SGI TESTING SERVICES
A Georgia Limited Liability Company

18 November 2022

Mr. David Agee
Geostone Retaining Wall Systems, Inc.
P.O. Box 325
Westover, AL 35185

Subject: Laboratory Test Results Transmittal
Connection Strength Testing
Synteen SF20, SF35, SF55, and DF80 Geogrids Connected to
Geostone G10 Blocks

Dear Mr. Agee,

SGI Testing Services, LLC (SGI) is pleased to present the attached test results for the above-mentioned testing program. The note section below addresses sample preparation, sample disposal and a disclosure statement.

SGI appreciates the opportunity to provide laboratory testing services to Geostone Retaining Wall Systems, Inc. Should you have any questions regarding the attached document(s), or if you require additional information, please do not hesitate to contact the undersigned.

Sincerely,

Zehong Yuan, Ph.D., P.E.
Laboratory Manager

Attachments

NOTES:
(1) Unless otherwise noted in the test results the sample(s)/specimen(s) were prepared in accordance with the applicable test standards or generally accepted sampling procedures.
(2) Materials that are not contaminated will be discarded after test specimens and archived specimens are obtained. Archived specimens will be discarded 30 days after the completion of the testing program, unless long-term storage arrangements are specifically made with SGI.
(3) The reported results apply only to the materials and test conditions used in the laboratory testing program. The results do not necessarily apply to other materials or test conditions. The test results should not be used in engineering analysis unless the test conditions model the anticipated field conditions. The testing was performed in accordance with general engineering testing standards and requirements. The reported results are submitted for the exclusive use of the client to whom they are addressed.

SGI22051.REPORT.2022.01

ATTACHMENT 1

GRAIN-SIZE CURVE OF AASHTO #57 STONE, AND CONNECTION TEST SETUP PHOTO

SGI Testing Services, LLC

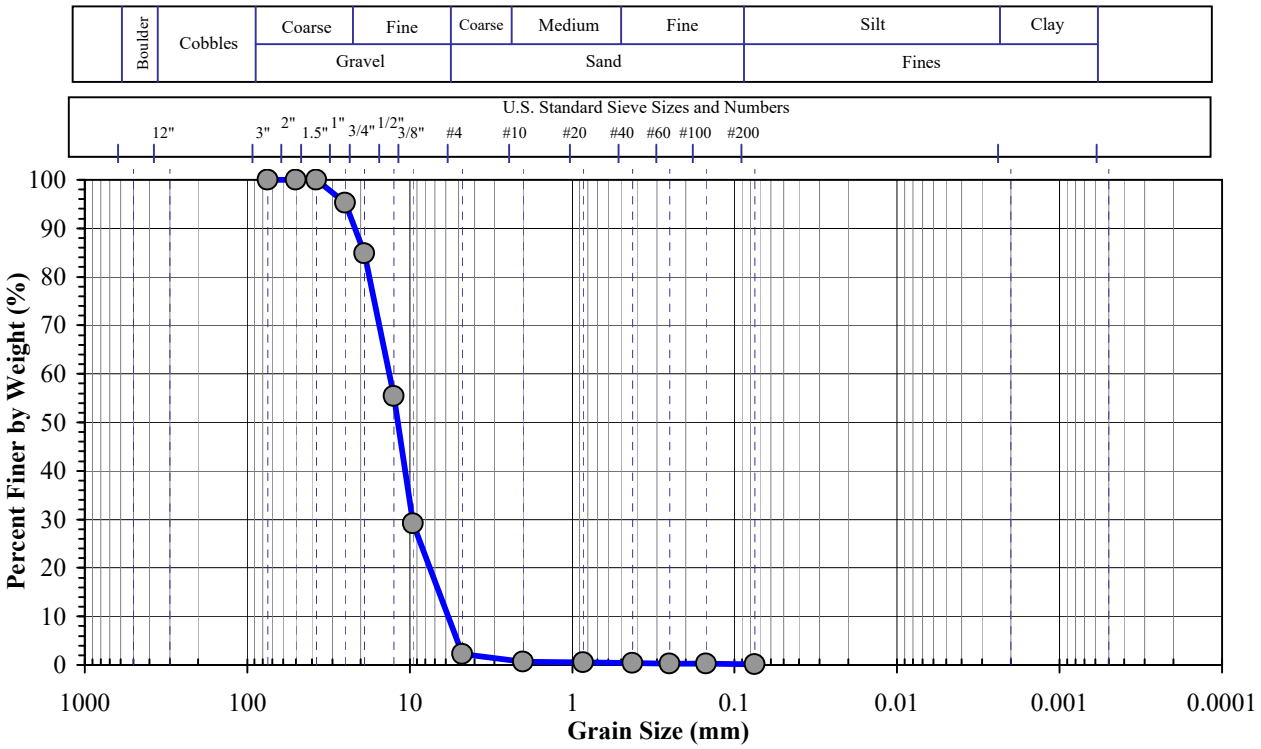
4405 International Blvd., Suite B-117, Norcross, GA 30093
Ph: (770) 931 8222 Fax: (770) 931 8240

