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March 21, 2021

Mr. Motaz Kaakarli
OYK Engineering & Construction
30700 Telegraph Road, Suite 2665
Bingham Farms, Michigan 48025

RE: Letter on Subsurface Conditions
2800 S. Rochester
2800 South Rochester Road
Rochester Hills, Michigan
G2 Project No. 210165

Dear Mr. Kaakarli:

We understand the existing property is being evaluated for redevelopment in Rochester Hills, Michigan. An existing detention basin is located at the southeast corner of the overall property. The City of Rochester Hills has requested an evaluation of the existing subsurface conditions relative to infiltration potential.

A 15-foot soil boring designed B-1 was performed on the north side of the existing basin as presented on the Soil Boring Location Plan, Plate No. 1. The soil boring was drilled using a truck mounted rotary drilling rig. Continuous flight, 2-1/4-inch inside diameter hollow-stem augers were used to advance the borehole to the explored depth. Soil samples were obtained at intervals of 2-1/2 feet within the upper 10 feet with an additional sample obtained at 15 feet. These samples were obtained by the Standard Penetration Test method (ASTM D 1586), which involves driving a 2-inch diameter split-spoon sampler into the soil with a 140-pound weight falling 30 inches. The sampler is generally driven three successive 6-inch increments with the number of blows for each increment recorded. The number of blows required to advance the sampler the last 12 inches is termed the Standard Penetration Resistance (N). Blow counts for each 6-inch increment and the resulting N-values are presented on the soil boring log.

Soil samples were placed in sealed containers in the field and brought to our laboratory for testing and classification. During field operations, the drilling crew maintained a log of the encountered subsurface conditions, including changes in stratigraphy and observed groundwater levels. The final boring log is based on the field log supplemented by laboratory soil classification and test results. After completion of drilling operations, the borehole was backfilled with auger cuttings.

Soil conditions at the boring location consist of 15 inches of topsoil underlain by very stiff to hard silty clay extending to the explored depth of 15 feet. The silty clay has natural moisture contents ranging from 11 to 15 percent and unconfined compressive strengths ranging from 4,000 to 9,000 pounds per square foot (psf). No measurable groundwater was encountered during or upon completion of drilling operations. Silty clay is a relatively impermeable material which typically has permeability rates ranging from $5x10^{-8}$ to $5x10^{-6}$. These values are not conducive to infiltration. These encountered subsurface conditions are consistent with surrounding historical soil borings, including a boring on the adjacent property to the north.

We appreciate the opportunity to be of service to OYK Engineering & Construction. If you have any questions regarding this letter or any other matter pertaining to the project, please do not hesitate to call.

