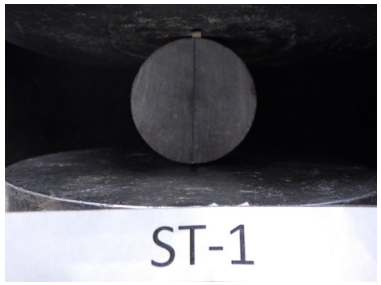
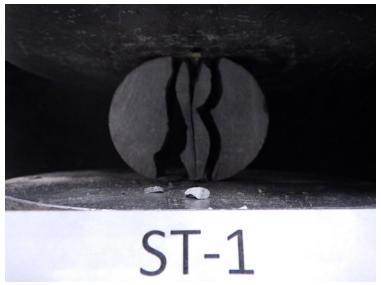
Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-051	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/11/25	Checked By:	smd
Depth :	34-35'	Test Id:	816748		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Splitting Tensile Strength of Intact Rock Core Specimens by ASTM D3967

Specimen Depth	Test No	Thickness (L), in	Diameter (D), in	Thickness to Diameter Ratio (L/D)	Failure Load (P), lbs	Splitting Tensile Strength, psi	Failure Type
34.46-34.55 ft	ST-1	0.97	1.98	0.49	4,750	1,570	1





Notes: Strain rate: 2.5%/min.

ASTM requires the thickness-to-diameter ratio (L/D) of each test specimen to be between 0.2 and 0.75.

The reported thickness (L) is the average of three measurements.

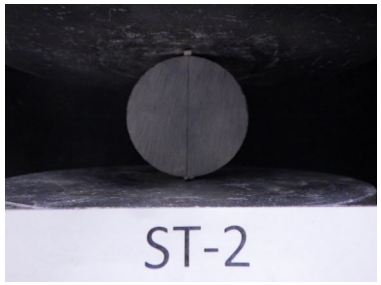
The reported diameter(D) is the average of three measurements.

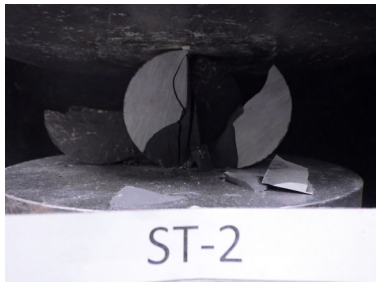
Failure Type: 1 = Intact Material Failure; 2 = Discontinuity Failure; 3 = Intact Material and Discontinuity Failure (See attached photographs)

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-068	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/11/25	Checked By:	smd
Depth :	33-33.5'	Test Id:	816749		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Splitting Tensile Strength of Intact Rock Core Specimens by ASTM D3967

Specimen Depth	Test No	Thickness (L), in	Diameter (D), in	Thickness to Diameter Ratio (L/D)	Failure Load (P), lbs	Splitting Tensile Strength, psi	Failure Type
33-33.5 ft	ST-2	1.01	1.97	0.51	2,846	913	3





Notes: Strain rate: 2.5%/min.

ASTM requires the thickness-to-diameter ratio (L/D) of each test specimen to be between 0.2 and 0.75.

The reported thickness (L) is the average of three measurements.

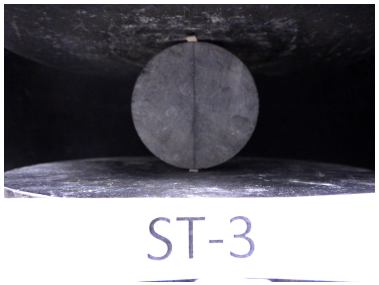
The reported diameter(D) is the average of three measurements.

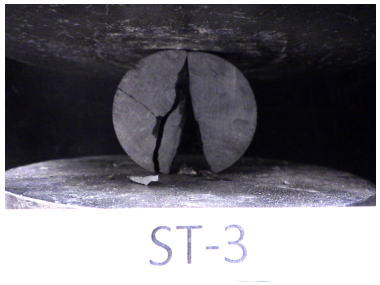
Failure Type: 1 = Intact Material Failure; 2 = Discontinuity Failure; 3 = Intact Material and Discontinuity Failure (See attached photographs)

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-069	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/11/25	Checked By:	smd
Depth :	40-40.5'	Test Id:	816759		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Splitting Tensile Strength of Intact Rock Core Specimens by ASTM D3967

Specimen Depth	Test No	Thickness (L), in	Diameter (D), in	Thickness to Diameter Ratio (L/D)	Failure Load (P), lbs	Splitting Tensile Strength, psi	Failure Type
40-40.5 ft	ST-3	0.85	1.98	0.43	4,810	1,830	3





Notes: Strain rate: 2.5%/min.

ASTM requires the thickness-to-diameter ratio (L/D) of each test specimen to be between 0.2 and 0.75.

The reported thickness (L) is the average of three measurements.

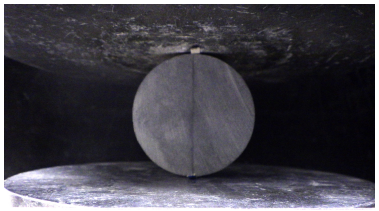
The reported diameter(D) is the average of three measurements.

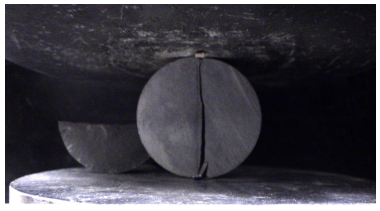
Failure Type: 1 = Intact Material Failure; 2 = Discontinuity Failure; 3 = Intact Material and Discontinuity Failure (See attached photographs)

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-077	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/11/25	Checked By:	smd
Depth :	47-47.25'	Test Id:	816750		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Splitting Tensile Strength of Intact Rock Core Specimens by ASTM D3967

Specimen Depth	Test No	Thickness (L), in	Diameter (D), in	Thickness to Diameter Ratio (L/D)	Failure Load (P), lbs	Splitting Tensile Strength, psi	Failure Type
47-47.25 ft	ST-4	0.96	1.98	0.49	2,331	778	3





Notes: Strain rate: 2.5%/min.

ASTM requires the thickness-to-diameter ratio (L/D) of each test specimen to be between 0.2 and 0.75.

The reported thickness (L) is the average of three measurements.

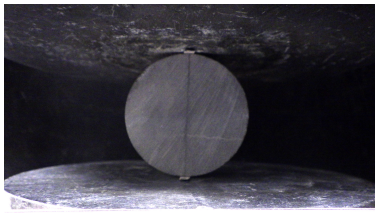
The reported diameter(D) is the average of three measurements.

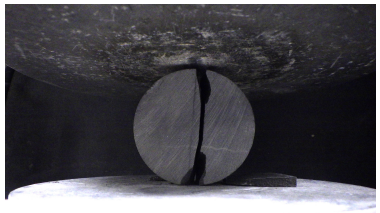
Failure Type: 1 = Intact Material Failure; 2 = Discontinuity Failure; 3 = Intact Material and Discontinuity Failure (See attached photographs)

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-082	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/11/25	Checked By:	smd
Depth :	28.5-28.75'	Test Id:	816760		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Splitting Tensile Strength of Intact Rock Core Specimens by ASTM D3967

Specimen Depth	Test No	Thickness (L), in	Diameter (D), in	Thickness to Diameter Ratio (L/D)	Failure Load (P), lbs	Splitting Tensile Strength, psi	Failure Type
28.5-28.75 ft	ST-5	0.86	1.96	0.44	2,393	901	1





Notes: Strain rate: 2.5%/min.

ASTM requires the thickness-to-diameter ratio (L/D) of each test specimen to be between 0.2 and 0.75.

The reported thickness (L) is the average of three measurements.

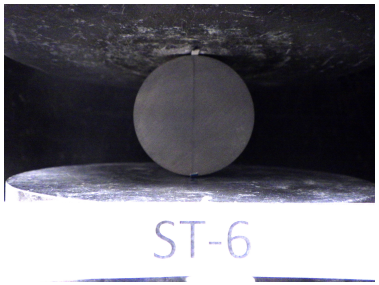
The reported diameter(D) is the average of three measurements.

Failure Type: 1 = Intact Material Failure; 2 = Discontinuity Failure; 3 = Intact Material and Discontinuity Failure (See attached photographs)

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-082	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/11/25	Checked By:	smd
Depth :	35.5-36'	Test Id:	816751		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Splitting Tensile Strength of Intact Rock Core Specimens by ASTM D3967

Specimen Depth	Test No	Thickness (L), in	Diameter (D), in	Thickness to Diameter Ratio (L/D)	Failure Load (P), lbs	Splitting Tensile Strength, psi	Failure Type
35.56-35.65 ft	ST-6	0.95	1.97	0.48	2,101	717	3



Notes: Strain rate: 2.5%/min.

ASTM requires the thickness-to-diameter ratio (L/D) of each test specimen to be between 0.2 and 0.75.

The reported thickness (L) is the average of three measurements.

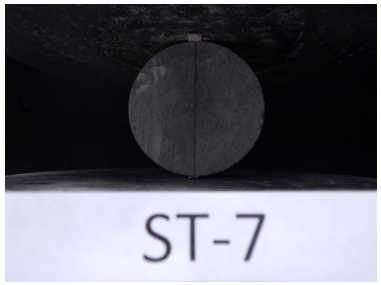
The reported diameter(D) is the average of three measurements.

Failure Type: 1 = Intact Material Failure; 2 = Discontinuity Failure; 3 = Intact Material and Discontinuity Failure (See attached photographs)

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-106	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/11/25	Checked By:	smd
Depth :	48-49'	Test Id:	816752		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Splitting Tensile Strength of Intact Rock Core Specimens by ASTM D3967

Specimen Depth	Test No	Thickness (L), in	Diameter (D), in	Thickness to Diameter Ratio (L/D)	Failure Load (P), lbs	Splitting Tensile Strength, psi	Failure Type
48-49 ft	ST-7	1.08	1.98	0.55	6,268	1,870	1



Notes: Strain rate: 2.5%/min.

ASTM requires the thickness-to-diameter ratio (L/D) of each test specimen to be between 0.2 and 0.75.

The reported thickness (L) is the average of three measurements.

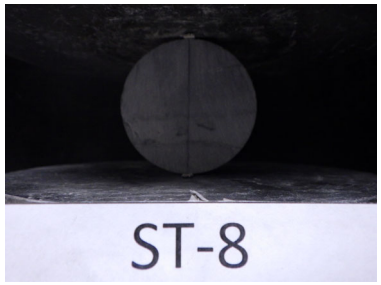
The reported diameter(D) is the average of three measurements.

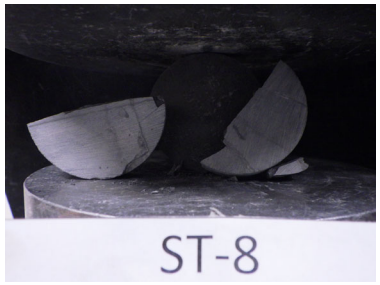
Failure Type: 1 = Intact Material Failure; 2 = Discontinuity Failure; 3 = Intact Material and Discontinuity Failure (See attached photographs)

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-112	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/11/25	Checked By:	smd
Depth :	27-28'	Test Id:	816753		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Splitting Tensile Strength of Intact Rock Core Specimens by ASTM D3967

Specimen Depth	Test No	Thickness (L), in	Diameter (D), in	Thickness to Diameter Ratio (L/D)	Failure Load (P), lbs	Splitting Tensile Strength, psi	Failure Type
27-28 ft	ST-8	1.02	1.98	0.51	2,745	866	3





Notes: Strain rate: 2.5%/min.

ASTM requires the thickness-to-diameter ratio (L/D) of each test specimen to be between 0.2 and 0.75.

The reported thickness (L) is the average of three measurements.

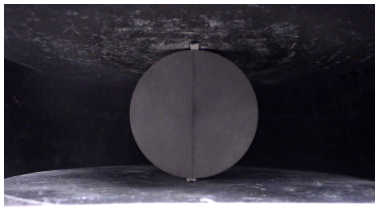
The reported diameter(D) is the average of three measurements.

Failure Type: 1 = Intact Material Failure; 2 = Discontinuity Failure; 3 = Intact Material and Discontinuity Failure (See attached photographs)

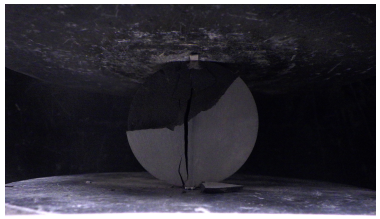
Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-115	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/11/25	Checked By:	smd
Depth :	21.5-22'	Test Id:	816754		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Splitting Tensile Strength of Intact Rock Core Specimens by ASTM D3967

Specimen Depth	Test No	Thickness (L), in	Diameter (D), in	Thickness to Diameter Ratio (L/D)	Failure Load (P), lbs	Splitting Tensile Strength, psi	Failure Type
21.52-21.62 ft	ST-9	0.99	1.97	0.50	2,249	734	3



ST-9



ST-9

Notes: Strain rate: 2.5%/min.

ASTM requires the thickness-to-diameter ratio (L/D) of each test specimen to be between 0.2 and 0.75.

The reported thickness (L) is the average of three measurements.

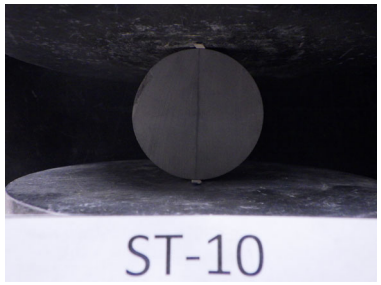
The reported diameter(D) is the average of three measurements.

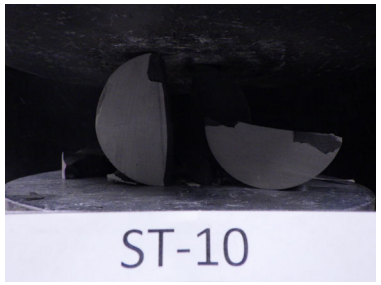
Failure Type: 1 = Intact Material Failure; 2 = Discontinuity Failure; 3 = Intact Material and Discontinuity Failure (See attached photographs)

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-117	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/11/25	Checked By:	smd
Depth :	27-27.5'	Test Id:	816755		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Splitting Tensile Strength of Intact Rock Core Specimens by ASTM D3967

Specimen Depth	Test No	Thickness (L), in	Diameter (D), in	Thickness to Diameter Ratio (L/D)	Failure Load (P), lbs	Splitting Tensile Strength, psi	Failure Type
27-27.5 ft	ST-10	1.04	1.98	0.53	1,240	382	3





Notes: Strain rate: 2.5%/min.

ASTM requires the thickness-to-diameter ratio (L/D) of each test specimen to be between 0.2 and 0.75.

The reported thickness (L) is the average of three measurements.

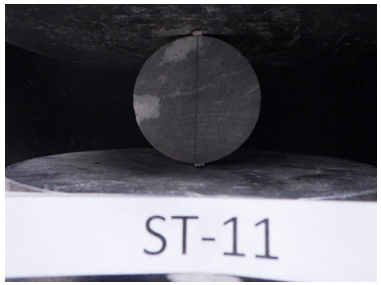
The reported diameter(D) is the average of three measurements.

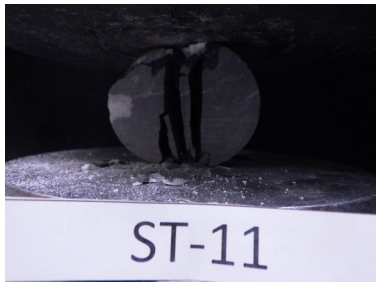
Failure Type: 1 = Intact Material Failure; 2 = Discontinuity Failure; 3 = Intact Material and Discontinuity Failure (See attached photographs)

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-127	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/11/25	Checked By:	smd
Depth :	20.25-21'	Test Id:	816756		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Splitting Tensile Strength of Intact Rock Core Specimens by ASTM D3967

Specimen Depth	Test No	Thickness (L), in	Diameter (D), in	Thickness to Diameter Ratio (L/D)	Failure Load (P), lbs	Splitting Tensile Strength, psi	Failure Type
20.25-21 ft	ST-11	0.92	1.98	0.46	6,301	2,210	3





Notes: Strain rate: 2.5%/min.

ASTM requires the thickness-to-diameter ratio (L/D) of each test specimen to be between 0.2 and 0.75.

The reported thickness (L) is the average of three measurements.

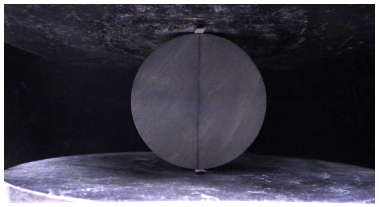
The reported diameter(D) is the average of three measurements.

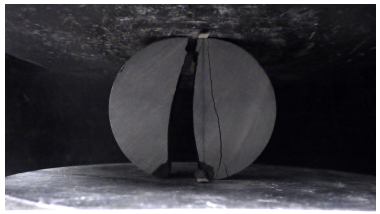
Failure Type: 1 = Intact Material Failure; 2 = Discontinuity Failure; 3 = Intact Material and Discontinuity Failure (See attached photographs)

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-129	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/11/25	Checked By:	smd
Depth :	31.5-32.5'	Test Id:	816757		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Splitting Tensile Strength of Intact Rock Core Specimens by ASTM D3967

Specimen Depth	Test No	Thickness (L), in	Diameter (D), in	Thickness to Diameter Ratio (L/D)	Failure Load (P), lbs	Splitting Tensile Strength, psi	Failure Type
31.5-32.5 ft	ST-12	0.89	1.98	0.45	2,479	892	1





Notes: Strain rate: 2.5%/min.

ASTM requires the thickness-to-diameter ratio (L/D) of each test specimen to be between 0.2 and 0.75.

The reported thickness (L) is the average of three measurements.

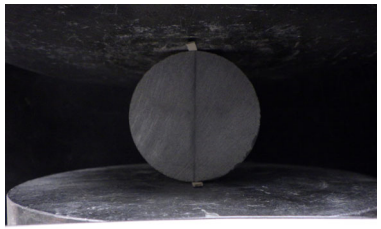
The reported diameter(D) is the average of three measurements.

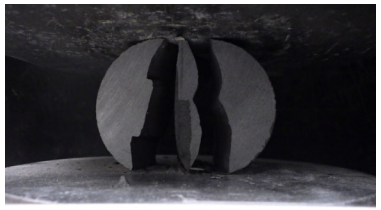
Failure Type: 1 = Intact Material Failure; 2 = Discontinuity Failure; 3 = Intact Material and Discontinuity Failure (See attached photographs)

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-130	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/11/25	Checked By:	smd
Depth :	20-22.5'	Test Id:	816758		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Splitting Tensile Strength of Intact Rock Core Specimens by ASTM D3967

Specimen Depth	Test No	Thickness (L), in	Diameter (D), in	Thickness to Diameter Ratio (L/D)	Failure Load (P), lbs	Splitting Tensile Strength, psi	Failure Type
22.33-22.42 ft	ST-13	0.89	1.99	0.44	5,678	2,050	1





Notes: Strain rate: 2.5%/min.

ASTM requires the thickness-to-diameter ratio (L/D) of each test specimen to be between 0.2 and 0.75.

The reported thickness (L) is the average of three measurements.

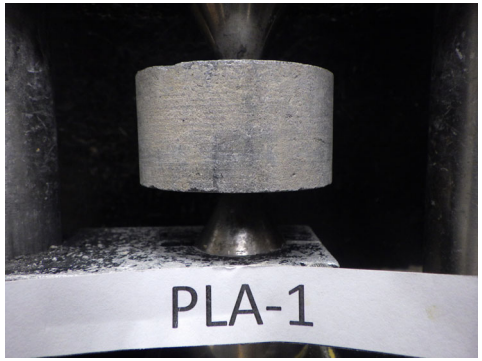
The reported diameter(D) is the average of three measurements.

Failure Type: 1 = Intact Material Failure; 2 = Discontinuity Failure; 3 = Intact Material and Discontinuity Failure (See attached photographs)

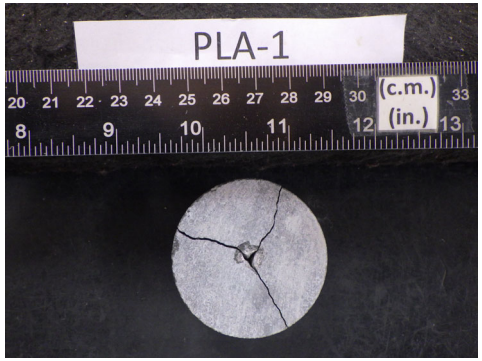
Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-018	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/09/25	Checked By:	smd
Depth :	27-27.5'	Test Id:	817032		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-1	27-27.5 ft	1.98	1.05	3,125	2.66	1.63	1174	0.919	1079	19	22,300



Before



After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

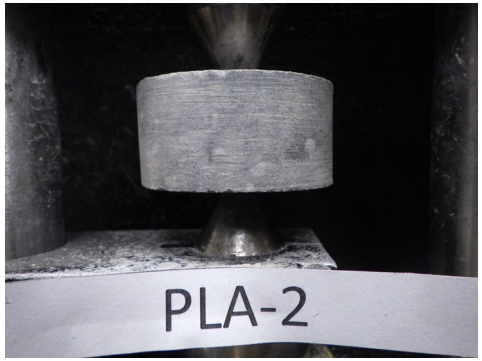
F = the size correction factor

Is(50) = the size corrected point load strength index

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-027	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/09/25	Checked By:	smd
Depth :	33.5-34'	Test Id:	817034		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-2	33.66-33.76 ft	1.98	0.99	2,970	2.49	1.58	1192	0.905	1079	18	21,500



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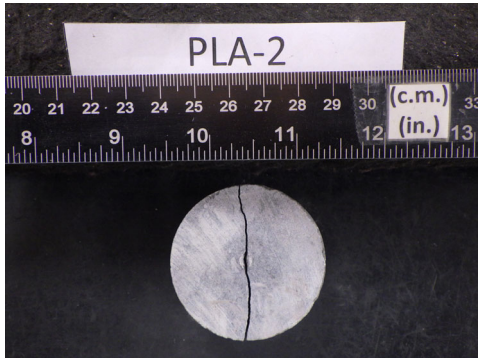


After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

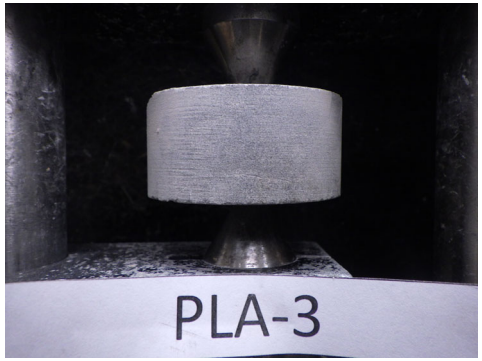
F = the size correction factor

Is(50) = the size corrected point load strength index

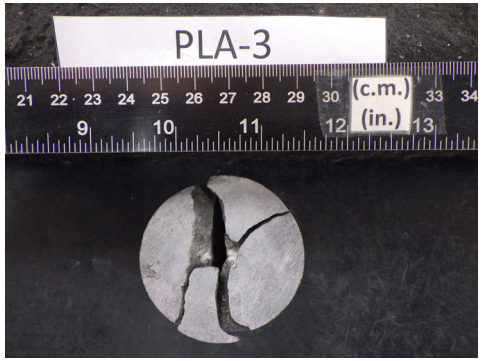
Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-029	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/09/25	Checked By:	smd
Depth :	30.1-31.1'	Test Id:	817035		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-3	30.53-30.63 ft	1.99	0.97	2,736	2.45	1.57	1117	0.902	1007	18	20,100



Before



After

Intact material and Discontinuity Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

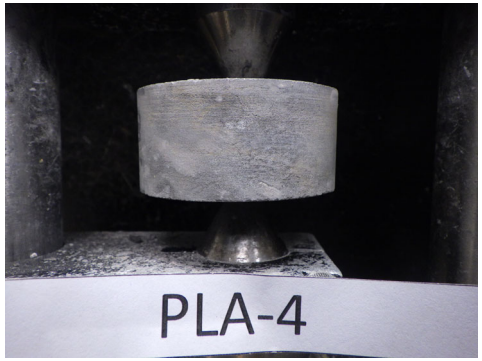
F = the size correction factor

Is(50) = the size corrected point load strength index

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-029	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/09/25	Checked By:	smd
Depth :	36.6-37.6'	Test Id:	817036		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-4	36.6-37.6 ft	1.99	0.97	3,111	2.44	1.56	1274	0.901	1148	18	22,900



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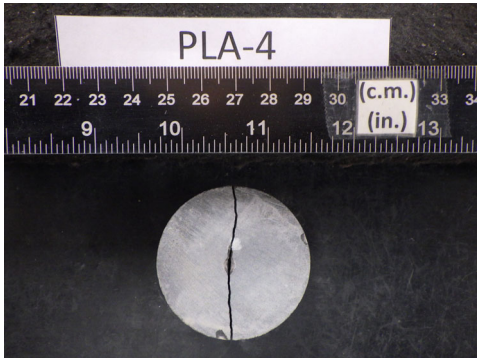


After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

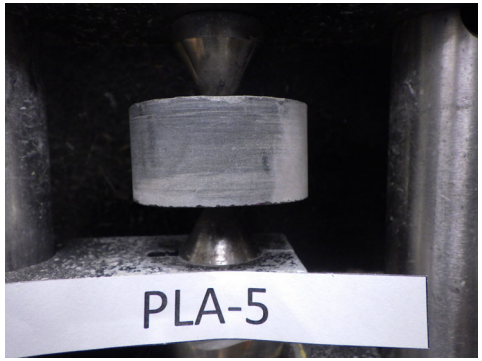
F = the size correction factor

Is(50) = the size corrected point load strength index

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-035	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/09/25	Checked By:	smd
Depth :	20.4-20.6'	Test Id:	817037		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-5	20.4-20.6 ft	1.99	1.01	3,132	2.57	1.60	1216	0.912	1109	19	23,100



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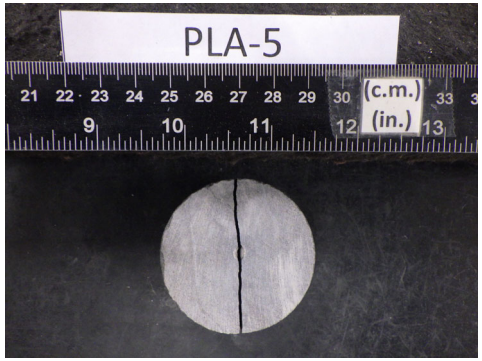


After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

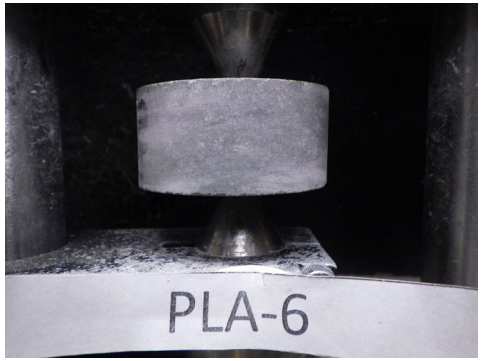
F = the size correction factor

Is(50) = the size corrected point load strength index

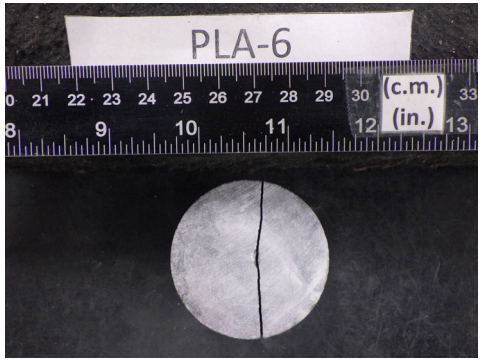
Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-041	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/09/25	Checked By:	smd
Depth :	29.6-30.6'	Test Id:	817038		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-6	29.6-30.6 ft	1.99	0.97	2,731	2.46	1.57	1113	0.902	1004	18	20,000



Before



After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

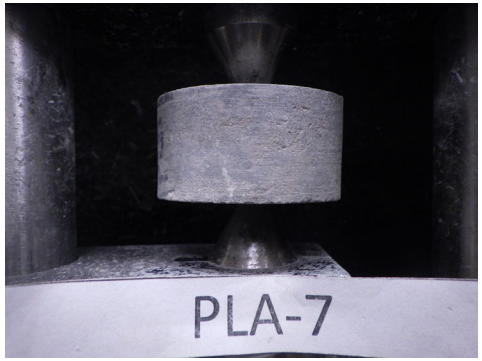
F = the size correction factor

Is(50) = the size corrected point load strength index

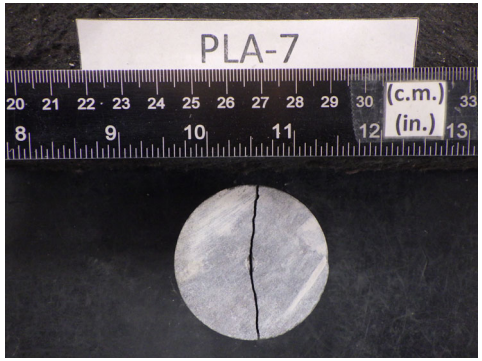
Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-045	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/09/25	Checked By:	smd
Depth :	11.5-12'	Test Id:	817040		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-7	11.62-11.71 ft	1.97	1.04	2,837	2.59	1.61	1095	0.913	1000	19	20,800



Before



After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

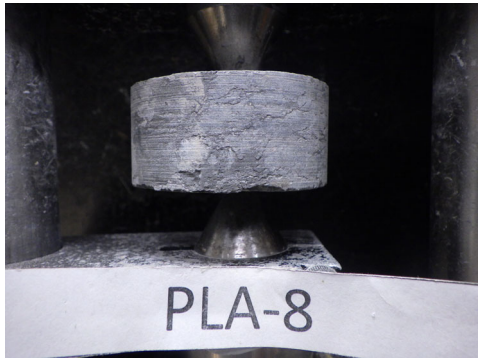
F = the size correction factor

Is(50) = the size corrected point load strength index

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-047	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/09/25	Checked By:	smd
Depth :	30.5-31'	Test Id:	817041		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-8	30.5-31 ft	1.99	0.97	1,387	2.46	1.57	564	0.903	509	18	10,200



Before

After

Intact material and Discontinuity Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

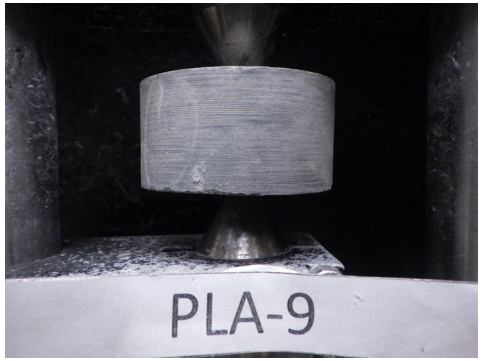
F = the size correction factor

Is(50) = the size corrected point load strength index

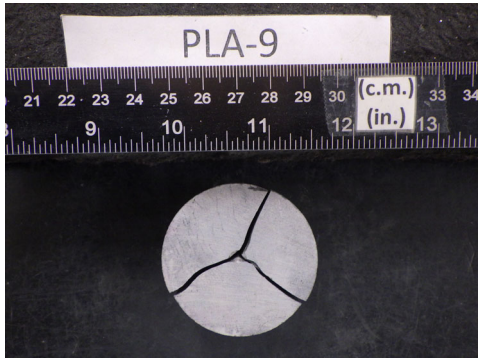
Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-051	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/09/25	Checked By:	smd
Depth :	28.5-29'	Test Id:	817043		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-9	28.56-28.65 ft	1.99	1.03	1,789	2.59	1.61	690	0.914	630	19	13,100



Before



After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

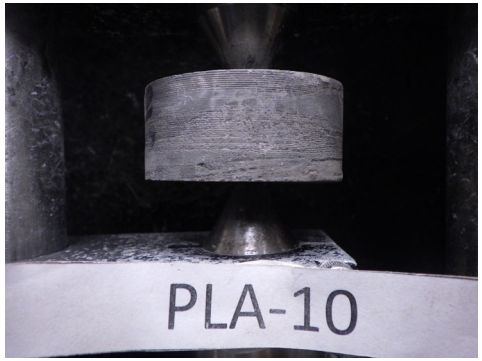
F = the size correction factor

Is(50) = the size corrected point load strength index

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-065	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/09/25	Checked By:	smd
Depth :	22-22.25'	Test Id:	817047		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-10	22.03-22.12 ft	1.98	0.90	1,592	2.28	1.51	699	0.887	620	18	12,600



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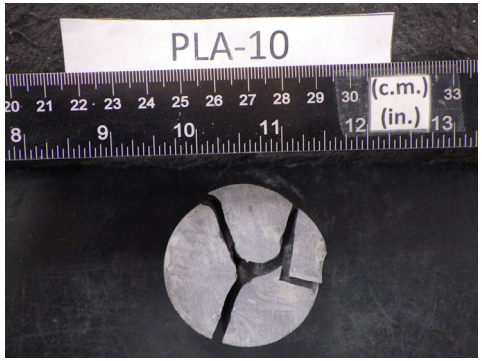


After

Intact material and Discontinuity Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

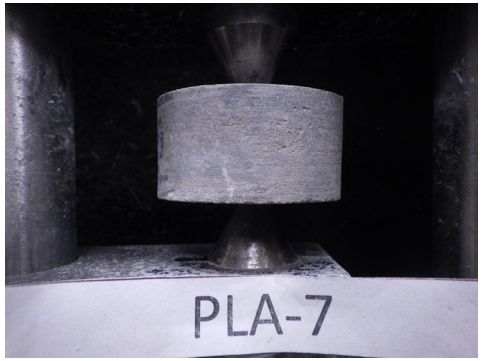
F = the size correction factor

Is(50) = the size corrected point load strength index

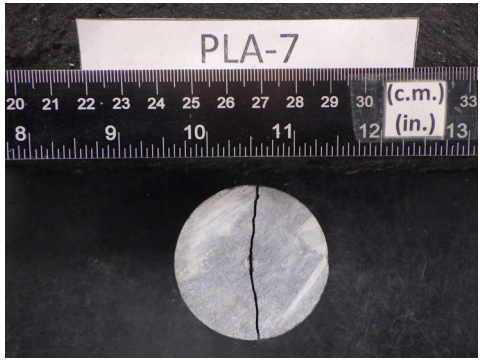
Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-068	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/09/25	Checked By:	smd
Depth :	24-24.5'	Test Id:	817049		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-11	24-24.5 ft	1.98	0.97	2,794	2.45	1.56	1142	0.902	1030	18	20,600



Before



After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

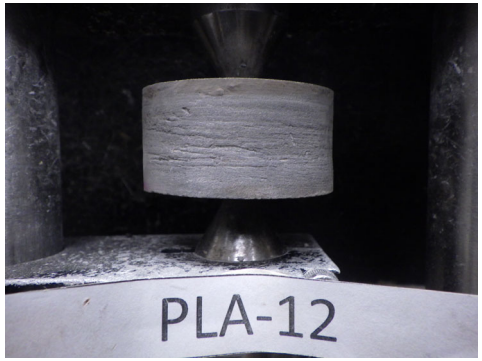
F = the size correction factor

Is(50) = the size corrected point load strength index

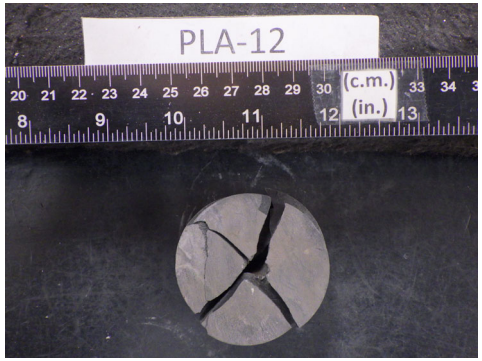
Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-068	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/09/25	Checked By:	smd
Depth :	26-26.5'	Test Id:	817050		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-12	26.07-26.16 ft	1.97	0.99	1,864	2.47	1.57	755	0.903	682	18	13,600



Before



After

Intact material and Discontinuity Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

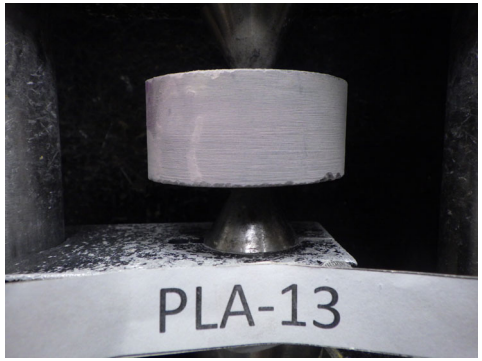
F = the size correction factor

Is(50) = the size corrected point load strength index

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-068	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/09/25	Checked By:	smd
Depth :	33.5-34'	Test Id:	817051		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-13	33.5-34 ft	1.97	0.92	1,490	2.30	1.52	647	0.890	576	18	11,600



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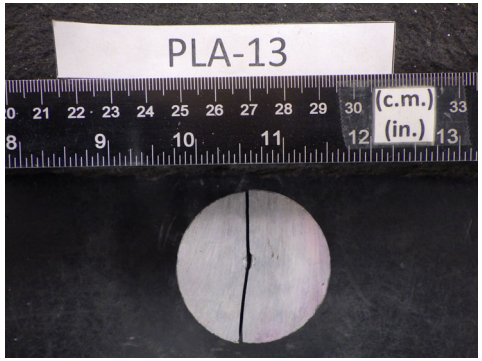


After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

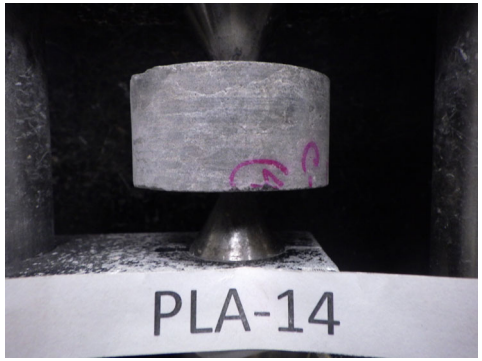
F = the size correction factor

Is(50) = the size corrected point load strength index

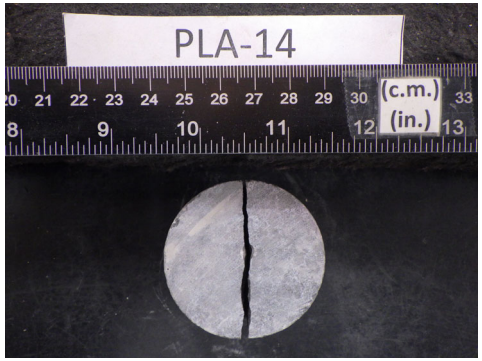
Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-072	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/09/25	Checked By:	smd
Depth :	46-46.25'	Test Id:	817055		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-14	46.04-46.14 ft	1.98	1.01	2,554	2.55	1.60	1002	0.910	912	18	18,000



Before



After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

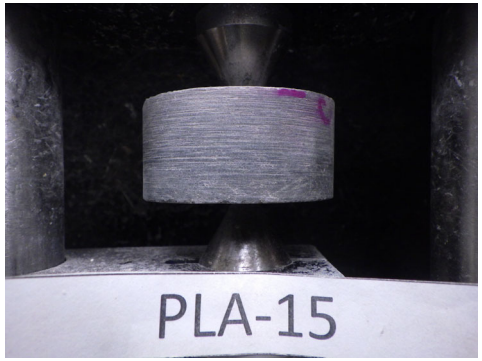
F = the size correction factor

Is(50) = the size corrected point load strength index

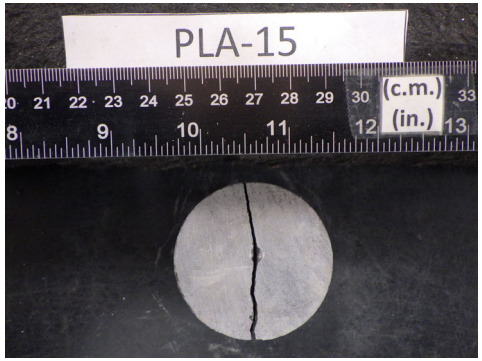
Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-076	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/09/25	Checked By:	smd
Depth :	40.5-40.75'	Test Id:	817057		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-15	40.54-40.63 ft	1.99	0.97	2,617	2.45	1.56	1069	0.902	964	18	19,200



Before



After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

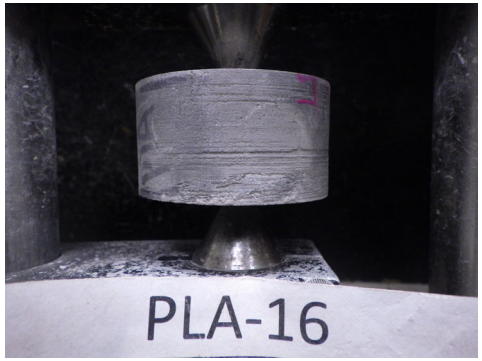
F = the size correction factor

Is(50) = the size corrected point load strength index

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-077	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/09/25	Checked By:	smd
Depth :	46.75-47'	Test Id:	817058		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-16	46.75-47 ft	1.96	1.09	1,243	2.73	1.65	456	0.924	421	19	8,660



Before

After

Intact material and Discontinuity Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

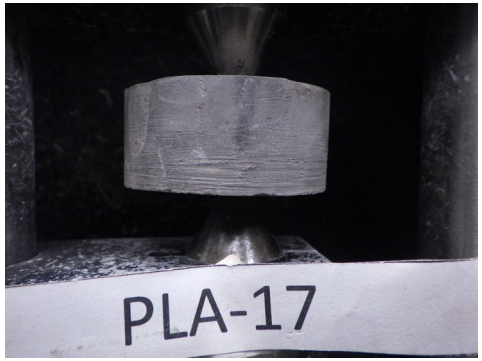
F = the size correction factor

Is(50) = the size corrected point load strength index

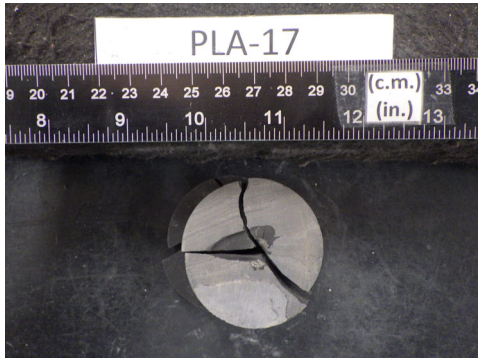
Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-086	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/09/25	Checked By:	smd
Depth :	25.5-26'	Test Id:	817064		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-17	25.5-26 ft	1.99	0.92	1,167	2.33	1.53	502	0.892	447	18	9,030



Before



After

Intact material and Discontinuity Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

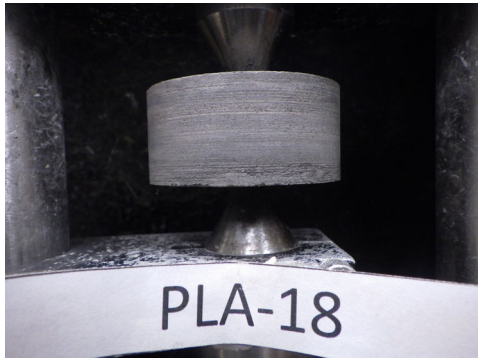
F = the size correction factor

Is(50) = the size corrected point load strength index

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-088	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/09/25	Checked By:	smd
Depth :	33.5-34'	Test Id:	817065		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-18	33.5-34 ft	1.99	0.93	4,636	2.36	1.54	1966	0.894	1758	18	35,400



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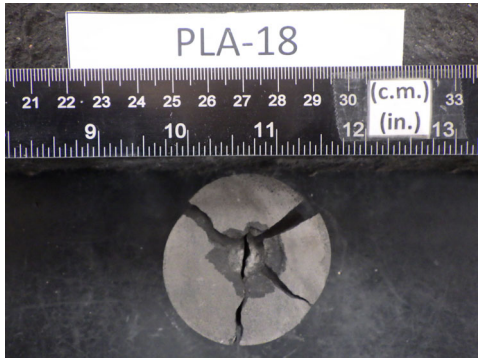


After

Intact material and Discontinuity Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

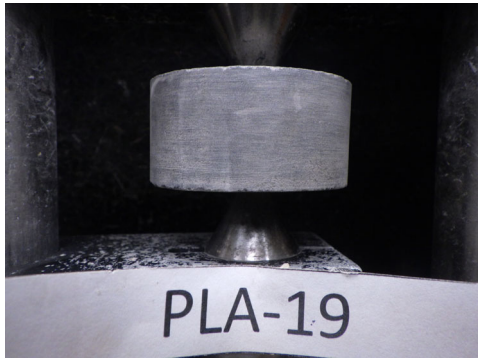
F = the size correction factor

Is(50) = the size corrected point load strength index

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-098	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/09/25	Checked By:	smd
Depth :	31.5-32'	Test Id:	817067		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-19	31.5-32 ft	1.99	0.99	2,812	2.51	1.58	1122	0.907	1018	18	20,200



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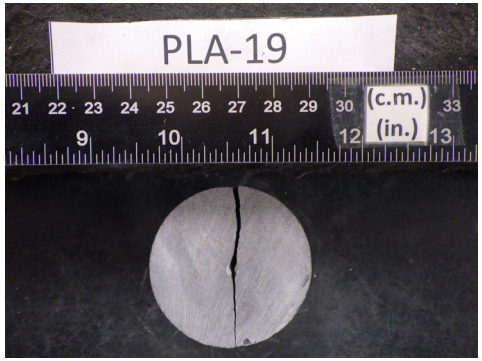


After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

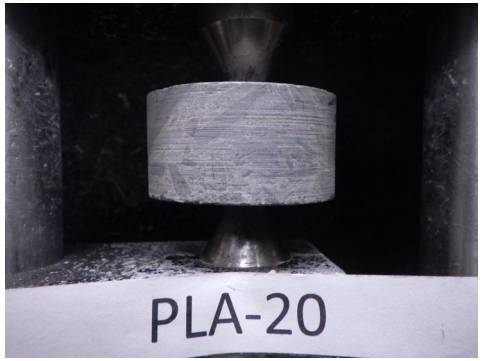
F = the size correction factor

Is(50) = the size corrected point load strength index

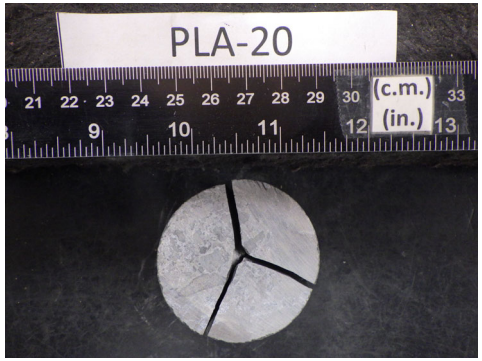
Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-104	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/09/25	Checked By:	smd
Depth :	57-57.5'	Test Id:	817071		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-20	57.07-57.16 ft	1.97	1.03	1,801	2.58	1.61	698	0.913	637	19	13,300



Before



After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

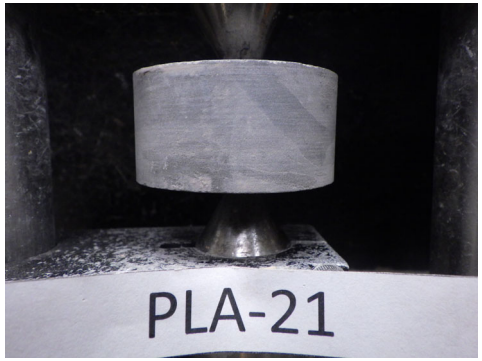
F = the size correction factor

Is(50) = the size corrected point load strength index

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-111	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/09/25	Checked By:	smd
Depth :	19.5-20'	Test Id:	817077		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-21	19.5-20 ft	1.97	1.01	1,396	2.53	1.59	552	0.909	501	18	9,930



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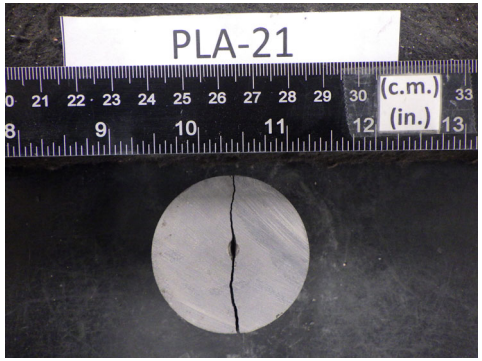


After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

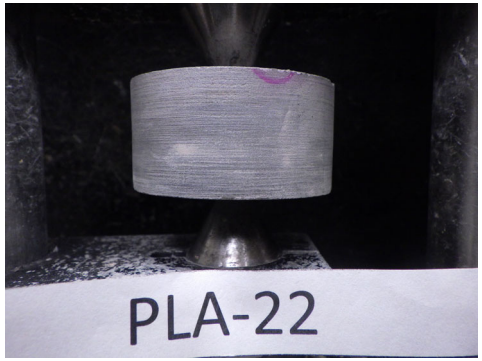
F = the size correction factor

Is(50) = the size corrected point load strength index

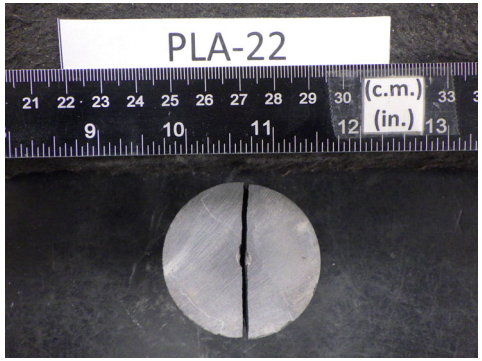
Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-116	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/09/25	Checked By:	smd
Depth :	34.5-34.75'	Test Id:	817083		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-22	34.5-34.75 ft	1.97	1.00	2,869	2.52	1.59	1139	0.908	1034	18	20,500



Before



After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

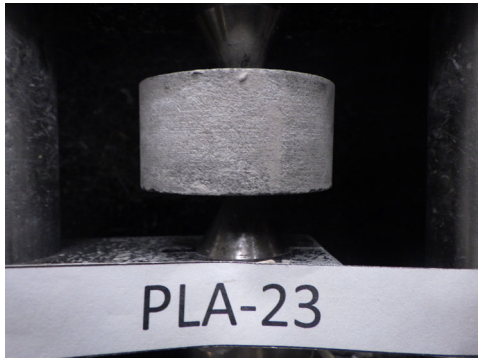
F = the size correction factor

Is(50) = the size corrected point load strength index

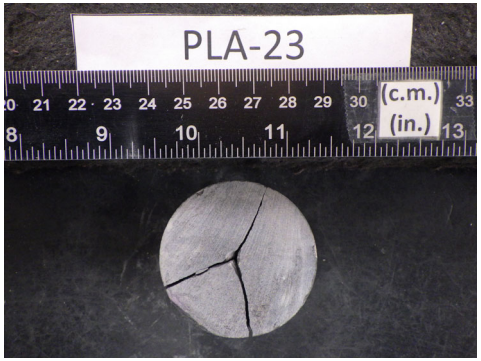
Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-116	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/09/25	Checked By:	smd
Depth :	39.5-40'	Test Id:	817085		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-23	39.5-40 ft	1.98	1.03	3,109	2.58	1.61	1205	0.913	1099	19	22,900



Before



After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

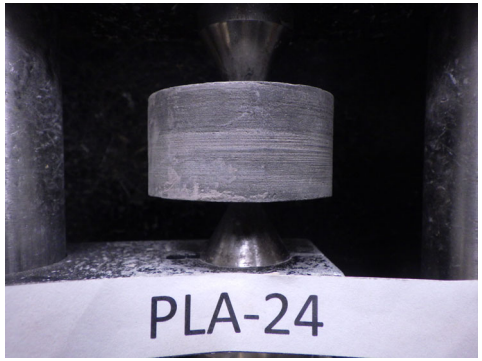
F = the size correction factor

Is(50) = the size corrected point load strength index

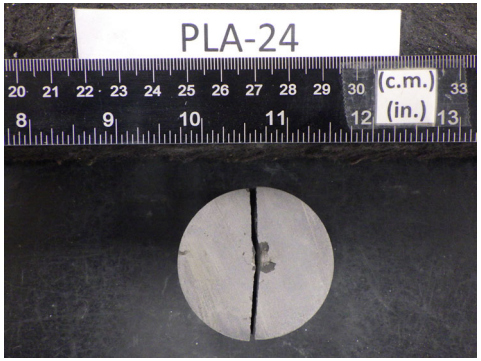
Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-117	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/09/25	Checked By:	smd
Depth :	15-15.3'	Test Id:	817086		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-24	15.05-15.14 ft	1.97	1.02	1,477	2.55	1.60	579	0.910	527	19	11,000



Before



After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

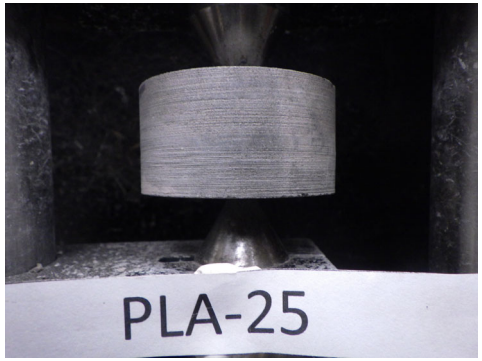
F = the size correction factor

Is(50) = the size corrected point load strength index

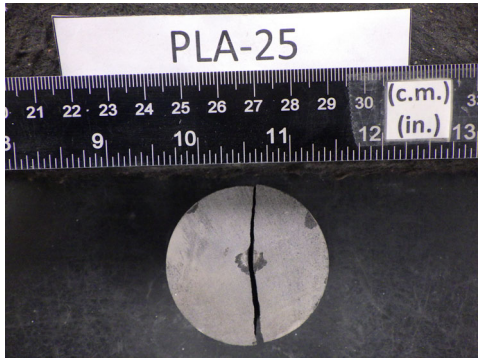
Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-120	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/09/25	Checked By:	smd
Depth :	47-47.5'	Test Id:	817093		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-25	47.08-47.17 ft	1.96	1.04	3,044	2.59	1.61	1176	0.913	1074	19	22,300



Before



After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

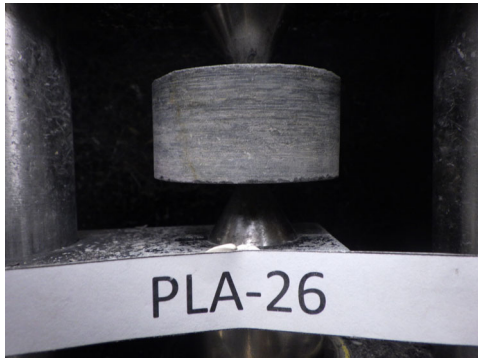
F = the size correction factor

Is(50) = the size corrected point load strength index

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-121	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/09/25	Checked By:	smd
Depth :	56.5-56.75'	Test Id:	817094		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-26	56.53-56.62 ft	1.98	1.01	1,850	2.55	1.60	725	0.910	660	18	13,100



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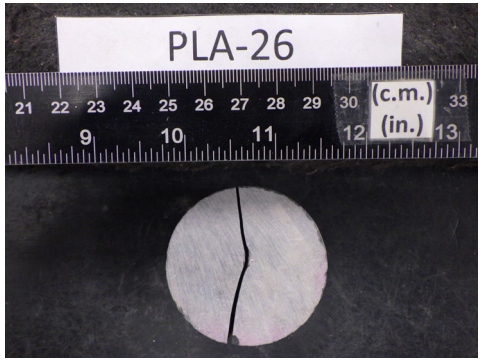


After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

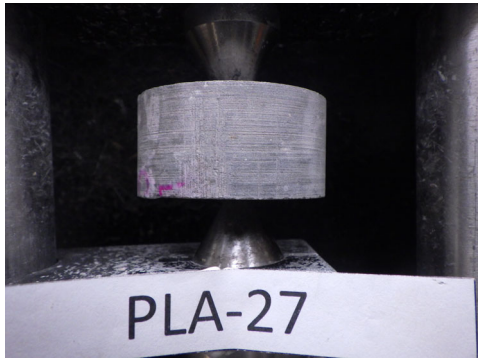
F = the size correction factor

Is(50) = the size corrected point load strength index

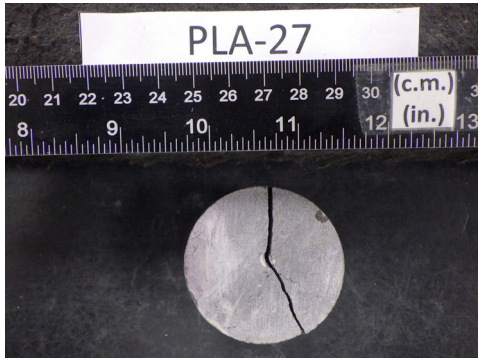
Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-125	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/09/25	Checked By:	smd
Depth :	11.5-12'	Test Id:	817099		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-27	11.56-11.65 ft	1.98	0.99	2,934	2.50	1.58	1174	0.906	1064	18	21,100



Before



After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

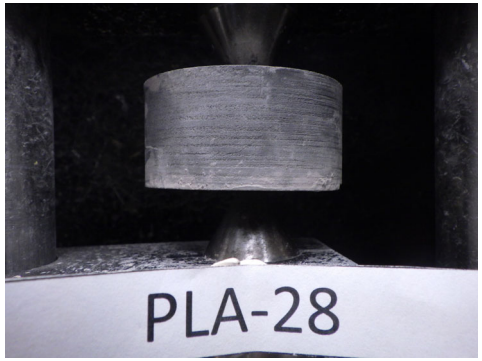
F = the size correction factor

Is(50) = the size corrected point load strength index

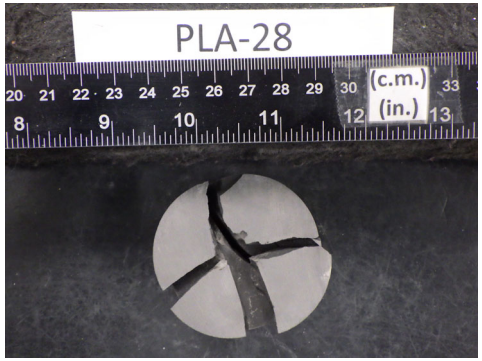
Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-129	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/09/25	Checked By:	smd
Depth :	31.5-32.5'	Test Id:	817103		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-28	31.5-32.5 ft	1.98	0.99	814	2.50	1.58	326	0.906	295	18	5,860



Before



After

Intact material and Discontinuity Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

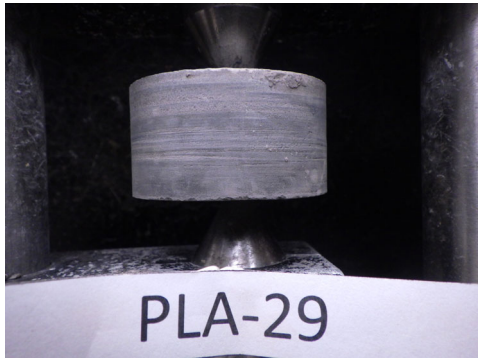
F = the size correction factor

Is(50) = the size corrected point load strength index

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-129	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/09/25	Checked By:	smd
Depth :	35-35.5'	Test Id:	817104		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-29	35-35.5 ft	1.98	1.06	1,969	2.67	1.63	738	0.919	679	19	14,000



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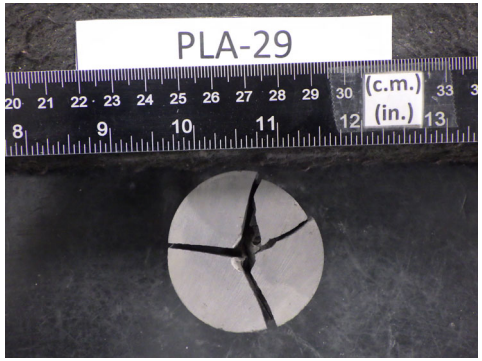


After

Intact material and Discontinuity Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

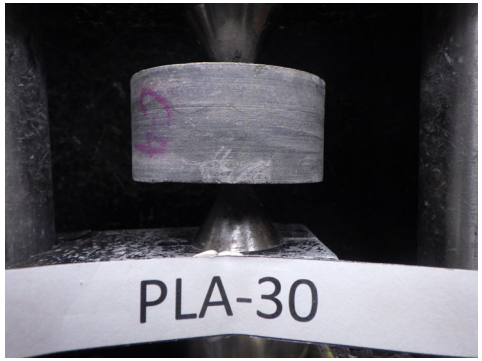
F = the size correction factor

Is(50) = the size corrected point load strength index

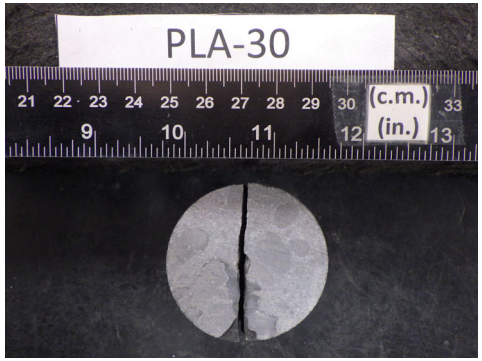
Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-129	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/09/25	Checked By:	smd
Depth :	44-44.5'	Test Id:	817105		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-30	44-44.5 ft	1.98	0.98	2,480	2.47	1.57	1005	0.903	908	18	18,100



Before



After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

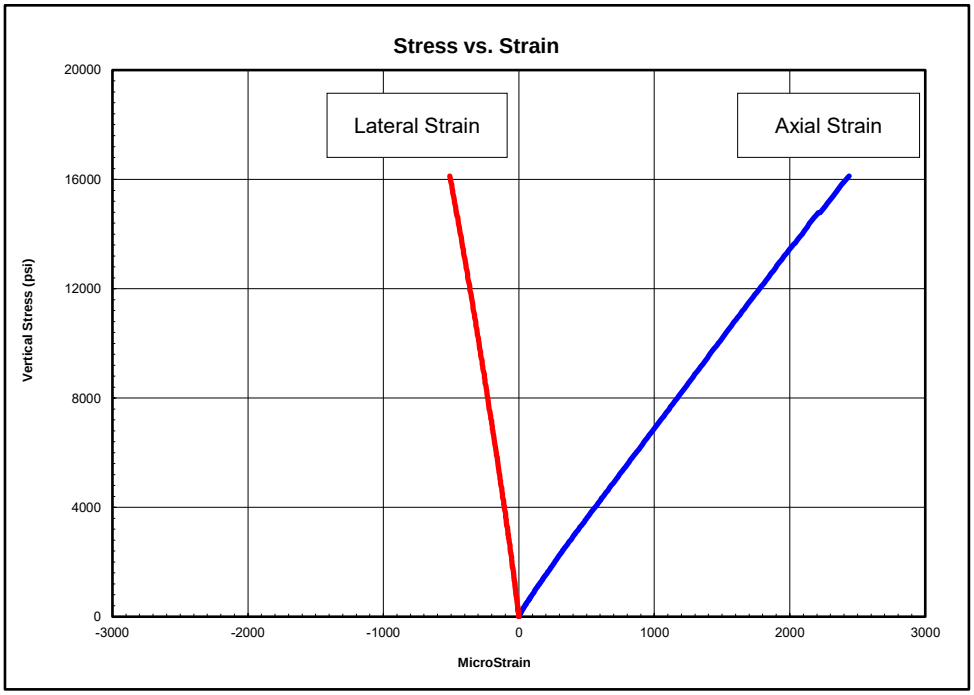
Is = the uncorrected point load strength index

F = the size correction factor

Is(50) = the size corrected point load strength index

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/11/2025
Tested By:	gp
Checked By:	jsc
Boring ID:	LB-R-077
Sample ID:	C-1
Depth, ft:	40.55-40.93
Sample Type:	rock core
Sample Description:	See photographs Intact material failure Best Effort end preparation performed

Compressive Strength and Elastic Moduli of Rock by ASTM D7012 - Method D



Peak Compressive Stress: 16,123 psi

Stress Range, psi	Young's Modulus, psi	Poisson's Ratio
1600-5900	6,670,000	0.19
5900-10200	6,600,000	0.21
1020-14500	6,460,000	0.22

Notes:
Test specimen tested at the approximate as-received moisture content and at standard laboratory temperature.
The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.
Young's Modulus and Poisson's Ratio calculated using the tangent to the line in the stress range listed.
Calculations assume samples are isotropic, which is not necessarily the case.

