GSG CONSULTANTS, INC.
ENGINEERS • SCIENTISTS • CONSTRUCTION MANAGERS
623 Cooper Court • Schaumburg, IL 60173
Tel: 630.994.2600 • Fax: 312.733.5612

Integrity | Quality | Reliability

GEOTECHNICAL DESIGN MEMORANDUM

To: Mr. Kurt Naus, P.E., S.E.

From: Suhaib Ibrahim
Min Zhang, Ph.D., P.E.

Date: February 10, 2021

Subject: **IDOT PTB 189/011 IL 59 Northbound Over I-55**
Geotechnical Recommendations
Detention Ponds

This Technical Memorandum provides geotechnical recommendation for the design of six (6) proposed detention ponds located in the proposed project area.

1.0 Project Information

GSG understands that six (6) new detention ponds will be designed as wet bottom ponds. It is anticipated that each pond design may include a flat bottom basin that would include 12-inches of topsoil across the bottom of the pond. The proposed pond locations and descriptions are as follows:

Table 1 – Detention Pond Summary

Pond ID	Location	Existing Ground Surface Elevation (ft)	Design Bottom of Pond Elevation (ft)*	Maximum Side Embankment Heights (ft)
55-1	Ramp C Sta. 807+00	584.0	582.5	4.0
59-1B	Ramp A Sta. 910+00	592.0	587.0	25.0
59-1A	Ramp B Sta. 1131+00	595.0	589.0	5.0
59-2A	I-55 SB Sta. 295+00	592.0	584.0	10.0

Pond ID	Location	Existing Ground Surface Elevation (ft)	Design Bottom of Pond Elevation (ft)*	Maximum Side Embankment Heights (ft)
59-2B	I-55 SB Sta. 299+00	586.0	579.5	15.5
55-10	I-55 NB Sta. 337+00	580.0	574.5	5.0

*Design bottom elevations based on information provided from Benesch Drainage Plan dated 12/04/2020

Where the proposed side slopes of the ponds will be lower than 20 feet, and are not steeper than 3H:1V, no slope stability analysis is required according to IDOT drainage manual, Section 12-003.03 for Grading and Depth. For Pond 59-1B, the maximum heights of the embankments along the pond perimeter will be approximately 25 feet. The slope stability analysis of the side slopes for this pond locations are provided in the Roadway Geotechnical Report.

2.0 Subsurface Site Investigation

GSG completed a subsurface investigation within the limits of each proposed pond between March 11 and November 19, 2020. A total of fifteen borings were completed within the proposed ponds areas to depths between 8 and 20 feet below existing grade. The locations of the soil borings are shown on the **Attachment A, Soil Boring Location Plan**.

Table 2 – Detention Pond Locations and Soil Borings

Pond ID	Pond Bottom Elevation	Borings	Surface Elevation (feet)	Boring Depths (feet)	Bedrock Depth (feet)	Soil Type at Pond Bottom
55-1	582.5	DPB-01	585.9	20.0	20.0	Sand
		DPB-02	584.1	18.5	18.5	Silty Clay
		DPB-03	584.1	20.0	NA	Silty Clay
59-1B	587.0	DPB-04	593.4	20.0	NA	Silty Clay
		DPB-05	590.8	20.0	NA	Silty Clay
59-1A	589.0	DPB-11	595.6	20.0	NA	Silty Clay Loam
		DPB-12	595.1	20.0	NA	Silty Clay Loam

Pond ID	Pond Bottom Elevation	Borings	Surface Elevation (feet)	Boring Depths (feet)	Bedrock Depth (feet)	Soil Type at Pond Bottom
		DPB-13	594.5	20.0	NA	Silty Clay Loam
59-2A	584.0	DPB-14	591.66	20.0	NA	Silty loam
		DPB-15	591.10	20.0	NA	Silty Loam
59-2B	579.5	DPB-06	586.7	20.0	NA	Silty Clay
		DPB-07	586.0	20.0	NA	Silty Clay
55-10	574.2	DPB-08	579.9	10.0	10.0	Silty Clay
		DPB-09	580.5	10.0	10.0	Silty Clay Loam
		DPB-10	580.3	8.0	8.0	Sand with Gravel

3.0 Subsurface Conditions

Proposed Pond 55-1

Borings DPB-01, DPB-02, and DPB-03 were completed within the proposed pond location. The borings encountered up to 5 inches of topsoil and 1 to 4 feet of silty clay fill. Below the topsoil and the fill material, the borings encountered 2 to 13 feet of loose to medium dense sand followed by stiff to hard silty clay to the termination depths of 20 feet or auger refusal on apparent bedrock.

Groundwater was encountered in each boring while drilling at depths between 7.0 and 8.5 feet (elevations between 575.6 and 577.4 feet). Based on the color change from brown and gray to gray, it is anticipated that the long-term groundwater level will be at depths between 6.0 and 8.5 feet (elevations 577.4 to 578.1 feet). The groundwater measurement is summarized in **Table 3**.

Proposed Pond 59-1B

Borings DPB-04, and DPB-05 were completed within the proposed pond location. The borings encountered up to 5 inches of topsoil and 6 feet of silty clay fill in boring DPB-05. Below the topsoil and the fill material, the borings encountered stiff to hard silty clay through the

termination depth in DPB-05 and to a depth of 18.5 feet in DPB-04. Boring DPB-04 was terminated at a depth of 20 feet in a layer of medium dense sand.

Groundwater was encountered in boring DPB-04 while drilling at a depth of 18.5 feet (elevation 574.9 feet). Groundwater was not encountered while drilling in DPB-05. Based on the color change from brown and gray to gray, it is anticipated that the long-term groundwater level will be at depths between 11.0 and 13.5 feet (elevations 577.5 to 582.5 feet)

Proposed Pond 59-1A

Borings DPB-11, DPB-12 and DPB-13 were completed within the proposed pond location. The borings encountered up to 6 inches of topsoil and 3.5 feet of silty clay fill in boring DPB-11. Below the topsoil and the fill material, the borings encountered mainly very stiff to hard silty clay through the termination depths of the borings. A layer of medium dense sand was noted in boring DPB-11 at depths between 9.0 and 11.5 feet. A layer of loose silty loam was noted in boring DPB-13 at depths between 7.0 and 11.0 feet

Groundwater was encountered in each boring at depths between 6.0 and 9.0 feet (elevations between 586.6 and 588.0 feet). Based on the color change from brown and gray to gray, it is anticipated that the long-term groundwater level will be at depths between 6.5 and 11.5 feet (elevations 584.0 to 588.0 feet).

Proposed Pond 59-2A

Borings DPB-14 and DPB-15 were completed within the proposed pond location. The borings encountered up to 4 inches of topsoil, followed by medium dense silty loam to depths of 9.0 to 10.0 feet, very stiff to hard silty to a depth of 16.0 feet and loose to medium dense silty loam to depths of 17.5 to 20 feet. Boring DPB-14 encountered hard silty clay loam under the medium dense silty loam to the boring termination depth at 20 feet.

Groundwater was not encountered while drilling in either of the borings. Based on the color change from brown and gray to gray, it is anticipated that the long-term groundwater level will be at depths between 8.5 and 11.5 feet (elevations 580.0 to 583.0 feet).

Proposed Pond 59-2B

Borings DPB-06, and DPB-07 were completed within the proposed pond location. The borings encountered up to 3 inches of topsoil. Below the topsoil, the borings encountered very soft to very stiff silty clay through the termination depths of the borings. A layer of medium dense sandy loam was noted in boring DPB-06 at depths between 14.5 and 16.0 feet.

Groundwater was encountered in DPB-06 at a depth of 16.0 feet (elevation 570.7 feet). Groundwater was not encountered while drilling in DPB-07. Based on the color change from brown and gray to gray, it is anticipated that the long-term groundwater level will be at depth around 9.0 feet (elevation 577.5 feet).