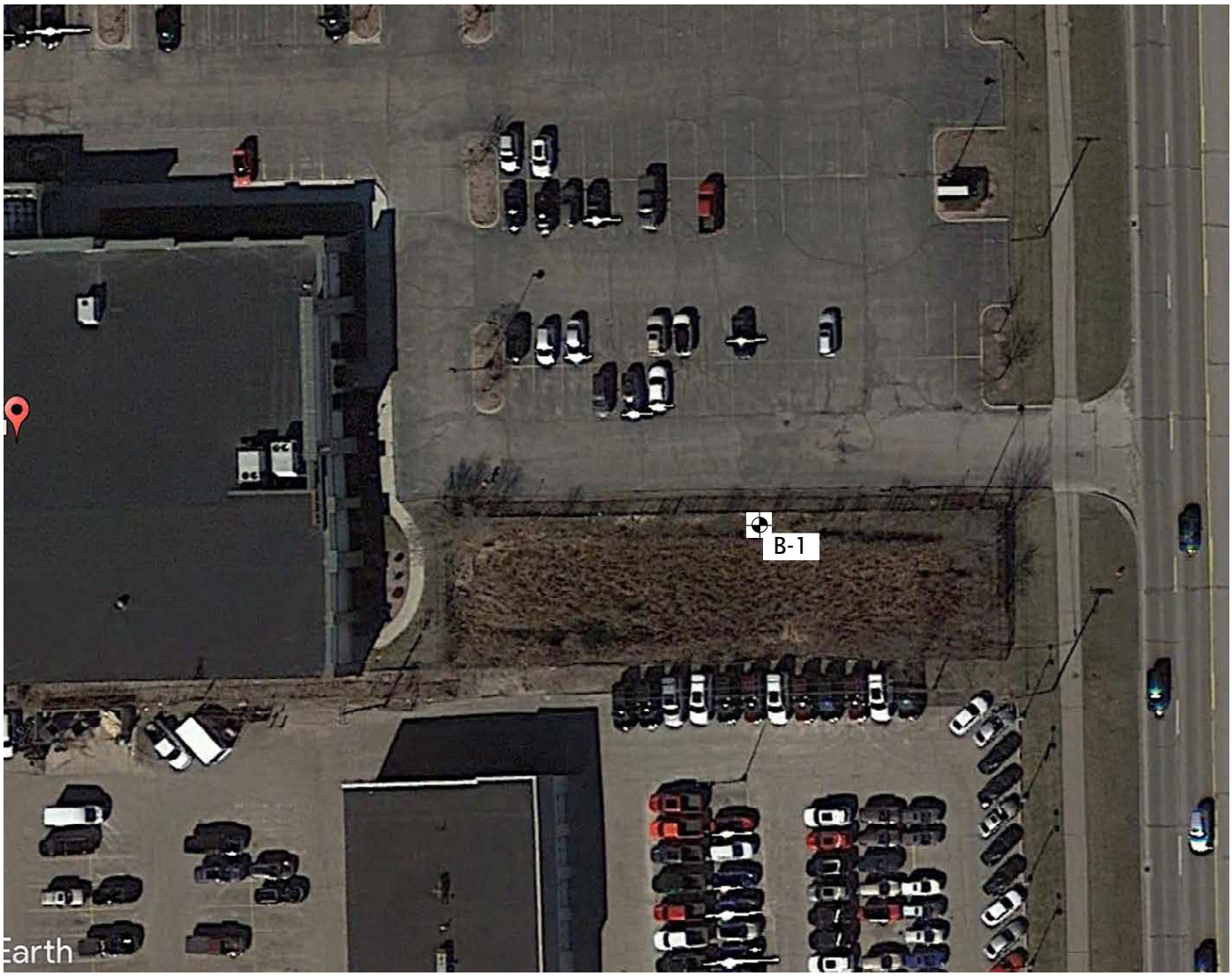
Sincerely,

G2 Consulting Group, LLC

Amy L. Schneider, P.E.
Project Manager

Noel J. Hargrave-Thomas, P.E.
Principal

Attachments: Soil Boring Location Plan, Plate No. 1
Soil Boring Log, Figure No. 1
General Notes Terminology, Figure No. 2



Legend

Soil Boring Performed by Strata Drilling, Inc. on March 17, 2021

Soil Boring Location Plan

2800 S. Rochester
2800 South Rochester Road
Rochester Hills, Michigan

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Project No. 210165	
Drawn by: ALS	
Date: 3/21/21	Plate No. 1
Scale: NTS	

Project Name: 2800 S. Rochseter

Project Location: 2800 South Rochester Road
Rochester Hills, Michigan

G2 Project No. 210165

Latitude: N/A Longitude: N/A

Soil Boring No. **B-1**

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DEPTH (ft)	PRO-FILE	GROUND SURFACE ELEVATION: N/A	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		SUBSURFACE PROFILE		**SOIL SAMPLE DATA**					
		Topsoil: Dark Brown Silty Clay							
		1.3		S-1	3 3 4	7	14.7		4000*
5		Very Stiff to Hard Brown Silty Clay with trace sand and gravel	5	S-2	3 4 4	8	11.7		9000*
				S-3	4 4 5	9	12.5		8000*
		8.0							
10		Very Stiff to Hard Brown Silty Clay with little sand and trace gravel	10	S-4	10 12 11	23	11.3		9000*
		12.0							
15		Very Stiff Gray Silty Clay with trace sand and gravel 15.0	15	S-5	5 6 8	14	11.9		6000*
		End of Boring @ 15 ft							
20			20						

