APPENDIX A

Appendix A Geotechnical Data Reports

A.1 Geotechnical Investigation performed by Soil and Material Consultants, Inc., dated April 6, 2010.

A.2 Geotechnical Investigation performed by Soil and Material Consultants, Inc., dated March 18, 2022

April 6, 2010
File No. 19903

Mr. Paul A.Cathey
Des Plaines Park District
2222 Birch Street
Des Plaines, Illinois 60018

Re: Geotechnical Investigation
Lake Park Expansion
Des Plaines, Illinois

Dear Mr. Cathey:

The following is our report of findings for the geotechnical investigation completed at Lake Park in the City of Des Plaines, Illinois.

The investigation was requested to determine current subsurface soil and water conditions at select boring locations. The findings of the field investigation and the results of laboratory testing are intended to assist in the design and construction of proposed site improvements.

We understand that the proposed improvements include a picnic shelter, gazebo, prefabricated restroom, and boardwalk. Also a storm water detention area is proposed in the south center portion of the site.

SCOPE OF THE INVESTIGATION

The field investigation included obtaining 8 borings at the locations requested and as indicated on the enclosed sketch. The boring locations were established using field taping methods and accuracy. Surface elevations were estimated to the nearest 0.5 ft. using the data presented on the topographic survey.

We auger drilled the 8 borings to depths of 10.0 feet to 15.0 feet below existing surface elevations. Soil samples were obtained using a split barrel sampler advanced utilizing an automatic SPT hammer. Soil profiles were determined in the field and soil samples returned to our laboratory for additional testing including determination of moisture content. Cohesive soils obtained by split barrel sampling were tested further to determine dry unit weight and unconfined compressive strength. The results of all field determinations and laboratory testing are included in summary with this report.

RESULTS OF THE INVESTIGATION

Enclosed are the boring logs indicating the soil conditions encountered at each location. The site surface conditions include vegetation and fill soil conditions. The topsoil fill is classified as black silt/clay mixtures with traces of roots.

Fill soil conditions were encountered at each of the boring locations. The composition of the fill includes the presence of silt/clay, clay/silt and silt/gravel/crushed asphalt mixtures extending to depths of 2.5 feet to 8.5 feet at these boring locations. It should be noted that the fill at borings 2 and 8 had the presence of crushed asphalt and traces of brick and cinders. The limits of fill placement were not determined within the scope of this investigation. The fill soil conditions are found to overlie the apparent natural topsoil at borings 1, 2, 3 and 5.

The underlying natural soil conditions consist primarily of cohesive soils. These soils are classified as tough to hard clay/silt mixtures with lesser portions of sand and gravel.

Non-cohesive soils were encountered between the cohesive soil layers as indicated at borings 3, 7 and 8. These include loose to medium dense silt/clay and sand mixtures. The non-cohesive granular soils are in a very damp condition. Cobbles and boulders may be present within the site soils at any elevation, although none were encountered while drilling.

The following table summarizes depth ranges below existing grade, the magnitude of soil strength within these ranges and other information:

Boring	Surface Elevation (feet)	Depth Range Below Existing Surface (feet)	Soil Strength (lbs./sq.ft.)	Recorded Water Levels, W.D./A.D. (feet)
Picnic Shelter				
1	648.0	1.5 to 3.5	*2,000	dry/dry
		3.5 to 6.5	*none	
		6.5 to 8.0	2,000	
2	648.5	1.0 to 3.5	*2,000	dry/dry
		3.5 to 6.5	*none	
		6.5 to 8.0	3,000	
Prefabricated Restroom				
3	645.0	1.0 to 1.5	*1,000	dry/dry
		1.5 to 4.5	*none	
		4.5 to 8.0	3,000	
Detention Area				
4	644.5	1.5 to 4.0	*2,000	dry/dry
		4.0 to 6.0	2,000	
		6.0 to 8.0	4,000	
Gazebo				
5	645.0	1.5 to 4.0	*2,000	dry/dry
		4.0 to 6.5	*none	
		6.5 to 8.0	4,000	
6	642.5	1.5 to 4.5	*2,000	2.5/dry
		4.5 to 7.0	*none	
		7.0 to 8.5	*2,000	
		8.5 to 9.0	4,000	
Boardwalk				
7	637.5	1.5 to 8.5	*2,000	11.0/9.0
		8.5 to 12.0	3,000	
8	637.0	2.0 to 4.0	*1,500	2.0,11.0/8.0
		4.0 to 9.0	*none	
		9.0 to 12.0	3,000	

* Not recommended for support of foundations. Deeper foundation depths will be needed to reduce the magnitude of long-term total and differential settlement.

It is expected that foundations can be supported on undisturbed natural soils located at any elevation within the depth ranges indicated in the above table, except as noted. Above these depth ranges the soils are not considered able to support foundations, even at reduced design bearing values, due to long-term settlement considerations.

SUBSURFACE WATER

The boring logs and the above table indicate the depth at which subsurface water was encountered in the bore holes at the time of the drilling operations and during the period of these readings. It is expected that fluctuations from the water levels recorded will occur over a period of time due to variations in rainfall, temperature, subsurface soil conditions, soil permeability and other factors not evident at the time of the water level measurements.

PICNIC SHELTER, GAZEBO & BOARDWALK

Borings 1, 2, 5, 6, 7 and 8 were performed in the area of the proposed picnic shelter, gazebo and boardwalk. The presence of deep unsuitable fill soil and buried topsoil conditions indicates that a deeper than normal foundation system will be necessary. Continuous and/or isolated footing foundations would need to extend to depths of 6.0 feet to 9.0 feet below the existing grades.

Alternately consideration could be given to a drilled pier foundation system. This type of foundation, designed by a licensed structural engineer, can be utilized to transmit loads through the unsuitable soil conditions and into the suitable soil conditions present at the deeper elevations. Temporary or permanent casing extending above the ground surface is needed to prevent caving of the soil around the top of the drilled shaft. Further, temporary or permanent casing will be needed when drilling through caving soils or through soft soils which squeeze thus narrowing the diameter of the drilled shaft. The casing will also reduce the volume of water seeping into the drilled shaft.

Also helical piers or micropiles could be utilized to transmit loads through the unsuitable soil conditions and into the suitable soil conditions present at the deeper elevations. The foundation system would also need to be designed by a licensed structural engineer.

Soil strength values and the depths at which they are expected to be encountered at these boring locations are indicated in the above table. An allowable bearing value of 2,000 lbs./sq.ft. is available for foundation design. Increased bearing values may be available at some locations and elevations. The feasibility of using a higher value is best determined after our review of proposed foundation details and elevations.

All exterior building foundations should extend at least 60.0 inches below exposed surface elevations to provide adequate protection against uplift due to freezing of the supporting soils. We recommend providing adequate reinforcing steel in foundation walls and piers to minimize the effects of long-term differential settlement.

Floor slabs planned for support on the existing soil conditions are expected to undergo some degree of long-term settlement as the soils consolidate under loading and as they shrink due to desiccation. Slabs may be considered for support on suitable natural soils or on properly placed and compacted fill soils. This is feasible when the soils supporting the slabs are prepared in accordance with the recommendations for Subgrade Soil Preparation. These include the removal of topsoil as well as removal or aeration of underlying high moisture content soils.

PREFABRICATED RESTROOM

Boring 3 was located in the area of the prefabricated slab on grade restroom. We understand the restroom is designed to rest on a prepared pad of compacted granular base. We would recommend that the surface topsoil and any low-strength or saturated surface soils be removed prior to placing the granular pad material. The removal of the surface topsoil and/or weak soil should extend beyond the edges of the proposed pad to a distance at least equal to the thickness of the pad.

DEWATERING

Excavations may require dewatering due to subsurface water seepage and/or surface precipitation. This water can likely be removed by standard sump and pump operations. Soils exposed at foundation, slab or undercut elevations should not be permitted to become saturated. Loss of bearing strength and stability may occur thus requiring additional soil excavation.

Organic soils, fill soils and others can be unstable when saturated. These soils tend to cave or run when submerged or disturbed. The stability of exposed embankments is minimal to non-existent as confining soil pressures are removed. Proper drainage within excavations is necessary at all times, particularly when excavations extend below anticipated water levels and below saturated soils.

SUBGRADE SOIL PREPARATION

The procedure in all areas of subgrade supported improvements should include the removal of unsuitable surface conditions including vegetation, topsoil, unsuitable fill soils, weak or unstable soils, and other deleterious conditions which may be encountered. Above grade areas should be cut to design subgrade elevations. Exposed subgrade soils should be leveled, compacted and proof-rolled in the presence of the Soil Engineer.

