered to be less than 6 inches thick. **Stratum** are considered to be greater than 6 inches thick.

DRILLING AND SAMPLING SYMBOLS

SS:	Split Spoon 1-3/8" I.D., 2" O.D.	HS:	Housel Sampler
ST:	Shelby Tube 2" O.D., except where noted	WS:	Wash Sample
AS:	Auger Sample	FT:	Fish Tail
DB:	Diamond Bit - NX: BX: AX	RB:	Rock Bit
CB:	Carboloy Bit - NX: BX: AX	WO:	Wash Out
OS:	Osterberg Sampler		

Standard "N" Penetration: Blows per foot of a 140 lb. hammer falling 30" on a 2" O.D. Split Spoon

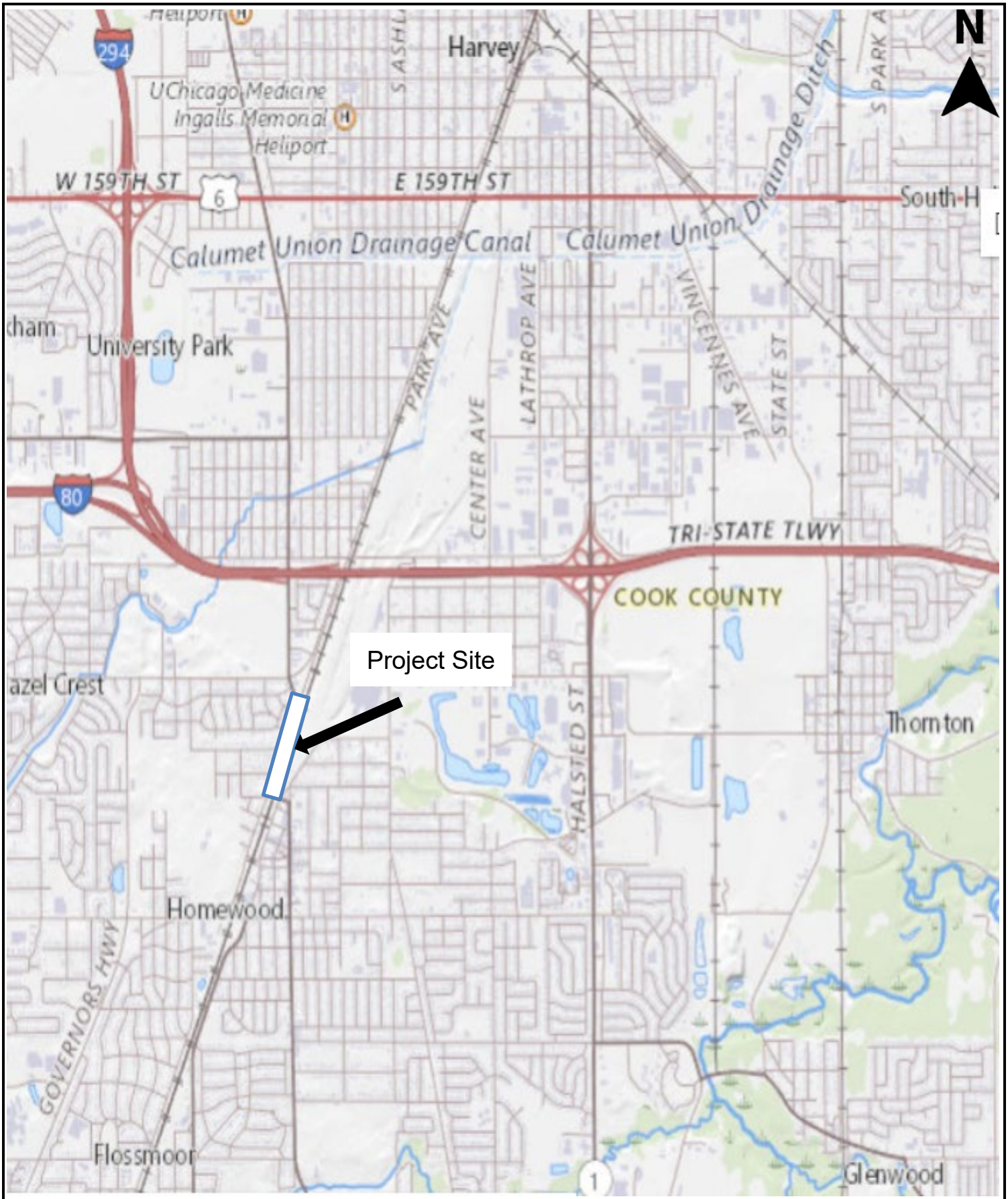
WATER LEVEL MEASUREMENT SYMBOLS

WL:	Water	WD:	While Drilling
WCI:	Wet Cave In	BCR:	Before Casing Removal
DCI:	Dry Cave In	ACR:	After Casing Removal
WS:	While sampling	AB:	After Boring

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days observation, and additional evidence on ground water elevations must be sought.

APPENDIX B

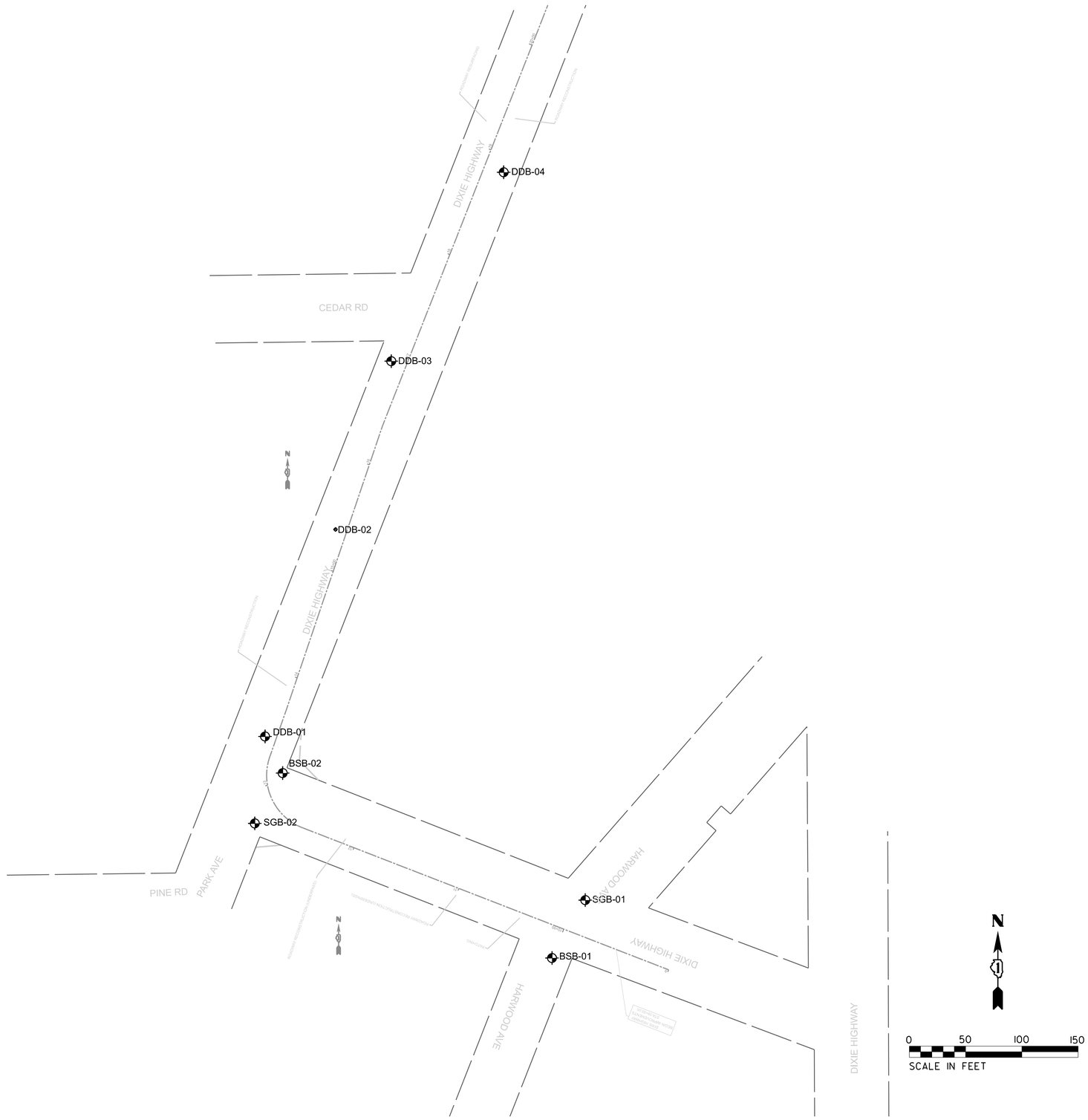
Site Map



Site Map	Geo Services, Inc.	DRAWN BY	QZ
BLA, Dixie Hwy., Harwood Ave. & Sycamore Ave., Homewood, IL 60430	Geotechnical, Environmental & Civil Engineering 805 Amherst Court, Suite 204 Naperville, Illinois 60565 (630) 355-2838	APPROVED BY	AM
		DATE	April 01, 2023
		GSI JOB No.	23074A
		SCALE	NTS

APPENDIX C

PLAN & PROFILE



Geo Services, Inc.
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805 Amherst Court, Suite 204
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(630) 355-7838

USER NAME =	DESIGNED -	REVISED -	
	DRAWN -	REVISED -	
PLOT SCALE =	CHECKED -	REVISED -	
PLOT DATE =	DATE -	REVISED -	

Storm Sewer Replacement, Dixie Hwy

Boring Plan

SCALE: ___ SHEET NO. 01 OF 03 SHEETS STA. TO STA.

F.A.U RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		COOK/DUPAGE	03	01
		CONTRACT NO.		
	ILLINOIS	FED. AID PROJECT		

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PLOT DATE =	DATE -	REVISED

4/25/2023

Storm Sewer Replacement Dixie Hwy.

Boring Plan

SCALE: ____ SHEET NO. 02 OF 03 SHEETS STA. TO STA.

F.A.U. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		COOK/DUPAGE	03	02
		CONTRACT NO.		
	ILLINOIS			

N

0 50 100 150

SCALE IN FEET

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	DRAWN -	REVISED -	
PLOT SCALE =	CHECKED -	REVISED -	
PLOT DATE =	DATE -	REVISED -	

AUG 29 2023

Storm Sewer Replacement, Dixie Hwy

2022 GEOTECH DEEP BORING PLAN

SCALE: ____ SHEET NO. 03 OF 03 SHEETS STA. TO STA.

F.A.U. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		COOK/DUPAGE	03	03
		CONTRACT NO.		
	ILLINOIS	FED. AID PROJECT		

PLAN
SURVEYED
PLOTTED
ALIGNMENT CHECKED
RT. OF WAY CHECKED
CADD FILE NAME
NOTE BOOK
NO.
BY
DATE

PROFILE
SURVEYED
PLOTTED
ALIGNMENT CHECKED
B.M. NOTED
STRUCTURE NOTATNS CHKD
NOTE BOOK
NO.
BY
DATE

$$$$date_time$$$$ $$user$$
$$$$dgn_name$$$$

655 650 645 640 635 630 625 620 615 610 605 600 595 590 585 580 575 570

110+00 111+00 112+00 113+00 114+00 115+00

Boring SGB-01
STA: 110+00
Offset:0
Elev: 639.9 ft

	N	Qu (tsf)	M%
2" ASPHALT / 10" CONCRETE			
	8	2	15
CLAY LOAM	7	1.5	18
	9	2	18
	15	4	14
EOB			

Boring SGB-02
STA:12+80
Offset
Elev: 637.7 ft

	N	Qu (tsf)	M%
2" ASPHALT / 10" CONCRETE			
	7	1.5	14
CLAY LOAM	10	1.5	15
	27	5	18
Sand	29		4
EOB			

Boring DDB-01
STA 13+10
Offset:
Elev: 638.9 ft

	N	Qu (tsf)	M%
2" ASPHALT / 12" CONCRETE			
	7	4.5+	23
CLAY LOAM	8	1.5	15
	8	1.0	13
	19	4.0	18
	18	2.5	18
	14	1.5	18
	44	3.0	17
SANDY SILT	34		17
	36		17
SAND	25		17
SAND & GRAVEL	20		18
	66		20
SAND	75		20
	22		21
SILT	46		21
SAND	9		17
CLAYEY SILT	20	1.75	19
SILTY CLAY LOAM			
NO RECOVERY	50/2"		
EOB			

Boring DDB-02
STA 115+30
Offset: N/A
Elev: 648.8 ft

	N	Qu (tsf)	M%
8" ASPHALT			4
	–	1.0	17
CLAY LOAM	50	4.5+	20
	17		
	5	2.5	13
CLAY LOAM	9	3.0	16
	12	1.0	19
CLAY LOAM	13	0.5	20
	39	4.5+	17
CLAY LOAM	34	4.5	21
	14		19
SAND	16		18
	15		18
SAND & GRAVEL	15		23
	57		15
SAND	51		14
	54		20
	11	1.5	18
SILTY CLAY			
	63		10
SAND	50/5"		11
EOB			

LEGEND
BORING NUMBER
STATION
OFFSET
ELEVATION
N Qu W%

SOIL STRENGTH (TSF)
B-BULGE
S-SHEAR
P-POCKET PENETROMETER
N-VALUE
MOISTURE CONTENT (%)
NR=NO RECOVERY

10	2.5P	22
9	NP	7
16	1.5B	14
27		12
EOB		

GROUNDWATER ELEVATION
▼ FIRST ENCOUNTER
▽ AT COMPLETION
▽ 24 HRS WATER LEVEL
EOB=END OF BORING

NOTE:
Conversion from NAVD88 to CCD is:
NAVD88 (ft) = CCD (ft) + 579.19 (ft)

