CONSULTING GROUP

December 30, 2021

Mr. Aaron Berkholz, P.E.
Senior Project Manager
Washtenaw County Road Commission
555 N. Zeeb Road
Ann Arbor, Michigan 48103

RE: Report on Inclinometer Readings
Grove Road Slope Stability
Grove Road between Margarita Street and Loon Feather Point Park
Ypsilanti, Michigan 48198
G2 Proposal No. 213174

Dear Mr. Berkholz:

The purpose of this letter is to present the Preliminary Inclinometer Displacement data for the aforementioned project. The attached information presents the displacement that has occurred within the inclinometer casing installed in soil boring I-01 since the baselining date of August 24, 2020.

SUMMARY

The data presented herein indicates the maximum displacement, approximately 0.1472 inches, observed within the inclinometer occurs at an elevation of EL 723.5 feet.

INCLINOMETER INSTALLATION

An inclinometer casing was installed with the soil boring I-01 in efforts to evaluate movement of the existing slope between Grove Road and Ford Lake. The soil boring and inclinometer were performed by Brax Drilling, LLC on August 5, 2020. The annular cavity between the borehole dimeter rand the inclinometer casing was backfilled with a cementitious grout.

The inclinometer casing was baselined on August 24, 2020 and the shape of the casing was deemed the initial profile or "zero" of the inclinometer casing. Baselining and subsequent readings of the inclinometer casing were performed using a Digitilt Inclinometer (Serial No. 50302500) connected to a Digitilt Datamate Part No. 50334150 (Serial No. 2039106). The inclinometer probe was lowered to the base of the inclinometer casing and raised by approximately 4 inches to establish the elevation of the first inclinometer reading. The inclinometer probe was allowed to acclimate to the temperature of the water within the inclinometer to eliminate any possible temperature effects on the instruments within the probe. Readings within the inclinometer casing were obtained at 2-foot intervals. Upon completion of surveying the inclinometer casing in the +A-Axis the instrument was rotated 180˚ to obtain readings in the -A-Axis. Please note the inclinometer probe contains instruments which simultaneously take readings in both the A & B directions. Data collected in the field was returned to our office in Ann Arbor, Michigan for evaluation.

INCLINOMETER DATA

In general, inclinometer data has been collected weekly since baselining operations on August 24, 2020. Inclinometer data is obtained with a manually read inclinometer with data collected by a field data logger.

The following diagram depicts the directions in which positive displacement would occur. For example, positive movements in the A-Axis would be movement towards Ford Lake. Conversely, negative movement in the A-Axis would be movement away from Ford Lake.

Appended to this letter are charts depicting the overall displacement of the inclinometer casing relative to the baselining performed on August 24, 2020.

Recommendations

It should be noted that the shape of the displacement curve has changed significantly since our last reading on February 8, 2020. We should also note that a void was observed around the inclinometer casing at the time of our last report. The attached photograph shows the aforementioned void. We recommend additional readings to monitor the apparent active ground movements.

General Comments

We appreciate the opportunity to be of service to you on this project and look forward to discussing the results presented herein. In the meantime, if you have any questions regarding this report tor any other matter pertaining to the project, please call us.