GeoTesting EXPRESS
A Sercel Business

Client:	Langan Engineering	Test Date:	6/10/2025
Project Name:	Upstate Confidential Project	Tested By:	jss
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-077		
Sample ID:	C-1		
Depth (ft):	40.55-40.93		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.39	4.38	4.38
Specimen Diameter, in:	1.98	1.98	1.98
Specimen Mass, g:	627.04		
Bulk Density, lb/ft^3	176	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? NO

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? NO

END FLATNESS AND PARALLELISM (Procedure FP1)

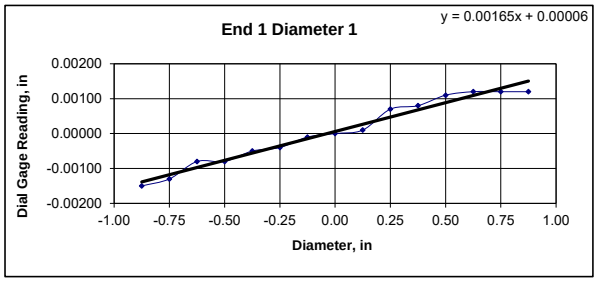
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00150	-0.00130	-0.00080	-0.00080	-0.00050	-0.00040	-0.00010	0.00000	0.00010	0.00070	0.00080	0.00110	0.00120	0.00120	0.00120
Diameter 2, in (rotated 90°)	0.00110	0.00090	0.00090	0.00070	0.00070	0.00020	0.00020	0.00000	0.00010	0.00020	-0.00030	-0.00030	-0.00070	-0.00070	-0.00090

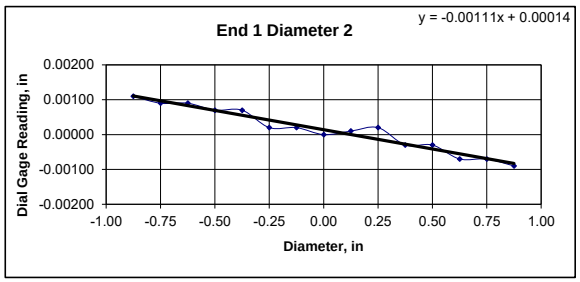
Difference between max and min readings, in:
0° = 0.00270 90° = 0.00200

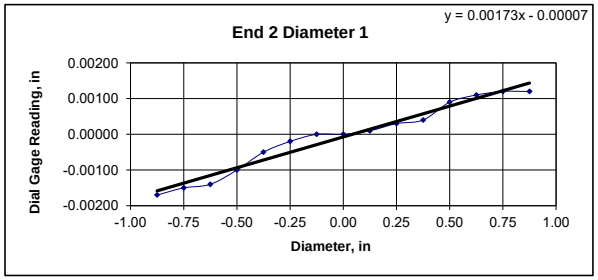
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00170	-0.00150	-0.00140	-0.00100	-0.00050	-0.00020	0.00000	0.00000	0.00010	0.00030	0.00040	0.00090	0.00110	0.00120	0.00120
Diameter 2, in (rotated 90°)	-0.00130	-0.00130	-0.00080	-0.00080	-0.00030	-0.00010	0.00000	0.00000	0.00000	0.00030	0.00070	0.00080	0.00080	0.00110	0.00110

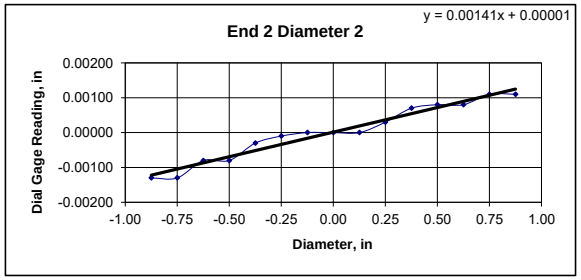
Difference between max and min readings, in:
0° = 0.0029 90° = 0.0024

Maximum difference must be < 0.0020 in. Difference = ± 0.00145
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00165
Angle of Best Fit Line: 0.09462

End 2:
Slope of Best Fit Line 0.00173
Angle of Best Fit Line: 0.09888

Maximum Angular Difference: 0.00426

Parallelism Tolerance Met? YES
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00111
Angle of Best Fit Line: 0.06335

End 2:
Slope of Best Fit Line 0.00141
Angle of Best Fit Line: 0.08087

Maximum Angular Difference: 0.01752

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00270	1.983	0.00136	0.078	YES
Diameter 2, in (rotated 90°)	0.00200	1.983	0.00101	0.058	YES
END 2					
Diameter 1, in	0.00290	1.983	0.00146	0.084	YES
Diameter 2, in (rotated 90°)	0.00240	1.983	0.00121	0.069	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

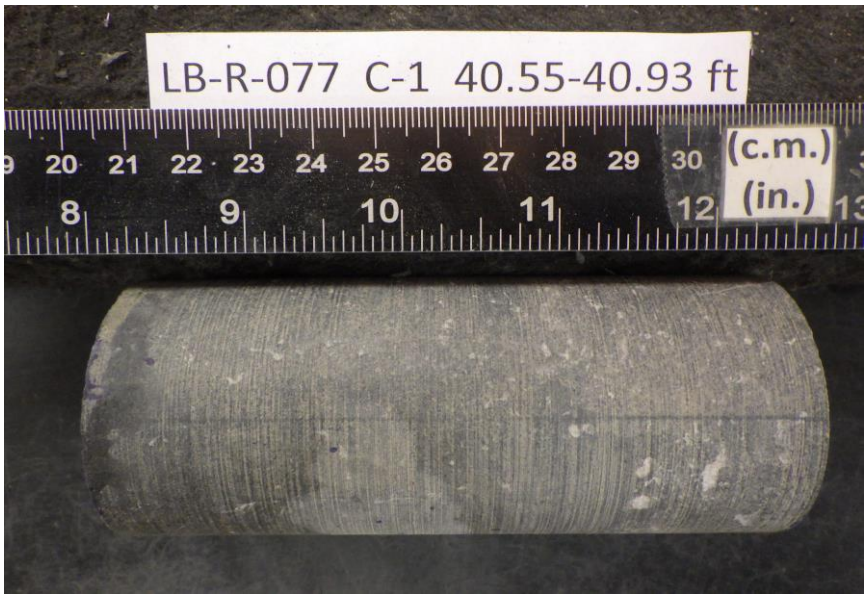
Client:	Langan Engineering	Test Date:	6/10/2025
Project Name:	Upstate Confidential Project	Tested By:	jss
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-077	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	C-1		
Depth (ft):	40.55-40.93		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/11/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-077
Sample ID:	C-1
Depth, ft:	40.55-40.93

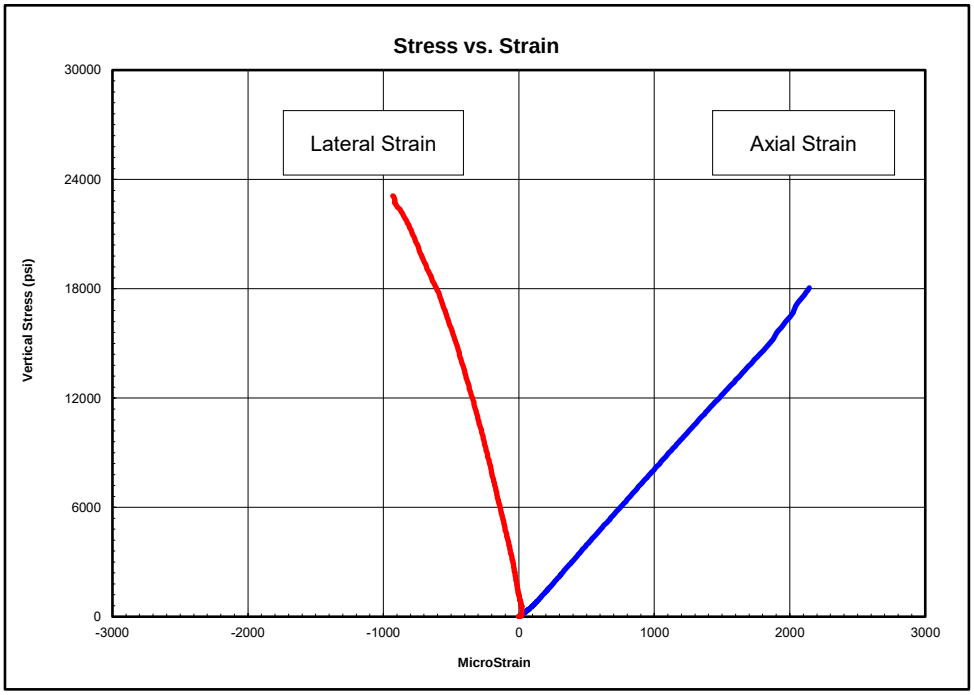


After cutting and grinding

After break

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/11/2025
Tested By:	gp
Checked By:	jsc
Boring ID:	LB-R-088
Sample ID:	C-2
Depth, ft:	34.03-34.38
Sample Type:	rock core
Sample Description:	See photographs Intact material failure Best Effort end preparation performed

Compressive Strength and Elastic Moduli of Rock by ASTM D7012 - Method D



Peak Compressive Stress: 23,093 psi

The axial strain gauges failed before the peak value was attained. Young's Modulus and Poisson' Ratio could not be determined within the third stress range.

Stress Range, psi	Young's Modulus, psi	Poisson's Ratio
2300-8500	8,360,000	0.26
8500-14600	8,080,000	0.30
14600-20800	---	---

Notes:
Test specimen tested at the approximate as-received moisture content and at standard laboratory temperature.
The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.
Young's Modulus and Poisson's Ratio calculated using the tangent to the line in the stress range listed.
Calculations assume samples are isotropic, which is not necessarily the case.

Client:	Langan Engineering	Test Date:	6/10/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-088		
Sample ID:	C-2		
Depth (ft):	34.03-34.38		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.32	4.32	4.32
Specimen Diameter, in:	1.98	1.98	1.98
Specimen Mass, g:	616.32		
Bulk Density, lb/ft^3	176	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

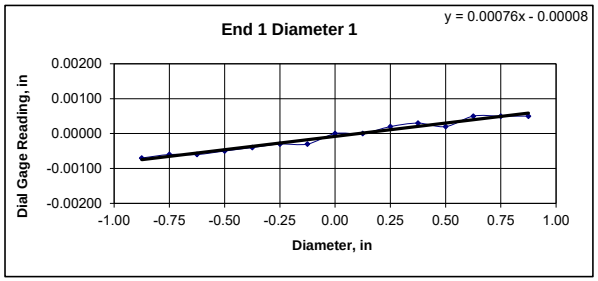
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00070	-0.00060	-0.00060	-0.00050	-0.00040	-0.00030	-0.00030	0.00000	0.00000	0.00020	0.00030	0.00020	0.00050	0.00050	0.00050
Diameter 2, in (rotated 90°)	0.00080	0.00080	0.00050	0.00030	0.00020	0.00010	0.00010	0.00000	-0.00020	-0.00050	-0.00050	-0.00080	-0.00110	-0.00130	-0.00150

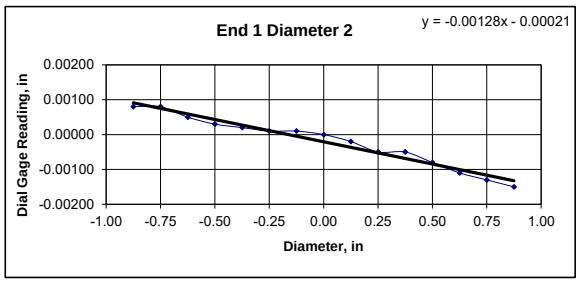
Difference between max and min readings, in:
0° = 0.00120 90° = 0.00230

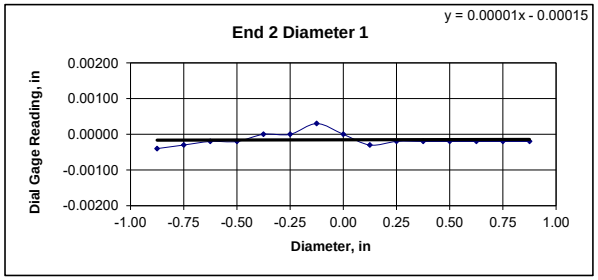
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00040	-0.00030	-0.00020	-0.00020	0.00000	0.00000	0.00030	0.00000	-0.00030	-0.00020	-0.00020	-0.00020	-0.00020	-0.00020	-0.00020
Diameter 2, in (rotated 90°)	-0.00170	-0.00130	-0.00130	-0.00100	-0.00080	-0.00060	0.00000	0.00000	0.00010	0.00040	0.00060	0.00070	0.00090	0.00120	0.00140

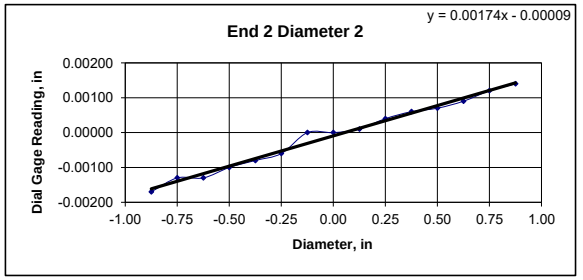
Difference between max and min readings, in:
0° = 0.0007 90° = 0.0031

Maximum difference must be < 0.0020 in. Difference = ± 0.00155
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00076
Angle of Best Fit Line: 0.04371

End 2:
Slope of Best Fit Line 0.00001
Angle of Best Fit Line: 0.00065

Maximum Angular Difference: 0.04305

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00128
Angle of Best Fit Line: 0.07317

End 2:
Slope of Best Fit Line 0.00174
Angle of Best Fit Line: 0.09953

Maximum Angular Difference: 0.02636

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00120	1.980	0.00061	0.035	YES
Diameter 2, in (rotated 90°)	0.00230	1.980	0.00116	0.067	YES
END 2					
Diameter 1, in	0.00070	1.980	0.00035	0.020	YES
Diameter 2, in (rotated 90°)	0.00310	1.980	0.00157	0.090	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

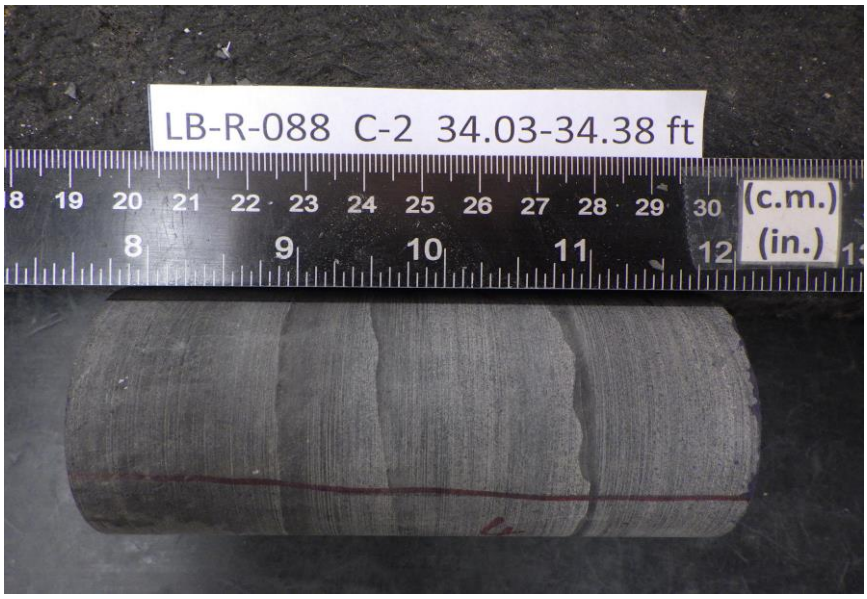
Client:	Langan Engineering	Test Date:	6/10/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-088	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	C-2		
Depth (ft):	34.03-34.38		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/11/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-088
Sample ID:	C-2
Depth, ft:	34.03-34.38

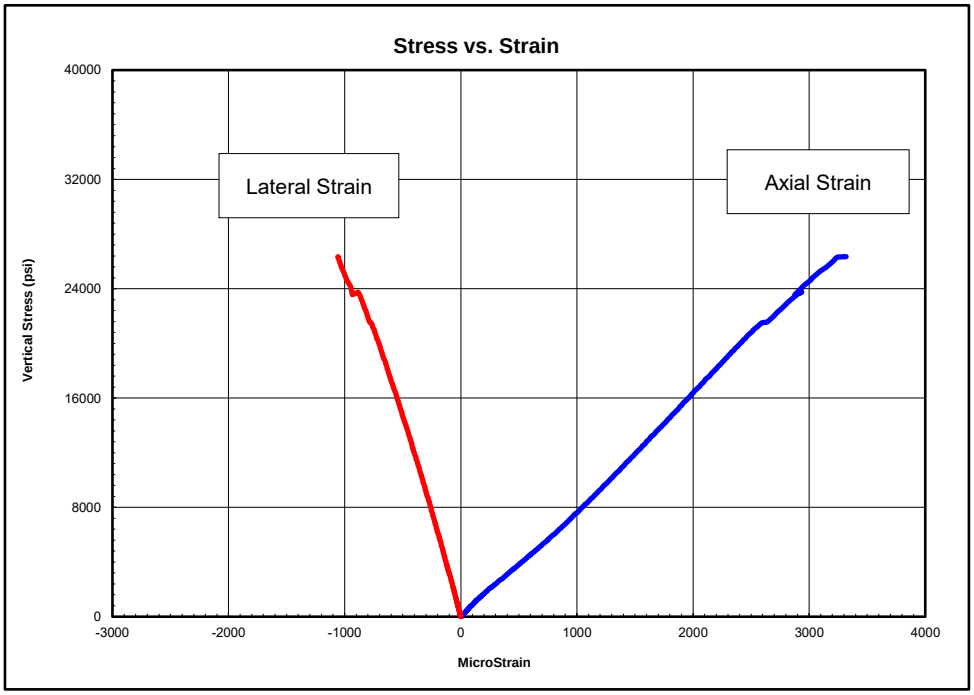


After cutting and grinding

After break

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/11/2025
Tested By:	gp
Checked By:	jsc
Boring ID:	LB-R-103
Sample ID:	C-1
Depth, ft:	11-12
Sample Type:	rock core
Sample Description:	See photographs Intact material failure Best Effort end preparation performed

Compressive Strength and Elastic Moduli of Rock by ASTM D7012 - Method D



Peak Compressive Stress: 26,347 psi

Stress Range, psi	Young's Modulus, psi	Poisson's Ratio
2600-9700	7,660,000	0.25
9700-16700	8,880,000	0.33
16700-23700	7,920,000	0.34

Notes:
Test specimen tested at the approximate as-received moisture content and at standard laboratory temperature.
The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.
Young's Modulus and Poisson's Ratio calculated using the tangent to the line in the stress range listed.
Calculations assume samples are isotropic, which is not necessarily the case.

Client:	Langan Engineering	Test Date:	6/9/2025
Project Name:	Upstate Confidential Project	Tested By:	jss
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-103		
Sample ID:	C-1		
Depth (ft):	11-12		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.40	4.39	4.40
Specimen Diameter, in:	2.00	1.99	1.99
Specimen Mass, g:	634.5		
Bulk Density, lb/ft^3	176	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

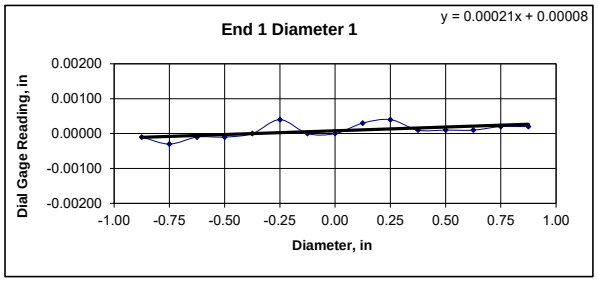
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00010	-0.00030	-0.00010	-0.00010	0.00000	0.00040	0.00000	0.00000	0.00030	0.00040	0.00010	0.00010	0.00010	0.00020	0.00020
Diameter 2, in (rotated 90°)	-0.00160	-0.00110	-0.00090	-0.00080	-0.00050	0.00000	-0.00010	0.00000	0.00040	0.00040	0.00050	0.00080	0.00090	0.00090	0.00110

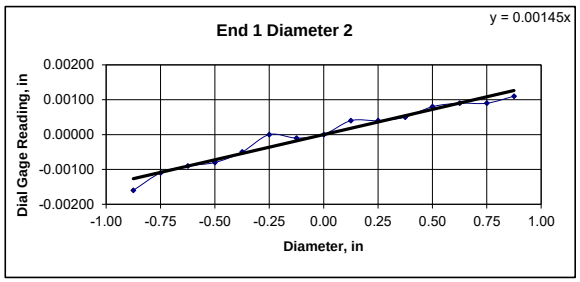
Difference between max and min readings, in:
0° = 0.00070 90° = 0.00270

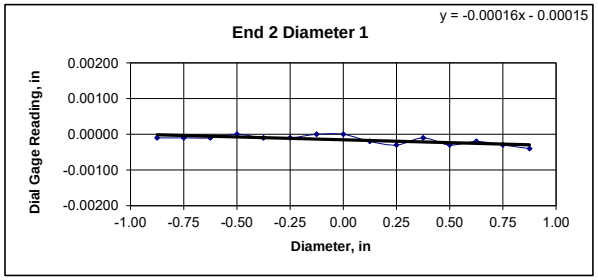
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00010	-0.00010	-0.00010	0.00000	-0.00010	-0.00010	0.00000	0.00000	-0.00020	-0.00030	-0.00010	-0.00030	-0.00020	-0.00030	-0.00040
Diameter 2, in (rotated 90°)	0.00100	0.00100	0.00100	0.00050	0.00040	0.00040	0.00030	0.00000	0.00000	0.00000	-0.00020	-0.00020	-0.00060	-0.00070	-0.00090

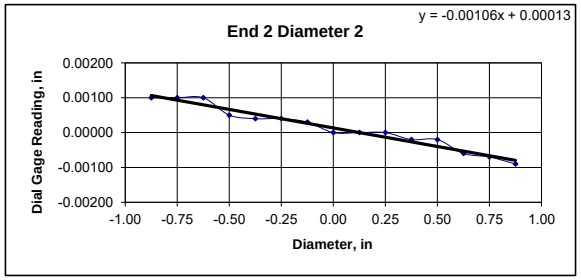
Difference between max and min readings, in:
0° = 0.0004 90° = 0.0019

Maximum difference must be < 0.0020 in. Difference = ± 0.00135
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00021
Angle of Best Fit Line: 0.01228

End 2:
Slope of Best Fit Line 0.00016
Angle of Best Fit Line: 0.00917

Maximum Angular Difference: 0.00311

Parallelism Tolerance Met? YES
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00145
Angle of Best Fit Line: 0.08283

End 2:
Slope of Best Fit Line 0.00106
Angle of Best Fit Line: 0.06090

Maximum Angular Difference: 0.02194

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00070	1.993	0.00035	0.020	YES
Diameter 2, in (rotated 90°)	0.00270	1.993	0.00135	0.078	YES
END 2					
Diameter 1, in	0.00040	1.993	0.00020	0.011	YES
Diameter 2, in (rotated 90°)	0.00190	1.993	0.00095	0.055	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

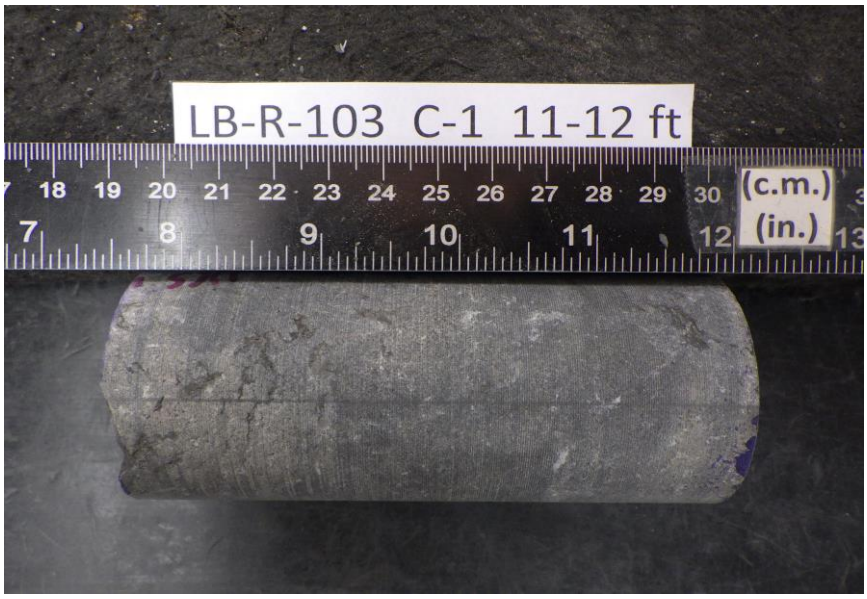
Client:	Langan Engineering	Test Date:	6/9/2025
Project Name:	Upstate Confidential Project	Tested By:	jss
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-103	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	C-1		
Depth (ft):	12-Nov		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/11/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-103
Sample ID:	C-1
Depth, ft:	11-12

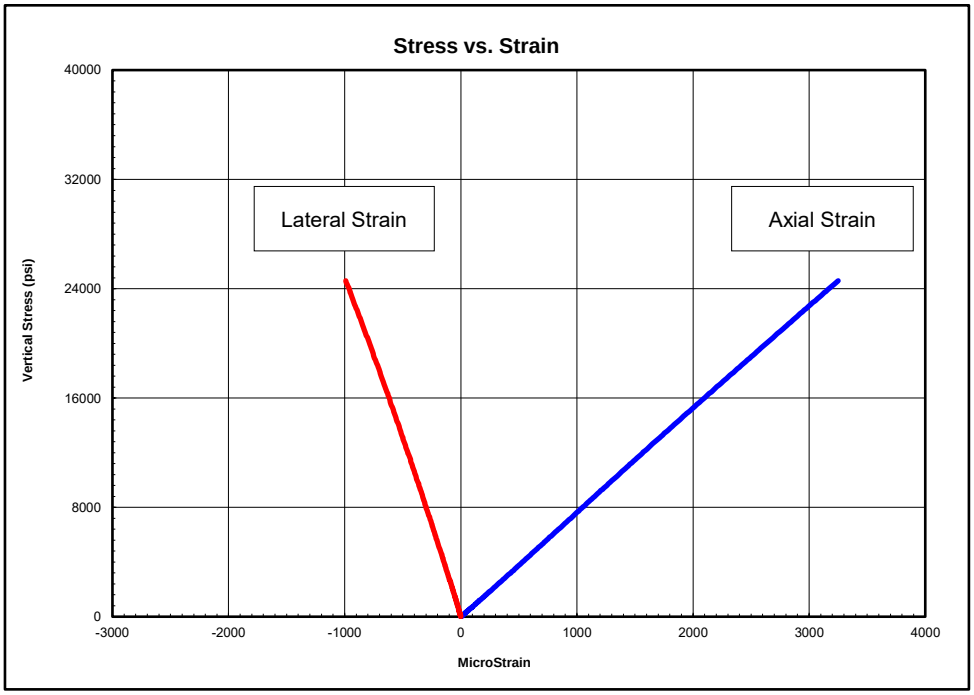


After cutting and grinding

After break

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/11/2025
Tested By:	gp
Checked By:	jsc
Boring ID:	LB-R-104
Sample ID:	---
Depth, ft:	57.75-58.2
Sample Type:	rock core
Sample Description:	See photographs Intact material failure Best Effort end preparation performed

Compressive Strength and Elastic Moduli of Rock by ASTM D7012 - Method D



Peak Compressive Stress: 24,581 psi

Stress Range, psi	Young's Modulus, psi	Poisson's Ratio
2500-9000	7,730,000	0.29
9000-15600	7,630,000	0.31
15600-22100	7,460,000	0.32

Notes:
Test specimen tested at the approximate as-received moisture content and at standard laboratory temperature.
The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.
Young's Modulus and Poisson's Ratio calculated using the tangent to the line in the stress range listed.
Calculations assume samples are isotropic, which is not necessarily the case.

Client:	Langan Engineering	Test Date:	6/10/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-104		
Sample ID:	---		
Depth (ft):	57.75-58.2		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.34	4.33	4.34
Specimen Diameter, in:	1.97	1.97	1.97
Specimen Mass, g:	588.87		
Bulk Density, lb/ft^3	169	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? NO

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? NO

END FLATNESS AND PARALLELISM (Procedure FP1)

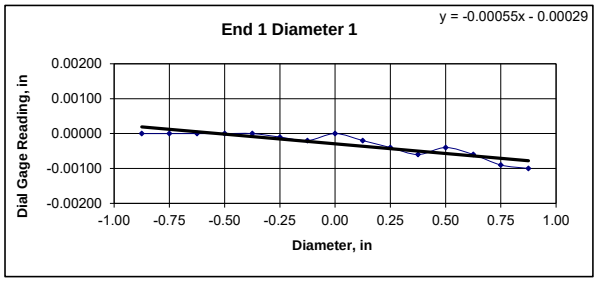
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00000	0.00000	0.00000	0.00000	0.00000	-0.00010	-0.00020	0.00000	-0.00020	-0.00040	-0.00060	-0.00040	-0.00060	-0.00090	-0.00100
Diameter 2, in (rotated 90°)	0.00170	0.00150	0.00140	0.00080	0.00060	0.00070	0.00040	0.00000	-0.00050	-0.00070	-0.00110	-0.00150	-0.00160	-0.00160	-0.00190

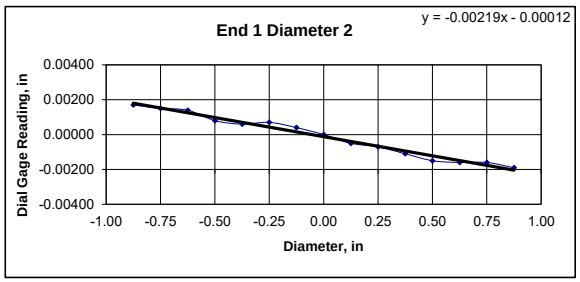
Difference between max and min readings, in:
0° = 0.00100 90° = 0.00360

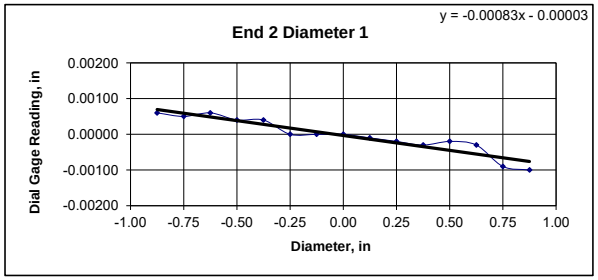
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00060	0.00050	0.00060	0.00040	0.00040	0.00000	0.00000	0.00000	-0.00010	-0.00020	-0.00030	-0.00020	-0.00030	-0.00090	-0.00100
Diameter 2, in (rotated 90°)	-0.00180	-0.00140	-0.00110	-0.00100	-0.00070	-0.00040	-0.00020	0.00000	0.00010	0.00050	0.00070	0.00090	0.00150	0.00160	0.00180

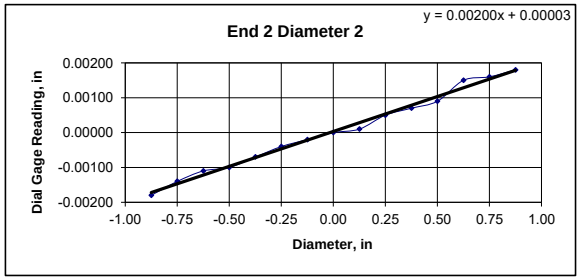
Difference between max and min readings, in:
0° = 0.0016 90° = 0.0036

Maximum difference must be < 0.0020 in. Difference = ± 0.00180
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00055
Angle of Best Fit Line: 0.03176

End 2:
Slope of Best Fit Line 0.00083
Angle of Best Fit Line: 0.04764

Maximum Angular Difference: 0.01588

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00219
Angle of Best Fit Line: 0.12572

End 2:
Slope of Best Fit Line 0.00200
Angle of Best Fit Line: 0.11476

Maximum Angular Difference: 0.01097

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00100	1.970	0.00051	0.029	YES
Diameter 2, in (rotated 90°)	0.00360	1.970	0.00183	0.105	YES
END 2					
Diameter 1, in	0.00160	1.970	0.00081	0.047	YES
Diameter 2, in (rotated 90°)	0.00360	1.970	0.00183	0.105	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/10/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-104	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	57.75-58.2		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS

END 1

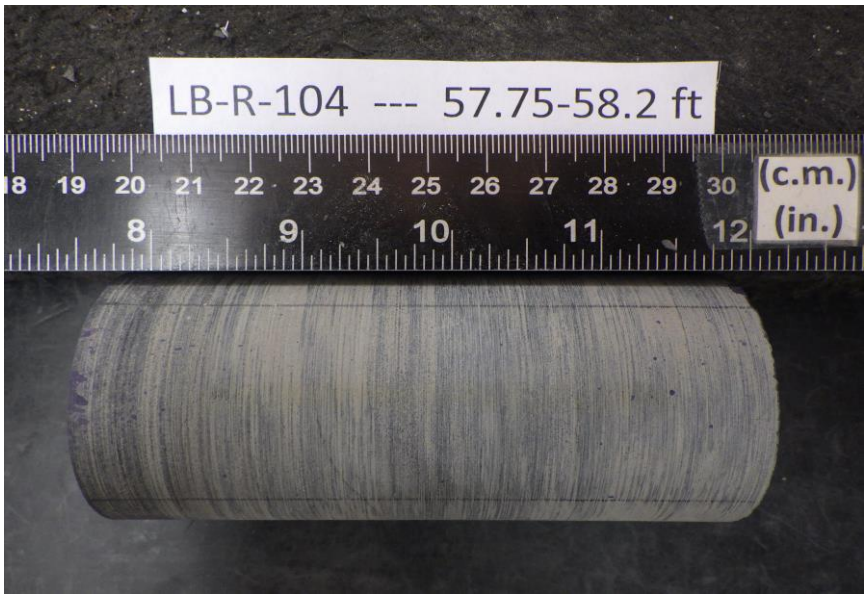
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

END 2

Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/11/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-104
Sample ID:	---
Depth, ft:	57.75-58.2

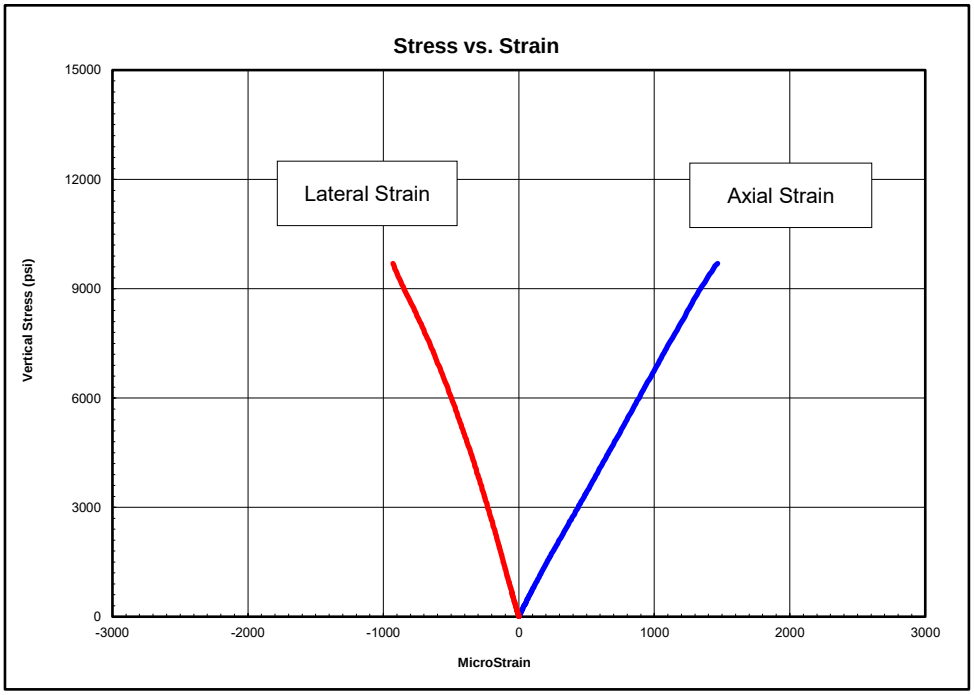


After cutting and grinding

After break

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/11/2025
Tested By:	gp
Checked By:	jsc
Boring ID:	LB-R-110
Sample ID:	C-2
Depth, ft:	23.74-24.12
Sample Type:	rock core
Sample Description:	See photographs Intact material failure Best Effort end preparation performed

Compressive Strength and Elastic Moduli of Rock by ASTM D7012 - Method D



Peak Compressive Stress: 9,692 psi

The strain values recorded for this test produce values of Poisson's Ratio that exceed maximum values found in rocks.

Stress Range, psi	Young's Modulus, psi	Poisson's Ratio
1000-3600	6,590,000	---
3600-6100	6,700,000	---
6100-8700	6,600,000	---

Notes:
Test specimen tested at the approximate as-received moisture content and at standard laboratory temperature.
The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.
Young's Modulus and Poisson's Ratio calculated using the tangent to the line in the stress range listed.
Calculations assume samples are isotropic, which is not necessarily the case.

Client:	Langan Engineering	Test Date:	6/10/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-110		
Sample ID:	C-2		
Depth (ft):	23.74-24.12		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.35	4.35	4.35
Specimen Diameter, in:	1.98	1.98	1.98
Specimen Mass, g:	602.47		
Bulk Density, lb/ft^3	171	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

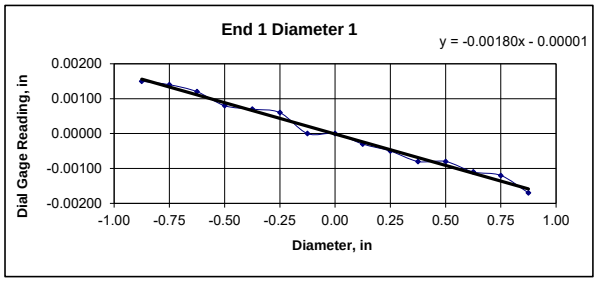
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00150	0.00140	0.00120	0.00080	0.00070	0.00060	0.00000	0.00000	-0.00030	-0.00050	-0.00080	-0.00080	-0.00110	-0.00120	-0.00170
Diameter 2, in (rotated 90°)	0.00120	0.00110	0.00090	0.00080	0.00070	0.00030	0.00030	0.00000	-0.00040	-0.00050	-0.00040	-0.00110	-0.00130	-0.00150	-0.00190

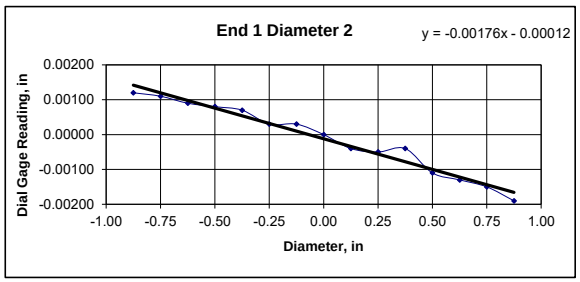
Difference between max and min readings, in:
0° = 0.00320 90° = 0.00310

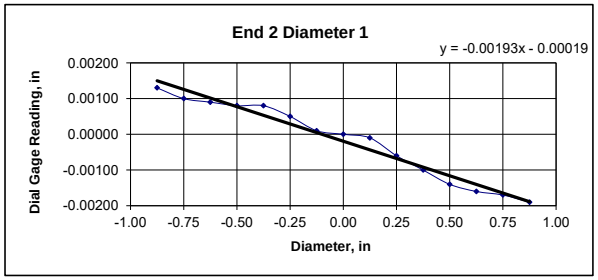
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00130	0.00100	0.00090	0.00080	0.00080	0.00050	0.00010	0.00000	-0.00010	-0.00060	-0.00100	-0.00140	-0.00160	-0.00170	-0.00190
Diameter 2, in (rotated 90°)	-0.00180	-0.00130	-0.00100	-0.00090	-0.00070	-0.00020	0.00000	0.00000	0.00030	0.00050	0.00070	0.00080	0.00090	0.00100	0.00120

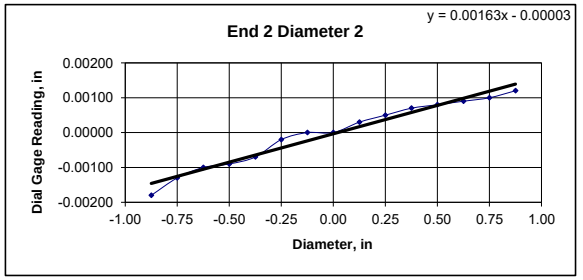
Difference between max and min readings, in:
0° = 0.0032 90° = 0.003

Maximum difference must be < 0.0020 in. Difference = ± 0.00160
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00180
Angle of Best Fit Line: 0.10297

End 2:
Slope of Best Fit Line 0.00193
Angle of Best Fit Line: 0.11083

Maximum Angular Difference: 0.00786

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00176
Angle of Best Fit Line: 0.10068

End 2:
Slope of Best Fit Line 0.00163
Angle of Best Fit Line: 0.09331

Maximum Angular Difference: 0.00737

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00320	1.980	0.00162	0.093	YES
Diameter 2, in (rotated 90°)	0.00310	1.980	0.00157	0.090	YES
END 2					
Diameter 1, in	0.00320	1.980	0.00162	0.093	YES
Diameter 2, in (rotated 90°)	0.00300	1.980	0.00152	0.087	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

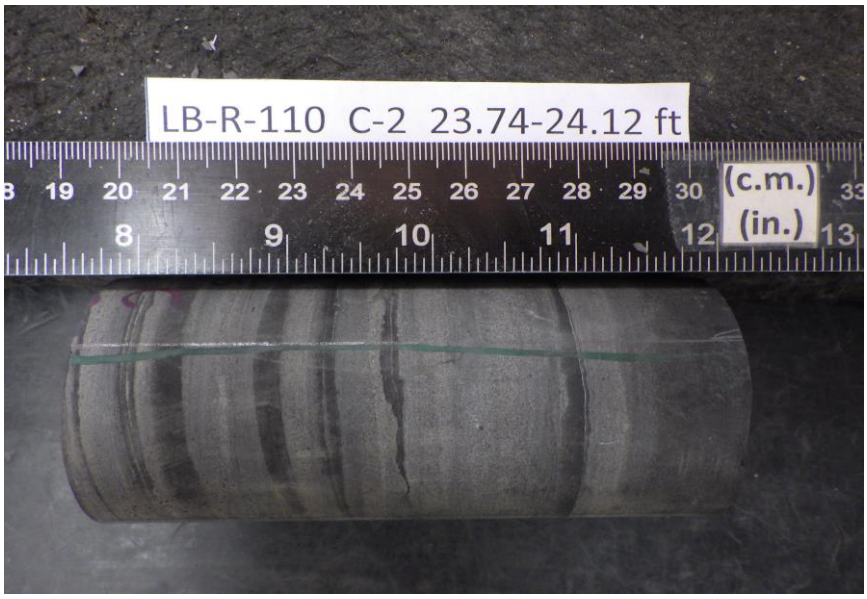
Client:	Langan Engineering	Test Date:	6/10/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-110	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	C-2		
Depth (ft):	23.74-24.12		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/11/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-110
Sample ID:	C-2
Depth, ft:	23.74-24.12

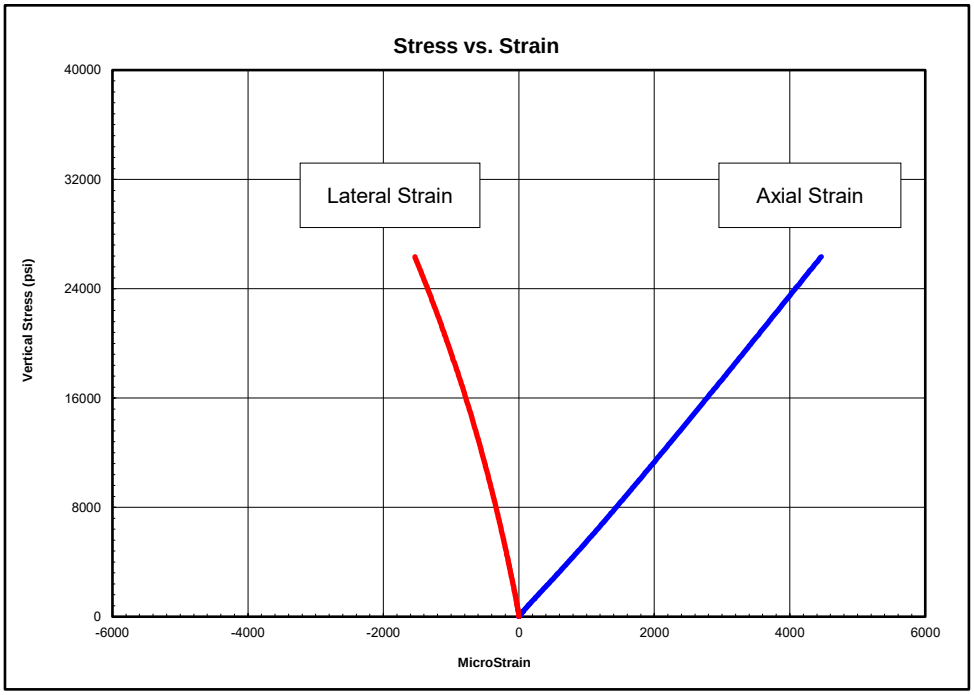


After cutting and grinding

After break

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/11/2025
Tested By:	gp
Checked By:	jsc
Boring ID:	LB-R-125
Sample ID:	C-1
Depth, ft:	14.56-14.93
Sample Type:	rock core
Sample Description:	See photographs Intact material failure Best Effort end preparation performed

Compressive Strength and Elastic Moduli of Rock by ASTM D7012 - Method D



Peak Compressive Stress: 26,340 psi

Stress Range, psi	Young's Modulus, psi	Poisson's Ratio
2600-9700	5,650,000	0.26
9700-16700	6,010,000	0.35
16700-23700	6,140,000	0.44

Notes:
Test specimen tested at the approximate as-received moisture content and at standard laboratory temperature.
The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.
Young's Modulus and Poisson's Ratio calculated using the tangent to the line in the stress range listed.
Calculations assume samples are isotropic, which is not necessarily the case.

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Client:	Langan Engineering	Test Date:	6/10/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-125		
Sample ID:	C-1		
Depth (ft):	14.56-14.93		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.34	4.34	4.34
Specimen Diameter, in:	1.98	1.98	1.98
Specimen Mass, g:	620.81		
Bulk Density, lb/ft^3	177	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

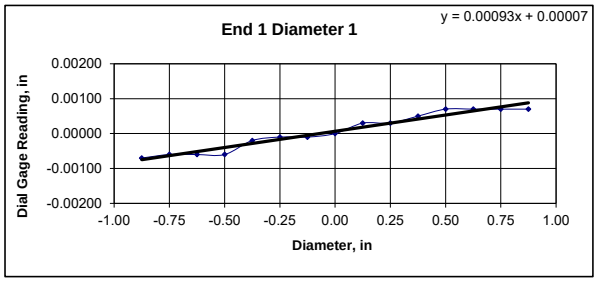
END FLATNESS AND PARALLELISM (Procedure FP1)

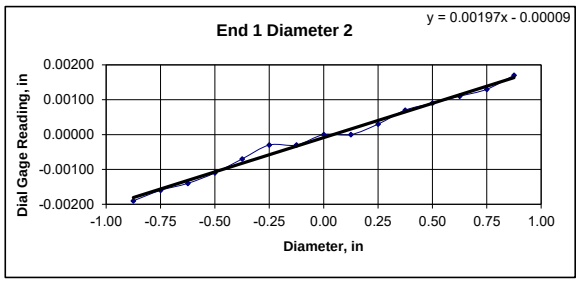
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00070	-0.00060	-0.00060	-0.00060	-0.00020	-0.00010	-0.00010	0.00000	0.00030	0.00030	0.00050	0.00070	0.00070	0.00070	0.00070
Diameter 2, in (rotated 90°)	-0.00190	-0.00160	-0.00140	-0.00110	-0.00070	-0.00030	-0.00030	0.00000	0.00000	0.00030	0.00070	0.00090	0.00110	0.00130	0.00170

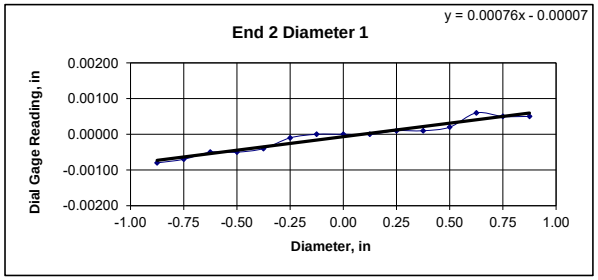
Difference between max and min readings, in:
0° = 0.00140 90° = 0.00360

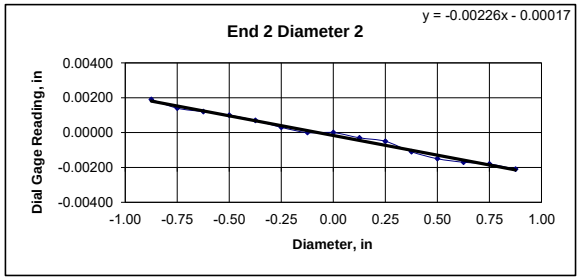
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00080	-0.00070	-0.00050	-0.00050	-0.00040	-0.00010	0.00000	0.00000	0.00000	0.00010	0.00010	0.00020	0.00060	0.00050	0.00050
Diameter 2, in (rotated 90°)	0.00190	0.00140	0.00120	0.00100	0.00070	0.00030	0.00000	0.00000	-0.00030	-0.00050	-0.00110	-0.00150	-0.00170	-0.00180	-0.00210

Difference between max and min readings, in:
0° = 0.0014 90° = 0.004
Maximum difference must be < 0.0020 in. Difference = ± 0.00200
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00093
Angle of Best Fit Line: 0.05337

End 2:
Slope of Best Fit Line 0.00076
Angle of Best Fit Line: 0.04338

Maximum Angular Difference: 0.00999

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00197
Angle of Best Fit Line: 0.11263

End 2:
Slope of Best Fit Line 0.00226
Angle of Best Fit Line: 0.12932

Maximum Angular Difference: 0.01670

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00140	1.980	0.00071	0.041	YES
Diameter 2, in (rotated 90°)	0.00360	1.980	0.00182	0.104	YES
END 2					
Diameter 1, in	0.00140	1.980	0.00071	0.041	YES
Diameter 2, in (rotated 90°)	0.00400	1.980	0.00202	0.116	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/10/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-125	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	C-1		
Depth (ft):	14.56-14.93		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/11/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-125
Sample ID:	C-1
Depth, ft:	14.56-14.93

After cutting and grinding

After break

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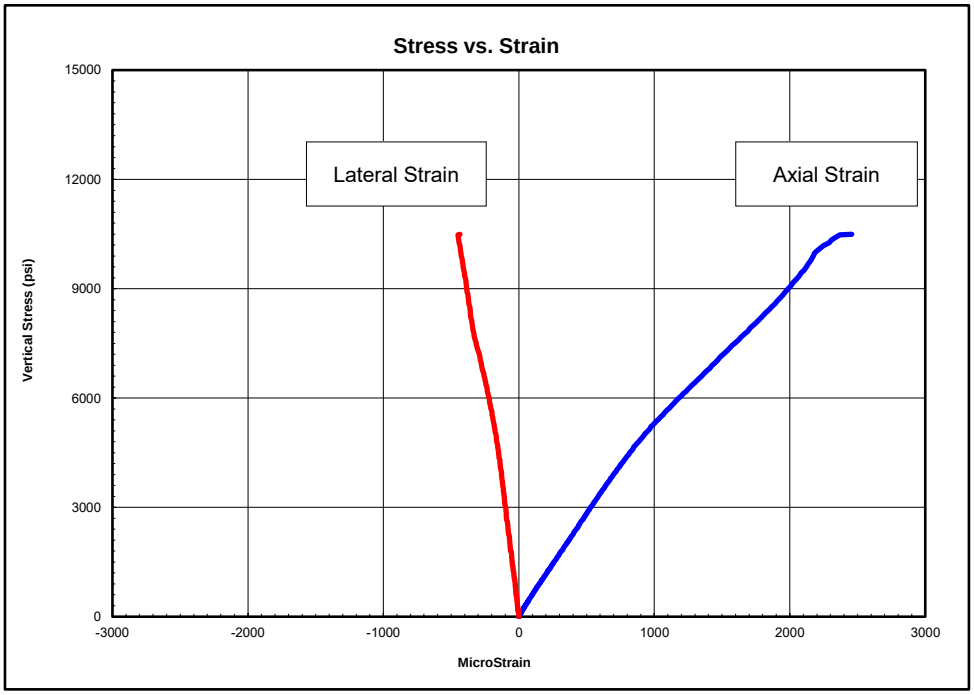
Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/11/2025
Tested By:	gp
Checked By:	jsc
Boring ID:	LB-R-136
Sample ID:	C-2
Depth, ft:	29.75-30.5
Sample Type:	rock core
Sample Description:	See photographs Intact material failure Best Effort end preparation performed

Compressive Strength and Elastic Moduli of Rock by ASTM D7012 - Method D



Peak Compressive Stress: 10,494 psi

Stress Range, psi	Young's Modulus, psi	Poisson's Ratio
1000-3800	5,510,000	0.19
3800-6600	4,190,000	0.20
6600-9400	3,750,000	0.20

Notes:
Test specimen tested at the approximate as-received moisture content and at standard laboratory temperature.
The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.
Young's Modulus and Poisson's Ratio calculated using the tangent to the line in the stress range listed.
Calculations assume samples are isotropic, which is not necessarily the case.

Client:	Langan Engineering	Test Date:	6/9/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-136		
Sample ID:	C-2		
Depth (ft):	29.75-30.5		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.37	4.37	4.37
Specimen Diameter, in:	1.99	1.99	1.99
Specimen Mass, g:	619.61		
Bulk Density, lb/ft^3	173	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

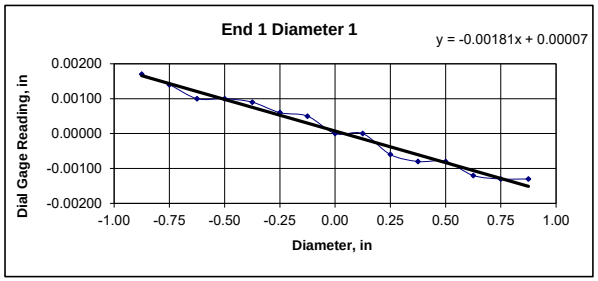
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00170	0.00140	0.00100	0.00100	0.00090	0.00060	0.00050	0.00000	0.00000	-0.00060	-0.00080	-0.00080	-0.00120	-0.00130	-0.00130
Diameter 2, in (rotated 90°)	0.00070	0.00060	0.00060	0.00040	0.00040	0.00040	0.00040	0.00000	-0.00020	-0.00020	-0.00030	-0.00050	-0.00070	-0.00070	-0.00090

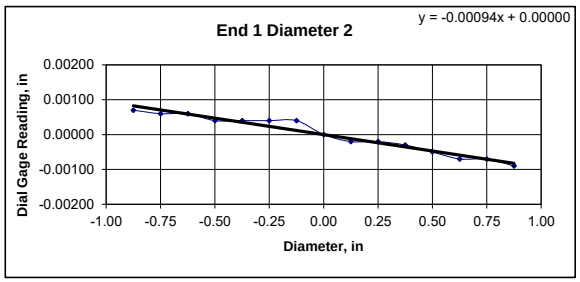
Difference between max and min readings, in:
0° = 0.00300 90° = 0.00160

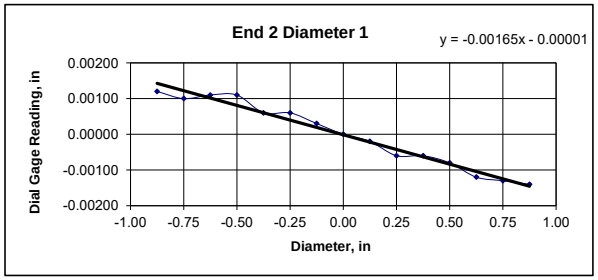
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00120	0.00100	0.00110	0.00110	0.00060	0.00060	0.00030	0.00000	-0.00020	-0.00060	-0.00060	-0.00080	-0.00120	-0.00130	-0.00140
Diameter 2, in (rotated 90°)	-0.00100	-0.00080	-0.00080	-0.00070	-0.00070	-0.00020	-0.00010	0.00000	0.00010	0.00030	0.00050	0.00070	0.00080	0.00080	0.00080

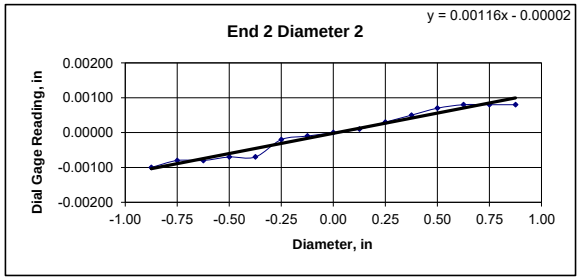
Difference between max and min readings, in:
0° = 0.0026 90° = 0.0018

Maximum difference must be < 0.0020 in. Difference = ± 0.00150
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00181
Angle of Best Fit Line: 0.10379

End 2:
Slope of Best Fit Line 0.00165
Angle of Best Fit Line: 0.09429

Maximum Angular Difference: 0.00949

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00094
Angle of Best Fit Line: 0.05402

End 2:
Slope of Best Fit Line 0.00116
Angle of Best Fit Line: 0.06646

Maximum Angular Difference: 0.01244

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00300	1.990	0.00151	0.086	YES
Diameter 2, in (rotated 90°)	0.00160	1.990	0.00080	0.046	YES
END 2					
Diameter 1, in	0.00260	1.990	0.00131	0.075	YES
Diameter 2, in (rotated 90°)	0.00180	1.990	0.00090	0.052	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/9/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-136	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	C-2		
Depth (ft):	29.75-30.5		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS

END 1

Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

END 2

Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

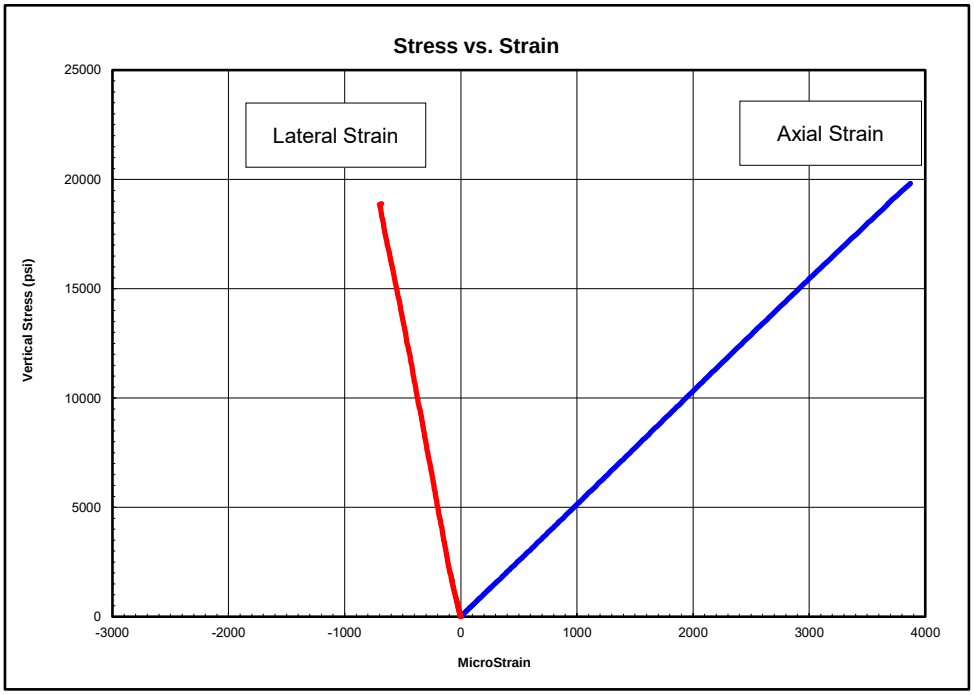
Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/11/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-136
Sample ID:	C-2
Depth, ft:	29.75-30.5

After cutting and grinding

After break

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/11/2025
Tested By:	gp
Checked By:	jsc
Boring ID:	LB-X-003
Sample ID:	C-2
Depth, ft:	31.53-31.91
Sample Type:	rock core
Sample Description:	See photographs Intact material failure Best Effort end preparation performed

Compressive Strength and Elastic Moduli of Rock by ASTM D7012 - Method D



Peak Compressive Stress: 19,818 psi

Stress Range, psi	Young's Modulus, psi	Poisson's Ratio
2000-7300	5,150,000	0.18
7300-12600	5,190,000	0.18
12600-17800	5,120,000	0.19

Notes:
Test specimen tested at the approximate as-received moisture content and at standard laboratory temperature.
The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.
Young's Modulus and Poisson's Ratio calculated using the tangent to the line in the stress range listed.
Calculations assume samples are isotropic, which is not necessarily the case.

Client:	Langan Engineering	Test Date:	6/10/2025
Project Name:	Upstate Confidential Project	Tested By:	jss
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-X-003		
Sample ID:	C-2		
Depth (ft):	31.53-31.91		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.36	4.36	4.36
Specimen Diameter, in:	1.99	1.99	1.99
Specimen Mass, g:	607.66		
Bulk Density, lb/ft^3	171	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

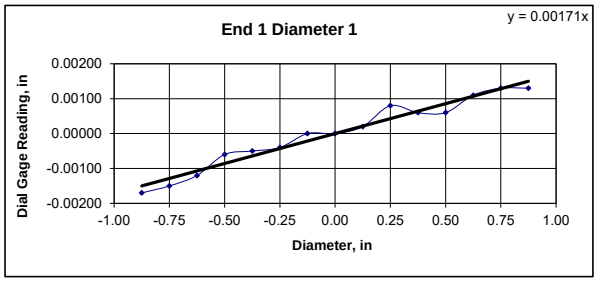
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00170	-0.00150	-0.00120	-0.00060	-0.00050	-0.00040	0.00000	0.00000	0.00020	0.00080	0.00060	0.00060	0.00110	0.00130	0.00130
Diameter 2, in (rotated 90°)	-0.00230	-0.00170	-0.00160	-0.00150	-0.00090	-0.00040	-0.00040	0.00000	0.00020	0.00060	0.00090	0.00130	0.00140	0.00160	0.00180

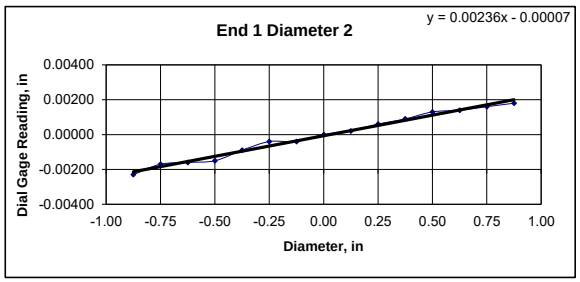
Difference between max and min readings, in:
0° = 0.00300 90° = 0.00410

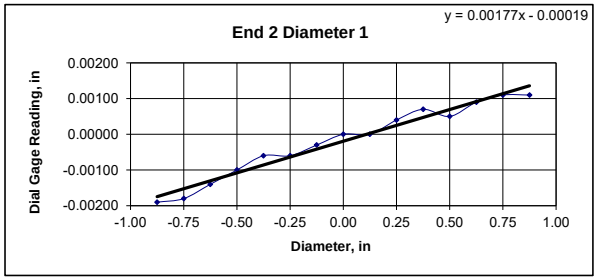
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00190	-0.00180	-0.00140	-0.00100	-0.00060	-0.00060	-0.00030	0.00000	0.00000	0.00040	0.00070	0.00050	0.00090	0.00110	0.00110
Diameter 2, in (rotated 90°)	0.00150	0.00150	0.00110	0.00100	0.00060	0.00040	0.00030	0.00000	-0.00010	-0.00030	-0.00080	-0.00100	-0.00140	-0.00150	-0.00180

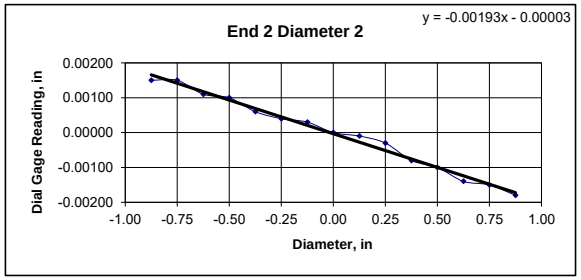
Difference between max and min readings, in:
0° = 0.003 90° = 0.0033

Maximum difference must be < 0.0020 in. Difference = ± 0.00205
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00171
Angle of Best Fit Line: 0.09822

End 2:
Slope of Best Fit Line 0.00177
Angle of Best Fit Line: 0.10166

Maximum Angular Difference: 0.00344

Parallelism Tolerance Met? YES
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00236
Angle of Best Fit Line: 0.13538

End 2:
Slope of Best Fit Line 0.00193
Angle of Best Fit Line: 0.11066

Maximum Angular Difference: 0.02472

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00300	1.989	0.00151	0.086	YES
Diameter 2, in (rotated 90°)	0.00410	1.989	0.00206	0.118	YES
END 2					
Diameter 1, in	0.00300	1.989	0.00151	0.086	YES
Diameter 2, in (rotated 90°)	0.00330	1.989	0.00166	0.095	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

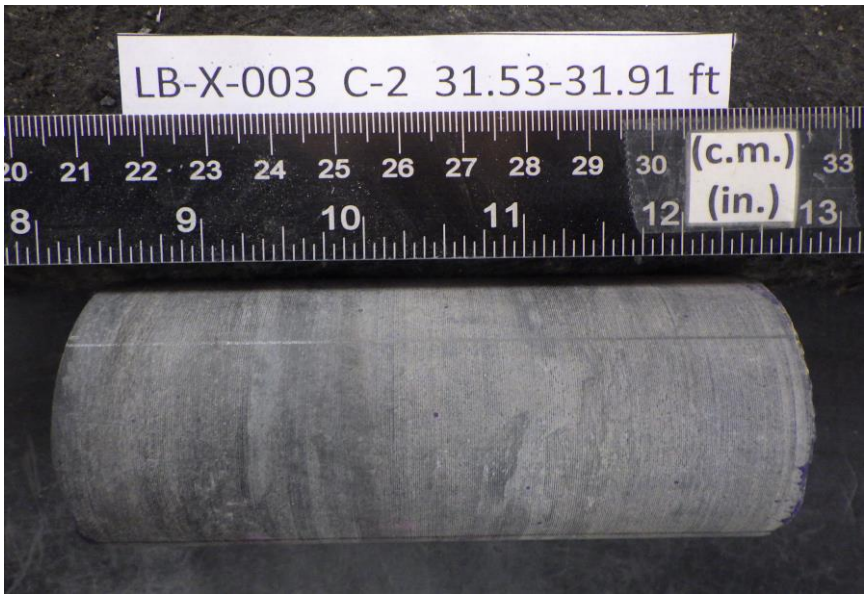
Client:	Langan Engineering	Test Date:	6/10/2025
Project Name:	Upstate Confidential Project	Tested By:	jss
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-X-003	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	C-2		
Depth (ft):	31.53-31.91		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/11/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-X-003
Sample ID:	C-2
Depth, ft:	31.53-31.91



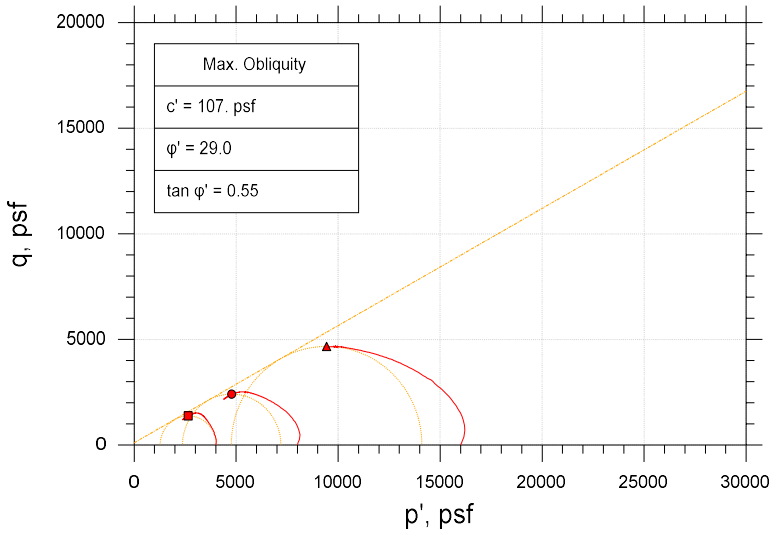
After cutting and grinding

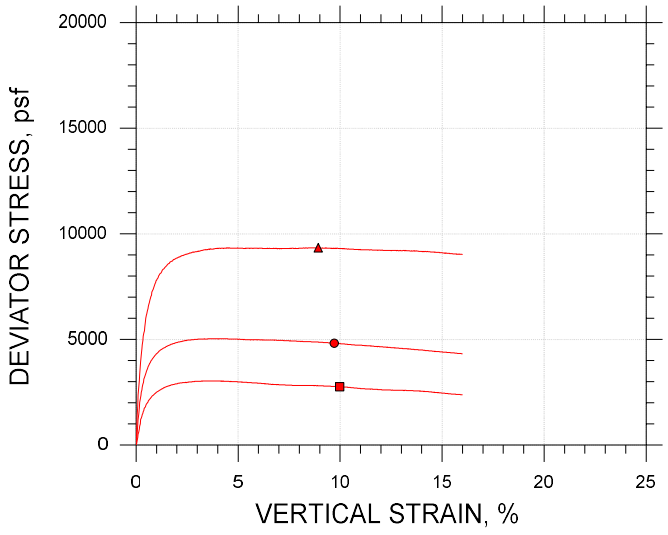
After break

GeoTesting EXPRESS
A Sercel Business

Client: Any Client	
Project Name: Any Project	
Project Location: Anywhere	
Project Number: GTX-309270	
Tested By: md	Checked By: njh
Boring ID: B-1	
Preparation: intact	
Description: Moist, dark gray clay	
Classification: Lean CLAY	
Group Symbol: CL	
Liquid Limit: 49	Plastic Limit: 25
Plasticity Index: 24	Estimated Specific Gravity: 2.7

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767

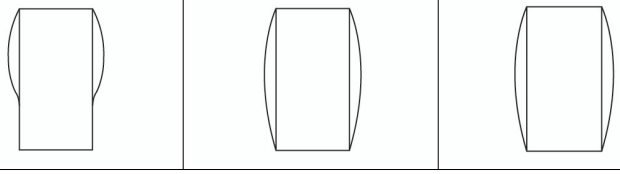




Symbol		■	●	▲	
Sample ID		U-1	U-1	U-1	
Depth, ft		24-26	24-26	24-26	
Test Number		CU-2-1	CU-2-2	CU-2-3	
Initial	Height, in	4.700	4.710	4.300	
	Diameter, in	2.040	2.030	2.030	
	Moisture Content (from Cuttings), %	38.0	36.7	35.9	
	Dry Density, pcf	82.1	84.7	84.7	
	Saturation (Wet Method), %	97.6	100.0	98.1	
	Void Ratio	1.05	0.990	0.989	
Before Shear	Moisture Content, %	35.6	33.3	30.0	
	Dry Density, pcf	86.0	88.8	93.2	
	Cross-sectional Area (Method A), in²	3.169	3.142	3.058	
	Saturation, %	100.0	100.0	100.0	
	Void Ratio	0.961	0.899	0.809	
	Back Pressure, psf	2.170e+004	2.200e+004	2.544e+004	
Vertical Effective Consolidation Stress, psf		3993.	7977.	1.596e+004	
Horizontal Effective Consolidation Stress, psf		4007.	7998.	1.600e+004	
Vertical Strain after Consolidation, %		1.181	1.886	3.572	
Volumetric Strain after Consolidation, %		3.606	5.082	8.647	
Time to 50% Consolidation, min		---	---	10.30	
Shear Strength, psf		1382.	2412.	4671.	
Strain at Failure, %		9.98	9.71	8.93	
Strain Rate, %/min		0.01600	0.01600	0.01600	
Deviator Stress at Failure, psf		2763.	4823.	9342.	
Effective Minor Principal Stress at Failure, psf		1271.	2369.	4762.	
Effective Major Principal Stress at Failure, psf		4035.	7192.	1.410e+004	
B-Value		0.96	0.94	0.94	

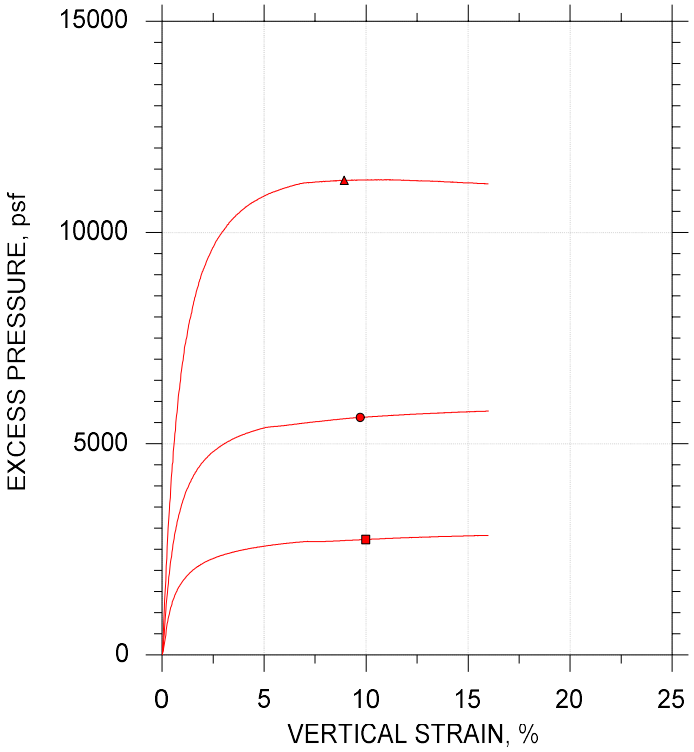
Notes:
- Before Shear Saturation set to 100% for phase calculation.
- Moisture Content determined by ASTM D2216.
- Atterberg Limits determined by ASTM D4318.
- Deviator Stress includes membrane correction.
- Values for c and φ determined from best-fit straight line for the specific test conditions. Actual strength parameters may vary and should be determined by an engineer for site conditions.

