
CULVERT GEOTECHNICAL REPORT
IL Route 56 at IL Route 53
IDOT D-91-612-11, Contract No 60P75
SN 022-C005
DuPage County, Illinois

Prepared for:

Mr. John P. O'Neill, P.E.
Bollinger, Lach and Associates, Inc.
333 Pierce Road, Suite 200
Itasca, IL. 60143

Prepared by:

Geo Services, Inc.
805 Amherst Court
Suite 204
Naperville, Illinois 60565
(630) 305-9186



GSI Job No. 12195

December, 2013
Revised August, 2021



December 18, 2013
Revised August 20, 2021

Bollinger, Lach and Associates, Inc.
333 Pierce Road, Suite 200
Itasca, IL 60143

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

GSI Project 12195

Re: Structure Geotechnical Report
IL Route 56 at IL Route 53
Culvert SN 022-C005
FAP 870, PTB 161-006
IDOT Project No. D-91-612-11, Contract No. 60P75
DuPage County, IL

Dear Mr. O'Neill:

The following report presents the geotechnical analysis and recommendations for IL Route 56 Culvert located along IL Route 56 between Arboretum Road to Briarcliff Road, and along IL Route 53 between Arboretum Road to IL Route 53 in DuPage County, Illinois. A total of eighteen (18) culvert soil borings (CB-01 through CB-18) were completed for this project. Copies of the boring logs, along with a boring location diagram, are included in this report.

If there are any questions with regard to the information submitted in this report, or if we can be of further assistance to you in any way, please do not hesitate to contact us.

Very truly yours,

GEO SERVICES, INC.

Sean Kirwan
Assistant Project Engineer

Andrew J. Ptak, P.E.
Principal Engineer

enc.

SECTION 01: INTRODUCTION

This report presents the results of the geotechnical investigation for the proposed culvert along IL Route 56 between Arboretum Road to IL Route 53 in DuPage County, Illinois (IDOT Job No. D-91-612-11). Geo Services, Inc. (GSI) selected the boring locations in cooperation with Bollinger, Lach and Associates, Inc. (BLA). The soil boring locations were laid out by GSI personnel using a mapping grade Trimble GPS unit. The elevations of each boring were interpolated from the topographic maps provided by BLA. The results of the eighteen borings (CB-01 thru CB-18) completed by GSI, along with a site location map, soil boring location diagrams, and laboratory test results are included with this report.

The proposed culvert (SN 022-C005) along IL Route 56 is anticipated at the eastbound side of IL Route 56 (Station 173+14.64) and extends east of the intersection of IL Route 53 and IL Route 56 (Station 179+00). The culvert will be a single cell 8'x4' box culvert with an approximated length of 566 feet. The culvert box will have upstream invert elevations of 680.37 and a downstream invert elevation of 677.45.

In addition to the proposed culvert (SN 022-C005), an "extended culvert" is also proposed at the eastbound side of IL Route 56 near the intersection of Arboretum Road and IL Route 56 at approximate Station 160+00, and tied into a junction box and to the proposed culvert (SN 022-C005) at approximate Station 173+00. The "extended culvert" will be a single cell 6'x3' box culvert with an approximated length of 1,280 feet. The culvert box will have upstream invert elevations of 690.0 and a downstream invert elevation of 680.71. No structure number has been assigned for the "extended culvert" structure.

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PLANS FOR PROPOSED

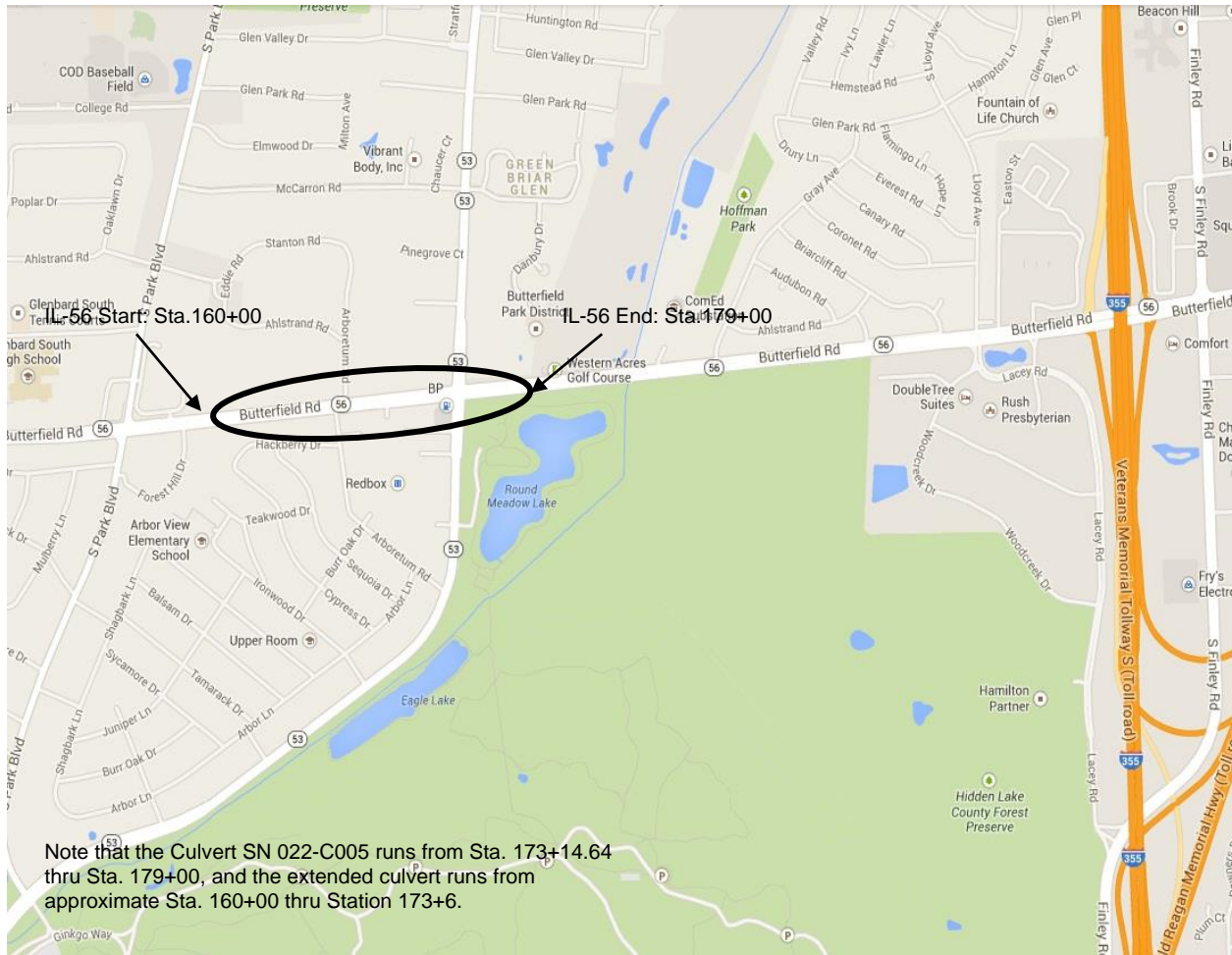
IDOT Job No. D-91-612-11, Contract 60P75

IL Route 56 at IL Route 53

Proposed Culvert SN 022-C005

DuPage County, IL.

GEO SERVICES JOB NO.12195



SECTION 02: CLIMATIC CONDITIONS

According to the USDA/NRCS Soil Survey of DuPage County, Illinois, the climate within the area of this project site falls within the temperate humid, continental range and is characterized by cold conditions in the winter and warm conditions in the summer. The winter average daily temperature is 25° F and the average daily minimum temperature is 17° F. The summer average temperature is 71° F and the summer average daily maximum temperature is 81° F. The total annual precipitation for this area is 35.8" with approximately 63% falling between April and September. The average seasonal snowfall for this area is 38.7".

Local Climatological Data, as measured at O'Hare International Airport (ORD), for the three (3) month period prior to and during drilling, including total precipitation, average temperature and snowfall are summarized below:

Table 1 – Climate Conditions

MONTH-Yr	ppt (inches)		Temp (°F)		Snow (inches)	
	Total	Departure From Norm	Average Temp.	Departure From Norm	Total	Monthly Norm
July 13	2.22	-1.48	73.2	-0.8	0.0	0.0
Aug-13	1.69	-3.21	73.0	0.6	0.0	0.0
Sept-13	2.57	-0.64	67.2	2.6	0.0	0.0
borings performed 09/30 to 10/09/13						

Total precipitation during the three months preceding drilling was below normal and temperatures were higher than normal during this period. The climatic conditions encountered prior to drilling operations suggest that the soils should be drier than normal moisture levels.

SECTION 03: GEOLOGY

According to the 1971 ISGS Circular #460: Summary of the Geology of the Chicago Area/ISGS Geologic Materials to a Depth of 20' – Du Page County, the project corridor is located in an area where the surficial soils to the east of the East Branch of the DuPage River are categorized as belonging to the Wadsworth Till Member of the Wedron Formation which were deposited during Woodfordian Substage of the Wisconsinan glaciation between 12,500 to 22,000 years ago and generally consist of gray clayey and silty clay tills. The soils on either side of the river consist of Cahokia Alluvium soils overlying soils belonging to the Batavia Member of the Henry Formation and the surficial soils away from the river bank area generally consist of Batavia Member deposits. Cahokia Alluviums consist of recent flood plain deposits of silt, sand

and gravel which can be organic and Batavia Member soils generally consist of sands and gravels deposited in outwash plains.

The ISGS Circular C542 15 Meter Stack Map confirms that surficial soils in the vicinity of the project corridor are as noted above and that bedrock is in excess of 50.0-ft below ground surface. A review of ISGS on-line well records and glacial drift thickness maps confirms that bedrock is encountered within a depth range of 50.0' to 100.0' below ground in the western portion of the project corridor and within 100' to 200' of the surface along the eastern portion of the site.