Sincerely,

G2 Consulting Group, LLC

Tyler Hesse

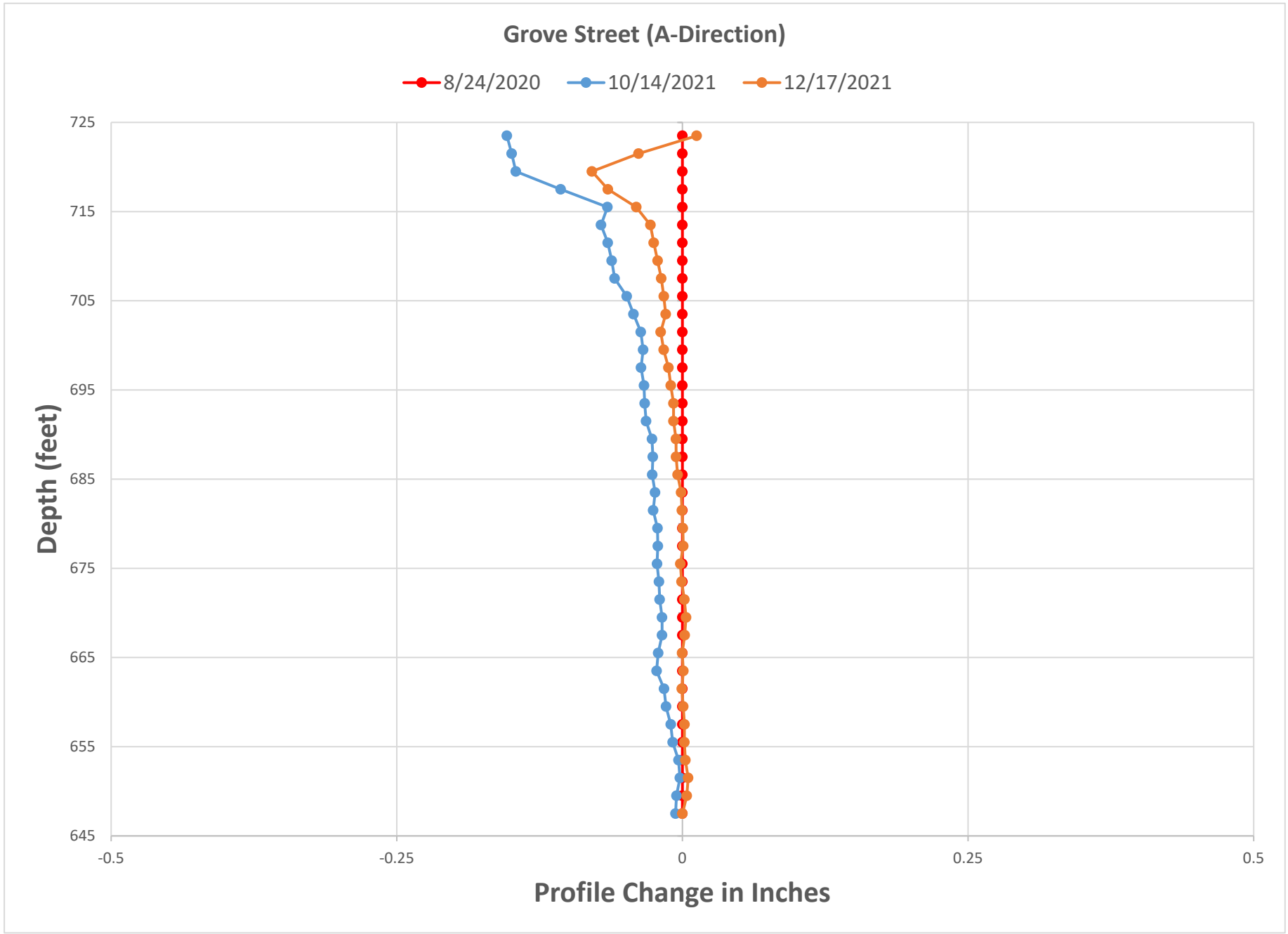
Mark S. Stapleton

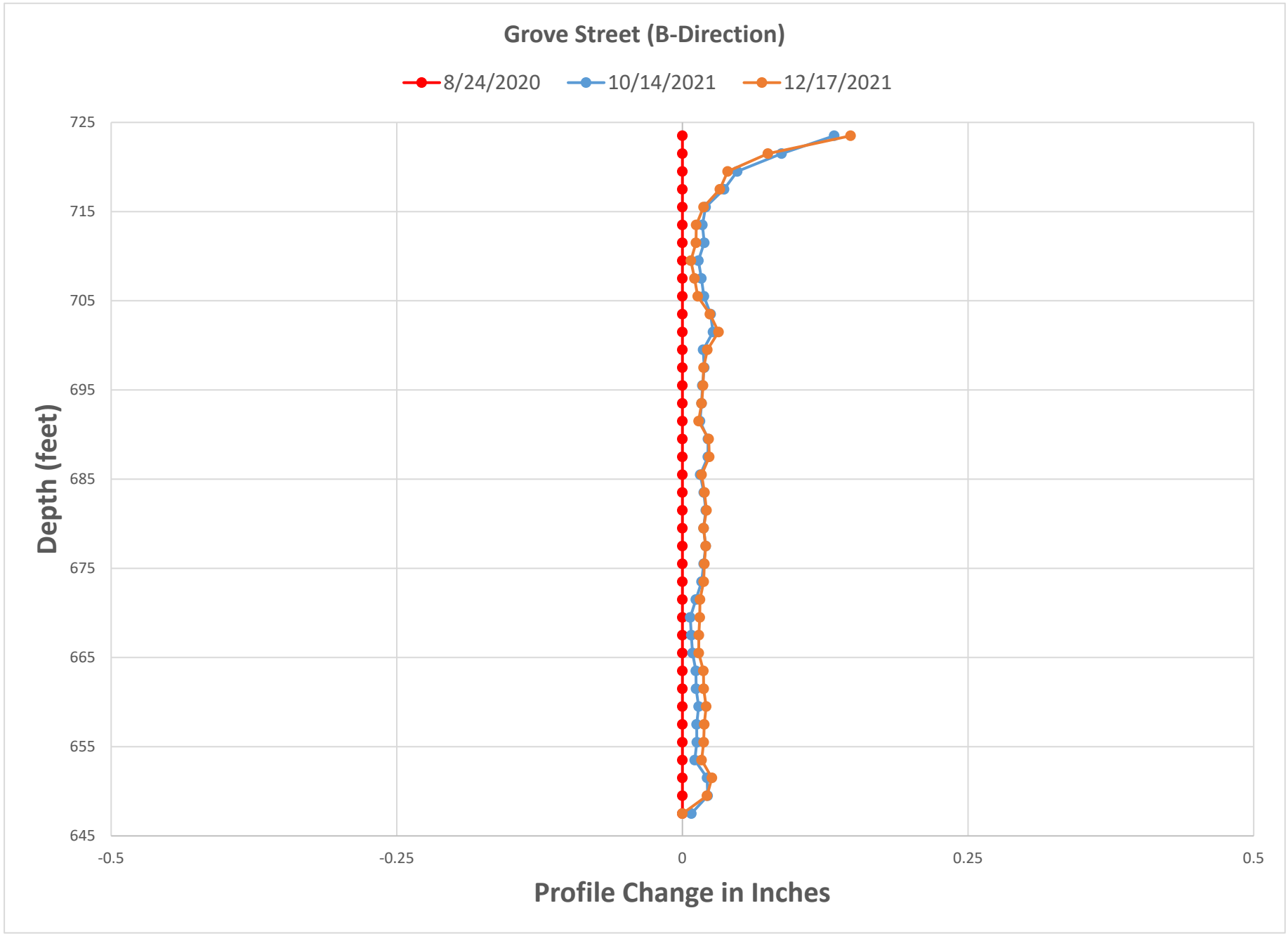
Tyler S. Hesse, E.I.T.
Senior Staff Engineer

Mark S. Stapleton, P.E.
Associate / Project Manager

TSH/MSS/mss

Encl: Inclinometer Displacement Readings


Grove Street (A-Direction)
8/24/2020
10/14/2021
12/17/2021
Depth (feet)
725
715
705
695
685
675
665
655
645
-0.5
-0.25
0
0.25
0.5
Profile Change in Inches


Grove Street (B-Direction)
8/24/2020
10/14/2021
12/17/2021
Depth (feet)
725
715
705
695
685
675
665
655
645
-0.5
-0.25
0
0.25
0.5
Profile Change in Inches

Legend

I-01 drilled to a depth of 80 feet.

Inclinometer installed within I-01 at 80 feet.

Soil Boring Location Plan		
Grove St Slope Stability 1251 S Grove St Ypsilanti Township, Michigan		
2G CONSULTING GROUP	Project No. 193278	
	Drawn by: TSH	
	Date: 08/10/20	Plate No. 1
	Scale: NTS	

Project Name: Grove Road Slope Stability

Project Location: 1340 Grove Road
Ypsilanti, Michigan

G2 Project No. 193278

Latitude: 42.221709° Longitude: -83.584960°

Soil Boring No. I-01

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SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 725.5 ft	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Asphalt (6 inches) 0.5							
		Fill: Aggregate Base (10 inches) 1.3							
		Fill: Medium Compact Brown Sand with trace gravel		S-01	6 9 9	18			
		3.0							
720.5		Fill: Loose Brown Clayey Sand with trace gravel	5	S-02	3 3 3	6			
		6.0							
		Medium Compact Brown Gravelly Sand with trace silt		S-03	4 6 7	13			
		9.0							
715.5		Medium Compact Brown Gravelly Sand	10	S-04	5 6 9	15			
		12.5							
710.5			15	S-05	7 9 11	20	20.9		7000*
705.5		Very Stiff Gray Silty Clay with trace sand and gravel, frequent silt seams	20	S-06	4 7 10	17	18.0	136	4260
700.5			25	S-07	6 8 13	21	21.1	118	5140