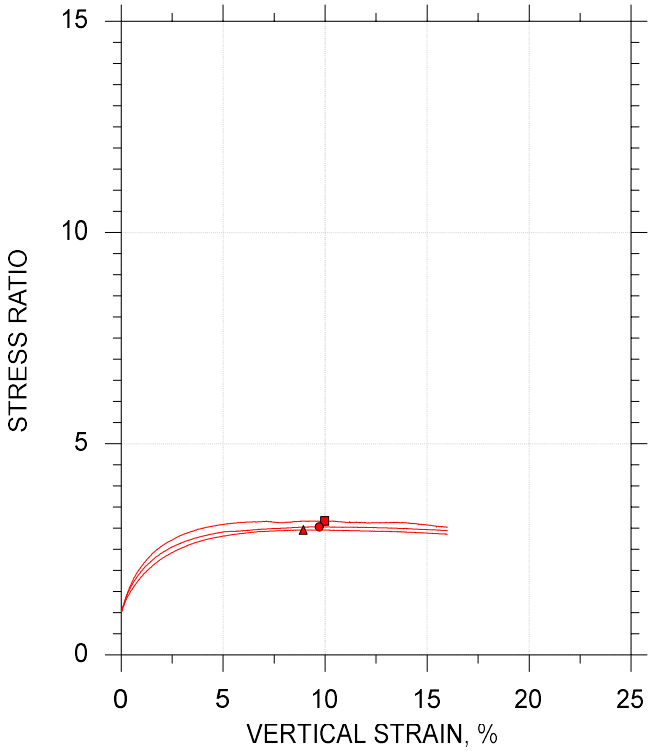
Remarks:

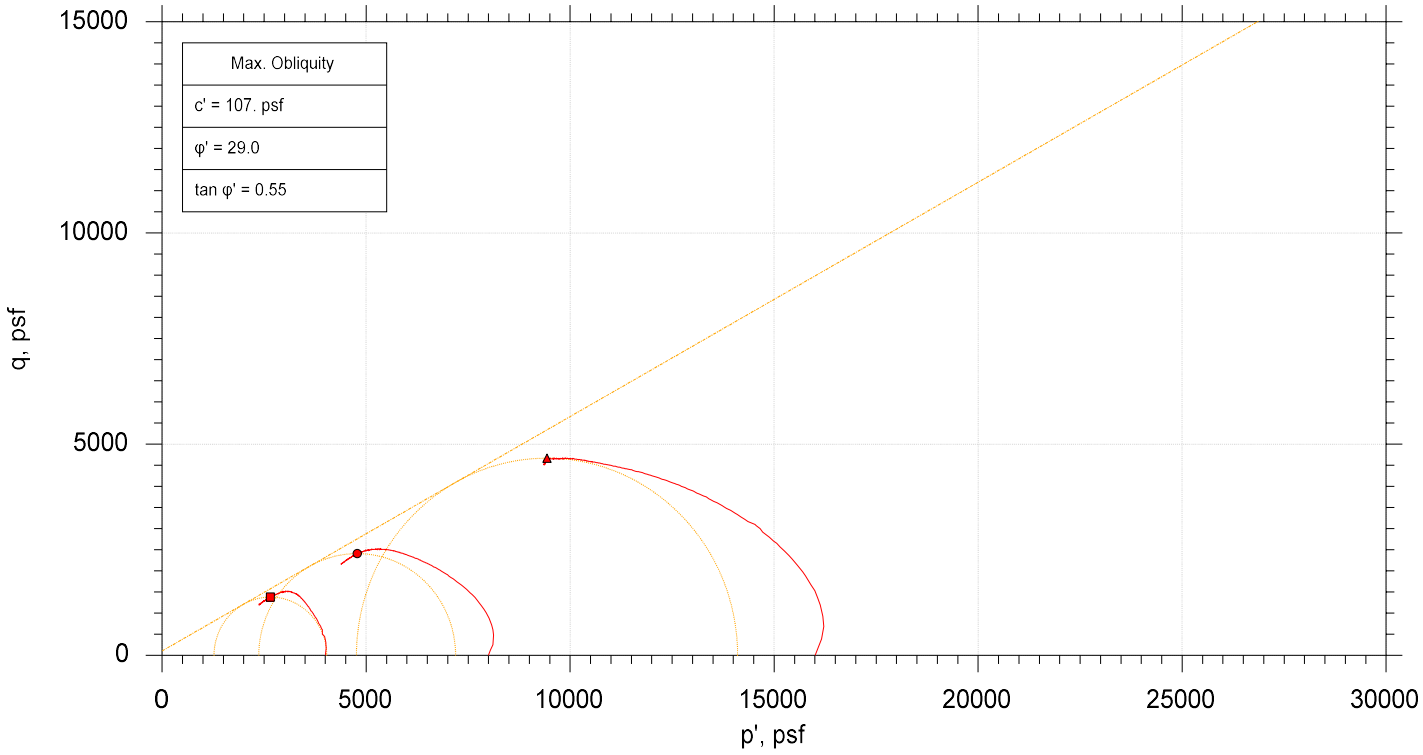


System Q

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767







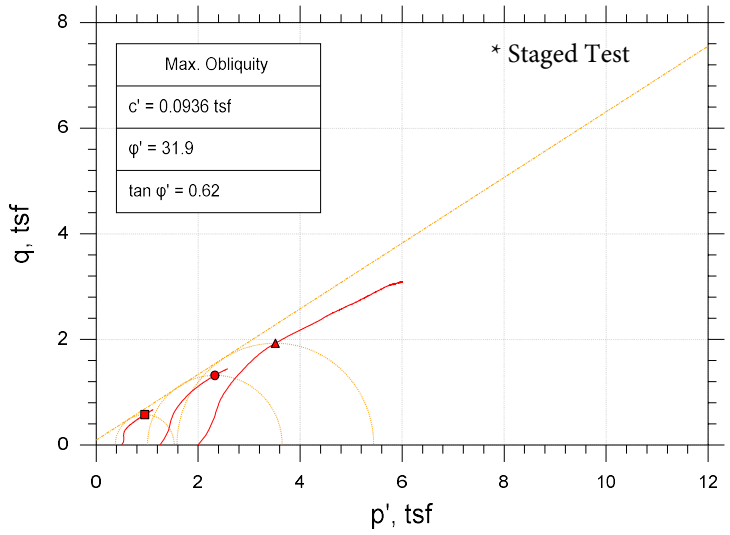
	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
■	U-1	CU-2-1	24-26	md	12/11/18	njh	12/26/18	309270-CU-2-1n.dat
●	U-1	CU-2-2	24-26	md	12/11/18	njh	12/26/18	309270-CU-2-2n.dat
▲	U-1	CU-2-3	24-26	md	12/11/18	njh	12/26/18	309270-CU-2-3n.dat

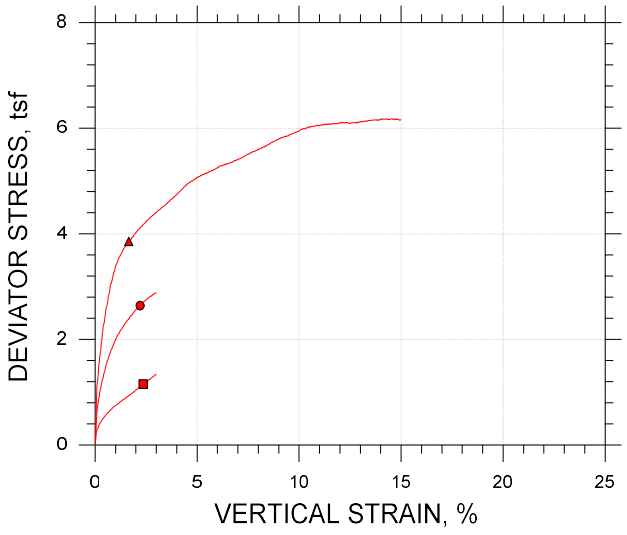
GeoTesting EXPRESS
A Sercel Business

Project: Any Project	Location: Anywhere	Project No.: GTX-309270
Boring No.: B-1	Sample Type: intact	
Description: Moist, dark gray clay		
Remarks: System Q		

Client: Any Client	
Project Name: Any Project	
Project Location: Anywhere	
Project Number: GTX-315433	
Tested By: trm	Checked By: anm
Boring ID: RW-5	
Preparation: intact	
Description: Moist, light yellowish brown clay	
Classification: ---	
Group Symbol: ---	
Liquid Limit: 32	Plastic Limit: 19
Plasticity Index: 13	Estimated Specific Gravity: 2.7

CONSOLIDATED UNDRAINED TRIAXIAL TEST

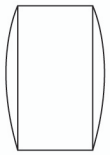




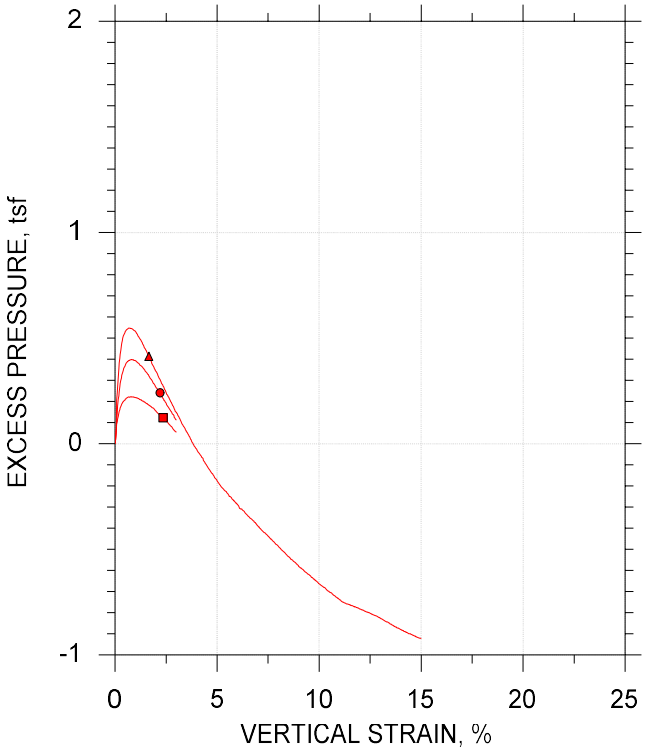
Symbol		■	●	▲	
Sample ID		ST-1	ST-1	ST-1	
Depth, ft		8-10	8-10	8-10	
Test Number		CU-1-1	CU-1-2	CU-1-3	
Initial	Height, in	4.690	4.542	4.437	
	Diameter, in	2.040	2.040	2.040	
	Moisture Content (from Cuttings), %	17.7	---	---	
	Dry Density, pcf	110.	---	---	
	Saturation (Wet Method), %	89.3	---	---	
	Void Ratio	0.534	---	---	
Before Shear	Moisture Content, %	---	---	17.9	
	Dry Density, pcf	---	---	114.	
	Cross-sectional Area (Method A), in²	---	---	3.311	
	Saturation, %	---	---	100.0	
	Void Ratio	---	---	0.482	
	Back Pressure, tsf	9.430	10.84	13.88	
Vertical Effective Consolidation Stress, tsf		0.5001	1.249	2.000	
Horizontal Effective Consolidation Stress, tsf		0.4993	1.249	1.999	
Vertical Strain after Consolidation, %		0.1507	0.003174	0.003245	
Volumetric Strain after Consolidation, %		0.5594	0.9955	0.3996	
Time to 50% Consolidation, min		96.04	---	---	
Shear Strength, tsf		0.5776	1.320	1.929	
Strain at Failure, %		2.35	2.20	1.65	
Strain Rate, %/min		0.01600	0.01600	0.01600	
Deviator Stress at Failure, tsf		1.155	2.640	3.857	
Effective Minor Principal Stress at Failure, tsf		0.3757	1.007	1.585	
Effective Major Principal Stress at Failure, tsf		1.531	3.647	5.442	
B-Value		0.99	---	---	

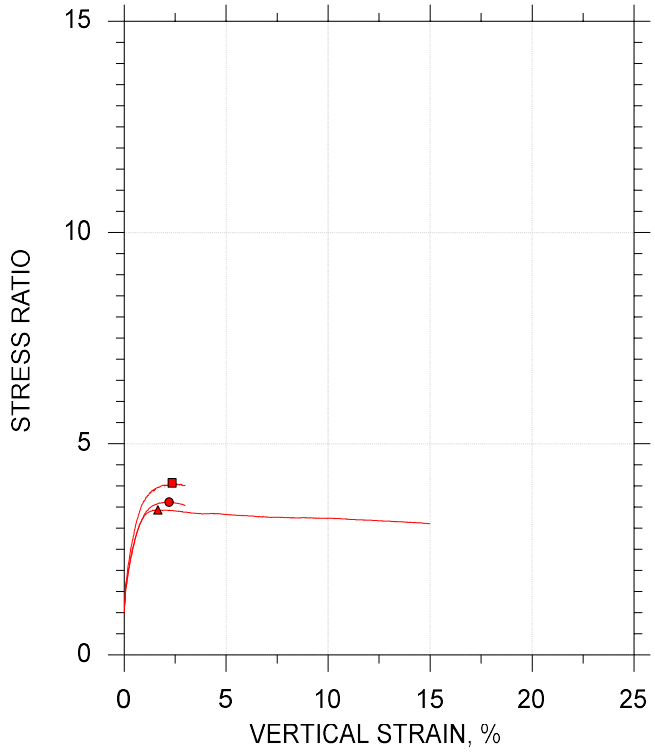
Notes:
- Before Shear Saturation set to 100% for phase calculation.
- Moisture Content determined by ASTM D2216.
- Atterberg Limits determined by ASTM D4318.
- Deviator Stress includes membrane correction.
- Values for c and φ determined from best-fit straight line for the specific test conditions. Actual strength parameters may vary and should be determined by an engineer for site conditions.

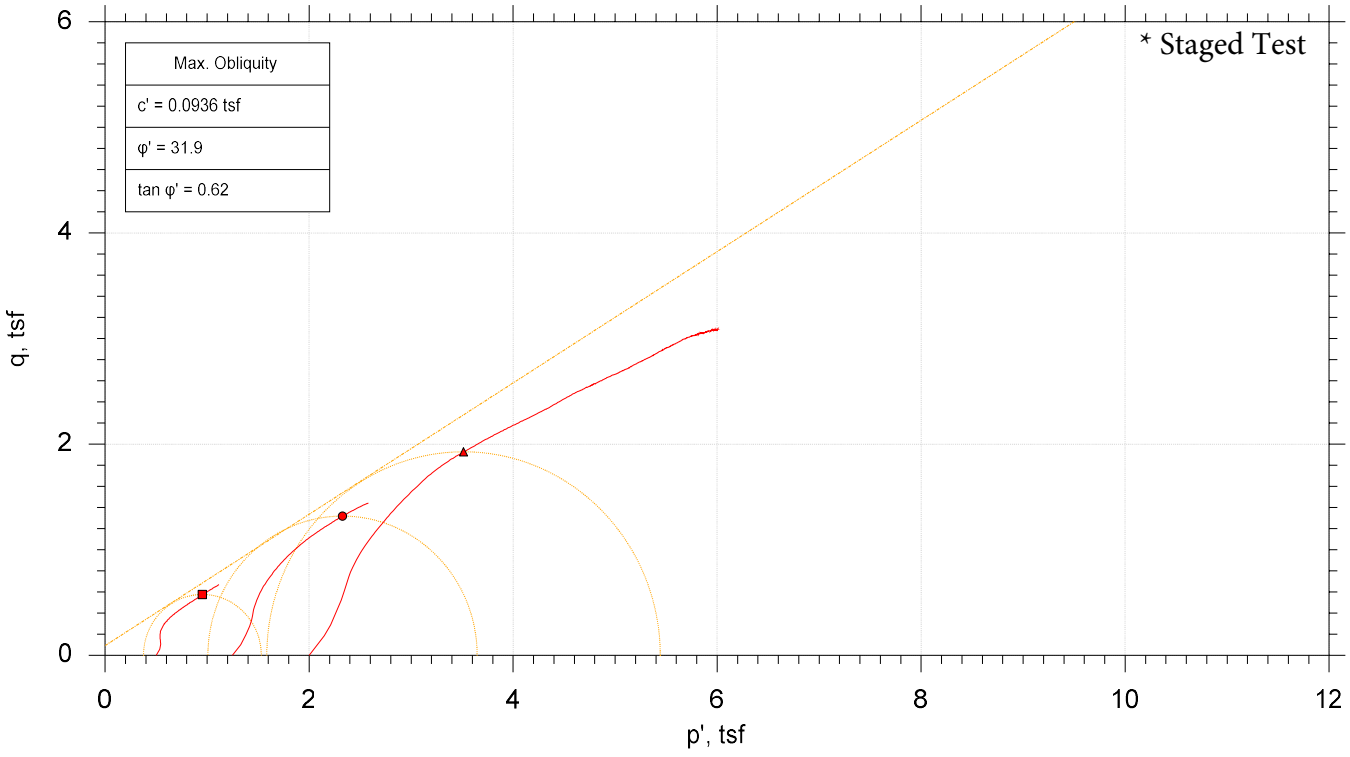
Remarks:



CONSOLIDATED UNDRAINED TRIAXIAL TEST







	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
■	ST-1	CU-1-1	8-10	trm	5/11/22	anm	5/19/22	315433-CU-1-1v.dat
●	ST-1	CU-1-2	8-10	trm	5/11/22	anm	5/19/22	315433-CU-1-2v.dat
▲	ST-1	CU-1-3	8-10	trm	5/11/22	anm	5/19/22	315433-CU-1-3v.dat

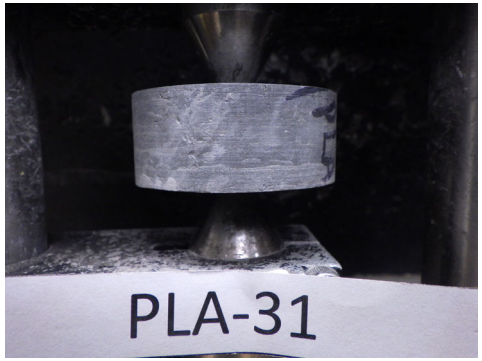
GeoTesting EXPRESS
A Sercel Business

Project: Any Project	Location: Anywhere	Project No.: GTX-315433
Boring No.: RW-5	Sample Type: intact	
Description: Moist, light yellowish brown clay		
Remarks: TX-024		

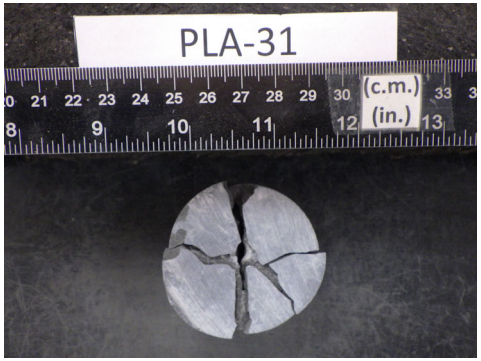
Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-005	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	29.9-30.4'	Test Id:	817031		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-31	29.95-30.04 ft	1.99	0.84	866	2.14	1.46	405	0.875	354	18	7,300



Before



After

Intact material and Discontinuity Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

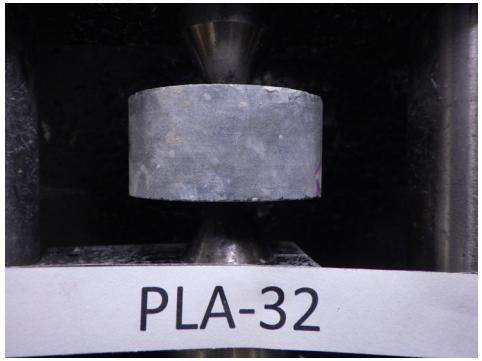
F = the size correction factor

Is(50) = the size corrected point load strength index

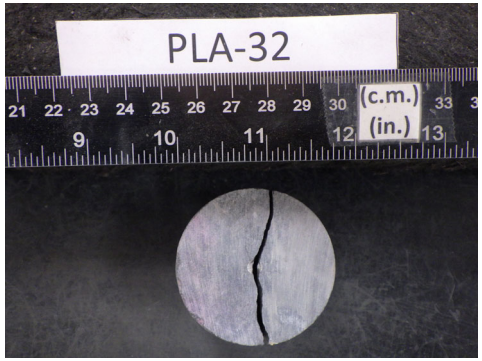
Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-027	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	28-29'	Test Id:	817033		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-32	28.48-28.58 ft	1.98	0.95	2,754	2.41	1.55	1144	0.898	1028	18	20,600



Before



After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

F = the size correction factor

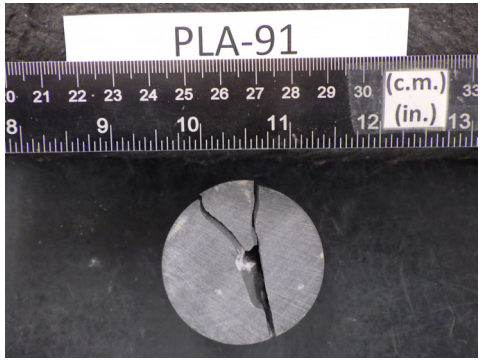
Is(50) = the size corrected point load strength index

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-033	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/18/25	Checked By:	smd
Depth :	31.2-32.2'	Test Id:	819400		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-91	31.2-32.2 ft	1.98	0.94	474	2.36	1.54	201	0.895	180	18	3,610

Before



After

Intact material and Discontinuity Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

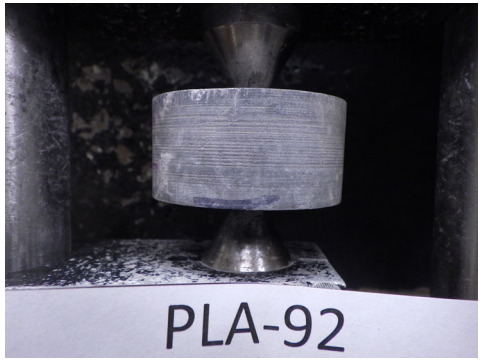
F = the size correction factor

Is(50) = the size corrected point load strength index

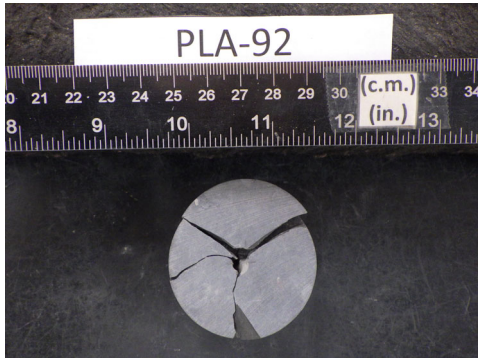
Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-035	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/18/25	Checked By:	smd
Depth :	23.9-24.4'	Test Id:	819401		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-92	23.9-24.4 ft	1.98	0.99	1,486	2.49	1.58	597	0.905	540	18	10,700



Before



After

Intact material and Discontinuity Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

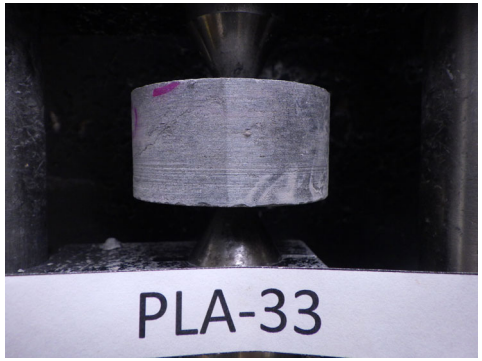
F = the size correction factor

Is(50) = the size corrected point load strength index

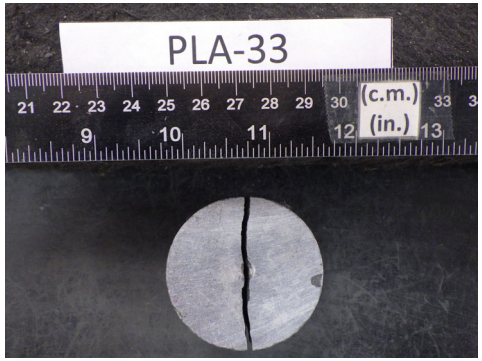
Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-042	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	25.2-26.2'	Test Id:	817039		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-33	25.63-25.72 ft	1.98	1.01	2,880	2.54	1.59	1133	0.909	1030	18	20,400



Before



After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

F = the size correction factor

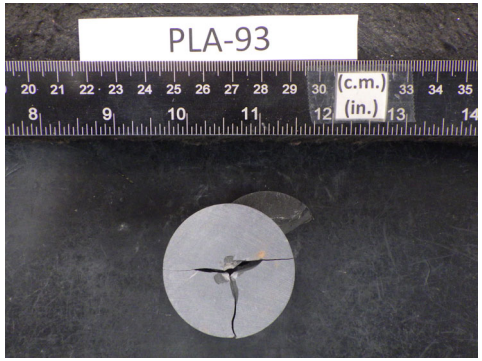
Is(50) = the size corrected point load strength index

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-042	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/18/25	Checked By:	smd
Depth :	30.2-31.2'	Test Id:	819402		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-93	30.2-31.2 ft	1.98	1.00	933	2.52	1.59	370	0.908	336	18	6,670

Before



After

Intact material and Discontinuity Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

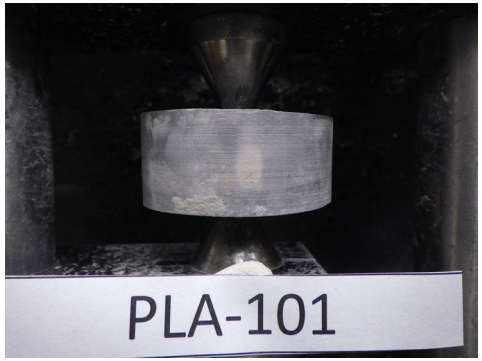
F = the size correction factor

Is(50) = the size corrected point load strength index

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-043	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/19/25	Checked By:	smd
Depth :	29.5-30.5'	Test Id:	820218		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-101	29.5-30.5 ft	1.98	0.89	807	2.25	1.50	359	0.885	318	18	6,460



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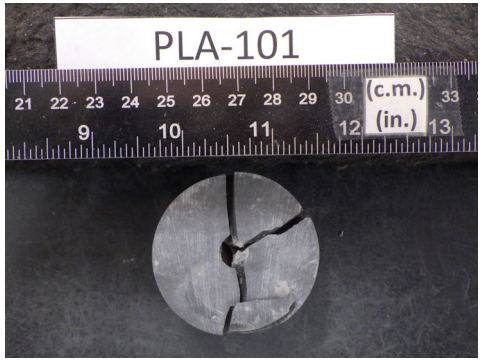


After

Intact material and Discontinuity Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

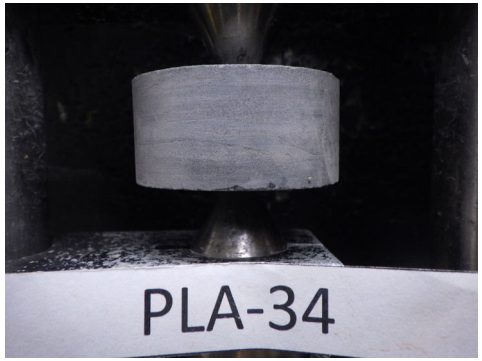
F = the size correction factor

Is(50) = the size corrected point load strength index

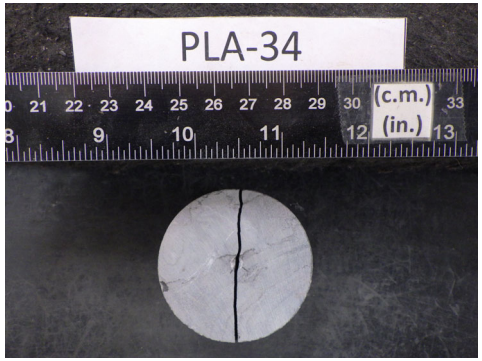
Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-048	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	25.5-26'	Test Id:	817042		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-34	25.60-25.70 ft	2	0.96	1,769	2.44	1.56	726	0.901	654	18	13,100



Before



After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

F = the size correction factor

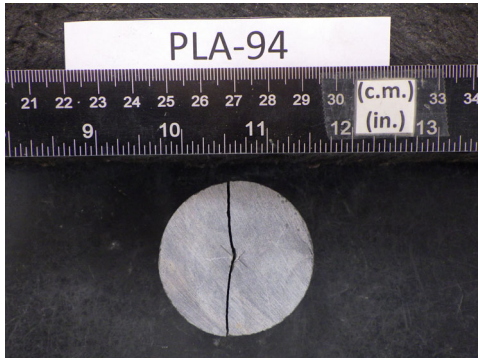
Is(50) = the size corrected point load strength index

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-051	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/18/25	Checked By:	smd
Depth :	28-28.5'	Test Id:	819403		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-94	28.05-28.14 ft	1.98	1.03	1,729	2.61	1.62	662	0.915	606	19	12,600

Before



After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

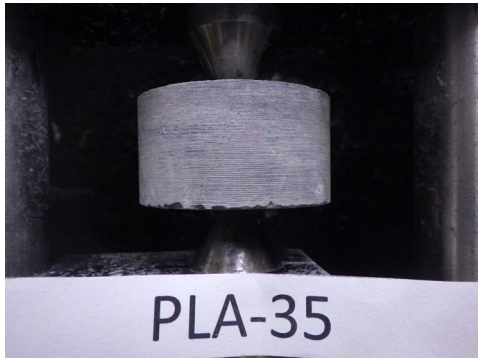
F = the size correction factor

Is(50) = the size corrected point load strength index

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-057	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	32-32.5'	Test Id:	819404		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-35	32-32.5 ft	1.99	1.06	1,646	2.67	1.64	615	0.920	566	19	11,700



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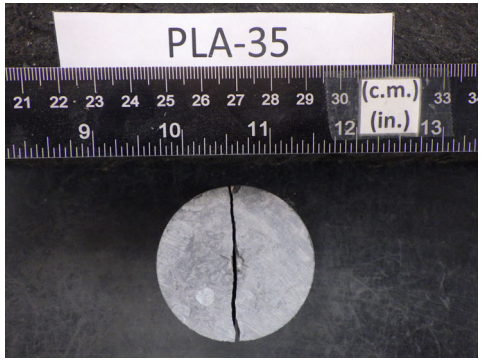


After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

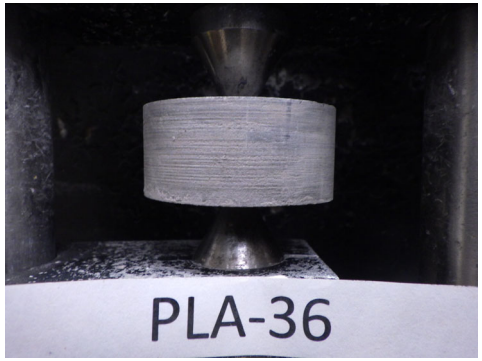
F = the size correction factor

Is(50) = the size corrected point load strength index

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-059	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	35-35.25'	Test Id:	817044		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-36	35-35.25 ft	1.98	0.90	1,830	2.26	1.50	810	0.886	717	18	14,600



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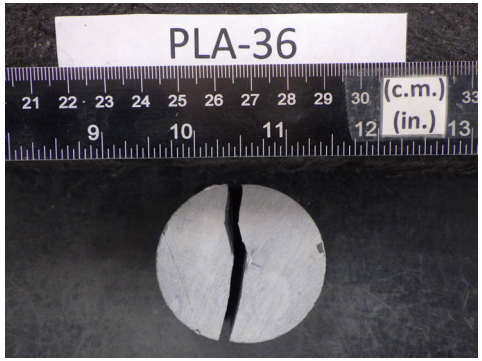


After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

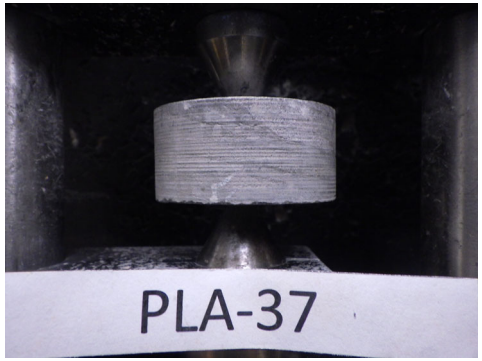
F = the size correction factor

Is(50) = the size corrected point load strength index

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-064	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	29-29.25'	Test Id:	817045		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-37	29-29.25 ft	1.96	0.93	2,491	2.32	1.52	1073	0.891	956	18	19,300



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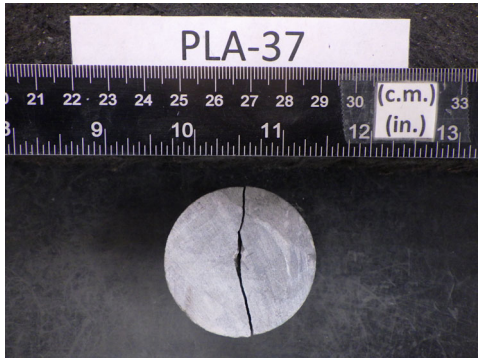


After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

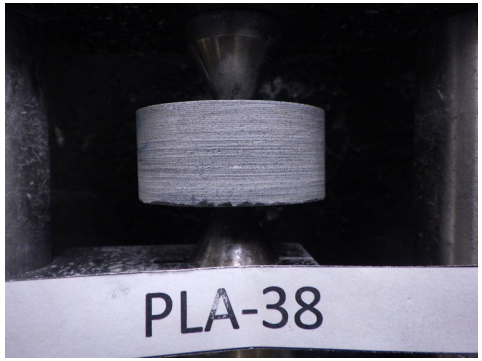
F = the size correction factor

Is(50) = the size corrected point load strength index

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-064	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	34-34.5'	Test Id:	817046		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-38	34-34.5 ft	1.96	0.88	1,810	2.21	1.49	820	0.881	723	18	14,800



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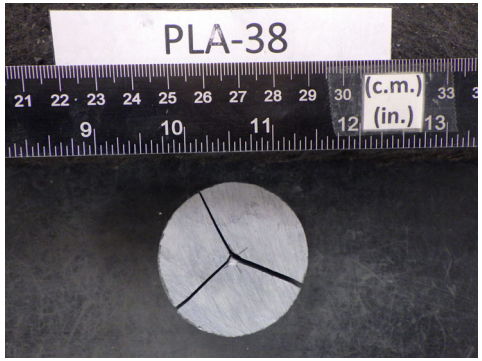


After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

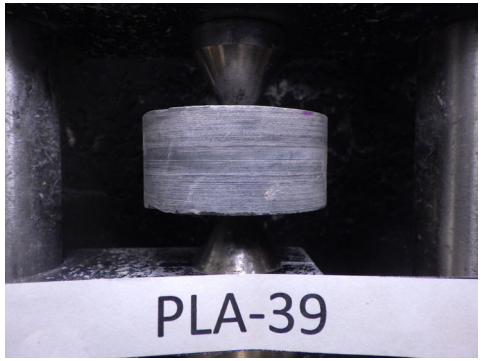
F = the size correction factor

Is(50) = the size corrected point load strength index

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-065	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	29-29.25'	Test Id:	817893		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-39	29-29.25 ft	1.99	0.93	2,482	2.36	1.54	1052	0.894	941	18	18,900



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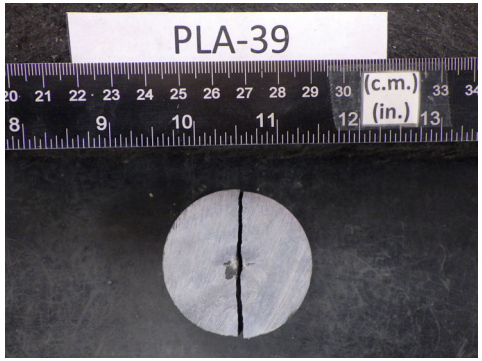


After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

F = the size correction factor

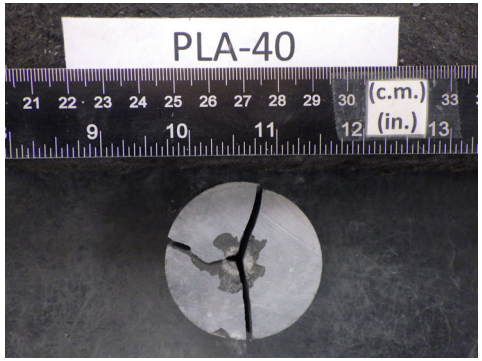
Is(50) = the size corrected point load strength index

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-070	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	37-37.5'	Test Id:	817052		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-40	37.05-37.15 ft	1.97	0.94	3,442	2.36	1.54	1457	0.895	1303	18	26,200

Before



After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

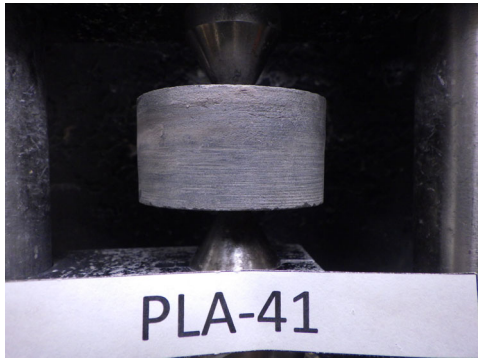
F = the size correction factor

Is(50) = the size corrected point load strength index

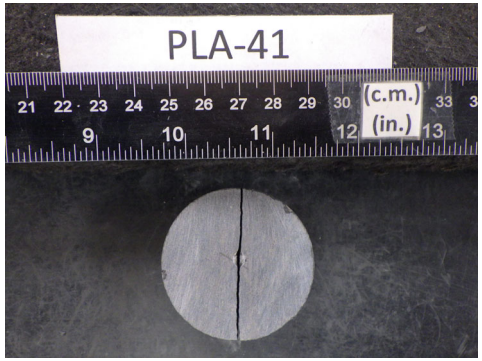
Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-071	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	29-29.75'	Test Id:	817053		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-41	29-29.75 ft	1.97	1.05	3,136	2.63	1.62	1192	0.917	1092	19	22,600



Before



After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

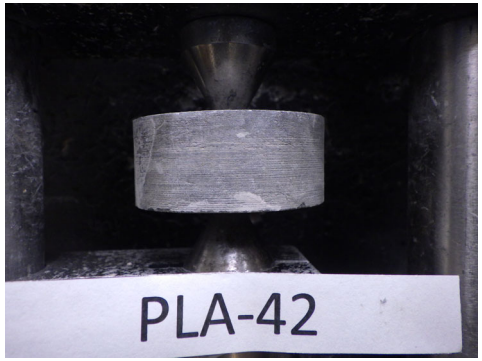
F = the size correction factor

Is(50) = the size corrected point load strength index

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-071	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	34.5-35'	Test Id:	817054		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-42	34.61-34.71 ft	1.99	0.85	1,774	2.16	1.47	822	0.877	720	18	14,800



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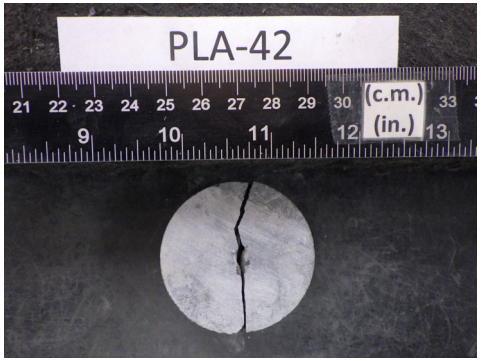


After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

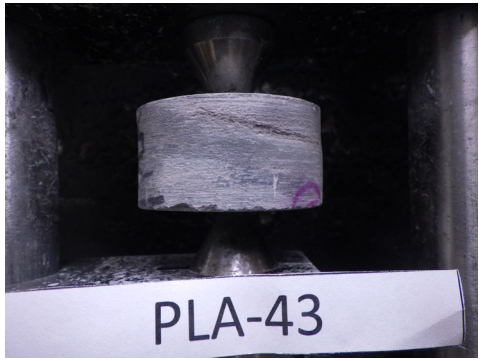
F = the size correction factor

Is(50) = the size corrected point load strength index

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-074	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	63.1-63.6'	Test Id:	817056		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-43	63.1-63.6 ft	1.97	1.01	1,664	2.53	1.59	659	0.908	598	18	11,900



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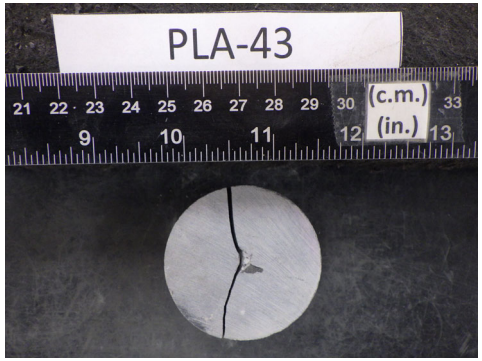


After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

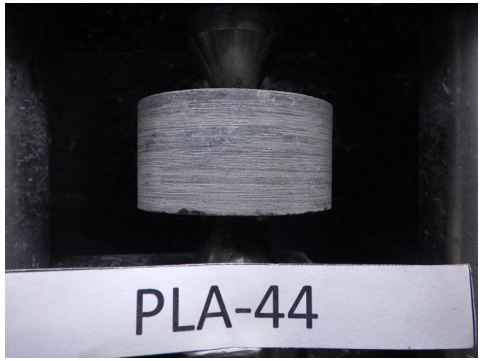
F = the size correction factor

Is(50) = the size corrected point load strength index

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-081	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	44-44.3'	Test Id:	817059		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-44	44.03-44.12 ft	1.97	1.00	1,147	2.52	1.59	456	0.907	414	18	8,200



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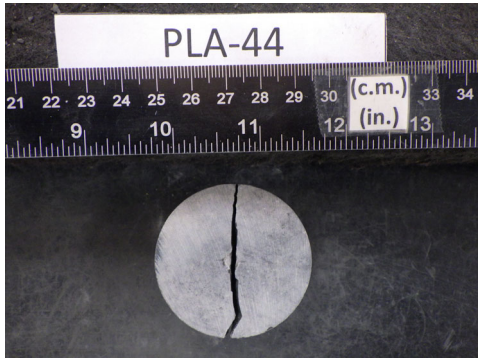


After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

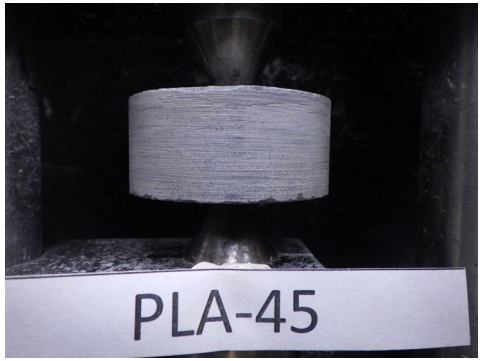
F = the size correction factor

Is(50) = the size corrected point load strength index

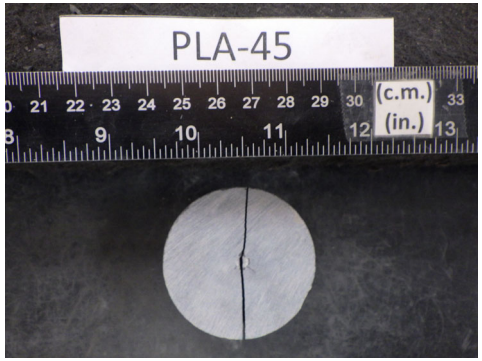
Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-082	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	41-41.25'	Test Id:	817060		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-45	41.11-41.20 ft	1.99	0.90	2,151	2.28	1.51	944	0.888	837	18	17,000



Before



After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

F = the size correction factor

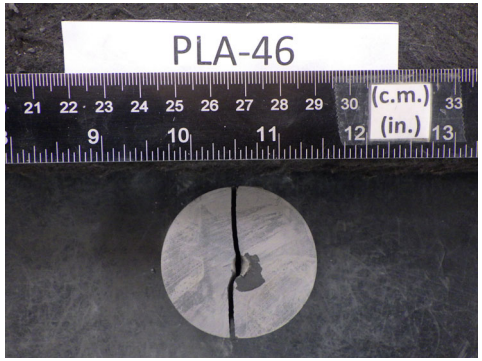
Is(50) = the size corrected point load strength index

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-083	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	23.75-24'	Test Id:	817061		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-46	23.83-23.92 ft	1.97	0.88	1,126	2.20	1.48	512	0.881	450	18	9,210

Before



After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

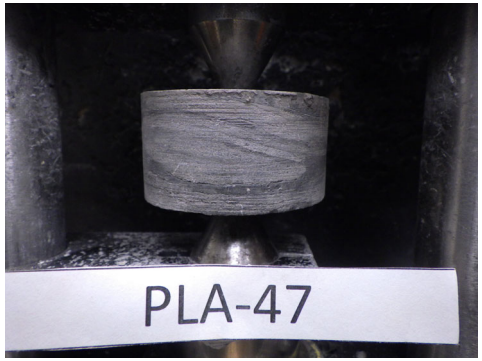
F = the size correction factor

Is(50) = the size corrected point load strength index

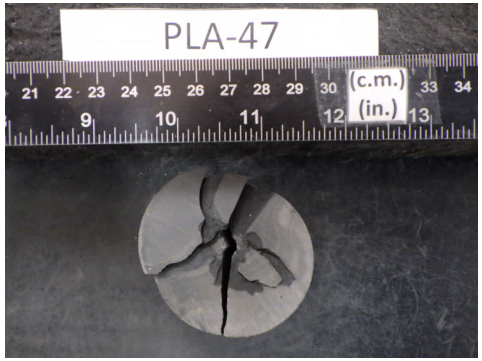
Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-083	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	30-30.5'	Test Id:	819405		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-47	30-30.5 ft	1.98	1.06	2,183	2.66	1.63	820	0.919	753	19	15,600



Before



After

Intact material and Discontinuity Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

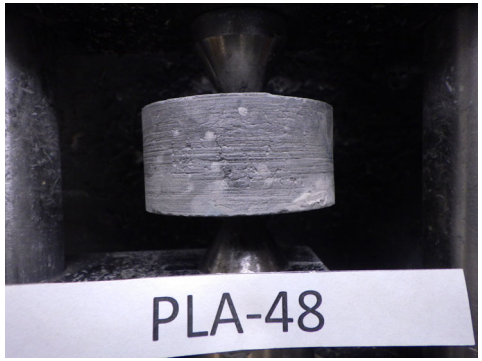
F = the size correction factor

Is(50) = the size corrected point load strength index

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-084	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	22.7-23'	Test Id:	817062		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-48	22.74-22.83 ft	1.98	0.98	1,311	2.48	1.58	528	0.905	477	18	9,500



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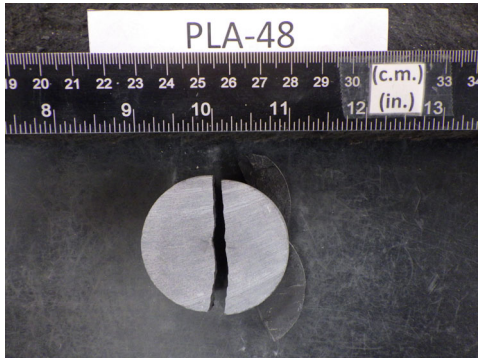


After

Intact material and Discontinuity Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

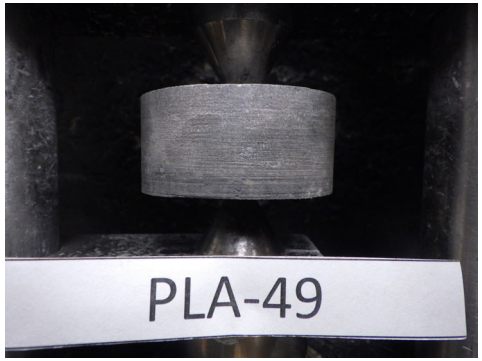
F = the size correction factor

Is(50) = the size corrected point load strength index

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-084	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	24.7-25'	Test Id:	817063		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-49	24.7-25 ft	1.98	0.93	1,499	2.36	1.54	636	0.894	569	18	11,500



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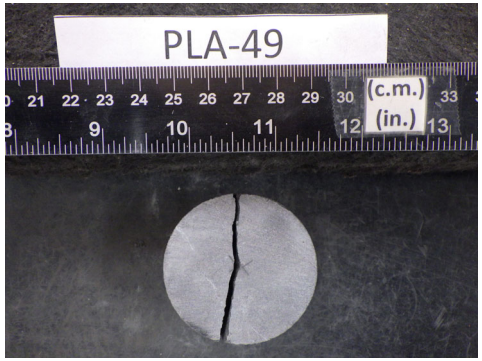


After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

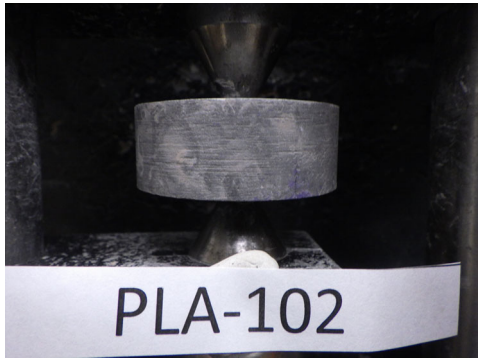
F = the size correction factor

Is(50) = the size corrected point load strength index

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-093	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/19/25	Checked By:	smd
Depth :	27.25-28'	Test Id:	820413		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-102	27.25-28 ft	1.97	0.76	1,124	1.90	1.38	592	0.852	505	18	10,700



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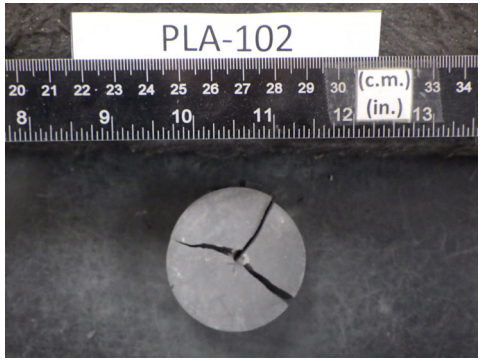


After

Intact material and Discontinuity Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

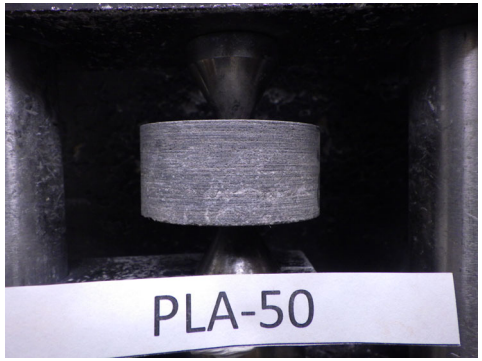
F = the size correction factor

Is(50) = the size corrected point load strength index

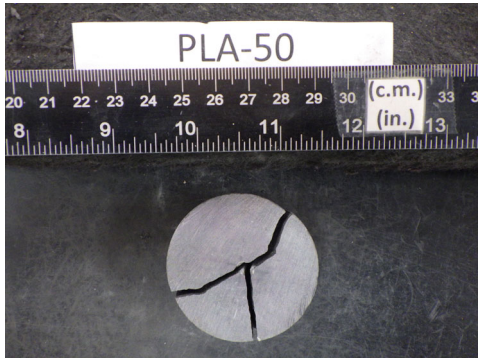
Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-096	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	45-45.5'	Test Id:	817066		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-50	45-45.5 ft	1.97	0.94	3,008	2.36	1.54	1274	0.895	1139	18	22,900



Before



After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

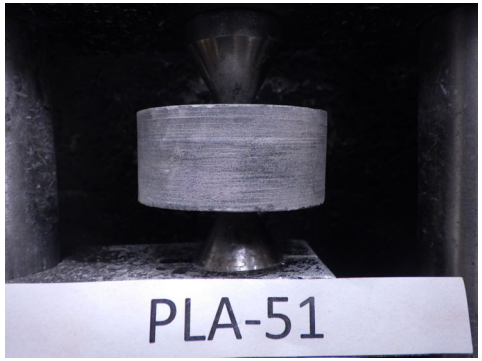
F = the size correction factor

Is(50) = the size corrected point load strength index

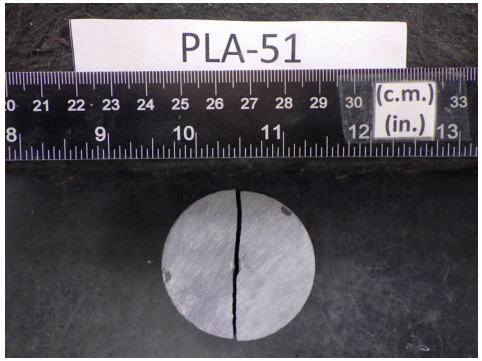
Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-104	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	44.5-44.75'	Test Id:	817068		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-51	44.5-44.75 ft	1.97	0.89	2,711	2.23	1.49	1214	0.883	1072	18	21,800



Before



After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

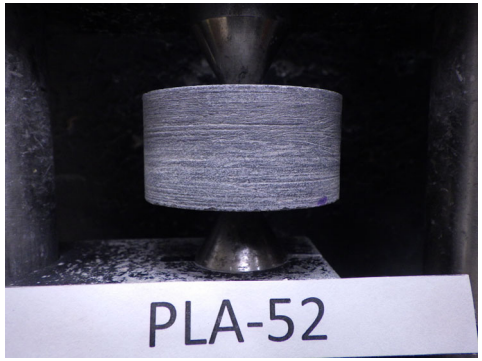
F = the size correction factor

Is(50) = the size corrected point load strength index

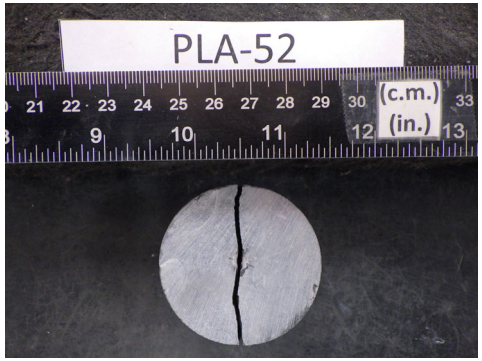
Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-104	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	52.5-53'	Test Id:	817069		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-52	52.5-53 ft	1.97	0.99	2,830	2.49	1.58	1139	0.905	1031	18	20,500



Before



After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

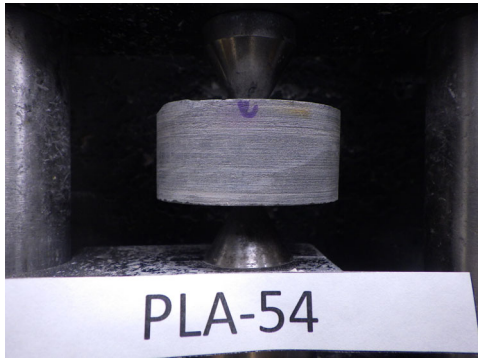
F = the size correction factor

Is(50) = the size corrected point load strength index

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-104	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	55.5-56'	Test Id:	817070		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-54	55.54-55.63 ft	1.97	0.92	3,572	2.32	1.52	1538	0.891	1371	18	27,700



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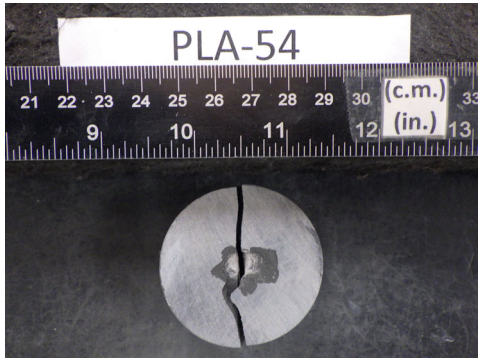


After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

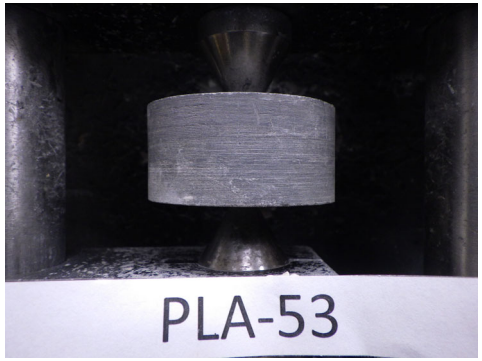
F = the size correction factor

Is(50) = the size corrected point load strength index

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-105	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	37-37.5'	Test Id:	817072		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-53	37-37.5 ft	1.98	0.96	3,127	2.43	1.56	1288	0.900	1159	18	23,200



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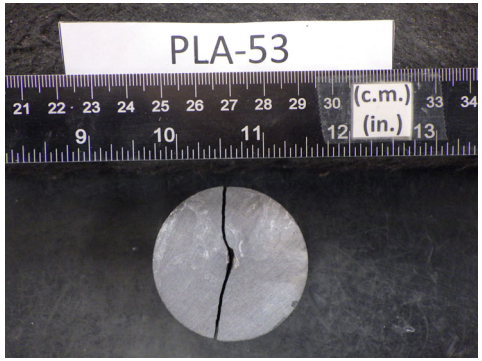


After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

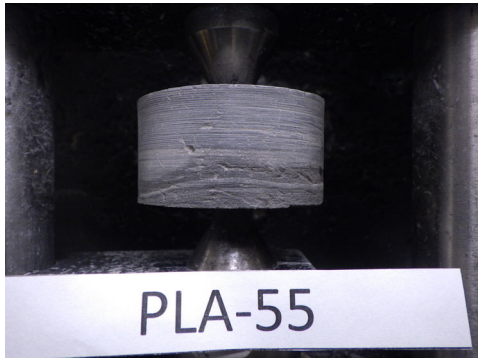
F = the size correction factor

Is(50) = the size corrected point load strength index

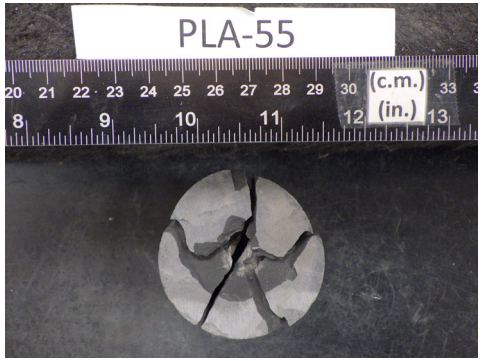
Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-105	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	43-43.5'	Test Id:	817073		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-55	43-43.5 ft	1.97	1.05	3,287	2.63	1.62	1251	0.916	1146	19	23,800



Before



After

Intact material and Discontinuity Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

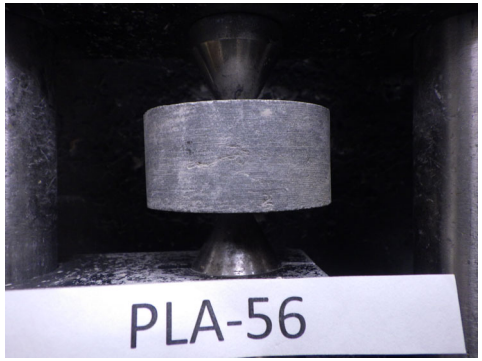
F = the size correction factor

Is(50) = the size corrected point load strength index

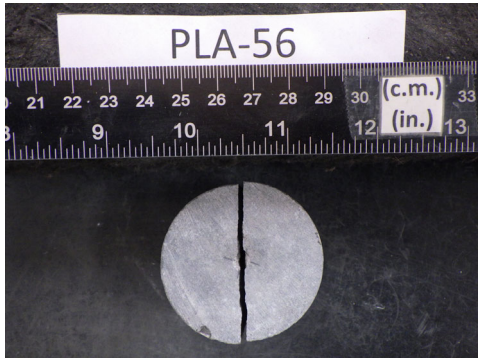
Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-106	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	56.5-57.5'	Test Id:	817074		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-56	56.5-57.5 ft	1.98	0.96	2,794	2.43	1.56	1151	0.900	1036	18	20,700



Before



After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

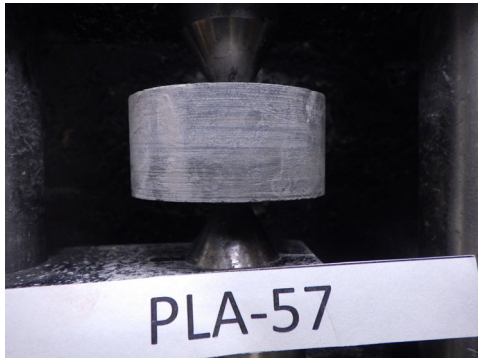
F = the size correction factor

Is(50) = the size corrected point load strength index

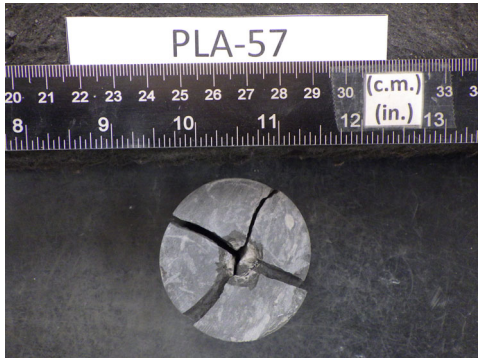
Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-107	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	42.5-43'	Test Id:	817075		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-57	42.53-42.62 ft	1.97	0.95	1,922	2.37	1.54	810	0.896	725	18	14,600



Before



After

Intact material and Discontinuity Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

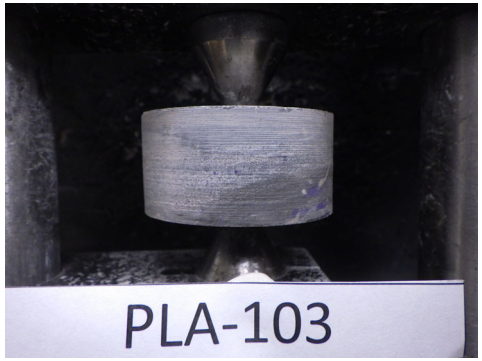
F = the size correction factor

Is(50) = the size corrected point load strength index

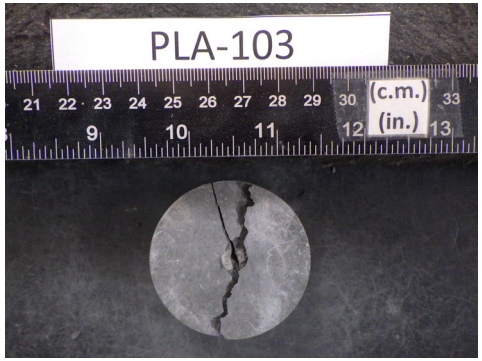
Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-107	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/19/25	Checked By:	smd
Depth :	43-43.75'	Test Id:	820414		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-103	43-43.75 ft	1.97	0.98	1,212	2.46	1.57	492	0.903	445	18	8,860



Before



After

Intact material and Discontinuity Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

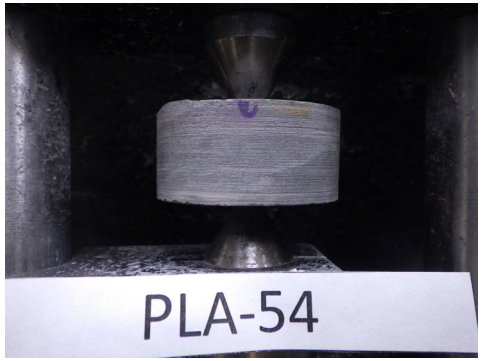
F = the size correction factor

Is(50) = the size corrected point load strength index

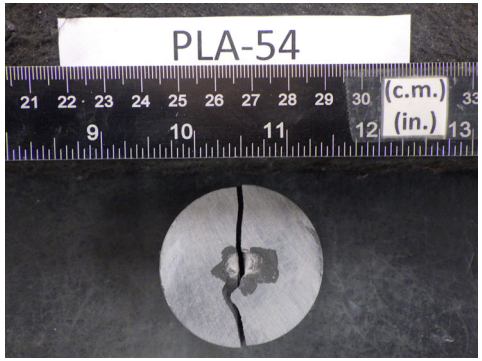
Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-110	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	15.5-16'	Test Id:	819054		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-58	15.5-16 ft	1.97	0.98	771	2.47	1.57	313	0.903	283	18	5,630



Before



After

Intact material and Discontinuity Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

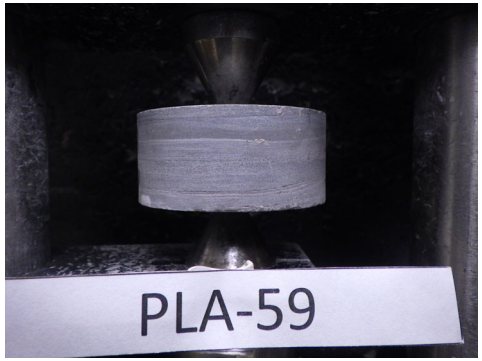
F = the size correction factor

Is(50) = the size corrected point load strength index

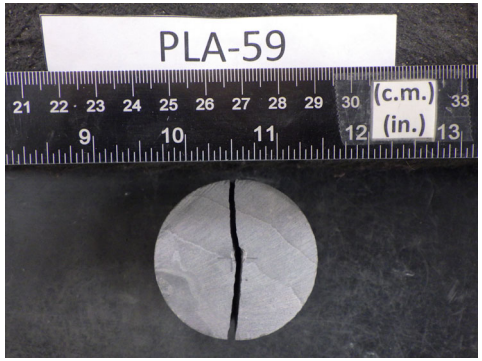
Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-110	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	19-19.25'	Test Id:	817076		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-59	19-19.25 ft	1.97	0.90	2,405	2.25	1.50	1069	0.885	946	18	19,200