Project Name:	SRW Testing
Project No:	SGI2022
Client Sample ID:	AASHTO #57 Stone
Lab Sample No:	SGIGP

ASTM D 421, D 422, D 4318

SOIL INDEX PROPERTIES

Moisture Content, Grain Size, Atterberg Limits, Classification

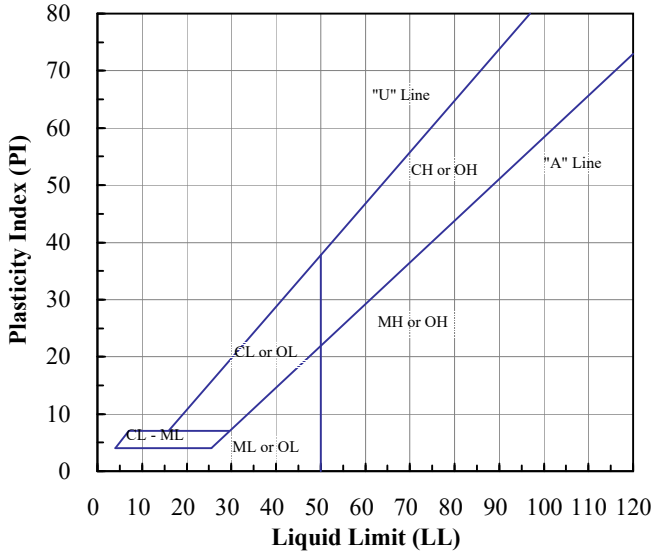


Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	95.2
3/4"	19	84.8
1/2"	12.5	55.4
3/8"	9.5	29.2
#4	4.75	2.3
#10	2.00	0.7
#20	0.850	0.5
#40	0.425	0.3
#60	0.250	0.3
#100	0.150	0.3
#200	0.075	0.1

Hydrometer Particle Diameter (mm)	% Finer
0.0500	
0.0200	
0.0050	
0.0020	
0.0012	

Gravel (%):	97.7
Sand (%):	2.2
Fines (%):	0.1
Silt (%):	0.1
Clay (%):	

Coeff. Unif. (Cu):	2.3
Coeff. Curv. (Cc):	1.2



Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (%)	Atterberg Limits PL (%)	Atterberg Limits PI (-)	Engineering Classification
AASHTO #57 Stone		-	0.1	NP	NP	NP	GP (Poorly Graded Gravel)

Note(s):

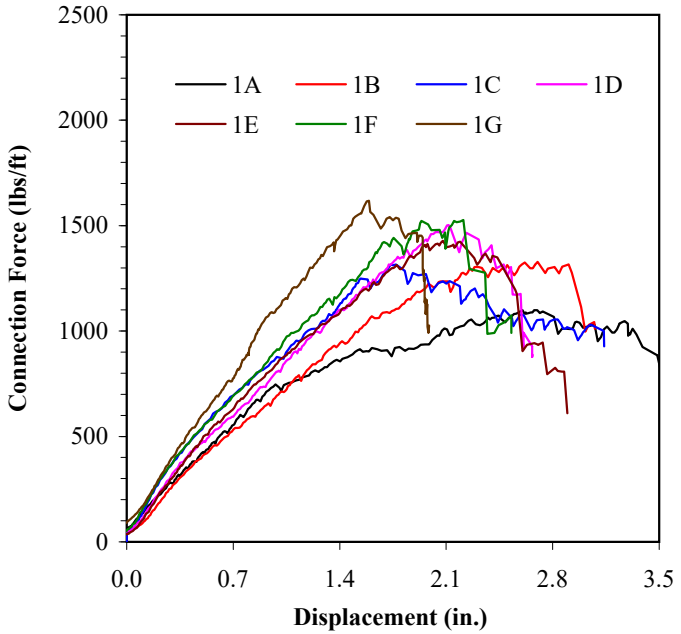
Figure A-2. SF55 geogrid/G10 block connection test setup.