BLA, Inc.
ITASCA, ILLINOIS

USER NAME = $USER$	DESIGNED - ____	REVISED - ____
	DRAWN - ____	REVISED - ____
PLOT SCALE = $SCALE$	CHECKED - ____	REVISED - ____
PLOT DATE = $DATE$	DATE - ____	REVISED - ____

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION
DIXIE HIGHWAY

SCALE: HORIZ. _____ VERT. _____ STA. _____ TO STA. _____

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
998	82-IR	ST. CLAIR	4	3

PRELIMINARY CONTRACT NO. 76C43
FED. ROAD DIST. NO. 8 | ILLINOIS | FED. AID PROJECT

BLA, Inc.
ITASCA, ILLINOIS

USER NAME = $USER$	DESIGNED -	REVISED -
	DRAWN -	REVISED -
PLOT SCALE = $SCALE$	CHECKED -	REVISED -
PLOT DATE = $DATE$	DATE -	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

DIXIE HIGHWAY

SCALE: HORIZ. ______ VERT. ______ STA. ______ TO STA. ______

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
998	82-IR	ST. CLAIR	4	2

PRELIMINARY CONTRACT NO. 76C43

FED. ROAD DIST. NO. 8 | ILLINOIS | FED. AID PROJECT

BLA, Inc.
ITASCA, ILLINOIS

USER NAME = $USER$	DESIGNED -	REVISED -	
	DRAWN -	REVISED -	
PLOT SCALE = $SCALE$	CHECKED -	REVISED -	
PLOT DATE = $DATE$	DATE -	REVISED -	

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

DIXIE HIGHWAY

SCALE: HORIZ. ______ VERT. ______ STA. ______ TO STA. ______

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
998	82-IR	ST. CLAIR	4	3

PRELIMINARY CONTRACT NO. 76C43

FED. ROAD DIST. NO. 8 | ILLINOIS | FED. AID PROJECT

PLAN: SURVEYED, PLOTTED, ALIGNMENT CHECKED, R/T OF WAY CHECKED, CADD FILE NAME, NOTE BOOK NO., BY, DATE

PROFILE: SURVEYED, PLOTTED, GRADES CHECKED, BM NOTED, STRUCTURE NOTATIONS CHKD, NOTE BOOK NO., BY, DATE

$$$$date_time$$$$ $$user$$ $$$$dgn_name$$$$

Elevation scale: 655, 650, 645, 640, 635, 630, 625, 620, 615, 610, 605, 600, 595, 590, 585, 580, 575, 570

Stations: 128+00, 129+00, 130+00, 131+00, 132+00, 133+00

Boring DDB-09
Elev: 642.1 ft

Strata (top to bottom): 12" Asphalt; CLAY LOAM; SANDY LOAM; CLAY LOAM; SAND; SILTY LOAM; CLAY LOAM; SILTY CLAY; SILTY LOAM; SILTY CLAY LOAM; SAND; SILTY LOAM; SILTY CLAY; BEDROCK; EOB

N	Qu (tsf)	M%
		2
6	1.5	17
5		22
17	4.5+	18
21	4.5+	17
24	3.5	19
29	3.5	18
25		17
25		14
26		20
16		19
14	4.5+	14
15	4.5+	18
30		9
16		10
55		19
31		13
19	1.0	17

Boring DDB-10
STA: 129+70
Elev: 641.1 ft

Strata (top to bottom): 6" Asphalt; CRUSHED STONE; CRUSHED CONCRETE; SILTY CLAY; CLAY LOAM; CLAY; SAND; SAND & GRAVEL; SILTY LOAM; SILTY CLAY LOAM; SAND; SILTY LOAM; BEDROCK; EOB

N	Qu (tsf)	M%
		1
13		5
4		6
2		11
4	2.5	23
13	3.0	20
23	2.5	19
14	2.5	22
20		22
12		20
10		15
59		14
36	4.5+	15
33		19
17		19
38		10
50/2"		9
12		

Boring DDB-11
130+90
Elev: 641 ft

Strata (top to bottom): 14" Asphalt; SILTY CLAY; SANDY CLAY; CLAY; CLAY LOAM; SILTY CLAY; SAND; SAND & GRAVEL; SILTY CLAY LOAM; SILT; SILTY LOAM; GRAVEL/SHALE; BEDROCK; EOB

N	Qu (tsf)	M%
		3
8	3.0	25
6	1.5	22
5	0.5	15
21	4.5	17
19	1.0	19
17	2.0	17
20	2.5	22
12		21
16		21
12		13
19	3.5	14
78		8
51		15
92		13
50/3"		7
50/3"		10
50/1"		NR

Boring DDB-12
STA: 132+30
Elev: 641.5 ft

Strata (top to bottom): 6" Asphalt; SILTY LOAM; CLAY LOAM; CLAY LOAM; SAND; SANDY CLAY; SAND; SAND & GRAVEL; EOB

N	Qu (tsf)	M%
		3
15		11
8	4.5+	23
12	3.0	19
15	3.5	18
14	2.5	17
19	3.5	15
27	3.5	19
33	2.0	22
21		21
21		22
17		21
17	4	14
40		19
47		NR
38		7
61		12
78		5

LEGEND

BORING NUMBER
STATION
OFFSET
ELEVATION

N	Qu	W%
10	2.5P	22
9	NP	7
16	1.5B	14
27	-	12

EOB

SOIL STRENGTH (TSF)
B-BULGE
S-SHEAR
P-POCKET PENETROMETER

N-VALUE

MOISTURE CONTENT (%)
NR=NO RECOVERY

GROUNDWATER ELEVATION
▼ FIRST ENCOUNTER
▽ AT COMPLETION
▽ 24 HRS WATER LEVEL

EOB=END OF BORING

NOTE:
Conversion from NAVD88 to CCD is:
NAVD88 (ft) = CCD (ft) + 579.19 (ft)

PLAN — SURVEYED, PLOTTED, ALIGNMENT CHECKED, RT. OF WAY CHECKED, CADD FILE NAME; NOTE BOOK NO.; BY; DATE

PROFILE — SURVEYED, PLOTTED, GRADES CHECKED, B.M. NOTED, STRUCTURE NOTAT'NS CH'KD; NOTE BOOK NO.; BY; DATE

$$$$$date_time$$$$$ $$user$$
$$$$$$$$$$$$dgn_name$$$$$$$$$$$$$$$

BLA, Inc.
ITASCA, ILLINOIS

USER NAME = $USER$
PLOT SCALE = $SCALE$
PLOT DATE = $DATE$

DESIGNED - ___ REVISED -
DRAWN - ___ REVISED -
CHECKED - ___ REVISED -
DATE - ___ REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION
DIXIE HIGHWAY

SCALE: HORIZ. ______ VERT. ______ STA. ______ TO STA. ______

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
998	82-IR	ST. CLAIR	4	4

PRELIMINARY CONTRACT NO. 76C43
FED. ROAD DIST. NO. 8 | ILLINOIS | FED. AID PROJECT

APPENDIX D

BORING & PAVEMENT CORE LOGS

Geo Services, Inc.
Geotechnical, Environmental & Civil Engineering
805 Amherst Court, Suite 204
Naperville, Illinois 60565
(630) 355-2818

SOIL BORING LOG

GEO Job No. 23074A

Page 1 **of** 1

Date 3/7/24

ROUTE Dixie Hwy Storm Sewer Replacement **DESCRIPTION** _____ **LOGGED BY** QZ

SECTION Harwood Avenue to Sycamore Drive **LOCATION** , **SEC.** , **TWP.** , **RNG.** _____

COUNTY Cook **DRILLING METHOD** HSA/Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO. _____
Station _____

BORING NO. SGB-01
Station 110+00
Offset _____
Ground Surface Elev. 639.86 **ft**

Surface Water Elev. n/a **ft**
Stream Bed Elev. n/a **ft**

Groundwater Elev.:
First Encounter Dry to -10.0' **ft**
Upon Completion n/a **ft**
After - **Hrs.** - **ft**

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
2.0" ASPHALTand 10.0" CONCRETE 639.03		-		
		-		7
		-		
CLAY LOAM-gray-Stiff to hard (CL)		8	2.00	15
		5	B	
		3		
		3		
		3	1.50	18
	-5	4	B	
		2		
		3	2.00	18
		6	B	
		4		
		6	4.00	14
629.86	-10	9	B	
End of the boring @ 10.0'. The Borehole was backfilled with bentonite chips and the surface was patched with grout.				
	-15			
	-20			

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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), GP-Geoprobe Hand Auger
BBS, from 137 (Rev. 8-99)

Geo Services, Inc.
Geotechnical, Environmental & Civil Engineering
805 Amherst Court, Suite 204
Naperville, Illinois 60565
(630) 355-2818

SOIL BORING LOG

GEO Job No. 23074A

Date 3/6/24

ROUTE Dixie Hwy Storm Sewer Replacement **DESCRIPTION** _____ **LOGGED BY** QZ

SECTION Harwood Avenue to Sycamore Drive **LOCATION** , **SEC.** , **TWP.** , **RNG.**

COUNTY Cook **DRILLING METHOD** HSA/Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO. _____
Station _____

BORING NO. SGB-02
Station 112+80
Offset _____
Ground Surface Elev. 637.69 **ft**

Surface Water Elev. n/a **ft**
Stream Bed Elev. n/a **ft**

Groundwater Elev.:
First Encounter Dry to -10.0' **ft**
Upon Completion n/a **ft**
After - **Hrs.** - **ft**

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
2" ASPHALT, 10" CONCRETE	-		
636.69	-		14
SILTY CLAY LOAM-gray-stiff to hard (CL/ML)	-		
	2	1.50	15
	3	B	
	4		
	3		
	5	1.50	18
-5	5	B	
	6		
	13	5.00	18
	14	B	
629.19			
SAND-gray-medium dense (SP)	9		
	14		4
627.69 -10	15		
End of the boring @ 10.0'. The Borehole was backfilled with bentonite chips and the surface was patched with grout.			
-15			
-20			

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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), GP-Geoprobe Hand Auger
BBS, from 137 (Rev. 8-99)

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Geotechnical, Environmental & Civil Engineering
805 Amherst Court, Suite 204
Naperville, Illinois 60565
(630) 355-2818

SOIL BORING LOG

GEO Job No. 23074A

Date 3/6/24

ROUTE Dixie Hwy Storm Sewer Replacement **DESCRIPTION** _____ **LOGGED BY** QZ

SECTION Harwood Avenue to Sycamore Drive **LOCATION** , **SEC.** , **TWP.** , **RNG.** _____

COUNTY Cook **DRILLING METHOD** HSA/Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO. _____
Station _____

BORING NO. DDB-01
Station 113+30
Offset 20.00ft NW
Ground Surface Elev. 638.89 **ft**

Surface Water Elev. n/a **ft**
Stream Bed Elev. n/a **ft**

Groundwater Elev.:
First Encounter Dry to -10.0' **ft**
Upon Completion n/a **ft**
After - **Hrs.** - **ft**

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				2.0" ASPHALT, 12.0" CONCRETE
			3	
637.72				
	2			CLAY LOAM-brown & gray-stiff to hard (CL)
	3	4.50	23	
	4	P		
	3			
	4	1.50	15	
-5	4	P		
	4			
	4	1.00	13	
	4	P		
	6			becoming gray @ -8.5'
	9	4.00	18	
-10	10	P		
	4			
	8	2.50	18	
	10	P		
	3			
	6	1.50	18	
-15	8	P		
	9			
	16	3.00	17	
	28	P		
620.39				
	11			SANDY SILT-gray-dense (ML)
	18		17	
-20	16			

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				SANDY SILT-gray-dense (ML) *(continued)*
617.89				
	11			SAND-gray-medium dense to dense (SP)
	16		17	
	20			
	10			
	13		17	
-25	12			
612.89				
	8			SAND & GRAVEL-gray-medium dense (SM)
	8		18	
	12			
610.39				
	19			SAND-gray-very dense (SP)
	32		20	
-30	34			
	26			
	35		20	
-35	40			
600.39				
	9			SILT-gray-medium dense (ML)
	9		21	
-40	13			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206), GP-Geoprobe Hand Auger
BBS, from 137 (Rev. 8-99)

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Geo Services, Inc.
Geotechnical, Environmental & Civil Engineering
805 Amherst Court, Suite 204
Naperville, Illinois 60565
(630) 355-2818

SOIL BORING LOG

GEO Job No. 23074A

Date 3/6/24

ROUTE Dixie Hwy Storm Sewer Replacement **DESCRIPTION** _____ **LOGGED BY** QZ

SECTION Harwood Avenue to Sycamore Drive **LOCATION** , **SEC.** , **TWP.** , **RNG.** _____

COUNTY Cook **DRILLING METHOD** HSA/Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO. _____
Station _____

BORING NO. DDB-01
Station 113+30
Offset 20.00ft NW
Ground Surface Elev. 638.89 **ft**

Surface Water Elev. n/a **ft**
Stream Bed Elev. n/a **ft**

Groundwater Elev.:
First Encounter Dry to -10.0' **ft**
Upon Completion n/a **ft**
After - **Hrs.** - **ft**

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
SILT-gray-medium dense (ML) *(continued)*				End Of Boring @ -60.0'. The borehole was backfilled with bentonite chips and the surface was patched with grout.			
595.39							
SAND-gray-dense (SP)	14						
	20		21				
-45	26			-65			
590.39							
CLAYEY SILT-gray-loose (ML)	4						
	4		17				
-50	5			-70			
585.39							
SILTY CLAY LOAM-gray-stiff (CL/ML)	5						
	10	1.75	19				
-55	10	P		-75			
580.39							
No Recovery	50/2"						
578.89							
-60				-80			