Before



After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

F = the size correction factor

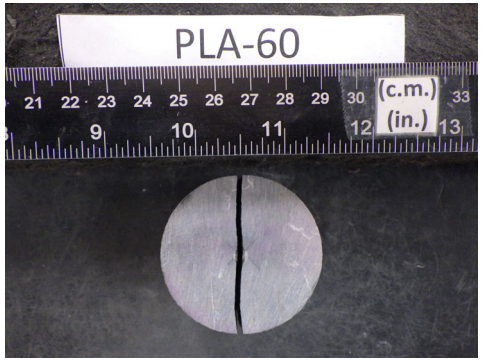
Is(50) = the size corrected point load strength index

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-112	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	19-19.5'	Test Id:	817078		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-60	19-19.5 ft	1.98	1.03	3,177	2.59	1.61	1225	0.914	1119	19	23,300

Before



After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

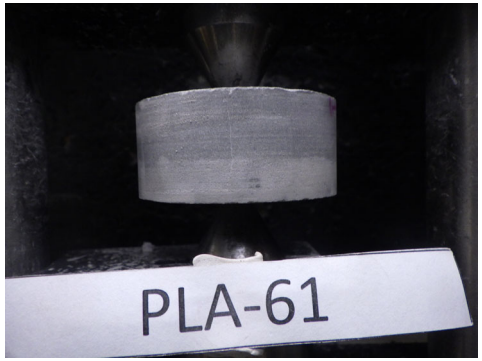
F = the size correction factor

Is(50) = the size corrected point load strength index

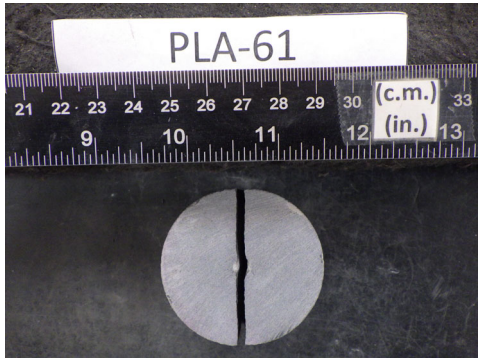
Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-112	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	20-20.25'	Test Id:	817079		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-61	20-20.25 ft	1.97	0.90	2,713	2.25	1.50	1206	0.885	1067	18	21,700



Before



After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

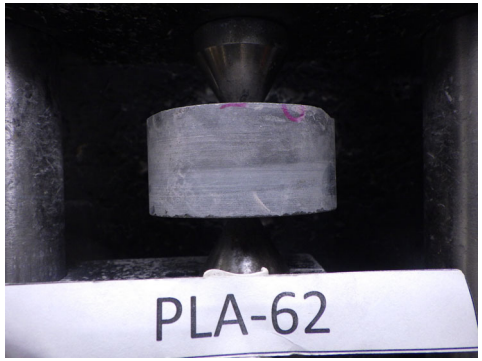
F = the size correction factor

Is(50) = the size corrected point load strength index

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-112	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	27.5-28'	Test Id:	817080		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-62	27.5-28 ft	1.98	0.96	1,315	2.43	1.56	540	0.901	487	18	9,730



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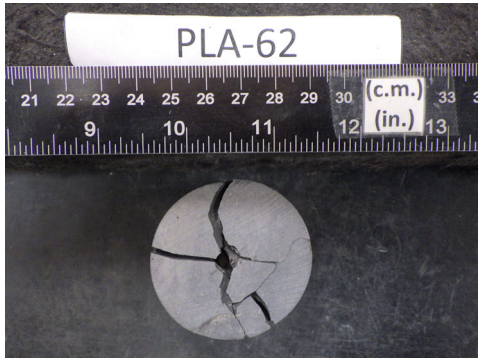


After

Intact material and Discontinuity Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

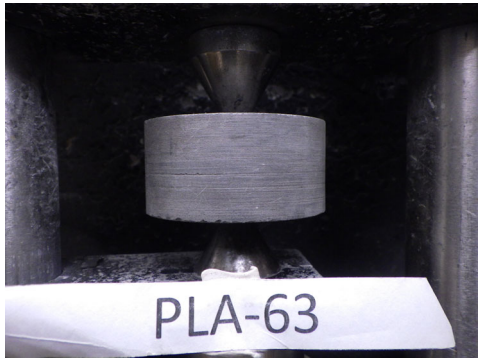
F = the size correction factor

Is(50) = the size corrected point load strength index

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-113	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	18.5-18.75'	Test Id:	817081		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-63	18.5-18.75 ft	1.97	0.96	3,118	2.41	1.55	1294	0.899	1163	18	23,300



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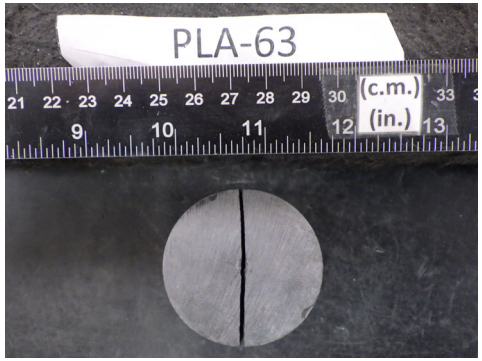


After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

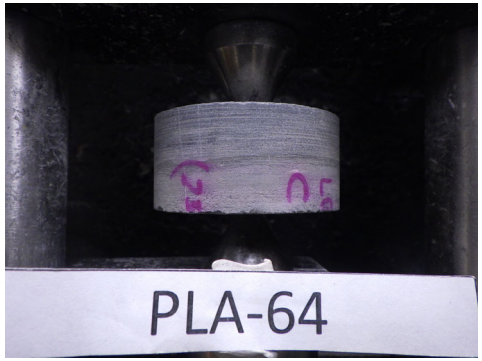
F = the size correction factor

Is(50) = the size corrected point load strength index

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-113	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	25.5-25.75'	Test Id:	817082		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-64	25.5-25.75 ft	1.98	0.94	2,590	2.38	1.54	1088	0.896	975	18	19,600



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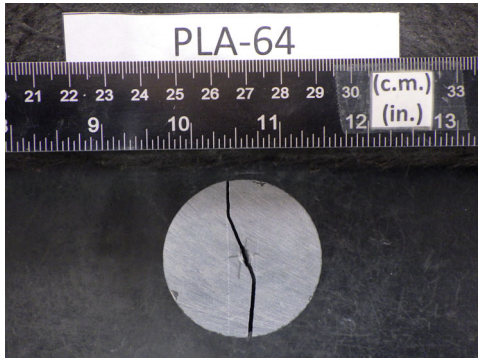


After

Intact material and Discontinuity Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

F = the size correction factor

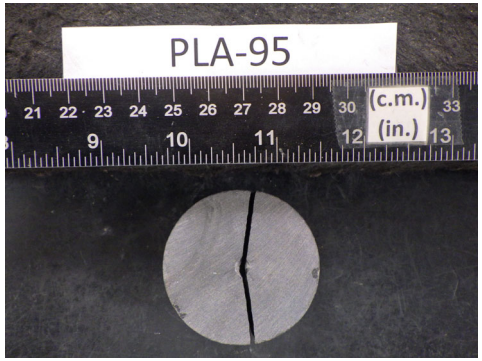
Is(50) = the size corrected point load strength index

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-115	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/18/25	Checked By:	smd
Depth :	26-27'	Test Id:	819406		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-95	26-27 ft	1.97	0.96	3,177	2.42	1.56	1310	0.900	1179	18	23,600

Before



After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

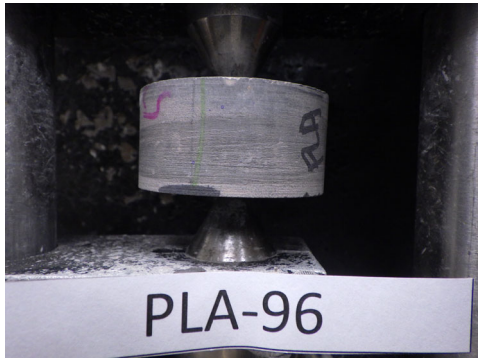
F = the size correction factor

Is(50) = the size corrected point load strength index

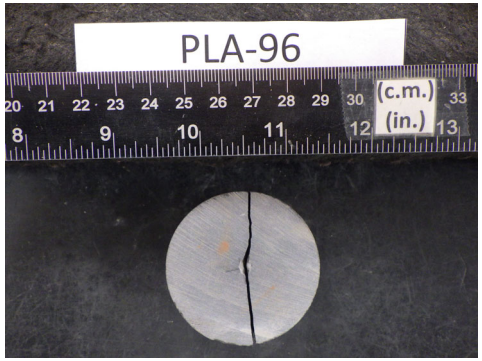
Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-115	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/18/25	Checked By:	smd
Depth :	30-31'	Test Id:	819407		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-96	30-31 ft	1.98	1.00	2,565	2.51	1.58	1021	0.907	926	18	18,400



Before



After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

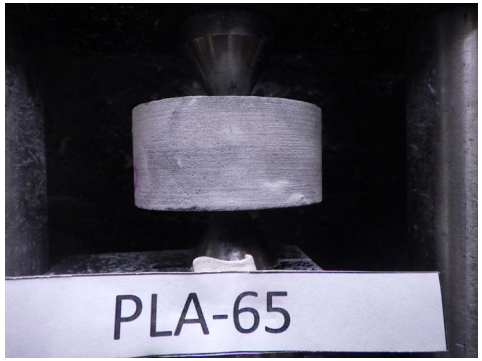
F = the size correction factor

Is(50) = the size corrected point load strength index

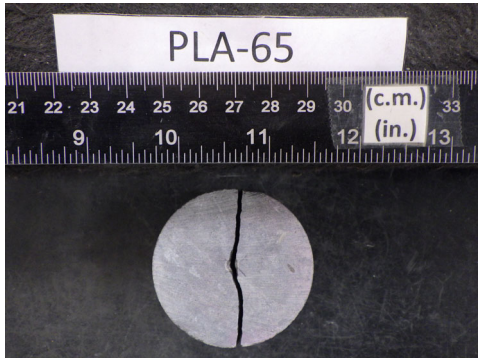
Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-116	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	36.25-36.5'	Test Id:	817084		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-65	36.28-36.37 ft	1.97	0.95	2,972	2.39	1.55	1242	0.897	1115	18	22,400



Before



After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

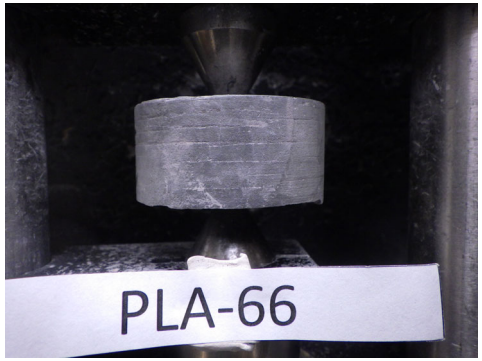
F = the size correction factor

Is(50) = the size corrected point load strength index

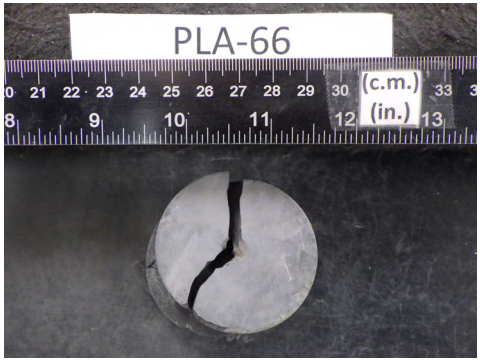
Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-117	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	22.7-23'	Test Id:	817087		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-66	22.7-23 ft	1.98	0.96	549	2.43	1.56	226	0.900	203	18	4,070



Before



After

Intact material and Discontinuity Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

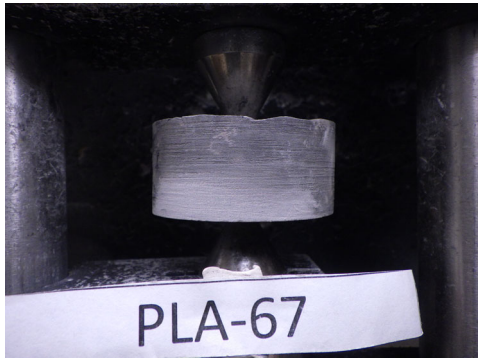
F = the size correction factor

Is(50) = the size corrected point load strength index

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-117	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	23.9-24.5'	Test Id:	819057		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-67	23.9-24.5 ft	1.98	0.94	1,061	2.38	1.54	445	0.896	399	18	8,010



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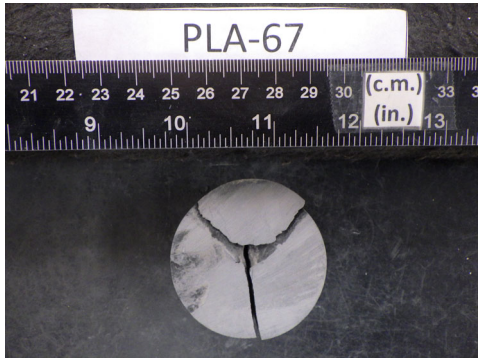


After

Intact material and Discontinuity Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

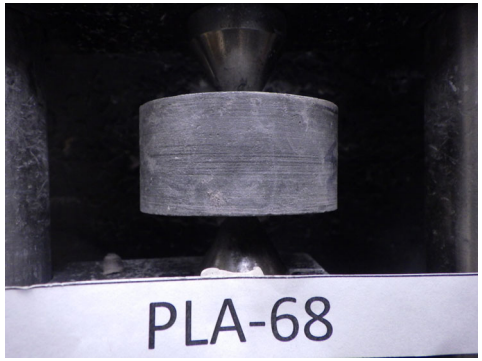
F = the size correction factor

Is(50) = the size corrected point load strength index

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-117	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	29-29.7'	Test Id:	819058		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-68	29-29.7 ft	1.98	1.00	1,317	2.53	1.59	522	0.908	474	18	9,390



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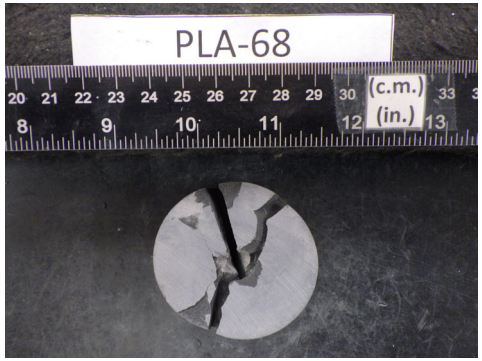


After

Intact material and Discontinuity Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

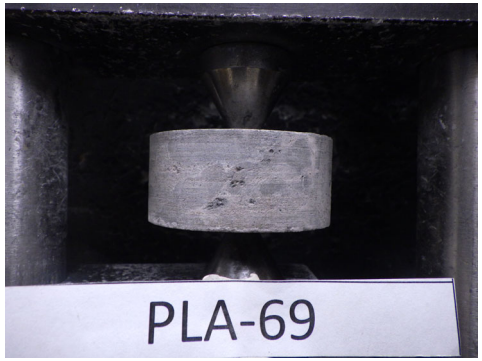
F = the size correction factor

Is(50) = the size corrected point load strength index

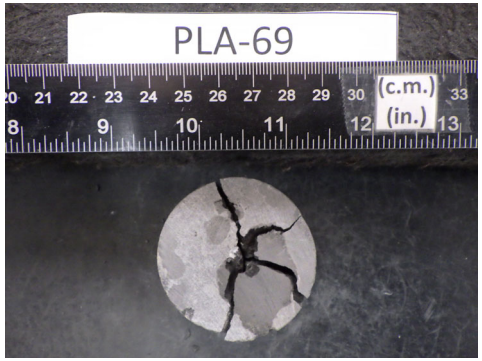
Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-118	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	34.5-35'	Test Id:	817088		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-69	34.5-35 ft	1.99	0.90	1,900	2.28	1.51	833	0.888	739	18	15,000



Before



After

Intact material and Discontinuity Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

F = the size correction factor

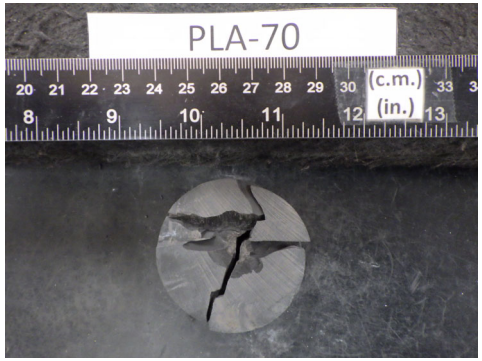
Is(50) = the size corrected point load strength index

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-118	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	42-42.5'	Test Id:	817089		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-70	42-42.5 ft	1.99	0.93	1,990	2.36	1.54	844	0.894	755	18	15,200

Before



After

Intact material and Discontinuity Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

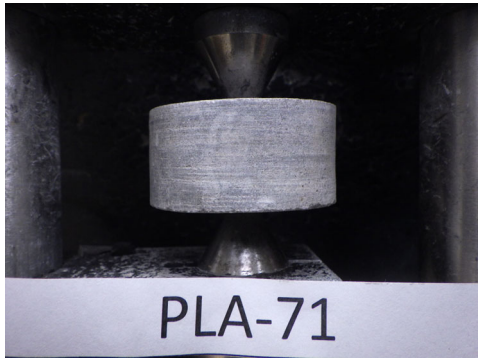
F = the size correction factor

Is(50) = the size corrected point load strength index

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-119	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	14-14.3'	Test Id:	817090		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-71	14.06-14.15 ft	1.97	0.98	2,556	2.46	1.57	1037	0.903	937	18	18,700



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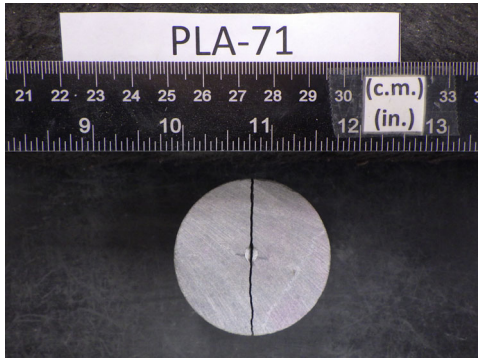


After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

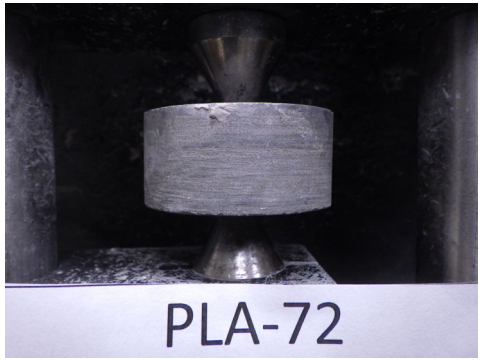
F = the size correction factor

Is(50) = the size corrected point load strength index

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-119	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	20.6-21'	Test Id:	817091		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-72	20.6-21 ft	1.98	0.94	1,904	2.37	1.54	804	0.895	720	18	14,500



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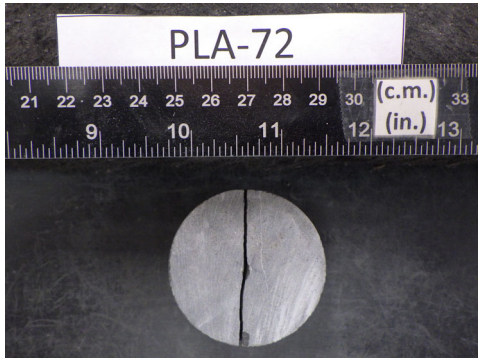


After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

F = the size correction factor

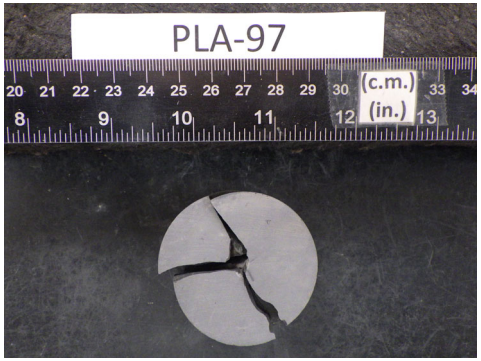
Is(50) = the size corrected point load strength index

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-119	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/18/25	Checked By:	smd
Depth :	30-30.5'	Test Id:	819408		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-97	30.08-30.17 ft	1.98	0.98	998	2.48	1.57	403	0.904	364	18	7,250

Before



After

Intact material and Discontinuity Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

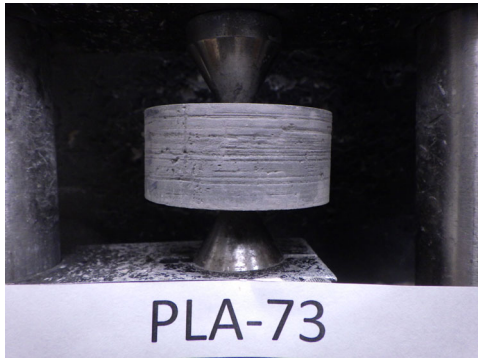
F = the size correction factor

Is(50) = the size corrected point load strength index

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-119	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	31.6-32'	Test Id:	817092		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-73	31.66-31.75 ft	1.97	0.90	585	2.27	1.51	258	0.886	228	18	4,640



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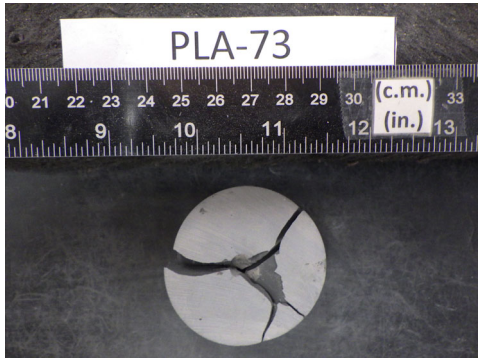


After

Intact material and Discontinuity Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

F = the size correction factor

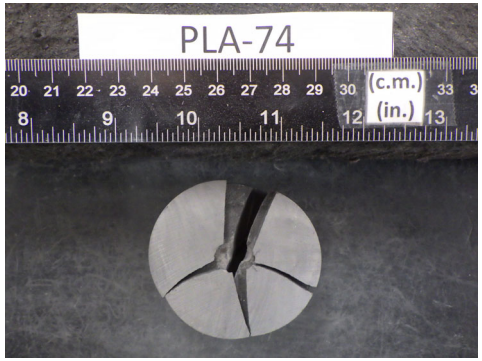
Is(50) = the size corrected point load strength index

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-119	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	32.5-33'	Test Id:	819059		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-74	32.88-32.98 ft	1.98	0.95	692	2.41	1.55	287	0.899	258	18	5,170

Before



After

Intact material and Discontinuity Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

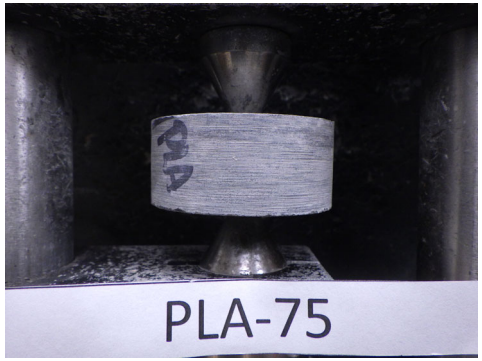
F = the size correction factor

Is(50) = the size corrected point load strength index

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-121	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	60-60.25'	Test Id:	819060		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-75	60.07-60.16 ft	1.98	0.90	1,578	2.27	1.51	694	0.887	616	18	12,500



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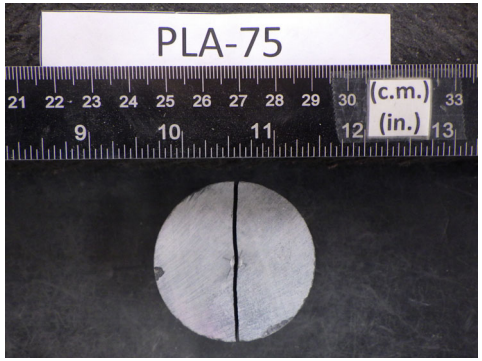


After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

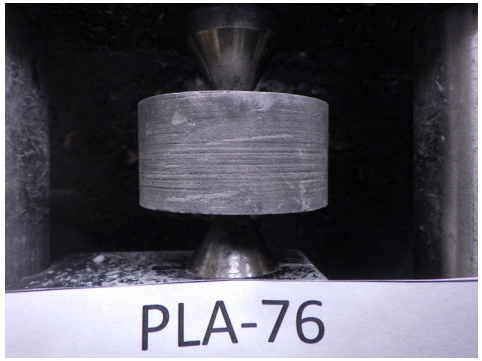
F = the size correction factor

Is(50) = the size corrected point load strength index

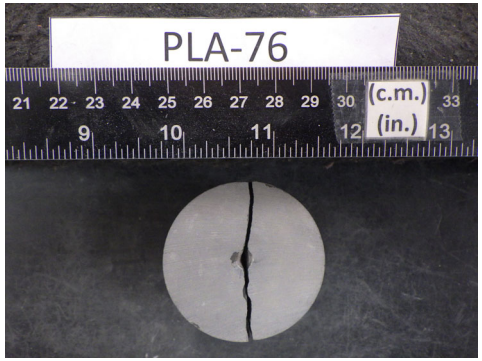
Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-122	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	42-43'	Test Id:	819061		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-76	42.02-42.16 ft	1.97	1.02	1,275	2.55	1.60	499	0.910	455	19	9,490



Before



After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

F = the size correction factor

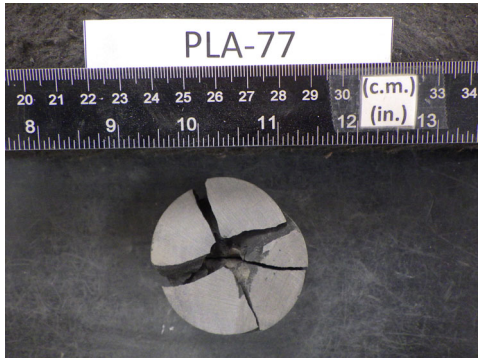
Is(50) = the size corrected point load strength index

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-122	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	48-48.3'	Test Id:	817095		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-77	48.05-48.14 ft	1.97	0.95	1,758	2.38	1.54	737	0.897	661	18	13,300

Before



After

Intact material and Discontinuity Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

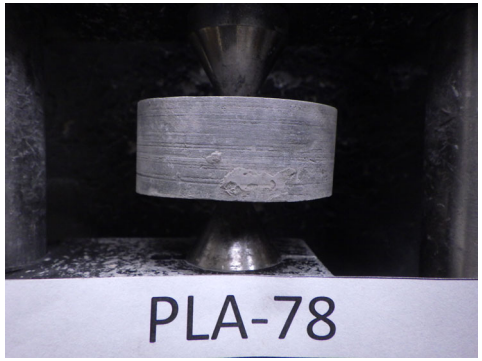
F = the size correction factor

Is(50) = the size corrected point load strength index

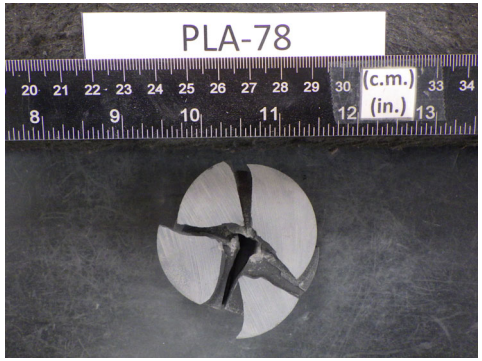
Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-123	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	36.75-37'	Test Id:	817096		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-78	36.79-36.89 ft	1.97	0.87	955	2.19	1.48	436	0.880	384	18	7,850



Before



After

Intact material and Discontinuity Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

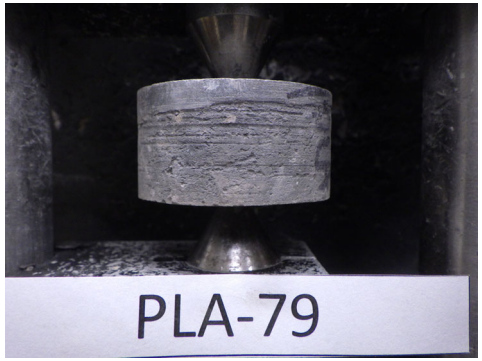
F = the size correction factor

Is(50) = the size corrected point load strength index

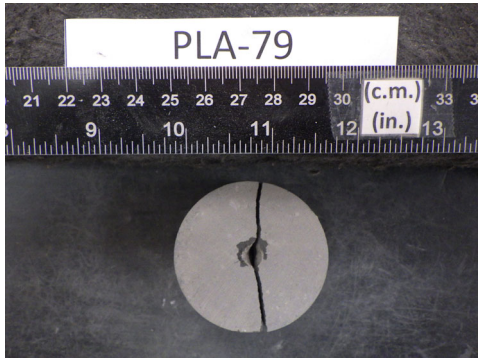
Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-124	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	47-47.5'	Test Id:	817097		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-79	47-47.5 ft	1.97	1.03	1,093	2.58	1.61	423	0.913	386	19	8,030



Before



After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

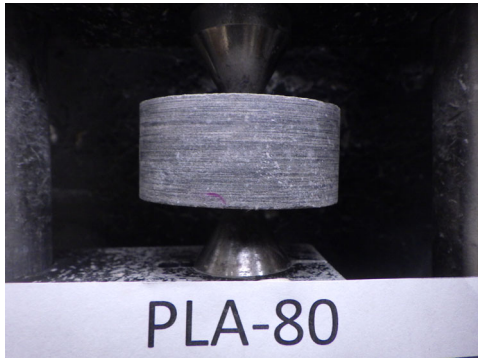
F = the size correction factor

Is(50) = the size corrected point load strength index

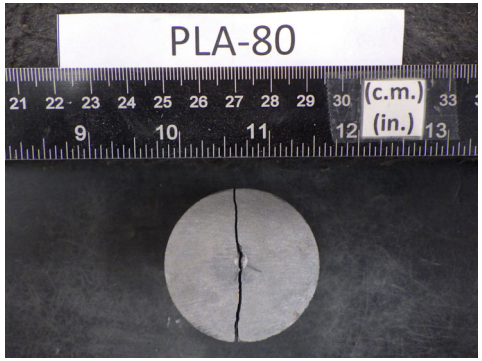
Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-124	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	49.5-49.75'	Test Id:	817098		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-80	49.5-49.75 ft	1.98	0.89	2,655	2.24	1.50	1187	0.884	1049	18	21,400



Before



After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

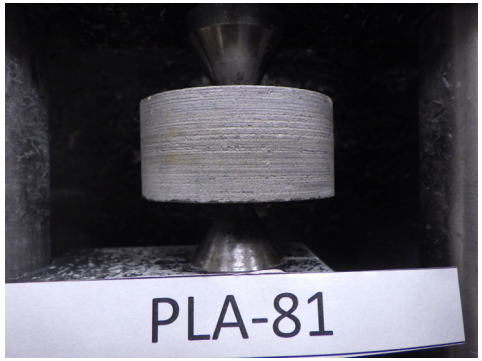
F = the size correction factor

Is(50) = the size corrected point load strength index

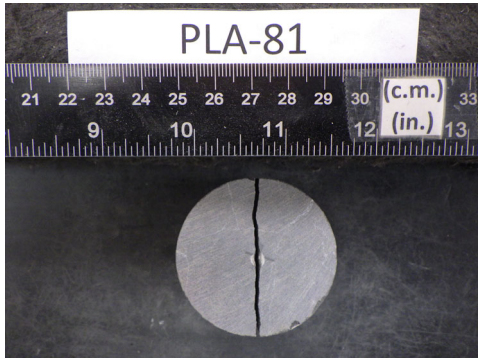
Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-126	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	13-13.25'	Test Id:	817100		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-81	13-13.25 ft	1.98	0.94	2,531	2.37	1.54	1067	0.895	956	18	19,200



Before



After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

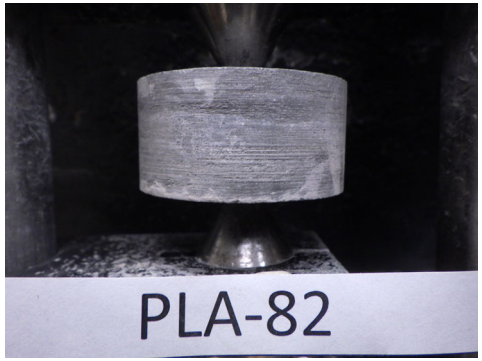
F = the size correction factor

Is(50) = the size corrected point load strength index

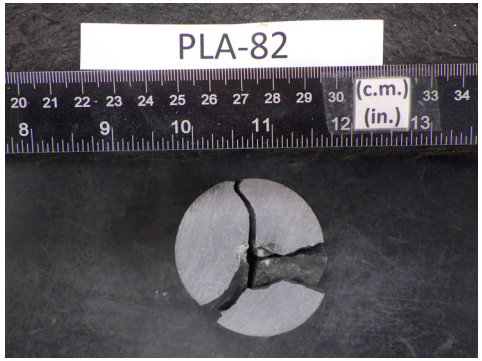
Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-127	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	34.25-34.75'	Test Id:	817101		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-82	34.25-34.75 ft	1.99	1.00	2,668	2.53	1.59	1056	0.908	959	18	19,000



Before



After

Intact material and Discontinuity Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

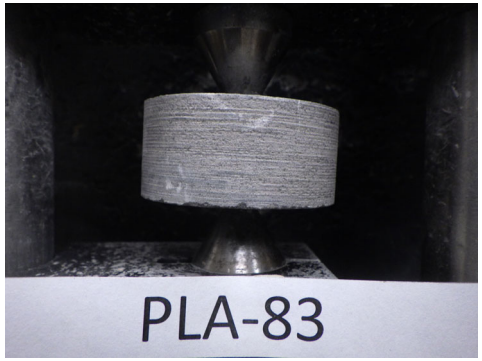
F = the size correction factor

Is(50) = the size corrected point load strength index

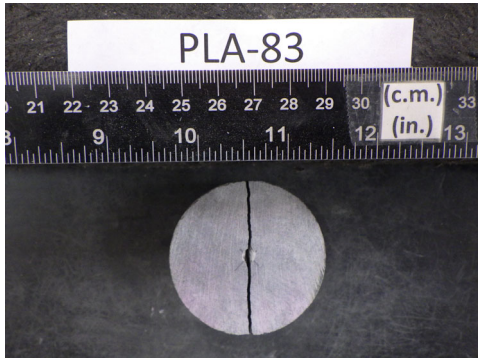
Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-128	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	30.25-30.5'	Test Id:	817102		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-83	30.29-30.38 ft	1.98	0.92	3,044	2.31	1.52	1315	0.891	1171	18	23,700



Before



After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

F = the size correction factor

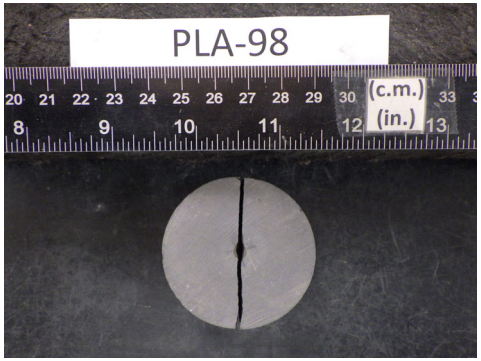
Is(50) = the size corrected point load strength index

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-129	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/18/25	Checked By:	smd
Depth :	32.5-33'	Test Id:	819413		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-98	32.80-32.90 ft	1.98	1.04	1,275	2.61	1.62	488	0.915	447	19	9,270

Before



After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

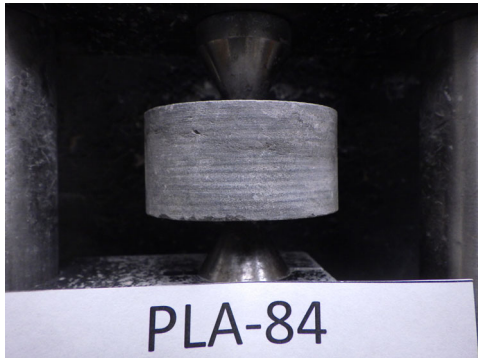
F = the size correction factor

Is(50) = the size corrected point load strength index

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-130	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	23-23.5'	Test Id:	817106		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-84	23-23.5 ft	1.99	0.99	1,949	2.51	1.58	776	0.907	704	18	14,000



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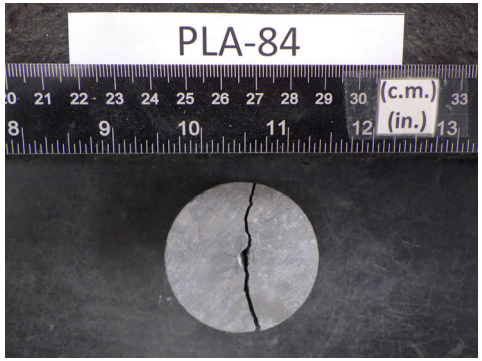


After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

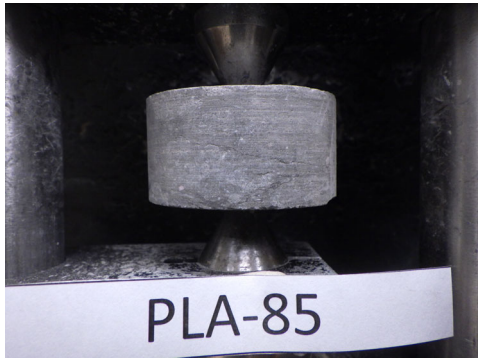
F = the size correction factor

Is(50) = the size corrected point load strength index

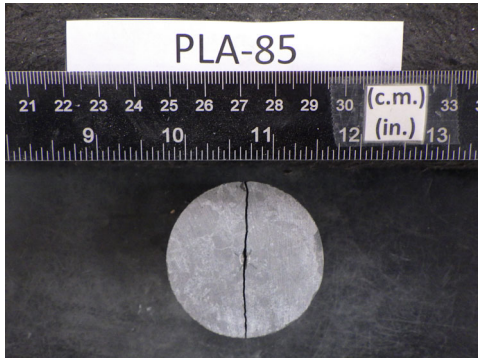
Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-131	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	33-33.25'	Test Id:	817107		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-85	33-33.25 ft	1.99	1.03	3,204	2.62	1.62	1222	0.916	1119	19	23,200



Before



After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

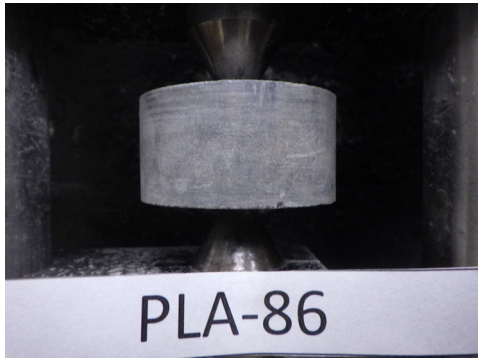
F = the size correction factor

Is(50) = the size corrected point load strength index

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-134	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	21.4-21.6'	Test Id:	817108		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-86	21.4-21.6 ft	1.99	1.01	2,331	2.57	1.60	906	0.912	827	18	16,300



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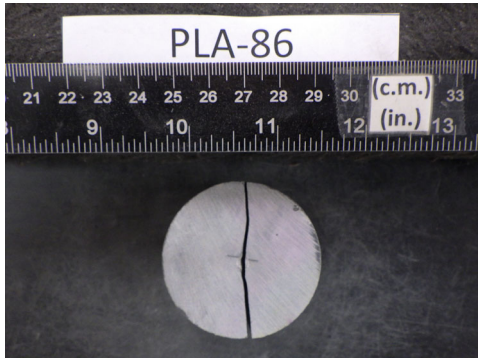


After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

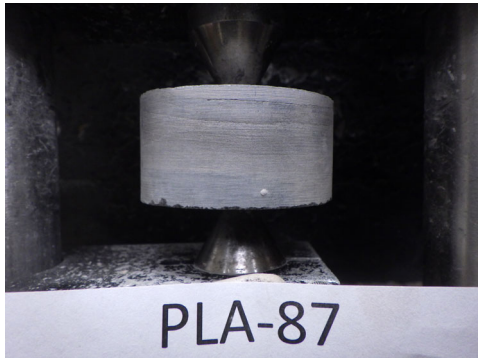
F = the size correction factor

Is(50) = the size corrected point load strength index

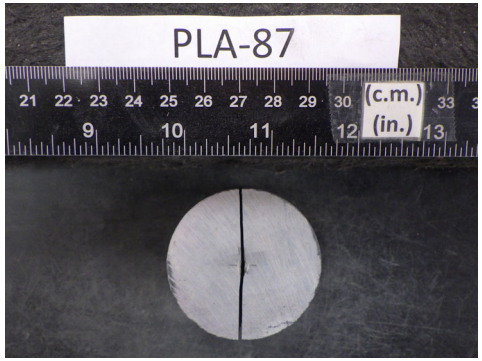
Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-134	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	25.4-25.6'	Test Id:	819063		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-87	25.4-25.6 ft	1.99	1.02	1,504	2.58	1.61	583	0.913	532	19	11,100



Before



After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

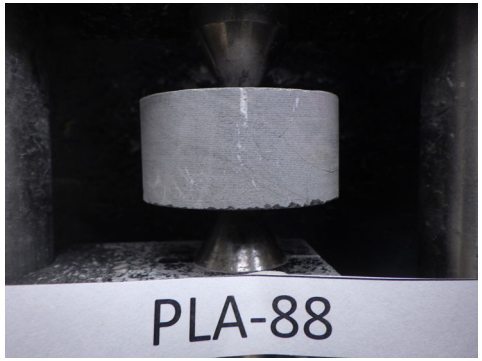
F = the size correction factor

Is(50) = the size corrected point load strength index

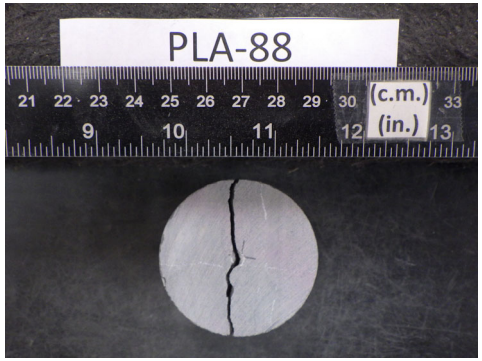
Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-135	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	27-28'	Test Id:	817109		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-88	27-28 ft	1.99	0.97	2,055	2.46	1.57	834	0.903	753	18	15,000



Before



After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

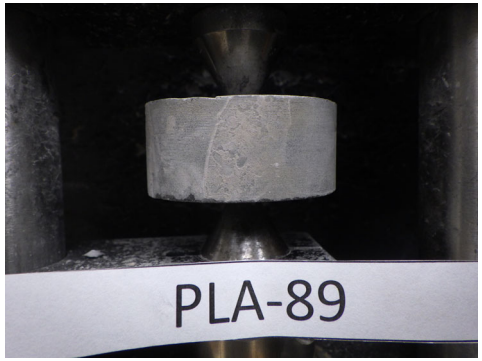
F = the size correction factor

Is(50) = the size corrected point load strength index

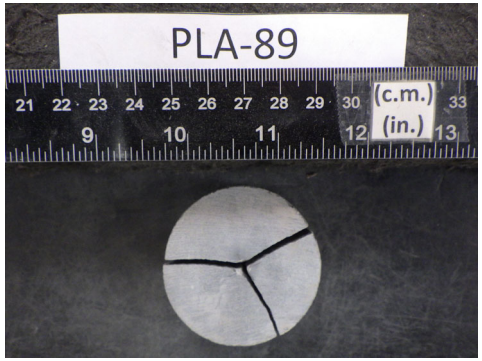
Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-R-136	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	26.25-26.5'	Test Id:	817110		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-89	26.26-26.5 ft	2	0.90	2,435	2.28	1.51	1069	0.887	948	18	19,200



Before



After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

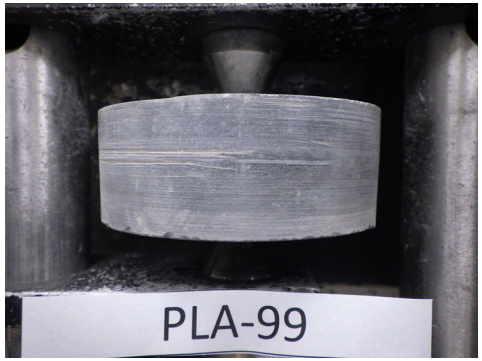
F = the size correction factor

Is(50) = the size corrected point load strength index

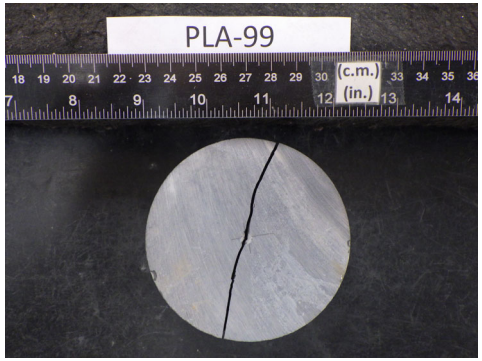
Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-X-001	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/18/25	Checked By:	smd
Depth :	39.5-40'	Test Id:	817111		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-99	39.53-39.65 ft	3.33	1.27	2,711	5.40	2.32	503	1.077	541	19	9,550



Before



After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

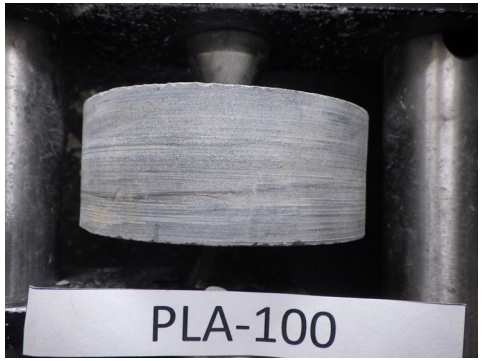
F = the size correction factor

Is(50) = the size corrected point load strength index

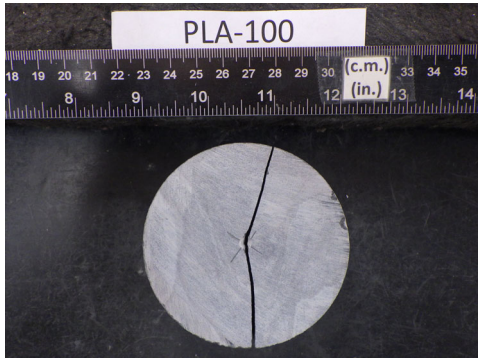
Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-X-001	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/18/25	Checked By:	smd
Depth :	40-40.75'	Test Id:	819065		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-100	40-40.75 ft	3.26	1.30	3,455	5.38	2.32	642	1.077	691	19	12,200



Before



After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

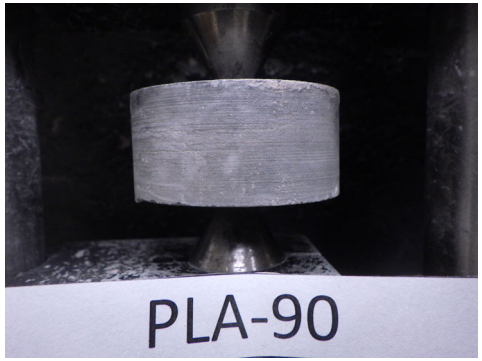
F = the size correction factor

Is(50) = the size corrected point load strength index

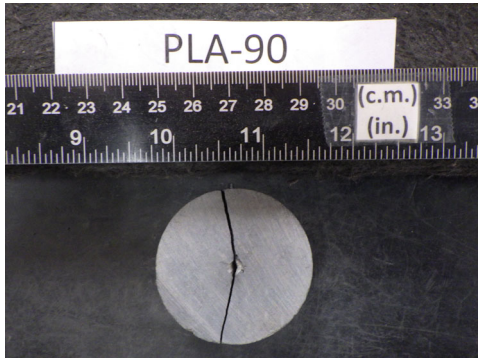
Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-X-003	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	33-33.5'	Test Id:	817112		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-90	33.03-33.13 ft	1.99	0.95	1,895	2.39	1.55	792	0.897	711	18	14,300



Before



After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

F = the size correction factor

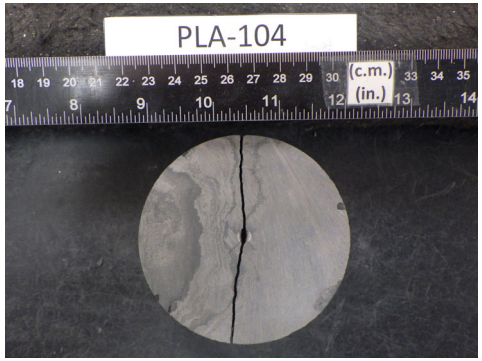
Is(50) = the size corrected point load strength index

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-X-005	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/19/25	Checked By:	smd
Depth :	38.5-39'	Test Id:	819064		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-104	38.56-38.68 ft	3.34	1.19	4,076	5.05	2.25	808	1.061	857	19	15,300

Before



After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

F = the size correction factor

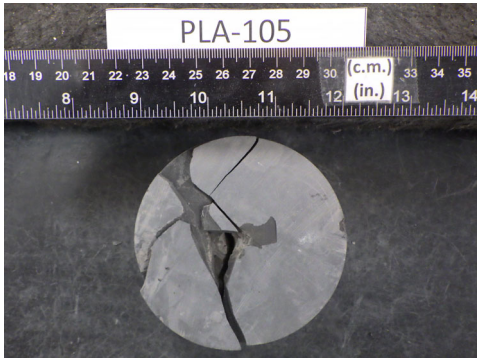
Is(50) = the size corrected point load strength index

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-X-006	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/19/25	Checked By:	smd
Depth :	44-44.5'	Test Id:	819070		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-105	44.06-44.18 ft	3.34	1.12	2,808	4.75	2.18	591	1.047	618	19	11,200

Before



After

Intact material and Discontinuity Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

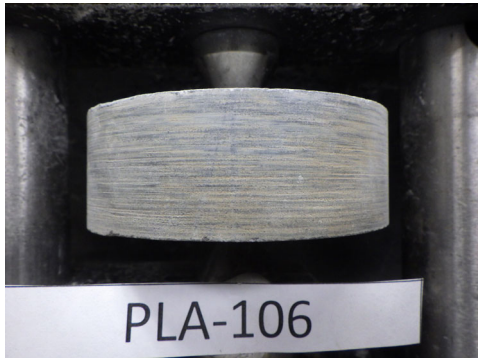
F = the size correction factor

Is(50) = the size corrected point load strength index

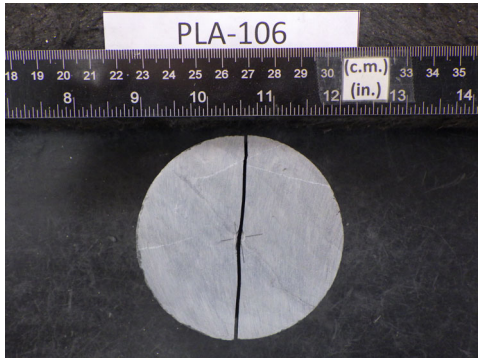
Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	LB-X-006	Sample Type:	Core	Tested By:	jss
Sample ID:	---	Test Date:	06/19/25	Checked By:	smd
Depth :	55-55.5'	Test Id:	819069		
Test Comment:	---				
Visual Description:	---				
Sample Comment:	---				

Axial Point Load Strength Index of Rock by ASTM D5731

Test No.	Specimen Depth	Diameter, in	Thickness, in	Failure Load (P), lbs	De, sq in	De, in	Is, psi	F	Is(50mm), psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
PLA-106	55.08-55.19 ft	3.31	1.15	2,343	4.86	2.20	482	1.052	508	19	9,170



Before



After

Intact Material Failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D5731 Table 1.

The reported thickness (L) is the average of three measurements.

The reported diameter(D) is the average of three measurements.

De = the equivalent core diameter

Is = the uncorrected point load strength index

F = the size correction factor

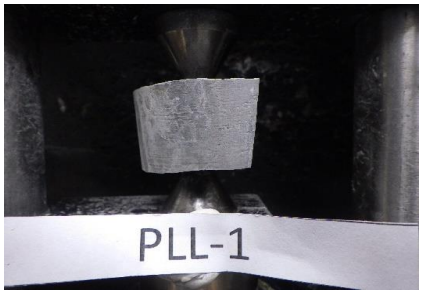
Is(50) = the size corrected point load strength index

Client:	Langan Engineering	Test Date:	06/19/25
Project Name:	Upstate Confidential Project	Tested By:	jss
Project Location	NY	Checked By:	smd
GTX #:	321096	Sample Type:	rock lump

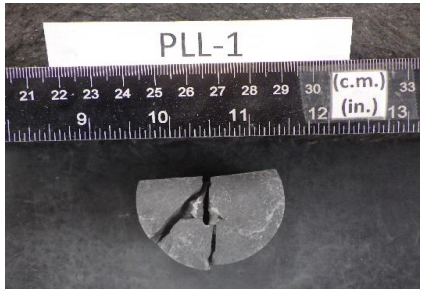
Point Load Strength Index of Rock by ASTM D5731

Boring No.	Sample No.	Depth, ft.	Test No.	Test Type	Width (W), in.	Depth (D), in.	Area, in^2	Failure Load (P), lb	D_e^2, in^2	D_e, in.	I_s, psi	F	$I_{s(50)}$, psi	Generalized Correction Factor, K	Estimated Compressive Strength, psi
LB-R-045	C-3	26.5-27	PLL-1	Irregular Lump	1.27	1.35	1.25	834	1.59	1.26	526	0.818	430	19	9,990

PLL-1
before



PLL-1
after



Intact material & discontinuity failure

Notes: Generalized correction factor, K, used to estimate the compressive strength based on the specimen depth and ASTM D 5731 Table 1.
D_e = the equivalent core diameter
I_s = the uncorrected point load strength index
F = the size correction factor
$I_{s(50)}$ = the size corrected point load strength index

GeoTesting EXPRESS
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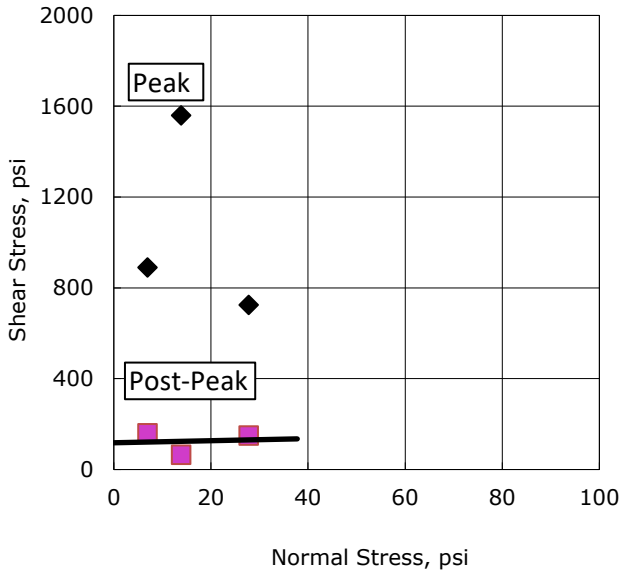
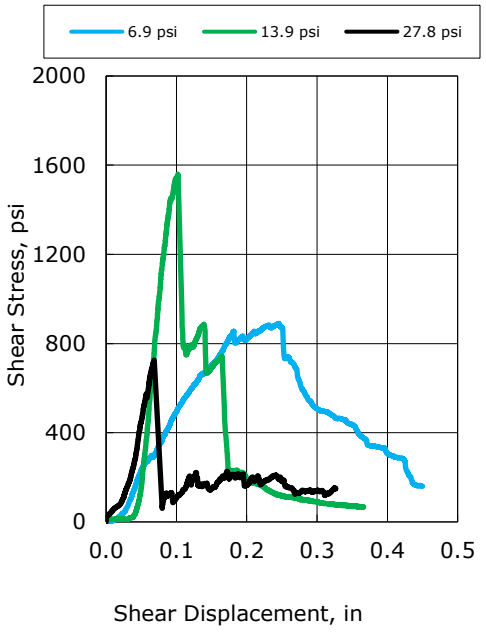
Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	6/20/2025
End Date:	6/20/2025
Tested By:	tlm
Checked By:	jsc
Boring ID:	LB-R-045
Sample ID:	C-1
Depth, ft:	13.5-14
Visual Description:	Rock Core

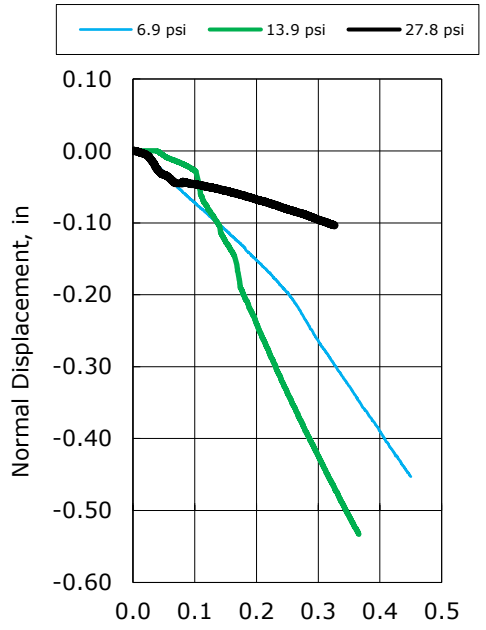
Direct Shear Test of Rock by ASTM D5607





Test No.:	DS-1	DS-2	DS-3
Specimen Diameter, in:	1.98	1.97	1.98
Specimen Length, in:	2.07	2.07	2.08
Specimen Mass, grams:	283	288	280
Specimen Area, in^2:	3.07	3.05	3.07
Specimen Bulk Density, pcf	170	173	167
Shear Plane Area, in^2	3.07	3.05	3.07
Normal Stress, psi:	6.94	13.9	27.8
Peak Shear Stress, psi:	890	1560	725
Post Peak Shear Stress, psi:	160	65.8	150
Horiz. Displacement Rate, in/min:	0.005	0.005	0.005

Peak Friction Angle:	---
Peak Cohesive Intercept, psi:	---
Post-Peak Friction Angle:	**24.4**
Post-Peak Cohesive Intercept, psi:	**118**
JRC Roughness	14-16 / 6-8 / 6-8

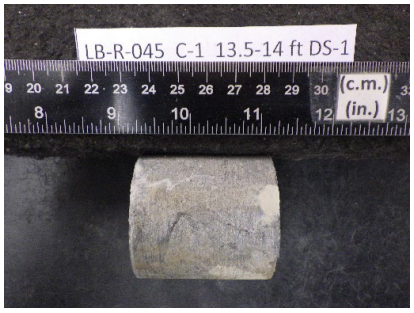


Notes:

Specimen cut to length using diamond tipped saw blade.
Tested at as-received moisture content and density.
'Hydro-Stone Super X' encapsulating compound used to mount specimen in test rings.
Actual strength parameters may vary and should be determined by an engineer for site-specific conditions.

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	6/20/2025
End Date:	6/20/2025
Tested By:	tlm
Checked By:	jsc
Boring ID:	LB-R-045
Sample ID:	C-1
Depth, ft:	13.5-14
Visual Description:	Rock Core

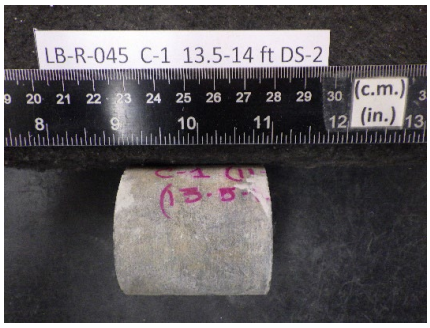
Point 1
Normal Stress, psi:
6.9



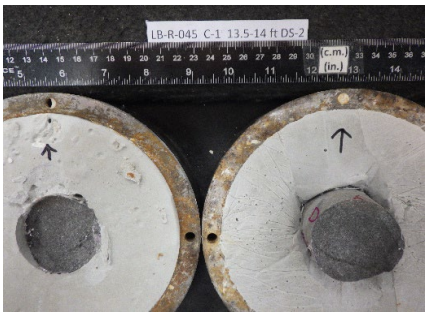
Pre-Test

Post-Test

Point 2
Normal Stress, psi:
13.9

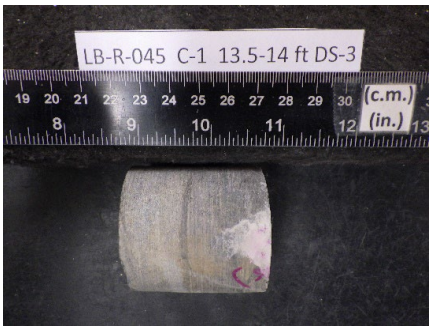


Pre-Test

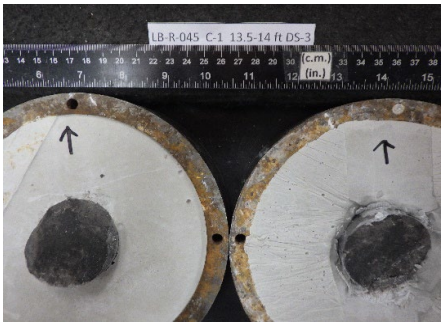


Post-Test

Point 3
Normal Stress, psi:
27.8



Pre-Test



Post-Test

GeoTesting EXPRESS
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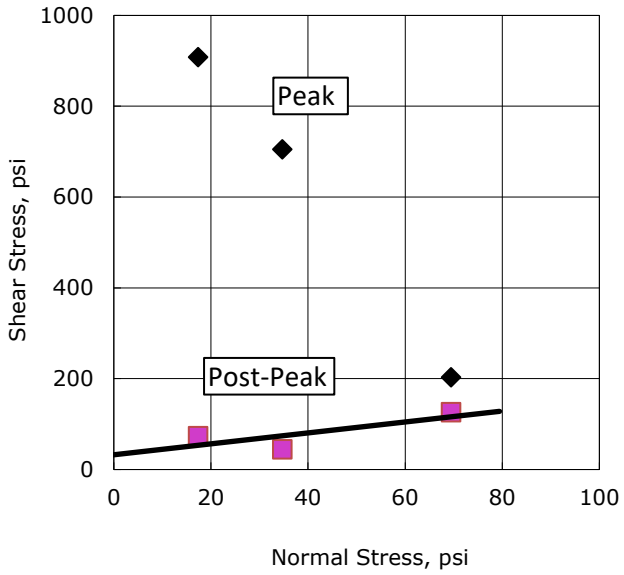
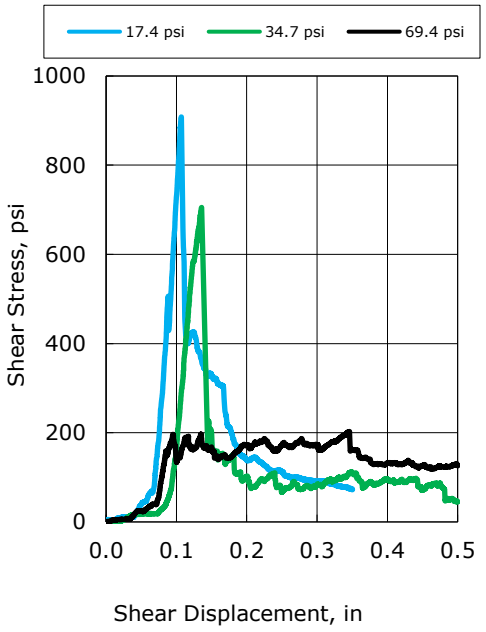
Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	6/20/2025
End Date:	6/23/2025
Tested By:	tlm
Checked By:	jsc
Boring ID:	LB-R-057
Sample ID:	C-2
Depth, ft:	33.5-34.5
Visual Description:	Rock Core

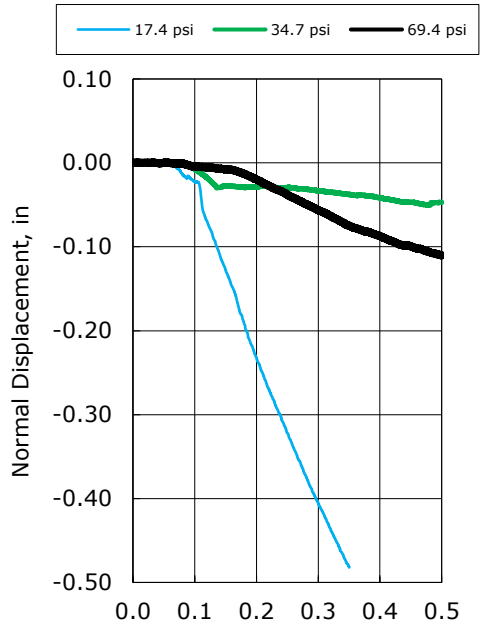
Direct Shear Test of Rock by ASTM D5607





Test No.:	DS-4	DS-5	DS-6
Specimen Diameter, in:	1.99	1.99	1.99
Specimen Length, in:	2.45	2.41	2.12
Specimen Mass, grams:	342	336	297
Specimen Area, in^2:	3.10	3.10	3.09
Specimen Bulk Density, pcf	172	171	173
Shear Plane Area, in^2	3.10	3.10	3.09
Normal Stress, psi:	17.4	34.7	69.4
Peak Shear Stress, psi:	908	705	203
Post Peak Shear Stress, psi:	73.2	44.6	126
Horiz. Displacement Rate, in/min:	0.005	0.005	0.005

Peak Friction Angle:		---	
Peak Cohesive Intercept, psi:		---	
Post-Peak Friction Angle:		**50.3**	
Post-Peak Cohesive Intercept, psi:		**32.5**	
JRC Roughness	8-10	4-6	4-6

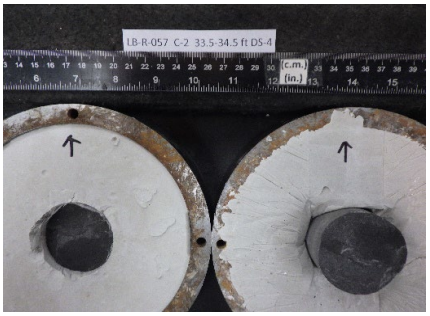


Notes:
Specimen cut to length using diamond tipped saw blade.
Tested at as-received moisture content and density.
'Hydro-Stone Super X' encapsulating compound used to mount specimen in test rings.
Actual strength parameters may vary and should be determined by an engineer for site-specific conditions.