Proposed Pond 55-10

Borings DPB-08, DPB-09, and DPB-010 were completed within the proposed pond location. The borings encountered up to 8 inches of topsoil and 4.0 to 6.5 feet of silty clay fill, followed by 1.5 to 3.0 feet of soft clay loam and medium dense sand. Each of the borings was terminated in highly weathered limestone upon encountering auger refusal at depths of 8 to 10 feet.

Groundwater was encountered in all the borings at depths between 6.0 and 7.0 feet (elevations between 573.0 and 574.0 feet). No gray soils were encountered in the borings since all borings were terminated within granular fill or limestone.

Table 3 – Summary of Groundwater Readings

Boring ID	Ground Surface Elevation (ft)	Date of Drilling	Groundwater Elevation at time of Drilling (ft)	Estimated Long term Groundwater (ft)
DPB-01	585.8	4/27/2020	577.4	577.4
DPB-02	584.1	4/27/2020	575.6	577.6
DPB-03	584.1	4/27/2020	577.1	578.1
DPB-04	593.4	3/27/2020	574.9	582.4
DPB-05	590.8	4/30/2020	None	577.3
DPB-06	586.7	5/6/2020	570.7	577.7
DPB-07	586.0	5/6/2020	None	577.5

Boring ID	Ground Surface Elevation (ft)	Date of Drilling	Groundwater Elevation at time of Drilling (ft)	Estimated Long term Groundwater (ft)
DPB-08	579.9	3/11/2020	572.9	571.4
DPB-09	580.5	3/11/2020	574.0	572.0
DPB-10	580.3	3/11/2020	573.3	572.3
DPB-11	595.6	5/8/2020	586.6	584.1
DPB-12	595.1	5/8/2020	589.1	588.1
DPB-13	594.5	5/8/2020	588.0	587.5
DPB-14	591.7	11/4/2020	None	583.2
DPB-15	591.1	11/4/2020	None	580.1

4.0 Geotechnical Analysis and Recommendations

For most of proposed detention pond locations, it is anticipated that the long-term groundwater level will be below the proposed base of the ponds. Based on the anticipated high groundwater level in the proposed detention ponds 59-1A and 55-10, it is anticipated that groundwater may be a concern for construction at these locations. However, the pond storage volume should not be affected assuming outlet pipes will be installed and extra ground water can be drained outside the pond.

The subsurface soil materials present at the proposed base of each detention pond consists predominantly of clay soils, with the exception of boring DPB-01 for Pond 55-1, DPB-010 for Pond 55-10, and borings for Pond 59-2A, where sand or silty loam was encountered around the proposed pond base elevations. The cohesive nature of the subgrade soils at most of the pond locations will provide little infiltration of stormwater from the detention storage. Most of the extra stormwater will be needed to drain out of the storage through the outlet piles.

For Pond 55-10, bedrock was encountered within 2 feet of the proposed pond bottom, which could potentially increase the excavation costs. However, the rock can be left exposed and the topsoil thickness can be reduced. This will not affect the pond storage volume significantly.

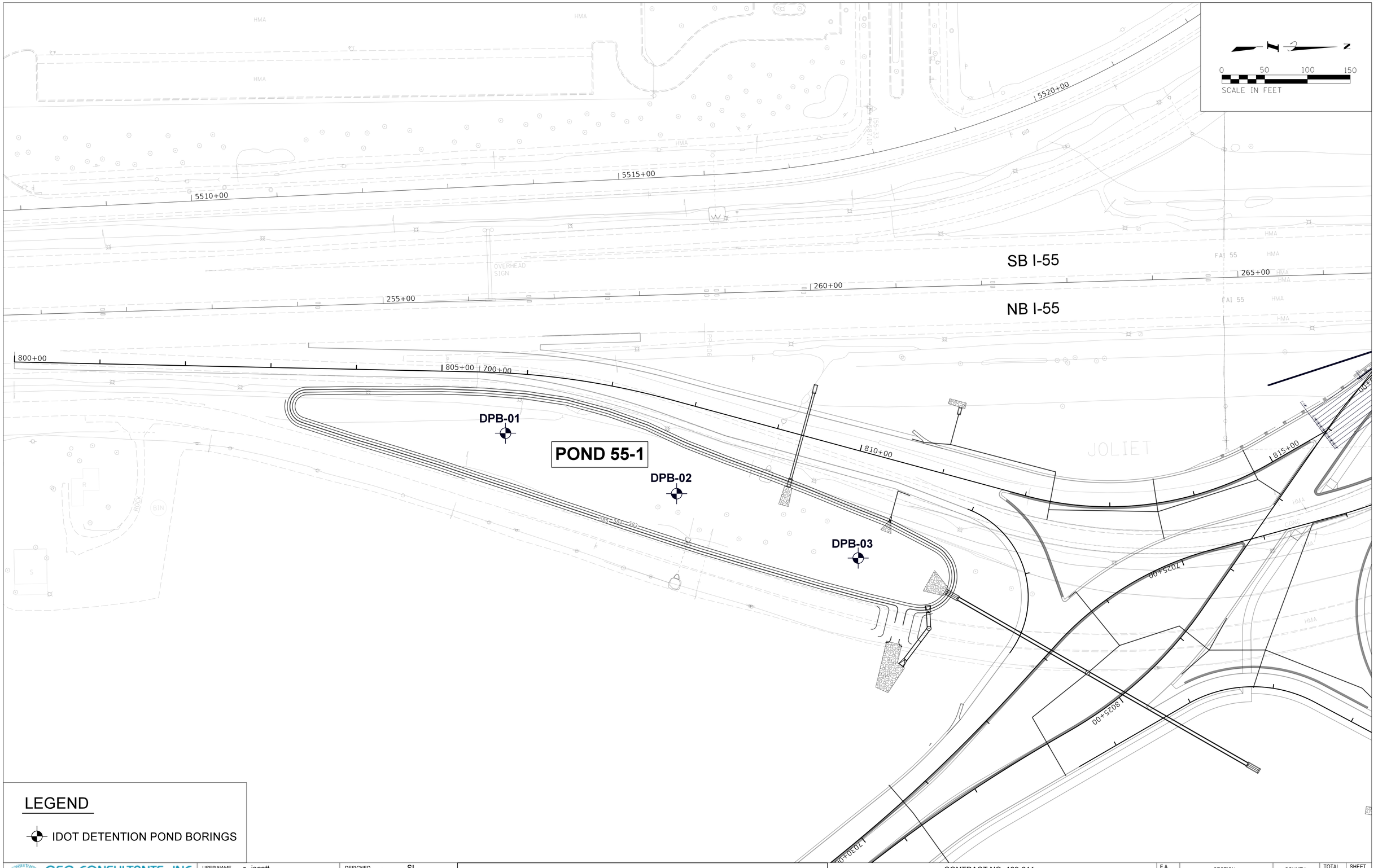
5.0 Construction Considerations

Based on the anticipated groundwater levels, excavation depths and cohesive soils on site, extensive dewatering is not anticipated during construction. Depending on the time of year that construction/excavation is completed, the quantity of water to be removed will vary.

Attachment A: Soil Boring Location Plan
Attachment B: Soil Boring Logs
Attachment C: Laboratory Test Result

APPENDIX A

SOIL BORING LOCATION PLAN



LEGEND

IDOT DETENTION POND BORINGS

GSG CONSULTANTS, INC.
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Tel: 630.994.2600
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STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

CONTRACT NO. 189-011

I-55/ROUTE 59 WILL COUNTY
BORING LOCATION PLAN DETENTION POND 55-1

SCALE: AS NOTED | SHEET 1 OF 1 SHEETS | STA. | TO STA.