According to the 1984 ISGS Berg Circular #532: "Potential for Contamination of Shallow Aquifers in Illinois, the far western portion of the project corridor and the eastern half of the site are located in an E Zone and the area on either side of the river are located in an AX Zone. AX Zones are defined as an area with alluvium stream deposits of gravel, sand, silt and clay and E Zones are areas with in excess of 50-ft of relatively impermeable silty or clayey tills with no evidence of interbedded granular layers.

The Wetland Inventory database reviewed on-line at the US Fish & Wildlife Service website identified several nearby wetland areas that are summarized as follows:

- The areas on the north and south sides of Butterfield Road where it crosses the East Branch of the Du Page River are identified as 79.7 and 10.4 acre Palustrine System/Emergent Class wetlands respectively that are located in a Seasonally Flooded Water Regime and are noted to be partially drained/ditched. Located immediately adjacent to the southwest corner of the northern wetland is an approximately 0.4 acre Palustrine System/Unconsolidated Bottom Class wetland that is located in an Intermittently Exposed Water Regime that is noted to be excavated.
- Located on the west side of Illinois Route 53 at the south end of the project corridor is a 2.4 acre Palustrine System/Emergent Class wetland that is in a sheet Flooded Water Regime.

The USDA Natural Resources Conservation Service Soil Survey database indicates that surficial soils in the vicinity of the project corridor are various silt loams and silty clay loams. None of these soils are overly organic (0.75 to 5.5%) 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 along the eastern half and the far western portion of the project corridor should generally consist of clay tills and the remainder of the soils closer to the Eastern Branch of the Du Page River should consist of variable silts, sand and gravel deposits overlying clays.

SECTION 04: SUBSURFACE INVESTIGATION PROCEDURES

The borings were performed during the months of September and October, 2013 with a truck-mounted drilling rig equipped with an automatic hammer, and were advanced by means of hollow stem augers. 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 accordance with test procedures discussed in the 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 either unconfined compression and/or 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) tests were performed on select samples from the borings. The tests were performed upon representative portions of the samples obtained in the field. The lab testing results are attached in the Appendix D of this report.

SECTION 06: SOIL CONDITIONS

Boring logs can be found in Appendix C. The stratification lines shown on the boring logs represent the approximate boundary between soil types, and the actual transition may be gradual.

Surface conditions at the majority of the boring locations had topsoil for borings performed near the proposed culvert locations. Boring CB-14 was performed off the proposed culvert location at about 30 feet offset due to existing underground utilities within the proposed culvert location. Surface conditions at boring CB-14 consist of existing asphalt pavement to crushed stone materials to approximately 12 inches deep.

Below the surface materials, clay loam fill to clay soils were encountered at varying depths at approximately 8 to 20 feet below ground level, with the exception of borings CB-05 and CB-09, which had granular soils encountered (with strata clay loam soils in-between) in the majority of the borings. Underneath the cohesive material were interstratified soils that include strata of sandy clay loam, silty loam, silty clay loam, sandy loam, sand and gravel to boring termination ranging from 30 to 40 feet. Moisture contents of the stiff to very stiff clay soils were typically in the low-teens to mid-twenties range. Granular soils had moisture contents that were typically in the low-teens to low-twenties range.

SECTION 07: GROUND WATER CONDITIONS

All of the culvert soil borings taken for this investigation encountered groundwater at depths ranging from 6 to 28 feet during drilling, and 8 to 30 after the completion of drilling. Where borings extended deep enough to encounter the gray colored soils that typically represent a saturated condition and therefore the estimated long term water level due the depth of the color change was generally in the range of 8 to 18 feet below existing ground surface (EL. 677 to 687). Fluctuations in the amount of water accumulated and in the hydrostatic water table can be anticipated depending upon variations in precipitation and surface runoff.

SECTION 08: ANALYSIS AND RECOMMENDATIONS

Culvert Foundation and Wingwalls Recommendations

As mentioned previously in the Section 01 of this report, the estimated invert elevations for the culvert ends based on the plan drawings provided by BLA are listed in Table 2.

Table 2- Estimated Invert Elevations for Proposed Culverts

Culvert Location	Corresponding Borings	Estimated Invert Elevations (feet)	
		Upstream End	Downstream End
Approximate Sta. 160+00 thru Sta. 173+00	CB-01 thru CB-13	690.0	680.7
Culvert SN 022-C005 at approximate Sta. 160+00 thru Sta. 173+00	CB-13 thru CB-18	680.4	677.5

Based on the results of the borings, it is our opinion that either precast or cast-in-place culverts can be used. The results of the borings indicate that majority of the subgrade consists of very stiff to hard clay soils and should be capable of providing support for the proposed culverts. The design team should be aware that soils exceeding 4.5 tons per square foot (tsf) were encountered in some of the soil borings completed for this project. These soil strengths exceed the values in the IDOT Temporary Sheet Pile Design Charts. If a temporary retention system is needed to facilitate construction based on depth or staging requirements, a Temporary Soil Retention System designed by the contractor may be required. We recommend that if such a system is needed, D1 Soils should be contacted to discuss the soils present in the specific area where the system will be needed in an effort to determine if temporary sheet piles are an option. However, portions of the soils within the culvert alignment have high moisture, medium stiff clay soils, and undercuts in this area should be expected prior to new culvert placement as summarized in Table 3 below. The undercuts presented in Table 3 below are also valid for the wingwalls.

Table 3- Remedial Treatment Recommendations

Location (Station Limits)	Boring	Boring Elevation (feet)	Estimated Bearing Elevation (feet)	Subgrade Condition	Remedial Treatment Approx. Depth (ft) ¹	Recommended Remedial Treatment
Sta.164+00 thru Sta.165+00	CB-05	692.7	685.2	Wet Sand and Gravel (mc=13% to 28%)	1.0	Dewater, undercut to 684, place non-woven filter fabric, and then replace with approved structural fill or bedding stone.

Note: 1. Undercuts should extend 2 feet beyond the outside edges of the culvert. Verify undercuts in field.

Based on the anticipated IL Route 56 fill heights above the proposed culvert, proposed culvert heights and the length of the proposed culverts, the horizontal cantilever wingwalls are feasible for design. However, if the wingwalls are going to be longer than 14 feet, vertical cantilever wingwalls such as L-type, T-type, and soldier pile wingwalls may be feasible for the wingwall structure design. Tabulated soil parameters for the soldier pile wingwall design are shown in Table 4 of this report. Any wingwall design other than horizontal or vertical cantilever walls need to have a Geotechnical Design Memorandum in the Design Phase per Table 7.4.1-1 from IDOT Geotechnical Manual Chapter 7.

The proposed culverts and the associated wingwalls can be designed using a factored soil bearing resistance of 3,000 pounds per square foot (psf). The factored soil bearing resistance is based on the data provided in the boring logs and also based from the culvert dimensions and invert elevations shown in the plans provided by BLA.

If any unsuitable soils are present, the soils should be undercut to the depth encountered. The overexcavated areas should be backfilled to design grade with Rockfill capped with CA-7 gradation crushed aggregate to backfill any undercuts as specified in the IDOT Culvert Manual. At areas where sandy soils are present, we recommend that a non-woven, geotechnical fabric be placed at the bottom of the undercut and the sidewalls to prevent migration of the native sand and gravel soils into the backfill material. The geotechnical fabric should meet the requirements of Article 210, Fabric for Ground Stabilization, of the SSRBC. During excavation, any unsuitable or organic material should be removed and be replaced with suitable fill material. This should be verified in the field by the geotechnical engineer.

The topsoil which is removed should be stockpiled and sorted on site for future use in proposed landscaping improvements. For estimating purposes, a topsoil removal depth of 6 inches can be assumed. However, the actual removal depth and quantity of topsoil removed should be verified in the field by a geotechnical engineer or soils inspector.

Due to a relatively high groundwater table (approximately 5 feet below existing grade),

and saturated sand and gravel soil conditions at boring CB-05 area, it is possible that a “quick or semi-quick condition” may occur at the base of the excavation following the release in confining overburden pressure and from construction activity. If such soil condition is encountered, the excavation should be thoroughly dewatered and any soils loosened as a result of this “quick or semi-quick condition” should be removed and replaced with approved structural fill or bedding stone.

Any undercutting should be performed in such a manner as to minimize disturbance to the undercut subgrade. Heavy equipment traffic directly on the subgrade should be minimized. The actual extent of any undercut should be determined in the field at the time of construction by the geotechnical engineer.

Structural fill placed below the invert should consist of a compacted, well-graded Rockfill capped with CA-7 gradation crushed aggregate. The fill should be placed and compacted in lifts not exceeding 8 inches in loose thickness. The fill materials should be placed during weather conditions and at moisture contents that permit the recommended degree of compaction to be obtained.

Total settlement of footings situated on approved natural soils or properly compacted structural fill is estimated to be 1/2 inch or less. To provide adequate frost protection, we recommend that footing foundations be situated at a minimum depth of 4 feet below final grade. For the evaluation of the resistance to sliding, per NAVFAQ Design Manual 7.02, we recommend using a friction factor (ultimate condition) of 0.60 for cast-in-place concrete on granular base. For LFRD based design for sliding, a resistance factor of 0.80 should be used for design.

The following Table 4 contains our recommended lateral soil parameters to be used for design.

Table 4 – Lateral Soil Properties

Material (elevation, feet)	Unit Weight (pcf)	Drained Friction Angle (°)	Undrained Cohesion (psf)	Lateral Modulus of Subgrade Reaction (pci)	Strain
Clay/ Clay Loam Fill (top to 688)	125	28	1,500	500	0.006
Stiff to Hard Clay/ Clay Loam (688 to 675)	125	30	2,500	800	0.005
Medium Dense to Very Dense Loam, Silt and Sand (675 to 655)	125	30	-	150	-
Medium Dense to Very Dense Sand, Gravel, and Fractured Rock (655 to 642)	125	32	-	250	-

Notes: 1. Values recommended for use in design from L-pile Software Manual

For the design of yielding walls, it is recommended that a lateral active earth pressure of 40 psf per foot of depth be used above the water table assuming a free-draining granular backfill is utilized. For cohesive soils, a lateral active earth pressure of 55 psf per foot should be used. For non-yielding walls with granular backfill, a lateral at-rest pressure of 50 psf per foot should be used, assuming proper drainage. For cohesive soils, a lateral at-rest pressure of 65 psf per foot should be used. Allowances should be made for any surcharge loads adjacent to the retaining structure. Drainage should be provided behind the wall or the wall designed for the full hydrostatic head.