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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), GP-Geoprobe Hand Auger
BBS, from 137 (Rev. 8-99)

Geo Services, Inc.
Geotechnical, Environmental & Civil Engineering
805 Amherst Court, Suite 204
Naperville, Illinois 60565
(630) 355-2818

SOIL BORING LOG

GEO Job No. 23074A

Date 3/5/24

ROUTE Dixie Hwy Storm Sewer Replacement **DESCRIPTION** _____ **LOGGED BY** NW

SECTION Harwood Avenue to Sycamore Drive **LOCATION** , **SEC.** , **TWP.** , **RNG.** _____

COUNTY Cook **DRILLING METHOD** HSA/Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO. _____
Station _____

BORING NO. DDB-02
Station 115+30
Offset _____
Ground Surface Elev. 648.76 **ft**

Surface Water Elev. n/a **ft**
Stream Bed Elev. n/a **ft**

Groundwater Elev.:
First Encounter Dry to -10.0' **ft**
Upon Completion n/a **ft**
After - **Hrs.** - **ft**

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				8.0" ASPHALT
				648.09
			4	CLAY LOAM-black-stiff (CL)
	4			
	50/1	1.00	17	
	-	P		
				645.26
	6			CLAY LOAM-brown & gray-very stiff to hard (CL)
	9	4.50	20	
-5	8	P		
	2			
	2	2.50	13	
	3	P		
	2			
	4	3.00	16	
-10	5	P		
				637.76
	4			CLAY-gray-medium stiff to stiff (CL)
	7	1.00	19	
	5	P		
	4			
	4	0.50	20	
-15	9	P		
				632.76
	9			CLAY LOAM-gray-hard (CL)
	17	4.50	17	
	22	P		
	8			
	15	4.50	21	
-20	19	P		

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				CLAY LOAM-gray-hard (CL) *(continued)*
				627.76
	6			SAND-gray-medium dense (SP)
	9		19	
	5			
	7			
	10		18	
-25	6			
				622.76
	10			SAND & GRAVEL-gray-medium dense (SP)
	8		18	
	7			
				620.26
	12			SAND-gray-medium dense to very dense (SP)
	9		23	
-30	6			
	22			
	27		15	
-35	30			
	18			
	22		14	
-40	29			

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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), GP-Geoprobe Hand Auger
BBS, from 137 (Rev. 8-99)

Geo Services, Inc.
Geotechnical, Environmental & Civil Engineering
805 Amherst Court, Suite 204
Naperville, Illinois 60565
(630) 355-2818

SOIL BORING LOG

GEO Job No. 23074A

Date 3/5/24

ROUTE Dixie Hwy Storm Sewer Replacement **DESCRIPTION** _____ **LOGGED BY** NW

SECTION Harwood Avenue to Sycamore Drive **LOCATION** , **SEC.** , **TWP.** , **RNG.** _____

COUNTY Cook **DRILLING METHOD** HSA/Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO. _____
Station _____

BORING NO. DDB-02
Station 115+30
Offset _____
Ground Surface Elev. 648.76 **ft**

Surface Water Elev. n/a **ft**
Stream Bed Elev. n/a **ft**

Groundwater Elev.:
First Encounter Dry to -10.0' **ft**
Upon Completion n/a **ft**
After - **Hrs.** - **ft**

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				SAND-gray-medium dense to very dense (SP) *(continued)*
	19			
	26		20	
-45	28			
600.26				
	8			SILTY CLAY LOAM-gray-stiff (CL/ML)
	6	1.50	18	
-50	5	P		
595.26				
	34			SAND with Crushed Stone-gray-very dense (SP)
	38		10	
-55	25			
	50/5"			
			11	
588.76				
-60				

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				End Of Boring @ -60.0'. The borehole was backfilled with bentonite chips and the surface was patched with grout.
-65				
-70				
-75				
-80				

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206), GP-Geoprobe Hand Auger
BBS, from 137 (Rev. 8-99)

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Geo Services, Inc.
Geotechnical, Environmental & Civil Engineering
805 Amherst Court, Suite 204
Naperville, Illinois 60565
(630) 355-2818

SOIL BORING LOG

GEO Job No. 23074A

Date 3/1/24

ROUTE Dixie Hwy Storm Sewer Replacement **DESCRIPTION** _____ **LOGGED BY** QZ

SECTION Harwood Avenue to Sycamore Drive **LOCATION** , **SEC.** , **TWP.** , **RNG.** _____

COUNTY Cook **DRILLING METHOD** HSA/Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO. _____
Station _____

BORING NO. DDB-03
Station 117+00
Offset _____
Ground Surface Elev. 650.52 **ft**

Surface Water Elev. - **ft**
Stream Bed Elev. - **ft**

Groundwater Elev.:
First Encounter 647.5 **ft** ▼
Upon Completion - **ft**
After - **Hrs.** - **ft**

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
650.02 6.0" ASPHALT			
CLAY LOAM-brown & gray-medium stiff (CL)			2
	1		
	3	0.50	25
	4	P	
▼			
647.02			
CLAY LOAM-brown & gray-very stiff (CL)	4		
	11	3.50	20
-5	6	P	
644.52			
SILTY CLAY-brown-very stiff (CL)	2		
	4	2.00	18
	4	P	
642.02			
CLAY LOAM-brown & gray-stiff to hard (CL)	5		
	7	3.50	16
-10	9	P	
becoming gray @ -11.0'	3		
	6	1.50	18
	8	P	
	2		
	6	1.50	17
-15	9	P	
	3		
	6	2.00	17
	7	P	
	10		
	22	4.00	20
-20	33	P	

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
CLAY LOAM-brown & gray-stiff to hard (CL) *(continued)*			
629.52 SAND-gray-dense(SM)	14		
	21		12
	18		
627.02			
SAND & GRAVEL-gray-medium dense to dense (SP)	21		
	21		10
-25	18		
	12		
	10		15
	9		
622.02			
SAND-gray-medium dense (SP)	7		
	11		25
-30	13		
617.02			
SAND & GRAVEL-gray-very dense (SP)	42		
	26		10
-35	24		
612.02			
SAND-gray-dense (SW)	12		
	22		21
-40	23		

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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), GP-Geoprobe Hand Auger
BBS, from 137 (Rev. 8-99)

Geo Services, Inc.
Geotechnical, Environmental & Civil Engineering
805 Amherst Court, Suite 204
Naperville, Illinois 60565
(630) 355-2818

SOIL BORING LOG

GEO Job No. 23074A

Date 3/1/24

ROUTE Dixie Hwy Storm Sewer Replacement **DESCRIPTION** _____ **LOGGED BY** QZ

SECTION Harwood Avenue to Sycamore Drive **LOCATION** , **SEC.** , **TWP.** , **RNG.** _____

COUNTY Cook **DRILLING METHOD** HSA/Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO. _____
Station _____

BORING NO. DDB-03
Station 117+00
Offset _____
Ground Surface Elev. 650.52 ft

Surface Water Elev. - ft
Stream Bed Elev. - ft

Groundwater Elev.:
First Encounter 647.5 ft ▼
Upon Completion - ft
After - **Hrs.** - ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Material Description
				SAND-gray-dense (SW) *(continued)*
607.02				
	3			SILT-gray-loose to medium dense (ML)
	4		22	
-45	4			
	4			
	5		21	
-50	5			
	6			
	5		19	
-55	6			
592.02				
	6			SILTY CLAY LOAM-gray-very stiff (CL/ML)
	10	3.00	17	
590.52	11	P		
-60				

End of boring at 60.0', the borehole was backfilled with bentonite chips and the pavement was patched with grout.

-65 -70 -75 -80

Z:\PROJECTS\2023\23074A BLA, DIXIE HWY STORM SEWER COLLAPSE, WO #1\23074A BORING LOG\23074A_LOG.GPJ 5/7/24

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

GEO Job No. 23074A

Date 3/4/24

ROUTE Dixie Hwy Storm Sewer Replacement **DESCRIPTION** _____ **LOGGED BY** QZ

SECTION Harwood Avenue to Sycamore Drive **LOCATION** , **SEC.** , **TWP.** , **RNG.** _____

COUNTY Cook **DRILLING METHOD** HSA/Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO. _____
Station _____

BORING NO. DDB-04
Station 118+90
Offset _____
Ground Surface Elev. 648.60 **ft**

Surface Water Elev. n/a **ft**
Stream Bed Elev. n/a **ft**

Groundwater Elev.:
First Encounter Dry to -10.0' **ft**
Upon Completion n/a **ft**
After - **Hrs.** - **ft**

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				12.0" ASPHALT, 6.0" CONCRETE
			2	
647.10	3			
	2	1.50	16	SILTY CLAY-brown & gray-stiff (CL)
	3	P		
645.10				
	3			SILTY CLAY-brown & gray-medium stiff (CL/ML)
	5	1.00	16	
-5	5	P		
	2			
	4	1.50	15	
	3	P		
	2			
	4	1.00	16	
-10	4	P		
	1			
	1	0.50	22	
	1	P		
635.10				
	2			CLAY LOAM-gray-very stiff to hard (CL)
	3	2.00	17	
-15	5	P		
	4			
	7	4.00	19	
	12	P		
630.10				
	7			SANDY LOAM-gray-medium dense (SW)
	15		17	
-20	20			

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				SANDY LOAM-gray-medium dense (SW) *(continued)*
627.60				
	14			SAND & GRAVEL-gray-medium dense to dense (SP)
	18		11	
	15			
	12			
	14		14	
-25	11			
	13			
	14		18	
	10			
620.10				
	14			SAND-gray-medium dense (SW)
	15		20	
-30	13			
615.10				
	7			SILTY CLAY-gray-very stiff (CL/ML)
	12	3.00	23	
-35	8	P		
610.10				
	18			SAND-gray-dense (SP)
	21		12	
-40	22			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206), GP-Geoprobe Hand Auger
BBS, from 137 (Rev. 8-99)

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SOIL BORING LOG

GEO Job No. 23074A
Page 2 **of** 2
Date 3/4/24

ROUTE Dixie Hwy Storm Sewer Replacement **DESCRIPTION** _____ **LOGGED BY** QZ

SECTION Harwood Avenue to Sycamore Drive **LOCATION** , **SEC.** , **TWP.** , **RNG.** _____

COUNTY Cook **DRILLING METHOD** HSA/Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO. _____
Station _____

BORING NO. DDB-04
Station 118+90
Offset _____
Ground Surface Elev. 648.60 **ft**

Surface Water Elev. n/a **ft**
Stream Bed Elev. n/a **ft**

Groundwater Elev.:
First Encounter Dry to -10.0' **ft**
Upon Completion n/a **ft**
After - **Hrs.** - **ft**

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
SAND-gray-dense (SP) *(continued)*		15		
		20		21
	-45	19		
600.10				
SILTY CLAY-gray-stiff (CL/ML)		6		
		5	1.50	23
	-50	7	P	
595.10				
SILT-gray-loose (ML)		5		
		5		16
	-55	4		
590.10				
SILTY CLAY-gray-very stiff (CL/ML)		6		
		5	2.00	20
588.60	-60	7	P	

End of boring at 60.0', the borehole was backfilled with bentonite chips and the pavement was patched with grout.

-65 -70 -75 -80

Z:\PROJECTS\2023\23074A BLA, DIXIE HWY STORM SEWER COLLAPSE, WO #1\23074A BORING LOG\23074A_LOG.GPJ 5/7/24

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

GEO Job No. 23074A

Date 3/5/24

ROUTE Dixie Hwy Storm Sewer Replacement **DESCRIPTION** _____ **LOGGED BY** NW

SECTION Harwood Avenue to Sycamore Drive **LOCATION** , **SEC.** , **TWP.** , **RNG.** _____

COUNTY Cook **DRILLING METHOD** HSA/Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO. _____
Station _____

BORING NO. DDB-05
Station 121+00
Offset _____
Ground Surface Elev. 648.11 **ft**

Surface Water Elev. n/a **ft**
Stream Bed Elev. n/a **ft**

Groundwater Elev.:
First Encounter Dry to -10.0' **ft**
Upon Completion n/a **ft**
After - **Hrs.** - **ft**

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				8.0" ASPHALT, 8.0" CONCRETE
			3	
646.77				
	3			CLAY LOAM-brown & gray-stiff to hard (CL)
	5	3.00	21	
	7	P		
	3			
	6	4.00	19	
-5	5	P		
	2			
	2	1.00	20	
	3	P		
	2			
	3	1.50	19	
-10	4	P		
	3			
	5	1.00	21	
	3	P		
	3			becoming gray @ -13.5'
	5	2.00	20	
-15	6	P		
	5			
	9	3.00	20	
	13	P		
629.61				
	14			SAND-gray-medium dense to dense (SP)
	17		14	
-20	19			

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				SAND-gray-medium dense to dense (SP) *(continued)*
	13			
	15		11	
	17			
	10			
	12		13	
-25	11			
	11			
	14		18	
	10			
619.61				
	8			SILTY CLAY LOAM-gray-very stiff (CL/ML)
	9	2.00	18	
-30	7	P		
	11			
	14	3.50	21	
-35	23	P		
	22			
	28		19	
-40	31			
609.61				
				SAND-gray-dense to very dense (SP)

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), GP-Geoprobe Hand Auger
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SOIL BORING LOG

GEO Job No. 23074A

Page 2 **of** 2

Date 3/5/24

ROUTE Dixie Hwy Storm Sewer Replacement **DESCRIPTION** _____ **LOGGED BY** NW

SECTION Harwood Avenue to Sycamore Drive **LOCATION** , **SEC.** , **TWP.** , **RNG.** _____