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	6/20/2025
End Date:	6/23/2025
Tested By:	tlm
Checked By:	jsc
Boring ID:	LB-R-057
Sample ID:	C-2
Depth, ft:	33.5-34.5
Visual Description:	Rock Core

Point 1
Normal Stress, psi:
17.4

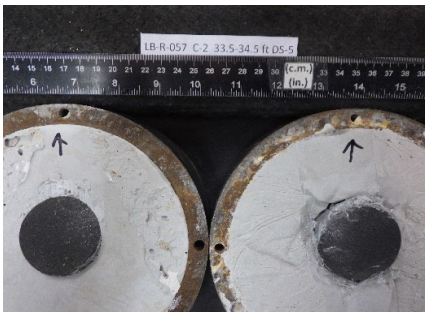
Pre-Test



Post-Test

Point 2
Normal Stress, psi:
34.7

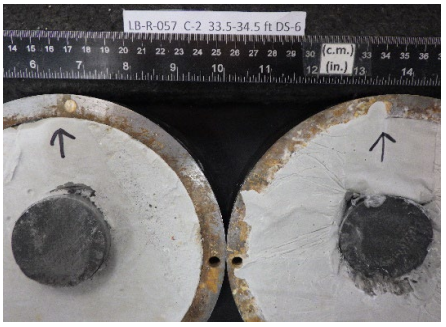
Pre-Test



Post-Test

Point 3
Normal Stress, psi:
69.4

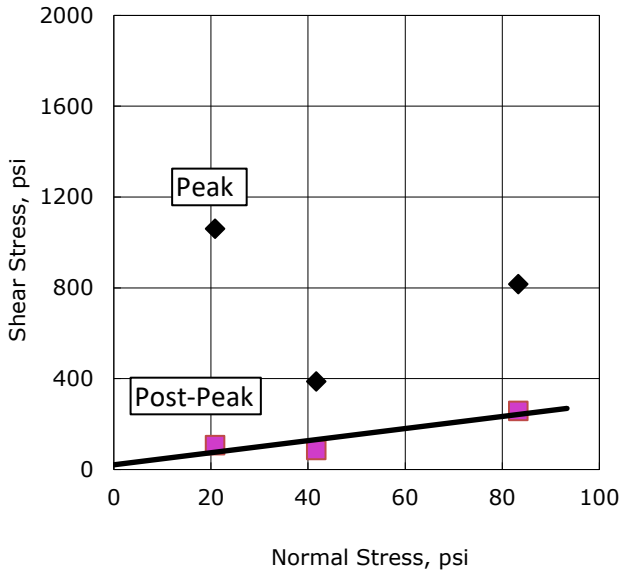
Pre-Test

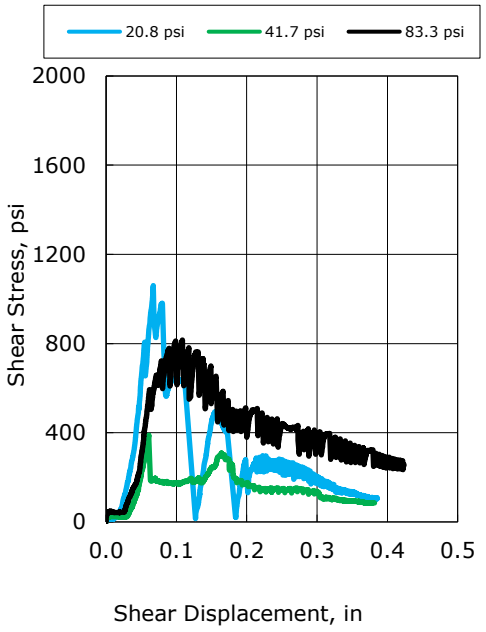


Post-Test

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	6/23/2025
End Date:	6/23/2025
Tested By:	tlm
Checked By:	jsc
Boring ID:	LB-R-064
Sample ID:	---
Depth, ft:	38-39
Visual Description:	Rock Core

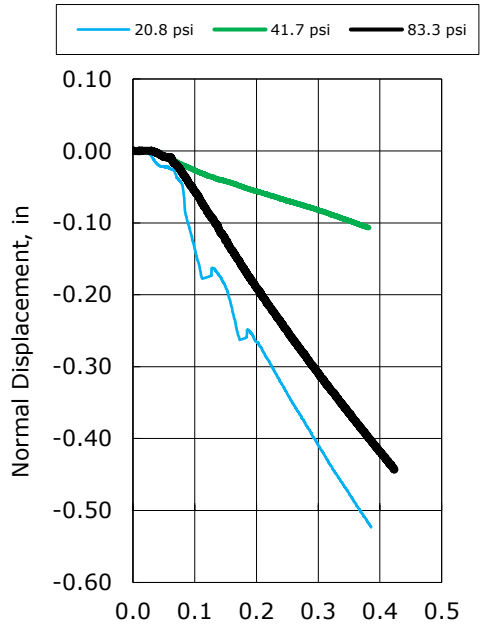
Direct Shear Test of Rock by ASTM D5607





Test No.:	DS-7	DS-8	DS-9
Specimen Diameter, in:	1.97	1.96	1.96
Specimen Length, in:	2.98	2.72	2.71
Specimen Mass, grams:	409	359	368
Specimen Area, in^2:	3.04	3.02	3.02
Specimen Bulk Density, pcf	172	167	171
Shear Plane Area, in^2	3.04	3.02	3.02
Normal Stress, psi:	20.8	41.7	83.3
Peak Shear Stress, psi:	1060	388	816
Post Peak Shear Stress, psi:	107	85.7	258
Horiz. Displacement Rate, in/min:	0.005	0.005	0.005

Peak Friction Angle:		---	
Peak Cohesive Intercept, psi:		---	
Post-Peak Friction Angle:		**69.4**	
Post-Peak Cohesive Intercept, psi:		**21**	
JRC Roughness	8-10	8-10	8-10



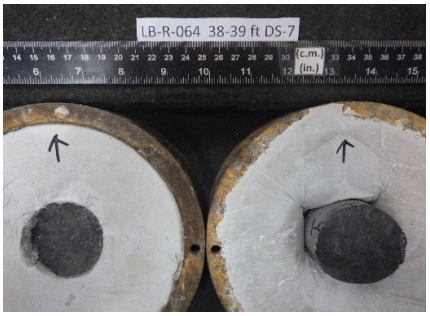
Notes:

Specimen cut to length using diamond tipped saw blade.
Tested at as-received moisture content and density.
'Hydro-Stone Super X' encapsulating compound used to mount specimen in test rings.
Actual strength parameters may vary and should be determined by an engineer for site-specific conditions.

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	6/23/2025
End Date:	6/23/2025
Tested By:	tlm
Checked By:	jsc
Boring ID:	LB-R-064
Sample ID:	---
Depth, ft:	38-39
Visual Description:	Rock Core

Point 1
Normal Stress, psi:
20.8

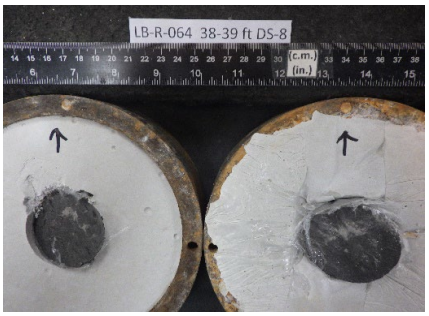
Pre-Test



Post-Test

Point 2
Normal Stress, psi:
41.7

Pre-Test



Post-Test

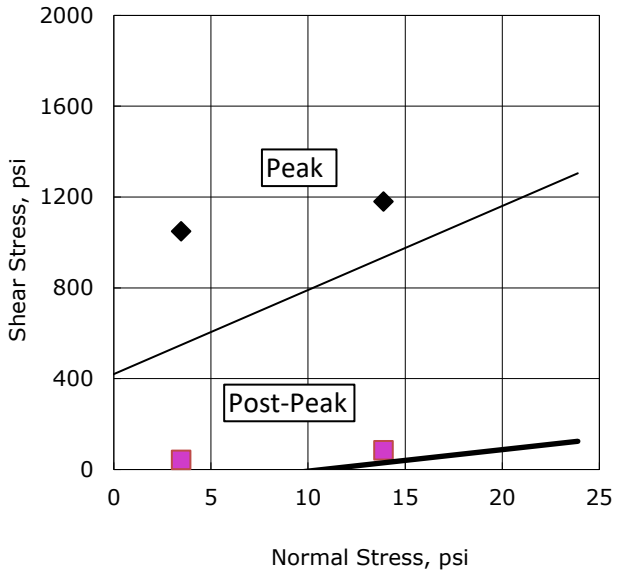
Point 3
Normal Stress, psi:
83.3

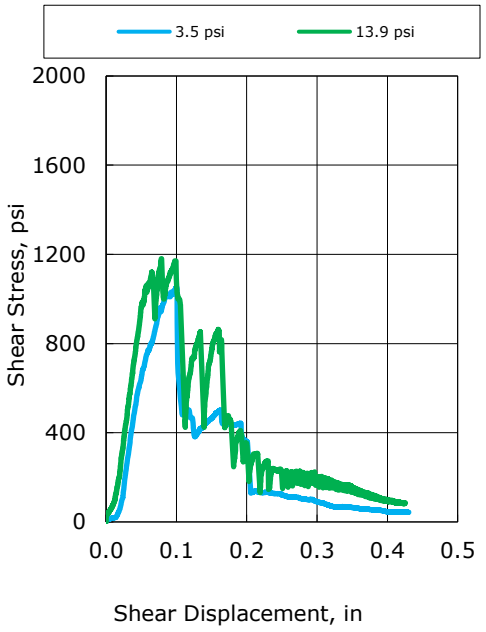
Pre-Test

Post-Test

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	6/23/2025
End Date:	6/23/2025
Tested By:	tlm
Checked By:	jsc
Boring ID:	LB-R-103
Sample ID:	---
Depth, ft:	10.10-10.29
Visual Description:	Rock Core

Direct Shear Test of Rock by ASTM D5607



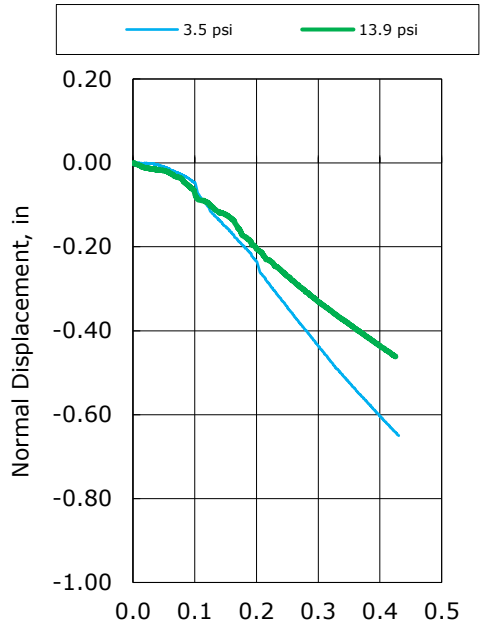


Test No.:	DS-10	DS-11	---
Specimen Diameter, in:	1.99	1.99	---
Specimen Length, in:	2.11	2.22	---
Specimen Mass, grams:	301	315	---
Specimen Area, in^2:	3.10	3.11	---
Specimen Bulk Density, pcf	175	174	---
Shear Plane Area, in^2	3.10	3.11	---
Normal Stress, psi:	3.47	13.9	---
Peak Shear Stress, psi:	1050	1180	---
Post Peak Shear Stress, psi:	43.1	84.6	---
Horiz. Displacement Rate, in/min:	0.005	0.005	---

Peak Friction Angle:		**85.4**	
Peak Cohesive Intercept, psi:		**1007**	
Post-Peak Friction Angle:		**75.9**	
Post-Peak Cohesive Intercept, psi:		**29.3**	
JRC Roughness	8-10	8-10	---

<u>Notes:</u>

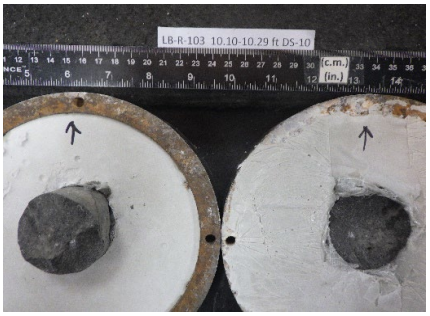
Specimen cut to length using diamond tipped saw blade.
Tested at as-received moisture content and density.
'Hydro-Stone Super X' encapsulating compound used to mount specimen in test rings.
Actual strength parameters may vary and should be determined by an engineer for site-specific conditions.



Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	6/23/2025
End Date:	6/23/2025
Tested By:	tlm
Checked By:	jsc
Boring ID:	LB-R-103
Sample ID:	---
Depth, ft:	10.10-10.29
Visual Description:	Rock Core

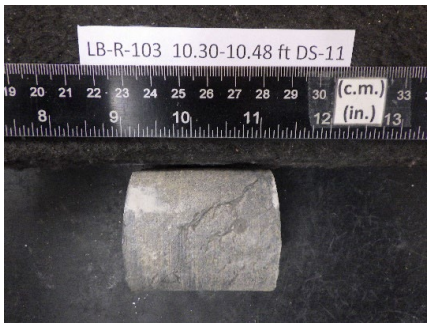
Point 1
Normal Stress, psi:
3.5

Pre-Test

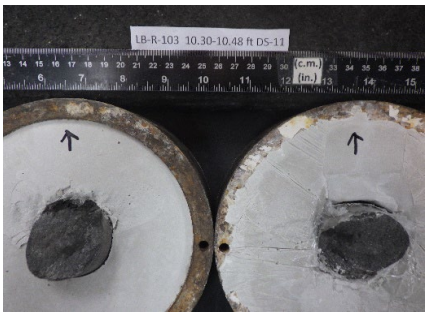


Post-Test

Point 2
Normal Stress, psi:
13.9



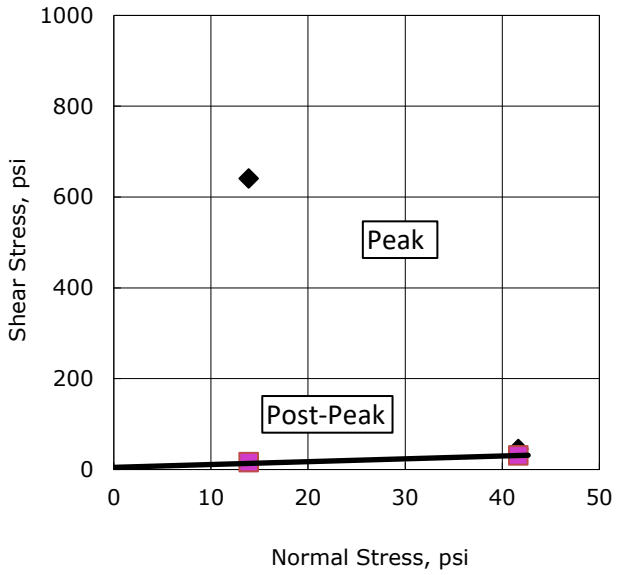
Pre-Test

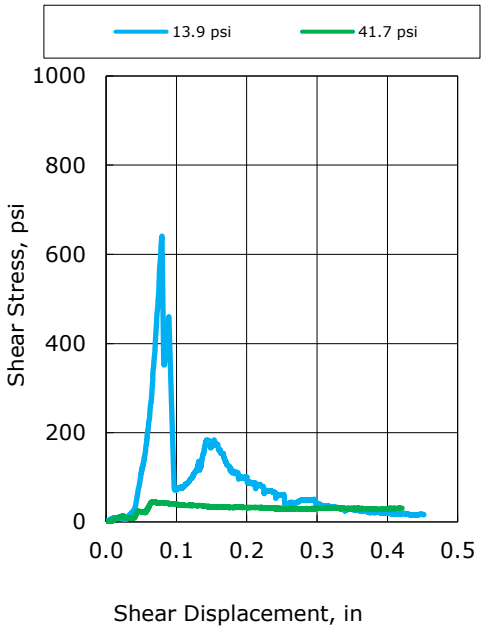


Post-Test

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	6/24/2025
End Date:	6/24/2025
Tested By:	tlm
Checked By:	jsc
Boring ID:	LB-R-111
Sample ID:	C-2
Depth, ft:	24.75-25.25
Visual Description:	Rock Core

Direct Shear Test of Rock by ASTM D5607

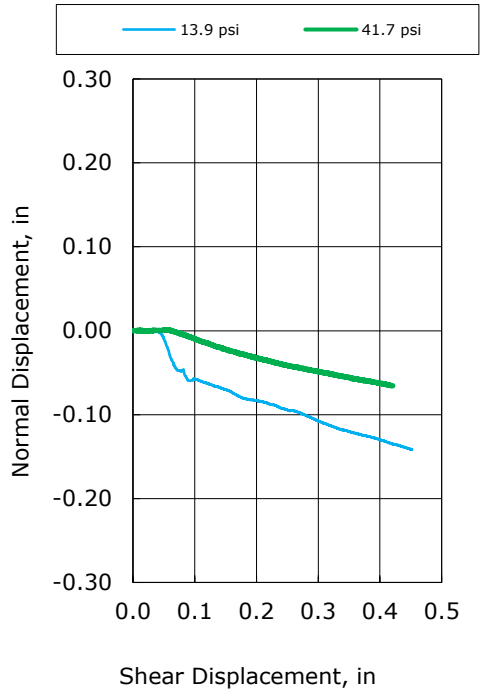




Test No.:	DS-12	DS-13	---
Specimen Diameter, in:	1.99	1.99	---
Specimen Length, in:	2.63	2.56	---
Specimen Mass, grams:	370	361	---
Specimen Area, in^2:	3.09	3.10	---
Specimen Bulk Density, pcf	174	173	---
Shear Plane Area, in^2	3.09	3.10	---
Normal Stress, psi:	13.9	41.7	---
Peak Shear Stress, psi:	641	45.2	---
Post Peak Shear Stress, psi:	16.4	31.0	---
Horiz. Displacement Rate, in/min:	0.005	0.005	---

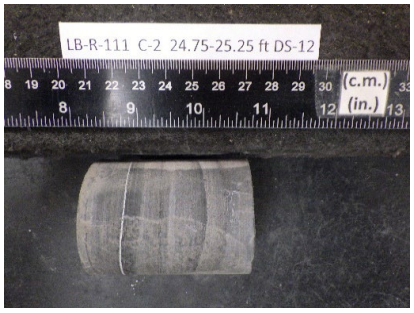
Peak Friction Angle:		**---**	
Peak Cohesive Intercept, psi:		**---**	
Post-Peak Friction Angle:		**27.7**	
Post-Peak Cohesive Intercept, psi:		**9.1**	
JRC Roughness	2-4	4-6	---

Notes: Specimen cut to length using diamond tipped saw blade.
Tested at as-received moisture content and density.
'Hydro-Stone Super X' encapsulating compound used to mount specimen in test rings.
Actual strength parameters may vary and should be determined by an engineer for site-specific conditions.

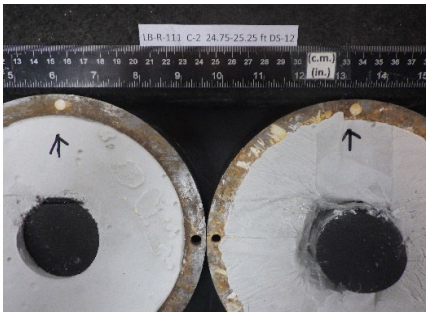


Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	6/24/2025
End Date:	6/24/2025
Tested By:	tlm
Checked By:	jsc
Boring ID:	LB-R-111
Sample ID:	C-2
Depth, ft:	24.75-25.25
Visual Description:	Rock Core

Point 1
Normal Stress, psi:
13.9



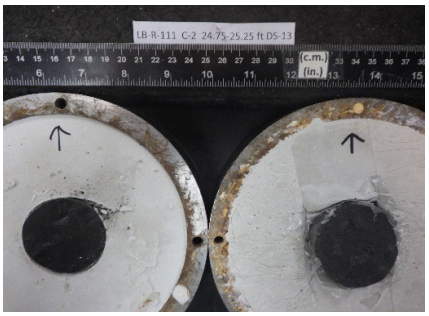
Pre-Test



Post-Test

Point 2
Normal Stress, psi:
41.7

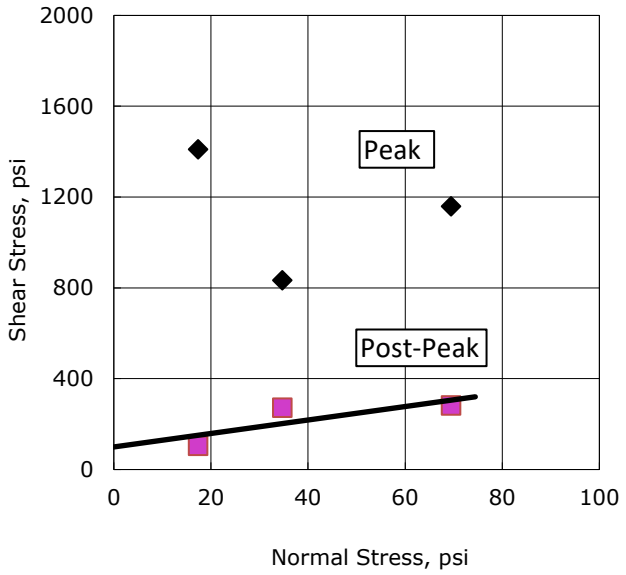
Pre-Test

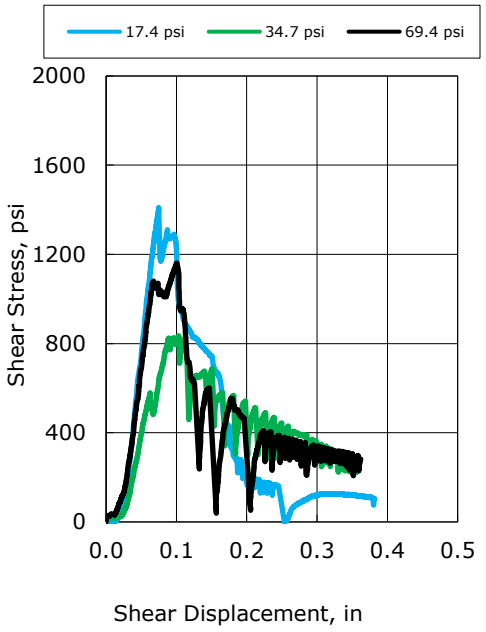


Post-Test

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	6/24/2025
End Date:	6/24/2025
Tested By:	tlm
Checked By:	jsc
Boring ID:	LB-R-115
Sample ID:	---
Depth, ft:	31.02-31.23
Visual Description:	Rock Core

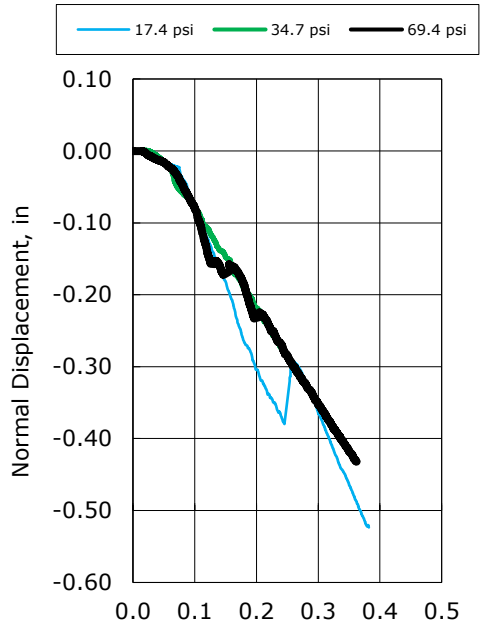
Direct Shear Test of Rock by ASTM D5607





Test No.:	DS-14	DS-15	DS-16
Specimen Diameter, in:	1.98	1.98	1.97
Specimen Length, in:	2.35	1.82	1.89
Specimen Mass, grams:	330	248	265
Specimen Area, in^2:	3.07	3.06	3.06
Specimen Bulk Density, pcf	174	169	174
Shear Plane Area, in^2	3.07	3.06	3.06
Normal Stress, psi:	17.4	34.7	69.4
Peak Shear Stress, psi:	1410	834	1160
Post Peak Shear Stress, psi:	104	273	282
Horiz. Displacement Rate, in/min:	0.005	0.005	0.005

Peak Friction Angle:		---	
Peak Cohesive Intercept, psi:		---	
Post-Peak Friction Angle:		**71.4**	
Post-Peak Cohesive Intercept, psi:		**100**	
JRC Roughness	6-8	6-8	6-8



Notes:

Specimen cut to length using diamond tipped saw blade.
Tested at as-received moisture content and density.
'Hydro-Stone Super X' encapsulating compound used to mount specimen in test rings.
Actual strength parameters may vary and should be determined by an engineer for site-specific conditions.

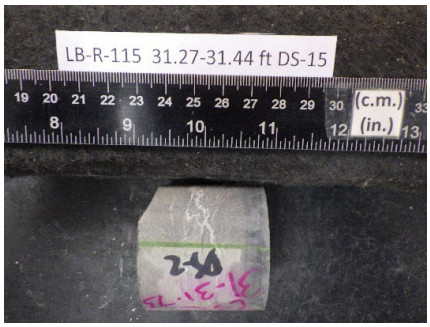
Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	6/24/2025
End Date:	6/24/2025
Tested By:	tlm
Checked By:	jsc
Boring ID:	LB-R-115
Sample ID:	---
Depth, ft:	31.02-31.23
Visual Description:	Rock Core

Point 1
Normal Stress, psi:
17.4

Pre-Test

Post-Test

Point 2
Normal Stress, psi:
34.7



Pre-Test

Post-Test

Point 3
Normal Stress, psi:
69.4

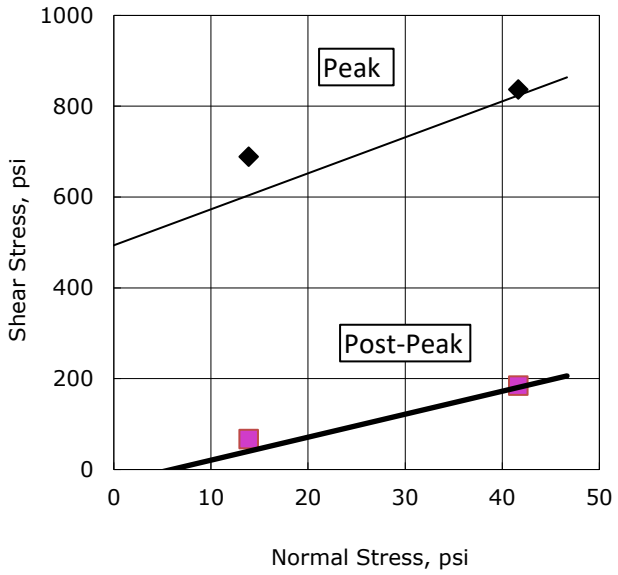
Pre-Test

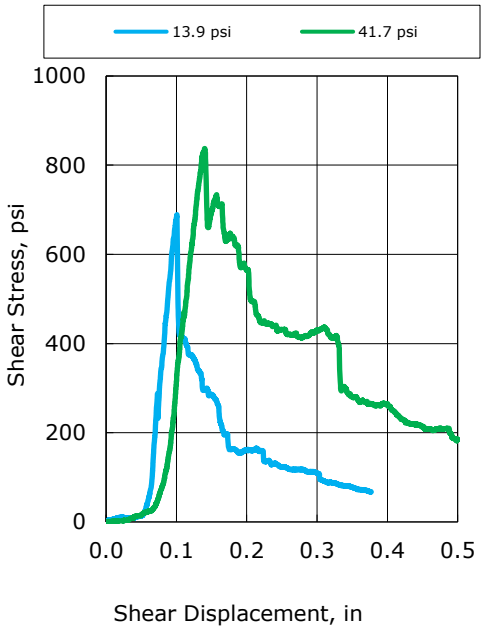
Post-Test

GeoTesting EXPRESS
A Sercel Business

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	6/24/2025
End Date:	6/24/2025
Tested By:	tlm
Checked By:	jsc
Boring ID:	LB-R-135
Sample ID:	---
Depth, ft:	23.51-23.66
Visual Description:	Rock Core

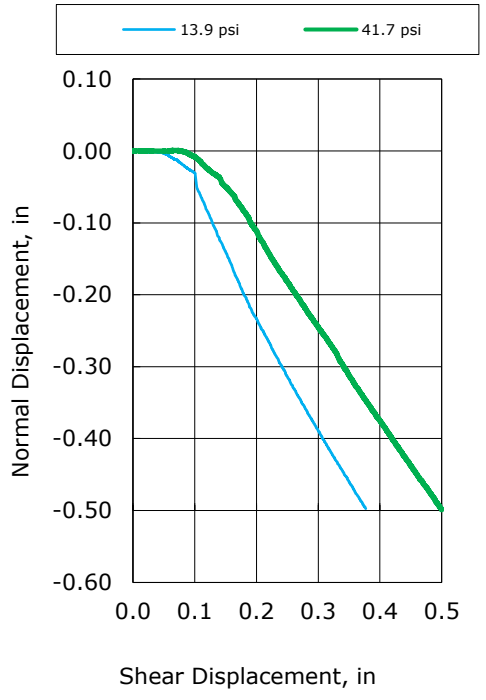
Direct Shear Test of Rock by ASTM D5607





Test No.:	DS-17	DS-18	---
Specimen Diameter, in:	1.99	1.99	---
Specimen Length, in:	1.84	2.12	---
Specimen Mass, grams:	259	297	---
Specimen Area, in^2:	3.11	3.11	---
Specimen Bulk Density, pcf	172	172	---
Shear Plane Area, in^2	3.11	3.11	---
Normal Stress, psi:	13.9	41.7	---
Peak Shear Stress, psi:	689	837	---
Post Peak Shear Stress, psi:	67.0	185	---
Horiz. Displacement Rate, in/min:	0.005	0.005	---

Peak Friction Angle:	**79.4**
Peak Cohesive Intercept, psi:	**615**
Post-Peak Friction Angle:	**76.8**
Post-Peak Cohesive Intercept, psi:	**8.0**
JRC Roughness	6-8 / 6-8 / ---

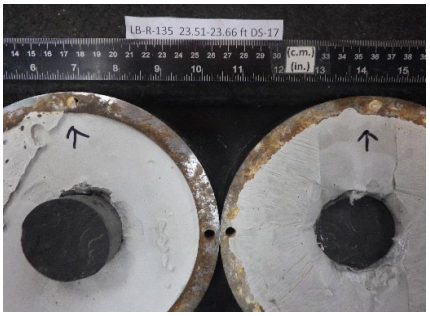


Notes:
Specimen cut to length using diamond tipped saw blade.
Tested at as-received moisture content and density.
'Hydro-Stone Super X' encapsulating compound used to mount specimen in test rings.
Actual strength parameters may vary and should be determined by an engineer for site-specific conditions.

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	6/24/2025
End Date:	6/24/2025
Tested By:	tlm
Checked By:	jsc
Boring ID:	LB-R-135
Sample ID:	---
Depth, ft:	23.51-23.66
Visual Description:	Rock Core

Point 1
Normal Stress, psi:
13.9

Pre-Test



Post-Test

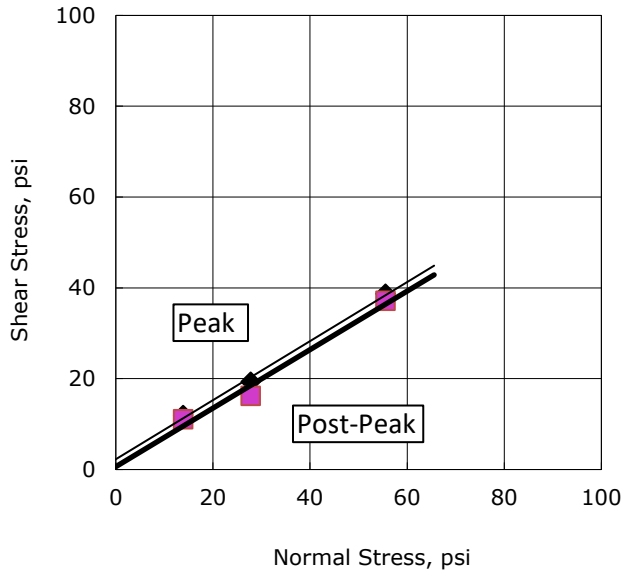
Point 2
Normal Stress, psi:
41.7

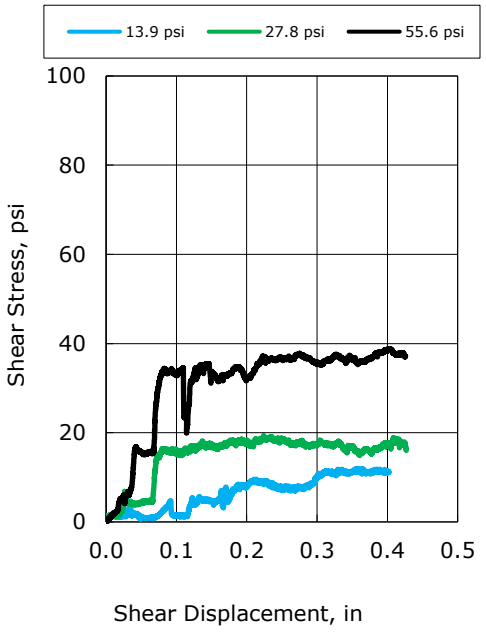
Pre-Test

Post-Test

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	6/12/2025
End Date:	6/12/2025
Tested By:	tlm
Checked By:	jsc
Boring ID:	LB-R-066
Sample ID:	C-2
Depth, ft:	28.02-28.28
Visual Description:	Rock core with saw cut joint

Sliding Friction Test of Rock by ASTM D5607



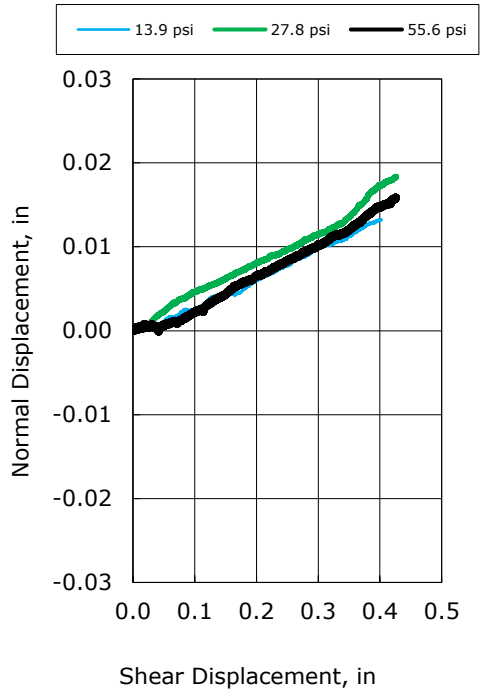


Test No.:	SF-1	SF-2	SF-3
Specimen Diameter, in:	1.99	1.99	1.99
Specimen Length, in:	2.86	2.86	2.86
Specimen Mass, grams:	401	401	401
Specimen Area, in^2:	3.10	3.10	3.10
Specimen Bulk Density, pcf	173	173	173
Shear Plane Area, in^2	3.21	3.21	3.21
Normal Stress, psi:	13.9	27.8	55.6
Peak Shear Stress, psi:	12.0	19.3	38.7
Post Peak Shear Stress, psi:	11.1	16.2	37.2
Horiz. Displacement Rate, in/min:	0.005	0.005	0.005

Peak Friction Angle:	**33.0**
Peak Cohesive Intercept, psi:	**2.3**
Post-Peak Friction Angle:	**32.8**
Post-Peak Cohesive Intercept, psi:	**0.6**

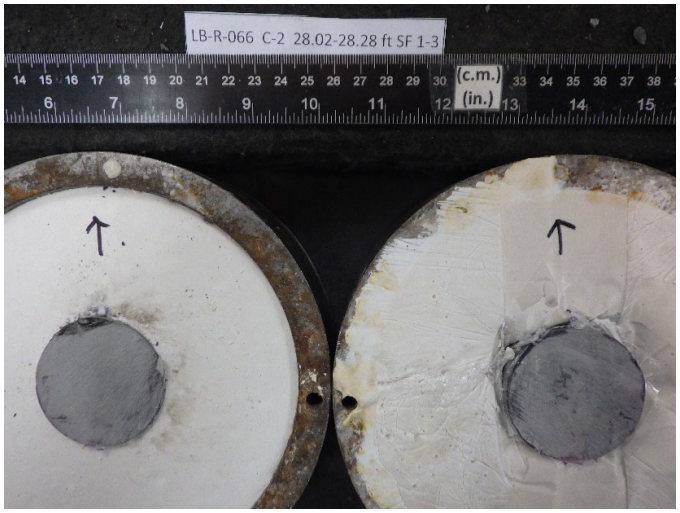
JRC Roughness	0-2	0-2	0-2

Notes: Specimen cut to length using diamond tipped saw blade.
Tested at as-received moisture content and density.
'Hydro-Stone Super X' encapsulating compound used to mount specimen in test rings.
Actual strength parameters may vary and should be determined by an engineer for site-specific conditions.



Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	6/12/2025
End Date:	6/12/2025
Tested By:	tlm
Checked By:	jsc
Boring ID:	LB-R-066
Sample ID:	C-2
Depth, ft:	28.02-28.28
Visual Description:	Rock core with saw cut joint

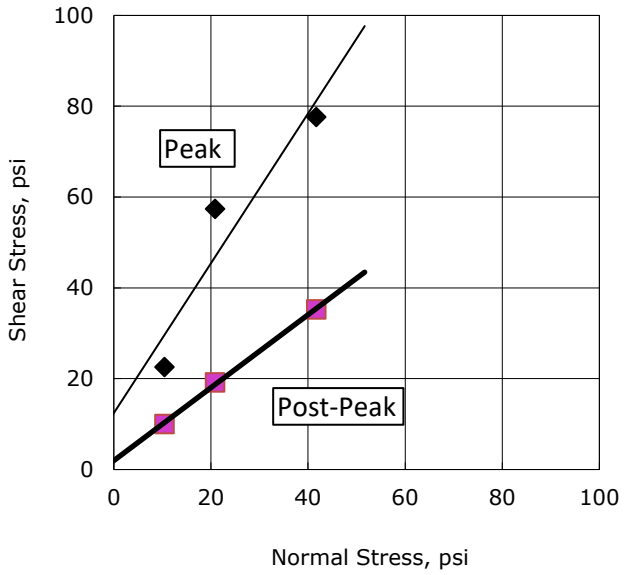
Pre-Test

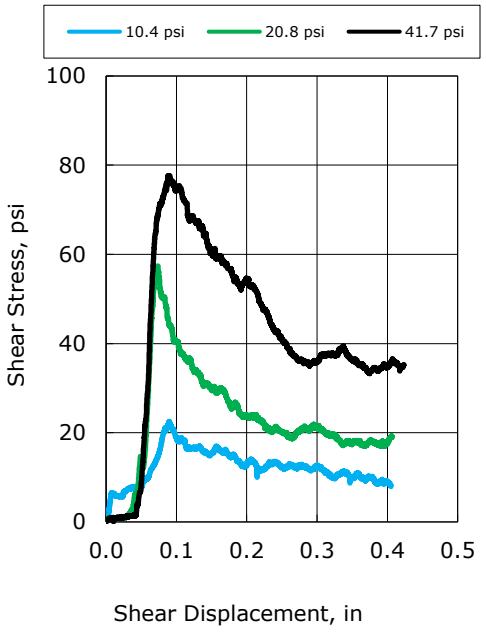


Post-Test

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	6/13/2025
End Date:	6/13/2025
Tested By:	tlm
Checked By:	jsc
Boring ID:	LB-R-068
Sample ID:	C-1
Depth, ft:	25-25.25
Visual Description:	Rock core with open joint

Sliding Friction Test of Rock by ASTM D5607



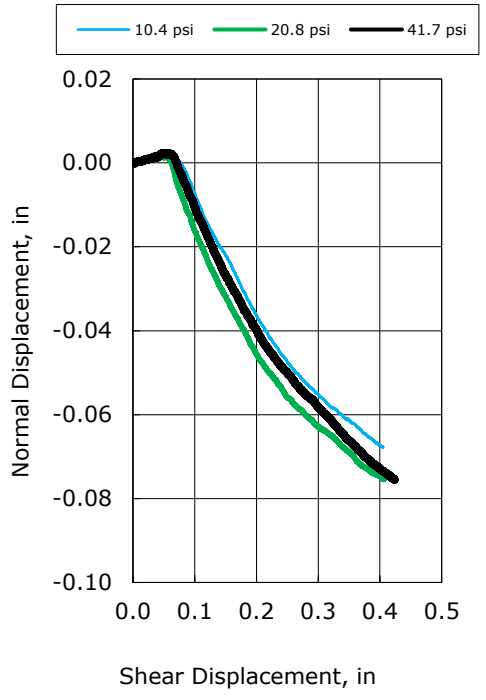


Test No.:	SF-4	SF-5	SF-6
Specimen Diameter, in:	1.97	1.97	1.97
Specimen Length, in:	2.84	2.84	2.84
Specimen Mass, grams:	392	392	392
Specimen Area, in^2:	3.03	3.03	3.03
Specimen Bulk Density, pcf	173	173	173
Shear Plane Area, in^2	5.39	5.39	5.39
Normal Stress, psi:	10.4	20.8	41.7
Peak Shear Stress, psi:	22.6	57.4	77.6
Post Peak Shear Stress, psi:	10.01	19.2	35.3
Horiz. Displacement Rate, in/min:	0.005	0.005	0.005

Peak Friction Angle:	**58.8**
Peak Cohesive Intercept, psi:	**12**
Post-Peak Friction Angle:	**38.8**
Post-Peak Cohesive Intercept, psi:	**2.0**

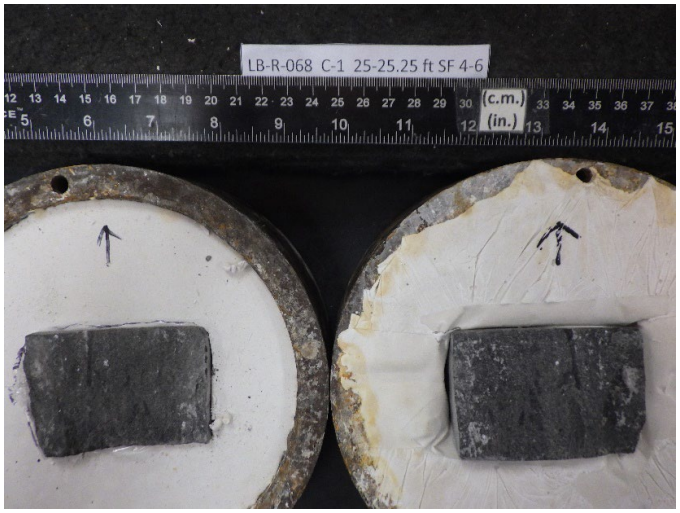
JRC Roughness	6-8	6-8	6-8

Notes: Specimen cut to length using diamond tipped saw blade.
Tested at as-received moisture content and density.
'Hydro-Stone Super X' encapsulating compound used to mount specimen in test rings.
Actual strength parameters may vary and should be determined by an engineer for site-specific conditions.



Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	6/13/2025
End Date:	6/13/2025
Tested By:	tlm
Checked By:	jsc
Boring ID:	LB-R-068
Sample ID:	C-1
Depth, ft:	25-25.25
Visual Description:	Rock core with open joint

Pre-Test

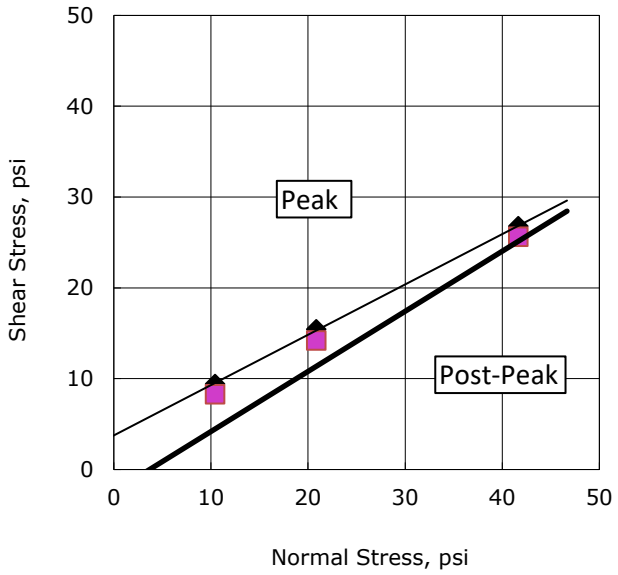


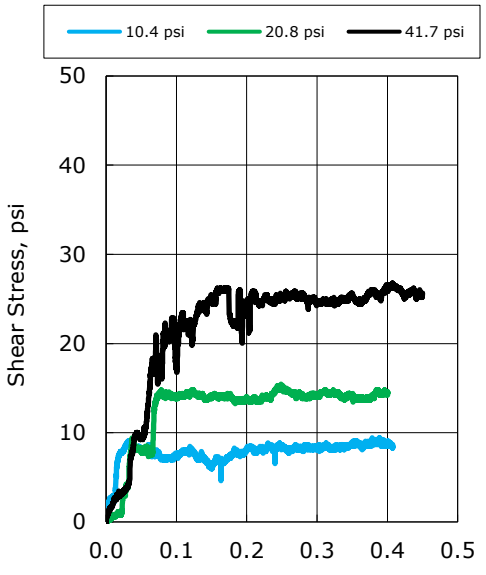
Post-Test

GeoTesting EXPRESS
A Sercel Business

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	6/12/2025
End Date:	6/12/2025
Tested By:	tlm
Checked By:	jsc
Boring ID:	LB-R-070
Sample ID:	C-1
Depth, ft:	34.53-34.78
Visual Description:	Rock core with saw cut joint

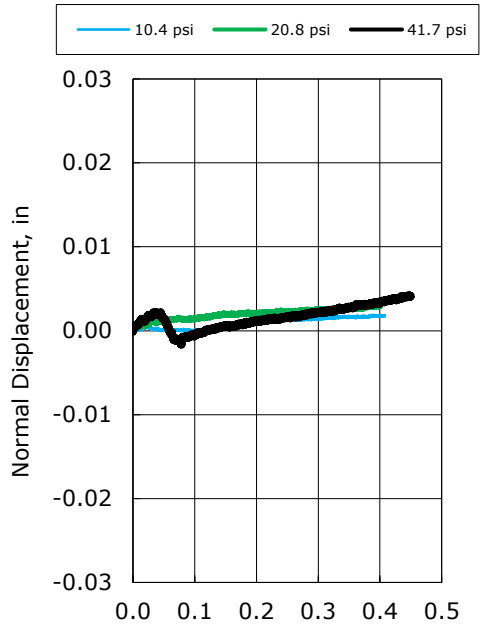
Sliding Friction Test of Rock by ASTM D5607





Test No.:	SF-7	SF-8	SF-9
Specimen Diameter, in:	1.97	1.97	1.97
Specimen Length, in:	2.70	2.70	2.70
Specimen Mass, grams:	370	370	370
Specimen Area, in^2:	3.05	3.05	3.05
Specimen Bulk Density, pcf	172	172	172
Shear Plane Area, in^2	3.19	3.19	3.19
Normal Stress, psi:	10.4	20.8	41.7
Peak Shear Stress, psi:	9.43	15.4	26.8
Post Peak Shear Stress, psi:	8.28	14.2	25.7
Horiz. Displacement Rate, in/min:	0.005	0.005	0.005

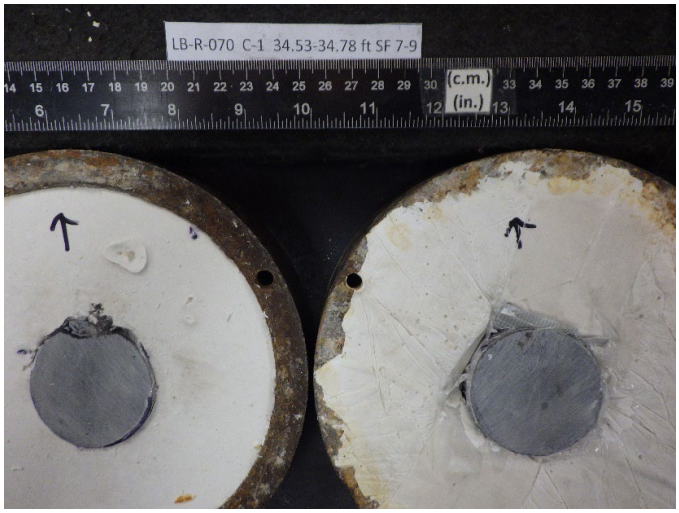
Peak Friction Angle:	**29.0**
Peak Cohesive Intercept, psi:	**3.8**
Post-Peak Friction Angle:	**29.0**
Post-Peak Cohesive Intercept, psi:	**2.6**
JRC Roughness	0-2 / 0-2 / 0-2



Notes:
Specimen cut to length using diamond tipped saw blade.
Tested at as-received moisture content and density.
'Hydro-Stone Super X' encapsulating compound used to mount specimen in test rings.
Actual strength parameters may vary and should be determined by an engineer for site-specific conditions.

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	6/12/2025
End Date:	6/12/2025
Tested By:	tlm
Checked By:	jsc
Boring ID:	LB-R-070
Sample ID:	C-1
Depth, ft:	34.53-34.78
Visual Description:	Rock core with saw cut joint

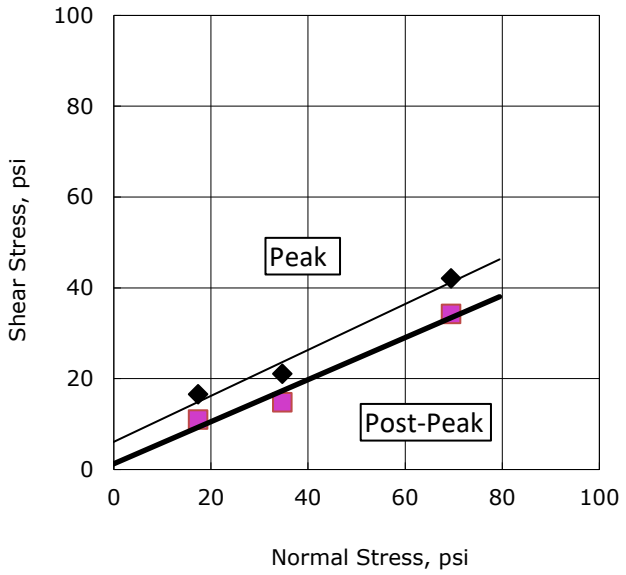
Pre-Test

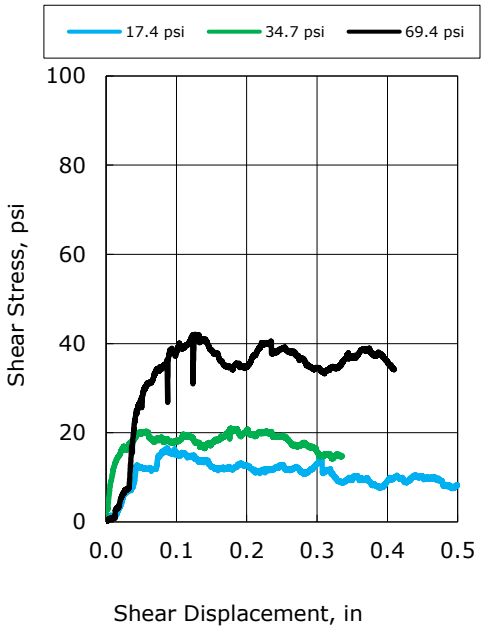


Post-Test

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	6/12/2025
End Date:	6/13/2025
Tested By:	tlm
Checked By:	jsc
Boring ID:	LB-R-102
Sample ID:	C-2
Depth, ft:	32.10-32.36
Visual Description:	Rock core with open joint

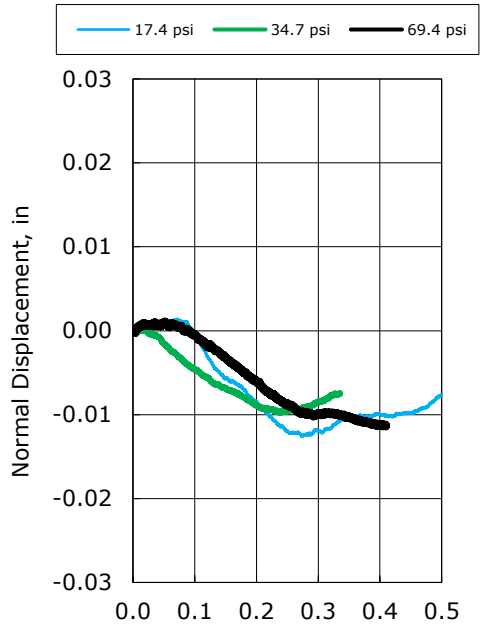
Sliding Friction Test of Rock by ASTM D5607





Test No.:	SF-10	SF-11	SF-12
Specimen Diameter, in:	1.98	1.98	1.98
Specimen Length, in:	2.95	2.95	2.95
Specimen Mass, grams:	412	412	412
Specimen Area, in^2:	3.07	3.07	3.07
Specimen Bulk Density, pcf	174	174	174
Shear Plane Area, in^2	3.77	3.77	3.77
Normal Stress, psi:	17.4	34.7	69.4
Peak Shear Stress, psi:	16.6	21.1	42.1
Post Peak Shear Stress, psi:	11.0	14.8	34.3
Horiz. Displacement Rate, in/min:	0.005	0.005	0.005

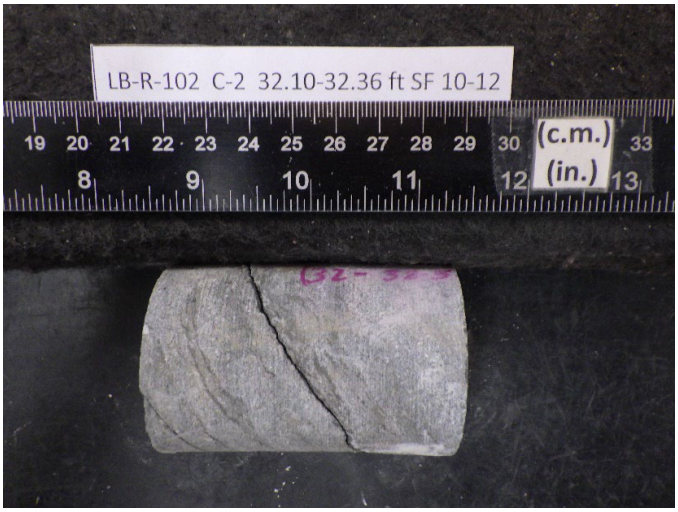
Peak Friction Angle:	**26.8**		
Peak Cohesive Intercept, psi:	**6.1**		
Post-Peak Friction Angle:	**24.8**		
Post-Peak Cohesive Intercept, psi:	**1.3**		
JRC Roughness	6-8	6-8	6-8



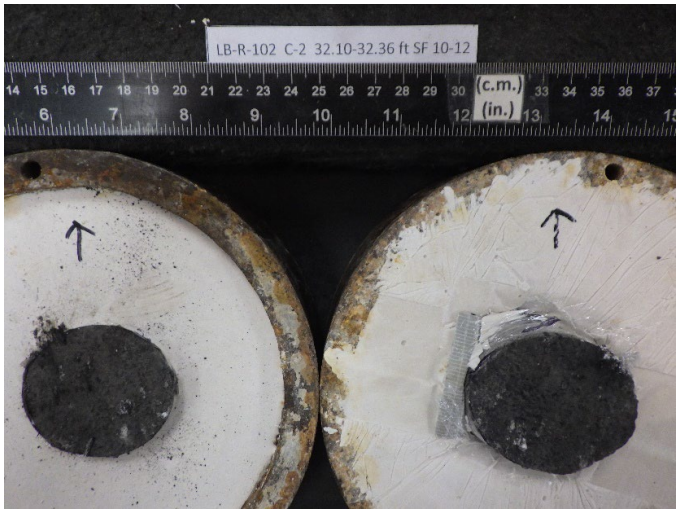
Notes:

Specimen cut to length using diamond tipped saw blade.
Tested at as-received moisture content and density.
'Hydro-Stone Super X' encapsulating compound used to mount specimen in test rings.
Actual strength parameters may vary and should be determined by an engineer for site-specific conditions.

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	6/12/2025
End Date:	6/13/2025
Tested By:	tlm
Checked By:	jsc
Boring ID:	LB-R-102
Sample ID:	C-2
Depth, ft:	32.10-32.36
Visual Description:	Rock core with open joint



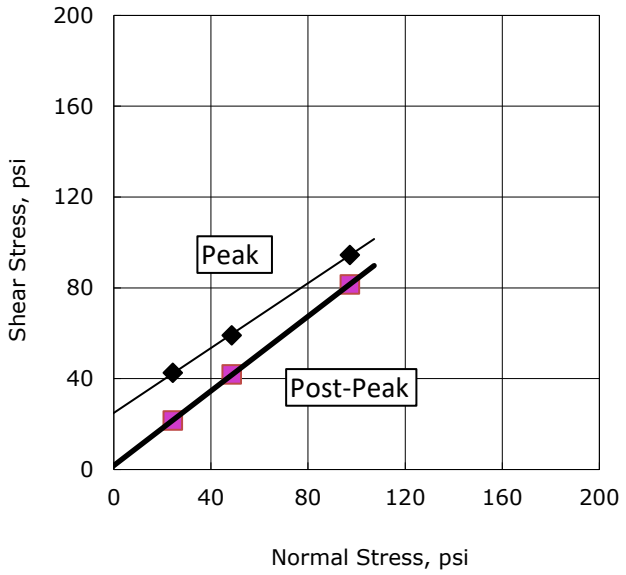
Pre-Test

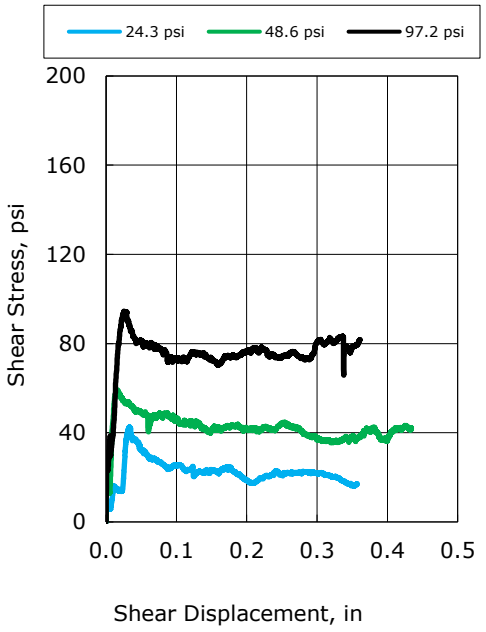


Post-Test

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	6/13/2025
End Date:	6/16/2025
Tested By:	tlm
Checked By:	jsc
Boring ID:	LB-R-105
Sample ID:	---
Depth, ft:	45-46
Visual Description:	Rock core with open joint

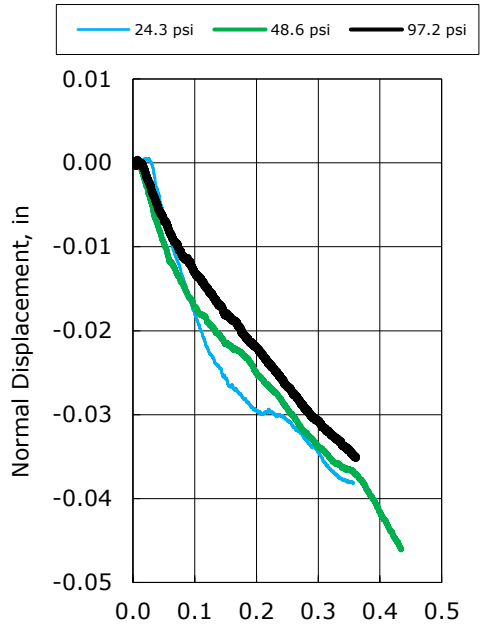
Sliding Friction Test of Rock by ASTM D5607





Test No.:	SF-13	SF-14	SF-15
Specimen Diameter, in:	1.98	1.98	1.98
Specimen Length, in:	2.87	2.87	2.88
Specimen Mass, grams:	407	407	407
Specimen Area, in^2:	3.08	3.08	3.08
Specimen Bulk Density, pcf	175	175	175
Shear Plane Area, in^2	3.22	3.22	3.22
Normal Stress, psi:	24.3	48.6	97.2
Peak Shear Stress, psi:	42.6	59.2	94.5
Post Peak Shear Stress, psi:	21.6	41.9	81.5
Horiz. Displacement Rate, in/min:	0.005	0.005	0.005

Peak Friction Angle:	**35.5**		
Peak Cohesive Intercept, psi:	**25**		
Post-Peak Friction Angle:	**39.4**		
Post-Peak Cohesive Intercept, psi:	**1.8**		
JRC Roughness	6-8	6-8	6-8

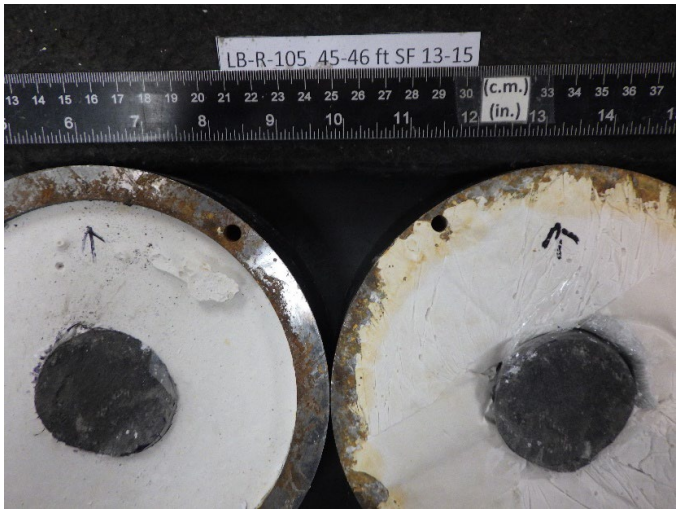


Notes:

Specimen cut to length using diamond tipped saw blade.
Tested at as-received moisture content and density.
'Hydro-Stone Super X' encapsulating compound used to mount specimen in test rings.
Actual strength parameters may vary and should be determined by an engineer for site-specific conditions.

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	6/13/2025
End Date:	6/16/2025
Tested By:	tlm
Checked By:	jsc
Boring ID:	LB-R-105
Sample ID:	---
Depth, ft:	45-46
Visual Description:	Rock core with open joint

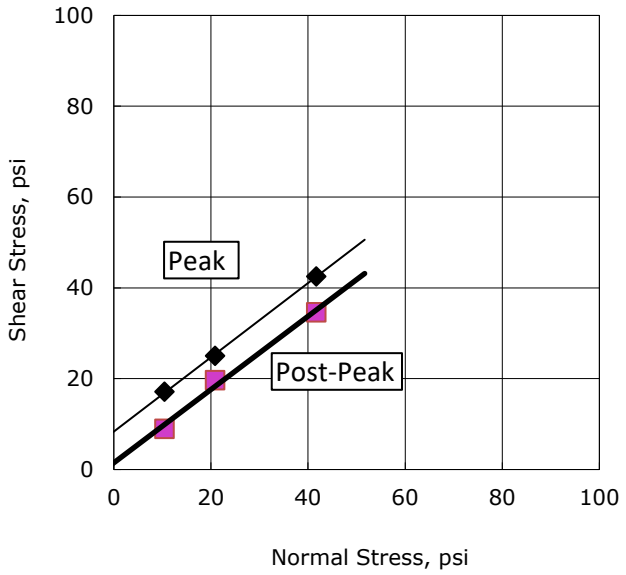
Pre-Test

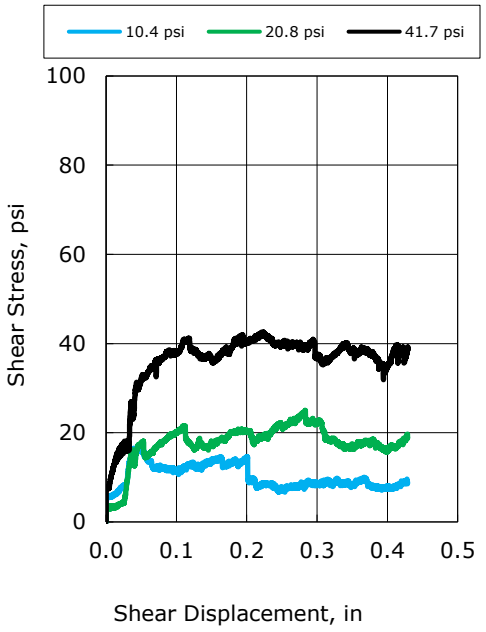


Post-Test

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	6/16/2025
End Date:	6/16/2025
Tested By:	tlm
Checked By:	jsc
Boring ID:	LB-R-107
Sample ID:	---
Depth, ft:	36-37
Visual Description:	Rock core with open joint

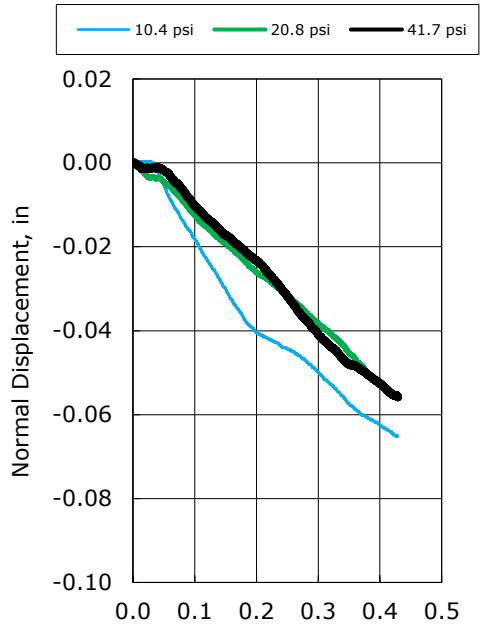
Sliding Friction Test of Rock by ASTM D5607





Test No.:	SF-16	SF-17	SF-18
Specimen Diameter, in:	1.97	1.97	1.97
Specimen Length, in:	3.01	3.01	3.01
Specimen Mass, grams:	421	421	421
Specimen Area, in^2:	3.05	3.05	3.05
Specimen Bulk Density, pcf	175	175	175
Shear Plane Area, in^2	3.01	3.01	3.01
Normal Stress, psi:	10.4	20.8	41.7
Peak Shear Stress, psi:	17.1	25.0	42.6
Post Peak Shear Stress, psi:	8.98	19.7	34.7
Horiz. Displacement Rate, in/min:	0.005	0.005	0.005

Peak Friction Angle:	**39.3**		
Peak Cohesive Intercept, psi:	**8.4**		
Post-Peak Friction Angle:	**38.9**		
Post-Peak Cohesive Intercept, psi:	**1.5**		
JRC Roughness	10-12	10-12	10-12

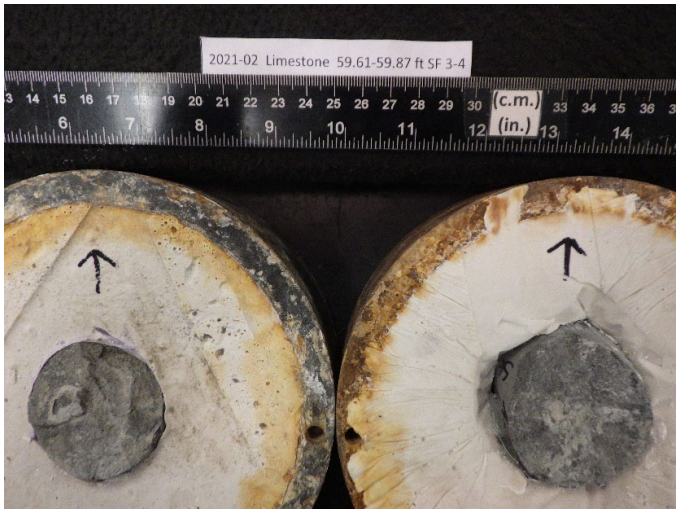


Notes:

Specimen cut to length using diamond tipped saw blade.
Tested at as-received moisture content and density.
'Hydro-Stone Super X' encapsulating compound used to mount specimen in test rings.
Actual strength parameters may vary and should be determined by an engineer for site-specific conditions.