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
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		CONTRACT NO. 189-011		
	ILLINOIS	FED. AID PROJECT		

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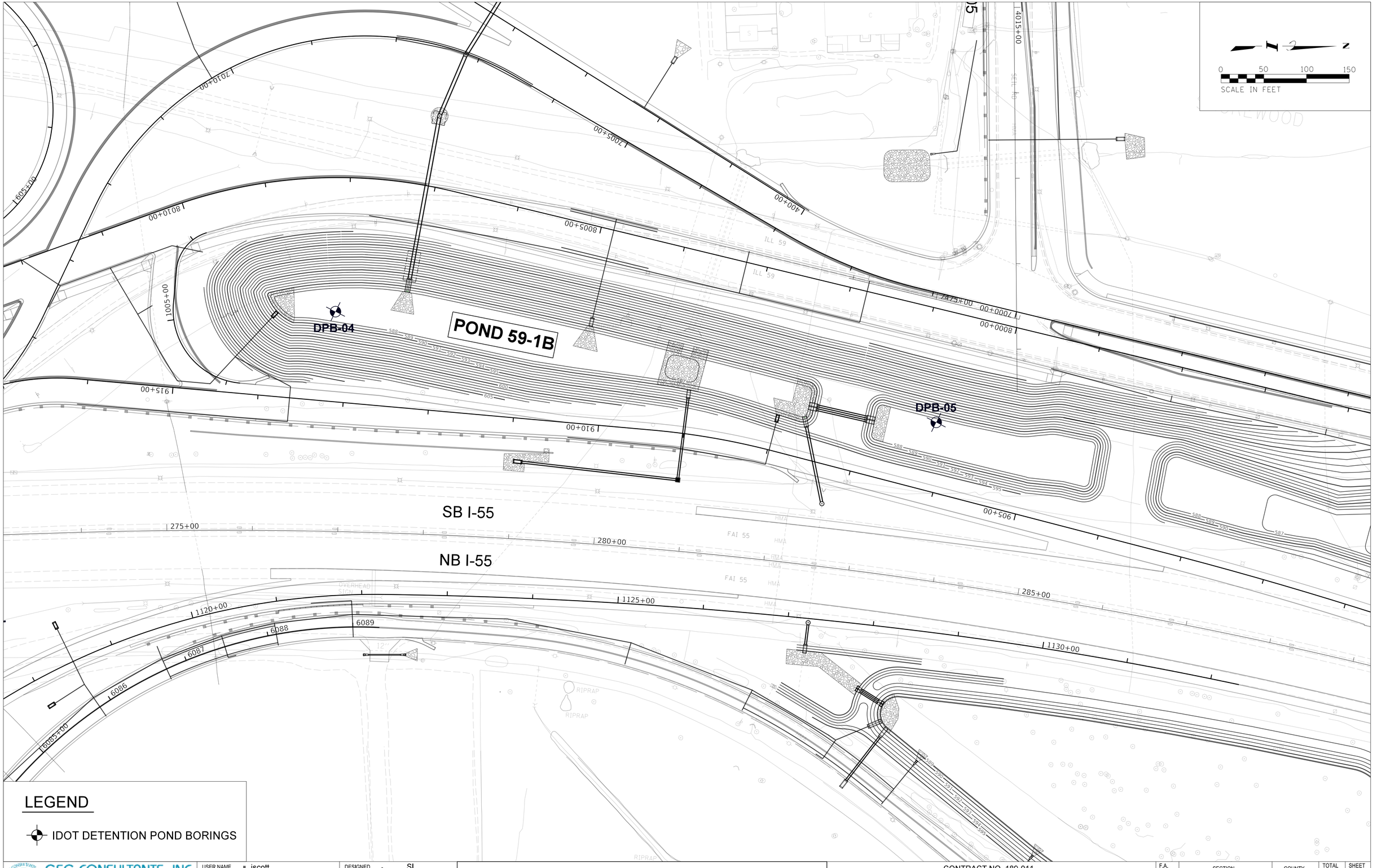

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CONTRACT NO. 189-011
I-55/ROUTE 59 WILL COUNTY
BORING LOCATION PLAN DETENTION POND 59-1B

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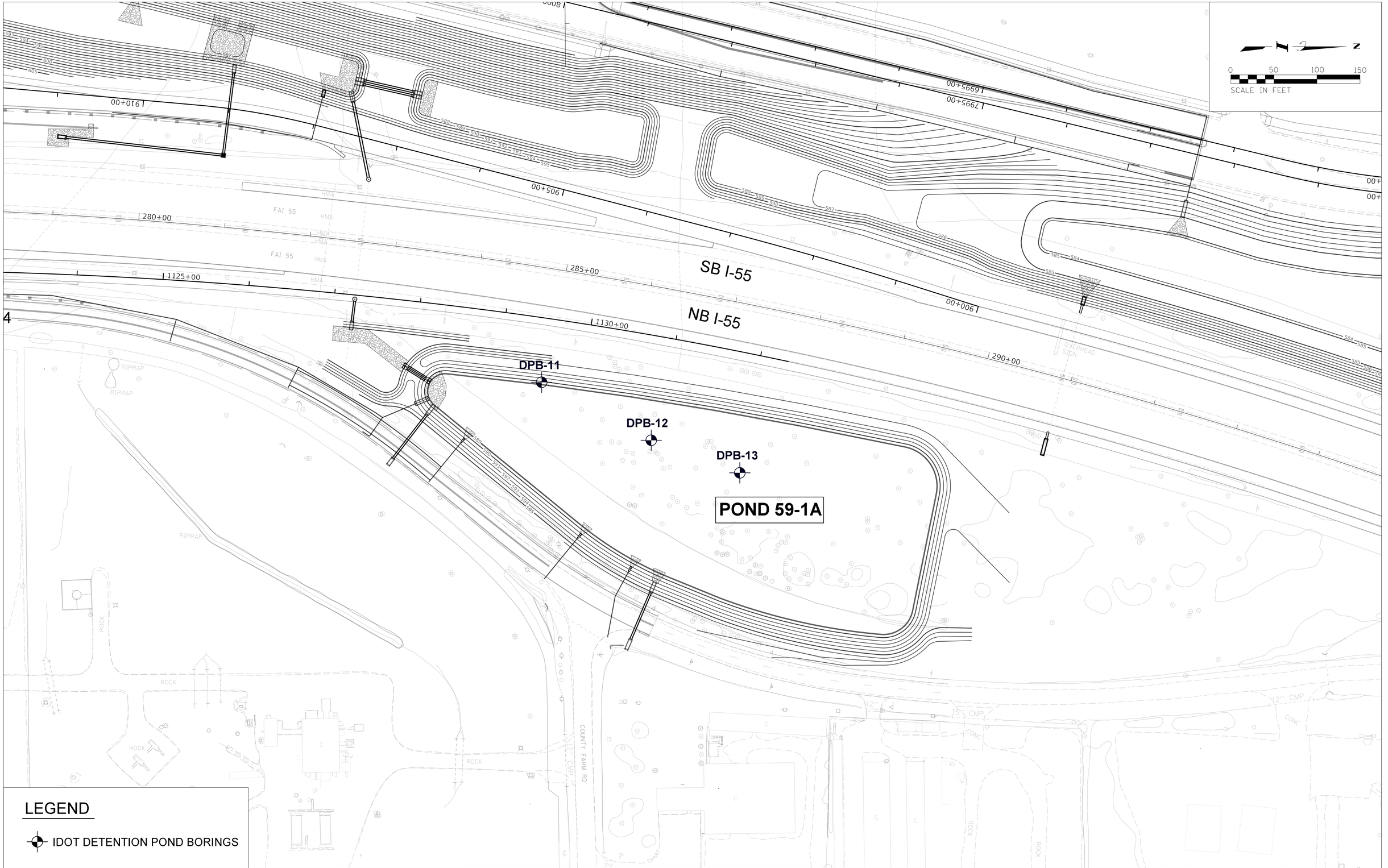

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PLOT DATE	= 2/10/2021	DATE	-	10/16/2020

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DEPARTMENT OF TRANSPORTATION

CONTRACT NO. 189-011

I-55/ROUTE 59 WILL COUNTY
BORING LOCATION PLAN DETENTION POND 59-1A

SCALE: AS NOTED | SHEET 1 OF 1 SHEETS | STA. | TO STA.