COUNTY Cook **DRILLING METHOD** HSA/Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO. _____
Station _____

BORING NO. DDB-05
Station 121+00
Offset _____
Ground Surface Elev. 648.11 **ft**

Surface Water Elev. n/a **ft**
Stream Bed Elev. n/a **ft**

Groundwater Elev.:
First Encounter Dry to -10.0' **ft**
Upon Completion n/a **ft**
After - **Hrs.** - **ft**

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				SAND-gray-dense to very dense (SP) *(continued)*
	18			
	26		20	
-45	25			
	19			
	22		20	
-50	24			
594.61				
	8			SILTY CLAY LOAM-gray-very stiff to hard CL/ML)
	7	2.50	19	
-55	7	P		
	12			
	8	4.50	17	
588.11 -60	10	P		

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				End of boring at -60.0', the borehole was backfilled with bentonite chips and the pavement was patched with grout.
-65				
-70				
-75				
-80				

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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), GP-Geoprobe Hand Auger
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SOIL BORING LOG

GEO Job No. 23074A

Date 3/11/24

ROUTE Dixie Hwy Storm Sewer Replacement **DESCRIPTION** _____ **LOGGED BY** QZ

SECTION Harwood Avenue to Sycamore Drive **LOCATION** _____, **SEC.** , **TWP.** , **RNG.** _____

COUNTY Cook **DRILLING METHOD** HSA/Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO. _____
Station _____

BORING NO. DDB-06
Station 122+60
Offset _____
Ground Surface Elev. 648.23 **ft**

Surface Water Elev. n/a **ft**
Stream Bed Elev. n/a **ft**

Groundwater Elev.:
First Encounter Dry to -10.0' **ft**
Upon Completion n/a **ft**
After - **Hrs.** - **ft**

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				6.0" ASPHALT
				647.73
			4	CLAY LOAM-brown & gray-very stiff to hard (CL)
	1			
	2	2.00	27	
	4	P		
	2			
-5	6	2.00	16	
	6	P		
	4			
	9	4.50	18	
	11	P		
	8			
-10	14	4.50	16	
	16	P		
				637.23
	4			SILTY CLAY LOAM-gray-stiff to very stiff (CL/ML)
	9	1.75	19	
	10	P		
	2			
	5	2.75	21	
-15	6	P		
	3			
	8	2.50	19	
	9	P		
				629.73
	14			SAND-gray-dense (SW)
	18		15	
-20	18			
				SAND-gray-dense (SW) *(continued)*
	15			
	17		16	
	20			
				624.73
	8			SAND & GRAVEL-gray-medium dense (SP)
	10		16	
-25	13			
	9			
	11		19	
	10			
				619.73
	8			SAND-gray-medium dense (SP)
	9		20	
-30	11			
				614.73
	7			SILTY LOAM-gray-medium dense (ML)
	9		20	
-35	16			
				609.73
	25			SAND-gray-very dense (SW)
	38		18	
-40	37			

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), GP-Geoprobe Hand Auger
BBS, from 137 (Rev. 8-99)

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SOIL BORING LOG

GEO Job No. 23074A

Date 3/11/24

ROUTE Dixie Hwy Storm Sewer Replacement **DESCRIPTION** _____ **LOGGED BY** QZ

SECTION Harwood Avenue to Sycamore Drive **LOCATION** , **SEC.** , **TWP.** , **RNG.** _____

COUNTY Cook **DRILLING METHOD** HSA/Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO. _____
Station _____

BORING NO. DDB-06
Station 122+60
Offset _____
Ground Surface Elev. 648.23 **ft**

Surface Water Elev. n/a **ft**
Stream Bed Elev. n/a **ft**

Groundwater Elev.:
First Encounter Dry to -10.0' **ft**
Upon Completion n/a **ft**
After - **Hrs.** - **ft**

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
SAND-gray-very dense (SW) *(continued)*			
	29		
	43		19
-45	48		
	21		
	29		17
-50	27		
594.73			
SILT-gray-very dense (ML)	21		
	28		18
-55	31		
589.73			
SILTY LOAM-gray-medium dense (ML)	9		
	12		18
588.23 -60	12		
End of boring at -60.0', the borehole was backfilled with bentonite chips and the pavement was patched with grout.			
-65			
-70			
-75			
-80			

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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), GP-Geoprobe Hand Auger
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SOIL BORING LOG

GEO Job No. 23074A

Date 2/28/24

ROUTE Dixie Hwy Storm Sewer Replacement **DESCRIPTION** _____ **LOGGED BY** NW

SECTION Harwood Avenue to Sycamore Drive **LOCATION** , **SEC.** , **TWP.** , **RNG.** _____

COUNTY Cook **DRILLING METHOD** HSA/Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO. _____
Station _____

BORING NO. DDB-07
Station 124+80
Offset _____
Ground Surface Elev. 645.61 **ft**

Surface Water Elev. - **ft**
Stream Bed Elev. - **ft**

Groundwater Elev.:
First Encounter 637.1 **ft** ▼
Upon Completion - **ft**
After - **Hrs.** - **ft**

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				4.0" ASPHALT and 8.0" gravel
			2	644.61
	2			SILTY CLAY LOAM-brown & gray-stiff to very stiff(CL/ML)
	4	2.00	19	
	3	P		
	3			
	50/2	1.50	24	
-5		P		
				639.61
	4			SILTY CLAY LOAM-brown & gray-very stiff (CL/ML)
	5	2.50	18	
	7	P		
▼				
	3			
	5	2.50	21	
-10	6	P		
				634.61
	4			SANDY CLAY LOAM-brown & gray-very stiff (CL)
	7	2.00	11	
	8	P		
	4			
	6	2.50	16	
-15	7	P		
				629.61
	2			SANDY LOAM-gray-medium dense (SM)
	10		15	
	25			
				627.11
	12			SAND-gray-medium dense to dense (SP)
	13		5	
-20	15			

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				SAND-gray-medium dense to dense (SP) *(continued)*
	13			
	16		10	
	15			
	9			
	14		18	
-25	15			
	7			
	13		18	
	18			
				617.11
	10			SILT-gray-dense (ML)
	17		24	
-30	19			
				612.11
	28			SAND-gray-very dense (SW)
	45		20	
-35	40			
	19			
	29		20	
-40	39			

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), GP-Geoprobe Hand Auger
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SOIL BORING LOG

GEO Job No. 23074A
Page 2 **of** 2
Date 2/28/24

ROUTE Dixie Hwy Storm Sewer Replacement **DESCRIPTION** _____ **LOGGED BY** NW
SECTION Harwood Avenue to Sycamore Drive **LOCATION** , **SEC.** , **TWP.** , **RNG.** _____
COUNTY Cook **DRILLING METHOD** HSA/Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO. _____
Station _____
BORING NO. DDB-07
Station 124+80
Offset _____
Ground Surface Elev. 645.61 ft

Surface Water Elev. - ft
Stream Bed Elev. - ft
Groundwater Elev.:
First Encounter 637.1 ft ▼
Upon Completion - ft
After - **Hrs.** - ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
SAND-gray-very dense (SW) *(continued)*				
		26		
		36		21
	-45	40		
597.11				
SILTY CLAY LOAM-gray-very stiff (CLMML)		4		
		7	2.50	18
	-50	9	P	
		7		
		11	2.00	19
	-55	11	P	
588.61				
Top of the Rock @ 57.0'. Drilled 2.0' into bedrock to confirm (-57.0' to -59.0').				
586.61		50/0"		
End of boring at -59.0', the borehole was backfilled with	-60			
bentonite chips and the pavement was patched with grout.	-65			
	-70			
	-75			
	-80			

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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), GP-Geoprobe Hand Auger
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SOIL BORING LOG

GEO Job No. 23074A

Date 2/28/24

ROUTE Dixie Hwy Storm Sewer Replacement **DESCRIPTION** _____ **LOGGED BY** NW

SECTION Harwood Avenue to Sycamore Drive **LOCATION** , **SEC.** , **TWP.** , **RNG.** _____

COUNTY Cook **DRILLING METHOD** HSA/Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO. _____
Station _____

BORING NO. DDB-08
Station 126+30
Offset _____
Ground Surface Elev. 643.53 **ft**

Surface Water Elev. n/a **ft**
Stream Bed Elev. n/a **ft**

Groundwater Elev.:
First Encounter Dry to -10.0' **ft**
Upon Completion n/a **ft**
After - **Hrs.** - **ft**

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				6.0" ASPHALT 643.03
			1	CLAY LOAM-brown-stiff to hard (CL)
	3			
	2	1.00	23	
	2	P		
	4			
	5	3.00	18	
-5	7	P		
	5			
	11	4.00	17	
	12	P		
	4			
	10	3.00	18	
-10	14	P		
	6			becoming gray @ -11.0'
	9	1.50	17	
	10	P		
	6			630.03 SILTY CLAY LOAM-gray-very stiff (CL/ML)
	13	2.00	20	
-15	17	P		
	14			627.53 SAND-gray-medium dense to dense (SP)
	16		15	
	15			
	7			
	9		18	
-20	14			

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				SAND-gray-medium dense to dense (SP) *(continued)*
	12			
	10		21	
	15			
				620.03
	10			SANDY SILT-gray-medium dense (MH)
	13		20	
-25	14			
				617.53
	18			CLAY LOAM-gray-hard (CL)
	13	4.50	13	
	10	P		616.03
	34			SILT-gray-very dense (ML)
	43		13	
-30	48			
				610.03
	8			SILTY CLAY LOAM-gray-very stiff (CL/ML)
	6	3.00	12	
-35	12	P		
				605.03
	25			SAND-gray-dense to very dense (SM)
	24		20	
-40	25			

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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), GP-Geoprobe Hand Auger
BBS, from 137 (Rev. 8-99)

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SOIL BORING LOG

GEO Job No. 23074A

Date 2/28/24

ROUTE Dixie Hwy Storm Sewer Replacement **DESCRIPTION** _____ **LOGGED BY** NW

SECTION Harwood Avenue to Sycamore Drive **LOCATION** , **SEC.** , **TWP.** , **RNG.** _____

COUNTY Cook **DRILLING METHOD** HSA/Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO. _____
Station _____

BORING NO. DDB-08
Station 126+30
Offset _____
Ground Surface Elev. 643.53 **ft**

Surface Water Elev. n/a **ft**
Stream Bed Elev. n/a **ft**

Groundwater Elev.:
First Encounter Dry to -10.0' **ft**
Upon Completion n/a **ft**
After - **Hrs.** - **ft**

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
SAND-gray-dense to very dense (SM) *(continued)*		22		
		25		21
	-45	26		
595.03				
SILTY LOAM-gray-very dense (ML)		15		
		48		17
	-50	22		
		50/1"		
588.53	-55			
Top of the Rock @ -55.0'. Drilled 2.0' into the bedrock to confirm (-55.0' to -57.0').				
586.53				
End of boring at -57.0', the borehole was backfilled with bentonite chips and the pavement was patched with grout.				
	-60			

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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), GP-Geoprobe Hand Auger
BBS, from 137 (Rev. 8-99)

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SOIL BORING LOG

GEO Job No. 23074A

Page 1 **of** 2

Date 2/23/24

ROUTE Dixie Hwy Storm Sewer Replacement **DESCRIPTION** _____ **LOGGED BY** NW

SECTION Harwood Avenue to Sycamore Drive **LOCATION** , **SEC.** , **TWP.** , **RNG.** _____

COUNTY Cook **DRILLING METHOD** HSA/Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO. _____
Station _____

BORING NO. DDB-09
Station 127+90
Offset _____
Ground Surface Elev. 642.08 **ft**

Surface Water Elev. - **ft**
Stream Bed Elev. - **ft**

Groundwater Elev.:
First Encounter 638.1 **ft** ▼
Upon Completion - **ft**
After - **Hrs.** - **ft**

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				12.0" ASPHALT
641.08			2	
	2			CLAY LOAM-brown,gray & with black spots-stiff (CL)
	3	1.50	17	
	3	P		
638.58				
	2			SANDY LOAM with Gravel-brown & gray-loose (SP) ▼
	3		22	
-5	2			
636.08				
	4			CLAY LOAM-brown & gray-very stiff to hard (CL)
	7	4.50	18	
	10	P		
	4			
	10	4.50	17	
-10	11	P		
	5			
	12	3.50	19	
	12	P		
	8			becoming gray @ -13.5'
	14	3.50	18	
-15	15	P		
626.08				
	6			SAND-gray-medium dense (SP)
	11		17	
	14			
	9			
	12		14	
-20	13			
621.08				SAND-gray-medium dense (SP) *(continued)*
	10			SILT-gray-medium dense (ML)
	13		20	
	13			
618.58				
	8			SILTY LOAM-gray-medium dense (ML)
	9		19	
-25	7			
616.08				
	5			CLAY LOAM-gray-hard (CL)
	7	4.50	14	
	7	P		
613.58				
	5			SILTY CLAY-gray-hard (CL/ML)
	7	4.50	18	
-30	8	P		
608.58				
	4			SILTY LOAM-gray-dense (ML)
	22		9	
-35	8			
603.58				
	12			SILTY CLAY LOAM-gray-medium dense (CL/ML)
	7		10	
-40	9			

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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), GP-Geoprobe Hand Auger
BBS, from 137 (Rev. 8-99)

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SOIL BORING LOG

GEO Job No. 23074A

Date 2/23/24

ROUTE Dixie Hwy Storm Sewer Replacement **DESCRIPTION** _____ **LOGGED BY** NW

SECTION Harwood Avenue to Sycamore Drive **LOCATION** , **SEC.** , **TWP.** , **RNG.** _____