SECTION 09: 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 soils 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.

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- APPENDIX B: Soil Boring Plan*
- APPENDIX C: Soil Boring Logs*
- APPENDIX D: Lab Data*

APPENDIX A
GENERAL NOTES

GENERAL NOTES

CLASSIFICATION

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

Cohesionless Soils

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

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.

Cohesive Soils

<u>Consistency</u>	<u>Unconfined Compressive Strength - qu (tsf)</u>
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

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: Carboly 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

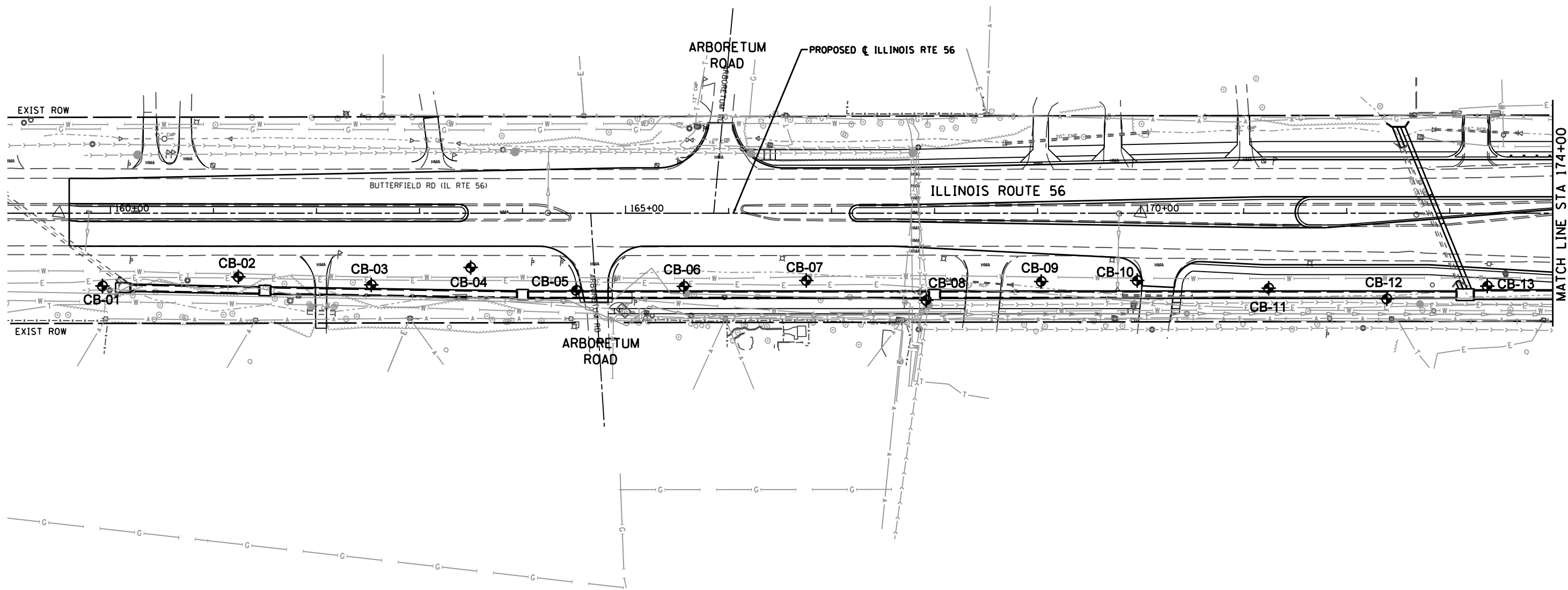
Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days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

APPENDIX B
SOIL BORING PLAN



PLAN	SURVEYED	DATE
	PLOTTED	
	GRADES CHECKED	
	STRUCTURE NOTATIONS CHECKED	
NOTE BOOK NO.	FILE NAME	

PROFILE	SURVEYED	DATE
	PLOTTED	
	GRADES CHECKED	
	STRUCTURE NOTATIONS CHECKED	
NOTE BOOK NO.	FILE NAME	



B Bollinger, Lach & Associates, Inc.
ITASCA, ILLINOIS

Geo Services, Inc.
Geotechnical, Environmental & Civil Engineering
805 Amherst Court, Suite 204
Naperville, Illinois 60565
630-351-2938

DESIGNED - RWC
DRAWN - RWC
CHECKED - AJP
DATE - 12/13/2013

REVISED -
REVISED -
REVISED -
REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

IL ROUTE 56 AT IL ROUTE 53
CULVERT SN 022-C005
SOIL BORING PLAN

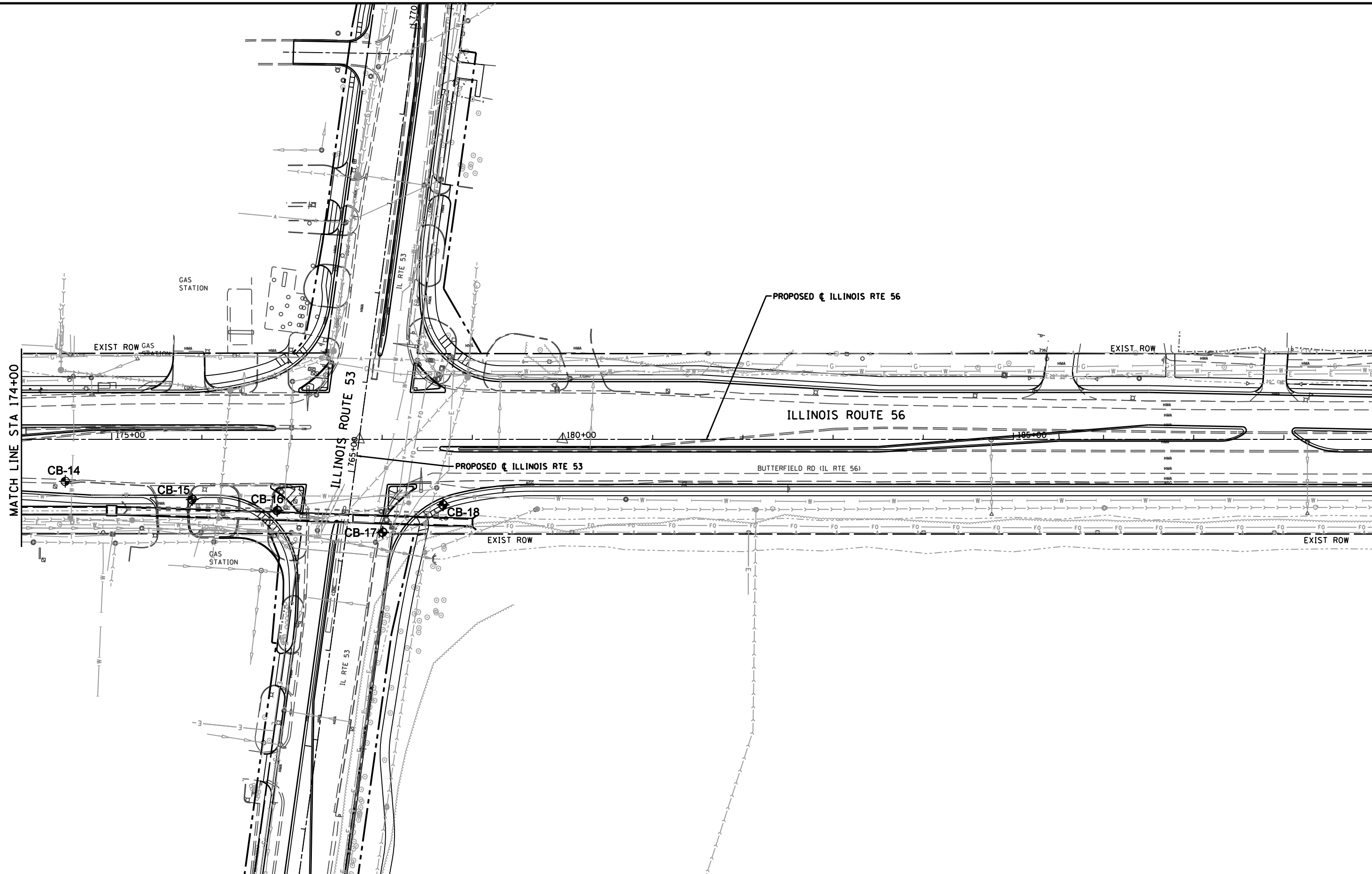
SCALE: 1"=50' SHEET NO. 1 OF 2 SHEETS STA. 159+00 TO STA. 174+00

F.A.U. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
365	634X-N-3	DUPAGE	2	1
CONTRACT NO. 60P75			ILLINOIS FED. AID PROJECT	



PLAN	SURVEYED	DATE
	PLOTTED	
	CHECKED	
	BY	
	FILE NAME	

PROFILE	SURVEYED	DATE
	PLOTTED	
	CHECKED	
	BY	
	NOTATIONS	



Bollinger, Lach & Associates, Inc.
 ITASCA, ILLINOIS

Geo Services, Inc.
 Geotechnical, Environmental, Civil Engineering
 805 Amherst Court, Suite 204
 Naperville, Illinois 60565
 (630) 951-2938

DESIGNED - RWC	REVISED -
DRAWN - RWC	REVISED -
CHECKED - AJP	REVISED -
DATE - 12/13/2013	REVISED -

**STATE OF ILLINOIS
 DEPARTMENT OF TRANSPORTATION**

**IL ROUTE 56 AT IL ROUTE 53
 CULVERT SN 022-C005
 SOIL BORING PLAN**

SCALE: 1"=50' SHEET NO. 2 OF 2 SHEETS STA. 174+00 TO STA. 189+00

F.A.U. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
365	634X-N-3	DUPAGE	2	2
CONTRACT NO. 60P75				
ILLINOIS FED. AID PROJECT				