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	6/16/2025
End Date:	6/16/2025
Tested By:	tlm
Checked By:	jsc
Boring ID:	LB-R-107
Sample ID:	---
Depth, ft:	36-37
Visual Description:	Rock core with open joint

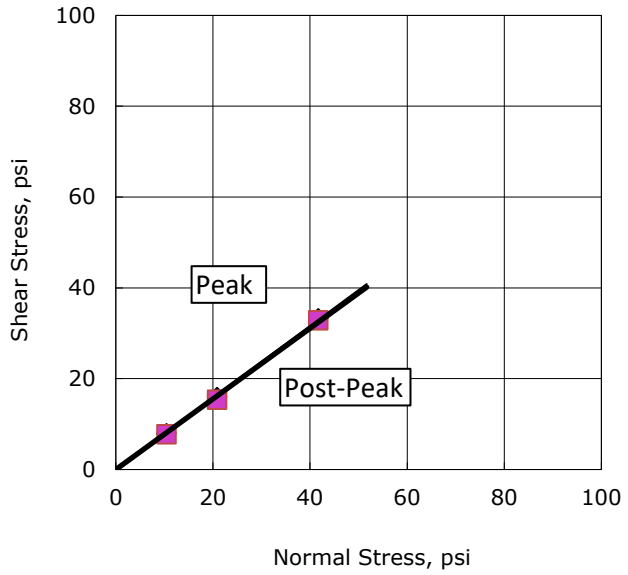
Pre-Test

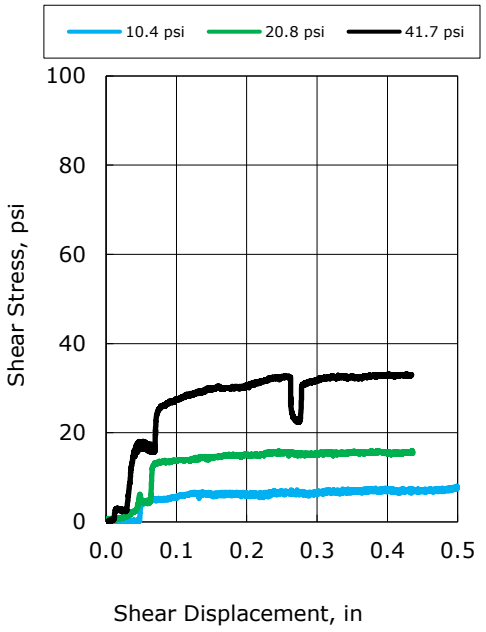


Post-Test

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	6/16/2025
End Date:	6/17/2025
Tested By:	tlm
Checked By:	jsc
Boring ID:	LB-R-115
Sample ID:	C-1
Depth, ft:	24.5-25
Visual Description:	Rock core with saw cut joint

Sliding Friction Test of Rock by ASTM D5607



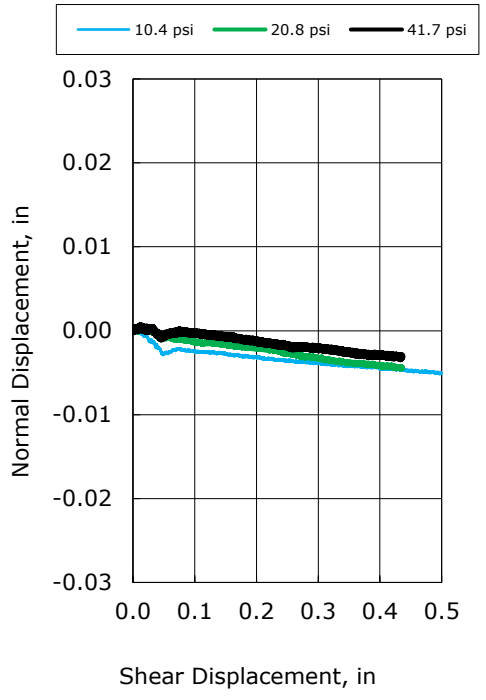


Test No.:	SF-19	SF-20	SF-21
Specimen Diameter, in:	1.98	1.98	1.98
Specimen Length, in:	2.82	2.82	2.81
Specimen Mass, grams:	392	392	392
Specimen Area, in^2:	3.06	3.06	3.06
Specimen Bulk Density, pcf	173	173	173
Shear Plane Area, in^2	3.22	3.22	3.22
Normal Stress, psi:	10.4	20.8	41.7
Peak Shear Stress, psi:	7.98	16.0	33.3
Post Peak Shear Stress, psi:	7.78	15.4	32.9
Horiz. Displacement Rate, in/min:	0.005	0.005	0.005

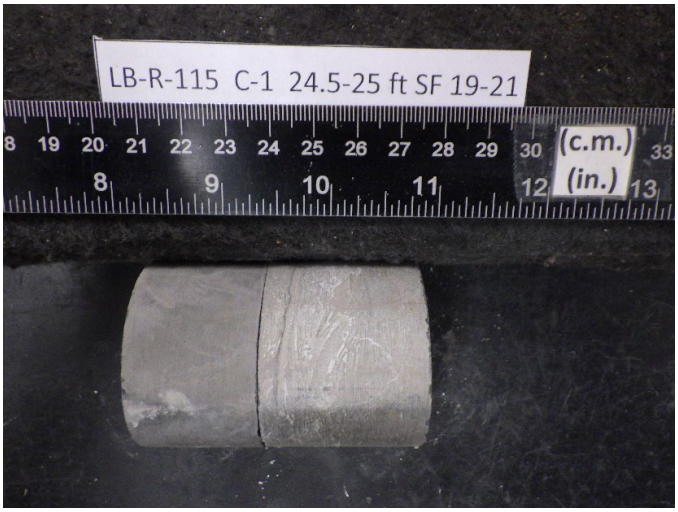
Peak Friction Angle:	**38.3**
Peak Cohesive Intercept, psi:	**0**
Post-Peak Friction Angle:	**37.9**
Post-Peak Cohesive Intercept, psi:	**0**
JRC Roughness	0-2 / 0-2 / 0-2

<u>Notes:</u>

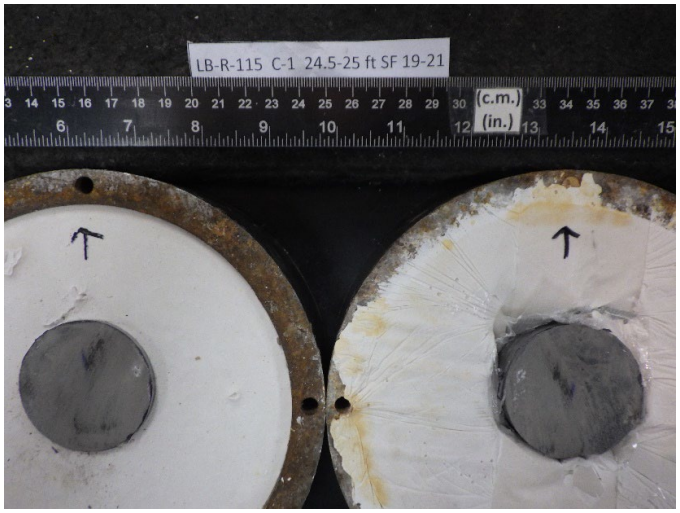
Specimen cut to length using diamond tipped saw blade.
Tested at as-received moisture content and density.
'Hydro-Stone Super X' encapsulating compound used to mount specimen in test rings.
Actual strength parameters may vary and should be determined by an engineer for site-specific conditions.



Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	6/16/2025
End Date:	6/17/2025
Tested By:	tlm
Checked By:	jsc
Boring ID:	LB-R-115
Sample ID:	C-1
Depth, ft:	24.5-25
Visual Description:	Rock core with saw cut joint



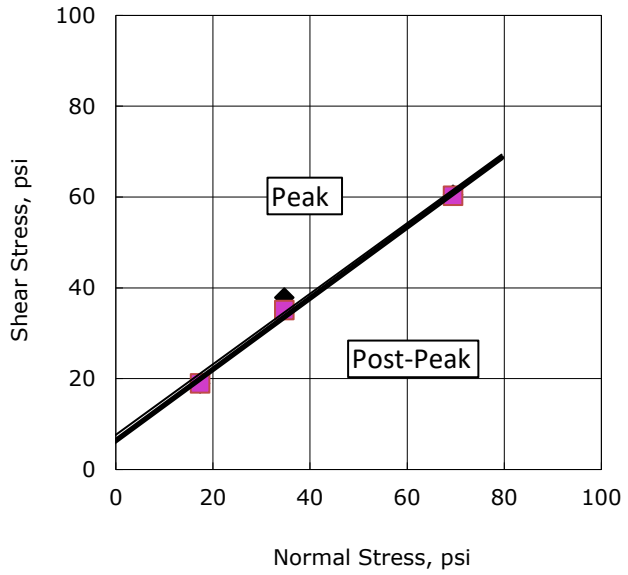
Pre-Test

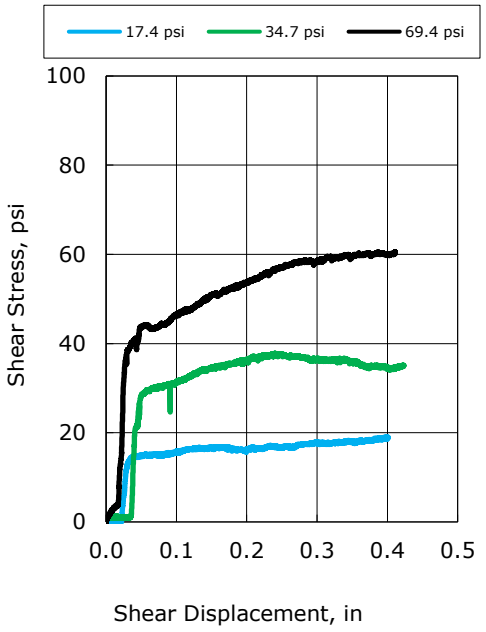


Post-Test

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	6/17/2025
End Date:	6/17/2025
Tested By:	tlm
Checked By:	jsc
Boring ID:	LB-R-116
Sample ID:	C-1
Depth, ft:	35-35.5
Visual Description:	Rock core with saw cut joint

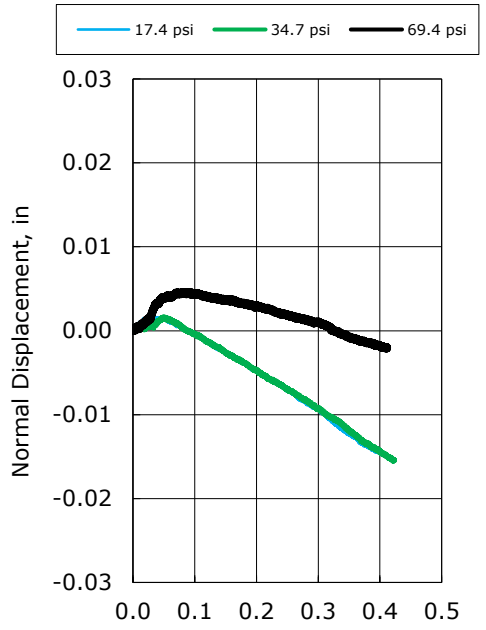
Sliding Friction Test of Rock by ASTM D5607





Test No.:	SF-22	SF-23	SF-24
Specimen Diameter, in:	1.97	1.97	1.97
Specimen Length, in:	2.81	2.81	2.82
Specimen Mass, grams:	380	380	380
Specimen Area, in^2:	3.03	3.03	3.03
Specimen Bulk Density, pcf	170	170	170
Shear Plane Area, in^2	3.21	3.21	3.21
Normal Stress, psi:	17.4	34.7	69.4
Peak Shear Stress, psi:	19.0	37.9	60.5
Post Peak Shear Stress, psi:	19.0	35.1	60.3
Horiz. Displacement Rate, in/min:	0.005	0.005	0.005

Peak Friction Angle:	**37.8**
Peak Cohesive Intercept, psi:	**7.6**
Post-Peak Friction Angle:	**38.1**
Post-Peak Cohesive Intercept, psi:	**6.4**
JRC Roughness	0-2 / 0-2 / 0-2

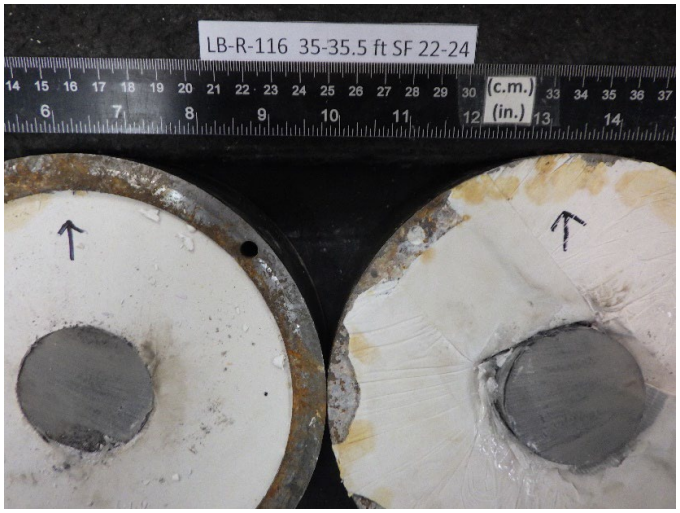


Notes:

Specimen cut to length using diamond tipped saw blade.
Tested at as-received moisture content and density.
'Hydro-Stone Super X' encapsulating compound used to mount specimen in test rings.
Actual strength parameters may vary and should be determined by an engineer for site-specific conditions.

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	6/17/2025
End Date:	6/17/2025
Tested By:	tlm
Checked By:	jsc
Boring ID:	LB-R-116
Sample ID:	C-1
Depth, ft:	35-35.5
Visual Description:	Rock core with saw cut joint

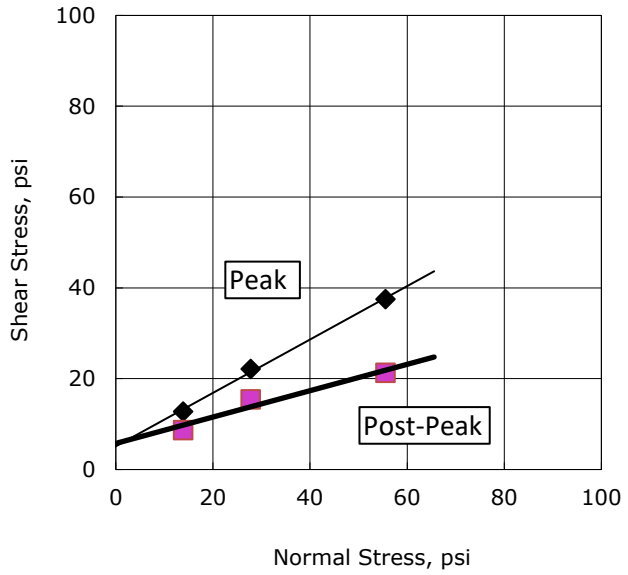
Pre-Test

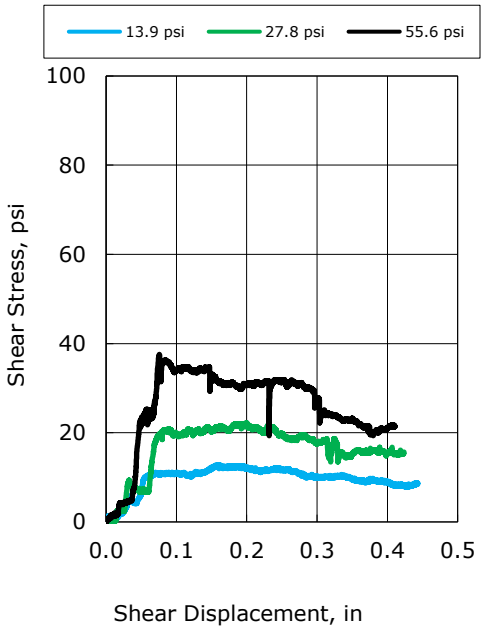


Post-Test

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	6/17/2025
End Date:	6/18/2025
Tested By:	tlm
Checked By:	jsc
Boring ID:	LB-R-125
Sample ID:	C-2
Depth, ft:	17.5-18
Visual Description:	Rock core with saw cut joint

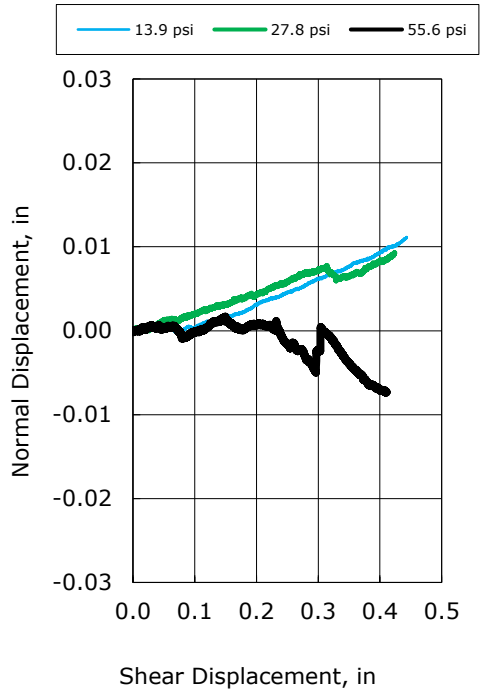
Sliding Friction Test of Rock by ASTM D5607





Test No.:	SF-25	SF-26	SF-27
Specimen Diameter, in:	1.98	1.98	1.98
Specimen Length, in:	2.68	2.68	2.68
Specimen Mass, grams:	377	377	377
Specimen Area, in^2:	3.08	3.08	3.08
Specimen Bulk Density, pcf	174	174	174
Shear Plane Area, in^2	2.89	2.89	2.89
Normal Stress, psi:	13.9	27.8	55.6
Peak Shear Stress, psi:	12.8	22.2	37.5
Post Peak Shear Stress, psi:	8.69	15.5	21.3
Horiz. Displacement Rate, in/min:	0.005	0.005	0.005

Peak Friction Angle:	**30.5**		
Peak Cohesive Intercept, psi:	**5.1**		
Post-Peak Friction Angle:	**16.2**		
Post-Peak Cohesive Intercept, psi:	**5.8**		
JRC Roughness	0-2	0-2	0-2



Notes:
Specimen cut to length using diamond tipped saw blade.
Tested at as-received moisture content and density.
'Hydro-Stone Super X' encapsulating compound used to mount specimen in test rings.
Actual strength parameters may vary and should be determined by an engineer for site-specific conditions.

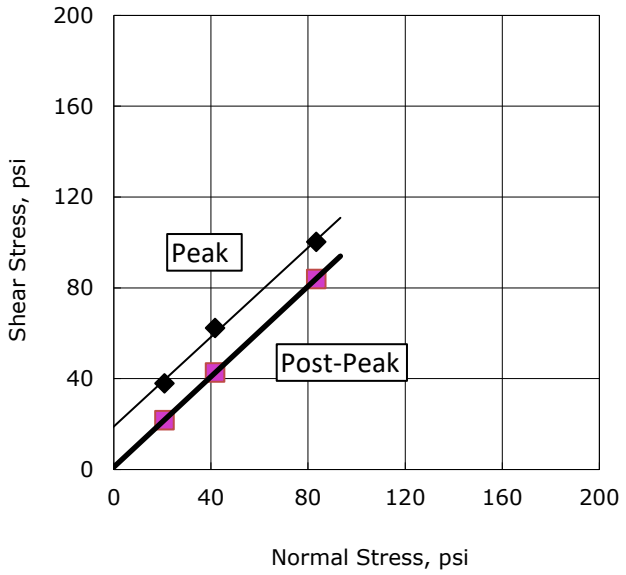
Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	6/17/2025
End Date:	6/18/2025
Tested By:	tlm
Checked By:	jsc
Boring ID:	LB-R-125
Sample ID:	C-2
Depth, ft:	17.5-18
Visual Description:	Rock core with saw cut joint

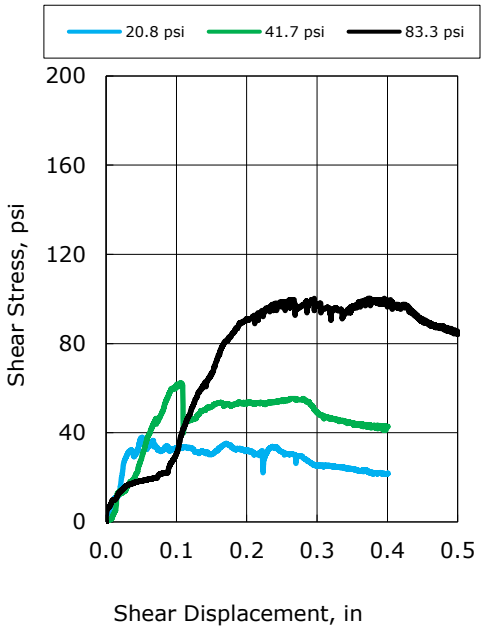
Pre-Test

Post-Test

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	6/18/2025
End Date:	6/18/2025
Tested By:	tlm
Checked By:	jsc
Boring ID:	LB-R-128
Sample ID:	---
Depth, ft:	38.08-38.39
Visual Description:	Rock core with open joint

Sliding Friction Test of Rock by ASTM D5607

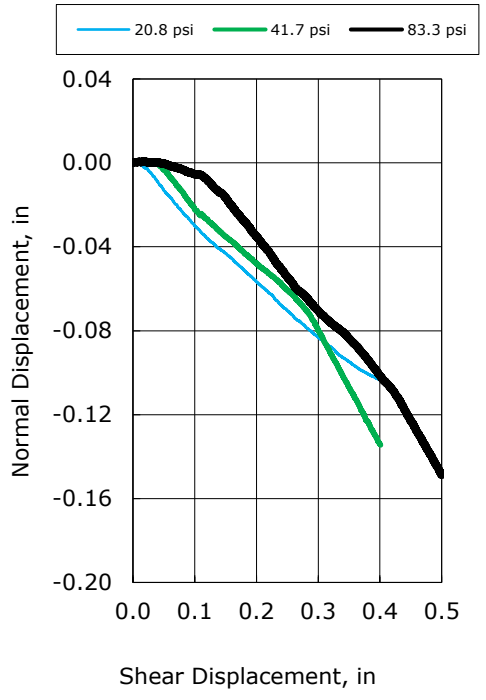




Test No.:	SF-28	SF-29	SF-30
Specimen Diameter, in:	1.98	1.98	1.98
Specimen Length, in:	3.66	3.66	3.66
Specimen Mass, grams:	497	497	497
Specimen Area, in^2:	3.08	3.08	3.08
Specimen Bulk Density, pcf	168	168	168
Shear Plane Area, in^2	5.69	5.69	5.69
Normal Stress, psi:	20.8	41.7	83.3
Peak Shear Stress, psi:	37.9	62.3	100
Post Peak Shear Stress, psi:	21.7	42.7	84.0
Horiz. Displacement Rate, in/min:	0.005	0.005	0.005

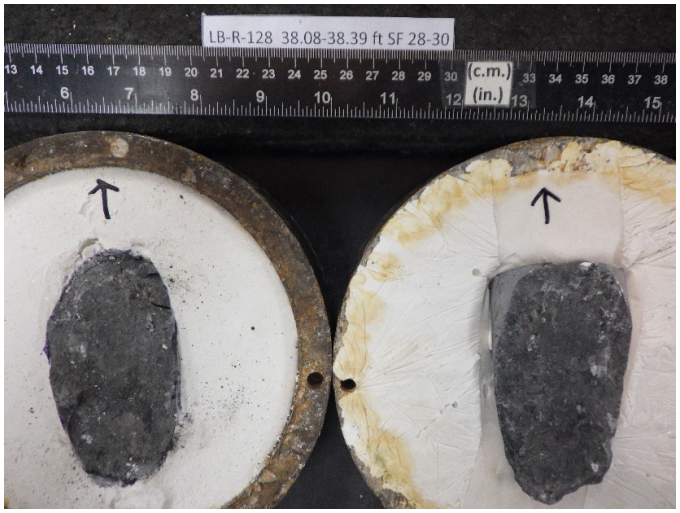
Peak Friction Angle:	**44.6**		
Peak Cohesive Intercept, psi:	**19**		
Post-Peak Friction Angle:	**44.9**		
Post-Peak Cohesive Intercept, psi:	**1.1**		
JRC Roughness	14-16	14-16	14-16

Notes: Specimen cut to length using diamond tipped saw blade.
Tested at as-received moisture content and density.
'Hydro-Stone Super X' encapsulating compound used to mount specimen in test rings.
Actual strength parameters may vary and should be determined by an engineer for site-specific conditions.



Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	6/18/2025
End Date:	6/18/2025
Tested By:	tlm
Checked By:	jsc
Boring ID:	LB-R-128
Sample ID:	---
Depth, ft:	38.08-38.39
Visual Description:	Rock core with open joint

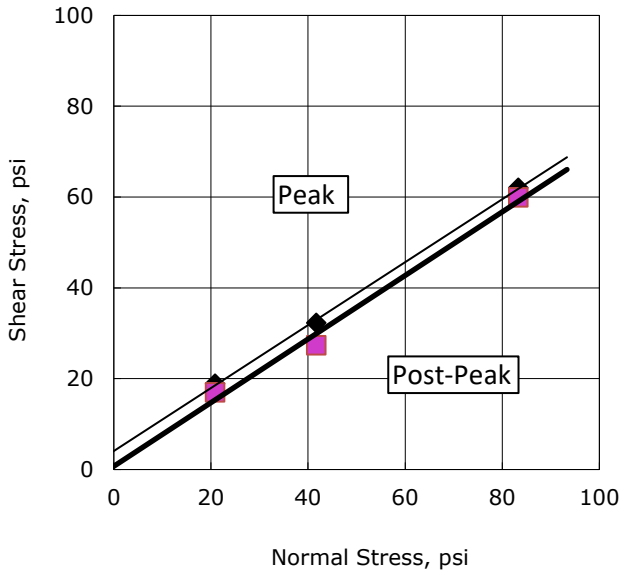
Pre-Test

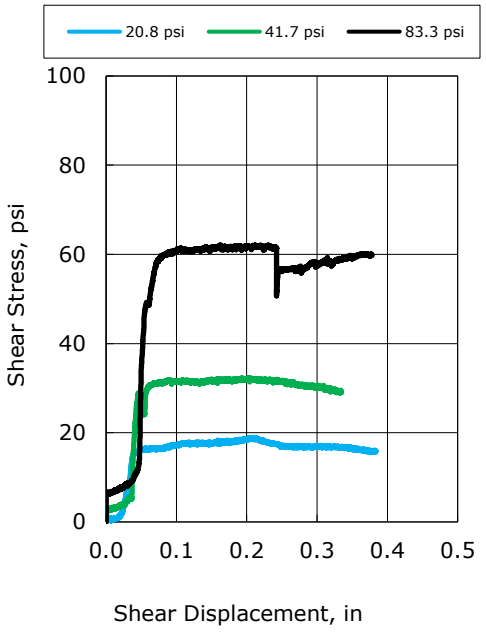


Post-Test

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	6/19/2025
End Date:	6/19/2025
Tested By:	tlm
Checked By:	jsc
Boring ID:	LB-R-129
Sample ID:	C-2
Depth, ft:	36.5-37
Visual Description:	Rock core with saw cut joint

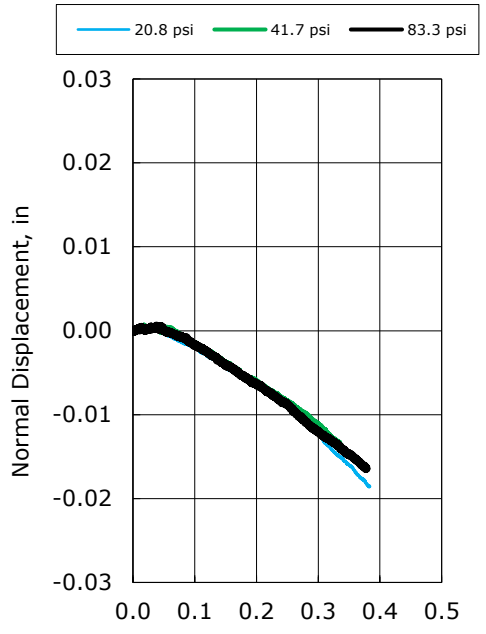
Sliding Friction Test of Rock by ASTM D5607





Test No.:	SF-31	SF-32	SF-33
Specimen Diameter, in:	1.98	1.98	1.98
Specimen Length, in:	2.82	2.82	2.82
Specimen Mass, grams:	388	388	388
Specimen Area, in^2:	3.09	3.09	3.09
Specimen Bulk Density, pcf	169	169	169
Shear Plane Area, in^2	3.18	3.18	3.18
Normal Stress, psi:	20.8	41.7	83.3
Peak Shear Stress, psi:	18.9	32.3	62.0
Post Peak Shear Stress, psi:	17.0	27.4	59.9
Horiz. Displacement Rate, in/min:	0.005	0.005	0.005

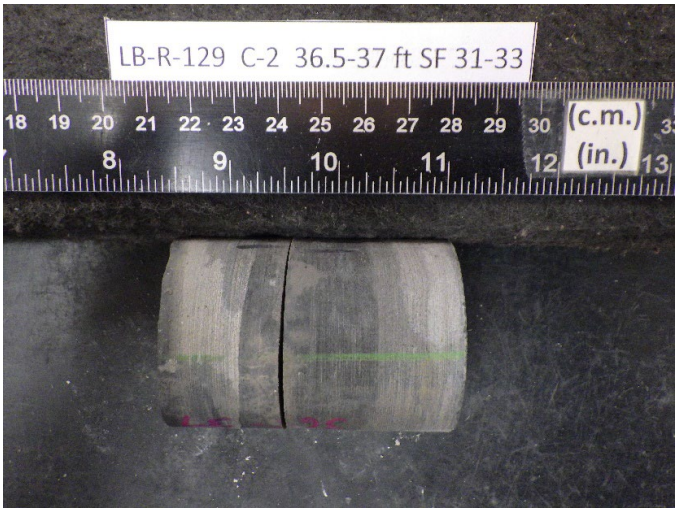
Peak Friction Angle:	**34.7**		
Peak Cohesive Intercept, psi:	**4.1**		
Post-Peak Friction Angle:	**35.0**		
Post-Peak Cohesive Intercept, psi:	**0.7**		
JRC Roughness	0-2	0-2	0-2



Notes:

Specimen cut to length using diamond tipped saw blade.
Tested at as-received moisture content and density.
'Hydro-Stone Super X' encapsulating compound used to mount specimen in test rings.
Actual strength parameters may vary and should be determined by an engineer for site-specific conditions.

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	6/19/2025
End Date:	6/19/2025
Tested By:	tlm
Checked By:	jsc
Boring ID:	LB-R-129
Sample ID:	C-2
Depth, ft:	36.5-37
Visual Description:	Rock core with saw cut joint

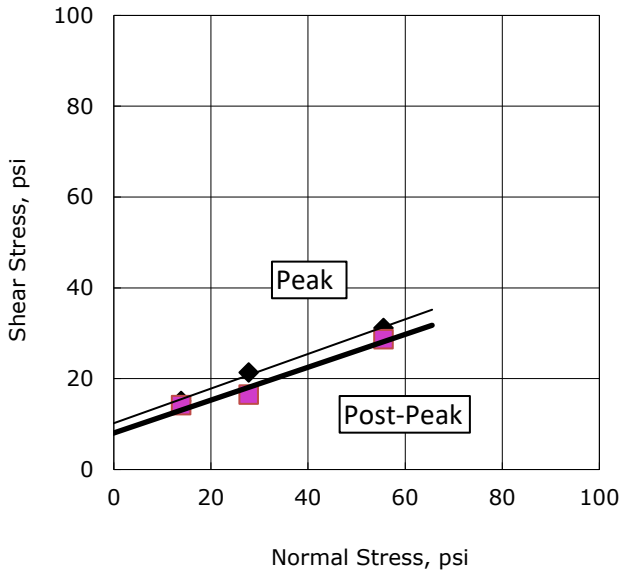


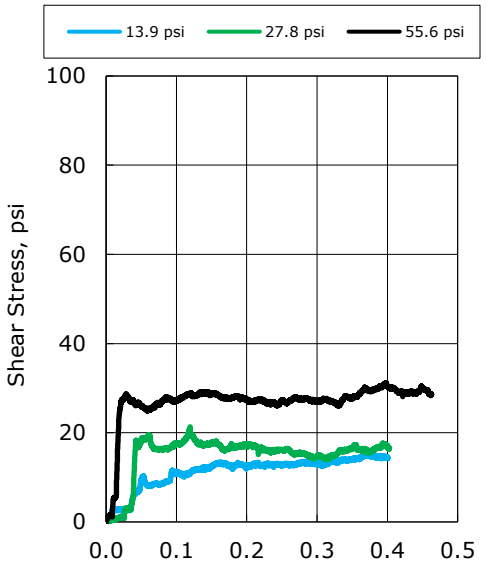
Pre-Test

Post-Test

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	6/19/2025
End Date:	6/19/2025
Tested By:	tlm
Checked By:	jsc
Boring ID:	LB-X-003
Sample ID:	C-1
Depth, ft:	26.51-26.69
Visual Description:	Rock core with saw cut joint

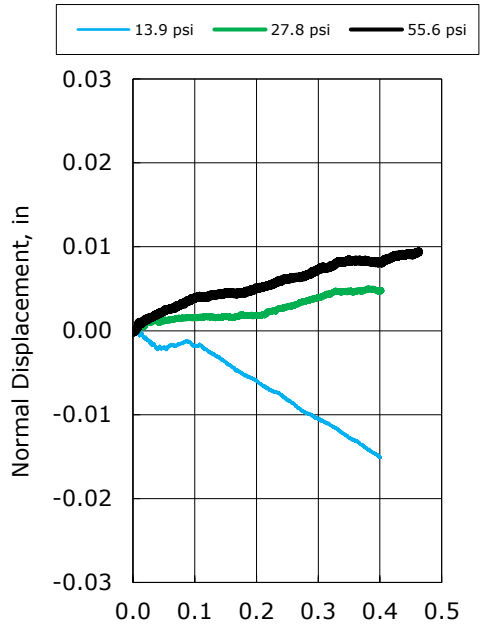
Sliding Friction Test of Rock by ASTM D5607





Test No.:	SF-34	SF-35	SF-36
Specimen Diameter, in:	1.98	1.98	1.98
Specimen Length, in:	2.22	2.22	2.22
Specimen Mass, grams:	309	309	309
Specimen Area, in^2:	3.08	3.08	3.08
Specimen Bulk Density, pcf	173	173	173
Shear Plane Area, in^2	3.19	3.19	3.19
Normal Stress, psi:	13.9	27.8	55.6
Peak Shear Stress, psi:	15.1	21.4	31.2
Post Peak Shear Stress, psi:	14.2	16.5	28.7
Horiz. Displacement Rate, in/min:	0.005	0.005	0.005

Peak Friction Angle:	**20.9**		
Peak Cohesive Intercept, psi:	**10**		
Post-Peak Friction Angle:	**19.9**		
Post-Peak Cohesive Intercept, psi:	**8.1**		
JRC Roughness	0-2	0-2	0-2

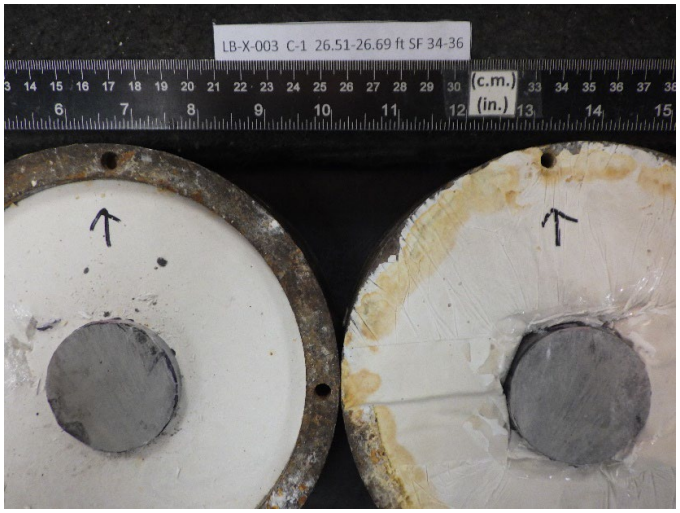


Notes:

Specimen cut to length using diamond tipped saw blade.
Tested at as-received moisture content and density.
'Hydro-Stone Super X' encapsulating compound used to mount specimen in test rings.
Actual strength parameters may vary and should be determined by an engineer for site-specific conditions.

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	6/19/2025
End Date:	6/19/2025
Tested By:	tlm
Checked By:	jsc
Boring ID:	LB-X-003
Sample ID:	C-1
Depth, ft:	26.51-26.69
Visual Description:	Rock core with saw cut joint

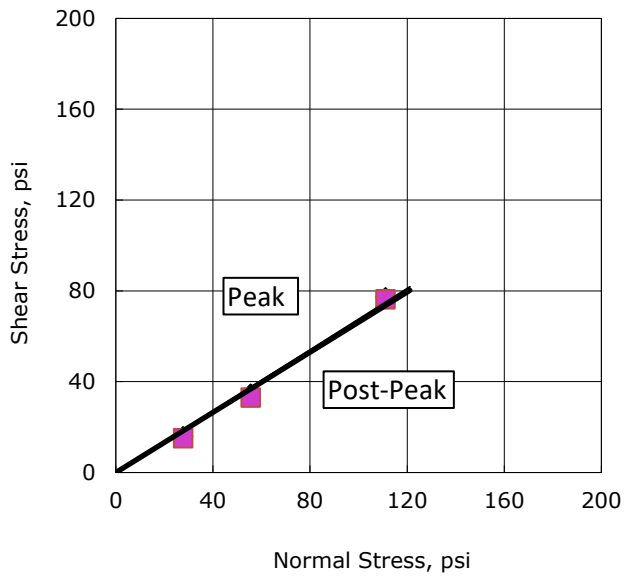
Pre-Test

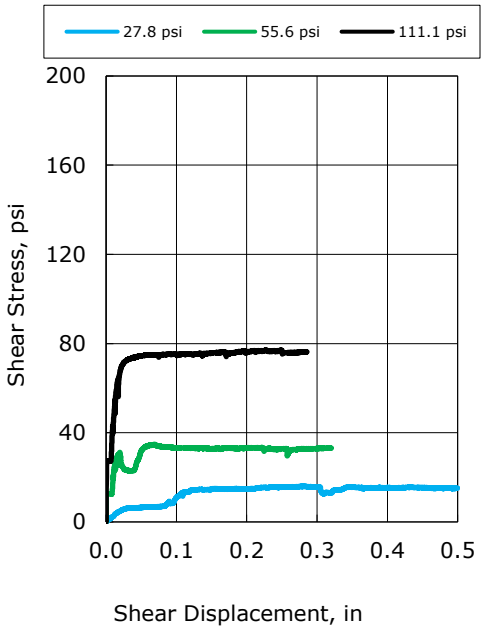


Post-Test

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	6/19/2025
End Date:	6/20/2025
Tested By:	tlm
Checked By:	jsc
Boring ID:	LB-X-005
Sample ID:	---
Depth, ft:	44-44.5
Visual Description:	Rock core with open joint

Sliding Friction Test of Rock by ASTM D5607

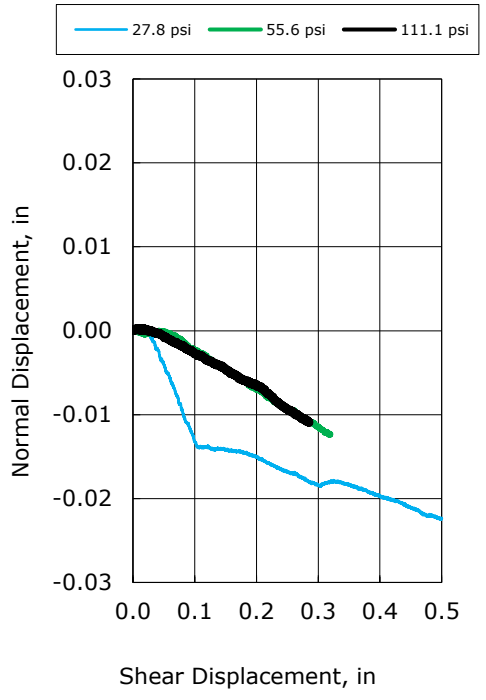




Test No.:	SF-37	SF-38	SF-39
Specimen Diameter, in:	3.35	3.35	3.35
Specimen Length, in:	2.50	2.50	2.50
Specimen Mass, grams:	960	960	960
Specimen Area, in^2:	8.79	8.79	8.79
Specimen Bulk Density, pcf	166	166	166
Shear Plane Area, in^2	8.86	8.86	8.86
Normal Stress, psi:	27.8	55.6	111
Peak Shear Stress, psi:	16.0	34.7	77.1
Post Peak Shear Stress, psi:	15.2	33.0	76.3
Horiz. Displacement Rate, in/min:	0.005	0.005	0.005

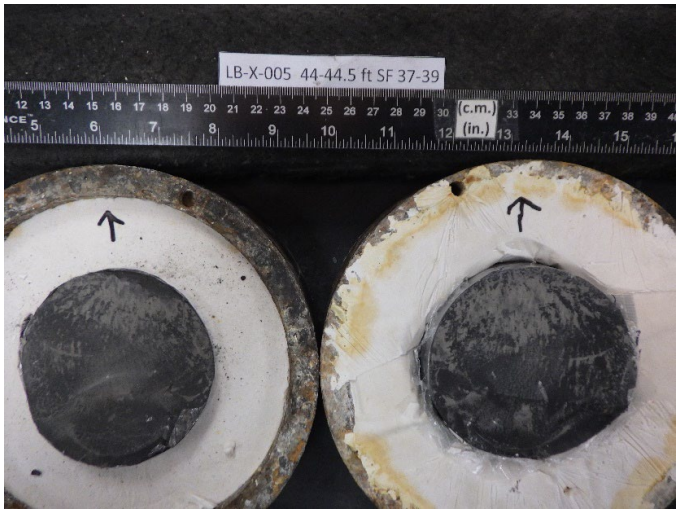
Peak Friction Angle:	**34.0**
Peak Cohesive Intercept, psi:	**0**
Post-Peak Friction Angle:	**33.5**
Post-Peak Cohesive Intercept, psi:	**0**
JRC Roughness	4-6 / 4-6 / 4-6

Notes: Specimen cut to length using diamond tipped saw blade.
Tested at as-received moisture content and density.
'Hydro-Stone Super X' encapsulating compound used to mount specimen in test rings.
Actual strength parameters may vary and should be determined by an engineer for site-specific conditions.



Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	6/19/2025
End Date:	6/20/2025
Tested By:	tlm
Checked By:	jsc
Boring ID:	LB-X-005
Sample ID:	---
Depth, ft:	44-44.5
Visual Description:	Rock core with open joint

Pre-Test



Post-Test

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	---	Sample Type:	---	Tested By:	gp
Sample ID:	---	Test Date:	06/13/25	Checked By:	smd
Depth :	---	Test Id:	816797		

Bulk Density and Compressive Strength of Rock Core Specimens by ASTM D7012 Method C

Boring ID	Sample Number	Depth	Bulk Density, pcf	Compressive strength, psi	Failure Type	Meets ASTM D4543	Note(s)
LB-R-001	---	21.49-21.85 ft	178	16944	1	No	1 , 2,*
LB-R-014	---	27.4-28.4 ft	178	29991	1	No	1,*
LB-R-021	---	26.56-26.98 ft	178	24083	1	No	1,*
LB-R-027	---	30-31 ft	178	26833	1	No	1,*
LB-R-029	---	30.15-30.52 ft	180	42240	1	No	1 , 2,*
LB-R-029	---	36.6-37.6 ft	177	23873	1	No	1 , 2,*
LB-R-030	---	28.54-28.93 ft	171	15026	1	No	1 , 2,*

Notes: Density determined on core samples by measuring dimensions and weight and then calculating.

All specimens tested at the approximate as-received moisture content and at standard laboratory temperature.

The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.

Failure Type: 1 = Intact Material Failure; 2 = Discontinuity Failure; 3 = Intact Material and Discontinuity Failure (See attached photographs)

1: Best effort end preparation. See Tolerance report for details.
2: The as-received core did not meet the ASTM side straightness tolerance due to irregularities in the sample as cored.
3: Specimen L/D < 2.
4: The as-received core did not meet the ASTM minimum diameter tolerance of 1.875 inches.
5: Specimen diameter is less than 10 times maximum particle size.
6: Specimen diameter is less than 6 times maximum particle size.

*Because the indicated tested specimens did not meet the ASTM D4543 standard tolerances, the results reported here may differ from those for a test specimen within tolerances.

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	---	Sample Type:	---	Tested By:	gp
Sample ID:	---	Test Date:	06/13/25	Checked By:	smd
Depth :	---	Test Id:	816807		

Bulk Density and Compressive Strength of Rock Core Specimens by ASTM D7012 Method C

Boring ID	Sample Number	Depth	Bulk Density, pcf	Compressive strength, psi	Failure Type	Meets ASTM D4543	Note(s)
LB-R-033	---	25.80-26.17 ft	176	22091	1	No	1 , 2,*
LB-R-041	---	29.6-30.6 ft	178	27713	1	No	1,*
LB-R-043	---	23.04-23.41 ft	176	20780	1	No	1,*
LB-R-044	---	29.19-29.56 ft	170	12900	1	No	1 , 2,*
LB-R-047	---	30.15-30.48 ft	171	20552	1	No	1,*
LB-R-048	---	29-30 ft	175	21064	1	No	1,*
LB-R-051	---	34.07-34.45 ft	174	15599	1	No	1,*

Notes: Density determined on core samples by measuring dimensions and weight and then calculating.

All specimens tested at the approximate as-received moisture content and at standard laboratory temperature.

The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.

Failure Type: 1 = Intact Material Failure; 2 = Discontinuity Failure; 3 = Intact Material and Discontinuity Failure (See attached photographs)

1: Best effort end preparation. See Tolerance report for details.
2: The as-received core did not meet the ASTM side straightness tolerance due to irregularities in the sample as cored.
3: Specimen L/D < 2.
4: The as-received core did not meet the ASTM minimum diameter tolerance of 1.875 inches.
5: Specimen diameter is less than 10 times maximum particle size.
6: Specimen diameter is less than 6 times maximum particle size.

*Because the indicated tested specimens did not meet the ASTM D4543 standard tolerances, the results reported here may differ from those for a test specimen within tolerances.

GeoTesting EXPRESS
A Sercel Business

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	---	Sample Type:	---	Tested By:	gp
Sample ID:	---	Test Date:	06/19/25	Checked By:	smd
Depth :	---	Test Id:	816847		

Bulk Density and Compressive Strength of Rock Core Specimens by ASTM D7012 Method C

Boring ID	Sample Number	Depth	Bulk Density, pcf	Compressive strength, psi	Failure Type	Meets ASTM D4543	Note(s)
LB-R-055	---	25.5-26 ft	170	39265	1	No	1 , 2,*
LB-R-055	---	39.5-40.5 ft	176	28926	1	No	1,*
LB-R-057	---	30.05-30.44 ft	171	23836	1	No	1,*
LB-R-058	---	30.5-31.5 ft	170	16812	1	No	1 , 2,*
LB-R-058	---	36-36.75 ft	177	22541	1	No	1 , 2,*
LB-R-059	---	34.54-34.91 ft	174	16214	1	No	1,*
LB-R-059	---	40-41 ft	172	18281	1	No	1,*

Notes: Density determined on core samples by measuring dimensions and weight and then calculating.

All specimens tested at the approximate as-received moisture content and at standard laboratory temperature.

The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.

Failure Type: 1 = Intact Material Failure; 2 = Discontinuity Failure; 3 = Intact Material and Discontinuity Failure (See attached photographs)

1: Best effort end preparation. See Tolerance report for details.
2: The as-received core did not meet the ASTM side straightness tolerance due to irregularities in the sample as cored.
3: Specimen L/D < 2.
4: The as-received core did not meet the ASTM minimum diameter tolerance of 1.875 inches.
5: Specimen diameter is less than 10 times maximum particle size.
6: Specimen diameter is less than 6 times maximum particle size.

*Because the indicated tested specimens did not meet the ASTM D4543 standard tolerances, the results reported here may differ from those for a test specimen within tolerances.

GeoTesting EXPRESS
A Sercel Business

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	---	Sample Type:	---	Tested By:	gp
Sample ID:	---	Test Date:	06/19/25	Checked By:	smd
Depth :	---	Test Id:	816853		

Bulk Density and Compressive Strength of Rock Core Specimens by ASTM D7012 Method C

Boring ID	Sample Number	Depth	Bulk Density, pcf	Compressive strength, psi	Failure Type	Meets ASTM D4543	Note(s)
LB-R-060	---	30.53-30.91 ft	174	12315	1	No	1 , 2,*
LB-R-062	---	32-33 ft	172	13218	1	No	1 , 2,*
LB-R-064	---	41.52-41.90 ft	170	21383	1	No	1,*
LB-R-065	---	23.54-23.91 ft	172	13514	1	No	1,*
LB-R-066	---	25.06-25.45 ft	175	22491	1	No	1,*
LB-R-066	---	26.31-26.68 ft	175	18458	1	Yes	---
LB-R-069	---	44.54-44.92 ft	171	38120	1	No	1,*

Notes: Density determined on core samples by measuring dimensions and weight and then calculating.

All specimens tested at the approximate as-received moisture content and at standard laboratory temperature.

The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.

Failure Type: 1 = Intact Material Failure; 2 = Discontinuity Failure; 3 = Intact Material and Discontinuity Failure (See attached photographs)

1: Best effort end preparation. See Tolerance report for details.
2: The as-received core did not meet the ASTM side straightness tolerance due to irregularities in the sample as cored.
3: Specimen L/D < 2.
4: The as-received core did not meet the ASTM minimum diameter tolerance of 1.875 inches.
5: Specimen diameter is less than 10 times maximum particle size.
6: Specimen diameter is less than 6 times maximum particle size.

*Because the indicated tested specimens did not meet the ASTM D4543 standard tolerances, the results reported here may differ from those for a test specimen within tolerances.

GeoTesting EXPRESS
A Sercel Business

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	---	Sample Type:	---	Tested By:	gp
Sample ID:	---	Test Date:	06/13/25	Checked By:	smd
Depth :	---	Test Id:	816818		

Bulk Density and Compressive Strength of Rock Core Specimens by ASTM D7012 Method C

Boring ID	Sample Number	Depth	Bulk Density, pcf	Compressive strength, psi	Failure Type	Meets ASTM D4543	Note(s)
LB-R-070	---	36.55-36.93 ft	171	20443	1	No	1 , 2,*
LB-R-070	---	41.5-42.5 ft	173	22779	1	No	1 , 2,*
LB-R-074	---	63.1-63.6 ft	172	11270	1	No	1 , 2,*
LB-R-074	---	65.13-65.50 ft	177	24221	1	No	1 , 2,*
LB-R-080	---	53.57-53.95 ft	171	30659	1	No	1 , 2,*
LB-R-081	---	35.84-36.21 ft	178	29920	1	No	1 , 2,*
LB-R-086	---	32.04-32.41 ft	175	13332	1	No	1 , 2,*

Notes: Density determined on core samples by measuring dimensions and weight and then calculating.

All specimens tested at the approximate as-received moisture content and at standard laboratory temperature.

The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.

Failure Type: 1 = Intact Material Failure; 2 = Discontinuity Failure; 3 = Intact Material and Discontinuity Failure (See attached photographs)

1: Best effort end preparation. See Tolerance report for details.
2: The as-received core did not meet the ASTM side straightness tolerance due to irregularities in the sample as cored.
3: Specimen L/D < 2.
4: The as-received core did not meet the ASTM minimum diameter tolerance of 1.875 inches.
5: Specimen diameter is less than 10 times maximum particle size.
6: Specimen diameter is less than 6 times maximum particle size.

*Because the indicated tested specimens did not meet the ASTM D4543 standard tolerances, the results reported here may differ from those for a test specimen within tolerances.

GeoTesting EXPRESS
A Sercel Business

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	---	Sample Type:	---	Tested By:	gp
Sample ID:	---	Test Date:	06/19/25	Checked By:	smd
Depth :	---	Test Id:	816857		

Bulk Density and Compressive Strength of Rock Core Specimens by ASTM D7012 Method C

Boring ID	Sample Number	Depth	Bulk Density, pcf	Compressive strength, psi	Failure Type	Meets ASTM D4543	Note(s)
LB-R-091	---	30-30.5 ft	177	12396	1	No	1 , 2,*
LB-R-098		29.04-29.42 ft	173	24839	1	No	1 , 2,*
LB-R-098	---	35-36 ft	172	18879	1	No	1 , 2,*
LB-R-102	---	25.52-25.90 ft	170	37259	1	No	1 , 2,*
LB-R-102	---	32.97-33.34 ft	175	25931	1	Yes	---
LB-R-106	---	55-56 ft	171	17762	3	No	1 , 3,*
LB-R-106	---	56.5-57.5 ft	175	23772	1	No	1,*

Notes: Density determined on core samples by measuring dimensions and weight and then calculating.

All specimens tested at the approximate as-received moisture content and at standard laboratory temperature.

The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.

Failure Type: 1 = Intact Material Failure; 2 = Discontinuity Failure; 3 = Intact Material and Discontinuity Failure (See attached photographs)

1: Best effort end preparation. See Tolerance report for details.
2: The as-received core did not meet the ASTM side straightness tolerance due to irregularities in the sample as cored.
3: Specimen L/D < 2.
4: The as-received core did not meet the ASTM minimum diameter tolerance of 1.875 inches.
5: Specimen diameter is less than 10 times maximum particle size.
6: Specimen diameter is less than 6 times maximum particle size.

*Because the indicated tested specimens did not meet the ASTM D4543 standard tolerances, the results reported here may differ from those for a test specimen within tolerances.

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	---	Sample Type:	---	Tested By:	gp
Sample ID:	---	Test Date:	06/13/25	Checked By:	n/a
Depth :	---	Test Id:	816832		

Bulk Density and Compressive Strength of Rock Core Specimens by ASTM D7012 Method C

Boring ID	Sample Number	Depth	Bulk Density, pcf	Compressive strength, psi	Failure Type	Meets ASTM D4543	Note(s)
LB-R-108	---	25.5-26 ft	175	11753	1	No	1 , 2,*
LB-R-111	---	23.5-24.5 ft	174	14808	1	No	1,*
LB-R-115	---	33.79-34.16 ft	175	18103	1	No	1,*
LB-R-115	---	36.60-36.98 ft	176	39491	1	No	1,*
LB-R-116	---	40.58-40.95 ft	174	11588	3	No	1,*
LB-R-118	---	41.05-41.42 ft	167	11772	1	No	1 , 2,*
LB-R-120	---	49.58-49.95 ft	172	17494	3	No	1 , 2,*

Notes: Density determined on core samples by measuring dimensions and weight and then calculating.

All specimens tested at the approximate as-received moisture content and at standard laboratory temperature.

The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.

Failure Type: 1 = Intact Material Failure; 2 = Discontinuity Failure; 3 = Intact Material and Discontinuity Failure (See attached photographs)

1: Best effort end preparation. See Tolerance report for details.
2: The as-received core did not meet the ASTM side straightness tolerance due to irregularities in the sample as cored.
3: Specimen L/D < 2.
4: The as-received core did not meet the ASTM minimum diameter tolerance of 1.875 inches.
5: Specimen diameter is less than 10 times maximum particle size.
6: Specimen diameter is less than 6 times maximum particle size.

*Because the indicated tested specimens did not meet the ASTM D4543 standard tolerances, the results reported here may differ from those for a test specimen within tolerances.

GeoTesting EXPRESS
A Sercel Business

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	---	Sample Type:	---	Tested By:	gp
Sample ID:	---	Test Date:	06/13/25	Checked By:	smd
Depth :	---	Test Id:	816832		

Bulk Density and Compressive Strength of Rock Core Specimens by ASTM D7012 Method C

Boring ID	Sample Number	Depth	Bulk Density, pcf	Compressive strength, psi	Failure Type	Meets ASTM D4543	Note(s)
LB-R-108	---	25.5-26 ft	174	11753	1	No	1 , 2,*
LB-R-111	---	23.5-24.5 ft	175	14808	1	No	1,*
LB-R-115	---	33.79-34.16 ft	174	18103	1	No	1,*
LB-R-115	---	36.60-36.98 ft	175	39491	1	No	1,*
LB-R-116	---	40.58-40.95 ft	173	11588	3	No	1,*
LB-R-118	---	41.05-41.42 ft	166	11772	1	No	1 , 2,*
LB-R-120	---	49.58-49.95 ft	173	17494	1	No	1 , 2,*

Notes: Density determined on core samples by measuring dimensions and weight and then calculating.

All specimens tested at the approximate as-received moisture content and at standard laboratory temperature.

The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.

Failure Type: 1 = Intact Material Failure; 2 = Discontinuity Failure; 3 = Intact Material and Discontinuity Failure (See attached photographs)

1: Best effort end preparation. See Tolerance report for details.
2: The as-received core did not meet the ASTM side straightness tolerance due to irregularities in the sample as cored.
3: Specimen L/D < 2.
4: The as-received core did not meet the ASTM minimum diameter tolerance of 1.875 inches.
5: Specimen diameter is less than 10 times maximum particle size.
6: Specimen diameter is less than 6 times maximum particle size.

*Because the indicated tested specimens did not meet the ASTM D4543 standard tolerances, the results reported here may differ from those for a test specimen within tolerances.

GeoTesting EXPRESS
A Sercel Business

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	---	Sample Type:	---	Tested By:	gp
Sample ID:	---	Test Date:	06/13/25	Checked By:	smd
Depth :	---	Test Id:	816863		

Bulk Density and Compressive Strength of Rock Core Specimens by ASTM D7012 Method C

Boring ID	Sample Number	Depth	Bulk Density, pcf	Compressive strength, psi	Failure Type	Meets ASTM D4543	Note(s)
LB-R-124	---	46.56-46.93 ft	176	15822	1	No	1,*
LB-R-124	---	49.5-50.5 ft	175	17002	1	No	1,*
LB-R-126	---	19.54-19.91 ft	175	12682	1	No	1,*
LB-R-127		31.80-32.16 ft	168	10315	1	No	1,*
LB-R-128	---	35.75-36.25 ft	171	35783	1	No	1,*
LB-R-129	---	44.61-44.99 ft	177	26103	1	No	1 , 2,*
LB-R-130	---	30.74-31.11 ft	172	14770	1	No	1 , 2,*

Notes: Density determined on core samples by measuring dimensions and weight and then calculating.

All specimens tested at the approximate as-received moisture content and at standard laboratory temperature.

The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.

Failure Type: 1 = Intact Material Failure; 2 = Discontinuity Failure; 3 = Intact Material and Discontinuity Failure (See attached photographs)

1: Best effort end preparation. See Tolerance report for details.
2: The as-received core did not meet the ASTM side straightness tolerance due to irregularities in the sample as cored.
3: Specimen L/D < 2.
4: The as-received core did not meet the ASTM minimum diameter tolerance of 1.875 inches.
5: Specimen diameter is less than 10 times maximum particle size.
6: Specimen diameter is less than 6 times maximum particle size.

*Because the indicated tested specimens did not meet the ASTM D4543 standard tolerances, the results reported here may differ from those for a test specimen within tolerances.

GeoTesting EXPRESS
A Sercel Business

Client:	Langan Engineering				
Project:	Upstate Confidential Project				
Location:	NY			Project No:	GTX-321096
Boring ID:	---	Sample Type:	---	Tested By:	gp
Sample ID:	---	Test Date:	06/12/25	Checked By:	smd
Depth :	---	Test Id:	816839		

Bulk Density and Compressive Strength of Rock Core Specimens by ASTM D7012 Method C

Boring ID	Sample Number	Depth	Bulk Density, pcf	Compressive strength, psi	Failure Type	Meets ASTM D4543	Note(s)
LB-R-132	---	32.08-32.45 ft	175	31786	1	No	1,*
LB-R-135	---	27-28 ft	170	30651	1	No	1 , 2,*
LB-R-136	---	24.75-25.5 ft	171	15562	1	No	1,*
LB-X-003	---	32.53-32.92 ft	171	15262	1	No	1,*

Notes: Density determined on core samples by measuring dimensions and weight and then calculating.

All specimens tested at the approximate as-received moisture content and at standard laboratory temperature.

The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.

Failure Type: 1 = Intact Material Failure; 2 = Discontinuity Failure; 3 = Intact Material and Discontinuity Failure (See attached photographs)

1: Best effort end preparation. See Tolerance report for details.
2: The as-received core did not meet the ASTM side straightness tolerance due to irregularities in the sample as cored.
3: Specimen L/D < 2.
4: The as-received core did not meet the ASTM minimum diameter tolerance of 1.875 inches.
5: Specimen diameter is less than 10 times maximum particle size.
6: Specimen diameter is less than 6 times maximum particle size.

*Because the indicated tested specimens did not meet the ASTM D4543 standard tolerances, the results reported here may differ from those for a test specimen within tolerances.