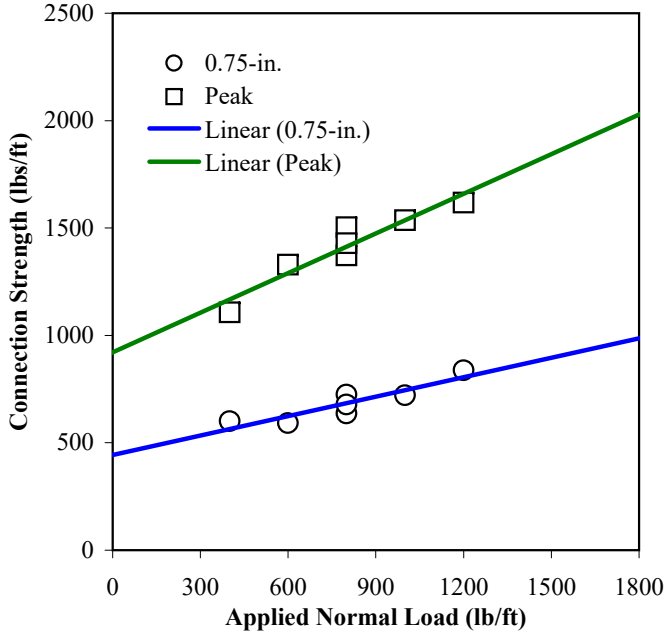
ATTACHMENT 2

SUMMARY OF CONNECTION TEST RESULTS

GEOSTONE RETAINING WALL SYSTEMS, INC.
CONNECTION STRENGTH TESTING (ASTM D 6638)

TEST SERIES NO. 1: Synteen SF20 geogrid #222-118-02-537 in machine direction between two courses of Geostone G10 blocks with 1" setback compacted AASHTO #57 stone within block apertures and space between blocks





Test No.	Geogrid Specimen Width W (in.)	Test Normal Stress σ_n (psi)	Equivalent Normal Load N (lb/ft)	Approximate No. of Blocks n	Approximate Wall Height h (ft)	0.75-in. Strength $T_{0.75\text{-}in}$ (lb/ft)	Peak Strength T_{peak} (lb/ft)	Connection Strength Equations (Strength assumed to be linearly related to N)
1A	34.0	3.3	400	6	4.0	600	1106	
1B	34.0	5.0	600	9	6.0	592	1329	$T_{0.75\text{-}in.} = 445 + (N) \tan(17°)$
1C	34.0	6.7	800	12	8.0	724	1373	
1D	34.0	6.7	800	12	8.0	636	1503	$T_{peak} = 920 + (N) \tan(32°)$
1E	34.0	6.7	800	12	8.0	678	1429	
1F	34.0	8.3	1000	15	10.0	722	1536	
1G	34.0	10.0	1200	18	12.0	837	1618	

NOTES:

Dimensions of Block:	17.625" wide by 10" deep by 8" high.
Weight of Full-Size Block:	55 lbs
Approximate Unit Weight of Facing (block & gravel):	120 pcf
Failure Mode:	Abrasion damage and rupture of geogrid ribs in each test.