APPENDIX C
SOIL BORING LOGS

SOIL BORING LOG

ROUTE F.A.P. RTE. 365 DESCRIPTION IL Route 56 at IL Route 53 Culverts, IDOT Project No. D-91-612-11, Contract No. 60P75 LOGGED BY NW

SECTION 634X-N-3 LOCATION SE 1/4, SEC. 26, TWP. T39N, RNG. R10E, 3rd PM

COUNTY DuPage DRILLING METHOD Hollow Stem Auger HAMMER TYPE Diedrich Automatic

STRUCT. NO. Station	DEPTH H (ft)	BLOW S (/6")	UCS Qu (tsf)	MOIST T (%)	Surface Water Elev. Stream Bed Elev.	DEPTH H (ft)	BLOW S (/6")	UCS Qu (tsf)	MOIST T (%)
BORING NO. <u>CB-01</u> Station <u>159+92</u> Offset <u>70.60ft Right</u> Ground Surface Elev. <u>697.20</u> ft					<u>n/a</u> ft <u>n/a</u> ft				
					Groundwater Elev.:				
					First Encounter <u>679.2</u> ft ▼				
					Upon Completion <u>689.2</u> ft ▼				
					After _____ Hrs. _____ ft				
4.0" TOPSOIL-black <u>696.87</u>					CLAY LOAM-gray-medium stiff <u>676.70</u> <i>(continued)</i>				
CLAY LOAM-brown & gray-medium stiff to very stiff (Fill)		3		13	SANDY CLAY LOAM with GRAVEL-brown-medium dense		8		15
		3	2.3	23			14		
		3	B				14		
					<u>674.20</u>				
		1			SILTY CLAY LOAM-gray-medium dense		11		12
		1	0.9	22			6		
	-5	1	B			-25	7		
					<u>671.70</u>				
		1			SAND & GRAVEL-gray-very dense		36		5
		1	0.5	25			34		
		2	B				33		
					<u>669.20</u>				
CLAY LOAM-gray-very stiff <u>689.20</u> ▼		3			SILTY CLAY LOAM-gray-medium dense		21		16
		6	2.2	13			18		
	-10	8	B			-30	11		
					<u>666.70</u>				
		3			SAND & GRAVEL-brown-very dense		27		9
		5	2.4	13			29		
		6	B				34		
					<u>664.20</u>				
SILTY LOAM-gray-very stiff <u>683.70</u>		3			COBBLES & GRAVEL-gray-very dense		50/2"		6
		4	2.3	15					
		7	B						
	-15				<u>661.70</u>				
SANDY CLAY LOAM-gray-medium dense		3			SILTY LOAM-gray-very dense		17		13
		7		9			50/3"		
		11							
					<u>659.20</u>				
CLAY LOAM-gray-medium stiff <u>679.20</u> ▼		4			SANDY LOAM-gray-medium dense		7		21
		7	0.9	15	End Of Boring @ -40.0'. Boring backfilled with cuttings.		9		
		11	B				8		
	-20				<u>657.20</u>	-40			

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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)

SOIL BORING LOG

ROUTE F.A.P. RTE. 365 DESCRIPTION IL Route 56 at IL Route 53 Culverts, IDOT Project No. D-91-612-11, Contract No. 60P75 LOGGED BY NW

SECTION 634X-N-3 LOCATION SE 1/4, SEC. 26, TWP. T39N, RNG. R10E, 3rd PM

COUNTY DuPage DRILLING METHOD Hollow Stem Auger HAMMER TYPE Diedrich Automatic

STRUCT. NO. Station	DEPTH H (ft)	BLOW S (/6")	UCS Qu (tsf)	MOIST T (%)	Surface Water Elev. Stream Bed Elev.	Groundwater Elev.: First Encounter Upon Completion After Hrs.	DEPTH H (ft)	BLOW S (/6")	UCS Qu (tsf)	MOIST T (%)
6.0" TOPSOIL-black CLAY LOAM-brown-very stiff	698.50			20	SAND & GRAVEL-brown-dense (continued)	n/a ft n/a ft				
	3				CLAY LOAM-gray-stiff to very stiff		7			
	4	2.7		21			7	1.4		12
	5	B					8	B		
	2						4			
	3	2.8		16			6	2.7		12
	-5	5	B				9	B		
						673.50				
	3				SAND & GRAVEL-brown & gray-medium dense to very dense		50/2"			
	4	3.2		16						NR
	6	B								
	4						9			
	5			16			11			12
	-10	6					27			
	3						17			
	4	2.4		16			12			13
	5	B					14			
						666.00				
	3				SANDY LOAM-gray-medium dense		6			
	5			17			10			19
	-15	9					13			
						663.50				
	12				SILTY LOAM-gray-medium dense		5			
	14			17			8			19
	36						9			
						661.00				
SAND & GRAVEL-brown-dense	681.00				SAND-gray-medium dense		6			
	12						10			18
	15			9	End Of Boring @ -40.0'. Boring backfilled with cuttings.		13			
	-20	16				659.00	-40			

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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)

SOIL BORING LOG

ROUTE F.A.P. RTE. 365 DESCRIPTION IL Route 56 at IL Route 53 Culverts, IDOT Project No. D-91-612-11, Contract No. 60P75 LOGGED BY NW

SECTION 634X-N-3 LOCATION SE 1/4, SEC. 26, TWP. T39N, RNG. R10E, 3rd PM

COUNTY DuPage DRILLING METHOD Hollow Stem Auger HAMMER TYPE Diedrich Automatic

STRUCT. NO. Station	DEPTH H (ft)	BLOW S (/6")	UCS Qu (tsf)	MOIST T (%)	Surface Water Elev. Stream Bed Elev.	DEPTH H (ft)	BLOW S (/6")	UCS Qu (tsf)	MOIST T (%)
					n/a ft n/a ft				
BORING NO. CB-03 Station 162+53 Offset 69.50ft Right Ground Surface Elev. 693.50 ft					Groundwater Elev.:				
					First Encounter 687.5 ft ▼				
					Upon Completion 688.5 ft ▼				
					After Hrs. ft				
4.0" TOPSOIL-dark brown to black	693.17				673.00				
CLAY LOAM-dark brown & spotted black-stiff to very stiff (Fill)		3		24			5		
		7	2.5	21			11		11
		26	P				24		
					670.50				
		1					8		
		1	1.0	38			11	2.2	18
		3	P				15	B	
	688.00				668.00				
CLAY LOAM-brown-stiff to very stiff		4					5		
		6	1.5	17			12		20
		8	B				18		
					665.50				
		4					24		
		9	1.9	16			31		7
		12	B				43		
	-10								
		8			662.50				
		12	2.9	14			50/1"		
		14	B						10
Auger Refusal @ -31.0'. End Of Boring. Boring backfilled with cuttings.									
		3							
becoming gray @ -13.0'		4	1.1	14					
		6	B						
	-15								
		5							
		7	2.1	11					
		7	B						
		3							
		5	1.4	16					
	-20	13	B						

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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)

SOIL BORING LOG

ROUTE F.A.P. RTE. 365 DESCRIPTION IL Route 56 at IL Route 53 Culverts, IDOT Project No. D-91-612-11, Contract No. 60P75 LOGGED BY NW

SECTION 634X-N-3 LOCATION SE 1/4, SEC. 26, TWP. T39N, RNG. R10E, 3rd PM

COUNTY DuPage DRILLING METHOD Hollow Stem Auger HAMMER TYPE Diedrich Automatic

STRUCT. NO. Station	DEPTH H (ft)	BLOW S (/6")	UCS Qu (tsf)	MOIST T (%)	Surface Water Elev. Stream Bed Elev.	DEPTH H (ft)	BLOW S (/6")	UCS Qu (tsf)	MOIST T (%)
					n/a ft				
					n/a ft				
BORING NO. <u>CB-04</u> Station <u>163+50</u> Offset <u>52.60ft Right</u> Ground Surface Elev. <u>694.90</u> ft					Groundwater Elev.:				
					First Encounter <u>682.4</u> ft ▼				
					Upon Completion <u>664.9</u> ft ▼				
					After _____ Hrs. _____ ft				
6.0" TOPSOIL-black 694.40					CLAY LOAM-brown-stiff to very stiff (continued)				
SILTY CLAY-dark brown to black-stiff to very stiff		5		29			3		
		5	1.5	24			6	1.8	14
		5	P				11	B	
					671.90				
becoming brown & gray @ -3.0'		3			SAND & GRAVEL-gray-medium dense		3		
		4	2.1	24			10		11
	-5	6	B				15		
					669.40				
		2			SILT-gray-medium dense		4		
		4	2.2	27			7		21
		4	B				19		
					666.90				
		2			GRAVEL-gray-dense		3		
		2	1.0	26			18		16
	-10	3	B				13		
					684.40				
CLAY LOAM-brown-stiff to very stiff							18		
		ST	3.5	18			20		4
			P				16		
		3			661.90				
		6	3.5	17	CLAY LOAM-gray-stiff to very stiff		9		
	-15	8	B				9	1.1	11
							10	B	
becoming gray @ -15.5'		3					7		
		12	3.5	14			11	2.1	12
		13	P				17	B	
		3					12		
		5	3.5	15	End Of Boring @ -40.0'. Boring backfilled with cuttings.		13	2.5	12
	-20	7	P				17	B	
					654.90	-40			

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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)

SOIL BORING LOG

ROUTE F.A.P. RTE. 365 DESCRIPTION IL Route 56 at IL Route 53 Culverts, IDOT Project No. D-91-612-11, Contract No. 60P75 LOGGED BY NW