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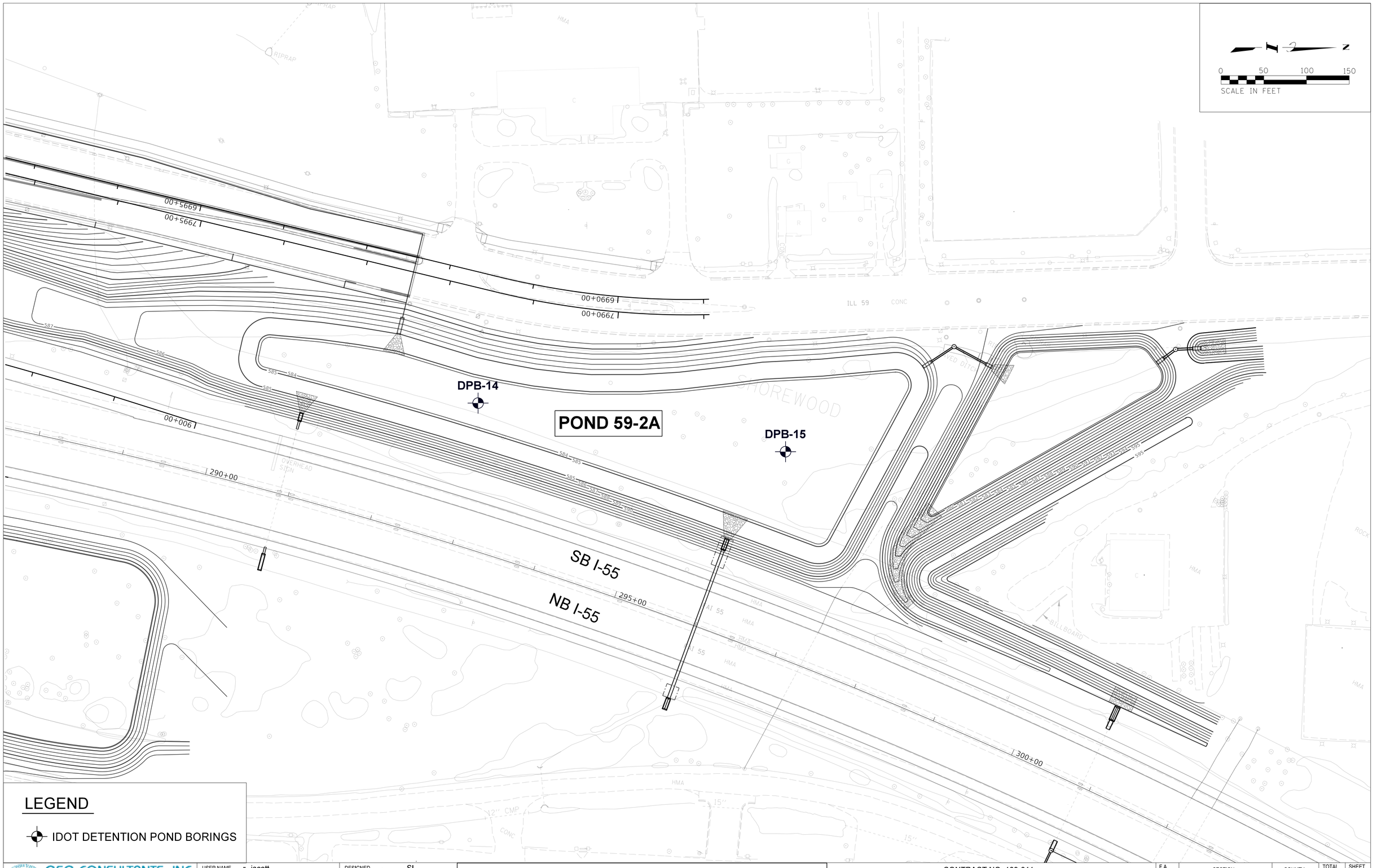

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STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

CONTRACT NO. 189-011
I-55/ROUTE 59 WILL COUNTY
BORING LOCATION PLAN DETENTION POND 59-2A
SCALE: AS NOTED | SHEET 1 OF 1 SHEETS | STA. | TO STA.

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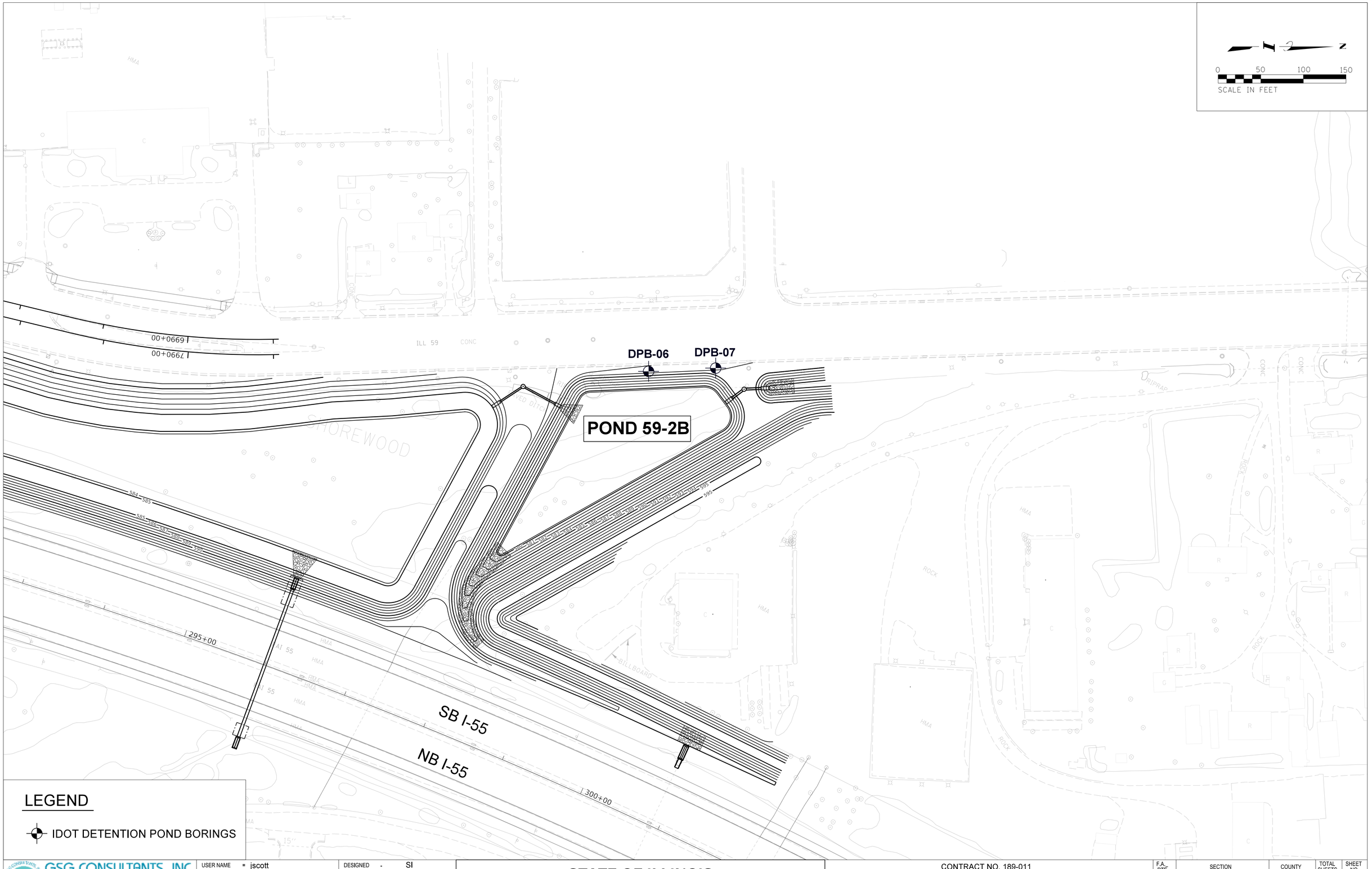

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PLOT DATE	= 2/10/2021	DATE	-	10/16/2020

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

CONTRACT NO. 189-011

I-55/ROUTE 59 WILL COUNTY
BORING LOCATION PLAN DETENTION POND 59-2B

SCALE: AS NOTED | SHEET 1 OF 1 SHEETS | STA. | TO STA.