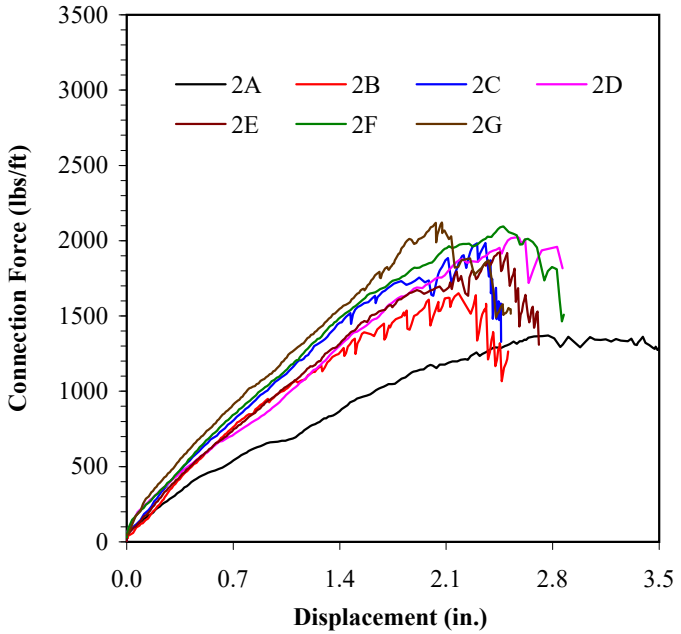
DATE REPORTED: 11/18/2022

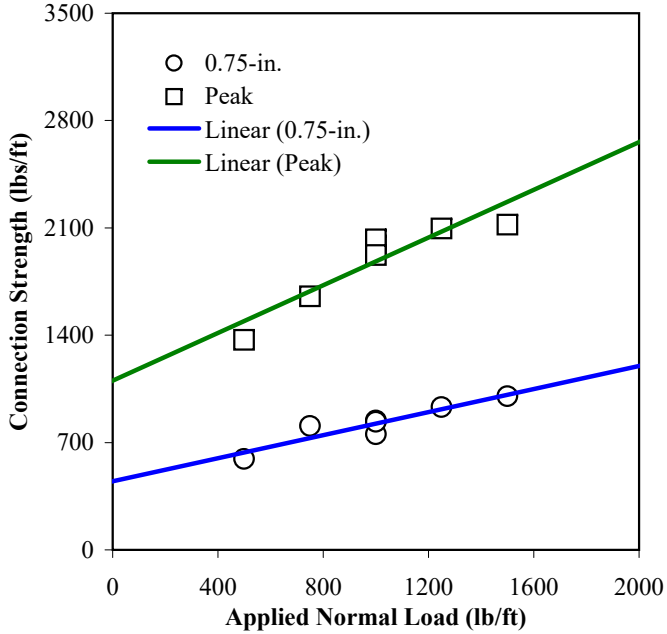
SGI TESTING SERVICES, LLC

FIGURE NO.	B-1
PROJECT NO.	SGI22051
DOCUMENT NO.	
FILE NO.	

GEOSTONE RETAINING WALL SYSTEMS, INC.
CONNECTION STRENGTH TESTING (ASTM D 6638)

TEST SERIES NO. 2: Synteen SF35 geogrid #222-184-01-175 in machine direction between two courses of Geostone G10 blocks with 1" setback compacted AASHTO #57 stone within block apertures and space between blocks





Test No.	Geogrid Specimen Width W (in.)	Test Normal Stress σ_n (psi)	Equivalent Normal Load N (lb/ft)	Approximate No. of Blocks n	Approximate Wall Height h (ft)	0.75-in. Strength $T_{0.75\text{-}in}$ (lb/ft)	Peak Strength T_{peak} (lb/ft)	Connection Strength Equations (Strength assumed to be linearly related to N)
2A	34.0	4.2	500	8	5.0	594	1370	
2B	34.0	6.3	750	11	7.5	807	1652	$T_{0.75\text{-}in.} = 450 + (N) \tan(21°)$
2C	34.0	8.3	1000	15	10.0	843	1985	
2D	34.0	8.3	1000	15	10.0	754	2024	$T_{peak} = 1105 + (N) \tan(38°)$
2E	34.0	8.3	1000	15	10.0	835	1923	
2F	34.0	10.4	1250	19	12.5	931	2096	
2G	34.0	12.5	1500	23	15.0	1002	2120	

NOTES:

Dimensions of Block:	17.625" wide by 10" deep by 8" high.
Weight of Full-Size Block:	55 lbs
Approximate Unit Weight of Facing (block & gravel):	120 pcf
Failure Mode:	Abrasion damage and rupture of geogrid ribs in each test.