Proof-rolling may reveal areas of unstable soil conditions. Discing and aeration of high moisture content soils can be effective to depths of up to 1.0 foot, depending upon the equipment utilized. Removal of unstable soils may be necessary if high moisture content conditions extend to depths greater than the effective depth of discing. If the depth of undercut appears to be significant, it may be economical to limit the depth of undercut to that needed to establish adequate support of slabs and remediate weak soil conditions at foundation elevations at the time of foundation construction.

Structural fill can be placed on soils prepared to the satisfaction of the Soil Engineer. The fill should be placed in lifts not to exceed 8.0 inches when uncompacted. Each lift should exceed minimum compaction requirements prior to placement of the next lift. We recommend a minimum of 95% compaction based on the modified Proctor test, ASTM D-1557, be achieved within building areas. A minimum of 90% compaction should be achieved beneath exterior improvements such as pavements and sidewalks. Compaction requirements also apply to backfill placement around foundations and within trench excavations located below subgrade supported improvements.

FILL SOURCES

The onsite non-organic soils are generally suitable for reuse as fill. Offsite sources may also be used provided they are approved in advance by the Soil Engineer. Aeration may be necessary to reduce soil moisture content prior to compaction. Soil borrowed from near the surface where seasonal fluctuations in soil moisture content occur may require particular attention. The moisture content of fill soils should be within approximately 3.0% of optimum moisture content as determined by the modified Proctor test for the soils to meet or exceed minimum compaction requirements.

PAVEMENT AREAS

Normal subgrade preparation is anticipated in the new pavement area. These include the removal of topsoil and unsuitable fill soils. If soft or unstable soil conditions are encountered these areas may possibly be bridged by use of an effective depth of crushed granular material. The placement of the crushed granular bridging material, possibly in conjunction with the use of an appropriate geotextile fabric, should only proceed after review of the proof-roll conditions by the Soil Engineer. Long-term settlement of pavement surfaces may occur locally as the bridged soils desiccate.

The following pavement sections can be considered by the designer firm for the new pavement area when the subgrade soils have been prepared in accordance with our subgrade soil preparation procedures:

Bituminous Concrete Surface N/50	Bituminous Concrete Binder N/50	Aggregate Base
2.0 in.	2.0 in.	8.0 in.

Final pavement design should address traffic load requirements and meet or exceed minimum pavement material thicknesses required by the local building code.

DETENTION AREA

The proposed grades for the detention area were not available to us at this time. Boring 4 was performed in this area. The soils at this location consisted of 1.0 feet of topsoil fill overlying 2.5

feet of clay/silt fill soils overlying natural cohesive clay/silt mixtures extending to the bottom of the boring. Proper drainage within excavations will be necessary at all times. The stability of exposed embankments will be minimal as confining soil pressures are removed.

CONCLUSION

The information within this report is intended to provide initial information concerning subsurface soil and water conditions on the site. Variations in subsurface conditions are expected to be present between boring locations due to naturally changing and fill soil conditions.

Our understanding of the proposed improvements is based on limited information available to us at the writing of this report. The findings of the investigation and the recommendations presented are not considered applicable to significant changes in the scope of the improvements or applicable to alternate site uses. We recommend that proposed foundation, pavement and grading plans be reviewed by our office to determine if additional considerations are necessary to address anticipated subsurface conditions.

The soils exposed in soil undercut areas should be evaluated for suitability prior to placement of structural fill, as previously indicated in this report. Soils and aggregates placed as structural fill should be tested as the work progresses to verify that minimum compaction requirements have been met. We recommend that soil conditions encountered at foundation elevations be tested to verify the presence of design soil strength prior to concrete placement.

If you have any questions concerning the findings or recommendations presented in this report, please let me know.

Very truly yours,

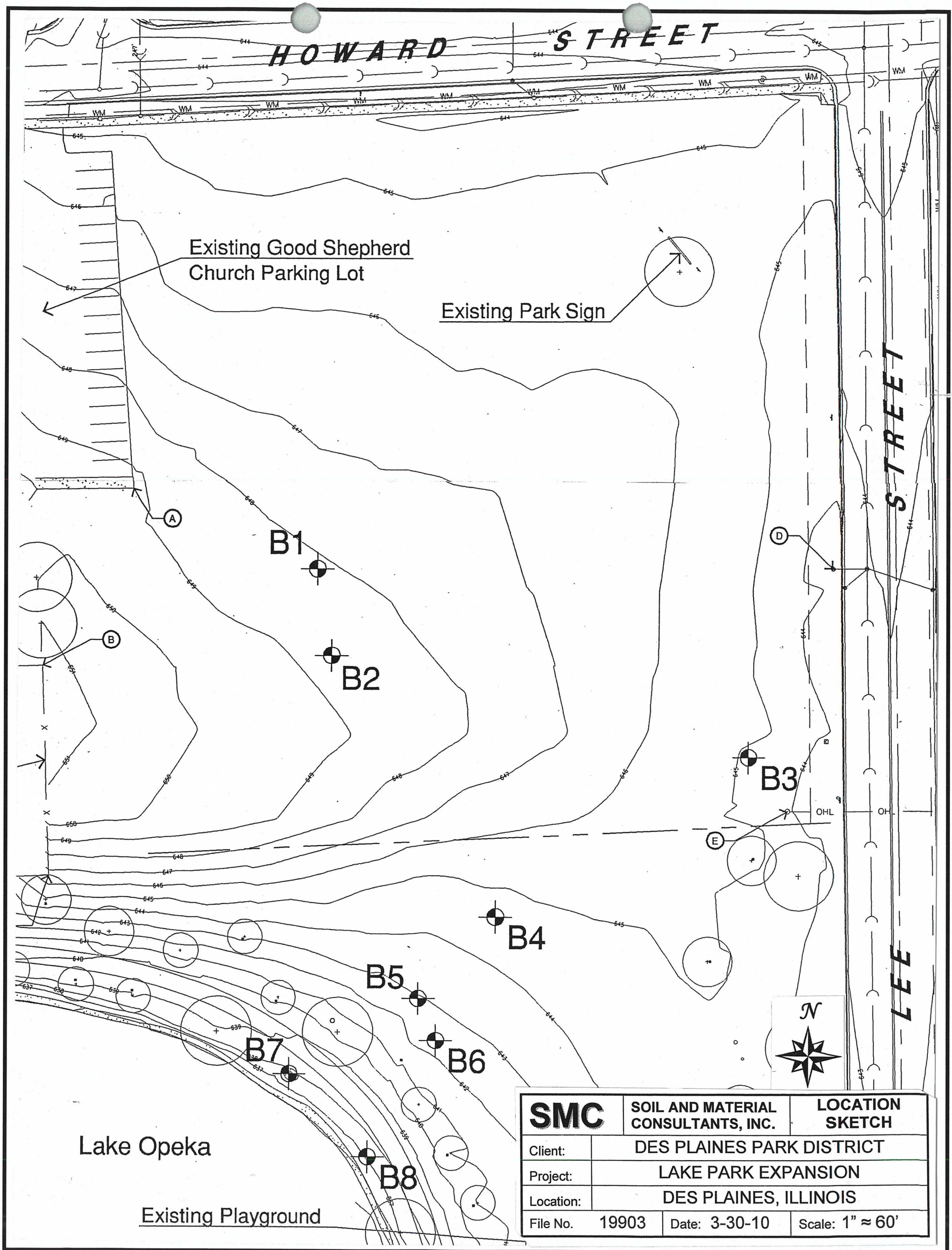
SOIL AND MATERIAL CONSULTANTS, INC.

Thomas P.

Thomas P. Johnson, P.E.
Project Engineer

CC: Joseph Brusseau – Brusseau Design Group, LLC.

TPJ:tj
Enc.



SMC SOIL AND MATERIAL CONSULTANTS, INC.