SECTION 634X-N-3 LOCATION SE 1/4, SEC. 26, TWP. T39N, RNG. R10E, 3rd PM

COUNTY DuPage DRILLING METHOD Hollow Stem Auger HAMMER TYPE Diedrich Automatic

STRUCT. NO. Station	DEPTH H (ft)	BLOW S (/6")	UCS Qu (tsf)	MOIST T (%)	Surface Water Elev. Stream Bed Elev.	DEPTH H (ft)	BLOW S (/6")	UCS Qu (tsf)	MOIST T (%)
					n/a ft				
					n/a ft				
BORING NO. <u>CB-05</u> Station <u>164+52</u> Offset <u>74.80ft Right</u> Ground Surface Elev. <u>692.70</u> ft					Groundwater Elev.:				
					First Encounter <u>687.2</u> ft ▼				
					Upon Completion <u>671.7</u> ft ▼				
					After _____ Hrs. _____ ft				
6.0" SANDY TOPSOIL-black 692.20					CLAY LOAM-brown & gray-medium stiff to stiff (continued)				
SANDY CLAY LOAM with GRAVEL-brown-loose				19			3		
	2			20			4	0.8	15
	4	1.8					5	B	
	3	P							
	2						4		
	3			16			6	0.7	12
	4						7	B	
	-5					-25			
687.20 ▼									
SAND & GRAVEL-brown-medium dense							2		
	2						2	1.0	25
	3			13			3	P	
	5								
	5			15			3		
	5						5		25
	-10					-30	6		
682.20									
SILTY SAND with GRAVEL-brown-loose							13		
	2			28			13		15
	2						14		
	3								
679.70									
CLAY LOAM-brown & gray-medium stiff to stiff							12		
	5			18			15		7
	5	1.4					16		
	-15	B				-35			
becoming gray @ -15.5'							5		
	3						18		10
	4	0.7					24		
	6	B							
	4						16		
	5	1.3		16			16		12
	9	B					19		
	-20					-40			
					End Of Boring @ -40.0'. Boring backfilled with cuttings.				
						652.70			

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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)

SOIL BORING LOG

ROUTE F.A.P. RTE. 365 DESCRIPTION IL Route 56 at IL Route 53 Culverts, IDOT Project No. D-91-612-11, Contract No. 60P75 LOGGED BY NW

SECTION 634X-N-3 LOCATION SE 1/4, SEC. 26, TWP. T39N, RNG. R10E, 3rd PM

COUNTY DuPage DRILLING METHOD Hollow Stem Auger HAMMER TYPE Diedrich Automatic

STRUCT. NO. Station	DEPTH H (ft)	BLOW S (/6")	UCS Qu (tsf)	MOIST T (%)	Surface Water Elev. Stream Bed Elev.	DEPTH H (ft)	BLOW S (/6")	UCS Qu (tsf)	MOIST T (%)
BORING NO. CB-06 Station 165+57 Offset 71.00ft Right Ground Surface Elev. 693.80 ft					n/a ft n/a ft				
6.0" TOPSOIL-black	693.30				673.30				
CLAY LOAM-brown-hard (Possible Fill)				26	SANDY CLAY LOAM-brown-medium dense		2		
		9					5		19
		6	4.5	20			6		
		8	P						
		6					3		
		10	4.5	13			4		19
	-5	12	P				6		
					668.30				
		5			CLAY LOAM-gray-very stiff		4		
		20	4.5	14			8	2.8	18
		26	P				9	B	
					665.80				
GRAVEL-brown-medium dense to dense	685.80				SAND-brown-loose to medium dense		3		
		21					4		22
		29		5			5		
	-10	17							
							4		
		5					4		24
		7		6			15		
		6			660.80				
					GRAVEL-gray-medium dense		7		
		4					7		6
		5		8			4		
	-15	5							
					658.30				
SAND & GRAVEL-brown-very loose to loose	678.30				SAND-gray-very dense		50/5"		
		2		12					19
		2							
		2			656.30				
					Auger Refusal @ -37.5'. End Of Boring. Boring backfilled with cuttings.				
		2							
		3		15					
		5							
	-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)

SOIL BORING LOG

ROUTE F.A.P. RTE. 365 DESCRIPTION IL Route 56 at IL Route 53 Culverts, IDOT Project No. D-91-612-11, Contract No. 60P75 LOGGED BY NW

SECTION 634X-N-3 LOCATION SE 1/4, SEC. 26, TWP. T39N, RNG. R10E, 3rd PM

COUNTY DuPage DRILLING METHOD Hollow Stem Auger HAMMER TYPE Diedrich Automatic

STRUCT. NO. Station	DEPTH H (ft)	BLOW S (/6")	UCS Qu (tsf)	MOIST S (%)	Surface Water Elev. Stream Bed Elev.	DEPTH H (ft)	BLOW S (/6")	UCS Qu (tsf)	MOIST S (%)
					n/a ft				
					n/a ft				
BORING NO. CB-07 Station 166+76 Offset 65.20ft Right Ground Surface Elev. 691.40 ft					Groundwater Elev.:				
					First Encounter 667.4 ft ▼				
					Upon Completion 667.4 ft ▽				
					After Hrs. ft				
6.0" TOPSOIL-black 690.90					670.90				
CLAY LOAM-dark brown-medium dense (Fill)		3		28	CLAY LOAM-brown-stiff		4		
		6		14			5	1.5	15
		7					5	B	
688.40					668.40				
CLAY LOAM-brown-hard		4			SAND-brown-loose	▼	4		
		7	4.5	17			4		18
	-5	10	p				4		
		6							
		6	5.9	19			2		
		7	B				3		23
		4					5		
		6	4.3	15			3		
	-10	8	B				3		18
					660.90				
		3			SAND & GRAVEL-gray-medium dense		6		
		8	3.4	15			9		9
		8	B				8		
678.40					658.40				
SAND & GRAVEL-brown-medium dense		9			SAND-gray-medium dense		7		
		7		8			10		21
	-15	7					13		
		6					6		
		6		10			5		19
		7					6		
					653.40				
		6			CLAY LOAM-gray-very dense		6		
		9		4	End Of Boring @ -40.0'. Boring backfilled with cuttings.		10	2.2	17
	-20	9					12	B	
					651.40	-40			

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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)

SOIL BORING LOG

ROUTE F.A.P. RTE. 365 DESCRIPTION IL Route 56 at IL Route 53 Culverts, IDOT Project No. D-91-612-11, Contract No. 60P75 LOGGED BY NW

SECTION 634X-N-3 LOCATION SE 1/4, SEC. 26, TWP. T39N, RNG. R10E, 3rd PM

COUNTY DuPage DRILLING METHOD Hollow Stem Auger HAMMER TYPE Diedrich Automatic

STRUCT. NO. Station	DEPTH H (ft)	BLOW S (/6")	UCS Qu (tsf)	MOIST T (%)	Surface Water Elev. Stream Bed Elev.	DEPTH H (ft)	BLOW S (/6")	UCS Qu (tsf)	MOIST T (%)
BORING NO. <u>CB-08</u> Station <u>167+92</u> Offset <u>84.40ft Right</u> Ground Surface Elev. <u>697.60</u> ft					n/a ft n/a ft				
					Groundwater Elev.:				
					First Encounter <u>679.6</u> ft ▼				
					Upon Completion <u>674.6</u> ft ▼				
					After _____ Hrs. _____ ft				
12.0" TOPSOIL-black 696.60				27	SAND & GRAVEL-brown-loose to medium dense (continued)		6		
CLAY LOAM-dark brown & spotted black-hard (Fill)		7					7		13
		10	4.5	15			8		
		10	P						
						▽			
		5					5		
		8	4.5	17			5		18
	-5	9	P				6		
		6					5		
		6	4.5	16			6		12
		8	P				6		
689.60					669.60				
CLAY LOAM-brown-hard		5			SAND with GRAVEL-brown-medium dense		3		
		6	6.7	15			5		22
	-10	7	B				7		
		4					2		
		5	4.5	15			4		21
		6	P				7		
684.60					becoming gray @ -33.0'				
SAND & GRAVEL-brown-loose to medium dense		4					3		
		4		7			5		15
	-15	6					6		
		14					10		
		5		NR			6		19
		4					10		
	▼				659.60				
		2			SAND & GRAVEL-gray-medium dense		9		
		3		13	End Of Boring @ -40.0'. Boring backfilled with cuttings.		7		12
		5			657.60		8		
	-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)

SOIL BORING LOG

ROUTE F.A.P. RTE. 365 DESCRIPTION IL Route 56 at IL Route 53 Culverts, IDOT Project No. D-91-612-11, Contract No. 60P75 LOGGED BY NW

SECTION 634X-N-3 LOCATION SE 1/4, SEC. 26, TWP. T39N, RNG. R10E, 3rd PM

COUNTY DuPage DRILLING METHOD Hollow Stem Auger HAMMER TYPE Diedrich Automatic

STRUCT. NO. Station	DEPTH H (ft)	BLOW S (/6")	UCS Qu (tsf)	MOIST T (%)	Surface Water Elev. Stream Bed Elev.	DEPTH H (ft)	BLOW S (/6")	UCS Qu (tsf)	MOIST T (%)
BORING NO. CB-09 Station 169+03 Offset 66.20ft Right Ground Surface Elev. 685.70 ft					n/a ft n/a ft				
6.0" SANDY TOPSOIL-black	685.20				SAND with GRAVEL-brown-medium dense to dense (continued)				
SAND & GRAVEL-brown-medium dense		3		18			8		15
		5		10		6			
		5				5			
	682.70								
CLAY LOAM-brown-stiff to very stiff		3				10			
		4	1.9	18		11			16
		-5	B			8			
					660.20				
		4			SAND & GRAVEL-brown & gray-medium dense		8		
		4	2.0	17			13		11
		6	B			10			
					657.70				
becoming gray @ -8.0'		2			SAND with GRAVEL-gray-medium dense to dense		15		
		4	1.8	14			10		13
		-10	B			8			
	675.20								
SAND & GRAVEL-brown-medium dense		3					15		
		11		11			26		13
		12					18		
								9	
		10					25		7
		9		9			31		
		-15							
					650.20				
		4			SAND & GRAVEL-gray-dense		20		
		8		15			26		9
		9				14			
	667.70								
SAND with GRAVEL-brown-medium dense to dense		11					13		
		18		22	End Of Boring @ -40.0'. Boring backfilled with cuttings.		27		9
		21					30		
		-20				645.70	-40		

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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)