COUNTY Cook **DRILLING METHOD** HSA/Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO. _____
Station _____

BORING NO. DDB-09
Station 127+90
Offset _____
Ground Surface Elev. 642.08 **ft**

Surface Water Elev. - **ft**
Stream Bed Elev. - **ft**

Groundwater Elev.:
First Encounter 638.1 **ft** ▼
Upon Completion - **ft**
After - **Hrs.** - **ft**

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
SILTY CLAY LOAM-gray-medium dense (CL/ML) *(continued)*				
598.58				
SAND-gray-very dense (SM)		21		
		28		19
	-45	27		
593.58				
SILTY LOAM-gray-medium dense (ML)		14		
		16		13
	-50	15		
588.58				
SILTY CLAY-gray-stiff (CL/ML)		6		
		8	1.00	17
	-55	11	P	
585.08				
Top of the Rock @ 57.0'. Drilled 2.0' into bedrock to confirm (-57.0' to -59.0').				
583.08				
End Of Boring @ -59.0'. Boring backfilled with cuttings.	-60			

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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), GP-Geoprobe Hand Auger
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SOIL BORING LOG

GEO Job No. 23074A

Date 2/22/24

ROUTE Dixie Hwy Storm Sewer Replacement **DESCRIPTION** _____ **LOGGED BY** NW

SECTION Harwood Avenue to Sycamore Drive **LOCATION** _____, **SEC.** , **TWP.** , **RNG.** _____

COUNTY Cook **DRILLING METHOD** HSA/Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO. _____
Station _____

BORING NO. DDB-10
Station 129+70
Offset _____
Ground Surface Elev. 641.07 **ft**

Surface Water Elev. n/a **ft**
Stream Bed Elev. n/a **ft**

Groundwater Elev.:
First Encounter Dry to -10.0' **ft**
Upon Completion n/a **ft**
After - **Hrs.** - **ft**

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Material
				6.0" ASPHALT 640.57
			1	CRUSHED STONE-loose to medium dense (GW)
	8			
	7		5	
	6			
	3			
	2		6	
-5	2			
				635.57
	1			CRUSHED CONCRETE-very loose
	1		11	
	1			
				632.57
	1			SILTY LOAM-brown & gray-loose(ML)
	2		23	
-10	2			
				630.07
	2			CLAY LOAM-brown & gray-very stiff (CL)
	6	3.00	20	
	7	P		
				627.57
	5			CLAY-gray-very stiff (CL)
	11	2.50	19	
-15	12	P		
	4			
	6	2.50	22	
	8	P		
				622.57
	6			SAND-gray-medium dense (SP)
	10		22	
-20	10			

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Material
				SAND-gray-medium dense (SP) *(continued)*
	5			
	6		20	
	6			
				617.57
	6			SAND & GRAVEL-gray-medium dense (SM)
	6		15	
-25	4			
				615.07
	12			SILTY LOAM-gray-very dense (ML)
	30		14	
	29			
				612.57
	12			SILTY CLAY LOAM-gray-hard (CL/ML)
	18	4.50	15	
-30	18	P		
				607.57
	15			SAND-gray-medium dense to dense (SP)
	18		19	
-35	15			
	8			
	9		19	
-40	8			

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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), GP-Geoprobe Hand Auger
BBS, from 137 (Rev. 8-99)

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SOIL BORING LOG

GEO Job No. 23074A

Date 2/22/24

ROUTE Dixie Hwy Storm Sewer Replacement **DESCRIPTION** _____ **LOGGED BY** NW

SECTION Harwood Avenue to Sycamore Drive **LOCATION** , **SEC.** , **TWP.** , **RNG.** _____

COUNTY Cook **DRILLING METHOD** HSA/Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO. _____
Station _____

BORING NO. DDB-10
Station 129+70
Offset _____
Ground Surface Elev. 641.07 **ft**

Surface Water Elev. n/a **ft**
Stream Bed Elev. n/a **ft**

Groundwater Elev.:
First Encounter Dry to -10.0' **ft**
Upon Completion n/a **ft**
After - **Hrs.** - **ft**

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
SAND-gray-medium dense to dense (SP) *(continued)*				
597.57		38		
SILTY LOAM-gray-dense to very dense (ML)		25		10
	-45	13		
		42		
		50/2"		9
	-50			
589.57				
Top of the Rock @ 51.5'. Drilled 3.5' into bedrock to confirm (-51.5' to -55.0').		50/1"		
		12		
586.07	-55			
End of boring at -55.0', the borehole was backfilled with bentonite chips and the pavement was patched with grout.				
	-60			

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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), GP-Geoprobe Hand Auger
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SOIL BORING LOG

GEO Job No. 23074A

Date 3/6/24

ROUTE Dixie Hwy Storm Sewer Replacement **DESCRIPTION** _____ **LOGGED BY** QZ

SECTION Harwood Avenue to Sycamore Drive **LOCATION** , **SEC.** , **TWP.** , **RNG.** _____

COUNTY Cook **DRILLING METHOD** HSA/Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO. _____
Station _____

BORING NO. DDB-11
Station 130+90
Offset _____
Ground Surface Elev. 641.02 **ft**

Surface Water Elev. n/a **ft**
Stream Bed Elev. n/a **ft**

Groundwater Elev.:
First Encounter Dry to -10.0' **ft**
Upon Completion n/a **ft**
After - **Hrs.** - **ft**

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				14.0" ASPHALT
			3	
639.85				
	4			SILTY CLAY-brown-very stiff (CL/ML)
	4	3.00	25	
	4	P		
637.52				
	2			SANDY CLAY LOAM-stiff (CL)
	3	1.50	22	
-5	3	P		
635.02				
	2			CLAY-brown-medium stiff (CL)
	2	0.50	15	
	3	P		
632.52				
	6			CLAY LOAM-gray-stiff to hard (CL)
	10	4.50	17	
-10	11	P		
	5			
	9	1.00	19	
	10	P		
	6			
	8	2.00	17	
-15	9	P		
625.02				
	5			SILTY CLAY-gray-very stiff (CL/ML)
	9	2.50	22	
	11	P		
622.52				
	5			SAND-gray-medium dense (SP)
	6		21	
-20	6			

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				SAND-gray-medium dense (SP) *(continued)*
	4			
	7		21	
	9			
617.52				
	5			SAND & GRAVEL-gray-medium dense (SM)
	7		13	
-25	5			
615.02				
	5			SILTY CLAY LOAM-gray-very stiff (CL-ML)
	10	3.50	14	
	9	P		
612.52				
	31			SILT-gray-very dense (ML)
	42		8	
-30	36			
	11			
	26		15	
-35	25			
602.52				
	27			SILTY LOAM-gray-very dense (ML)
	46		13	
-40	46			

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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), GP-Geoprobe Hand Auger
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SOIL BORING LOG

GEO Job No. 23074A

Date 3/6/24

ROUTE Dixie Hwy Storm Sewer Replacement **DESCRIPTION** _____ **LOGGED BY** QZ

SECTION Harwood Avenue to Sycamore Drive **LOCATION** , **SEC.** , **TWP.** , **RNG.** _____

COUNTY Cook **DRILLING METHOD** HSA/Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO. _____
Station _____

BORING NO. DDB-11
Station 130+90
Offset _____
Ground Surface Elev. 641.02 **ft**

Surface Water Elev. n/a **ft**
Stream Bed Elev. n/a **ft**

Groundwater Elev.:
First Encounter Dry to -10.0' **ft**
Upon Completion n/a **ft**
After - **Hrs.** - **ft**

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
SILTY LOAM-gray-very dense (ML) *(continued)*				
597.52				
GRAVEL/SHALE-gray-very dense (GW)		50/3"		
				7
	-45			
		50/3"		
				10
	-50			
590.02				
Top of the Rock @ -51.0'. Drilled additional 5.0' into the bedrock to confirm (-51.0' to -56.0').		50/1"		
				NR
	-55			
585.02				
End of boring at -56.0', the borehole was backfilled with bentonite chips and the pavement was patched with grout.				
	-60			

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The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
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SOIL BORING LOG

GEO Job No. 23074A

Date 3/4/24

ROUTE Dixie Hwy Storm Sewer Replacement **DESCRIPTION** _____ **LOGGED BY** QZ

SECTION Harwood Avenue to Sycamore Drive **LOCATION** , **SEC.** , **TWP.** , **RNG.** _____

COUNTY Cook **DRILLING METHOD** HSA/Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO. _____
Station _____

BORING NO. DDB-12
Station 132+30
Offset 50.00ft S
Ground Surface Elev. 641.48 ft

Surface Water Elev. n/a ft
Stream Bed Elev. n/a ft

Groundwater Elev.:
First Encounter Dry to -10.0' ft
Upon Completion n/a ft
After - **Hrs.** - ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				6.0" ASPHALT 640.98
			3	SILTY LOAM with Gravel-gray-medium dense (ML)
	7			
	9		11	
	6			
				637.98
	1			CLAY LOAM-brown-hard (CL)
	3	4.50	23	
-5	5	P		
				635.48
	3			CLAY LOAM-brown & gray-very stiff (CL)
	5	3.00	19	
	7	P		
	5			
	7	3.50	18	
-10	8	P		
	3			becoming gray @ -11.0'
	7	2.50	17	
	7	P		
	4			
	8	3.50	15	
-15	11	P		
	7			
	12	3.50	19	
	15	P		
	6			
	15	2.00	22	
-20	18	P		

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				CLAY LOAM-brown & gray-very stiff (CL) *(continued)* 620.48
	7			SAND-gray-medium dense (SP)
	10		21	
	11			
	8			
	10		22	
-25	11			
	9			
	10		21	
	7			
				612.98
	3			SANDY CLAY LOAM-gray-hard (CL)
	9	4.00	14	
-30	8	P		
				607.98
	8			SAND-gray-very dense (SW)
	20		19	
-35	20			
	20			
	24		NR	
-40	23			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
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BBS, from 137 (Rev. 8-99)

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SOIL BORING LOG

GEO Job No. 23074A

Date 3/4/24

ROUTE Dixie Hwy Storm Sewer Replacement **DESCRIPTION** _____ **LOGGED BY** QZ

SECTION Harwood Avenue to Sycamore Drive **LOCATION** , **SEC.** , **TWP.** , **RNG.** _____

COUNTY Cook **DRILLING METHOD** HSA/Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO. _____
Station _____

BORING NO. DDB-12
Station 132+30
Offset 50.00ft S
Ground Surface Elev. 641.48 **ft**

Surface Water Elev. n/a **ft**
Stream Bed Elev. n/a **ft**

Groundwater Elev.:
First Encounter Dry to -10.0' **ft**
Upon Completion n/a **ft**
After - **Hrs.** - **ft**

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
SAND-gray-very dense (SW) *(continued)*				
597.98				
GRAVEL & STONE-gray/green-dense to very dense (GP)		40		
		24		7
	-45	14		
		15		
		28		12
	-50	33		
		18		
		35		5
586.48	-55	43		
End Of Boring @ -55.0'. The borehole was collapsing, therefore it was not completed. The bore backfilled with bentonite chips and the surface was patched with grout.	-60			

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PAVEMENT CORE SUMMARY

Project: Dixie Hwy Storm Sewer Collapse, WO #1 GSI Job No.: 23074A
Location: Dixie Hwy, Illinois Date: 2-27-2024
County: Cook Cored By: RT
Client: BLA Checked By: NMA

CORE NO.	THICKNESS (in.)	MATERIAL DESCRIPTION
C-03		Northing: 1785256 Easting: 1166723 Elevation: 648.7
	1.75	ASPHALT-well consolidated, fine to medium aggregate. (Surface Mix)
	1.0	ASPHALT-well consolidated, fine to medium aggregate. (Surface Mix)
	2.5	ASPHALT-well consolidated, fine to medium aggregate. (Surface Mix)
	7.25	CONCRETE-well consolidated
	12.5+	CRUSHED STONE-brown
C-04		Northing: 1785813 Easting: 1166907 Elevation: 645.7
	4.0	ASPHALT-well consolidated, fine to medium aggregate. (Surface Mix)
	8.75	CONCRETE-well consolidated
	12.75+	CRUSHED STONE-brown
C-05		Northing: 178676.6 Easting: 1167114 Elevation: 641.1
	2.5	ASPHALT-well consolidated, fine to medium aggregate. (Surface Mix)
	3.0	ASPHALT-well consolidated, fine to medium coarse aggregate. (Binder Mix)
	3.0	ASPHALT-well consolidated, fine to medium coarse aggregate. (Binder Mix)
	3.0	ASPHALT-well consolidated, fine to medium coarse aggregate. (Binder Mix)
	11.5+	CRUSHED STONE-brown
C-02		Northing: 1784939 Easting: 1166574 Elevation: 648.8
	2.0	ASPHALT-well consolidated, fine to medium aggregate. (Surface Mix)
	1.5	ASPHALT-well consolidated, fine to medium coarse aggregate. (Binder Mix)
	1.5	ASPHALT-well consolidated, fine to medium aggregate. (Surface Mix)
	2.0	ASPHALT-well consolidated, fine to medium coarse aggregate. (Binder Mix)
	2.0	ASPHALT-well consolidated, fine to medium aggregate. (Surface Mix)
	8.5	CONCRETE-well consolidated
	18.5+	CRUSHED STONE-brown

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PAVEMENT CORE PHOTO LOG

Project: Dixie Hwy Storm Sewer Collapse, WO #1
GSI Job No.: 23074A
Location: Dixie Hwy, Illinois
Date: 2-27-2024
County: Cook
Cored By: RT
Client: BLA
Checked By: NMA