LOCATION SKETCH

Client: DES PLAINES PARK DISTRICT

Project: LAKE PARK EXPANSION

Location: DES PLAINES, ILLINOIS

File No. 19903 Date: 3-30-10 Scale: 1" ≈ 60'

SOIL AND MATERIAL CONSULTANTS, INC.
Arlington Heights, Illinois (847) 870-0544

SOIL BORING LOG 1

Logged By: DA
Page: 1 of 1
File No. 19903
Date Drilled: 3/30/10

Client: Des Plaines Park District

Reference: Lake Park Expansion
Des Plaines, IL

Comments:

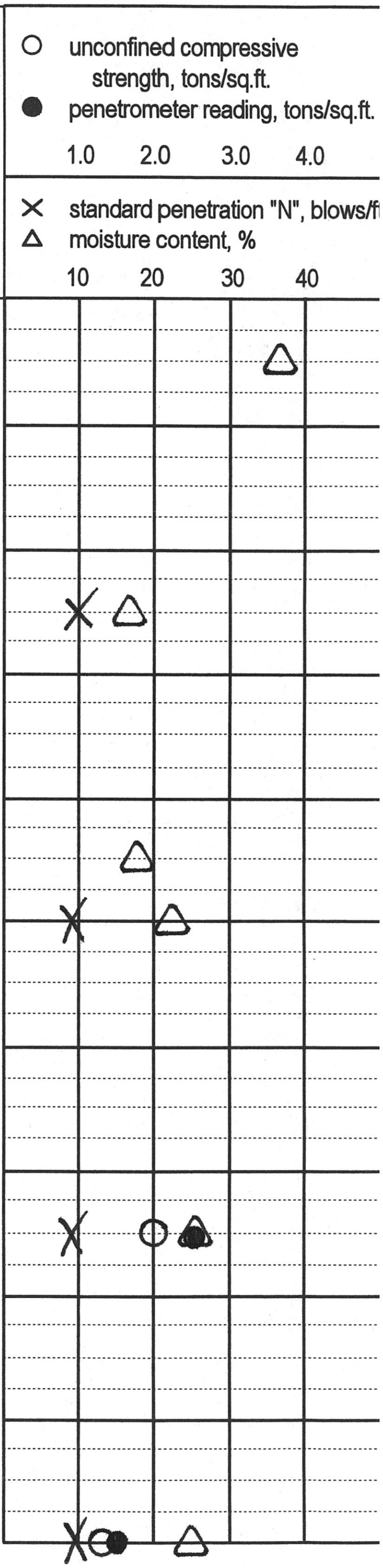
Equipment: ☒ CME 45B ☐ CME 55 ☐ Hand Auger ☐ Other

CLASSIFICATION

Elevation 648.0' **Existing Surface**

Classification	standard penetration ✕	moisture content △	dry unit weight lbs./cu.ft. ɣ	unconfined compressive strength ○
Black silt, some clay, trace sand & roots, damp (topsoil) - Fill		35.7		
Brown-gray silt, some clay, trace sand & gravel, damp, medium dense - Fill	10	16.2		
		18.6		
Black silt, some clay, trace sand, damp, loose (topsoil)	9	22.0		
Brown-gray clay & silt, trace sand & gravel, damp-very damp, very tough	9	25.0	96.2	2.0
Brown-gray clay & silt, trace sand & gravel, damp-very damp, tough	9	24.5	100.2	1.3

End of Boring



Water encountered at dry feet during drilling operations (W.D.).
Water recorded at dry feet on completion of drilling operations (A.D.).
Water recorded at feet hours after completion of drilling operations (A.D.).

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SOIL BORING LOG 2

Logged By: DA **Page:** 1 of 1

File No. 19903 **Date Drilled:** 3/30/10

Client: Des Plaines Park District

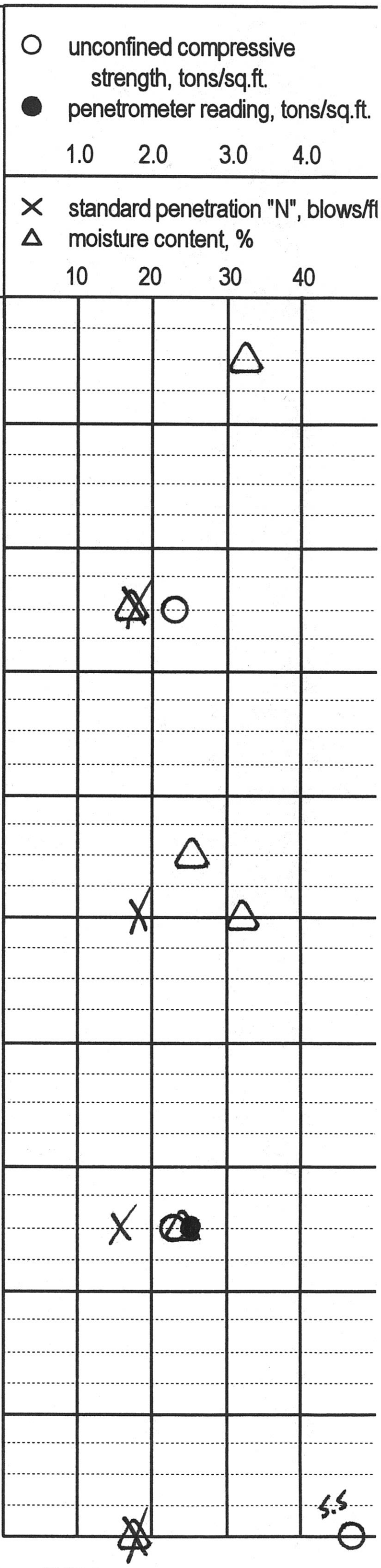
Reference: Lake Park Expansion
Des Plaines, IL

Comments:

Equipment: ☒ CME 45B ☐ CME 55 ☐ Hand Auger ☐ Other

depth, ft.	CLASSIFICATION **Elevation** 648.5' **Existing Surface**	standard penetration ✕	moisture content △	dry unit weight lbs./cu.ft. ɣ	unconfined compressive strength ○
	Black silt,some clay,trace sand & roots, very damp (topsoil) - Fill		31.4		
1	Brown-gray-black clay & silt,trace sand & gravel,damp,very tough - Fill	18	18.3	98.7	2.3
4	Black silt,some clay,trace sand,gravel, brick & cinders,damp,medium dense - Fill		24.7		
5	Black silt,some clay,trace sand,damp, medium dense (topsoil)	18	30.8		
7	Brown-gray clay,some silt,trace sand & gravel,damp,very tough to hard	16	24.0	96.4	2.3
10		18	18.4	111.5	5.5

End of Boring



Water encountered at dry feet during drilling operations (W.D.).
Water recorded at dry feet on completion of drilling operations (A.D.).
Water recorded at feet hours after completion of drilling operations (A.D.).

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SOIL BORING LOG 3

Logged By: DA **Page:** 1 of 1

File No. 19903 **Date Drilled:** 3/30/10

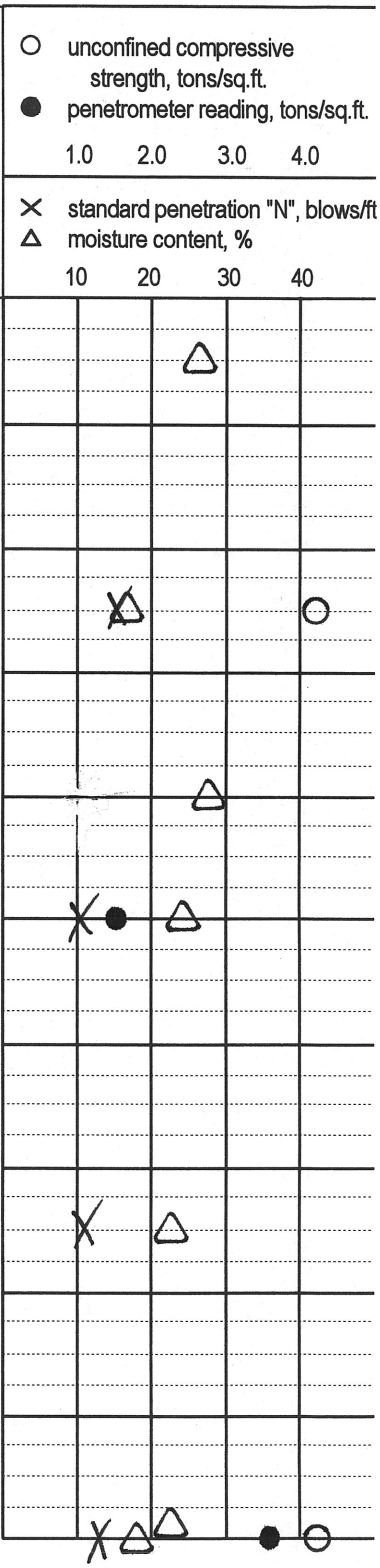
Client: Des Plaines Park District

Reference: Lake Park Expansion
Des Plaines, IL

Comments:

Equipment: ☒ CME 45B ☐ CME 55 ☐ Hand Auger ☐ Other

depth, ft.	CLASSIFICATION	standard penetration ×	moisture content △	dry unit weight lbs./cu.ft. ⊗	unconfined compressive strength ○
	Elevation 645.0' **Existing Surface**				
	Black silt, some clay, trace sand & roots, very damp (topsoil) - Fill		27.1		
1	Brown-dark brown-black clay & silt, trace sand & gravel, damp, hard - Fill				
2					
		15	16.5	105.2	4.2
3	Black silt, some clay, trace sand, damp, loose (topsoil)				
4			28.9		
	Brown-gray clay, some silt, trace sand & gravel, damp, tough				
5		11	23.9		
6					
7	Brown silt, some clay, trace fine sand, damp, medium dense				
		11	21.6		
8					
9					
	Brown clay, some silt, trace sand & gravel, damp, hard		21.7		
10	End of Boring	13	19.4	111.8	4.2



Water encountered at dry feet during drilling operations (W.D.).
Water recorded at dry feet on completion of drilling operations (A.D.).
Water recorded at feet hours after completion of drilling operations (A.D.).