Client:	Langan Engineering	Test Date:	6/9/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-001		
Sample ID:	---		
Depth (ft):	21.49-21.85		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.39	4.39	4.39
Specimen Diameter, in:	1.98	1.98	1.98
Specimen Mass, g:	634.48		
Bulk Density, lb/ft^3	178	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? NO

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? NO

END FLATNESS AND PARALLELISM (Procedure FP1)

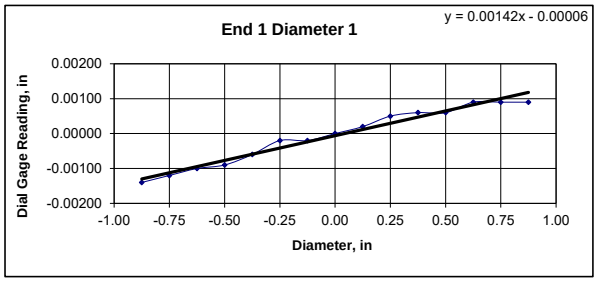
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00140	-0.00120	-0.00100	-0.00090	-0.00060	-0.00020	-0.00020	0.00000	0.00020	0.00050	0.00060	0.00060	0.00090	0.00090	0.00090
Diameter 2, in (rotated 90°)	0.00100	0.00090	0.00070	0.00060	0.00050	0.00020	0.00000	0.00000	-0.00030	-0.00070	-0.00090	-0.00100	-0.00140	-0.00170	-0.00180

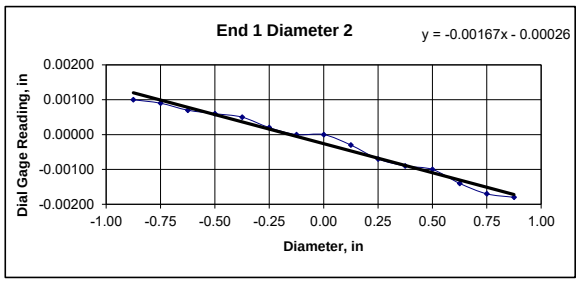
Difference between max and min readings, in:
0° = 0.00230 90° = 0.00280

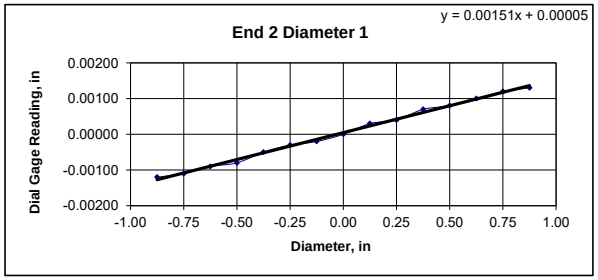
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00120	-0.00110	-0.00090	-0.00080	-0.00050	-0.00030	-0.00020	0.00000	0.00030	0.00040	0.00070	0.00080	0.00100	0.00120	0.00130
Diameter 2, in (rotated 90°)	-0.00140	-0.00110	-0.00080	-0.00080	-0.00060	-0.00050	-0.00010	0.00000	0.00040	0.00060	0.00080	0.00110	0.00110	0.00130	0.00150

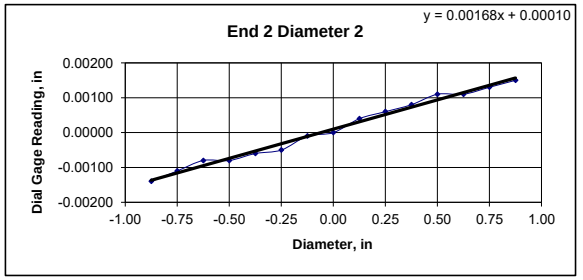
Difference between max and min readings, in:
0° = 0.0025 90° = 0.0029

Maximum difference must be < 0.0020 in. Difference = ± 0.00145
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00142
Angle of Best Fit Line: 0.08120

End 2:
Slope of Best Fit Line 0.00151
Angle of Best Fit Line: 0.08627

Maximum Angular Difference: 0.00507

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00167
Angle of Best Fit Line: 0.09560

End 2:
Slope of Best Fit Line 0.00168
Angle of Best Fit Line: 0.09609

Maximum Angular Difference: 0.00049

Parallelism Tolerance Met? YES
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00230	1.980	0.00116	0.067	YES
Diameter 2, in (rotated 90°)	0.00280	1.980	0.00141	0.081	YES
END 2					
Diameter 1, in	0.00250	1.980	0.00126	0.072	YES
Diameter 2, in (rotated 90°)	0.00290	1.980	0.00146	0.084	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/9/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-001	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	21.49-21.85		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS

END 1

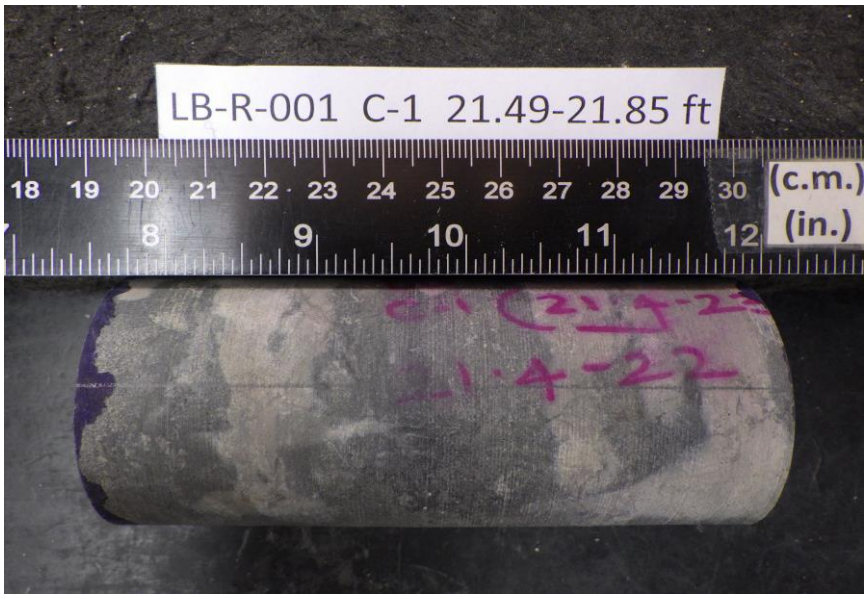
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

END 2

Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/9/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-001
Sample ID:	---
Depth, ft:	21.49-21.85



After cutting and grinding

After break

Client:	Langan Engineering	Test Date:	6/12/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-014		
Sample ID:	---		
Depth (ft):	27.4-28.4		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.41	4.41	4.41
Specimen Diameter, in:	1.99	1.99	1.99
Specimen Mass, g:	643.9		
Bulk Density, lb/ft^3	178	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

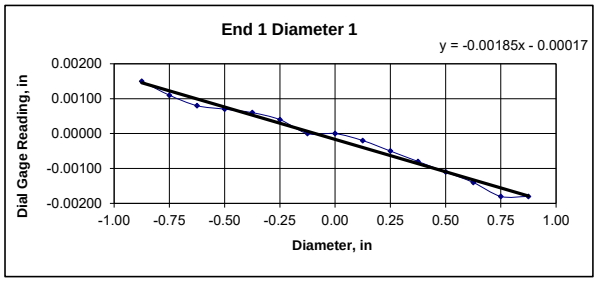
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00150	0.00110	0.00080	0.00070	0.00060	0.00040	0.00000	0.00000	-0.00020	-0.00050	-0.00080	-0.00110	-0.00140	-0.00180	-0.00180
Diameter 2, in (rotated 90°)	-0.00150	-0.00140	-0.00120	-0.00080	-0.00050	-0.00020	0.00000	0.00000	0.00030	0.00060	0.00090	0.00100	0.00150	0.00150	0.00170

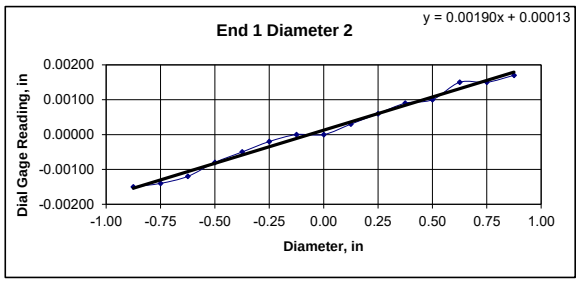
Difference between max and min readings, in:
0° = 0.00330 90° = 0.00320

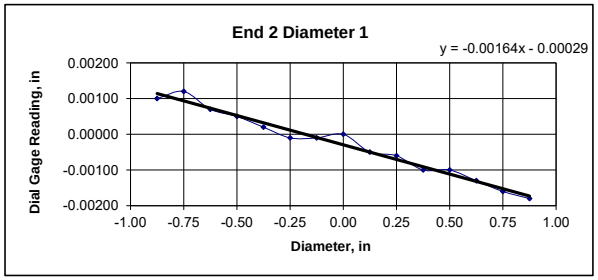
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00100	0.00120	0.00070	0.00050	0.00020	-0.00010	-0.00010	0.00000	-0.00050	-0.00060	-0.00100	-0.00100	-0.00130	-0.00160	-0.00180
Diameter 2, in (rotated 90°)	0.00150	0.00140	0.00120	0.00070	0.00060	0.00050	0.00010	0.00000	0.00000	-0.00030	-0.00060	-0.00090	-0.00130	-0.00130	-0.00180

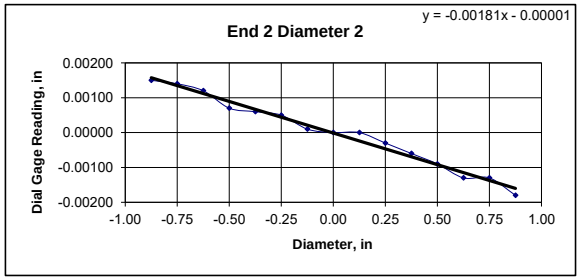
Difference between max and min readings, in:
0° = 0.003 90° = 0.0033

Maximum difference must be < 0.0020 in. Difference = ± 0.00165
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00185
Angle of Best Fit Line: 0.10624

End 2:
Slope of Best Fit Line 0.00164
Angle of Best Fit Line: 0.09396

Maximum Angular Difference: 0.01228

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00190
Angle of Best Fit Line: 0.10903

End 2:
Slope of Best Fit Line 0.00181
Angle of Best Fit Line: 0.10395

Maximum Angular Difference: 0.00507

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00330	1.990	0.00166	0.095	YES
Diameter 2, in (rotated 90°)	0.00320	1.990	0.00161	0.092	YES
END 2					
Diameter 1, in	0.00300	1.990	0.00151	0.086	YES
Diameter 2, in (rotated 90°)	0.00330	1.990	0.00166	0.095	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/12/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-014	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	27.4-28.4		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/13/2025
Tested By:	jss
Checked By:	smd
Boring ID:	LB-R-014
Sample ID:	---
Depth, ft:	27.4-28.4

After cutting and grinding

After break

Client:	Langan Engineering	Test Date:	6/13/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-021		
Sample ID:	---		
Depth (ft):	26.56-26.98		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.43	4.43	4.43
Specimen Diameter, in:	1.98	1.98	1.98
Specimen Mass, g:	637.7		
Bulk Density, lb/ft^3	178	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

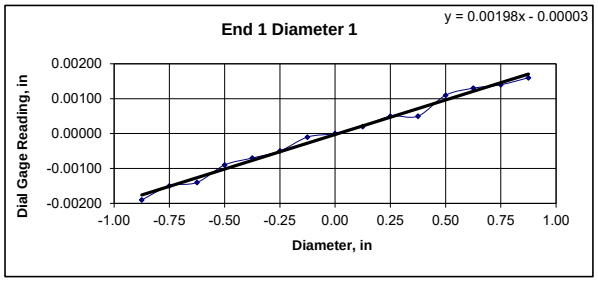
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00190	-0.00150	-0.00140	-0.00090	-0.00070	-0.00050	-0.00010	0.00000	0.00020	0.00050	0.00050	0.00110	0.00130	0.00140	0.00160
Diameter 2, in (rotated 90°)	-0.00110	-0.00080	-0.00050	-0.00020	-0.00020	-0.00010	-0.00010	0.00000	0.00000	0.00050	0.00050	0.00070	0.00060	0.00080	0.00080

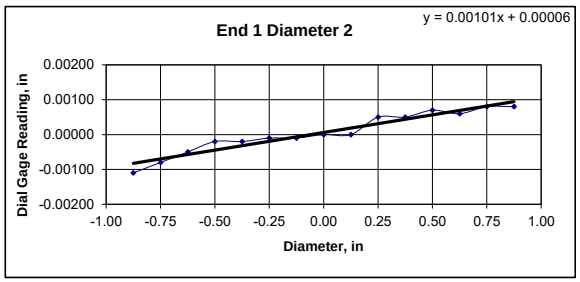
Difference between max and min readings, in:
0° = 0.00350 90° = 0.00190

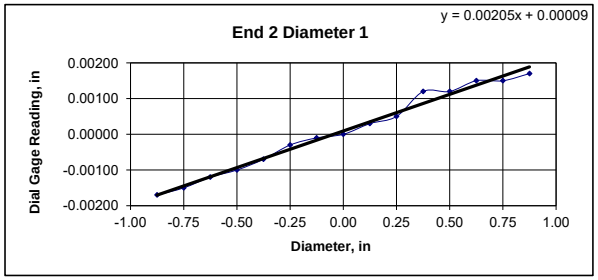
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00170	-0.00150	-0.00120	-0.00100	-0.00070	-0.00030	-0.00010	0.00000	0.00030	0.00050	0.00120	0.00120	0.00150	0.00150	0.00170
Diameter 2, in (rotated 90°)	0.00030	0.00030	0.00030	0.00030	0.00020	0.00000	0.00000	0.00000	-0.00030	-0.00040	-0.00070	-0.00080	-0.00100	-0.00100	-0.00120

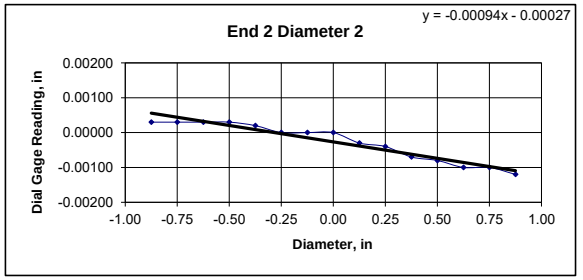
Difference between max and min readings, in:
0° = 0.0034 90° = 0.0015

Maximum difference must be < 0.0020 in. Difference = ± 0.00175
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00198
Angle of Best Fit Line: 0.11345

End 2:
Slope of Best Fit Line 0.00205
Angle of Best Fit Line: 0.11754

Maximum Angular Difference: 0.00409

Parallelism Tolerance Met? YES
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00101
Angle of Best Fit Line: 0.05795

End 2:
Slope of Best Fit Line 0.00094
Angle of Best Fit Line: 0.05402

Maximum Angular Difference: 0.00393

Parallelism Tolerance Met? YES
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00350	1.980	0.00177	0.101	YES
Diameter 2, in (rotated 90°)	0.00190	1.980	0.00096	0.055	YES
END 2					
Diameter 1, in	0.00340	1.980	0.00172	0.098	YES
Diameter 2, in (rotated 90°)	0.00150	1.980	0.00076	0.043	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/18/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-021	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	26.56-26.98		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS

END 1

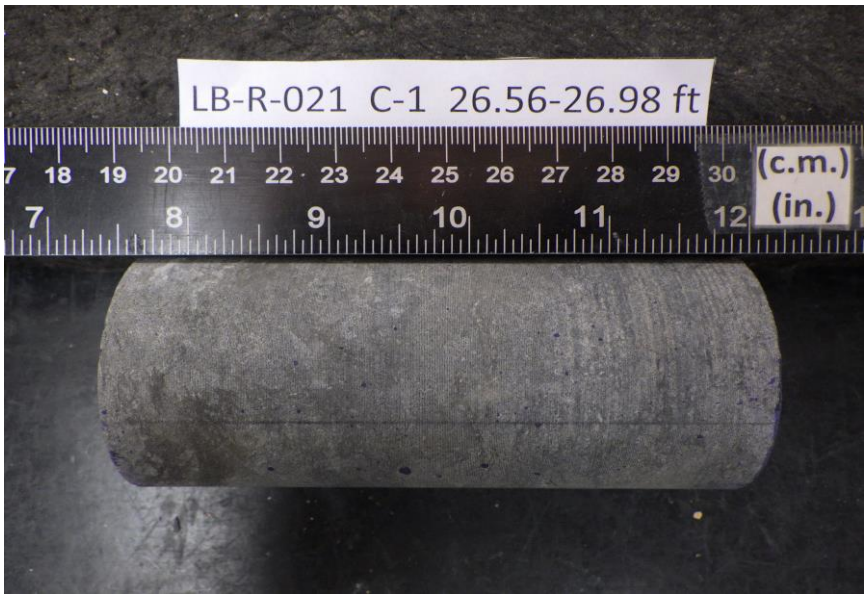
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

END 2

Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/19/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-021
Sample ID:	---
Depth, ft:	26.56-26.98



After cutting and grinding

After break

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Client:	Langan Engineering	Test Date:	6/9/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-027		
Sample ID:	---		
Depth (ft):	30-31		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.47	4.47	4.47
Specimen Diameter, in:	1.98	1.98	1.98
Specimen Mass, g:	645.96		
Bulk Density, lb/ft^3	178	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.3	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

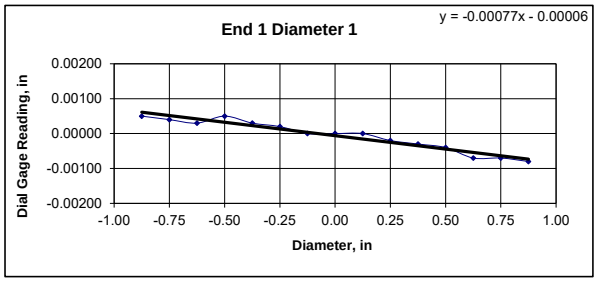
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00050	0.00040	0.00030	0.00050	0.00030	0.00020	0.00000	0.00000	0.00000	-0.00020	-0.00030	-0.00040	-0.00070	-0.00070	-0.00080
Diameter 2, in (rotated 90°)	0.00190	0.00160	0.00150	0.00120	0.00070	0.00050	0.00030	0.00000	0.00000	-0.00050	-0.00080	-0.00110	-0.00140	-0.00160	-0.00170

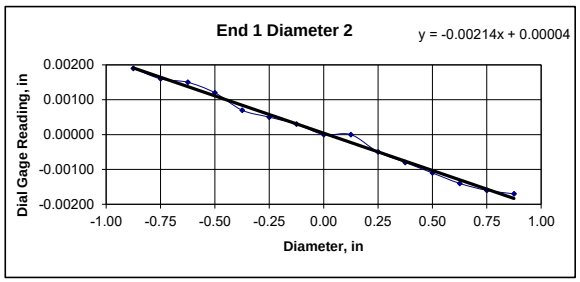
Difference between max and min readings, in:
0° = 0.00130 90° = 0.00360

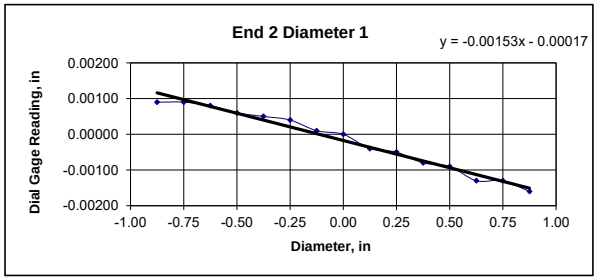
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00090	0.00090	0.00080	0.00060	0.00050	0.00040	0.00010	0.00000	-0.00040	-0.00050	-0.00080	-0.00090	-0.00130	-0.00130	-0.00160
Diameter 2, in (rotated 90°)	-0.00160	-0.00160	-0.00140	-0.00120	-0.00050	-0.00040	-0.00020	0.00000	0.00010	0.00030	0.00070	0.00100	0.00140	0.00140	0.00180

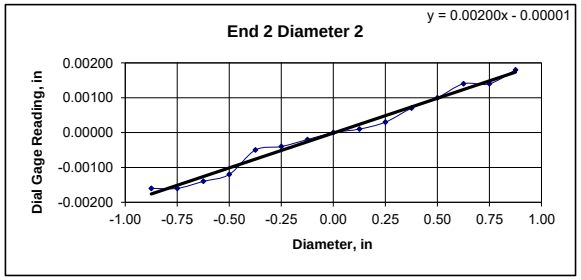
Difference between max and min readings, in:
0° = 0.0025 90° = 0.0034

Maximum difference must be < 0.0020 in. Difference = ± 0.00180
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00077
Angle of Best Fit Line: 0.04404

End 2:
Slope of Best Fit Line 0.00153
Angle of Best Fit Line: 0.08742

Maximum Angular Difference: 0.04338

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00214
Angle of Best Fit Line: 0.12261

End 2:
Slope of Best Fit Line 0.00200
Angle of Best Fit Line: 0.11443

Maximum Angular Difference: 0.00819

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00130	1.980	0.00066	0.038	YES
Diameter 2, in (rotated 90°)	0.00360	1.980	0.00182	0.104	YES
END 2					
Diameter 1, in	0.00250	1.980	0.00126	0.072	YES
Diameter 2, in (rotated 90°)	0.00340	1.980	0.00172	0.098	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/9/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-027	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	30-31		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/9/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-027
Sample ID:	---
Depth, ft:	30-31

After cutting and grinding

After break

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Client:	Langan Engineering	Test Date:	6/12/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-029		
Sample ID:	---		
Depth (ft):	30.15-30.52		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.50	4.50	4.50
Specimen Diameter, in:	1.98	1.98	1.98
Specimen Mass, g:	654.86		
Bulk Density, lb/ft^3	180	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.3	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? NO

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? NO

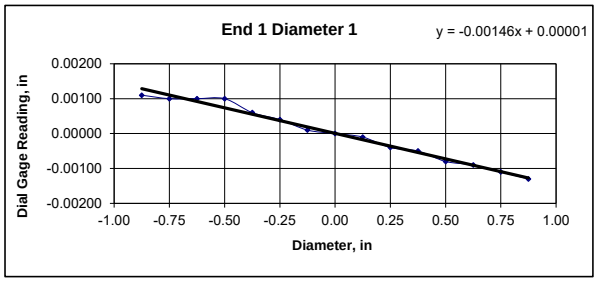
END FLATNESS AND PARALLELISM (Procedure FP1)

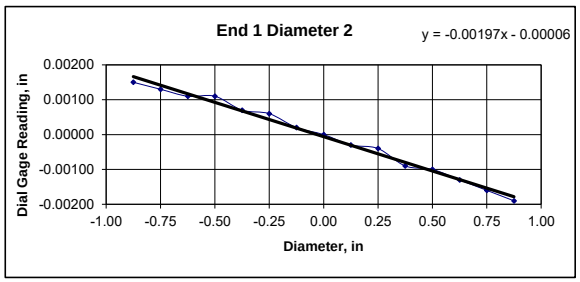
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00110	0.00100	0.00100	0.00100	0.00060	0.00040	0.00010	0.00000	-0.00010	-0.00040	-0.00050	-0.00080	-0.00090	-0.00110	-0.00130
Diameter 2, in (rotated 90°)	0.00150	0.00130	0.00110	0.00110	0.00070	0.00060	0.00020	0.00000	-0.00030	-0.00040	-0.00090	-0.00100	-0.00130	-0.00160	-0.00190

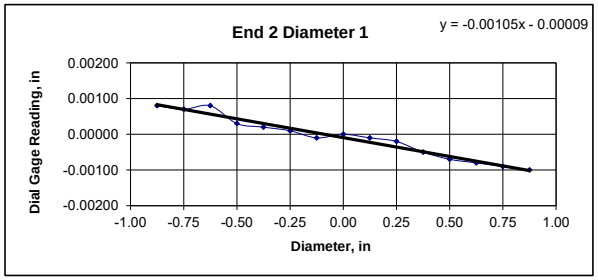
Difference between max and min readings, in:
0° = 0.00240 90° = 0.00340

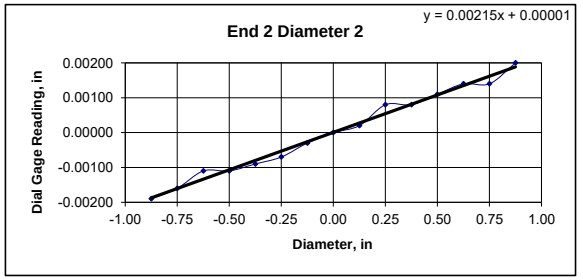
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00080	0.00070	0.00080	0.00030	0.00020	0.00010	-0.00010	0.00000	-0.00010	-0.00020	-0.00050	-0.00070	-0.00080	-0.00090	-0.00100
Diameter 2, in (rotated 90°)	-0.00190	-0.00160	-0.00110	-0.00110	-0.00090	-0.00070	-0.00030	0.00000	0.00020	0.00080	0.00080	0.00110	0.00140	0.00140	0.00200

Difference between max and min readings, in:
0° = 0.0018 90° = 0.0039
Maximum difference must be < 0.0020 in. Difference = ± 0.00195
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00146
Angle of Best Fit Line: 0.08382

End 2:
Slope of Best Fit Line 0.00105
Angle of Best Fit Line: 0.06041

Maximum Angular Difference: 0.02341

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00197
Angle of Best Fit Line: 0.11279

End 2:
Slope of Best Fit Line 0.00215
Angle of Best Fit Line: 0.12310

Maximum Angular Difference: 0.01031

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00240	1.980	0.00121	0.069	YES
Diameter 2, in (rotated 90°)	0.00340	1.980	0.00172	0.098	YES
END 2					
Diameter 1, in	0.00180	1.980	0.00091	0.052	YES
Diameter 2, in (rotated 90°)	0.00390	1.980	0.00197	0.113	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

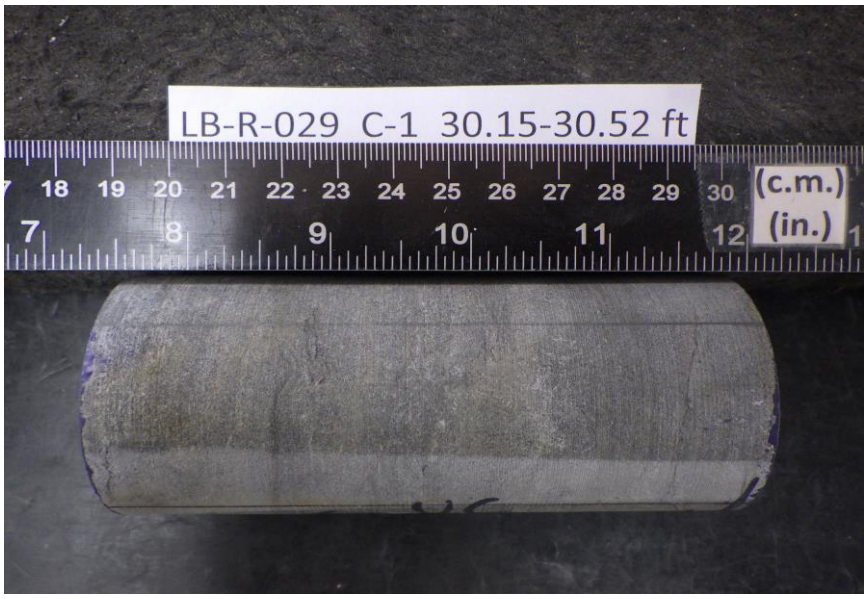
Client:	Langan Engineering	Test Date:	6/12/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-029	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	30.15-30.52		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/13/2025
Tested By:	jss
Checked By:	smd
Boring ID:	LB-R-029
Sample ID:	---
Depth, ft:	30.15-30.52



After cutting and grinding

After break

GeoTesting EXPRESS
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Client:	Langan Engineering	Test Date:	6/11/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-029		
Sample ID:	---		
Depth (ft):	36.6-37.6		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.23	4.23	4.23
Specimen Diameter, in:	1.99	1.99	1.99
Specimen Mass, g:	614.09		
Bulk Density, lb/ft^3	177	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.1	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? NO

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? NO

END FLATNESS AND PARALLELISM (Procedure FP1)

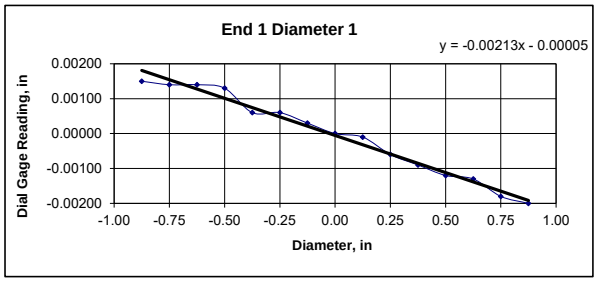
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00150	0.00140	0.00140	0.00130	0.00060	0.00060	0.00030	0.00000	-0.00010	-0.00060	-0.00090	-0.00120	-0.00130	-0.00180	-0.00200
Diameter 2, in (rotated 90°)	-0.00040	-0.00020	0.00000	0.00000	0.00010	0.00020	0.00020	0.00000	-0.00020	0.00000	0.00000	0.00000	-0.00010	0.00010	0.00010

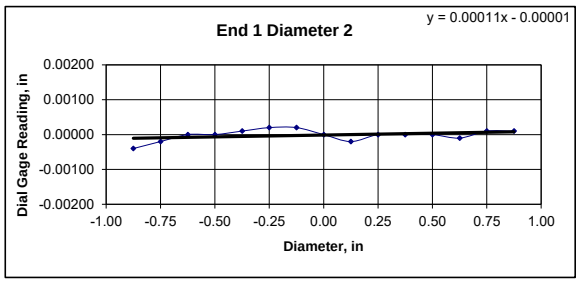
Difference between max and min readings, in:
0° = 0.00350 90° = 0.00060

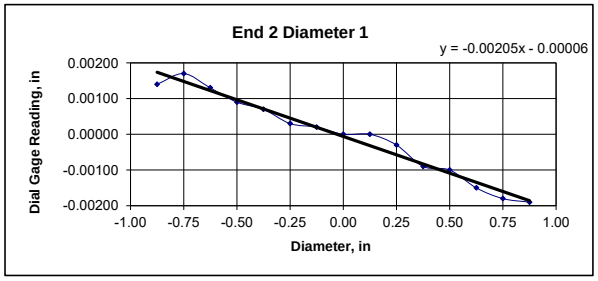
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00140	0.00170	0.00130	0.00090	0.00070	0.00030	0.00020	0.00000	0.00000	-0.00030	-0.00090	-0.00100	-0.00150	-0.00180	-0.00190
Diameter 2, in (rotated 90°)	-0.00050	-0.00020	-0.00020	-0.00040	-0.00030	-0.00010	-0.00030	0.00000	-0.00010	-0.00010	-0.00020	-0.00030	-0.00040	-0.00060	-0.00070

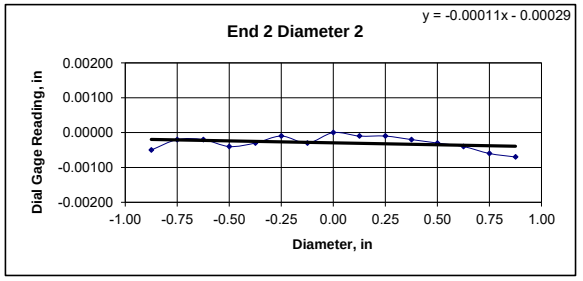
Difference between max and min readings, in:
0° = 0.0036 90° = 0.0007

Maximum difference must be < 0.0020 in. Difference = ± 0.00180
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00213
Angle of Best Fit Line: 0.12196

End 2:
Slope of Best Fit Line 0.00205
Angle of Best Fit Line: 0.11770

Maximum Angular Difference: 0.00426

Parallelism Tolerance Met? YES
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00011
Angle of Best Fit Line: 0.00606

End 2:
Slope of Best Fit Line 0.00011
Angle of Best Fit Line: 0.00638

Maximum Angular Difference: 0.00033

Parallelism Tolerance Met? YES
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00350	1.990	0.00176	0.101	YES
Diameter 2, in (rotated 90°)	0.00060	1.990	0.00030	0.017	YES
END 2					
Diameter 1, in	0.00360	1.990	0.00181	0.104	YES
Diameter 2, in (rotated 90°)	0.00070	1.990	0.00035	0.020	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/11/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-029	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	36.6-37.6		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS

END 1

Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

END 2

Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/13/2025
Tested By:	jss
Checked By:	smd
Boring ID:	LB-R-029
Sample ID:	---
Depth, ft:	36.6-37.6

After cutting and grinding

After break

GeoTesting EXPRESS
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Client:	Langan Engineering	Test Date:	6/11/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-030		
Sample ID:	---		
Depth (ft):	28.54-28.93		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.46	4.46	4.46
Specimen Diameter, in:	1.97	1.98	1.98
Specimen Mass, g:	615.73		
Bulk Density, lb/ft^3	171	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.3	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? NO

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? NO

END FLATNESS AND PARALLELISM (Procedure FP1)

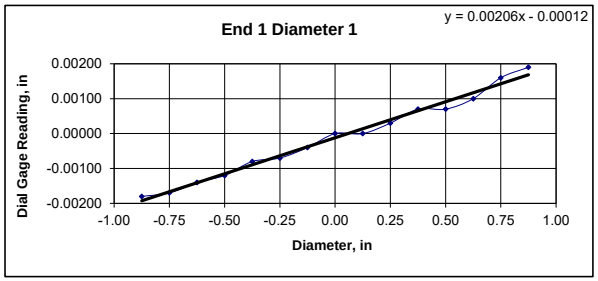
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00180	-0.00170	-0.00140	-0.00120	-0.00080	-0.00070	-0.00040	0.00000	0.00000	0.00030	0.00070	0.00070	0.00100	0.00160	0.00190
Diameter 2, in (rotated 90°)	0.00030	0.00000	-0.00010	-0.00010	-0.00010	-0.00010	-0.00010	0.00000	-0.00010	-0.00040	-0.00050	-0.00060	-0.00060	-0.00060	-0.00080

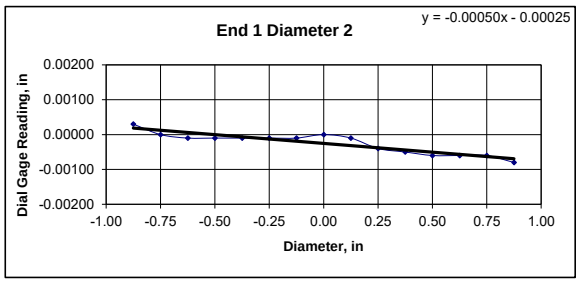
Difference between max and min readings, in:
0° = 0.00370 90° = 0.00110

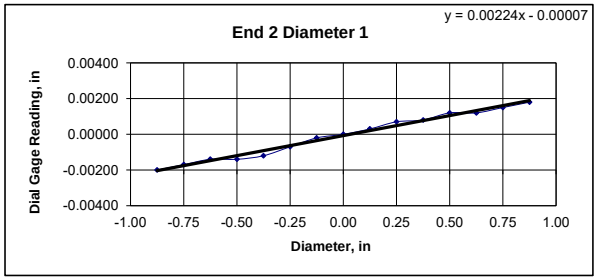
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00200	-0.00170	-0.00140	-0.00140	-0.00120	-0.00070	-0.00020	0.00000	0.00030	0.00070	0.00080	0.00120	0.00120	0.00150	0.00180
Diameter 2, in (rotated 90°)	-0.00060	-0.00060	-0.00060	-0.00050	-0.00030	-0.00030	-0.00020	0.00000	0.00000	-0.00010	-0.00010	0.00000	0.00000	0.00000	0.00030

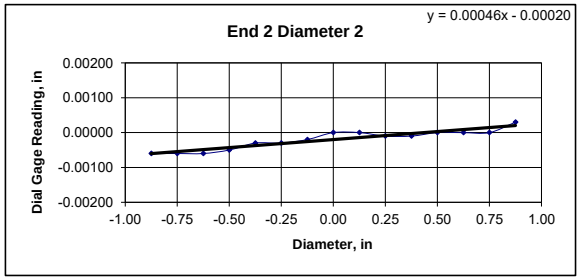
Difference between max and min readings, in:
0° = 0.0038 90° = 0.0009

Maximum difference must be < 0.0020 in. Difference = ± 0.00190
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00206
Angle of Best Fit Line: 0.11819

End 2:
Slope of Best Fit Line 0.00224
Angle of Best Fit Line: 0.12851

Maximum Angular Difference: 0.01031

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00050
Angle of Best Fit Line: 0.02881

End 2:
Slope of Best Fit Line 0.00046
Angle of Best Fit Line: 0.02636

Maximum Angular Difference: 0.00246

Parallelism Tolerance Met? YES
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00370	1.975	0.00187	0.107	YES
Diameter 2, in (rotated 90°)	0.00110	1.975	0.00056	0.032	YES
END 2					
Diameter 1, in	0.00380	1.975	0.00192	0.110	YES
Diameter 2, in (rotated 90°)	0.00090	1.975	0.00046	0.026	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/11/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-030	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	28.54-28.93		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS

END 1

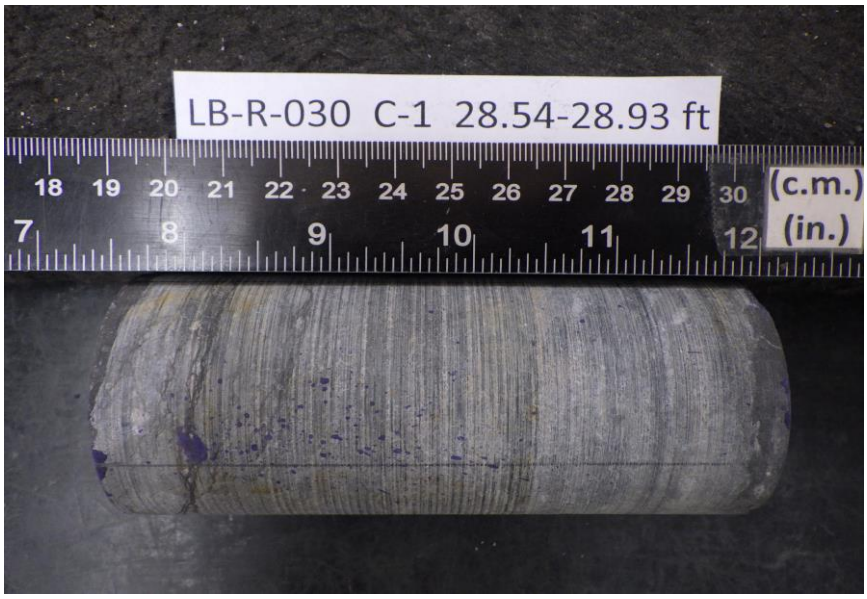
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

END 2

Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/13/2025
Tested By:	jss
Checked By:	smd
Boring ID:	LB-R-030
Sample ID:	---
Depth, ft:	28.54-28.93



After cutting and grinding

After break

GeoTesting EXPRESS
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Client:	Langan Engineering	Test Date:	6/12/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-033		
Sample ID:	---		
Depth (ft):	25.80-26.17		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.38	4.38	4.38
Specimen Diameter, in:	1.98	1.99	1.99
Specimen Mass, g:	626.58		
Bulk Density, lb/ft^3	176	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? NO

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? NO

END FLATNESS AND PARALLELISM (Procedure FP1)

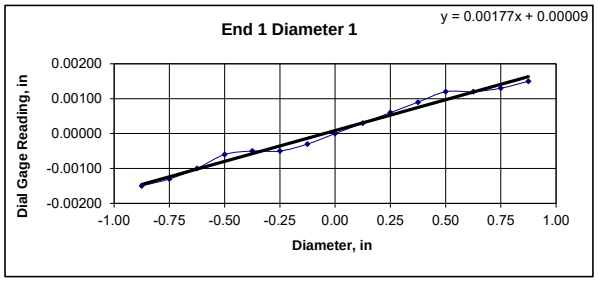
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00150	-0.00130	-0.00100	-0.00060	-0.00050	-0.00050	-0.00030	0.00000	0.00030	0.00060	0.00090	0.00120	0.00120	0.00130	0.00150
Diameter 2, in (rotated 90°)	0.00190	0.00140	0.00130	0.00130	0.00070	0.00060	0.00030	0.00000	-0.00010	-0.00040	-0.00080	-0.00100	-0.00150	-0.00160	-0.00160

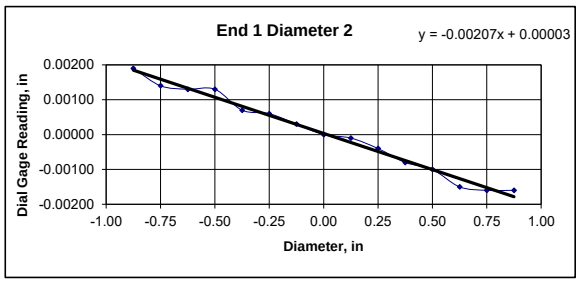
Difference between max and min readings, in:
0° = 0.00300 90° = 0.00350

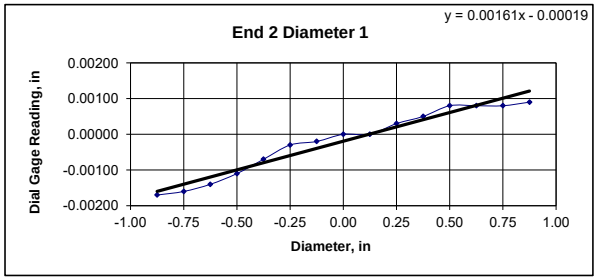
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00170	-0.00160	-0.00140	-0.00110	-0.00070	-0.00030	-0.00020	0.00000	0.00000	0.00030	0.00050	0.00080	0.00080	0.00080	0.00090
Diameter 2, in (rotated 90°)	-0.00160	-0.00160	-0.00090	-0.00090	-0.00070	-0.00020	-0.00010	0.00000	0.00060	0.00070	0.00110	0.00150	0.00160	0.00160	0.00190

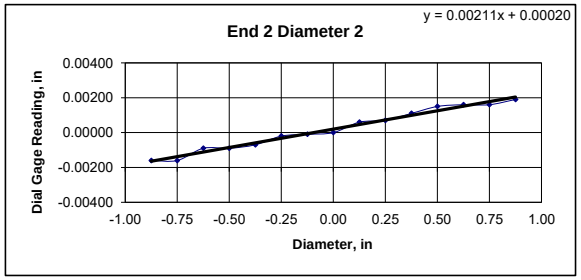
Difference between max and min readings, in:
0° = 0.0026 90° = 0.0035

Maximum difference must be < 0.0020 in. Difference = ± 0.00175
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00177
Angle of Best Fit Line: 0.10117

End 2:
Slope of Best Fit Line 0.00161
Angle of Best Fit Line: 0.09200

Maximum Angular Difference: 0.00917

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00207
Angle of Best Fit Line: 0.11885

End 2:
Slope of Best Fit Line 0.00211
Angle of Best Fit Line: 0.12065

Maximum Angular Difference: 0.00180

Parallelism Tolerance Met? YES
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00300	1.985	0.00151	0.087	YES
Diameter 2, in (rotated 90°)	0.00350	1.985	0.00176	0.101	YES
END 2					
Diameter 1, in	0.00260	1.985	0.00131	0.075	YES
Diameter 2, in (rotated 90°)	0.00350	1.985	0.00176	0.101	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

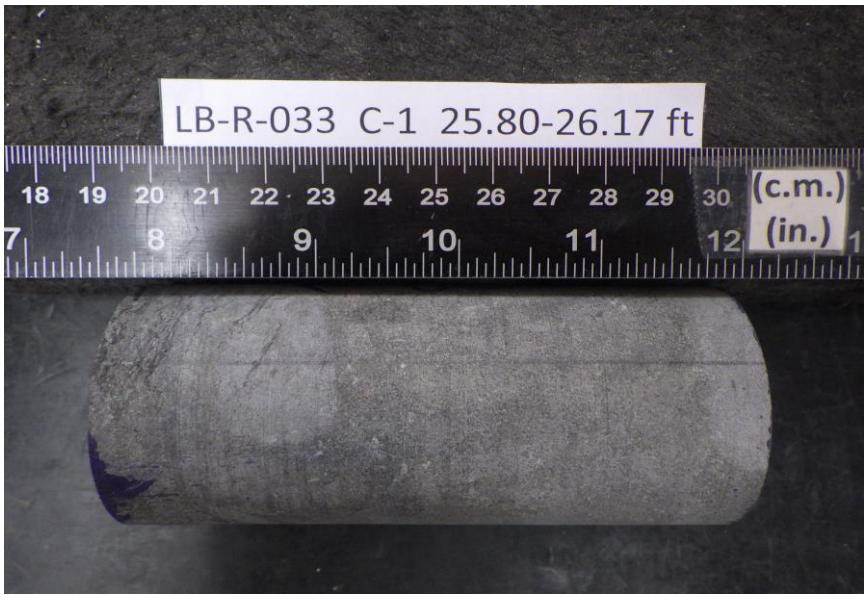
Client:	Langan Engineering	Test Date:	6/12/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-033	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	25.80-26.17		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/13/2025
Tested By:	jss
Checked By:	smd
Boring ID:	LB-R-033
Sample ID:	---
Depth, ft:	25.80-26.17



After cutting and grinding

After break

GeoTesting EXPRESS
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Client:	Langan Engineering	Test Date:	6/12/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-041		
Sample ID:	---		
Depth (ft):	29.6-30.6		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.41	4.41	4.41
Specimen Diameter, in:	1.98	1.98	1.98
Specimen Mass, g:	635.8		
Bulk Density, lb/ft^3	178	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

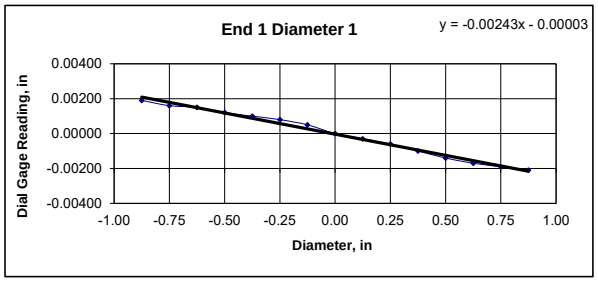
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00190	0.00160	0.00150	0.00120	0.00100	0.00080	0.00050	0.00000	-0.00030	-0.00060	-0.00100	-0.00140	-0.00170	-0.00190	-0.00210
Diameter 2, in (rotated 90°)	-0.00080	-0.00040	-0.00050	-0.00040	-0.00010	0.00010	0.00010	0.00000	0.00020	0.00020	0.00070	0.00080	0.00080	0.00060	0.00060

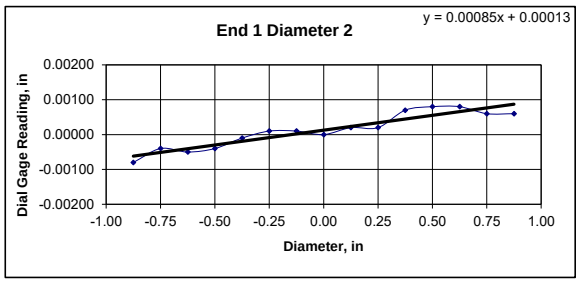
Difference between max and min readings, in:
0° = 0.00400 90° = 0.00160

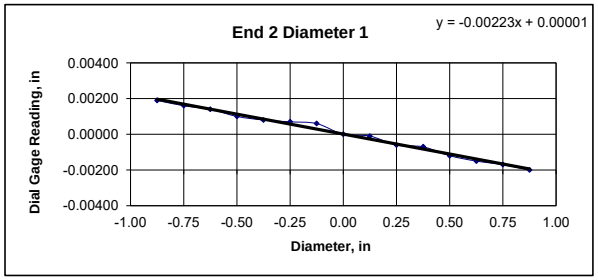
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00190	0.00160	0.00140	0.00100	0.00080	0.00070	0.00060	0.00000	-0.00010	-0.00060	-0.00070	-0.00120	-0.00150	-0.00170	-0.00200
Diameter 2, in (rotated 90°)	0.00060	0.00080	0.00060	0.00070	0.00050	0.00050	0.00010	0.00000	-0.00020	-0.00030	-0.00040	-0.00060	-0.00080	-0.00090	-0.00140

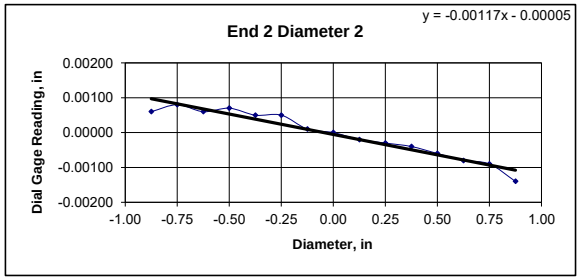
Difference between max and min readings, in:
0° = 0.0039 90° = 0.0022

Maximum difference must be < 0.0020 in. Difference = ± 0.00200
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00243
Angle of Best Fit Line: 0.13915

End 2:
Slope of Best Fit Line 0.00223
Angle of Best Fit Line: 0.12801

Maximum Angular Difference: 0.01113

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00085
Angle of Best Fit Line: 0.04878

End 2:
Slope of Best Fit Line 0.00117
Angle of Best Fit Line: 0.06712

Maximum Angular Difference: 0.01833

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00400	1.980	0.00202	0.116	YES
Diameter 2, in (rotated 90°)	0.00160	1.980	0.00081	0.046	YES
END 2					
Diameter 1, in	0.00390	1.980	0.00197	0.113	YES
Diameter 2, in (rotated 90°)	0.00220	1.980	0.00111	0.064	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/12/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-041	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	29.6-30.6		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS

END 1

Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

END 2

Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/13/2025
Tested By:	jss
Checked By:	smd
Boring ID:	LB-R-041
Sample ID:	---
Depth, ft:	29.6-30.6

After cutting and grinding

After break

Client:	Langan Engineering	Test Date:	6/9/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-043		
Sample ID:	---		
Depth (ft):	23.04-23.41		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.41	4.41	4.41
Specimen Diameter, in:	1.98	1.98	1.98
Specimen Mass, g:	627.75		
Bulk Density, lb/ft^3	176	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

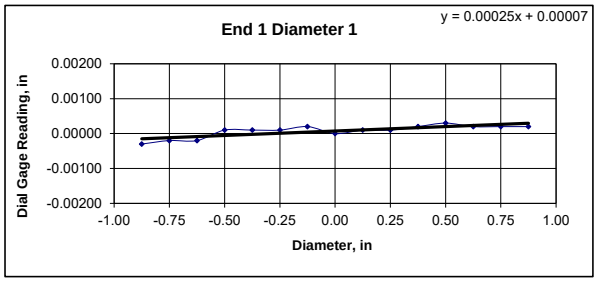
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00030	-0.00020	-0.00020	0.00010	0.00010	0.00010	0.00020	0.00000	0.00010	0.00010	0.00020	0.00030	0.00020	0.00020	0.00020
Diameter 2, in (rotated 90°)	-0.00190	-0.00160	-0.00110	-0.00100	-0.00070	-0.00020	-0.00020	0.00000	0.00000	0.00020	0.00070	0.00100	0.00110	0.00160	0.00170

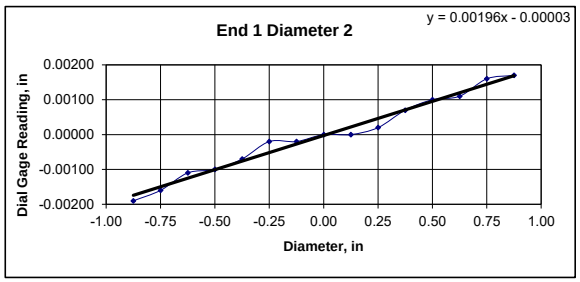
Difference between max and min readings, in:
0° = 0.00060 90° = 0.00360

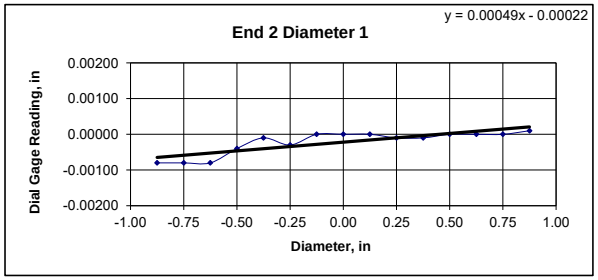
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00080	-0.00080	-0.00080	-0.00040	-0.00010	-0.00030	0.00000	0.00000	0.00000	-0.00010	-0.00010	0.00000	0.00000	0.00000	0.00010
Diameter 2, in (rotated 90°)	0.00180	0.00170	0.00150	0.00080	0.00050	0.00040	0.00010	0.00000	-0.00020	-0.00050	-0.00090	-0.00130	-0.00150	-0.00160	-0.00190

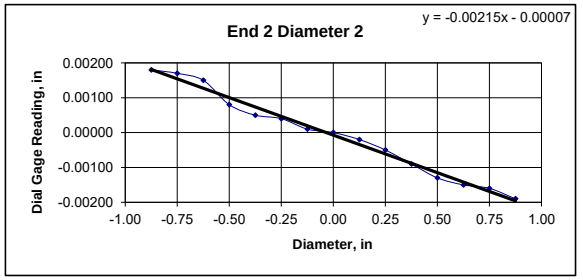
Difference between max and min readings, in:
0° = 0.0009 90° = 0.0037

Maximum difference must be < 0.0020 in. Difference = ± 0.00185
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00025
Angle of Best Fit Line: 0.01457

End 2:
Slope of Best Fit Line 0.00049
Angle of Best Fit Line: 0.02799

Maximum Angular Difference: 0.01342

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00196
Angle of Best Fit Line: 0.11230

End 2:
Slope of Best Fit Line 0.00215
Angle of Best Fit Line: 0.12343

Maximum Angular Difference: 0.01113

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00060	1.980	0.00030	0.017	YES
Diameter 2, in (rotated 90°)	0.00360	1.980	0.00182	0.104	YES
END 2					
Diameter 1, in	0.00090	1.980	0.00045	0.026	YES
Diameter 2, in (rotated 90°)	0.00370	1.980	0.00187	0.107	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/9/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-043	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	23.04-23.41		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS

END 1

Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

END 2

Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/9/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-043
Sample ID:	---
Depth, ft:	23.04-23.41

After cutting and grinding

After break

Client:	Langan Engineering	Test Date:	6/11/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-044		
Sample ID:	---		
Depth (ft):	29.19-29.56		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.40	4.40	4.40
Specimen Diameter, in:	1.99	1.99	1.99
Specimen Mass, g:	613.62		
Bulk Density, lb/ft^3	170	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? NO

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? NO

END FLATNESS AND PARALLELISM (Procedure FP1)

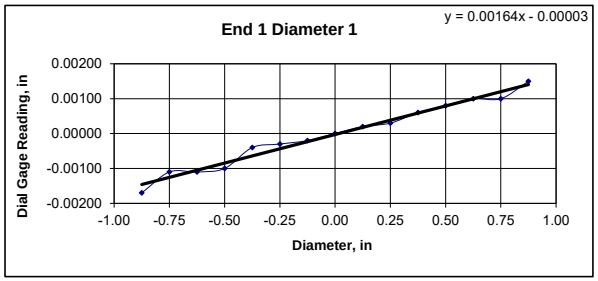
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00170	-0.00110	-0.00110	-0.00100	-0.00040	-0.00030	-0.00020	0.00000	0.00020	0.00030	0.00060	0.00080	0.00100	0.00100	0.00150
Diameter 2, in (rotated 90°)	0.00120	0.00060	0.00060	0.00050	0.00020	0.00010	0.00000	0.00000	-0.00030	-0.00050	-0.00080	-0.00130	-0.00140	-0.00160	-0.00180

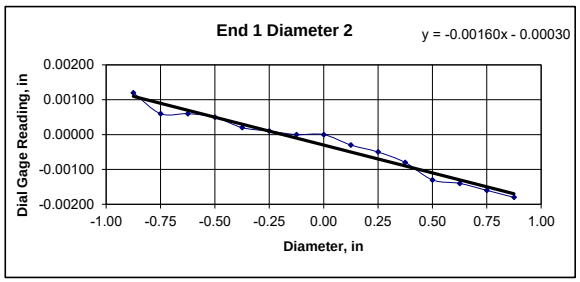
Difference between max and min readings, in:
0° = 0.00320 90° = 0.00300

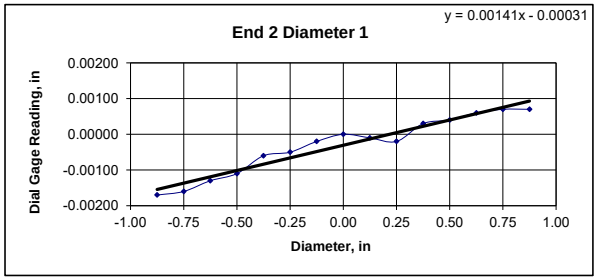
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00170	-0.00160	-0.00130	-0.00110	-0.00060	-0.00050	-0.00020	0.00000	-0.00010	-0.00020	0.00030	0.00040	0.00060	0.00070	0.00070
Diameter 2, in (rotated 90°)	-0.00140	-0.00120	-0.00120	-0.00070	-0.00050	-0.00040	-0.00010	0.00000	-0.00010	0.00010	0.00070	0.00070	0.00080	0.00080	0.00120

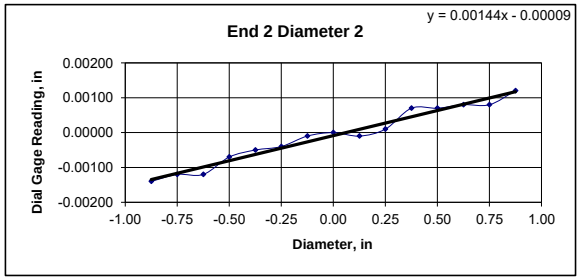
Difference between max and min readings, in:
0° = 0.0024 90° = 0.0026

Maximum difference must be < 0.0020 in. Difference = ± 0.00160
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00164
Angle of Best Fit Line: 0.09380

End 2:
Slope of Best Fit Line 0.00141
Angle of Best Fit Line: 0.08103

Maximum Angular Difference: 0.01277

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00160
Angle of Best Fit Line: 0.09151

End 2:
Slope of Best Fit Line 0.00144
Angle of Best Fit Line: 0.08251

Maximum Angular Difference: 0.00900

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00320	1.990	0.00161	0.092	YES
Diameter 2, in (rotated 90°)	0.00300	1.990	0.00151	0.086	YES
END 2					
Diameter 1, in	0.00240	1.990	0.00121	0.069	YES
Diameter 2, in (rotated 90°)	0.00260	1.990	0.00131	0.075	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/11/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-044	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	29.19-29.56		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/13/2025
Tested By:	jss
Checked By:	smd
Boring ID:	LB-R-044
Sample ID:	---
Depth, ft:	29.19-29.56

After cutting and grinding

After break

Client:	Langan Engineering	Test Date:	6/10/2025
Project Name:	Upstate Confidential Project	Tested By:	jss
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-047		
Sample ID:	---		
Depth (ft):	30.15-30.48		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	3.92	3.92	3.92
Specimen Diameter, in:	1.99	1.99	1.99
Specimen Mass, g:	549.92		
Bulk Density, lb/ft^3	171	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.0	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

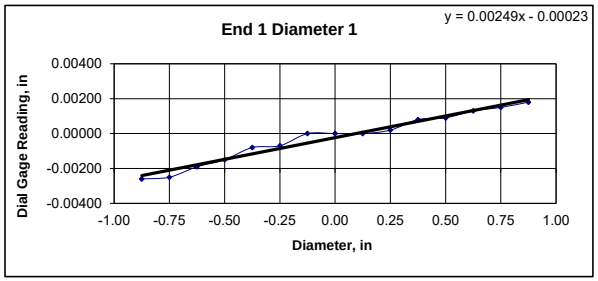
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00260	-0.00250	-0.00190	-0.00150	-0.00080	-0.00070	0.00000	0.00000	0.00000	0.00020	0.00080	0.00090	0.00130	0.00150	0.00180
Diameter 2, in (rotated 90°)	-0.00150	-0.00120	-0.00090	-0.00080	-0.00020	-0.00010	-0.00010	0.00000	-0.00030	0.00030	0.00050	0.00050	0.00090	0.00100	0.00100

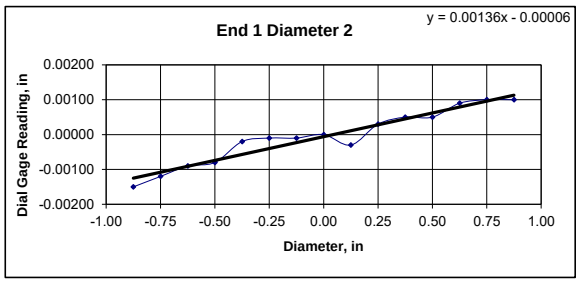
Difference between max and min readings, in:
0° = 0.00440 90° = 0.00250

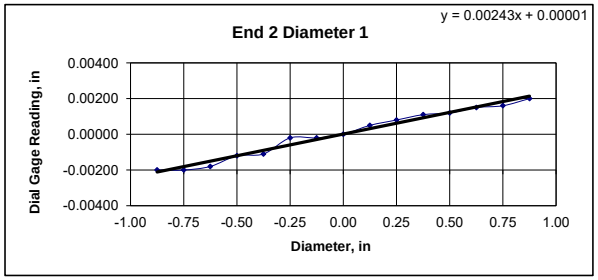
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00200	-0.00200	-0.00180	-0.00120	-0.00110	-0.00020	-0.00020	0.00000	0.00050	0.00080	0.00110	0.00120	0.00150	0.00160	0.00200
Diameter 2, in (rotated 90°)	0.00130	0.00120	0.00090	0.00070	0.00070	0.00050	0.00050	0.00000	0.00000	0.00000	-0.00020	-0.00040	-0.00080	-0.00110	-0.00110

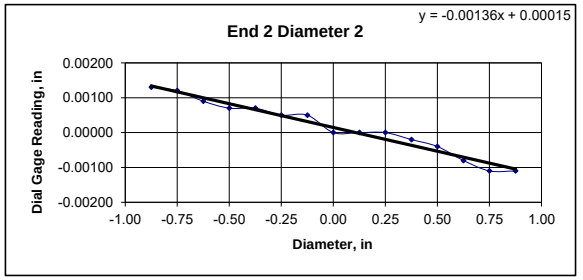
Difference between max and min readings, in:
0° = 0.004 90° = 0.0024

Maximum difference must be < 0.0020 in. Difference = ± 0.00220
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00249
Angle of Best Fit Line: 0.14242

End 2:
Slope of Best Fit Line 0.00243
Angle of Best Fit Line: 0.13915

Maximum Angular Difference: 0.00327

Parallelism Tolerance Met? YES
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00136
Angle of Best Fit Line: 0.07792

End 2:
Slope of Best Fit Line 0.00136
Angle of Best Fit Line: 0.07809

Maximum Angular Difference: 0.00016

Parallelism Tolerance Met? YES
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00440	1.993	0.00221	0.127	YES
Diameter 2, in (rotated 90°)	0.00250	1.993	0.00125	0.072	YES
END 2					
Diameter 1, in	0.00400	1.993	0.00201	0.115	YES
Diameter 2, in (rotated 90°)	0.00240	1.993	0.00120	0.069	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

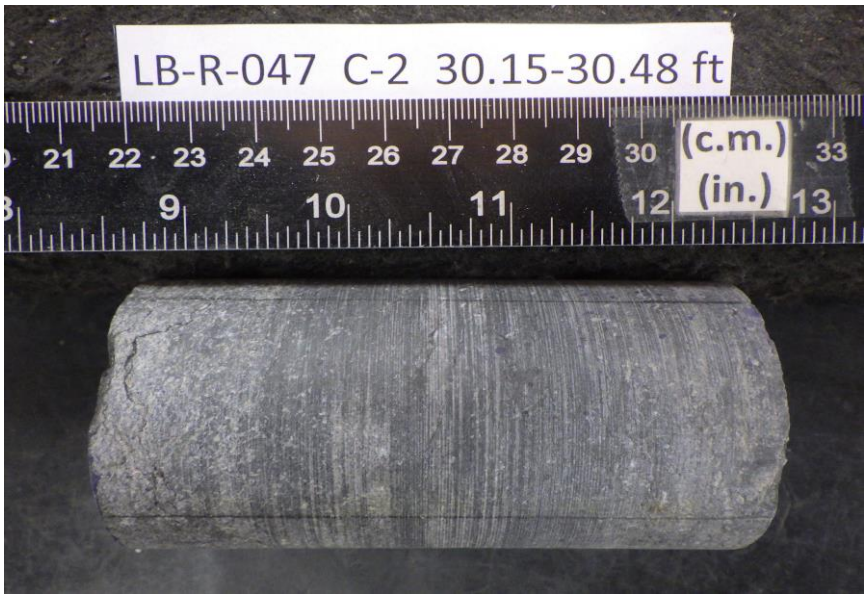
Client:	Langan Engineering	Test Date:	6/10/2025
Project Name:	Upstate Confidential Project	Tested By:	jss
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-047	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	30.15-30.48		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/9/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-047
Sample ID:	---
Depth, ft:	30.15-30.48



After cutting and grinding

After break

Client:	Langan Engineering	Test Date:	6/13/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-048		
Sample ID:	---		
Depth (ft):	29-30		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.42	4.42	4.42
Specimen Diameter, in:	1.99	1.99	1.99
Specimen Mass, g:	633.51		
Bulk Density, lb/ft^3	175	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

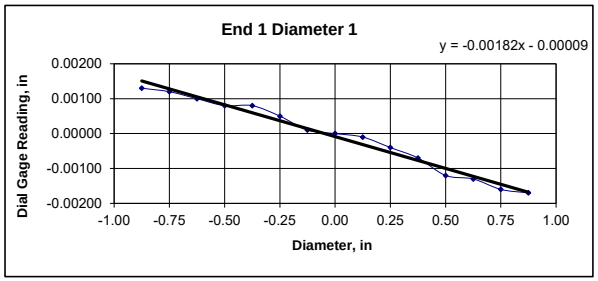
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00130	0.00120	0.00100	0.00080	0.00080	0.00050	0.00010	0.00000	-0.00010	-0.00040	-0.00070	-0.00120	-0.00130	-0.00160	-0.00170
Diameter 2, in (rotated 90°)	-0.00110	-0.00090	-0.00070	-0.00070	-0.00030	-0.00030	-0.00020	0.00000	0.00010	0.00010	0.00010	0.00050	0.00040	0.00050	0.00050

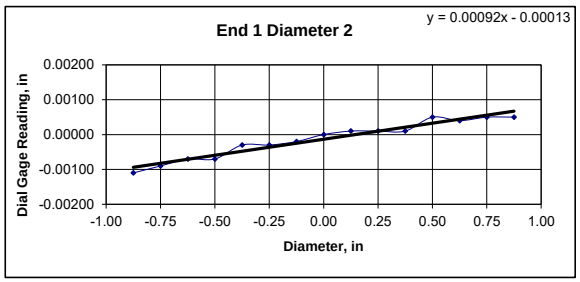
Difference between max and min readings, in:
0° = 0.00300 90° = 0.00160

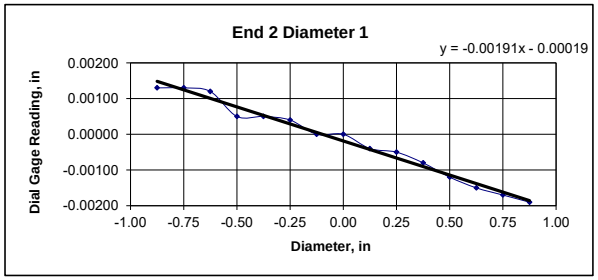
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00130	0.00130	0.00120	0.00050	0.00050	0.00040	0.00000	0.00000	-0.00040	-0.00050	-0.00080	-0.00120	-0.00150	-0.00170	-0.00190
Diameter 2, in (rotated 90°)	0.00050	0.00040	0.00040	0.00040	0.00020	-0.00010	-0.00010	0.00000	-0.00010	-0.00030	-0.00070	-0.00090	-0.00100	-0.00140	-0.00160

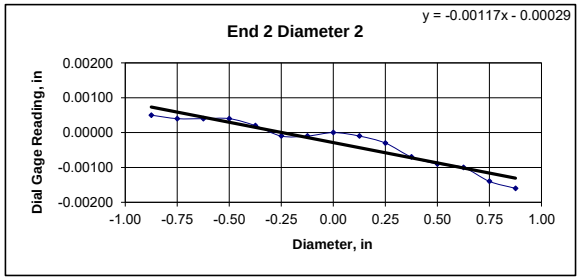
Difference between max and min readings, in:
0° = 0.0032 90° = 0.0021

Maximum difference must be < 0.0020 in. Difference = ± 0.00160
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00182
Angle of Best Fit Line: 0.10444

End 2:
Slope of Best Fit Line 0.00191
Angle of Best Fit Line: 0.10935

Maximum Angular Difference: 0.00491

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00092
Angle of Best Fit Line: 0.05271

End 2:
Slope of Best Fit Line 0.00117
Angle of Best Fit Line: 0.06679

Maximum Angular Difference: 0.01408

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00300	1.990	0.00151	0.086	YES
Diameter 2, in (rotated 90°)	0.00160	1.990	0.00080	0.046	YES
END 2					
Diameter 1, in	0.00320	1.990	0.00161	0.092	YES
Diameter 2, in (rotated 90°)	0.00210	1.990	0.00106	0.060	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/13/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-048	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	29-30		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/18/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-048
Sample ID:	---
Depth, ft:	29-30

After cutting and grinding

After break

GeoTesting EXPRESS
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Client:	Langan Engineering	Test Date:	6/12/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-051		
Sample ID:	---		
Depth (ft):	34.07-34.45		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.39	4.40	4.40
Specimen Diameter, in:	1.98	1.98	1.98
Specimen Mass, g:	619.76		
Bulk Density, lb/ft^3	174	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

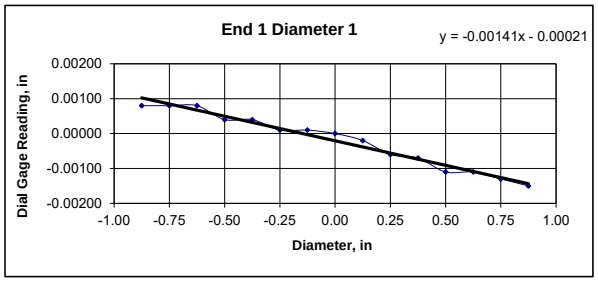
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00080	0.00080	0.00080	0.00040	0.00040	0.00010	0.00010	0.00000	-0.00020	-0.00060	-0.00070	-0.00110	-0.00110	-0.00130	-0.00150
Diameter 2, in (rotated 90°)	-0.00200	-0.00170	-0.00140	-0.00120	-0.00090	-0.00040	-0.00020	0.00000	0.00020	0.00060	0.00120	0.00120	0.00140	0.00190	0.00190

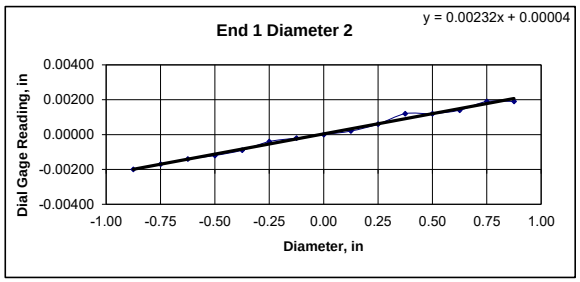
Difference between max and min readings, in:
0° = 0.00230 90° = 0.00390

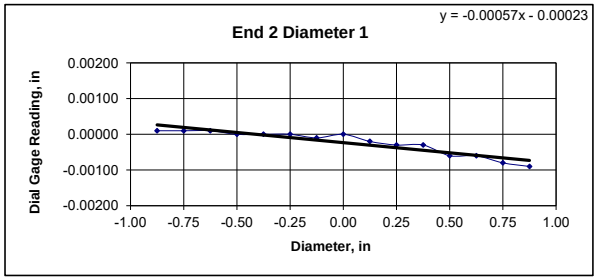
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00010	0.00010	0.00010	0.00000	0.00000	0.00000	-0.00010	0.00000	-0.00020	-0.00030	-0.00030	-0.00060	-0.00060	-0.00080	-0.00090
Diameter 2, in (rotated 90°)	0.00170	0.00160	0.00140	0.00100	0.00080	0.00080	0.00020	0.00000	-0.00020	-0.00040	-0.00090	-0.00120	-0.00130	-0.00160	-0.00200

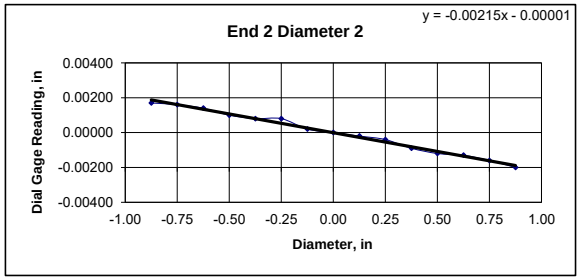
Difference between max and min readings, in:
0° = 0.001 90° = 0.0037

Maximum difference must be < 0.0020 in. Difference = ± 0.00195
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00141
Angle of Best Fit Line: 0.08054

End 2:
Slope of Best Fit Line 0.00057
Angle of Best Fit Line: 0.03258

Maximum Angular Difference: 0.04796

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00232
Angle of Best Fit Line: 0.13293

End 2:
Slope of Best Fit Line 0.00215
Angle of Best Fit Line: 0.12327

Maximum Angular Difference: 0.00966

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00230	1.980	0.00116	0.067	YES
Diameter 2, in (rotated 90°)	0.00390	1.980	0.00197	0.113	YES
END 2					
Diameter 1, in	0.00100	1.980	0.00051	0.029	YES
Diameter 2, in (rotated 90°)	0.00370	1.980	0.00187	0.107	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

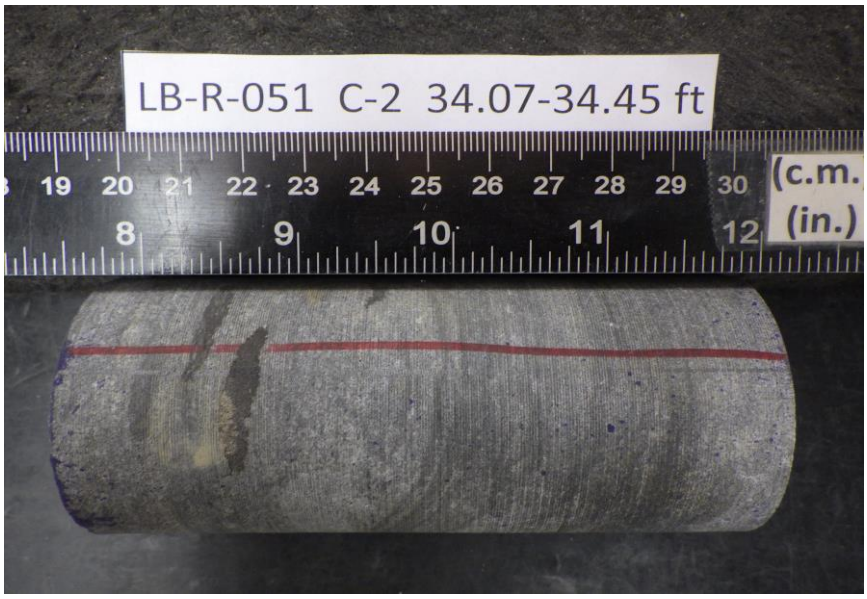
Client:	Langan Engineering	Test Date:	6/12/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-051	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	34.07-34.45		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/13/2025
Tested By:	jss
Checked By:	smd
Boring ID:	LB-R-051
Sample ID:	---
Depth, ft:	34.07-34.45



After cutting and grinding

After break

Client:	Langan Engineering	Test Date:	6/10/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-055		
Sample ID:	---		
Depth (ft):	35.5-36.5		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.32	4.32	4.32
Specimen Diameter, in:	1.97	1.97	1.97
Specimen Mass, g:	590.33		
Bulk Density, lb/ft^3	170	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? NO

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? NO

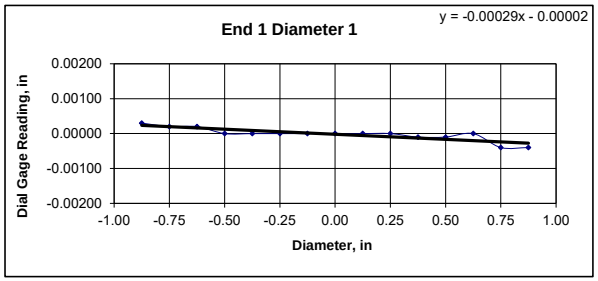
END FLATNESS AND PARALLELISM (Procedure FP1)