Core No.: C-03 Core Location: Northing: 1785256 Easting: 1166723

Core No.: C-04 Core Location: Northing: 1785813 Easting: 1166907

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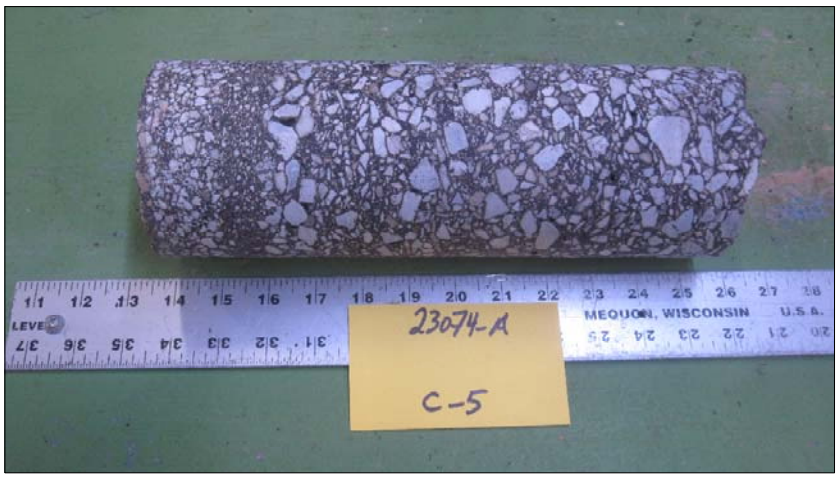
PAVEMENT CORE PHOTO LOG

Project: Dixie Hwy Storm Sewer Collapse, WO #1 GSI Job No.: 23074A
Location: Dixie Hwy, Illinois Date: 2-27-2024
County: Cook Cored By: RT
Client: BLA Checked By: NMA



Core No.: C-05 Core Location: Northing: 178676.6 Easting: 1167114

Core No.: C-02 Core Location: Northing: 1167114 Easting: 1166574

APPENDIX 9

LAB RESULTS

Geo Services, Inc.
Geotechnical, Environmental and Civil Engineering
An MBE - DBE Firm

1235 East Davis Street, Suite 101
Arlington Heights, IL 60005
(847) 253-3845

Liquid Limit, Plastic Limit, and Plasticity Index of Soils

AASHTO T89/T90

Project Name Dixie Hwy Improvements Job No 23074A

Location Homewood, Illinois Date 3/26/24

Client BLA

Boring No.	BSB-01	DDB-04	DDB-07	DDB-10	SGB-02			
Sample No.	2	3	2	5	3			
Depth	1.0'-2.5'	3.5'-5.0'	1.0'-2.5'	8.5'-10.0'	3.5'-5.0'			
LIQUID LIMIT (LL)	27	27	37	42	29			
PLASTIC LIMIT (PL)	15	15	20	22	16			
PLASTICITY INDEX (PI)	12	12	17	20	13			

Tested by MT

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Fax (847) 253-0482

ORGANIC MATTER of SOILS
AASHTO T 267

Project Name Dixie Hwy Improvements **Date** 3/11/2024

Location Harwood, Illinois **Job No** 23074A

Boring No. DDB-07 **Sample No.** 2 **Depth** 1.0'-2.5'

Sample Description SILTY CLAY LOAM-brown & gray **Furnace Temp ^{0}C.:** 440

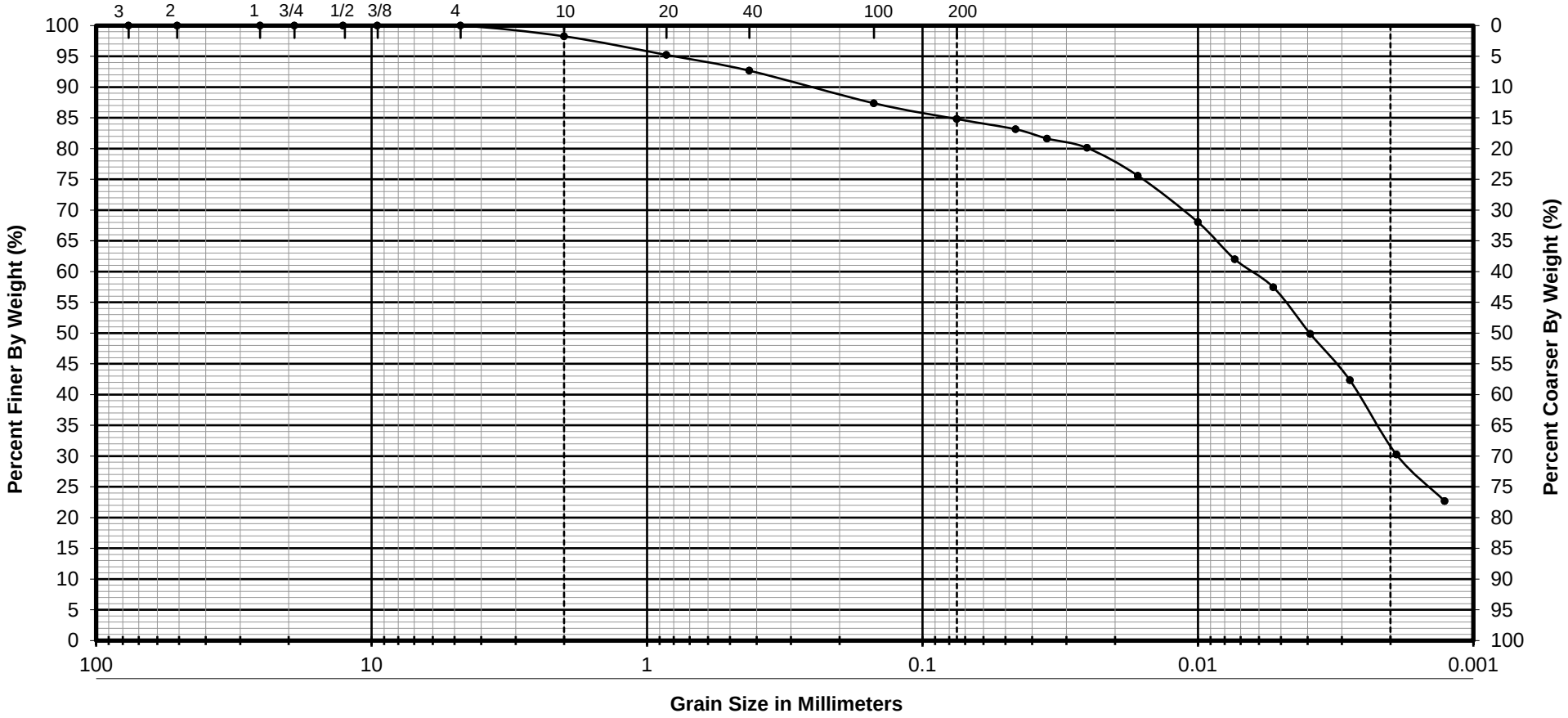
Moisture Content	Wet Soil+Tare (g)	Dry Soil+Tare (g)	Tare Mass (g)	w (%)
Oven-Dry Method	80.42	74.91	48.45	20.8

Ash Content	Dry Soil+Tare (g)	Ash+Tare (g)	Tare Mass (g)	Ash content (%)
Loss on Ignition	74.91	74.47	48.45	98.3

Organic Content (%) = 1.70%

Notes:

Test By MT



GRAVEL	SAND		SILT	CLAY
	COARSE	FINE		

Boring No.	DDB-04	CLASSIFICATION		PARTICLE SIZE ANALYSIS-AASHTO T88
Sample No.	3			
Depth	3.5'-5.0'	SILTY CLAY		Dixie Hwy Improvements
Liquid Limit	27	A-6		Harwood, IL
Plastic Limit	15	gray		
Plasticity Index	12	Group Index	8	
Test By	MT	% Gravel	1.7	
Date	3/13/24	% Sand	13.5	
Reviewed By	RS	% Silt	54.6	
Job No	23074A	% Clay	30.2	

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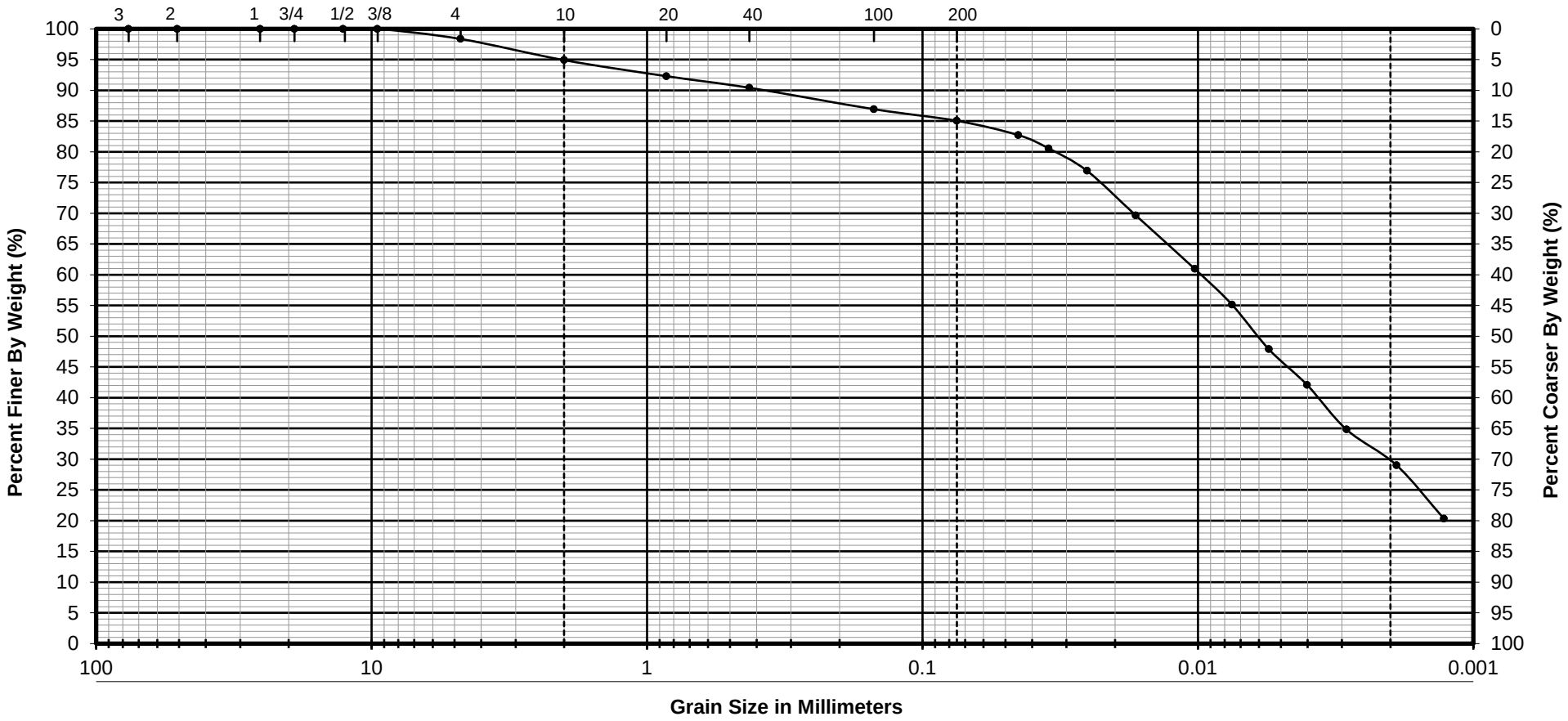

GRAVEL	SAND		SILT	CLAY
	COARSE	FINE		

Boring No.	DDB-07	CLASSIFICATION		PARTICLE SIZE ANALYSIS-AASHTO T88
Sample No.	2			
Depth	1.0'-2.5'	SILTY CLAY LOAM		Dixie Hwy Improvements
Liquid Limit	37	A-6		Harwood, IL
Plastic Limit	20	brown/gray		
Plasticity Index	17	Group Index	14	
Test By	MT	% Gravel	5.1	
Date	3/13/24	% Sand	9.9	
Reviewed By	RS	% Silt	56.0	
Job No	23074A	% Clay	29.0	