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SOIL BORING LOG 4

Logged By: DA **Page:** 1 of 1

File No. 19903 **Date Drilled:** 3/30/10

Client: Des Plaines Park District

Reference: Lake Park Expansion
Des Plaines, IL

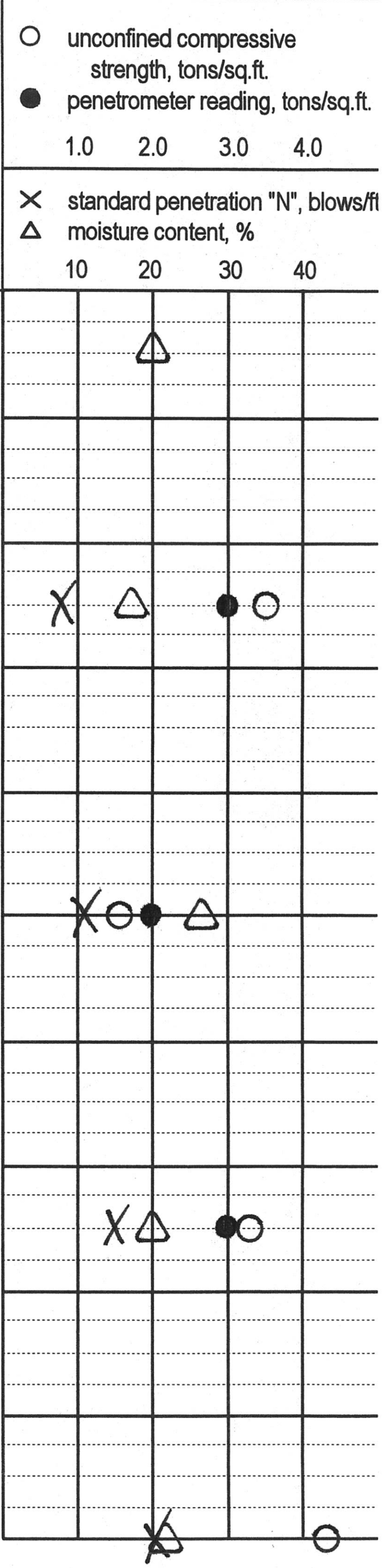
Comments:

Equipment: ☒ CME 45B ☐ CME 55 ☐ Hand Auger ☐ Other

Elevation 644.5' **Existing Surface**

depth, ft.	CLASSIFICATION	standard penetration ×	moisture content △	dry unit weight lbs./cu.ft. γ	unconfined compressive strength ○
0–1	Black silt, some clay, trace sand & roots, very damp (topsoil) - Fill		20.1		
1–3.5	Brown-dark brown clay & silt, trace sand & gravel, damp, very tough - Fill	8	18.3	104.7	3.5
3.5–10	Brown clay, some silt, trace sand & gravel, damp, tough to hard	11	26.9	93.5	1.5
		15	19.6	109.0	3.3
10		20	20.7	106.9	4.3

End of Boring



Water encountered at dry feet during drilling operations (W.D.).
Water recorded at dry feet on completion of drilling operations (A.D.).
Water recorded at feet hours after completion of drilling operations (A.D.).

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Arlington Heights, Illinois (847) 870-0544

SOIL BORING LOG 5

Logged By: DA **Page:** 1 of 1

File No. 19903 **Date Drilled:** 3/30/10

Client: Des Plaines Park District

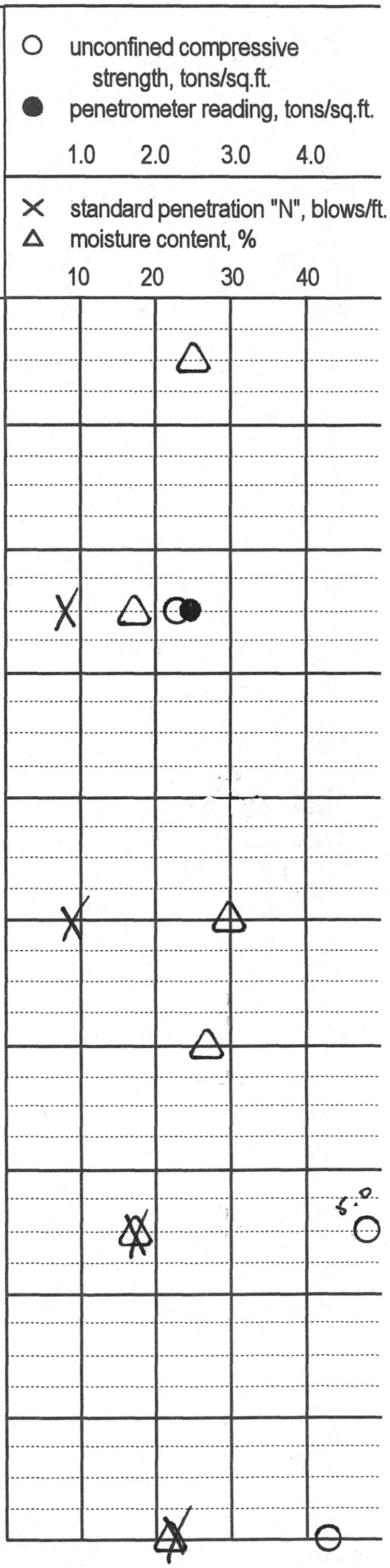
Reference: Lake Park Expansion
Des Plaines, IL

Comments:

Equipment: ☒ CME 45B ☐ CME 55 ☐ Hand Auger ☐ Other

depth, ft.	CLASSIFICATION Elevation 643.0' Existing Surface	standard penetration ✕	moisture content △	dry unit weight lbs./cu.ft. ɤ	unconfined compressive strength ○
0–1	Black silt,some clay,trace sand & roots, very damp (topsoil) - Fill		24.6		
1–2.5	Brown-gray-black clay & silt,trace sand & gravel,damp,very tough - Fill	8	18.2	106.6	2.3
2.5–5	Black-gray-brown silt,some clay,trace sand & gravel,damp-very damp,loose - Fill	9	30.2		
5–6	Black silt,some clay,trace sand,damp (topsoil)		26.6		
6–10	Brown clay,some silt,trace sand & gravel, damp,hard	17	18.4	113.8	5.0
10		22	20.6	106.1	4.3

End of Boring



Water encountered at dry feet during drilling operations (W.D.).
Water recorded at dry feet on completion of drilling operations (A.D.).
Water recorded at feet hours after completion of drilling operations (A.D.).