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FIGURE NO.	B-2
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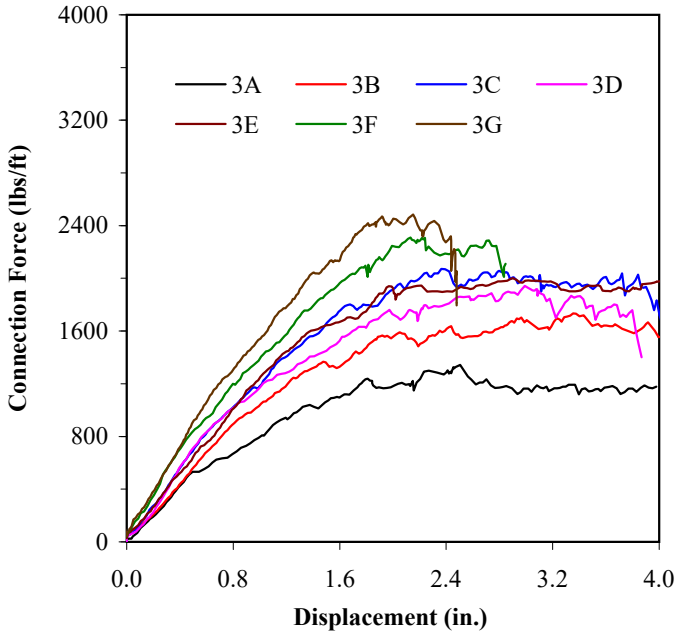
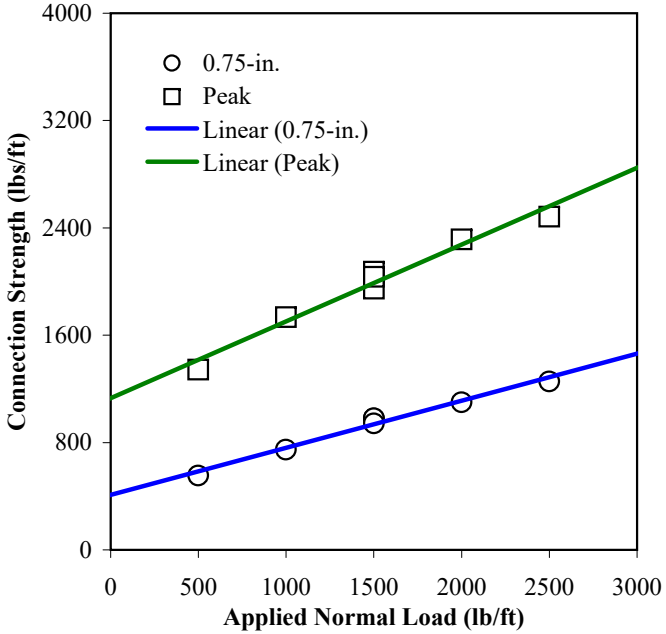
DOCUMENT NO.	
FILE NO.	

GEOSTONE RETAINING WALL SYSTEMS, INC.
CONNECTION STRENGTH TESTING (ASTM D 6638)

TEST SERIES NO. 3: Synteen SF55 geogrid #218-034-02-124 in machine direction between two courses of Geostone G10 blocks with 1" setback compacted AASHTO #57 stone within block apertures and space between blocks





Test No.	Geogrid Specimen Width W (in.)	Test Normal Stress σ_n (psi)	Equivalent Normal Load N (lb/ft)	Approximate No. of Blocks n	Approximate Wall Height h (ft)	0.75-in. Strength $T_{0.75\text{-}in}$ (lb/ft)	Peak Strength T_{peak} (lb/ft)	Connection Strength Equations (Strength assumed to be linearly related to N)
3A	34.0	4.2	500	8	5.0	554	1342	
3B	34.0	8.3	1000	15	10.0	746	1735	$T_{0.75\text{-}in.} = 410 + (N) \tan(19°)$
3C	34.0	12.5	1500	23	15.0	977	2073	
3D	34.0	12.5	1500	23	15.0	979	1947	$T_{peak} = 1130 + (N) \tan(30°)$
3E	34.0	12.5	1500	23	15.0	943	2034	
3F	34.0	16.7	2000	30	20.0	1099	2313	
3G	34.0	20.8	2500	38	25.0	1255	2484	

NOTES:

Dimensions of Block:	17.625" wide by 10" deep by 8" high.
Weight of Full-Size Block:	55 lbs
Approximate Unit Weight of Facing (block & gravel):	120 pcf
Failure Mode:	Abrasion damage and rupture of geogrid ribs in each test.