Total Depth: 80 ft
Drilling Date: August 5, 2020
Inspector: T. Hesse
Contractor: G2 Consulting Group
Driller: A. Guzdzial

Drilling Method:
4-inch flight auger to 10 feet; 3-7/8-inch mud rotary thereafter

Water Level Observation:
Groundwater data not available due to mud-rotary drilling method

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Inclinometer Installed - Borehole backfilled with inclinometer casing and grout

Figure No. 1a

SOIL / PAVEMENT BORING 193278.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 10/29/20

Project Name: Grove Road Slope Stability

Project Location: 1340 Grove Road
Ypsilanti, Michigan

G2 Project No. 193278

Latitude: 42.221709° Longitude: -83.584960°

Soil Boring No. I-01

CONSULTING GROUP

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 725.5 ft	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Very Stiff Gray Silty Clay with trace sand and gravel, frequent silt seams *(continued)*							
		28.0							
695.5			30	S-08	8 10 15	25	23.1		2500*
690.5		Medium Compact Gray Clayey Silt with trace sand	35	S-09	4 6 7	13	27.2		1500*
		38.0							
685.5		Compact Gray Silty Sand	40	S-10	15 22 21	43			
		42.0							
680.5			45	S-11	9 12 15	27	23.4		4000*
		Medium Compact Clayey Silt							
675.5			50	S-12	15 8 9	17	22.8		2000*

Total Depth: 80 ft
Drilling Date: August 5, 2020
Inspector: T. Hesse
Contractor: G2 Consulting Group
Driller: A. Guzdzial

Drilling Method:
4-inch flight auger to 10 feet; 3-7/8-inch mud rotary thereafter

Water Level Observation:
Groundwater data not available due to mud-rotary drilling method

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Inclinometer Installed - Borehole backfilled with inclinometer casing and grout

Figure No. 1b

SOIL / PAVEMENT BORING 193278.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 10/29/20

Project Name: Grove Road Slope Stability

Project Location: 1340 Grove Road
Ypsilanti, Michigan

G2 Project No. 193278

Latitude: 42.221709° Longitude: -83.584960°

Soil Boring No. I-01

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SUBSURFACE PROFILE				SOIL SAMPLE DATA					
ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 725.5 ft	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
670.5		Medium Compact Clayey Silt *(continued)*	55	S-13	12 13 15	28	20.6		
		57.0							
665.5			60	S-14	13 16 14	30			
660.5		Medium Compact to Compact Gray Sandy Silt	65	S-15	10 17 18	35			
655.5			70	S-16	11 12 17	29			
		72.0							
		Hard Gray Silty Clay with trace sand and gravel							
		74.0							
650.5		Very Compact Gray Sand with trace silt	75	S-17	38 48 51	99			

Total Depth: 80 ft
Drilling Date: August 5, 2020
Inspector: T. Hesse
Contractor: G2 Consulting Group
Driller: A. Guzdzial

Drilling Method:
4-inch flight auger to 10 feet; 3-7/8-inch mud rotary thereafter

Water Level Observation:
Groundwater data not available due to mud-rotary drilling method

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Inclinometer Installed - Borehole backfilled with inclinometer casing and grout

Figure No. 1c

SOIL / PAVEMENT BORING 193278.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 10/29/20

Project Name: Grove Road Slope Stability

Project Location: 1340 Grove Road
Ypsilanti, Michigan

G2 Project No. 193278

Latitude: 42.221709° Longitude: -83.584960°

Soil Boring No. I-01

CONSULTING GROUP

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 725.5 ft	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Very Compact Gray Sand with trace silt *(continued)*							
645.5		80.0	80	S-18	30 39 51	90			
		End of Boring @ 80 ft							
640.5			85						
635.5			90						
630.5			95						
625.5			100						

Total Depth: 80 ft
Drilling Date: August 5, 2020
Inspector: T. Hesse
Contractor: G2 Consulting Group
Driller: A. Guzdzial

Drilling Method:
4-inch flight auger to 10 feet; 3-7/8-inch mud rotary thereafter

Water Level Observation:
Groundwater data not available due to mud-rotary drilling method

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Inclinometer Installed - Borehole backfilled with inclinometer casing and grout

Figure No. 1d

SOIL / PAVEMENT BORING 193278.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 10/29/20