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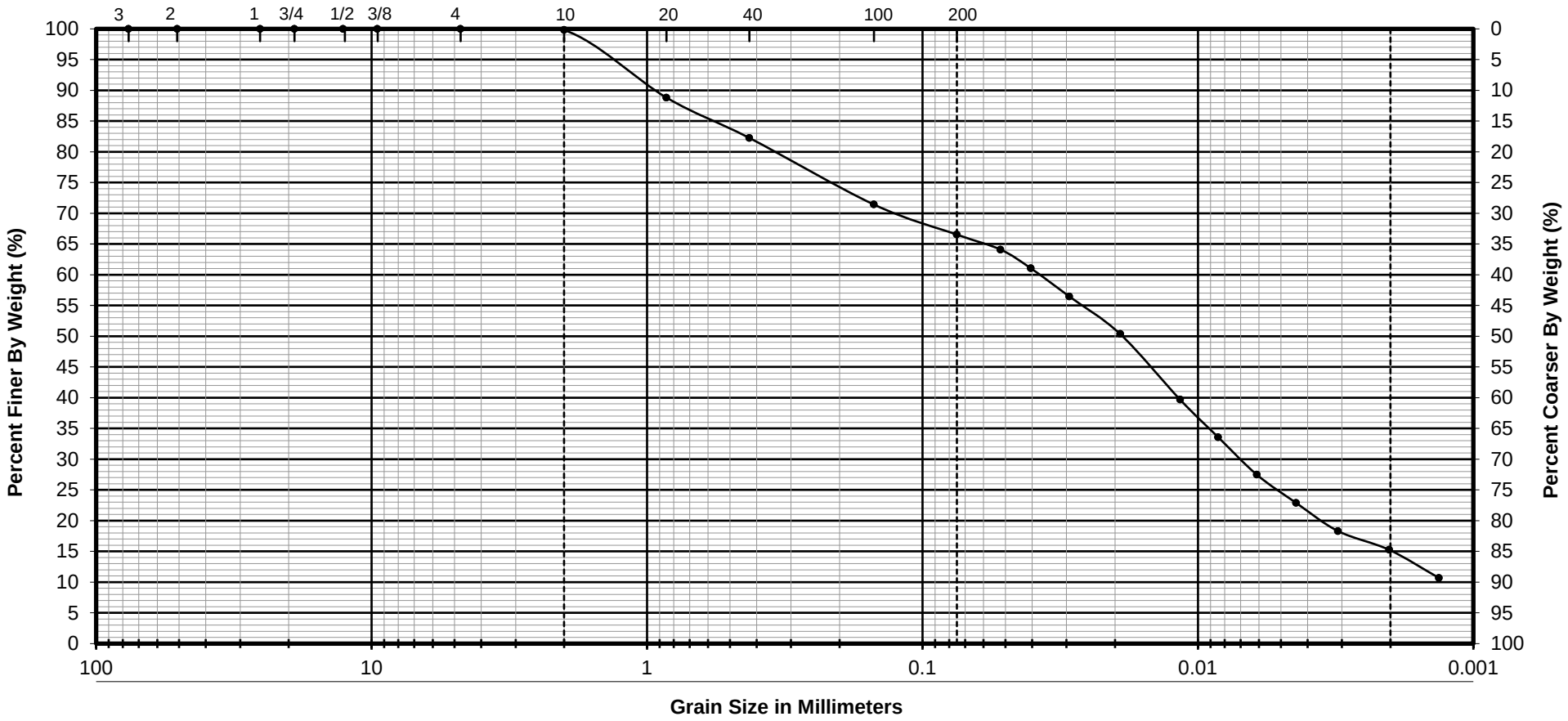

GRAVEL	SAND		SILT	CLAY
	COARSE	FINE		

Boring No.	DDB-10	CLASSIFICATION		PARTICLE SIZE ANALYSIS-AASHTO T88
Sample No.	5			
Depth	8.5'-10.0'	SILTY LOAM		Dixie Hwy Improvements
Liquid Limit	42	A-7		Harwood, IL
Plastic Limit	22	brown/gray		
Plasticity Index	20	Group Index	12	
Test By	MT	% Gravel	0.2	
Date	3/13/24	% Sand	33.3	
Reviewed By	RS	% Silt	51.3	
Job No	23074A	% Clay	15.3	

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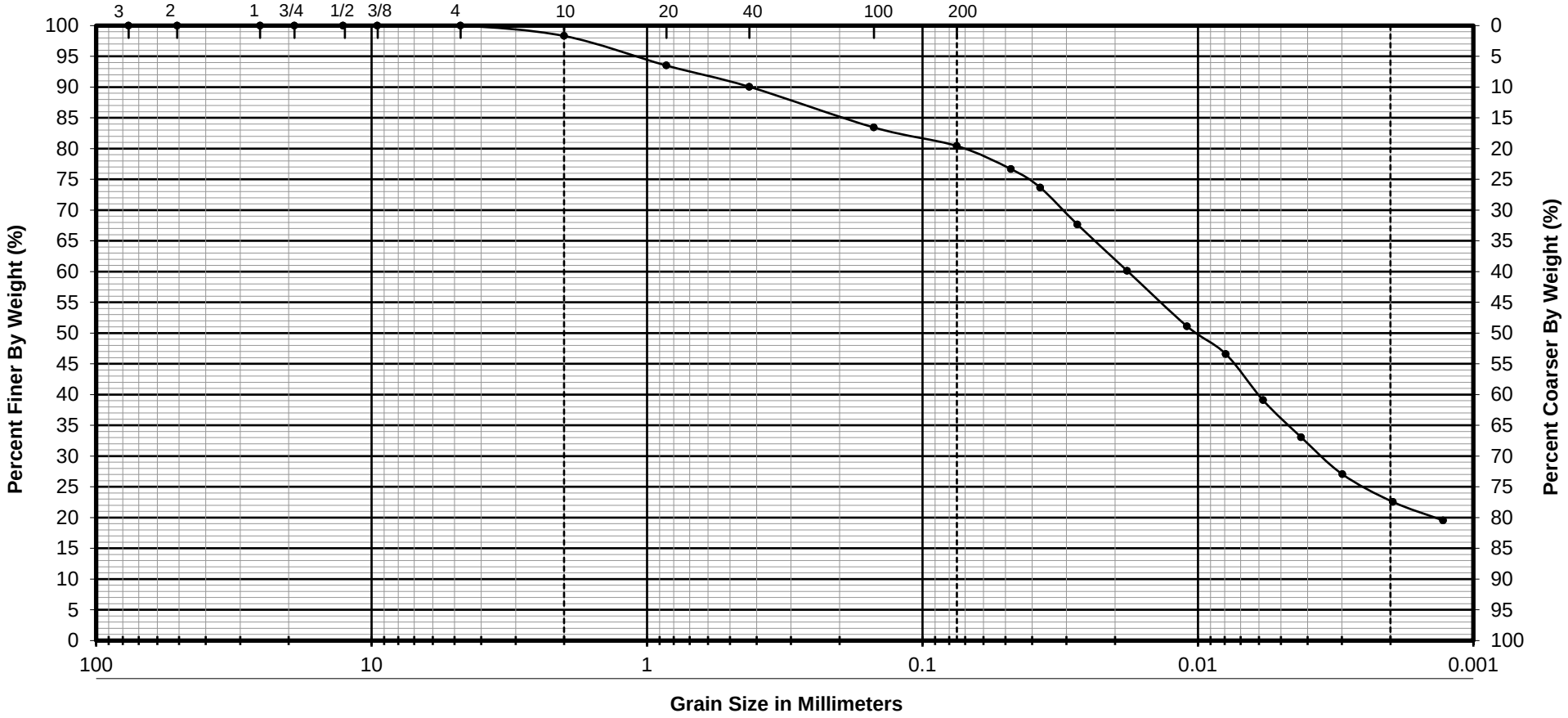

GRAVEL	SAND		SILT	CLAY
	COARSE	FINE		

Boring No.	SGB-02	CLASSIFICATION		PARTICLE SIZE ANALYSIS-AASHTO T88
Sample No.	3			
Depth	3.5'-5.0'	SILTY CLAY LOAM		Dixie Hwy Improvements
Liquid Limit	29	A-6		Harwood, IL
Plastic Limit	16	gray		
Plasticity Index	13	Group Index	8	
Test By	MT	% Gravel	1.7	
Date	3/13/24	% Sand	17.9	
Reviewed By	RS	% Silt	57.9	
Job No	23074A	% Clay	22.6	

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APPENDIX F

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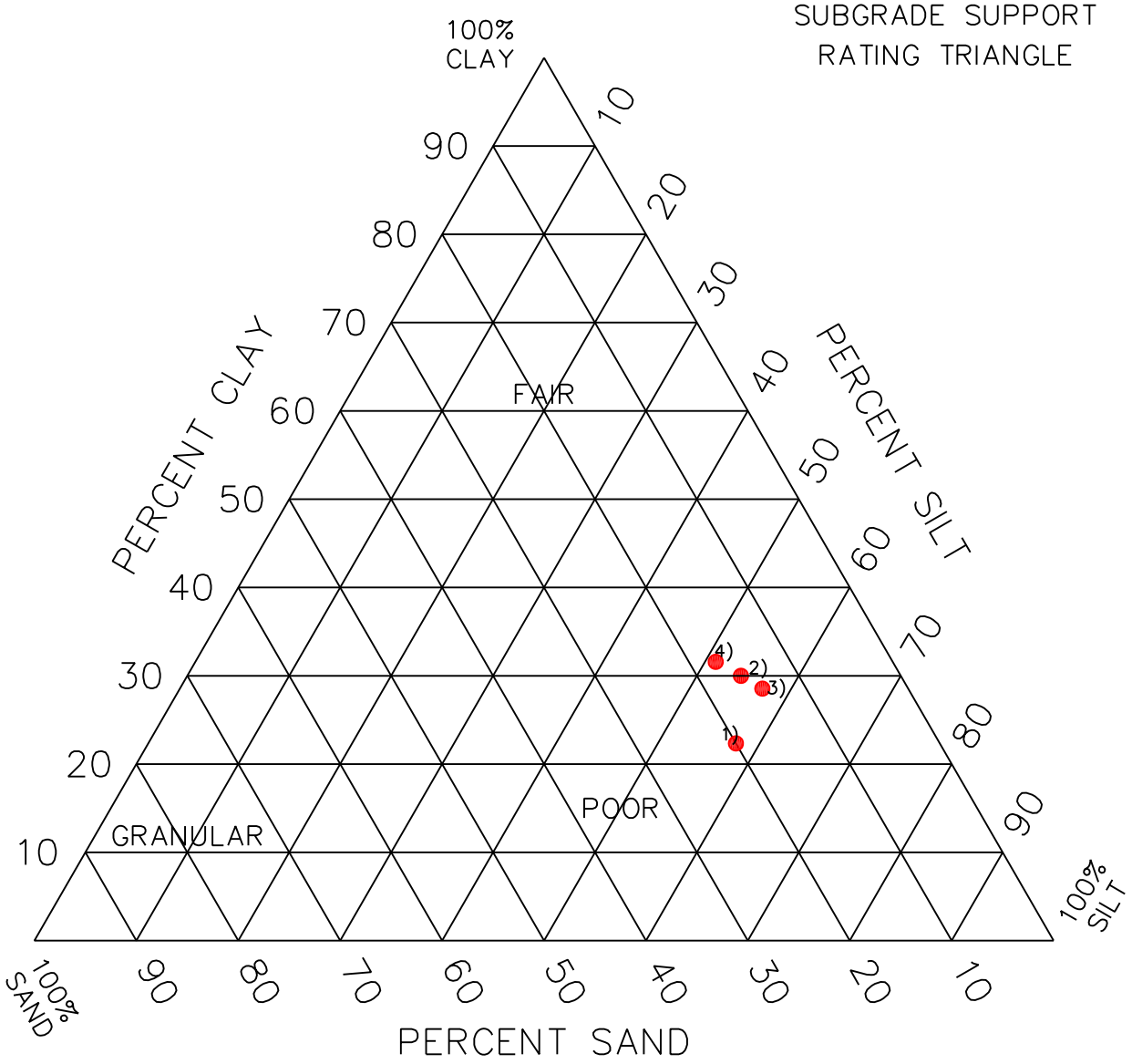
SUBGRADE SUPPORT RATING TRIANGLE



LAB SAMPLES:

1) SGB-02 (-3.5' to -5.0')
2) DDB-04(-3.5' to -5.0')
3) DDB-07 (-1.0' to -2.5')
4) DDB-10 (-8.5' to -10.0')

NOTES:

1. If granular soils are encountered, the soils report should note alternatives to the 12 inch improved subgrade policy
2. Soil Separate Sizes:
   Sand: 2.0 mm to 0.074 mm
   Silt: 0.074 mm to 0.002 mm
   Clay: Below 0.002 mm

SUBGRADE SUPPORT RATING (SSR) Subsurface Investigation for Dixie Highway-Storm Sewer Replacement- Harwood Ave. to Sycamore Road PBT-208-010, Task Order-1 Homewood, Cook County, IL	Geo Services, Inc. Geotechnical, Environmental & Civil Engineering 805 Amherst Court, Suite 204 Naperville, Illinois 60565 (630) 355-2838	DRAWN BY	QZ
		APPROVED BY	SJP
		DATE	03-28-2024
		JOB NO.	23074A

Geo Services, Inc.
Geotechnical, Environmental and Civil Engineering
An MBE - DBE Firm

Soil Test Data

Route Dixie Highway
Section Harwood Avenue to Sycamore Avenue
County Cook
Location Homewood

Boring No./Sample No.	DDB-04/S-3	DDB-7/S-2	DDB-10/S-5	SGB-2/S-3
Station	116+40	124+30	130+00	112+80
Offset	N/A	N/A	N/A	N/A
Depth	3.5.0' –5.0'	1.0' –2.5'	8.5.0' –10.0'	3.5.0' –5.0'
AASHTO Classification	SILTY CLAY	SILTY CLAY LOAM	CLAY LOAM	SILTY CLAY LOAM
Illinois Textural Classification	A-6	A-6	A-7	A-7
Gradation Passing – 1"	100	100	100	100
¾"	100	100	100	100
½"	100	100	100	100
No. 4	100	98.5	100	100
No. 10	98	95	100	98.2
No. 40	93	90.4	97.7	90
No. 100	87	87	82.2	88.5
No. 200	85	85	66.5	80.5
Gravel (AASHTO T-88)	1.7	5.1	0.2	1.7
Sand (AASHTO T-88)	13.5	9.9	33.3	17.9
Silt (AASHTO T-88)	54.6	56	51.3	57.9
Clay (AASHTO T-88)	30.2	29	15.3	22.6
Liquid Limit (AASHTO T-89)	27	37	42	29
Plasticity Index (AASHTO T-90)	12	17	20	13
Std. Dry Density pcf (AASHTO T-99)	--	--	--	--
Optimum Moisture (AASHTO T-99)	--	--	--	--
Subgrade Support Rating		--		
Organic Content	--	-	--	-
Insitu Moisture	16.0	19.0	23.0	18.0