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FIGURE NO.	B-3
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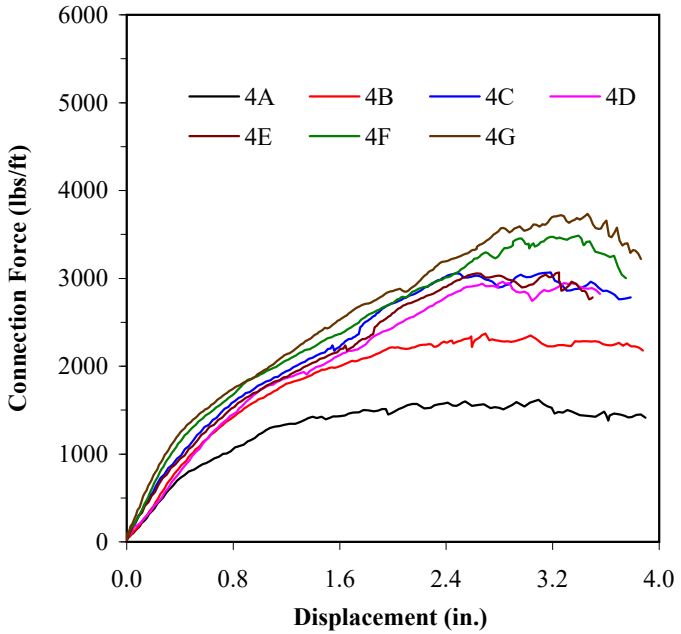
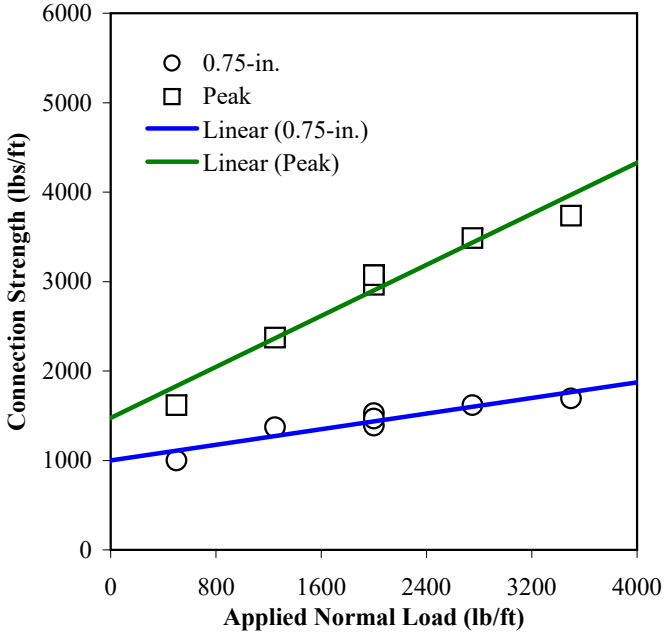
FILE NO.	

GEOSTONE RETAINING WALL SYSTEMS, INC.
CONNECTION STRENGTH TESTING (ASTM D 6638)

TEST SERIES NO. 4: Synteen SF80 geogrid #222-030-02-220 in machine direction between two courses of Geostone G10 blocks with 1" setback compacted AASHTO #57 stone within block apertures and space between blocks





Test No.	Geogrid Specimen Width W (in.)	Test Normal Stress σ_n (psi)	Equivalent Normal Load N (lb/ft)	Approximate No. of Blocks n	Approximate Wall Height h (ft)	0.75-in. Strength $T_{0.75\text{-}in}$ (lb/ft)	Peak Strength T_{peak} (lb/ft)	Connection Strength Equations (Strength assumed to be linearly related to N)
4A	34.0	4.2	500	8	5.0	999	1616	
4B	34.0	10.4	1250	19	12.5	1369	2371	$T_{0.75\text{-}in.} = 1000 + (N) \tan(12°)$
4C	34.0	16.7	2000	30	20.0	1528	3069	
4D	34.0	16.7	2000	30	20.0	1387	2962	$T_{peak} = 1475 + (N) \tan(35°)$
4E	34.0	16.7	2000	30	20.0	1466	3069	
4F	34.0	22.9	2750	41	27.5	1618	3485	
4G	34.0	29.2	3500	53	35.0	1692	3734	

NOTES:

Dimensions of Block:	17.625" wide by 10" deep by 8" high.
Weight of Full-Size Block:	55 lbs
Approximate Unit Weight of Facing (block & gravel):	120 pcf
Failure Mode:	Abrasion damage and rupture of geogrid ribs in each test.

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FIGURE NO.	B-4
PROJECT NO.	SGI22051
DOCUMENT NO.	
FILE NO.	