G-303d

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Arlington Heights, Illinois (847) 870-0544

SOIL BORING LOG 6

Logged By: DA **Page:** 1 of 1

File No. 19903 **Date Drilled:** 3/30/10

Client: Des Plaines Park District

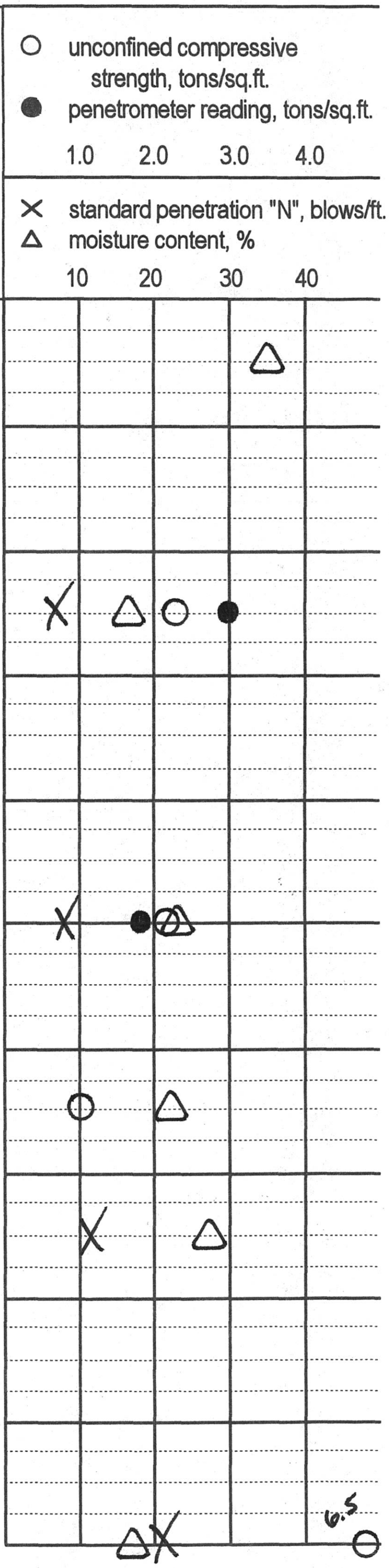
Reference: Lake Park Expansion
Des Plaines, IL

Comments:

Equipment: ☒ CME 45B ☐ CME 55 ☐ Hand Auger ☐ Other

Elevation 642.5' **Existing Surface**

depth, ft.	CLASSIFICATION	standard penetration ×	moisture content △	dry unit weight lbs./cu.ft. ४	unconfined compressive strength ○
0–1	Black silt,some clay,trace sand & roots, damp (topsoil) - Fill		35.0		
1–2.5	Brown-dark brown-black clay & silt,trace sand & gravel,damp,very tough - Fill ▽	7	16.7	111.3	2.3
2.5–5.75	Brown-gray clay,some silt,trace sand & gravel,damp,very tough - Fill	8	22.9	104.8	2.1
5.75–6.5	Brown-gray clay,some silt,trace sand & gravel,damp,tough - Fill		20.7	107.7	1.0
6.5–8	Black-dark gray-brown silt,some clay, trace sand & gravel,damp,medium dense - Fill	12	27.7		
8–10	Brown clay,some silt,trace sand & gravel, damp,hard	21	17.0	115.6	6.5



End of Boring

Water encountered at 2.5 feet during drilling operations (W.D.).
Water recorded at dry feet on completion of drilling operations (A.D.).
Water recorded at feet hours after completion of drilling operations (A.D.).

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SOIL BORING LOG 7

Logged By: DA **Page:** 1 of 1

Client: Des Plaines Park District

File No. 19903 **Date Drilled:** 3/30/10

Reference: Lake Park Expansion
Des Plaines, IL

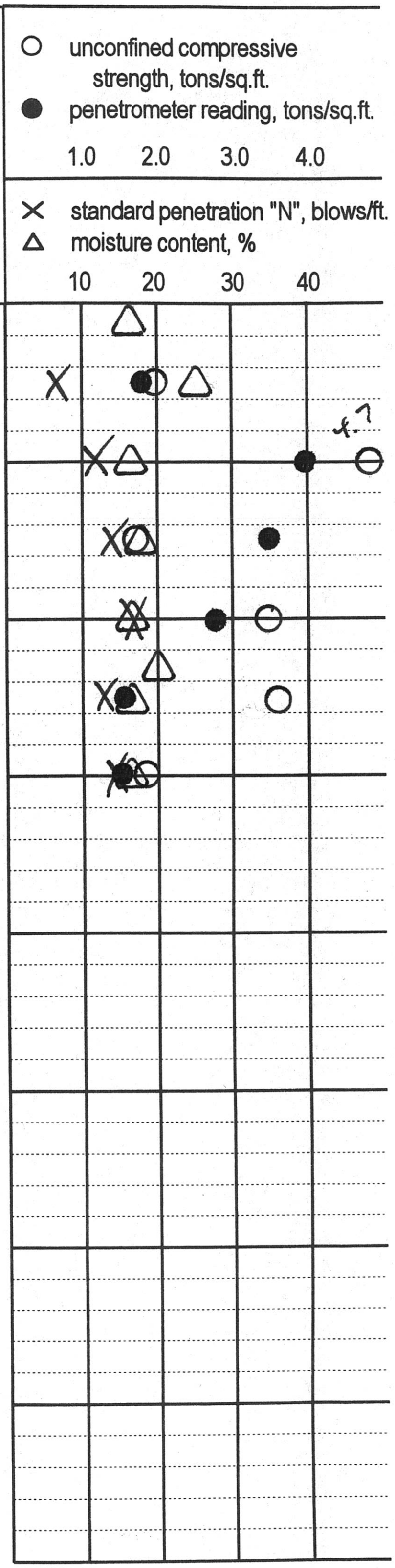
Comments:

Equipment: ☒ CME 45B ☐ CME 55 ☐ Hand Auger ☐ Other

depth, ft.	CLASSIFICATION Elevation 637.5 ' Existing Surface	standard penetration ✕	moisture content △	dry unit weight lbs./cu.ft.	unconfined compressive strength ○
	(a) see below		16.5		
	Brown-gray-black clay & silt, trace sand & gravel, damp, very tough to hard - Fill	7	24.5	100.5	2.0
5		12	16.4	109.6	4.7
	Brown-gray-black clay & silt, trace sand & gravel, damp, tough - Fill	14	19.3	101.0	1.6
10	Gray clay, some silt, trace sand & gravel, damp, very tough	16	16.6	114.4	3.5
	(b) see below		20.0		
	Gray clay, some silt, trace sand & gravel, damp, very tough to tough	13	16.1	119.3	3.6
15	End of Boring	14	16.8	122.5	1.9
20					
25					
30					
35					
40					

(a) Dark brown silt, some clay, trace sand, gravel & roots, damp - Fill

(b) Gray fine sand, trace silt, very damp, loose



Water encountered at 11.0 feet during drilling operations (W.D.).
Water recorded at 9.0 feet on completion of drilling operations (A.D.).
Water recorded at feet hours after completion of drilling operations (A.D.).

G-303

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Arlington Heights, Illinois (847) 870-0544

SOIL BORING LOG 8

Logged By: DA **Page:** 1 of 1

Client: Des Plaines Park District **File No.** 19903 **Date Drilled:** 3/30/10

Reference: Lake Park Expansion
Des Plaines, IL

Comments:

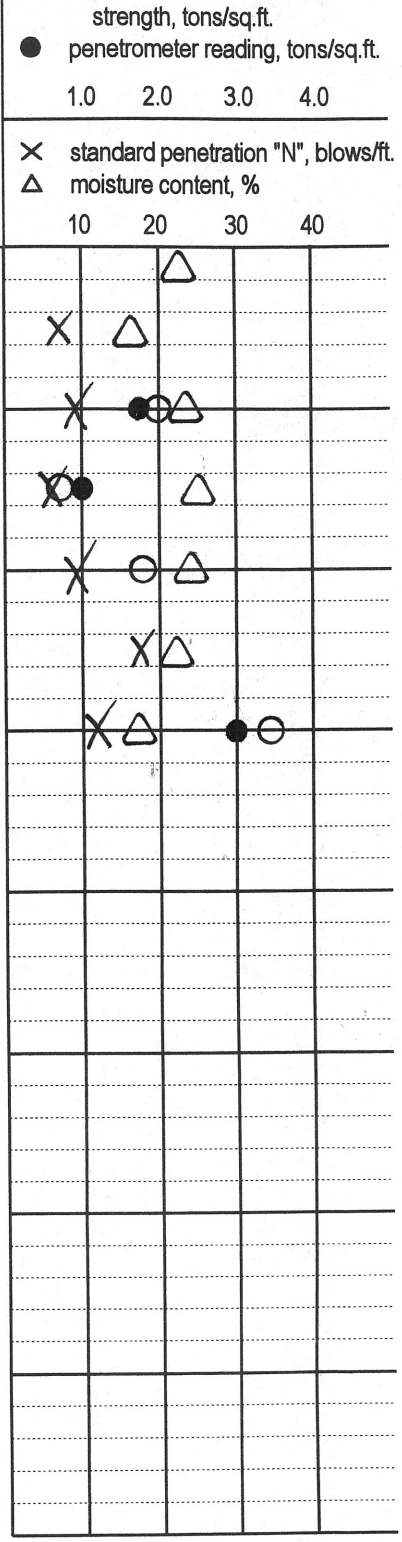
Equipment: ☒ CME 45B ☐ CME 55 ☐ Hand Auger ☐ Other

Elevation 637.0' **Existing Surface**

depth, ft.	CLASSIFICATION	standard penetration ×	moisture content △	dry unit weight lbs./cu.ft. ɤ	unconfined compressive strength ○
	(a) see below		22.0		
	(b) see below ∇	7	17.0		
5	Brown-gray clay,some silt,trace sand & gravel,damp-very damp,very tough to stiff Fill	9	23.2	104.1	2.0
		6	25.0	104.1	0.7
10	Gray clay,some silt,trace sand & gravel, damp,tough	9	24.3	103.0	1.8
	Gray fine sand,trace silt,very damp,medium dense	17	20.8		
15	Gray clay,some silt,trace sand & gravel, damp,very tough	12	18.4	112.8	3.5
	End of Boring				
20					
25					
30					
35					
40					

(a) Dark brown silt,some clay,trace sand, gravel & roots,damp - Fill - 15.0"

(b) Brown silt & gravel,some crushed asphalt,trace clay & silt,damp,loose Fill



Water encountered at 2'/11' feet during drilling operations (W.D.).
Water recorded at 8.0 feet on completion of drilling operations (A.D.).
Water recorded at feet hours after completion of drilling operations (A.D.).