APPENDIX G

GENERAL NOTES

United States Department of Agriculture

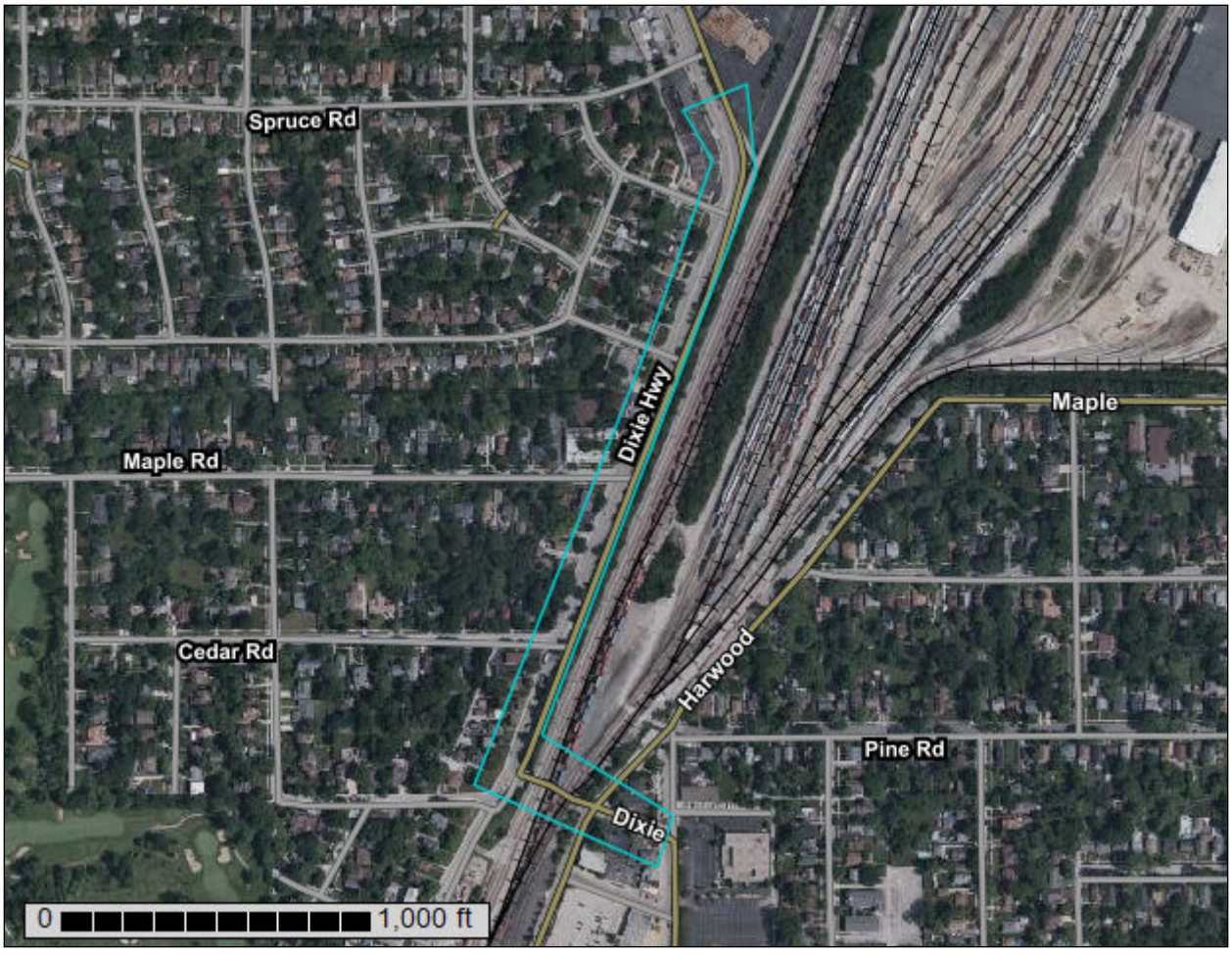
NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Cook County, Illinois

Soil Report



April 5, 2024

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.


87° 40' 13" W
87° 39' 42" W
41° 34' 17" N
41° 33' 47" N
444200
444300
444400
444500
444600
444700
444800
4602400
4602300
4602200
4602100
4602000
4601900
4601800
4601700
4601600
4601500
Spruce Rd
Magnolia Rd
Briar Ave
802B
741B
49A
Dixie Hwy
Maple Rd
805B
854B
Cedar Rd
Pine Rd
Park Ave
Harwood
Dixie
Soil Map may not be valid at this scale.
Map Scale: 1:4,510 if printed on A portrait (8.5" x 11") sheet.
N
Meters
0 50 100 200 300
Feet
0 200 400 800 1200
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Cook County, Illinois
Survey Area Data: Version 17, Aug 28, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 7, 2020—Oct 13, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend (Soil Map)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
49A	Watseka loamy fine sand, 0 to 2 percent slopes	0.1	0.7%
741B	Oakville fine sand, 1 to 6 percent slopes	0.1	1.4%
802B	Orthents, loamy, 1 to 6 percent slopes	2.5	24.7%
805B	Orthents, clayey, undulating	6.8	67.2%
854B	Markham-Ashkum-Beecher complex, 1 to 6 percent slopes	0.6	6.0%
Totals for Area of Interest		**10.2**	**100.0%**

Map Unit Descriptions (Soil Map)

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Cook County, Illinois

49A—Watseka loamy fine sand, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 28s8p
Elevation: 510 to 980 feet
Mean annual precipitation: 28 to 40 inches
Mean annual air temperature: 45 to 54 degrees F
Frost-free period: 140 to 180 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Watseka and similar soils: 92 percent
Minor components: 8 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Watseka

Setting

Landform: Lake plains, stream terraces, outwash plains, beach ridges
Landform position (two-dimensional): Summit, footslope
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Eolian deposits and/or outwash

Typical profile

H1 - 0 to 10 inches: loamy fine sand
H2 - 10 to 32 inches: sand
H3 - 32 to 60 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: About 12 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A/D
Ecological site: R110XY014IL - Moist Sand Prairie, R098XB033IN - Kankakee Moist Drift Flats
Hydric soil rating: No

Minor Components

Orthents, loamy

Percent of map unit: 2 percent

Landform: Ground moraines, lake plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Gilford

Percent of map unit: 2 percent
Landform: Outwash plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R110XY015IL - Wet Sand Prairie
Hydric soil rating: Yes

Granby

Percent of map unit: 2 percent
Landform: Swales
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R110XY015IL - Wet Sand Prairie
Hydric soil rating: Yes

Urban land

Percent of map unit: 2 percent
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

741B—Oakville fine sand, 1 to 6 percent slopes

Map Unit Setting

National map unit symbol: 28shd
Elevation: 510 to 980 feet
Mean annual precipitation: 28 to 40 inches
Mean annual air temperature: 45 to 54 degrees F
Frost-free period: 140 to 180 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Oakville and similar soils: 94 percent
Minor components: 6 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Oakville

Setting

Landform: Dunes on lake plains, dunes on outwash plains, beach ridges on lake plains, beach ridges on outwash plains
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Eolian deposits

Typical profile

H1 - 0 to 7 inches: fine sand
H2 - 7 to 40 inches: fine sand
H3 - 40 to 60 inches: fine sand

Properties and qualities

Slope: 1 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Ecological site: F098XB030IN - Kankakee Sand Dunes
Hydric soil rating: No

Minor Components

Urban land

Percent of map unit: 3 percent
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Watseka

Percent of map unit: 3 percent
Landform: Beach ridges, lake plains, stream terraces, outwash plains
Landform position (two-dimensional): Summit, footslope
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R098XB033IN - Kankakee Moist Drift Flats
Hydric soil rating: No

802B—Orthents, loamy, 1 to 6 percent slopes

Map Unit Setting

National map unit symbol: 2ytf6
Elevation: 510 to 930 feet
Mean annual precipitation: 34 to 40 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 158 to 175 days
Farmland classification: Not prime farmland

Map Unit Composition

Orthents, loamy, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Orthents, Loamy

Setting

Landform: Outwash plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy human-transported material

Typical profile

^A - 0 to 6 inches: loam
^C - 6 to 79 inches: clay loam

Properties and qualities

Slope: 1 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 42 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 6.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: C
Ecological site: R110XY024IL - Ponded Depressional Sedge Meadow
Hydric soil rating: No

Minor Components

Orthents, clayey, undulating
Percent of map unit: 3 percent
Landform: Outwash plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R110XY024IL - Ponded Depressional Sedge Meadow
Hydric soil rating: No

Orthents, loamy-skeletal, undulating
Percent of map unit: 2 percent
Landform: Outwash plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R110XY024IL - Ponded Depressional Sedge Meadow
Hydric soil rating: No

Urban land
Percent of map unit: 2 percent
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Houghton, drained
Percent of map unit: 1 percent
Landform: Depressions on lake plains, depressions on outwash plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R110XY024IL - Ponded Depressional Sedge Meadow
Hydric soil rating: Yes

Pella
Percent of map unit: 1 percent
Landform: Lake plains, ground moraines, outwash plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R110XY008IL - Wet Glacial Drift Upland Prairie
Hydric soil rating: Yes

Drummer, drained
Percent of map unit: 1 percent
Landform: Swales on till plains, swales on outwash plains, stream terraces on till plains, stream terraces on outwash plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope, talf
Down-slope shape: Linear
Across-slope shape: Concave, linear

Ecological site: R111XD020IN - Wet Outwash Mollisol, R108XA013IL - Wet Outwash Prairie, R110XY024IL - Ponded Depressional Sedge Meadow
Hydric soil rating: Yes

805B—Orthents, clayey, undulating

Map Unit Setting

National map unit symbol: 2ytf7
Elevation: 510 to 930 feet
Mean annual precipitation: 34 to 40 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 158 to 175 days
Farmland classification: Not prime farmland

Map Unit Composition

Orthents, clayey, undulating, and similar soils: 91 percent
Minor components: 9 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Orthents, Clayey, Undulating

Setting

Landform: Outwash plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Clayey human-transported material

Typical profile

^A - 0 to 7 inches: silty clay
^Cd - 7 to 79 inches: silty clay

Properties and qualities

Slope: 1 to 6 percent
Depth to restrictive feature: 4 to 12 inches to densic material
Drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low (0.02 to 0.06 in/hr)
Depth to water table: About 24 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 0.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: D

Ecological site: R110XY008IL - Wet Glacial Drift Upland Prairie
Hydric soil rating: No

Minor Components

Ashkum, drained
Percent of map unit: 3 percent
Landform: End moraines, ground moraines
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R110XY024IL - Ponded Depressional Sedge Meadow
Hydric soil rating: Yes

Bryce, drained
Percent of map unit: 2 percent
Landform: Till-floored lake plains, ground moraines, glacial lakes (relict)
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope, talf
Down-slope shape: Linear, concave
Across-slope shape: Concave
Ecological site: R110XY008IL - Wet Glacial Drift Upland Prairie
Hydric soil rating: Yes

Houghton, drained
Percent of map unit: 2 percent
Landform: Depressions on lake plains, depressions on outwash plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R110XY024IL - Ponded Depressional Sedge Meadow
Hydric soil rating: Yes

Urban land
Percent of map unit: 1 percent
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Aquents, clayey
Percent of map unit: 1 percent
Landform: Depressions, lake plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Ecological site: F095XB002WI - Wet Floodplain
Hydric soil rating: Yes

854B—Markham-Ashkum-Beecher complex, 1 to 6 percent slopes

Map Unit Setting

National map unit symbol: 28shj
Elevation: 510 to 930 feet
Mean annual precipitation: 28 to 40 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 140 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Markham and similar soils: 40 percent
Ashkum and similar soils: 30 percent
Beecher and similar soils: 25 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Markham

Setting

Landform: End moraines, ground moraines
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Thin mantle of loess or other silty material and in the underlying till

Typical profile

H1 - 0 to 8 inches: silt loam
H2 - 8 to 21 inches: silty clay loam
H3 - 21 to 32 inches: silty clay loam
H4 - 32 to 60 inches: silty clay loam

Properties and qualities

Slope: 1 to 6 percent
Depth to restrictive feature: 20 to 55 inches to densic material
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 24 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Available water supply, 0 to 60 inches: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: C
Ecological site: R110XY010IL - Moist Glacial Drift Upland Savanna
Hydric soil rating: No

Description of Ashkum

Setting

Landform: End moraines, ground moraines
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Colluvium and in the underlying till

Typical profile

H1 - 0 to 12 inches: silty clay loam
H2 - 12 to 29 inches: silty clay
H3 - 29 to 54 inches: silty clay loam
H4 - 54 to 60 inches: silty clay loam

Properties and qualities

Slope: 1 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 25 percent
Available water supply, 0 to 60 inches: High (about 9.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C/D
Ecological site: R110XY008IL - Wet Glacial Drift Upland Prairie
Hydric soil rating: Yes

Description of Beecher

Setting

Landform: End moraines, ground moraines
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Thin mantle of loess or other silty material and in the underlying till

Typical profile

H1 - 0 to 7 inches: silt loam
H2 - 7 to 24 inches: silty clay loam
H3 - 24 to 36 inches: silty clay loam
H4 - 36 to 60 inches: silty clay loam

Properties and qualities

Slope: 2 to 4 percent
Depth to restrictive feature: 24 to 45 inches to densic material
Drainage class: Somewhat poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 6 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent
Available water supply, 0 to 60 inches: Low (about 5.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C/D
Ecological site: R110XY010IL - Moist Glacial Drift Upland Savanna
Hydric soil rating: No

Minor Components

Orthents, clayey

Percent of map unit: 5 percent
Landform: Lake plains, ground moraines
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: F095XB010WI - Loamy and Clayey Upland
Hydric soil rating: No

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