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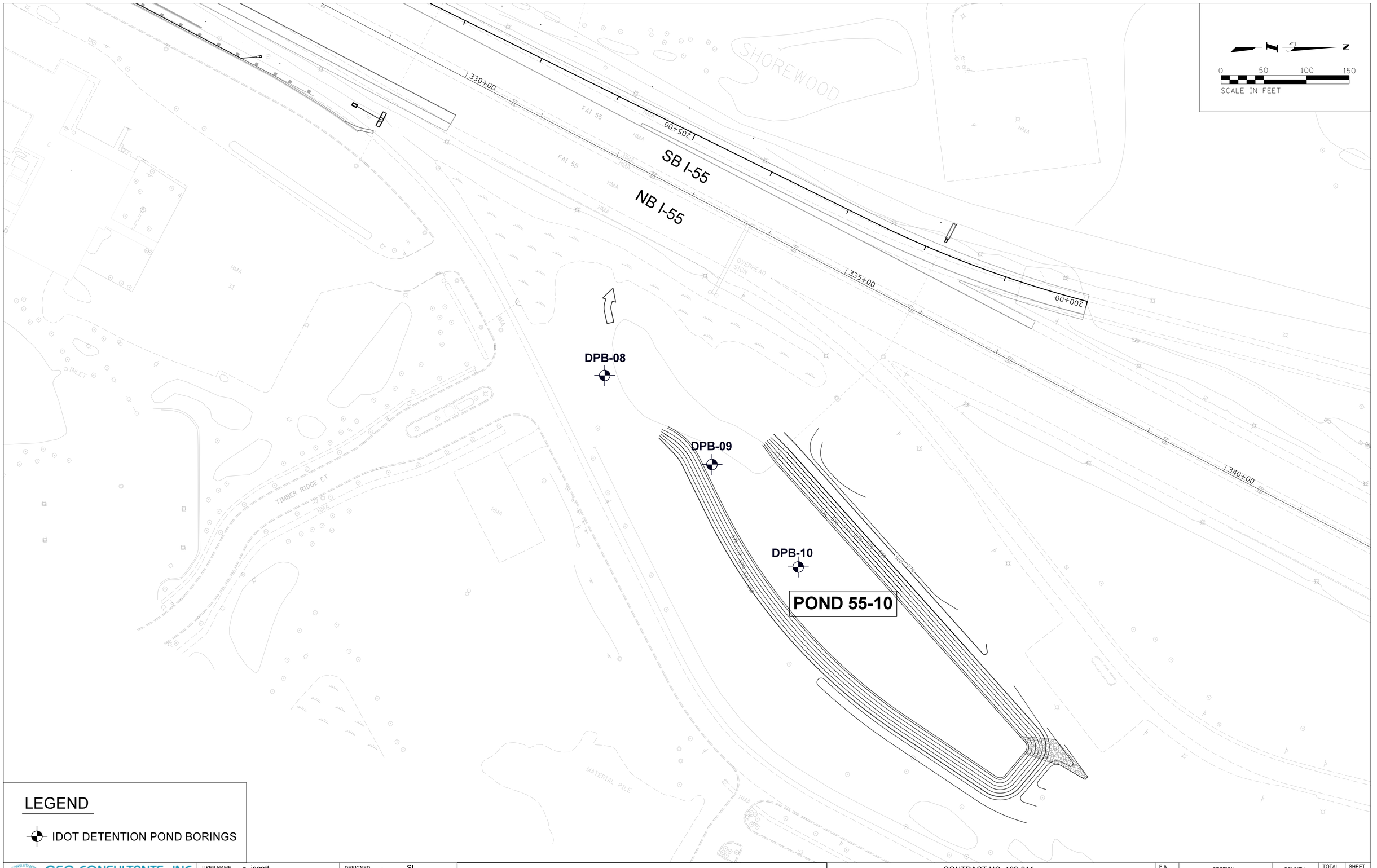

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USER NAME = jscott	DESIGNED -	SI
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PLOT DATE = 2/10/2021	DATE -	10/16/2020

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CONTRACT NO. 189-011

I-55/ROUTE 59 WILL COUNTY
BORING LOCATION PLAN DETENTION POND 55-10

SCALE: AS NOTED | SHEET 1 OF 1 SHEETS | STA. | TO STA.

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
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APPENDIX B

SOIL BORING LOGS

Illinois Department of Transportation
Division of Highways
GSG CONSULTANTS, INC

SOIL BORING LOG

Date 4/27/20

ROUTE I-55 and IL 59 **DESCRIPTION** Pond 55-1 **LOGGED BY** MH

SECTION 2018-075-R **LOCATION** I-55/SE Frontange Rd, **SEC.** , **TWP.** , **RNG.** ,
Latitude , **Longitude**

COUNTY WILL **DRILLING METHOD** HSA **HAMMER TYPE** AUTO

STRUCT. NO. Pond 55-1
Station

BORING NO. DPB-01
Station 805+78.6
Offset 70.40ft RT
Ground Surface Elev. 585.85 ft

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

Groundwater Elev.:
First Encounter 577.4 ft ▼
Upon Completion N/A ft
After N/A **Hrs.** N/A ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
5 inches of Topsoil 585.44				
Brown and Gray, Moist FILL: SILTY CLAY, with sand		2		
		2 4	1.0 P	16
582.35				
Loose to Medium Dense Brown and Gray, Wet SAND, trace gravel (SP)		1		
		3 4		15
	-5			
		3		
		5 8		22
577.35 ▼				
Medium Dense Gray, Moist to Wet SAND, with gravel (SPG)		4		
		8 11		17
	-10			
		11		
		10 14		18
		23		
		14 14		13
	-15			
569.85				
Hard Gray, Moist SILTY CLAY LOAM (ML/CL)		12		
		39 28	7.0 P	9
		29		
566.35		26		6
Limestone, highly weathered 565.85	-20	50/6"		

End of Boring

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

Illinois Department of Transportation
Division of Highways
GSG CONSULTANTS, INC

SOIL BORING LOG

Date 4/27/20

ROUTE I-55 and IL 59 **DESCRIPTION** Pond 55-1 **LOGGED BY** MH

SECTION 2018-075-R **LOCATION** I-55/SE Frontange Rd, **SEC.** , **TWP.** , **RNG.** ,
Latitude , **Longitude**

COUNTY WILL **DRILLING METHOD** HSA **HAMMER TYPE** AUTO

STRUCT. NO. Pond 55-1
Station

BORING NO. DPB-02
Station 808+5.9
Offset 104.30ft RT
Ground Surface Elev. 584.09 **ft**

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

Groundwater Elev.:
First Encounter 575.6 **ft** ▼
Upon Completion N/A **ft**
After N/A **Hrs.** N/A **ft**

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
4 inches of Topsoil 583.76				
Brown and Gray, Moist FILL: SILTY CLAY, with sand 582.59		2		
Stiff Black, Moist SILTY CLAY, trace sand (CL/ML)		2 3	1.0 P	11
580.59		3		
Medium Dense Brown and Gray, Wet SAND, trace gravel (SP)	-5	6 8		30
577.59		5		
Stiff to Hard Gray, Moist SILTY CLAY, trace sand and gravel (CL/ML)	▼	5 7	1.3 B	17
		4		
	-10	7 11	3.8 B	20
		3		
		5 6	4.5 P	11
570.59				
Very Stiff Gray, Moist SILTY CLAY LOAM, trace gravel (ML/CL)		4		
	-15	8 11	3.0 P	10
Limestone fragments at 16 feet		50/4"		5
565.59				
Limestone fragments at 18.5 feet Auger refusal at 18.5 feet		50/1"		6
End of Boring	-20			

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

Illinois Department of Transportation
Division of Highways
GSG CONSULTANTS, INC

SOIL BORING LOG

Date 4/27/20

ROUTE I-55 and IL 59 **DESCRIPTION** Pond 55-1 **LOGGED BY** MH

SECTION 2018-075-R **LOCATION** I-55/SE Frontange Rd, **SEC.** , **TWP.** , **RNG.** ,
Latitude , **Longitude**