SMC SOIL AND MATERIAL CONSULTANTS, INC.

General Notes

SAMPLE CLASSIFICATION

Soil sample classification is based on the Unified Soil Classification System, the Standard Practice for Description and Identification of Soils (Visual-Manual Procedure), ASTM D-2488, the Standard Test Method for Classification of Soils for Engineering Purposes, ASTM D-2487(when applicable), and the modifiers noted below.

CONSISTENCY OF COHESIVE SOILS

Term	Qu -tons/sq. ft.	N (unreliable)
Very Soft	0.00 - 0.25	0 - 2
Soft	0.26 - 0.49	3 - 4
Stiff	0.50 - 0.99	5 - 8
Tough	1.00 - 1.99	9 - 15
Very Tough	2.00 - 3.99	16 - 30
Hard	4.00 - 7.99	30 +
Very Hard	8.00 +	

RELATIVE DENSITY OF GRANULAR SOILS

Term	N - blows/foot
Very Loose	0 - 4
Loose	5 - 9
Medium Dense	10 - 29
Dense	30 - 49
Very Dense	50 +

IDENTIFICATION AND TERMINOLOGY

Term		Size Range
Boulder		over 8 in.
Cobble		3 in. to 8 in.
Gravel	-coarse	1 in. to 3 in.
	-medium	3/8 in. to 1 in.
	-fine	#4 sieve to 3/8 in.
Sand	-coarse	#10 sieve to #4 sieve
	-medium	#40 sieve to #10 sieve
	-fine	#200 sieve to #40 sieve
Silt		0.002 mm to #200 sieve
Clay		smaller than 0.002 mm

Modifying Term	Percent by Weight
Trace	1 - 10
Little	11 - 20
Some	21 - 35
And	36 - 50

Moisture Condition
Dry
Damp
Very Damp
Saturated

DRILLING, SAMPLING & SOIL PROPERTY SYMBOLS

CF - Continuous Flight Auger
HS - Hollow Stem Auger
HA - Hand Auger
RD - Rotary Drilling
AX - Rock Core, 1-3/16 in. diameter
BX - Rock Core, 1-5/8 in. diameter
NX - Rock Core, 2-1/8 in. diameter
S - Sample Number
T - Type of Sample
J - Jar
AS - Auger Sample
SS - Split-spoon (2 in. O.D. with 1-3/8 in. I.D.)
ST - Shelby Tube (2 in. O.D. with 1-7/8 in. I.D.)
R - Recovery Length, in.
B - Blows/ 6 in. interval, Standard Penetration Test (SPT)
N - Blows/ foot to drive 2 in. O.D. split-spoon sampler with 140 lb. hammer falling 30 in., (STP)
Pen. - Pocket Penetrometer reading, tons/ sq. ft.
W - Water Content, % of dry weight
Uw - Dry Unit Weight of soil, lbs./ cu. ft.
Qu - Unconfined Compressive Strength, tons/ sq. ft.
Str - % Strain at Qu.
WL - Water Level
WD - While Drilling
AD - After Drilling
DCI - Dry Cave-in
WCI - Wet Cave-in
LL - Liquid Limit, %
PL - Plastic limit, %
PI - Plasticity Index (LL-PL)
LI - Liquidity Index [(W-PL)/PI]

SOIL AND MATERIAL CONSULTANTS, INC.

Office: 847-870-0544
Fax: 847-870-0661
us@soilandmaterialconsultants.com
www.soilandmaterialconsultants.com

March 18, 2022
File No. 26392

Mr. Paul A. Cathey
Des Plaines Park District
2222 Birch Street
Des Plaines, IL 60018

Re: Geotechnical Investigation
Lake Park
Des Plaines, Illinois

Dear Mr. Cathey:

We are submitting our report for the subsurface investigation completed at Lake Park in the City of Des Plaines, Illinois.

The investigation was requested to determine current subsurface soil and water conditions at select boring locations. The findings of the field investigation and the results of laboratory testing are intended to assist in the planning, design and construction of proposed site improvements. We understand it is proposed to construct a stormwater pump station in the area of boring B-1 and a raised deck in the area of boring B-2.

SCOPE OF THE INVESTIGATION

The field investigation included obtaining 2 borings at the locations requested and as indicated on the enclosed location sketches. The boring locations were established using field taping methods and accuracy. Surface elevations were determined using the temporary benchmarks indicated on the location sketches.

We auger drilled the borings to depths of 15.0 feet and 30.0 feet below existing surface elevations. Soil samples were obtained using a split barrel sampler advanced utilizing an automatic SPT hammer. Soil profiles were determined in the field and soil samples returned to our laboratory for additional testing including determination of moisture content. Cohesive soils obtained by split barrel sampling were tested further to determine dry unit weight and unconfined compressive strength.

The results of all field determinations and laboratory testing are included in summary with this report.

RESULTS OF THE INVESTIGATION

Enclosed are boring logs indicating the soil conditions encountered at each location. Site surface conditions include vegetation, topsoil and fill soil conditions. The topsoil is classified as black silt/clay mixtures with traces of roots.

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SOIL BORINGS ● SITE INVESTIGATIONS ● PAVEMENT INVESTIGATIONS ● GEOTECHNICAL ENGINEERING
TESTING OF ● SOIL ● ASPHALT ● CONCRETE ● MORTAR ● STEEL

Fill soil conditions were encountered underlying the surface topsoil at boring B-2. Composition of the fill includes the presence of clay/silt mixtures extending to a depth of 3.0 feet. The limits of fill placement were not determined within the scope of this investigation. Larger debris may also be present within the fill but was not encountered during the investigation.

Underlying natural soil conditions include the presence of cohesive soils. These are classified as tough to hard clay/silt mixtures with lesser portions of sand and gravel. Non-cohesive soils were also encountered as indicated at boring B-1. These include medium dense sand and silt/clay mixtures. The sand seam encountered between 18.5 feet and 19.5 feet below the surface was in a saturated condition. Cobbles and boulders may be present within the site soils at any elevation, although none were encountered while drilling.

The following table summarizes depth ranges below existing grade, the magnitude of soil strength within these ranges and other information:

Boring	Surface Elevation (feet)	Depth Range Below Existing Surface (feet)	Soil Strength (lbs./sq.ft.)	Recorded Water Levels, W.D./A.D. (feet)
1	632.7	1.5 to 7.0	6,000	18.5/18.5
		7.0 to 15.5	5,000	
		15.5 to 26.5	3,000	
		26.5 to 27.0	8,000	
2	99.7	2.0 to 3.5	*3,000	dry/dry
		3.5 to 5.5	6,000	
		5.5 to 12.0	3,000	

* Not recommended for support of foundations.

The boring logs and the above table indicate the depth at which subsurface water was encountered in the bore holes at the time of the drilling operations and during the period of these readings. It is expected that fluctuations from the water levels recorded will occur over a period of time due to variations in rainfall, temperature, subsurface soil conditions, soil permeability and other factors not evident at the time of the water level measurements.

FOUNDATIONS

Based on the results of this investigation it is our opinion that continuous and isolated footing foundations may be considered for support of building loads. These foundations can be supported on undisturbed natural soils located below all topsoil, debris, unsuitable fill soils, low strength soils and other unsuitable conditions which may be encountered. Soil strength values and the depths at which they are expected to be encountered at these boring locations are indicated in the above table. A net allowable bearing value of 3,000 lbs./sq.ft. is available for design. This value can be used to size foundations for support of structure dead and live loads. Increased bearing values may be available at some locations and elevations. The feasibility of using a higher value is best determined after our review of proposed foundation details and elevations.