SOIL BORING LOG

ROUTE F.A.P. RTE. 365 DESCRIPTION IL Route 56 at IL Route 53 Culverts, IDOT Project No. D-91-612-11, Contract No. 60P75 LOGGED BY NW

SECTION 634X-N-3 LOCATION SE 1/4, SEC. 26, TWP. T39N, RNG. R10E, 3rd PM

COUNTY DuPage DRILLING METHOD Hollow Stem Auger HAMMER TYPE Diedrich Automatic

STRUCT. NO. Station	DEPTH H (ft)	BLOW S (/6")	UCS Qu (tsf)	MOIST T (%)	Surface Water Elev. Stream Bed Elev.	DEPTH H (ft)	BLOW S (/6")	UCS Qu (tsf)	MOIST T (%)
BORING NO. CB-10 Station 169+97 Offset 65.20ft Right Ground Surface Elev. 687.80 ft					n/a ft n/a ft				
6.0" TOPSOIL-black CLAY LOAM-brown-very stiff to hard	687.30			19					
		7					2		
		8	4.5	15			3		17
		9	P				5		
					664.80				
		2			SAND & GRAVEL-brown-medium dense		4		
		5	5.4	18			10		17
	-5	7	B			-25	7		
		3					4		
		4	3.3	16			5		12
		7	B				12		
SAND & GRAVEL-brown-medium dense	679.80								
		6		9			8		
	-10	5				-30	12		13
		4					7		
		5		11			5		16
		6					6		
		4			becoming gray @ -33.0'		13		
		5		11			14		6
	-15	7				-35	13		
		5					10		
		4		10			12		20
		6					11		
SILTY SAND & GRAVEL-brown-loose	669.80 ▼								
		2					12		
		3		13	End Of Boring @ -40.0'. Boring backfilled with cuttings.		14		7
	-20	4				-40	17		

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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)

SOIL BORING LOG

ROUTE F.A.P. RTE. 365 DESCRIPTION IL Route 56 at IL Route 53 Culverts, IDOT Project No. D-91-612-11, Contract No. 60P75 LOGGED BY NW

SECTION 634X-N-3 LOCATION SE 1/4, SEC. 26, TWP. T39N, RNG. R10E, 3rd PM

COUNTY DuPage DRILLING METHOD Hollow Stem Auger HAMMER TYPE Diedrich Automatic

STRUCT. NO. Station	DEPTH H	BLOW S	UCS Qu	MOIST T	Surface Water Elev. Stream Bed Elev.	DEPTH H	BLOW S	UCS Qu	MOIST T
	(ft)	(/6")	(tsf)	(%)	n/a ft n/a ft	(ft)	(/6")	(tsf)	(%)
6.0" TOPSOIL-black CLAY LOAM-brown-very stiff to hard 685.10				25	SAND & GRAVEL-brown-loose to medium dense (continued)		3		
	5					4		15	
	7	6.8				4			
	7	S							
	3					3			
	7	4.5		17		4		15	
	-5	7	P			-25	5		
	11					10			
	50/4"	3.5		17		6		18	
		P				5			
SAND & GRAVEL-brown-loose to medium dense 677.60					CLAY LOAM-gray-stiff 657.60		2		
	6					9	1.5	14	
	10			7		-30	13	P	
	-10	11				655.10			
	8				SAND & GRAVEL-gray-medium dense to dense		7		
	5			16		7		13	
	4					14			
	2					19			
	3			14		16		9	
	-15	4				-35	12		
	2					8			
	3			15		12		8	
	3					13			
	3					9			
	3			9	End Of Boring @ -40.0'. Boring backfilled with cuttings.	16		6	
	-20	3				-40	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)

SOIL BORING LOG

ROUTE F.A.P. RTE. 365 DESCRIPTION IL Route 56 at IL Route 53 Culverts, IDOT Project No. D-91-612-11, Contract No. 60P75 LOGGED BY NW

SECTION 634X-N-3 LOCATION SE 1/4, SEC. 26, TWP. T39N, RNG. R10E, 3rd PM

COUNTY DuPage DRILLING METHOD Hollow Stem Auger HAMMER TYPE Diedrich Automatic

STRUCT. NO. Station	DEPTH H (ft)	BLOW S (/6")	UCS Qu (tsf)	MOIST S (%)	Surface Water Elev. Stream Bed Elev.	DEPTH H (ft)	BLOW S (/6")	UCS Qu (tsf)	MOIST S (%)
BORING NO. CB-12 Station 172+39 Offset 83.00ft Right Ground Surface Elev. 682.90 ft					n/a ft n/a ft				
6.0" TOPSOIL-dark brown to black CLAY LOAM-brown-very stiff (Fill)	682.40			19	SAND-brown-medium dense (continued)	662.40			
		6			SAND & GRAVEL-gray-medium dense to dense		13		
		7	3.3	14			13		9
		9	P				28		
679.90									
CLAY-brown-very stiff		2					19		
		4	2.1	19			12		13
		-5	5	B			10		
677.40									
SAND & GRAVEL-brown-loose to medium dense		2					11		
		5		24			18		9
		5					18		
		2					17		
		3		21			13		8
		-10	5				12		
		5					10		
		10		8			12		11
		12					14		
		4					11		
		5		9			13		9
		-15	5				19		
667.40									
SILTY SAND & GRAVEL-brown-loose		5			SILT-gray-medium dense to dense	647.40			
		4		15			45		18
		4					18		
664.90									
SAND-brown-medium dense		3					10		
		3		32	End Of Boring @ -40.0'. Boring backfilled with cuttings.		10		18
		-20	10				12		
						642.90	-40		

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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)

SOIL BORING LOG

ROUTE F.A.P. RTE. 365 DESCRIPTION IL Route 56 at IL Route 53 Culverts, IDOT Project No. D-91-612-11, Contract No. 60P75 LOGGED BY NW

SECTION 634X-N-3 LOCATION SE 1/4, SEC. 26, TWP. T39N, RNG. R10E, 3rd PM

COUNTY DuPage DRILLING METHOD Hollow Stem Auger HAMMER TYPE Diedrich Automatic

STRUCT. NO. Station	BORING NO. Station Offset Ground Surface Elev.	DEPTH (ft)	BLOW S (/6")	UCS Qu (tsf)	MOIST T (%)	Surface Water Elev.	Stream Bed Elev.	DEPTH (ft)	BLOW S (/6")	UCS Qu (tsf)	MOIST T (%)
						n/a ft	n/a ft				
SN 022-C005, SN 022-C006 173+14.64 to Sta. 179+00, Sta. 175+00	CB-13 173+36 70.60ft Right 683.00 ft										
6.0" TOPSOIL-black	682.50					SAND with GRAVEL-brown-loose to medium dense (continued)					
CLAY LOAM-dark brown to black-stiff (Fill)			3		16			2			
			4	1.5	27			3			13
			4	P				5			
	680.00										
CLAY-brown-medium stiff to stiff			2					2			
			2	1.5	27			2			18
		-5	3	B				3			
			2					3			
			2	0.7	23			5			9
			2	B				9			
	675.00						655.00				
CLAY LOAM-brown & gray-very stiff to hard			3			SANDY LOAM-gray-medium dense		5			
			6	3.8	16			5			18
		-10	7	P				15			
							652.50				
becoming gray @ -10.5' LOAM-brown-hard	672.00		3			SAND & GRAVEL-gray-medium dense		5			
			9	4.5	11			21			11
			14	P				27			
	670.50						650.00				
CLAY LOAM-brown & gray-very stiff to hard			3			SANDY CLAY LOAM with GRAVEL-gray-medium dense to very dense		9			
			6	5.3	17			9			9
		-15	8	B				11			
	667.50										
SAND with GRAVEL-brown-loose to medium dense		▼	2					20			
			3		23			36			8
			6					42			
		▽									
			3					46			
			4		12	End Of Boring @ -40.0'. Boring backfilled with cuttings.		50/5"			7
		-20	6				643.00	-40			

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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)

SOIL BORING LOG

ROUTE F.A.P. RTE. 365 DESCRIPTION IL Route 56 at IL Route 53 Culverts, IDOT Project No. D-91-612-11, Contract No. 60P75 LOGGED BY NW

SECTION 634X-N-3 LOCATION SE 1/4, SEC. 26, TWP. T39N, RNG. R10E, 3rd PM

COUNTY DuPage DRILLING METHOD Hollow Stem Auger HAMMER TYPE Diedrich Automatic

STRUCT. NO. SN 022-C005
 Station Sta. 173+14.64 to Sta. 179+00

BORING NO. CB-14
 Station 174+49
 Offset 46.60ft Right
 Ground Surface Elev. 688.00 ft

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

Surface Water Elev. n/a ft
 Stream Bed Elev. n/a ft
 Groundwater Elev.:
 First Encounter 672.0 ft ▼
 Upon Completion 666.0 ft ▼
 After Hrs. ft

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

12.0" ASPHALT				SAND & GRAVEL-brown-medium dense (continued)			
687.00							
12.0" CRUSHED STONE	4				4		
686.00	4		19		5		17
CLAY LOAM-brown & gray-stiff to very stiff (Fill)	5				6		
	3				4		
	5	2.7	21		4		8
	8	B			6		
	-5				-25		
	4				4		
	5	2.0	19		5		8
	7	P			9		
	3				7		
	4	1.7	20		9		9
	5	B			10		
	-10				-30		
677.50					657.50		
CLAY to CLAY LOAM-brown-medium dense	3			SILTY SAND with GRAVEL-gray-medium dense			
	4		25		7		
	7				5		13
					6		
					655.00		
	5			CLAYEY SAND & GRAVEL-gray-medium dense		10	
	6		22			12	15
	7					13	
	-15					-35	
672.50					652.50		
SILTY SAND with GRAVEL-brown-medium dense	4			SAND & GRAVEL-gray-medium dense to dense		9	
	5		17			11	8
	7					12	
670.00							
SAND & GRAVEL-brown-medium dense	3					12	
	5		15			19	8
	6			End Of Boring @ -40.0'. Boring backfilled with cuttings.		33	
	-20				648.00	-40	

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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)