COUNTY WILL **DRILLING METHOD** HSA **HAMMER TYPE** AUTO

STRUCT. NO. Pond 55-1
Station

BORING NO. DPB-03
Station 810+30.5
Offset 121.60ft RT
Ground Surface Elev. 584.06 ft

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

Groundwater Elev.:
First Encounter 577.1 ft ▼
Upon Completion N/A ft
After N/A **Hrs.** N/A ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
5 inches of Topsoil 583.65				
Brown and Gray, Very Moist FILL: SILTY CLAY, trace sand and gravel		2		
		2 2	1.0 P	27
580.06		2		
Loose Brown and Gray, Wet SAND, trace gravel (SP)	-5	3 5		22
578.06		1		
Stiff Gray, Moist to Very Moist SILTY CLAY, trace sand and gravel (CL/ML) ▼		2 2	1.3 B	21
		2		
	-10	2 6	1.0 B	22
		3		
		3 6	1.3 B	33
570.56		2		
Stiff to Very Stiff Gray, Moist SILTY CLAY LOAM (ML/CL)	-15	13 13	1.3 P	10
		9		
Limestone fragments at 17 feet		15 17	2.8 P	9
Limestone fragments at 18.5 feet		23		
		50/2"		14
564.06	-20			

End of Boring

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

Illinois Department of Transportation
Division of Highways
GSG CONSULTANTS, INC

SOIL BORING LOG

Date 3/27/20

ROUTE I-55 and IL 59 **DESCRIPTION** Pond 59-1B **LOGGED BY** MH

SECTION 2018-075-R **LOCATION** I-55/IL-59, **SEC.** , **TWP.** , **RNG.** ,
Latitude , **Longitude**

COUNTY WILL **DRILLING METHOD** HSA **HAMMER TYPE** AUTO

STRUCT. NO. Pond 59-1B
Station

BORING NO. DPB-04
Station 913+18.4
Offset 105.20ft RT
Ground Surface Elev. 593.39 ft

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

Groundwater Elev.:
First Encounter 574.9 ft ▼
Upon Completion N/A ft
After N/A **Hrs.** N/A ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
4 inches of Topsoil 593.06				
Stiff to Very Stiff Gray and Brown, Moist SILTY CLAY, trace gravel and sand (CL/ML)		2		
		4 5	1.5 P	24
		3		
	-5	3 4	2.5 P	22
586.89		5		
Sand seam at 6.5 feet Hard Gray and Brown, Moist SILTY CLAY (CL/ML)		6 8	4.8 P	21
		5		
	-10	8 10	5.0 P	21
582.39		4		
Very Stiff to Hard Gray, Moist to Very Moist SILTY CLAY LOAM, trace sand (ML/CL)		7 9	4.0 P	20
		3		
	-15	7 11	5.0 P	24
		2		
Sand seam at 16.5 feet		6 8	3.5 P	19
574.89 ▼				
Medium Dense Gray, Wet SAND, with gravel and limestone		6		
573.39	-20	7 12		23

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
fragments (SPG)				
End of Boring				
	-25			
	-30			
	-35			
	-40			

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

Illinois Department of Transportation
Division of Highways
GSG CONSULTANTS, INC

SOIL BORING LOG

Date 4/30/20

ROUTE I-55 and IL 59 **DESCRIPTION** Pond 59-1B **LOGGED BY** MH

SECTION 2018-075-R **LOCATION** I-55/IL-59, **SEC.** , **TWP.** , **RNG.** ,
Latitude , **Longitude**

COUNTY WILL **DRILLING METHOD** HSA **HAMMER TYPE** AUTO

STRUCT. NO. Pond 59-1B
Station

BORING NO. DPB-05
Station 906+16.9
Offset 80.40ft RT
Ground Surface Elev. 590.84 **ft**

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

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

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
5 inches of Topsoil 590.43				
Brown and Gray, Moist FILL: SILTY CLAY, trace sand and gravel		2		
		3 4	1.9 B	19
Cobbles at 3.5-5 feet		2		
	-5	4 6	4.2 B	20
584.84		4		
Hard Brown and Gray, Moist SILTY CLAY LOAM, trace sand and gravel (ML/CL)		8 12	6.7 B	13
		4		
	-10	10 13	6.3 B	21
		5		
		8 10	5.2 B	24
577.34		4		
Very Stiff to Hard Gray, Moist to Very Moist SILTY CLAY LOAM, trace gravel (ML/CL)	-15	8 12	5.0 B	16
		2		
		4 7	2.5 B	28
Sand seam at 18.5 feet		9		
		15	3.0	19
Limestone fragments at 19.5 feet 570.84	-20	13	P	

End of Boring

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

Illinois Department of Transportation
Division of Highways
GSG CONSULTANTS, INC

SOIL BORING LOG

Date 5/6/20

ROUTE I-55 and IL 59 **DESCRIPTION** Pond 59-2B **LOGGED BY** EH

SECTION 2018-075-R **LOCATION** IL-59 and Amendoge Dr, **SEC.** , **TWP.** , **RNG.** ,
Latitude , **Longitude**

COUNTY WILL **DRILLING METHOD** HSA **HAMMER TYPE** AUTO

STRUCT. NO. Pond 59-2B
Station

BORING NO. DPB-06
Station 298+80.03
Offset 486.40ft LT
Ground Surface Elev. 586.69 ft

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

Groundwater Elev.:
First Encounter 570.7 ft ▼
Upon Completion N/A ft
After N/A **Hrs.** N/A ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
3 inches of Topsoil 586.44				
Very Soft to Stiff Brown and Gray, Moist to Very Moist SILTY CLAY, trace sand (CL/ML)		1		
		2 2	1.0 P	19
		2		
	-5	3 6	0.2 B	19
		1		
		2 3	1.7 B	28
577.69		3		
Very Stiff Gray, Moist SILTY CLAY (CL/ML)	-10	7 10	2.5 B	19
		2		
		7 11	4.0 P	19
573.19				
Medium Dense Gray, Wet SANDY LOAM (SM)		6		
	-15	10 7		20
570.69 ▼				
Very Stiff Gray, Moist SILTY CLAY (CL/ML)		3		
		7 11	2.5 B	20
		4		
566.69	-20	6 12	3.3 B	22

End of Boring

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

Illinois Department of Transportation

Division of Highways
GSG CONSULTANTS, INC

SOIL BORING LOG

Date 5/6/20

ROUTE I-55 and IL 59 **DESCRIPTION** Pond 59-2B **LOGGED BY** EH

SECTION 2018-075-R **LOCATION** IL-59 and Amendoge Dr, **SEC.** , **TWP.** , **RNG.** ,
Latitude , **Longitude**

COUNTY WILL **DRILLING METHOD** HSA **HAMMER TYPE** AUTO

STRUCT. NO. Pond 59-2B
Station

BORING NO. DPB-07
Station 299+45.1
Offset 521.10ft LT
Ground Surface Elev. 586.03 **ft**

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

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

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
3 inches of Topsoil 585.78				
Very Stiff Brown and Gray, Moist SILTY CLAY (CL/ML)		2		
		4 4	2.7 S	16
		3		
		3 3	2.9 B	17
	-5			
Cobbles at 6-7.5 feet		4		
		10 9	4.0 P	17
577.53		2		
Very Stiff Gray, Moist SILTY CLAY (CL/ML)		4 18	2.5 B	19
	-10			
		8		
		14 16	4.0 P	17
		5		
		8 6	2.9 B	20
	-15			
		1		
		3 6	2.9 B	22
		2		
		2 5	2.9 B	18
566.03	-20			

End of Boring

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

BBS, form 137 (Rev. 8-99)

Illinois Department of Transportation
Division of Highways
GSG CONSULTANTS, INC

SOIL BORING LOG

Date 3/11/20

ROUTE I-55 and IL 59 **DESCRIPTION** Pond 55-10 **LOGGED BY** PS

SECTION 2018-075-R **LOCATION** I-55/SE Frontage Rd, **SEC.** , **TWP.** , **RNG.** ,
Latitude , **Longitude**