All exterior building foundations should extend at least 42.0 inches below exposed surface elevations to provide adequate protection against uplift due to freezing of the supporting soils. Foundations for unprotected improvements should extend at least 48.0 inches below exposed surface elevations. We recommend providing adequate reinforcing steel in foundation walls and piers to minimize the effects of long-term differential settlement.

Weak soil conditions may be discovered locally at design foundation elevations and may require extending the foundation to a deeper elevation. Alternately, removal of the weak soil followed by replacement with properly compacted coarse crushed granular fill (CA01) may be feasible. When removal is approved by the Soil Engineer, the removal of the weak soil should also extend beyond the face of footings and/or piers to a distance at least equal to the depth of fill that will be present beneath the footings and/or piers. A capping layer of finer crushed granular fill (CA06) can be utilized to establish a working surface.

FLOOR SLABS

Floor slabs planned for support on the existing soil conditions are expected to undergo some degree of long-term settlement as the soils consolidate under loading and as they shrink due to desiccation. Slabs may be considered for support on suitable natural soils or on properly placed and compacted fill soils. This is feasible when the soils supporting the slabs are prepared in accordance with the recommendations for Subgrade Soil Preparation. These include the removal of topsoil as well as removal or aeration of underlying high moisture content soils.

DEWATERING

Excavations may require dewatering due to subsurface water seepage and/or surface precipitation. This water can likely be removed to depths of several feet by standard sump and pump operations. Soils exposed at foundation, slab or undercut elevations should not be permitted to become saturated. Loss of bearing strength and stability may occur, requiring additional soil excavation.

Organic soils, non-cohesive soils and others can be unstable when saturated. These soils tend to cave or run when submerged or disturbed. The stability of exposed embankments is minimal to non-existent as confining soil pressures are removed. Proper drainage within excavations is necessary at all times, particularly when excavations extend below anticipated water levels and below saturated soils.

The contractor should be made responsible for designing and constructing stable temporary excavations. Also, the contractor should shore, slope, bench or restrain the sides of the excavations as required to maintain stability of both the excavation sides and bottom. In no case, should the slope, slope heights, or excavation depth exceed those in the local, state, and federal safety regulations.

SUBGRADE SOIL PREPARATION

The procedure in all areas of subgrade supported improvements should include the removal of unsuitable surface conditions including vegetation, topsoil, unsuitable fill soils, significant debris, weak or unstable soils, and other deleterious conditions which may be encountered. Above grade areas should be cut to design subgrade elevations. Exposed subgrade soils should be leveled, compacted and proof-rolled in the presence of the Soil Engineer.

Proof-rolling may reveal areas of unstable soil conditions. Discing and aeration of high moisture content soils can be effective to depths of up to 1.0 foot, depending upon the equipment utilized. Removal of unstable soils may be necessary if high moisture content conditions extend to depths greater than the effective depth of discing. If the depth of undercut appears to be significant, it may be economical to limit the depth of undercut to that needed to establish adequate support of slabs and remediate weak soil conditions at foundation elevations at the time of foundation construction.

Soft or unstable soil conditions in pavement areas can often be bridged by use of an effective depth of crushed granular material. The placement of the crushed granular bridging material, possibly in conjunction with the use of an appropriate geotextile fabric, should only proceed after review of the proof-roll conditions by the Soil Engineer. Long-term settlement of pavement surfaces may occur locally as the bridged soils desiccate.

Structural fill can be placed on soils prepared to the satisfaction of the Soil Engineer. The fill should be placed in lifts not to exceed 8.0 inches when uncompacted. Each lift should exceed minimum compaction requirements prior to placement of the next lift. We recommend a minimum of 95% compaction based on the modified Proctor test, ASTM D-1557, be achieved within building areas. A minimum of 90% compaction should be achieved beneath exterior improvements such as pavements and sidewalks. Compaction requirements also apply to backfill placement around foundations and within trench excavations located below subgrade supported improvements.

CONCLUSION

The information within this report is intended to provide initial information concerning subsurface soil and water conditions on the site. Variations in subsurface conditions are expected to be present between boring locations due to naturally changing soil conditions. Variations are also expected within areas of disturbed (filled) soil conditions.

Our understanding of the proposed improvements is based on limited information available to us at the writing of this report. The findings of the investigation and the recommendations presented are not considered applicable to significant changes in the scope of the improvements or applicable to alternate site uses. We recommend that proposed foundation, pavement and grading plans be reviewed by our office to determine if additional considerations are necessary to address anticipated subsurface conditions.

The soils exposed in soil undercut areas should be evaluated for suitability prior to placement of structural fill, as previously indicated in this report. Soils and aggregates placed as structural fill should be tested as the work progresses to verify that minimum compaction requirements have been met. We recommend that soil conditions encountered at foundation elevations be tested to verify the presence of design soil strength prior to concrete placement.

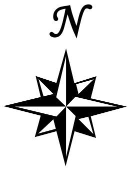
If you have any questions concerning the findings or recommendations presented in this report, please let me know.

Very truly yours,

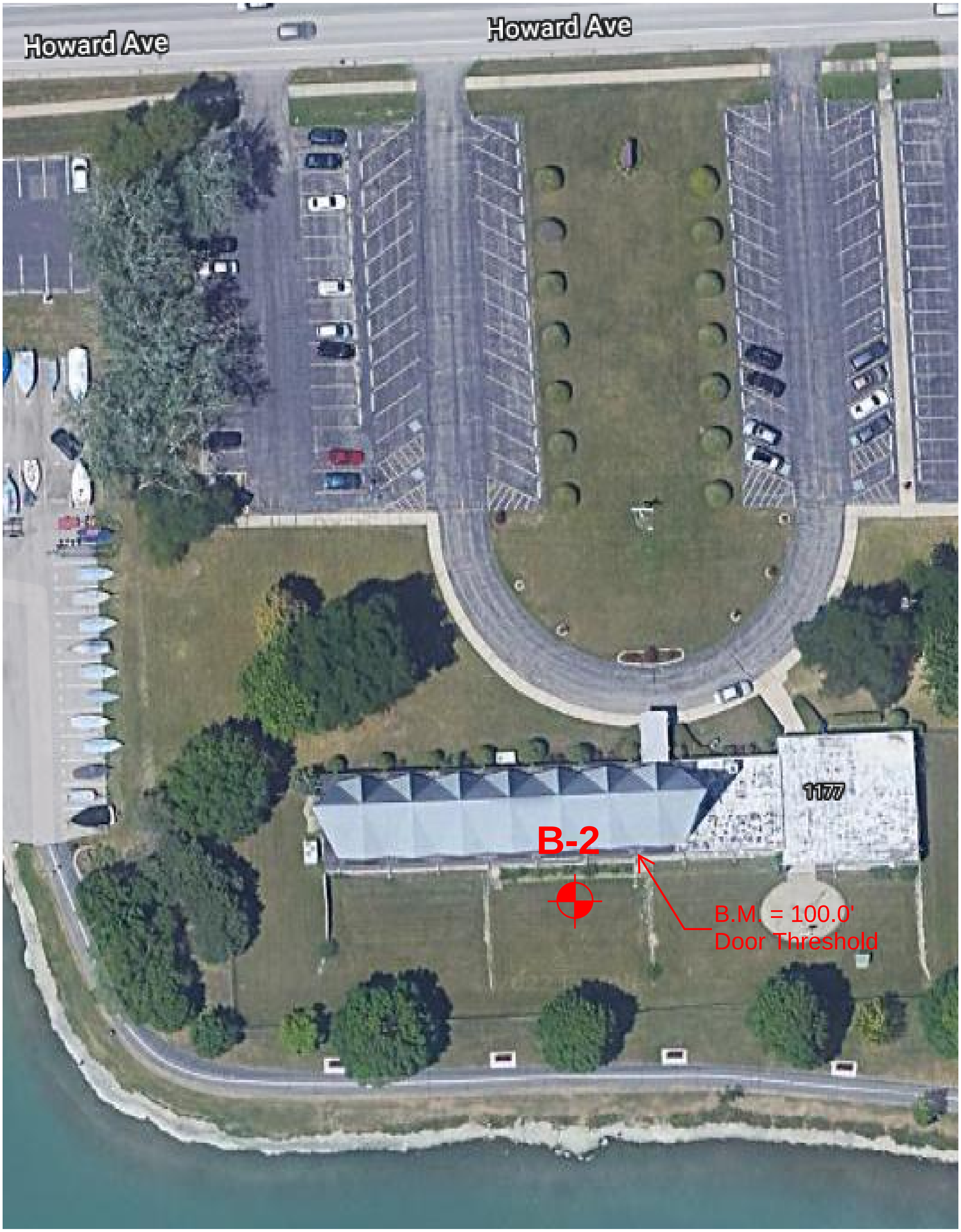
SOIL AND MATERIAL CONSULTANTS, INC.