Total Depth: 15 ft
Drilling Date: March 17, 2021
Inspector:
Contractor: Strata Drilling, Inc.
Driller: D. Watkins

Drilling Method:
2-1/4 inch inside diameter hollow stem augers

Water Level Observation:
Dry during and upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Auger cuttings

Figure No. 1

SOIL / PAVEMENT BORING 210165.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 3/22/21

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GENERAL NOTES TERMINOLOGY

Unless otherwise noted, all terms herein refer to the Standard Definitions presented in ASTM 653.

PARTICLE SIZE

Boulders		- greater than 12 inches
Cobbles		- 3 inches to 12 inches
Gravel	- Coarse	- 3/4 inches to 3 inches
	- Fine	- No. 4 to 3/4 inches
Sand	- Coarse	- No. 10 to No. 4
	- Medium	- No. 40 to No. 10
	- Fine	- No. 200 to No. 40
Silt		- 0.005mm to 0.074mm
Clay		- Less than 0.005mm

CLASSIFICATION

The major soil constituent is the principal noun, i.e. clay, silt, sand, gravel. The second major soil constituent and other minor constituents are reported as follows:

Second Major Constituent (percent by weight)	Minor Constituent (percent by weight)
Trace - 1 to 12%	Trace - 1 to 12%
Adjective - 12 to 35%	Little - 12 to 23%
And - over 35%	Some - 23 to 33%

COHESIVE SOILS

If clay content is sufficient so that clay dominates soil properties, clay becomes the principal noun with the other major soil constituent as modifier, i.e. sandy clay. Other minor soil constituents may be included in accordance with the classification breakdown for cohesionless soils, i.e. silty clay, trace sand, little gravel.

Consistency	Unconfined Compressive Strength (psf)	Approximate Range of (N)
Very Soft	Below 500	0 - 2
Soft	500 - 1,000	3 - 4
Medium	1,000 - 2,000	5 - 8
Stiff	2,000 - 4,000	9 - 15
Very Stiff	4,000 - 8,000	16 - 30
Hard	8,000 - 16,000	31 - 50
Very Hard	Over 16,000	Over 50

Consistency of cohesive soils is based upon an evaluation of the observed resistance to deformation under load and not upon the Standard Penetration Resistance (N).

COHESIONLESS SOILS

Density Classification	Relative Density %	Approximate Range of (N)
Very Loose	0 - 15	0 - 4
Loose	16 - 35	5 - 10
Medium Compact	36 - 65	11 - 30
Compact	66 - 85	31 - 50
Very Compact	86 - 100	Over 50

Relative Density of cohesionless soils is based upon the evaluation of the Standard Penetration Resistance (N), modified as required for depth effects, sampling effects, etc.

SAMPLE DESIGNATIONS

AS - Auger Sample – Cuttings directly from auger flight
BS - Bottle or Bag Samples
S - Split Spoon Sample - ASTM D 1586
LS - Liner Sample with liner insert 3 inches in length
ST - Shelby Tube sample - 3 inch diameter unless otherwise noted
PS - Piston Sample - 3 inch diameter unless otherwise noted
RC - Rock Core - NX core unless otherwise noted

STANDARD PENETRATION TEST (ASTM D 1586) - A 2.0 inch outside-diameter, 1-3/8 inch inside-diameter split barrel sampler is driven into undisturbed soil by means of a 140-pound weight falling freely through a vertical distance of 30 inches. The sampler is normally driven three successive 6-inch increments. The total number of blows required for the final 12 inches of penetration is the Standard Penetration Resistance (N).