COUNTY WILL **DRILLING METHOD** HSA **HAMMER TYPE** AUTO

STRUCT. NO. Pond 55-10
Station

BORING NO. DPB-08
Station 333+5.5
Offset 234.20ft RT
Ground Surface Elev. 579.87 ft

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

Groundwater Elev.:
First Encounter 572.9 ft ▼
Upon Completion N/A ft
After N/A **Hrs.** N/A ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
7 inches of Topsoil 579.29				
Brown and Black, Moist to Very Moist		2		
FILL: SILTY CLAY, trace sand, gravel and roots		2 3	1.5 B	19
		2		
		4	0.6	27
Cobbles at 4.5 feet	-5	4	B	
573.37		2		
Soft ▼		2	0.5	19
Brown, Moist		2	P	
CLAY LOAM, some gravel (CLS)				
571.37				
LIMESTONE, highly weathered		50/3"		
				13
569.87	-10			
Auger Refusal at 10 feet				
End of Boring				
	-15			
	-20			

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

BBS, form 137 (Rev. 8-99)

Illinois Department of Transportation
Division of Highways
GSG CONSULTANTS, INC

SOIL BORING LOG

Date 3/11/20

ROUTE I-55 and IL 59 **DESCRIPTION** Pond 55-10 **LOGGED BY** PS

SECTION 2018-075-R **LOCATION** I-55/SE Frontage Rd, **SEC.** , **TWP.** , **RNG.** ,
Latitude , **Longitude**

COUNTY WILL **DRILLING METHOD** HSA **HAMMER TYPE** AUTO

STRUCT. NO. Pond 55-10
Station

BORING NO. DPB-09
Station 334+64.9
Offset 268.90ft RT
Ground Surface Elev. 580.46 ft

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

Groundwater Elev.:
First Encounter 574.0 ft ▼
Upon Completion N/A ft
After N/A **Hrs.** N/A ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
579.79				8 inches of Topsoil
	2			Brown, Moist to Very Moist FILL: SILTY CLAY LOAM, with sand, gravel and roots
	5 11	0.6 B	27	
	5			
	5 2	2.1 B	10	Trace organics from 4.5 feet to 5 feet
-5				
573.96 ▼	2			
	1 2		15	Very Loose Brown, Moist SANDY LOAM, with gravel (SC)
571.96				
	50/4"		17	LIMESTONE, highly weathered
570.46 -10				Auger Refusal at 10 feet End of Boring
-15				
-20				

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

Illinois Department of Transportation
Division of Highways
GSG CONSULTANTS, INC

SOIL BORING LOG

Date 3/11/20

ROUTE I-55 and IL 59 **DESCRIPTION** Pond 55-10 **LOGGED BY** PS

SECTION 2018-075-R **LOCATION** I-55/SE Frontage Rd, **SEC.** , **TWP.** , **RNG.** ,
Latitude , **Longitude**

COUNTY WILL **DRILLING METHOD** HSA **HAMMER TYPE** AUTO

STRUCT. NO. Pond 55-10
Station

BORING NO. DPB-10
Station 336+9.7
Offset 328.80ft RT
Ground Surface Elev. 580.34 ft

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

Groundwater Elev.:
First Encounter 573.3 ft ▼
Upon Completion N/A ft
After N/A **Hrs.** N/A ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
6 inches of Topsoil 579.84				
Brown and Gray, Very Moist FILL: SILTY CLAY, with sand, trace gravel and roots		3		
		5 7	1.0 B	25
576.34		5		
Medium Dense Brown, Moist SAND with gravel, trace silt (SPG)	-5	6 11		11
		4		
Cobbles at 6.5 feet 573.34 ▼		38 10	0.4 P	7
Soft Brown, Dry to Moist CLAY LOAM, with gravel (CLS) 572.34				
Auger refusal at 8 feet End of Boring	-10			
	-15			
	-20			

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

Illinois Department of Transportation
Division of Highways
GSG CONSULTANTS, INC

SOIL BORING LOG

Date 5/8/20

ROUTE I-55 and IL 59 **DESCRIPTION** Pond 59-1A **LOGGED BY** MH

SECTION 2018-075-R **LOCATION** I-55/US 52, **SEC.** , **TWP.** , **RNG.** ,
Latitude , **Longitude**

COUNTY WILL **DRILLING METHOD** HSA **HAMMER TYPE** AUTO

STRUCT. NO. _____
Station _____

BORING NO. DPB-11
Station 1129+52.2
Offset 74.00ft RT
Ground Surface Elev. 595.60 ft

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

Groundwater Elev.:
First Encounter 586.6 ft ▼
Upon Completion N/A ft
After N/A **Hrs.** N/A ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
595.10				6 inches of Topsoil
	2			Gray, Black, and Brown, Very Moist FILL: SILTY CLAY, trace sand
	3 5	1.7 B	27	
592.10				
	3			Hard Brown and Gray, Moist SILTY CLAY LOAM, trace gravel (ML/CL)
-5	8 11	5.5 P	20	
	4			
	9 12	5.4 B	20	
586.60 ▼	4			
	8 7		25	Medium Dense Black and Brown, Wet SAND (SP)
-10				
584.10	3			
	4 8	4.2 B	18	Hard Gray, Moist SILTY CLAY LOAM, trace sand and gravel (ML/CL)
	4			
	7 10	4.5 P	18	
-15				
	4			
	10 15	5.0 B	17	
576.60	4			
	4 5	2.1 B	25	Very Stiff Gray, Very Moist
575.60 -20				

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				SILTY CLAY (CL/ML)
				End of Boring
-25				
-30				
-35				
-40				

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

BBS, form 137 (Rev. 8-99)

Illinois Department of Transportation
Division of Highways
GSG CONSULTANTS, INC

SOIL BORING LOG

Date 5/8/20

ROUTE I-55 and IL 59 **DESCRIPTION** Pond 59-1A **LOGGED BY** MH

SECTION 2018-075-R **LOCATION** I-55/US 52, **SEC.** , **TWP.** , **RNG.** ,
Latitude , **Longitude**

COUNTY WILL **DRILLING METHOD** HSA **HAMMER TYPE** AUTO

STRUCT. NO.
Station

BORING NO. DPB-12
Station 1130+92.7
Offset 120.50ft RT
Ground Surface Elev. 595.06 ft

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

Groundwater Elev.:
First Encounter 589.1 ft ▼
Upon Completion N/A ft
After N/A **Hrs.** N/A ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
4 inches of Topsoil 594.73				
Stiff to Very Stiff Brown and Gray, Moist SILTY CLAY, trace sand (CL/ML)		2		
		4 6	2.1 B	21
		2		
590.56		3 6	1.5 B	19
Very Stiff Brown and Gray, Moist SILTY CLAY LOAM, trace sand (ML/CL) ▼	-5	4		
Sand seam at 6.5-7 feet 588.06		5 6	3.5 P	16
Very Stiff to Hard Gray, Moist SILTY CLAY LOAM, trace sand (ML/CL)		3		
		4 5	2.3 B	20
	-10	5		
		5 9	4.0 B	20
		5		
		10 12	4.4 B	24
	-15	5		
		9 14	5.8 B	18
		6		
575.06	-20	13 17	7.0 P	19

End of Boring

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

Illinois Department of Transportation
Division of Highways
GSG CONSULTANTS, INC

SOIL BORING LOG

Date 5/8/20

ROUTE I-55 and IL 59 **DESCRIPTION** Pond 59-1A **LOGGED BY** MH

SECTION 2018-075-R **LOCATION** I-55/US 52, **SEC.** , **TWP.** , **RNG.** ,
Latitude , **Longitude**

COUNTY WILL **DRILLING METHOD** HSA **HAMMER TYPE** AUTO

STRUCT. NO.
Station

BORING NO. DPB-13
Station 1132+3.4
Offset 138.50ft RT
Ground Surface Elev. 594.50 ft