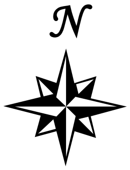
Thomas P. Johnson, P.E.
President

TPJ:ek
Enc.



SMC	**SOIL AND MATERIAL CONSULTANTS, INC.**	**LOCATION SKETCH**
Client:	DES PLAINES PARK DISTRICT	
Project:	LAKE PARK	
Location:	DES PLAINES, ILLINOIS	
File No. 26392	Date: 3-17-22	Scale: NONE





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SOIL AND MATERIAL CONSULTANTS, INC.

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SOIL BORING LOG 1

Logged By: CS **Page:** 1 of 1

File No. 26392 **Date Drilled:** 3/17/22

Client: Des Plaines Park District

Reference: Lake Park
Des Plaines, IL

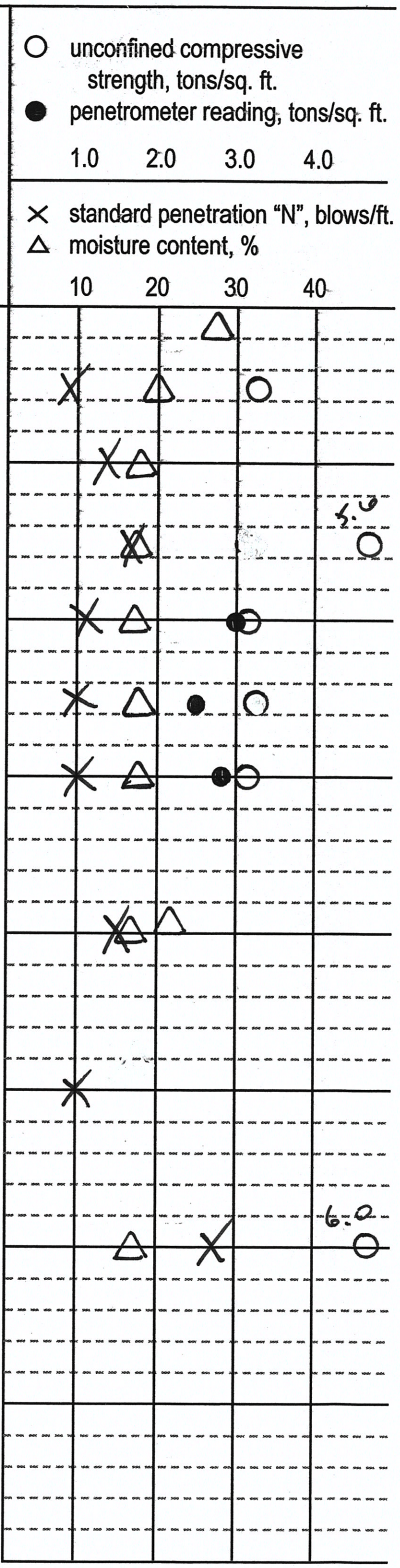
Comments:

Equipment: ☐D - 25 ☒ D - 50 ☐Hand Auger ☐Other

Elevation 632.7' **Existing Surface**

depth, ft.	CLASSIFICATION	standard penetration ×	moisture content △	dry unit weight lbs./cu.ft. ☒	unconfined compressive strength ○
	(a) see below		29.4		
	Brown-gray to brown clay,some silt,trace sand & gravel,damp,very tough to hard	9	20.0	105.0	3.3
5		14	18.5		
		17	17.8	115.5	5.6
10	Gray clay,some silt,trace sand & gravel, damp,very tough	11	17.6	114.2	3.1
		10	18.8	114.7	3.2
15		10	18.5	114.5	3.1
	(b) see below				
20	Gray silt,some clay,trace fine sand, damp-very damp,medium dense	15	20.5 17.3		
25		10	18.8		
	Gray clay,some silt,trace sand & gravel, damp,hard				
30	End of Boring	27	17.8	122.6	6.0
35					
40					

(a) Black silt,some clay,trace sand & roots,damp (topsoil) - 10.0"
(b) Gray fine sand,trace silt,saturated medium dense



Water encountered at 18.5 feet during drilling operations (W.D.)
Water recorded at 18.5 feet on completion of drilling operations (A.D.)
Water recorded at feet hours after completion of drilling operations (A.D.)

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SOIL BORING LOG 2

Logged By: CS **Page:** 1 of 1

File No. 26392 **Date Drilled:** 3/17/22

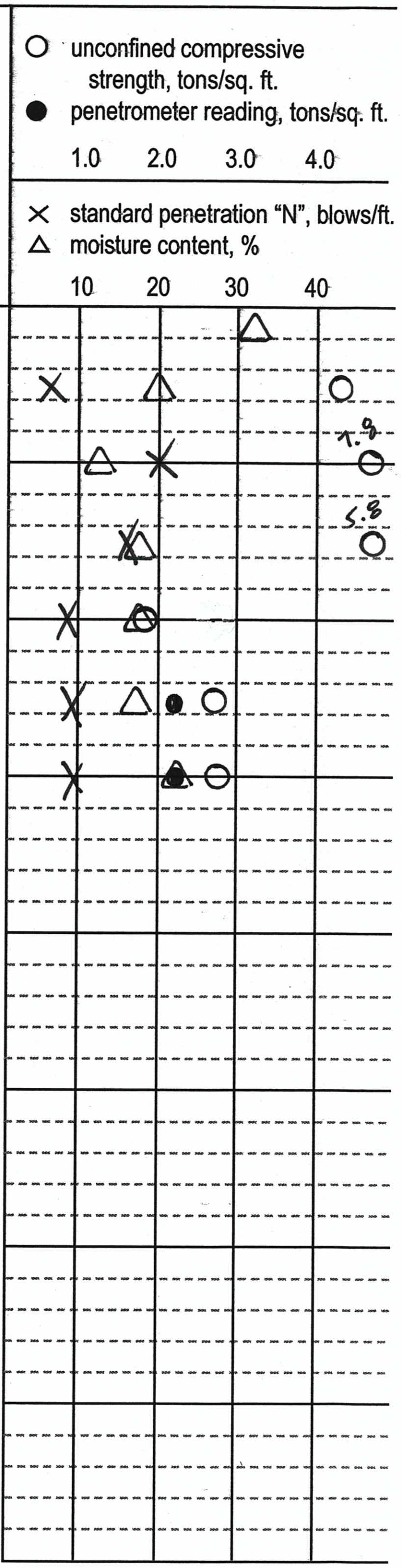
Client: Des Plaines Park District

Reference: Lake Park
Des Plaines, IL

Comments:

Equipment: ☐D - 25 ☒D - 50 ☐Hand Auger ☐Other

depth, ft.	CLASSIFICATION **Elevation** 99.7' **Existing Surface**	standard penetration ✕	moisture content △	dry unit weight lbs./cu.ft.	unconfined compressive strengh ○
	Black silt, some clay, trace sand & roots, damp (topsoil) - Fill		31.7		
	Brown clay, some silt, trace sand & gravel, damp, hard - Fill	6	20.2	109.2	4.3
5	Brown clay, some silt, trace sand & gravel damp, hard	20	12.5	128.0	7.8
		16	19.2	110.5	5.8
10	Gray clay, some silt, trace sand & gravel, damp, tough to very tough	8	17.5	117.2	1.9
		9	18.4	114.2	2.7
15	End of Boring	9	23.1	106.6	2.8
20					
25					
30					
35					
40					



Water encountered at dry feet during drilling operations (W.D.)
Water recorded at dry feet on completion of drilling operations (A.D.)
Water recorded at feet hours after completion of drilling operations (A.D.)

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GENERAL NOTES

SAMPLE CLASSIFICATION

Soil sample classification is based on the Unified Soil Classification System, the Standard Practice for Description and Identification Soils (Visual-Manual Procedure), ASTM D-2488, the Standard Test Method for Classification of Soils for Engineering Purposes, ASTM D-2487 (when applicable), and the modifiers noted below.

CONSISTENCY OF COHESIVE SOILS

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Soft	0.26 – 0.49	3 – 4
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Moisture Content

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