SOIL BORING LOG

ROUTE F.A.P. RTE. 365 DESCRIPTION IL Route 56 at IL Route 53 Culverts, IDOT Project No. D-91-612-11, Contract No. 60P75 LOGGED BY NW

SECTION 634X-N-3 LOCATION SE 1/4, SEC. 26, TWP. T39N, RNG. R10E, 3rd PM

COUNTY DuPage DRILLING METHOD Hollow Stem Auger HAMMER TYPE Diedrich Automatic

STRUCT. NO. SN 022-C005
 Station Sta. 173+14.64 to Sta. 179+00

BORING NO. CB-15
 Station 175+89
 Offset 66.60ft Right
 Ground Surface Elev. 686.90 ft

DEPTH H S	BLOW S Qu	UCS Qu	MOIST S T	Surface Water Elev. _____ n/a ft	DEPTH H S	BLOW S Qu	UCS Qu	MOIST S T
(ft)	(/6")	(tsf)	(%)	Stream Bed Elev. _____ n/a ft	(ft)	(/6")	(tsf)	(%)
6.0" TOPSOIL-black				686.40	666.40			
CLAY LOAM-dark brown-loose to medium dense (Fill)	6		17			2		
	8		16			2		10
	6					4		
				663.90				
	2					2		
	4		22			3		18
	-5	5				-25	3	
CLAY LOAM-brown & gray-stiff to very stiff				681.40				
	3					2		
	3	2.1	27			2		24
	5	B				2		
	2					6		
	3	2.0	25			5		23
	-10	4	B			-30	4	
	3					3		
	3	1.3	22			5		17
	3	P				6		
	2					6		
	5	3.3	19			7		15
	-15	7	B			-35	10	
	5					9		
	7	3.2	15			11		14
	8	B				11		
	3					6		
	6	2.0	19			5		9
	6	P				9		
	-20				646.90	-40		

becoming gray @ -38.0'

End Of Boring @ -40.0'. Boring backfilled with cuttings.

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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)

SOIL BORING LOG

ROUTE F.A.P. RTE. 365 DESCRIPTION IL Route 56 at IL Route 53 Culverts, IDOT Project No. D-91-612-11, Contract No. 60P75 LOGGED BY NW

SECTION 634X-N-3 LOCATION SE 1/4, SEC. 26, TWP. T39N, RNG. R10E, 3rd PM

COUNTY DuPage DRILLING METHOD Hollow Stem Auger HAMMER TYPE Diedrich Automatic

STRUCT. NO. SN 022-C005
 Station Sta. 173+14.64 to Sta. 179+00

BORING NO. CB-16
 Station 176+84
 Offset 78.80ft Right
 Ground Surface Elev. 685.70 ft

DEPTH (ft)	BLOW S (ft/6")	UCS (tsf)	MOIST (%)
------------	----------------	-----------	-----------

Surface Water Elev. n/a ft
 Stream Bed Elev. n/a ft
 Groundwater Elev.:
 First Encounter 671.7 ft ▼
 Upon Completion 668.7 ft ▽
 After Hrs. ft

DEPTH (ft)	BLOW S (ft/6")	UCS (tsf)	MOIST (%)
------------	----------------	-----------	-----------

6.0" TOPSOIL-black	685.20				SAND & GRAVEL-brown-loose to medium dense (continued)				
CLAY LOAM-dark brown-hard (Fill)		6		23			2		
		5	4.5	15			3		12
		5	P				4		
	682.70								
CLAY-brown-very stiff		2					5		
		3	3.0	24			6		16
		-5	5	P			7		
					becoming gray @ -25.5'				
		3					8		
		5	3.5	15			7		14
		7	P				8		
	677.70					657.70			
CLAYEY SAND & GRAVEL-brown-loose to medium dense		3				SILTY SAND & GRAVEL-gray-medium dense			
		4		19			14		
		-10	4				12		10
							13		
		6					7		
		7		16			10		12
		9					14		
		8					4		
		6		7			6		9
		-15	5				5		
	670.20					650.20			
SAND & GRAVEL-brown-loose to medium dense		2				SILTY LOAM-gray-dense			
		4		10			7		
		4					16		14
							18		
		2							
		4		15			22		
		5				End Of Boring @ -40.0'. Boring backfilled with cuttings.	26		14
	-20						30		
						645.70	-40		

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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)

SOIL BORING LOG

ROUTE F.A.P. RTE. 365 DESCRIPTION IL Route 56 at IL Route 53 Culverts, IDOT Project No. D-91-612-11, Contract No. 60P75 LOGGED BY NW

SECTION 634X-N-3 LOCATION SE 1/4, SEC. 26, TWP. T39N, RNG. R10E, 3rd PM

COUNTY DuPage DRILLING METHOD Hollow Stem Auger HAMMER TYPE Diedrich Automatic

STRUCT. NO. SN 022-C005
 Station Sta. 173+14.64 to Sta. 179+00

BORING NO. CB-18
 Station 178+68
 Offset 72.70ft Right
 Ground Surface Elev. 682.70 ft

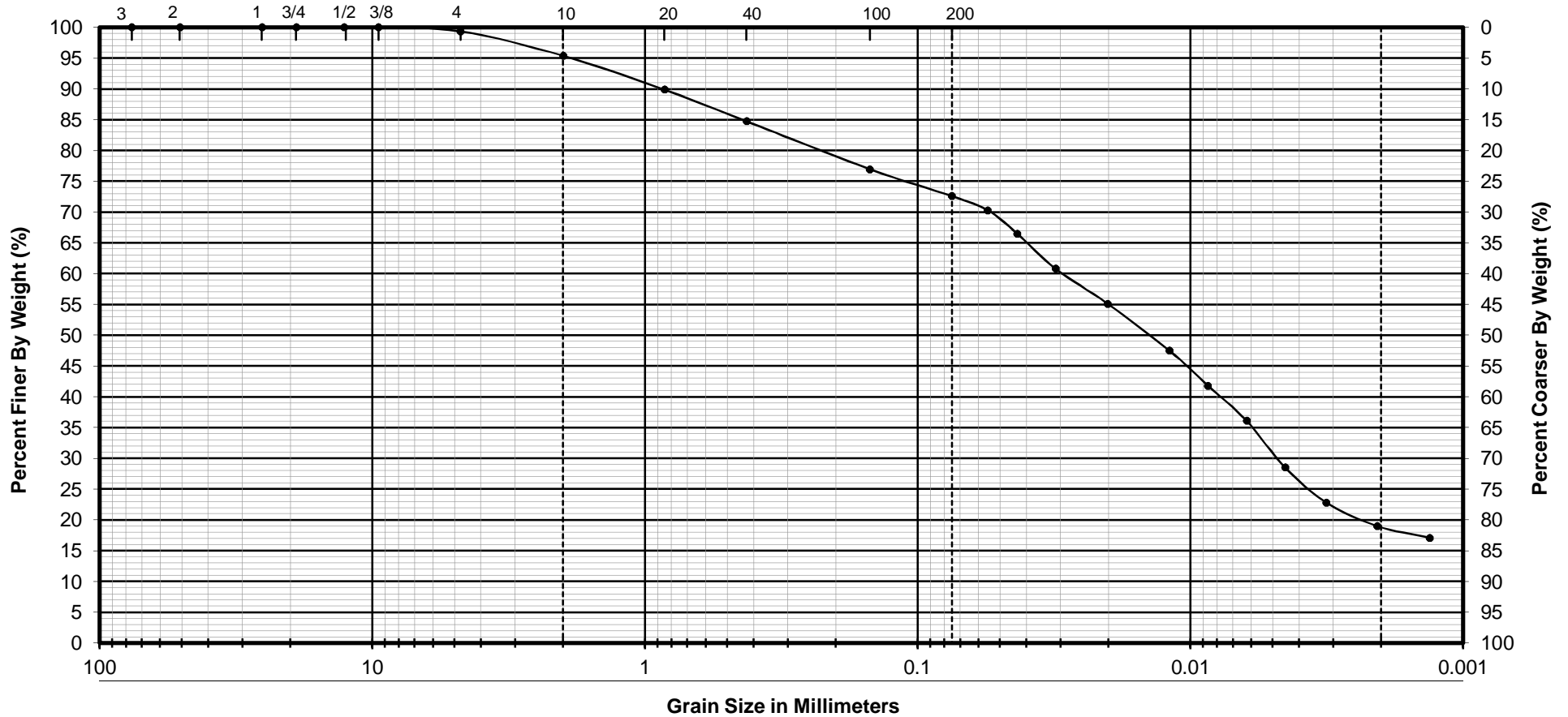
DEPTH H (ft)	BLOW S (/6")	UCS Qu (tsf)	MOIST T (%)	Surface Water Elev. <u>n/a</u> ft	Stream Bed Elev. <u>n/a</u> ft	DEPTH H (ft)	BLOW S (/6")	UCS Qu (tsf)	MOIST T (%)
682.20									
	2		27				6		
	3	3.0	20				9		6
	5	P					11		
					659.70				
	4						11		
	5	4.5	16				11		19
	-5	P					-25	12	
677.20									
	3						11		
	4	2.8	23				8		7
	4	P					10		
	3						10		
	3	1.5	27				12		9
	-10	P					-30	10	
672.20									
	2						2		
	2		6				4	1.3	12
	3						5	P	
669.70									
	2						5		
	2		25				5	1.5	16
	-15						-35	13	P
667.20									
	3						16		
	7		11				11		15
	5						14		
	15						15		
	11		8				14		9
	9						14		
-20							-40		