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

Groundwater Elev.:
First Encounter 588.0 ft ▼
Upon Completion N/A ft
After N/A **Hrs.** N/A ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
4 inches of Topsoil 594.17				
Very Stiff to Hard Brown and Gray, Moist to Very Moist SILTY CLAY LOAM, trace sand (ML/CL)		4		
		7 8	2.8 B	28
		4		
	-5	7 10	5.4 B	23
		4		
Sand seam from 6.5-7 feet 587.50		7 4	5.6 B	20
Loose Gray, Very Moist SILTY LOAM, trace gravel (ML)		4		
	-10	5 5		23
583.50		3		
Hard Gray, Moist SILTY CLAY LOAM, trace sand (ML/CL)		5 9	5.0 B	17
		6		
	-15	10 13	5.2 B	21
		5		
		10 14	6.0 P	23
		5		
Limestone fragments at 19.5 feet 574.50	-20	9 16	6.5 P	17

End of Boring

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

Illinois Department of Transportation
Division of Highways
GSG CONSULTANTS, INC

SOIL BORING LOG

Date 11/4/20

ROUTE I-55 and IL 59 **DESCRIPTION** Pond 59-2A **LOGGED BY** MH

SECTION 2018-075-R **LOCATION** I-55/IL59, **SEC.** , **TWP.** , **RNG.** ,
Latitude , **Longitude**

COUNTY WILL **DRILLING METHOD** HSA **HAMMER TYPE** AUTO

STRUCT. NO. Pond 59-2A
Station

BORING NO. DPB-14
Station 292+50
Offset 170.00ft LT
Ground Surface Elev. 591.66 **ft**

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

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

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
4 inches of Topsoil 591.33				
Medium Dense Brown and Gray, Moist SILTY LOAM, with sand, trace gravel (ML)		5 6 8		16
		6		
Silty Clay Seam at 4.0 feet	-5	9 11	6.5 B	18
		5		
Sandy Seam at 7.0 feet		10 11		18
583.16				
Very Stiff Gray, Moist SILTY CLAY LOAM, trace sand (ML/CL)	-10	4 6 8	3.8 B	14
		3		
		5 11	2.7 B	15
Rock Fragments at 12.5 feet		6		
	-15	7 13	3.5 P	18
575.66				
Medium Dense Gray, Moist SILTY LOAM, with sand (ML)		8 11 8		20
574.16				
Hard Gray, Very Moist SILTY CLAY LOAM, trace sand (ML/CL)		7		
		7 7	4.8 B	25
571.66	-20			

End of Boring

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

Illinois Department of Transportation
Division of Highways
GSG CONSULTANTS, INC

SOIL BORING LOG

Date 11/4/20

ROUTE I-55 and IL 59 **DESCRIPTION** Pond 59-2A **LOGGED BY** MH

SECTION 2018-075-R **LOCATION** I-55/IL59, **SEC.** , **TWP.** , **RNG.** ,
Latitude , **Longitude**

COUNTY WILL **DRILLING METHOD** HSA **HAMMER TYPE** AUTO

STRUCT. NO. Pond 59-2A
Station

BORING NO. DPB-15
Station 296+00
Offset 230.00ft LT
Ground Surface Elev. 591.10 ft

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

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

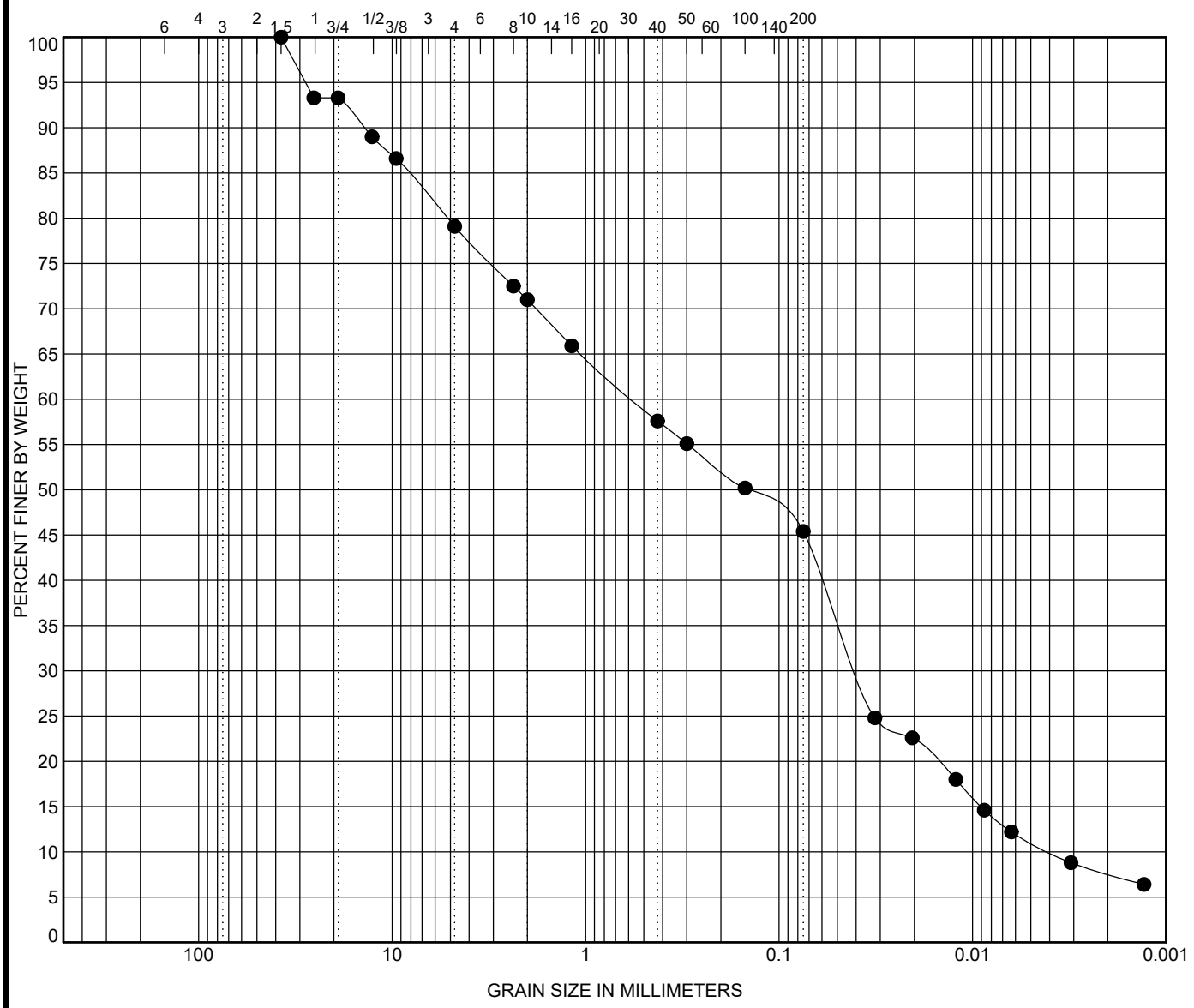
DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
590.77				4 inches of Topsoil
	5			Medium Dense Light Brown and Gray, Moist SILTY LOAM, with sand, trace gravel (ML)
	9 10		13	
	6			
	8 8		16	
-5				
	8			
	9 9		13	
	7			
	15 14		12	
-10				Gravel and Cobbles Seam at 9.5 feet
580.10				
	5			Hard Gray, Moist SILTY CLAY LOAM, some sand (ML/CL)
	9 11	5.0 P	19	
	5			
	9 10	6.5 B	23	
-15				
575.10				
	8			Loose to Medium Dense Gray, Moist to Very Moist SILTY LOAM, with sand (ML)
	10 11		19	
	3			
	5 5		23	
571.10 -20				

End of Boring

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

APPENDIX C

Laboratory Test Results



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	**DPB-09 6 ft**					**0.69**	**143.41**

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**DPB-09 6 ft**	**37.5**	**0.571**	**0.04**	**0.004**	**20.9**	**33.7**	**45.4**	

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GRAIN SIZE DISTRIBUTION

Route: I-55 and IL 59

Section: 2018-075-R

County: WILL