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


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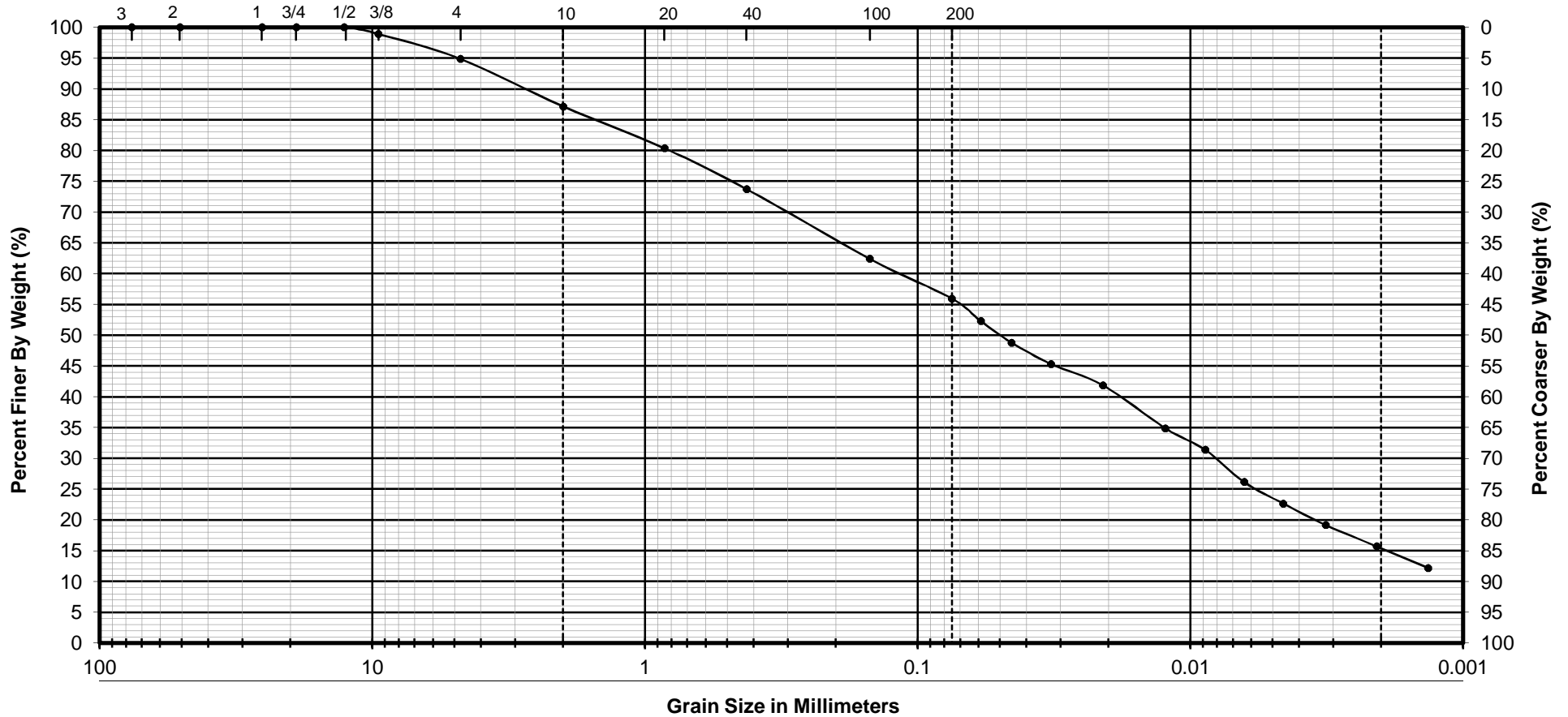
APPENDIX D

LAB DATA




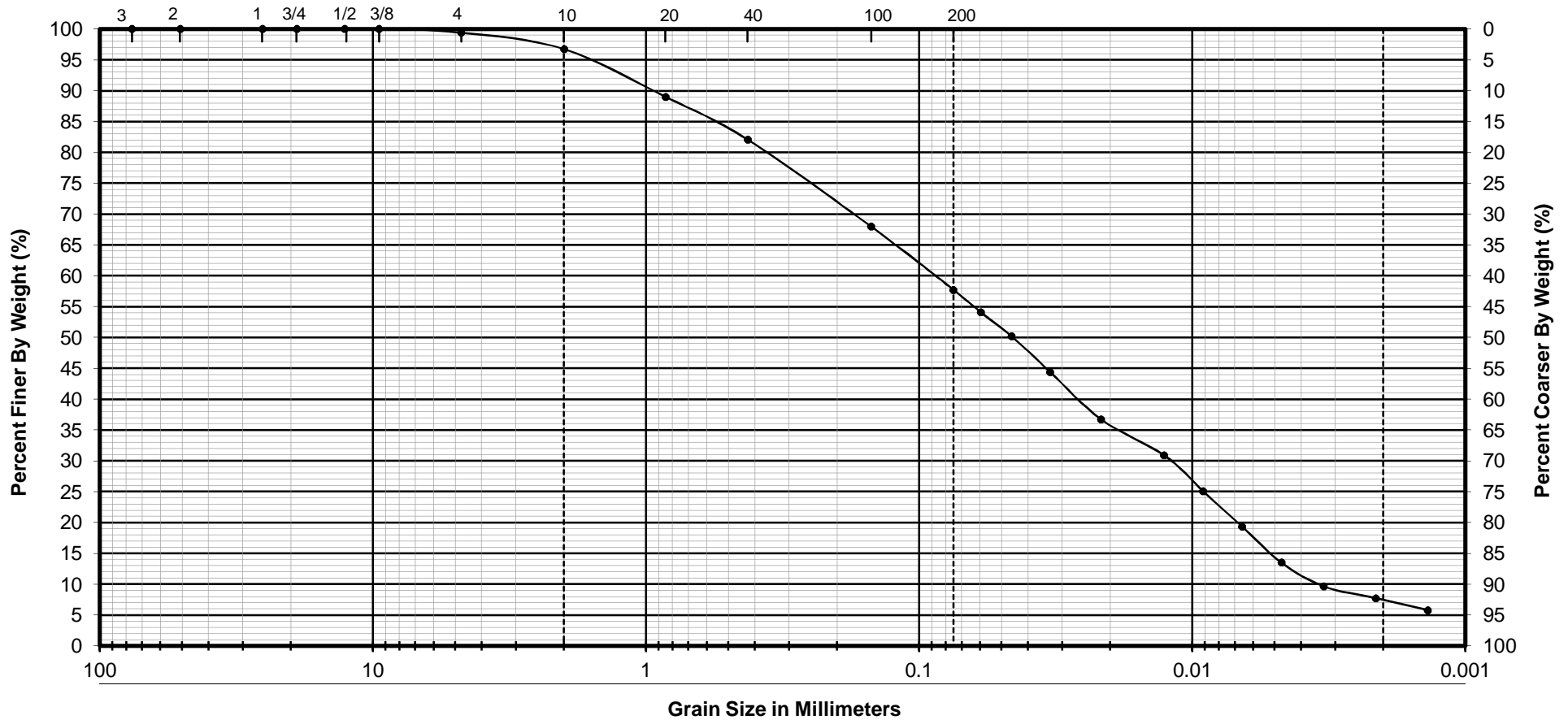
GRAVEL	SAND		SILT	CLAY
	COARSE	FINE		

Boring No.	CB-01	CLASSIFICATION	PARTICLE SIZE ANALYSIS-AASHTO T88
Sample No.	7	SILTY LOAM A-4 gray Group Index 5 % Gravel 4.6 % Sand 22.8 % Silt 53.6 % Clay 19.0	IL-56 / Route 53 IDOT P-91-439-01 DuPage County, Illinois  Geo Services, Inc. <small>Geotechnical, Environmental and Civil Engineering An MBE - DBE Firm</small> 1235 E. Davis St., Arlington Heights, IL 60005 Phone 847-253-3845 • Fax 847-253-0482
Depth	13.5'-15.0'		
Liquid Limit	26		
Plastic Limit	16		
Plasticity Index	10		
Test By	CC		
Date	10/17/13		
Reviewed By	RR		
Job No	12195		




GRAVEL	SAND		SILT	CLAY
	COARSE	FINE		

Boring No.	CB-13	CLASSIFICATION		PARTICLE SIZE ANALYSIS-AASHTO T88	
Sample No.	6	LOAM A-4 brown Group Index 1 % Gravel 12.8 % Sand 31.2 % Silt 40.3 % Clay 15.7		IL-56 / Route 53 IDOT P-91-439-01 DuPage County, Illinois  Geo Services, Inc. <small>Geotechnical, Environmental and Civil Engineering An MBE - DBE Firm</small> 1235 E. Davis St., Arlington Heights, IL 60005 Phone 847-253-3845 • Fax 847-253-0482	
Depth	11.0'-12.5'				
Liquid Limit	22				
Plastic Limit	15				
Plasticity Index	7				
Test By	CC				
Date	10/17/13				
Reviewed By	RR				
Job No	12195				



GRAVEL	SAND		SILT	CLAY
	COARSE	FINE		

Boring No.	CB-18	CLASSIFICATION	PARTICLE SIZE ANALYSIS-AASHTO T88
Sample No.	7	<p style="text-align: center;">SILTY LOAM A-4 brown</p> <p>Group Index 0</p> <p>% Gravel 3.3</p> <p>% Sand 39.0</p> <p>% Silt 50.0</p> <p>% Clay 7.7</p>	<p style="text-align: center;">IL-56 / Route 53 IDOT P-91-439-01 DuPage County, Illinois</p> <p style="text-align: center;"> Geo Services, Inc. Geotechnical, Environmental and Civil Engineering An MBE - DBE Firm</p> <p style="text-align: center;">1235 E. Davis St., Arlington Heights, IL 60005 Phone 847-253-3845 • Fax 847-253-0482</p>
Depth	13.5'-15.0'		
Liquid Limit	23		
Plastic Limit	18		
Plasticity Index	5		
Test By	CC		
Date	10/17/13		
Reviewed By	RR		
Job No	12195		

Liquid Limit, Plastic Limit, and Plasticity Index of Soils
 AASHTO T89/T90

Project Name IL-56 / Route 53 IDOT Project No. P-91-439-01

Job No 12195

Location DuPage County, Illinois

Date 10/21/13

Client Bollinger, Lach and Associates, Inc.

Boring No.	CB-01	CB-13	CB-18					
Sample No.	7	6	7					
Depth	13.5'-15.0'	11.0'-12.5'	13.5'-15.0'					
LIQUID LIMIT (LL)	26	22	23					
PLASTIC LIMIT (PL)	16	15	18					
PLASTICITY INDEX (PI)	10	7	5					

Tested by TOB/CC