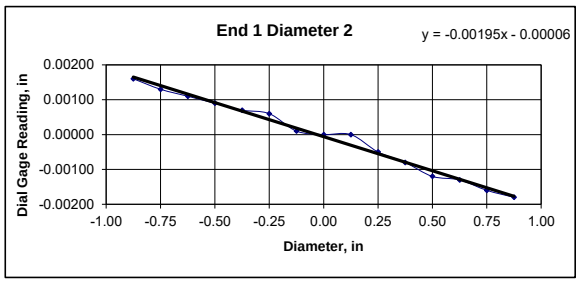
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00030	0.00020	0.00020	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	-0.00010	-0.00010	0.00000	-0.00040	-0.00040
Diameter 2, in (rotated 90°)	0.00160	0.00130	0.00110	0.00090	0.00070	0.00060	0.00010	0.00000	0.00000	-0.00050	-0.00080	-0.00120	-0.00130	-0.00160	-0.00180

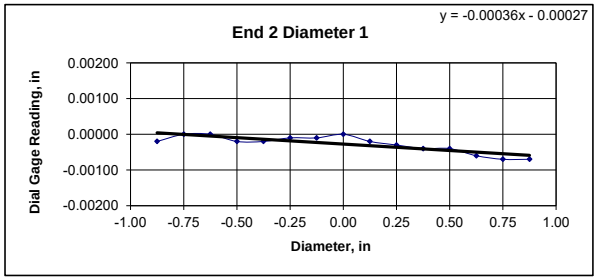
Difference between max and min readings, in:
0° = 0.00070 90° = 0.00340

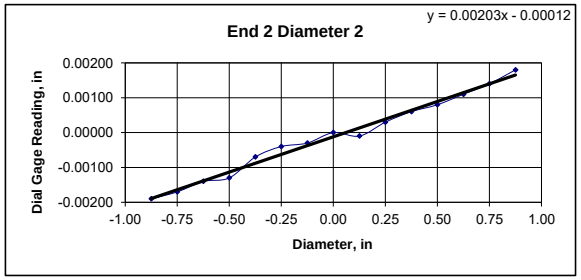
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00020	0.00000	0.00000	-0.00020	-0.00020	-0.00010	-0.00010	0.00000	-0.00020	-0.00030	-0.00040	-0.00040	-0.00060	-0.00070	-0.00070
Diameter 2, in (rotated 90°)	-0.00190	-0.00170	-0.00140	-0.00130	-0.00070	-0.00040	-0.00030	0.00000	-0.00010	0.00030	0.00060	0.00080	0.00110	0.00140	0.00180

Difference between max and min readings, in:
0° = 0.0007 90° = 0.0037
Maximum difference must be < 0.0020 in. Difference = ± 0.00185
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00029
Angle of Best Fit Line: 0.01670

End 2:
Slope of Best Fit Line 0.00036
Angle of Best Fit Line: 0.02063

Maximum Angular Difference: 0.00393

Parallelism Tolerance Met? YES
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00195
Angle of Best Fit Line: 0.11197

End 2:
Slope of Best Fit Line 0.00203
Angle of Best Fit Line: 0.11606

Maximum Angular Difference: 0.00409

Parallelism Tolerance Met? YES
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00070	1.970	0.00036	0.020	YES
Diameter 2, in (rotated 90°)	0.00340	1.970	0.00173	0.099	YES
END 2					
Diameter 1, in	0.00070	1.970	0.00036	0.020	YES
Diameter 2, in (rotated 90°)	0.00370	1.970	0.00188	0.108	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/10/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-055	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	35.5-36.5		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS

END 1

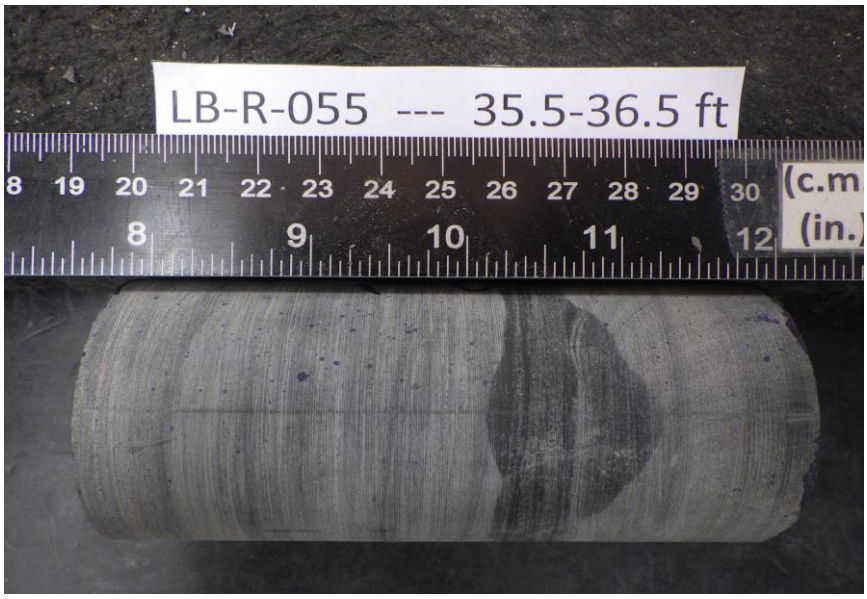
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

END 2

Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/12/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-055
Sample ID:	---
Depth, ft:	35.5-36.5



After cutting and grinding

After break

Client:	Langan Engineering	Test Date:	6/16/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-055		
Sample ID:	---		
Depth (ft):	39.5-40.5		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.21	4.21	4.21
Specimen Diameter, in:	1.97	1.97	1.97
Specimen Mass, g:	594.57		
Bulk Density, lb/ft^3	176	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.1	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

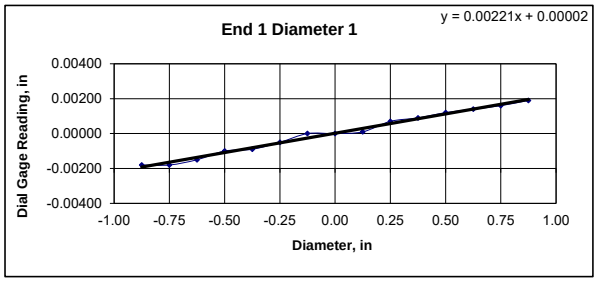
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00180	-0.00180	-0.00150	-0.00100	-0.00090	-0.00050	0.00000	0.00000	0.00010	0.00070	0.00090	0.00120	0.00140	0.00160	0.00190
Diameter 2, in (rotated 90°)	0.00010	0.00030	0.00030	0.00020	0.00020	0.00030	0.00010	0.00000	-0.00010	-0.00020	-0.00020	-0.00030	-0.00040	-0.00040	-0.00060

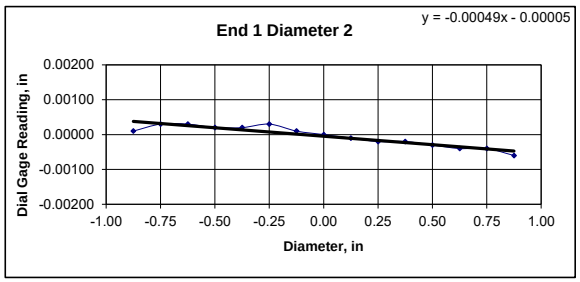
Difference between max and min readings, in:
0° = 0.00370 90° = 0.00090

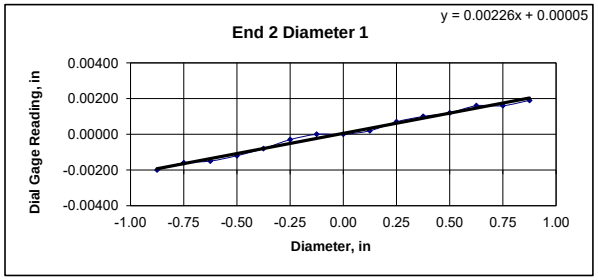
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00200	-0.00160	-0.00150	-0.00120	-0.00080	-0.00030	0.00000	0.00000	0.00020	0.00070	0.00100	0.00120	0.00160	0.00160	0.00190
Diameter 2, in (rotated 90°)	-0.00040	-0.00030	-0.00030	-0.00020	-0.00010	0.00010	-0.00010	0.00000	-0.00020	-0.00030	-0.00040	-0.00030	-0.00030	-0.00020	-0.00020

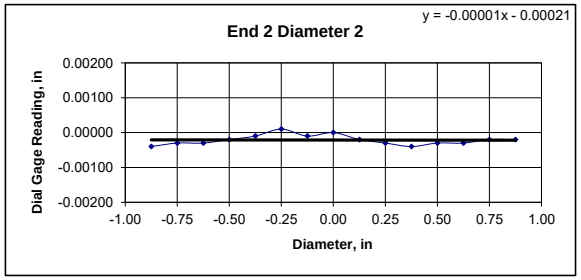
Difference between max and min readings, in:
0° = 0.0039 90° = 0.0005

Maximum difference must be < 0.0020 in. Difference = ± 0.00195
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00221
Angle of Best Fit Line: 0.12687

End 2:
Slope of Best Fit Line 0.00226
Angle of Best Fit Line: 0.12965

Maximum Angular Difference: 0.00278

Parallelism Tolerance Met? YES
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00049
Angle of Best Fit Line: 0.02783

End 2:
Slope of Best Fit Line 0.00001
Angle of Best Fit Line: 0.00033

Maximum Angular Difference: 0.02750

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00370	1.970	0.00188	0.108	YES
Diameter 2, in (rotated 90°)	0.00090	1.970	0.00046	0.026	YES
END 2					
Diameter 1, in	0.00390	1.970	0.00198	0.113	YES
Diameter 2, in (rotated 90°)	0.00050	1.970	0.00025	0.015	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/16/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-055	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	39.5-40.5		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS

END 1

Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

END 2

Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/18/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-055
Sample ID:	---
Depth, ft:	39.5-40.5

After cutting and grinding

After break

GeoTesting EXPRESS
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Client:	Langan Engineering	Test Date:	6/19/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-057		
Sample ID:	---		
Depth (ft):	30.05-30.44		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.42	4.42	4.42
Specimen Diameter, in:	1.98	1.98	1.98
Specimen Mass, g:	612.12		
Bulk Density, lb/ft^3	171	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

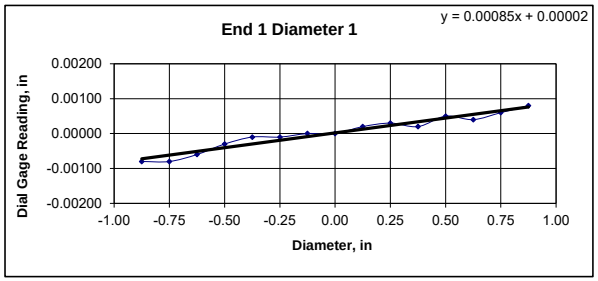
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00080	-0.00080	-0.00060	-0.00030	-0.00010	-0.00010	0.00000	0.00000	0.00020	0.00030	0.00020	0.00050	0.00040	0.00060	0.00080
Diameter 2, in (rotated 90°)	-0.00180	-0.00170	-0.00130	-0.00100	-0.00070	-0.00030	-0.00020	0.00000	0.00010	0.00060	0.00090	0.00120	0.00140	0.00150	0.00170

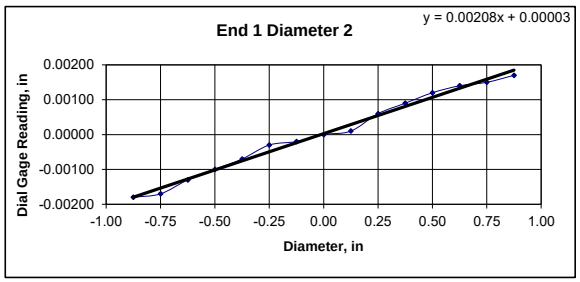
Difference between max and min readings, in:
0° = 0.00160 90° = 0.00350

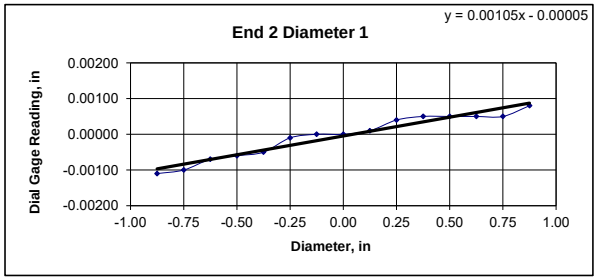
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00110	-0.00100	-0.00070	-0.00060	-0.00050	-0.00010	0.00000	0.00000	0.00010	0.00040	0.00050	0.00050	0.00050	0.00050	0.00080
Diameter 2, in (rotated 90°)	0.00160	0.00130	0.00120	0.00090	0.00050	0.00010	0.00000	0.00000	-0.00020	-0.00040	-0.00100	-0.00110	-0.00150	-0.00180	-0.00200

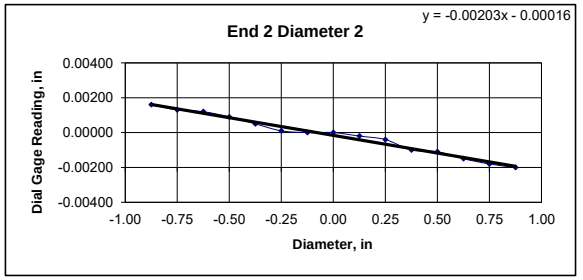
Difference between max and min readings, in:
0° = 0.0019 90° = 0.0036

Maximum difference must be < 0.0020 in. Difference = ± 0.00180
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00085
Angle of Best Fit Line: 0.04862

End 2:
Slope of Best Fit Line 0.00105
Angle of Best Fit Line: 0.06024

Maximum Angular Difference: 0.01162

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00208
Angle of Best Fit Line: 0.11934

End 2:
Slope of Best Fit Line 0.00203
Angle of Best Fit Line: 0.11623

Maximum Angular Difference: 0.00311

Parallelism Tolerance Met? YES
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00160	1.980	0.00081	0.046	YES
Diameter 2, in (rotated 90°)	0.00350	1.980	0.00177	0.101	YES
END 2					
Diameter 1, in	0.00190	1.980	0.00096	0.055	YES
Diameter 2, in (rotated 90°)	0.00360	1.980	0.00182	0.104	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/19/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-057	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	C-1		
Depth (ft):	30.05-30.44		
Visual Description:	See photographs		

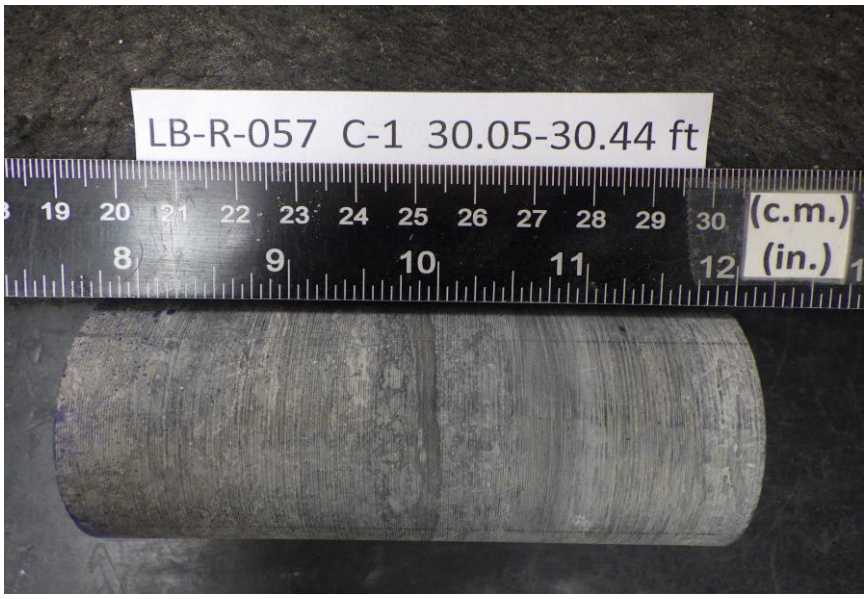
BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS

END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/19/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-057
Sample ID:	---
Depth, ft:	30.05-30.44



After cutting and grinding

After break

Client:	Langan Engineering	Test Date:	6/10/2025
Project Name:	Upstate Confidential Project	Tested By:	jss
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-058		
Sample ID:	---		
Depth (ft):	30.5-31.5		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.25	4.25	4.25
Specimen Diameter, in:	1.99	1.98	1.98
Specimen Mass, g:	588.01		
Bulk Density, lb/ft^3	170	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.1	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? NO

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? NO

END FLATNESS AND PARALLELISM (Procedure FP1)

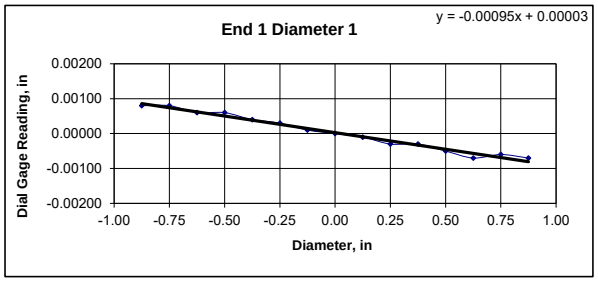
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00080	0.00080	0.00060	0.00060	0.00040	0.00030	0.00010	0.00000	-0.00010	-0.00030	-0.00030	-0.00050	-0.00070	-0.00060	-0.00070
Diameter 2, in (rotated 90°)	-0.00210	-0.00170	-0.00140	-0.00090	-0.00060	-0.00030	0.00010	0.00000	0.00060	0.00050	0.00120	0.00100	0.00150	0.00170	0.00280

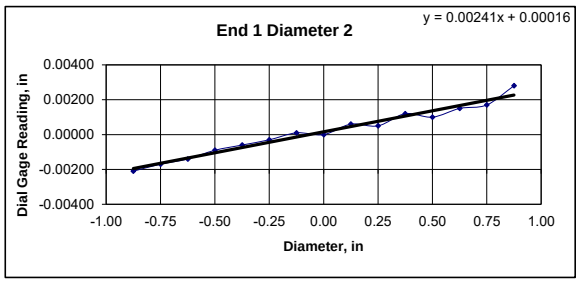
Difference between max and min readings, in:
0° = 0.00150 90° = 0.00490

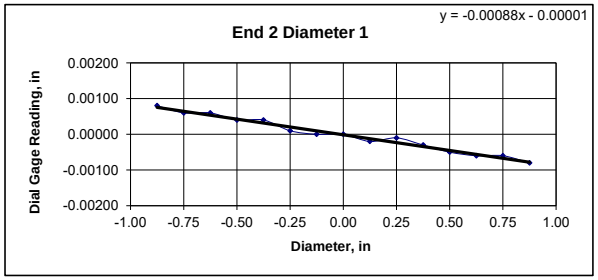
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00080	0.00060	0.00060	0.00040	0.00040	0.00010	0.00000	0.00000	-0.00020	-0.00010	-0.00030	-0.00050	-0.00060	-0.00060	-0.00080
Diameter 2, in (rotated 90°)	0.00200	0.00160	0.00150	0.00130	0.00080	0.00070	0.00040	0.00000	-0.00010	-0.00060	-0.00090	-0.00120	-0.00150	-0.00170	-0.00210

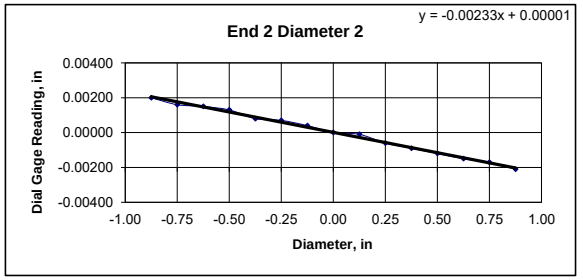
Difference between max and min readings, in:
0° = 0.0016 90° = 0.0041

Maximum difference must be < 0.0020 in. Difference = ± 0.00245
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00095
Angle of Best Fit Line: 0.05451

End 2:
Slope of Best Fit Line 0.00088
Angle of Best Fit Line: 0.05026

Maximum Angular Difference: 0.00426

Parallelism Tolerance Met? YES
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00241
Angle of Best Fit Line: 0.13800

End 2:
Slope of Best Fit Line 0.00233
Angle of Best Fit Line: 0.13374

Maximum Angular Difference: 0.00426

Parallelism Tolerance Met? YES
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00150	1.984	0.00076	0.043	YES
Diameter 2, in (rotated 90°)	0.00490	1.984	0.00247	0.142	YES
END 2					
Diameter 1, in	0.00160	1.984	0.00081	0.046	YES
Diameter 2, in (rotated 90°)	0.00410	1.984	0.00207	0.118	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

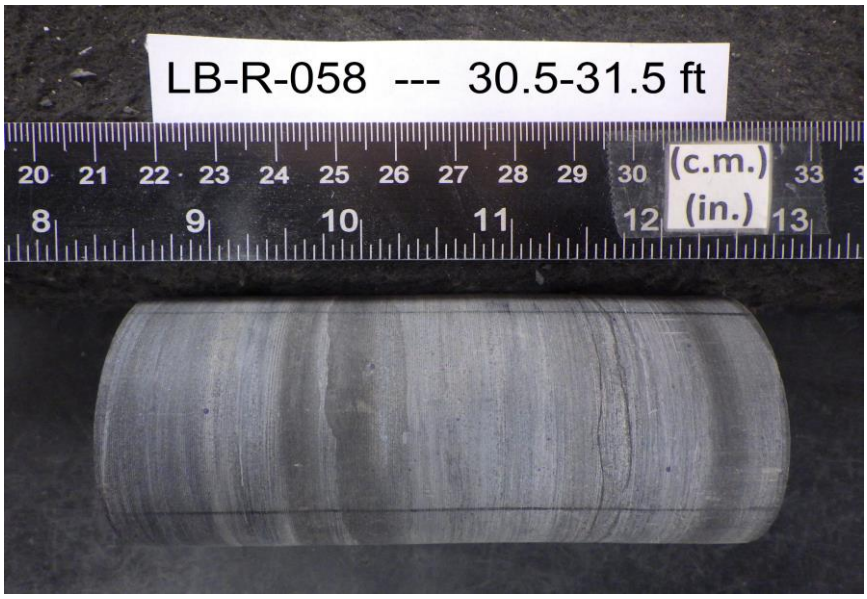
Client:	Langan Engineering	Test Date:	6/10/2025
Project Name:	Upstate Confidential Project	Tested By:	jss
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-058	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	30.5-31.5		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/9/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-058
Sample ID:	---
Depth, ft:	30.5-31.5



After cutting and grinding

After break

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Client:	Langan Engineering	Test Date:	6/16/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-058		
Sample ID:	C-2		
Depth (ft):	36-36.75		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.27	4.28	4.28
Specimen Diameter, in:	1.98	1.98	1.98
Specimen Mass, g:	611.85		
Bulk Density, lb/ft^3	177	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? NO

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? NO

END FLATNESS AND PARALLELISM (Procedure FP1)

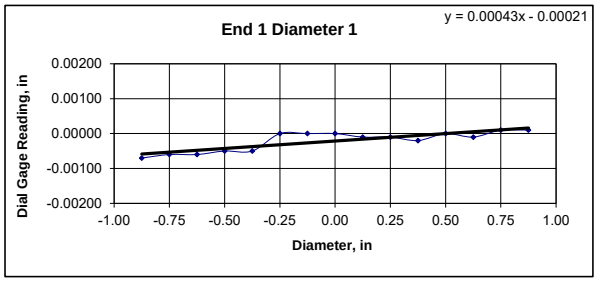
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00070	-0.00060	-0.00060	-0.00050	-0.00050	0.00000	0.00000	0.00000	-0.00010	-0.00010	-0.00020	0.00000	-0.00010	0.00010	0.00010
Diameter 2, in (rotated 90°)	-0.00180	-0.00170	-0.00110	-0.00110	-0.00080	-0.00060	-0.00030	0.00000	0.00030	0.00060	0.00110	0.00130	0.00150	0.00170	0.00190

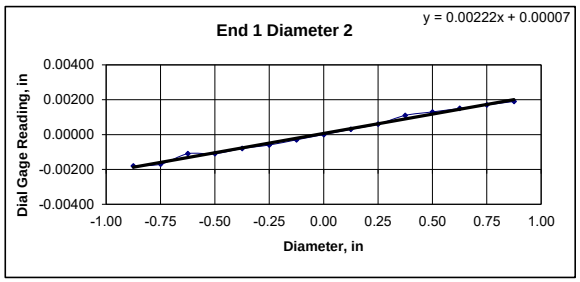
Difference between max and min readings, in:
0° = 0.00080 90° = 0.00370

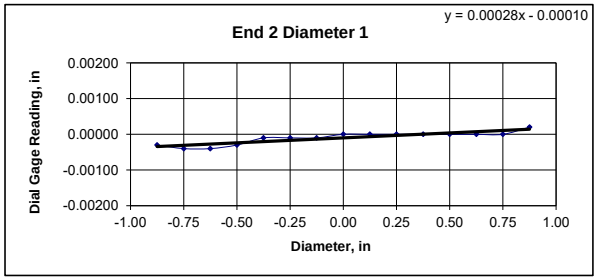
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00030	-0.00040	-0.00040	-0.00030	-0.00010	-0.00010	-0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00020
Diameter 2, in (rotated 90°)	0.00140	0.00140	0.00100	0.00060	0.00060	0.00020	0.00020	0.00000	-0.00030	-0.00050	-0.00100	-0.00130	-0.00160	-0.00160	-0.00200

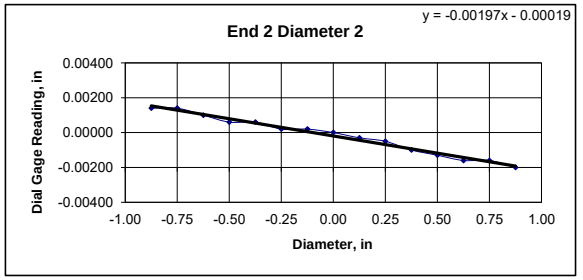
Difference between max and min readings, in:
0° = 0.0006 90° = 0.0034

Maximum difference must be < 0.0020 in. Difference = ± 0.00185
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00043
Angle of Best Fit Line: 0.02439

End 2:
Slope of Best Fit Line 0.00028
Angle of Best Fit Line: 0.01588

Maximum Angular Difference: 0.00851

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00222
Angle of Best Fit Line: 0.12703

End 2:
Slope of Best Fit Line 0.00197
Angle of Best Fit Line: 0.11312

Maximum Angular Difference: 0.01391

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00080	1.980	0.00040	0.023	YES
Diameter 2, in (rotated 90°)	0.00370	1.980	0.00187	0.107	YES
END 2					
Diameter 1, in	0.00060	1.980	0.00030	0.017	YES
Diameter 2, in (rotated 90°)	0.00340	1.980	0.00172	0.098	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

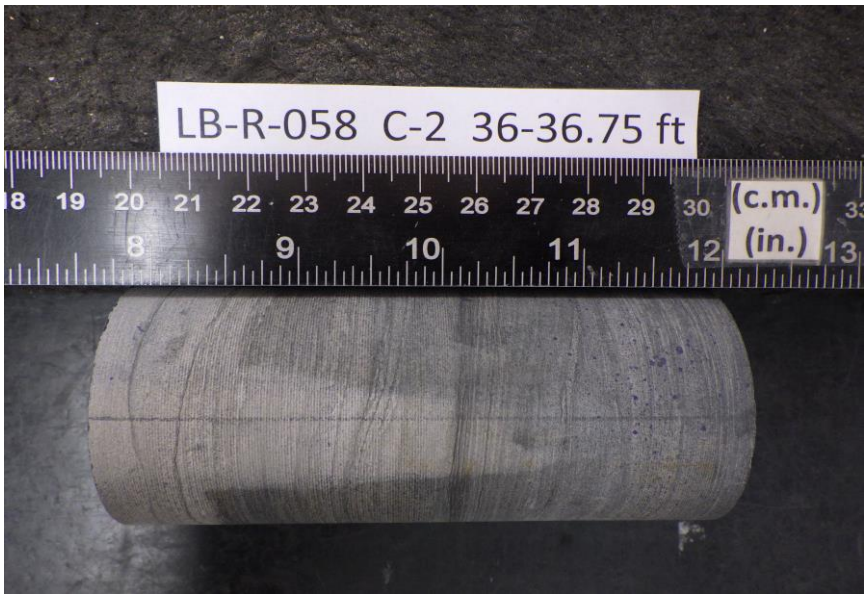
Client:	Langan Engineering	Test Date:	6/16/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-058	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	36-36.75		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/18/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-058
Sample ID:	---
Depth, ft:	36-36.75



After cutting and grinding

After break

GeoTesting EXPRESS
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Client:	Langan Engineering	Test Date:	6/16/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-059		
Sample ID:	---		
Depth (ft):	34.54-34.91		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.27	4.27	4.27
Specimen Diameter, in:	1.97	1.97	1.97
Specimen Mass, g:	594.8		
Bulk Density, lb/ft^3	174	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

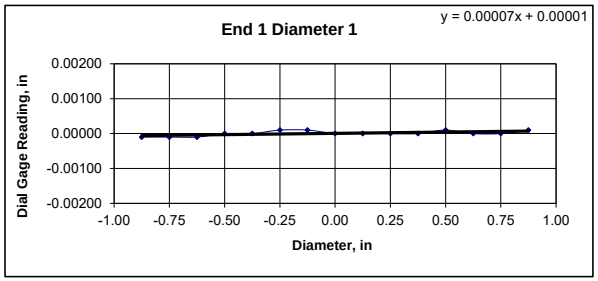
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00010	-0.00010	-0.00010	0.00000	0.00000	0.00010	0.00010	0.00000	0.00000	0.00000	0.00000	0.00010	0.00000	0.00000	0.00010
Diameter 2, in (rotated 90°)	-0.00160	-0.00130	-0.00120	-0.00100	-0.00050	-0.00030	-0.00020	0.00000	0.00010	0.00040	0.00080	0.00100	0.00110	0.00150	0.00160

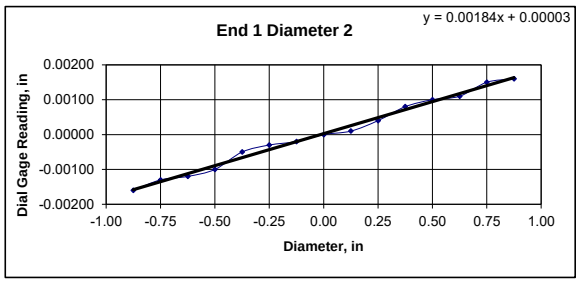
Difference between max and min readings, in:
0° = 0.00020 90° = 0.00320

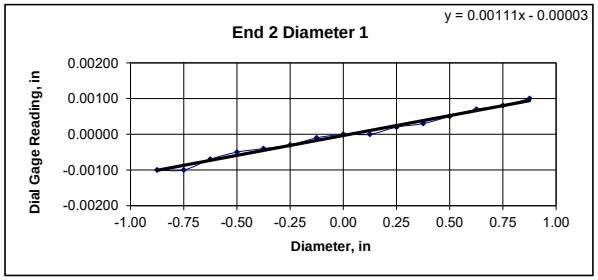
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00100	-0.00100	-0.00070	-0.00050	-0.00040	-0.00030	-0.00010	0.00000	0.00000	0.00020	0.00030	0.00050	0.00070	0.00080	0.00100
Diameter 2, in (rotated 90°)	0.00180	0.00170	0.00140	0.00120	0.00090	0.00060	0.00030	0.00000	-0.00040	-0.00040	-0.00090	-0.00110	-0.00140	-0.00190	-0.00210

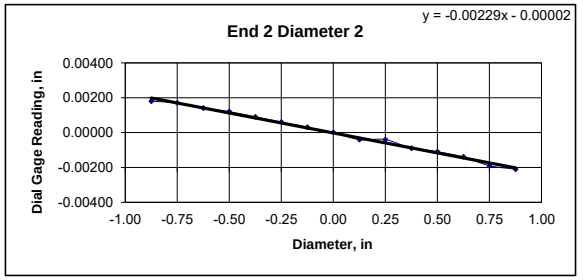
Difference between max and min readings, in:
0° = 0.002 90° = 0.0039

Maximum difference must be < 0.0020 in. Difference = ± 0.00195
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00007
Angle of Best Fit Line: 0.00426

End 2:
Slope of Best Fit Line 0.00111
Angle of Best Fit Line: 0.06384

Maximum Angular Difference: 0.05959

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00184
Angle of Best Fit Line: 0.10526

End 2:
Slope of Best Fit Line 0.00229
Angle of Best Fit Line: 0.13129

Maximum Angular Difference: 0.02603

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00020	1.970	0.00010	0.006	YES
Diameter 2, in (rotated 90°)	0.00320	1.970	0.00162	0.093	YES
END 2					
Diameter 1, in	0.00200	1.970	0.00102	0.058	YES
Diameter 2, in (rotated 90°)	0.00390	1.970	0.00198	0.113	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

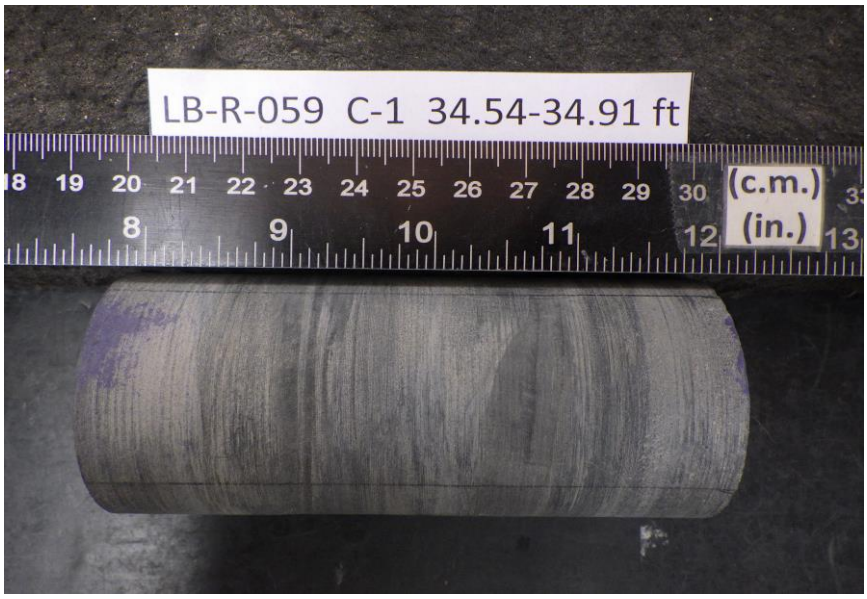
Client:	Langan Engineering	Test Date:	6/16/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-059	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	34.54-34.91		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/18/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-059
Sample ID:	---
Depth, ft:	34.54-34.91



After cutting and grinding

After break

Client:	Langan Engineering	Test Date:	6/13/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-059		
Sample ID:	---		
Depth (ft):	40-41		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.30	4.30	4.30
Specimen Diameter, in:	1.98	1.98	1.98
Specimen Mass, g:	599.7		
Bulk Density, lb/ft^3	172	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

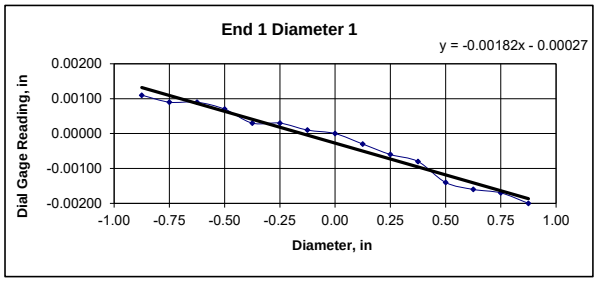
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00110	0.00090	0.00090	0.00070	0.00030	0.00030	0.00010	0.00000	-0.00030	-0.00060	-0.00080	-0.00140	-0.00160	-0.00170	-0.00200
Diameter 2, in (rotated 90°)	-0.00120	-0.00120	-0.00110	-0.00050	-0.00040	-0.00020	0.00010	0.00000	0.00010	0.00030	0.00060	0.00060	0.00110	0.00110	0.00130

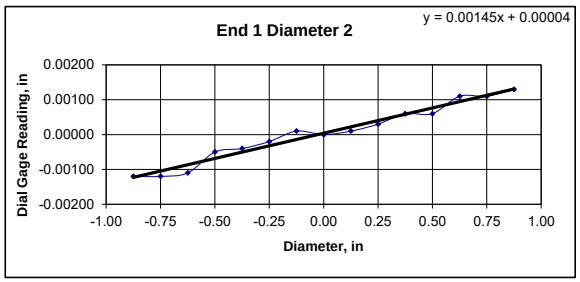
Difference between max and min readings, in:
0° = 0.00310 90° = 0.00250

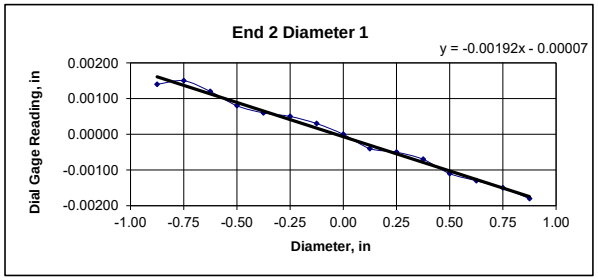
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00140	0.00150	0.00120	0.00080	0.00060	0.00050	0.00030	0.00000	-0.00040	-0.00050	-0.00070	-0.00110	-0.00130	-0.00150	-0.00180
Diameter 2, in (rotated 90°)	0.00110	0.00080	0.00080	0.00040	0.00020	0.00010	0.00000	0.00000	-0.00020	-0.00060	-0.00100	-0.00120	-0.00140	-0.00150	-0.00170

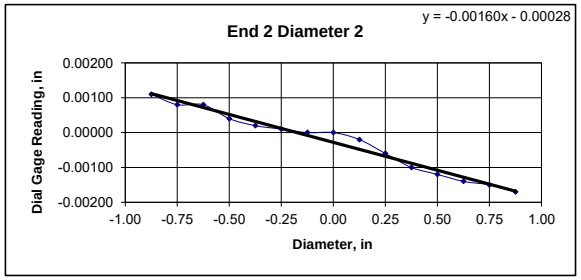
Difference between max and min readings, in:
0° = 0.0033 90° = 0.0028

Maximum difference must be < 0.0020 in. Difference = ± 0.00165
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00182
Angle of Best Fit Line: 0.10428

End 2:
Slope of Best Fit Line 0.00192
Angle of Best Fit Line: 0.10984

Maximum Angular Difference: 0.00557

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00145
Angle of Best Fit Line: 0.08300

End 2:
Slope of Best Fit Line 0.00160
Angle of Best Fit Line: 0.09167

Maximum Angular Difference: 0.00868

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00310	1.980	0.00157	0.090	YES
Diameter 2, in (rotated 90°)	0.00250	1.980	0.00126	0.072	YES
END 2					
Diameter 1, in	0.00330	1.980	0.00167	0.095	YES
Diameter 2, in (rotated 90°)	0.00280	1.980	0.00141	0.081	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

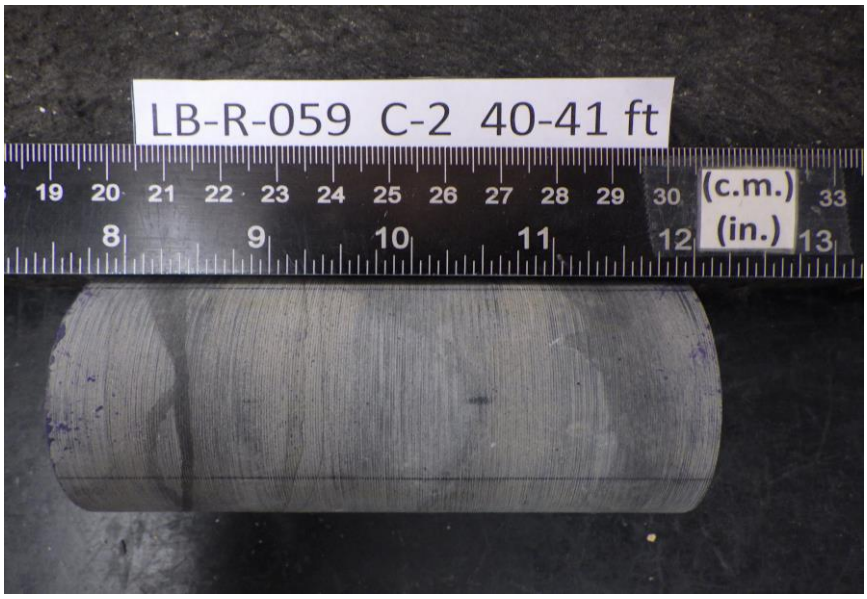
Client:	Langan Engineering	Test Date:	6/18/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-059	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	40-41		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

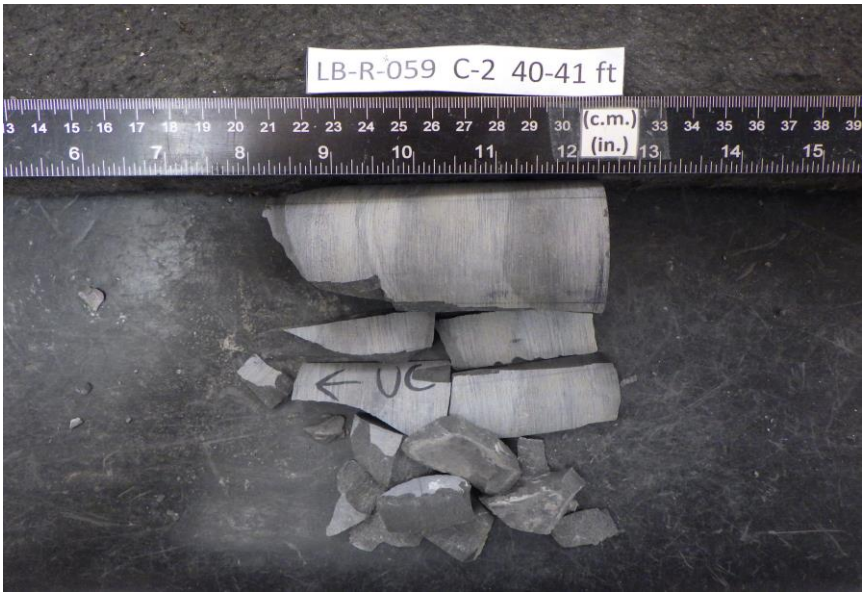
END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/19/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-059
Sample ID:	---
Depth, ft:	40-41



After cutting and grinding



After break

Client:	Langan Engineering	Test Date:	6/10/2025
Project Name:	Upstate Confidential Project	Tested By:	jss
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-060		
Sample ID:	---		
Depth (ft):	30.53-30.91		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.22	4.22	4.22
Specimen Diameter, in:	1.98	1.98	1.98
Specimen Mass, g:	591.29		
Bulk Density, lb/ft^3	174	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.1	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? NO

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? NO

END FLATNESS AND PARALLELISM (Procedure FP1)

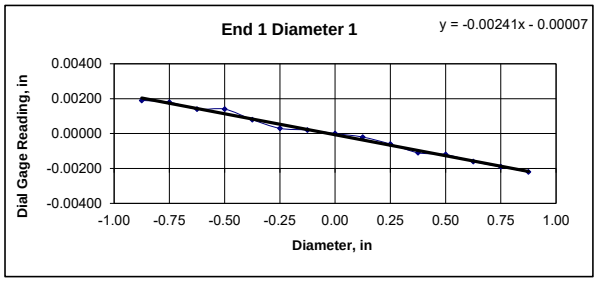
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00190	0.00180	0.00140	0.00140	0.00080	0.00030	0.00020	0.00000	-0.00020	-0.00060	-0.00110	-0.00120	-0.00160	-0.00190	-0.00220
Diameter 2, in (rotated 90°)	-0.00170	-0.00140	-0.00130	-0.00090	-0.00060	-0.00020	-0.00010	0.00000	0.00000	0.00020	0.00030	0.00060	0.00070	0.00100	0.00090

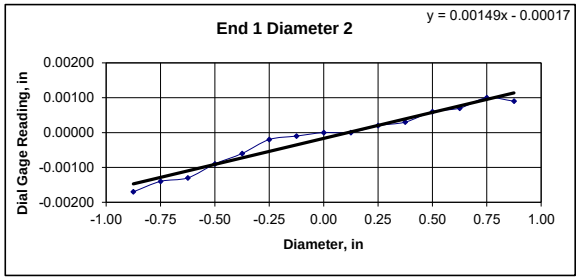
Difference between max and min readings, in:
0° = 0.00410 90° = 0.00270

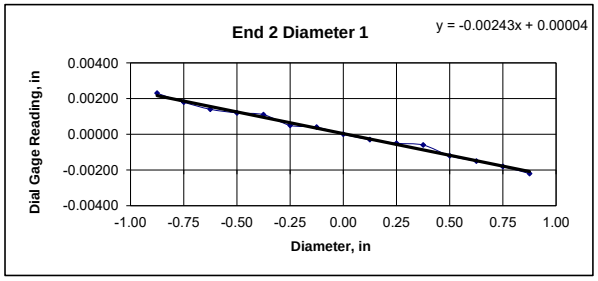
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00230	0.00180	0.00140	0.00120	0.00110	0.00050	0.00040	0.00000	-0.00030	-0.00050	-0.00060	-0.00120	-0.00150	-0.00180	-0.00220
Diameter 2, in (rotated 90°)	0.00050	0.00050	0.00040	0.00020	0.00010	0.00010	0.00000	0.00000	-0.00020	-0.00020	-0.00060	-0.00090	-0.00110	-0.00110	-0.00130

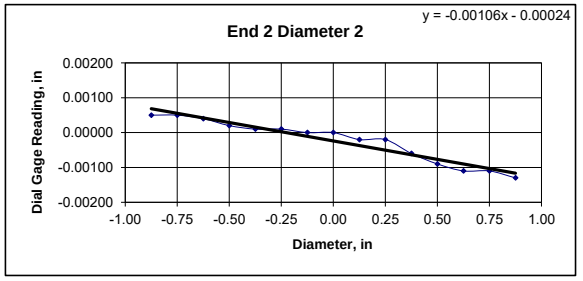
Difference between max and min readings, in:
0° = 0.0045 90° = 0.0018

Maximum difference must be < 0.0020 in. Difference = ± 0.00225
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00241
Angle of Best Fit Line: 0.13784

End 2:
Slope of Best Fit Line 0.00243
Angle of Best Fit Line: 0.13915

Maximum Angular Difference: 0.00131

Parallelism Tolerance Met? YES
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00149
Angle of Best Fit Line: 0.08545

End 2:
Slope of Best Fit Line 0.00106
Angle of Best Fit Line: 0.06057

Maximum Angular Difference: 0.02488

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00410	1.976	0.00207	0.119	YES
Diameter 2, in (rotated 90°)	0.00270	1.976	0.00137	0.078	YES
END 2					
Diameter 1, in	0.00450	1.976	0.00228	0.130	YES
Diameter 2, in (rotated 90°)	0.00180	1.976	0.00091	0.052	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/10/2025
Project Name:	Upstate Confidential Project	Tested By:	jss
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-060	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	30.53-30.91		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS

END 1

Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

END 2

Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/9/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-060
Sample ID:	---
Depth, ft:	30.53-30.91

After cutting and grinding

After break

GeoTesting EXPRESS
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Client:	Langan Engineering	Test Date:	6/12/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-062		
Sample ID:	---		
Depth (ft):	32-33		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.36	4.36	4.36
Specimen Diameter, in:	1.98	1.98	1.98
Specimen Mass, g:	605.95		
Bulk Density, lb/ft^3	172	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? NO

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? NO

END FLATNESS AND PARALLELISM (Procedure FP1)

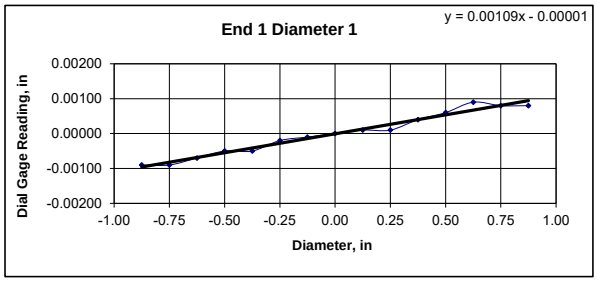
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00090	-0.00090	-0.00070	-0.00050	-0.00050	-0.00020	-0.00010	0.00000	0.00010	0.00010	0.00040	0.00060	0.00090	0.00080	0.00080
Diameter 2, in (rotated 90°)	-0.00150	-0.00140	-0.00100	-0.00070	-0.00050	-0.00040	-0.00030	0.00000	0.00040	0.00050	0.00100	0.00110	0.00120	0.00140	0.00190

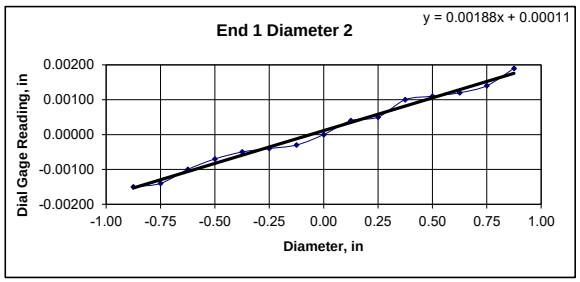
Difference between max and min readings, in:
0° = 0.00180 90° = 0.00340

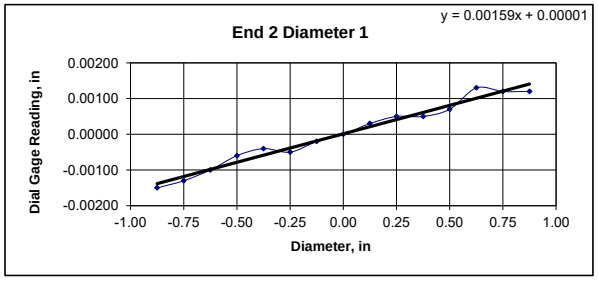
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00150	-0.00130	-0.00100	-0.00060	-0.00040	-0.00050	-0.00020	0.00000	0.00030	0.00050	0.00050	0.00070	0.00130	0.00120	0.00120
Diameter 2, in (rotated 90°)	0.00180	0.00120	0.00110	0.00080	0.00080	0.00030	0.00020	0.00000	-0.00030	-0.00030	-0.00090	-0.00120	-0.00120	-0.00190	-0.00200

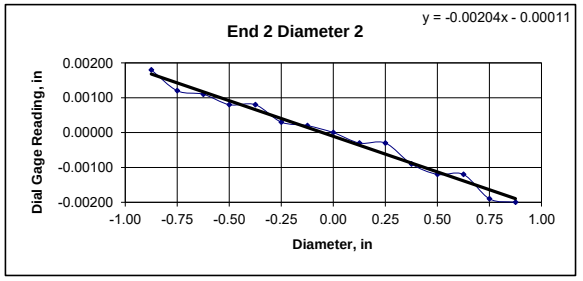
Difference between max and min readings, in:
0° = 0.0028 90° = 0.0038

Maximum difference must be < 0.0020 in. Difference = ± 0.00190
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00109
Angle of Best Fit Line: 0.06221

End 2:
Slope of Best Fit Line 0.00159
Angle of Best Fit Line: 0.09135

Maximum Angular Difference: 0.02914

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00188
Angle of Best Fit Line: 0.10772

End 2:
Slope of Best Fit Line 0.00204
Angle of Best Fit Line: 0.11705

Maximum Angular Difference: 0.00933

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00180	1.980	0.00091	0.052	YES
Diameter 2, in (rotated 90°)	0.00340	1.980	0.00172	0.098	YES
END 2					
Diameter 1, in	0.00280	1.980	0.00141	0.081	YES
Diameter 2, in (rotated 90°)	0.00380	1.980	0.00192	0.110	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/12/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-007	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	32-33		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/13/2025
Tested By:	jss
Checked By:	smd
Boring ID:	LB-R-062
Sample ID:	---
Depth, ft:	32-33

After cutting and grinding

After break

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Client:	Langan Engineering	Test Date:	6/16/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-064		
Sample ID:	---		
Depth (ft):	41.52-41.90		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.39	4.39	4.39
Specimen Diameter, in:	1.96	1.96	1.96
Specimen Mass, g:	591.17		
Bulk Density, lb/ft^3	170	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

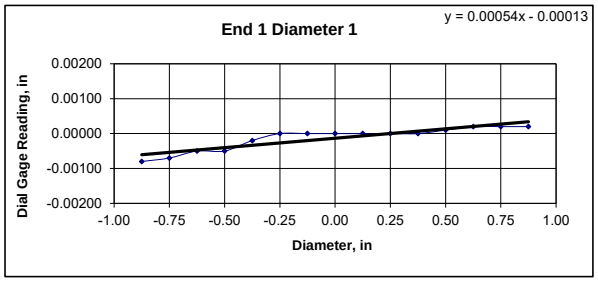
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00080	-0.00070	-0.00050	-0.00050	-0.00020	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00010	0.00020	0.00020	0.00020
Diameter 2, in (rotated 90°)	0.00180	0.00160	0.00140	0.00110	0.00110	0.00070	0.00030	0.00000	-0.00020	-0.00070	-0.00090	-0.00150	-0.00160	-0.00170	-0.00190

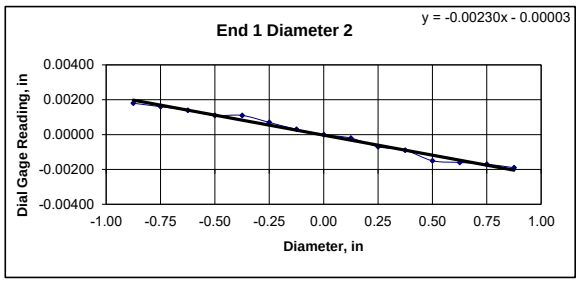
Difference between max and min readings, in:
0° = 0.00100 90° = 0.00370

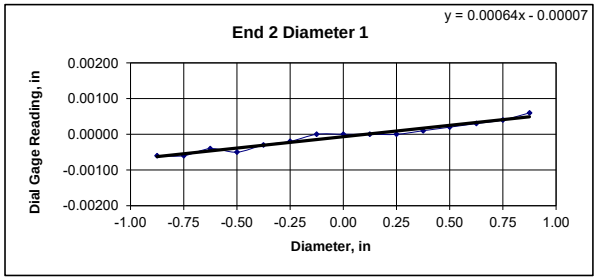
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00060	-0.00060	-0.00040	-0.00050	-0.00030	-0.00020	0.00000	0.00000	0.00000	0.00000	0.00010	0.00020	0.00030	0.00040	0.00060
Diameter 2, in (rotated 90°)	-0.00180	-0.00190	-0.00150	-0.00100	-0.00080	-0.00030	-0.00010	0.00000	0.00000	0.00020	0.00060	0.00080	0.00090	0.00120	0.00150

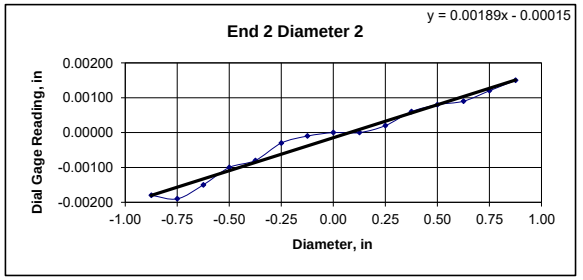
Difference between max and min readings, in:
0° = 0.0012 90° = 0.0034

Maximum difference must be < 0.0020 in. Difference = ± 0.00185
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00054
Angle of Best Fit Line: 0.03094

End 2:
Slope of Best Fit Line 0.00064
Angle of Best Fit Line: 0.03651

Maximum Angular Difference: 0.00557

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00230
Angle of Best Fit Line: 0.13162

End 2:
Slope of Best Fit Line 0.00189
Angle of Best Fit Line: 0.10837

Maximum Angular Difference: 0.02325

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00100	1.960	0.00051	0.029	YES
Diameter 2, in (rotated 90°)	0.00370	1.960	0.00189	0.108	YES
END 2					
Diameter 1, in	0.00120	1.960	0.00061	0.035	YES
Diameter 2, in (rotated 90°)	0.00340	1.960	0.00173	0.099	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

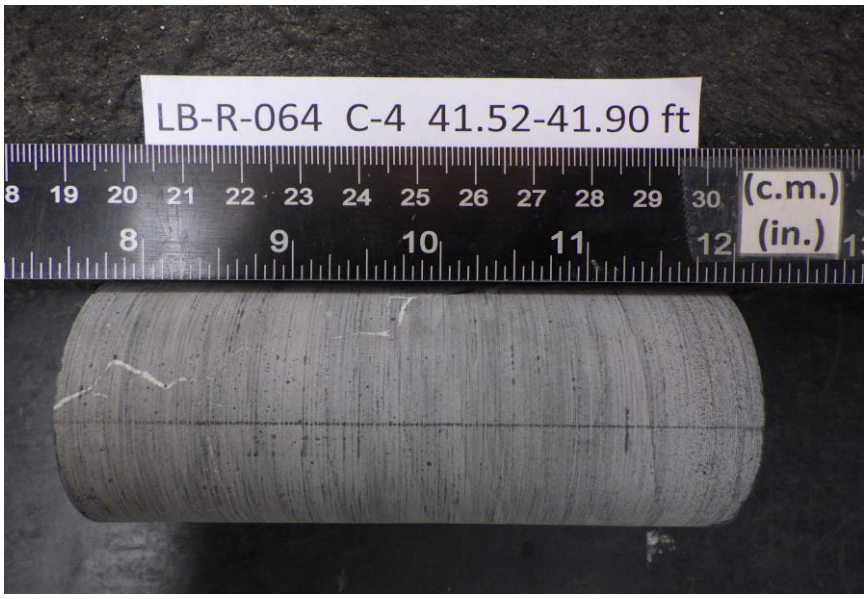
Client:	Langan Engineering	Test Date:	6/16/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-064	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	41.52-41.90		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/18/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-064
Sample ID:	---
Depth, ft:	41.52-41.90



After cutting and grinding

After break

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Client:	Langan Engineering	Test Date:	6/19/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-065		
Sample ID:	---		
Depth (ft):	23.54-23.91		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.24	4.24	4.24
Specimen Diameter, in:	1.98	1.98	1.98
Specimen Mass, g:	590.39		
Bulk Density, lb/ft^3	172	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.1	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

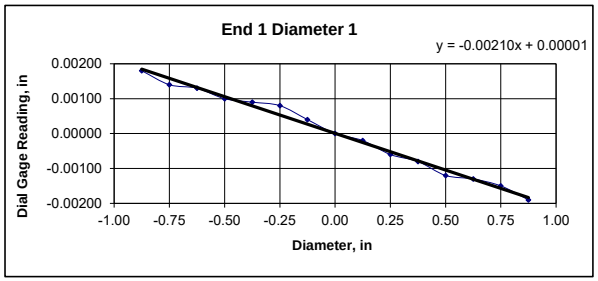
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00180	0.00140	0.00130	0.00100	0.00090	0.00080	0.00040	0.00000	-0.00020	-0.00060	-0.00080	-0.00120	-0.00130	-0.00150	-0.00190
Diameter 2, in (rotated 90°)	-0.00060	-0.00040	-0.00040	-0.00020	-0.00020	0.00000	0.00000	0.00000	0.00000	0.00010	0.00010	0.00010	0.00010	0.00010	0.00000

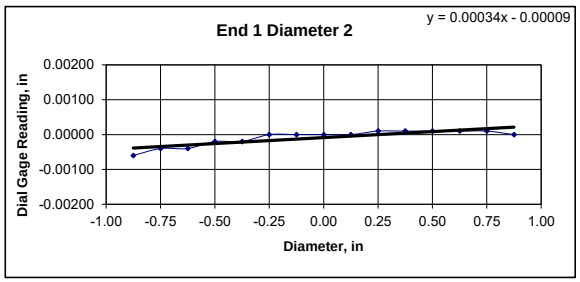
Difference between max and min readings, in:
0° = 0.00370 90° = 0.00070

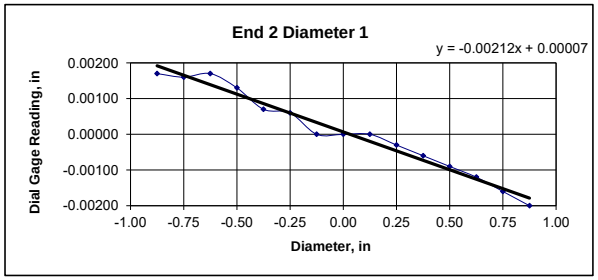
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00170	0.00160	0.00170	0.00130	0.00070	0.00060	0.00000	0.00000	0.00000	-0.00030	-0.00060	-0.00090	-0.00120	-0.00160	-0.00200
Diameter 2, in (rotated 90°)	0.00040	0.00060	0.00050	0.00080	0.00040	0.00030	0.00000	0.00000	0.00010	0.00010	-0.00020	-0.00030	-0.00020	-0.00040	-0.00060

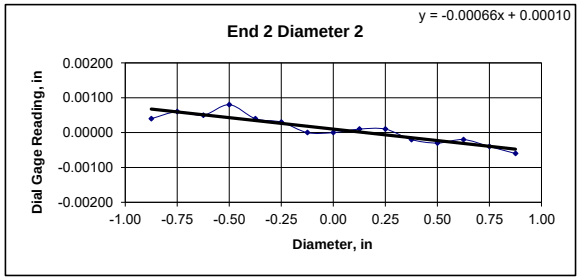
Difference between max and min readings, in:
0° = 0.0037 90° = 0.0014

Maximum difference must be < 0.0020 in. Difference = ± 0.00185
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00210
Angle of Best Fit Line: 0.12048

End 2:
Slope of Best Fit Line 0.00212
Angle of Best Fit Line: 0.12130

Maximum Angular Difference: 0.00082

Parallelism Tolerance Met? YES
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00034
Angle of Best Fit Line: 0.01964

End 2:
Slope of Best Fit Line 0.00066
Angle of Best Fit Line: 0.03765

Maximum Angular Difference: 0.01801

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00370	1.980	0.00187	0.107	YES
Diameter 2, in (rotated 90°)	0.00070	1.980	0.00035	0.020	YES
END 2					
Diameter 1, in	0.00370	1.980	0.00187	0.107	YES
Diameter 2, in (rotated 90°)	0.00140	1.980	0.00071	0.041	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

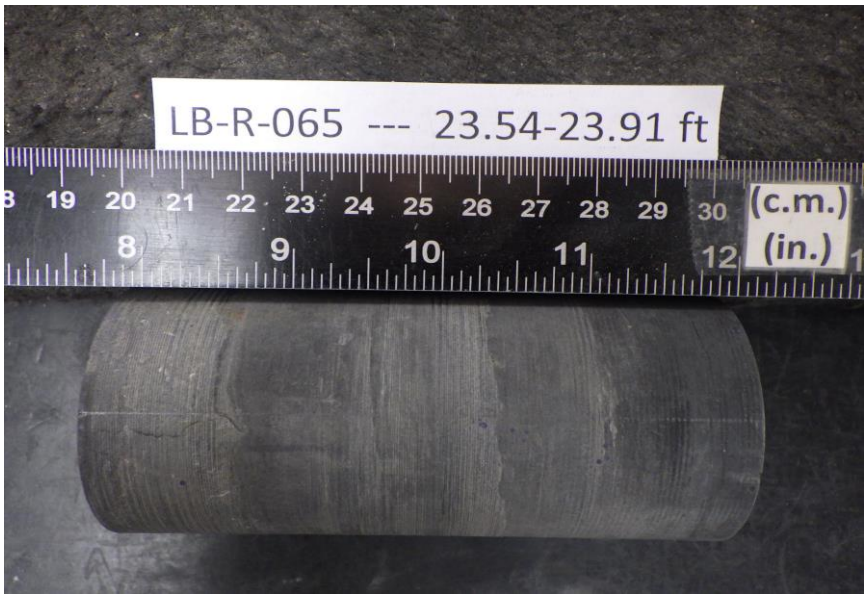
Client:	Langan Engineering	Test Date:	6/19/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-065	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	23.54-23.91		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/19/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-065
Sample ID:	---
Depth, ft:	23.54-23.91



After cutting and grinding

After break

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Client:	Langan Engineering	Test Date:	6/10/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-066		
Sample ID:	---		
Depth (ft):	25.06-25.45		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.34	4.34	4.34
Specimen Diameter, in:	1.98	1.98	1.98
Specimen Mass, g:	614.15		
Bulk Density, lb/ft^3	175	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

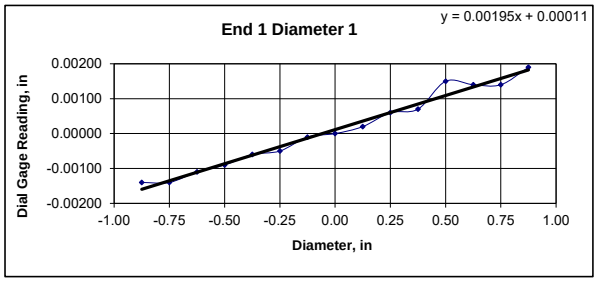
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00140	-0.00140	-0.00110	-0.00090	-0.00060	-0.00050	-0.00010	0.00000	0.00020	0.00060	0.00070	0.00150	0.00140	0.00140	0.00190
Diameter 2, in (rotated 90°)	-0.00110	-0.00100	-0.00060	-0.00050	-0.00020	-0.00020	-0.00010	0.00000	0.00010	0.00020	0.00050	0.00050	0.00070	0.00060	0.00070

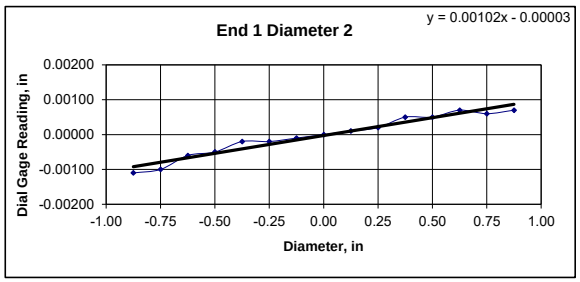
Difference between max and min readings, in:
0° = 0.00330 90° = 0.00180

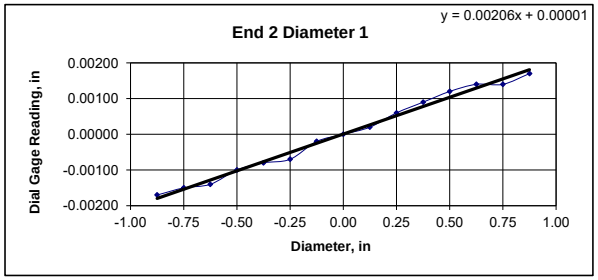
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00170	-0.00150	-0.00140	-0.00100	-0.00080	-0.00070	-0.00020	0.00000	0.00020	0.00060	0.00090	0.00120	0.00140	0.00140	0.00170
Diameter 2, in (rotated 90°)	0.00040	0.00050	0.00030	0.00040	0.00010	0.00010	0.00010	0.00000	0.00010	0.00010	0.00000	0.00000	-0.00020	-0.00030	-0.00050

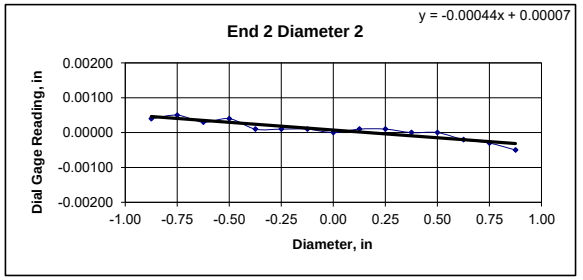
Difference between max and min readings, in:
0° = 0.0034 90° = 0.001

Maximum difference must be < 0.0020 in. Difference = ± 0.00170
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00195
Angle of Best Fit Line: 0.11197

End 2:
Slope of Best Fit Line 0.00206
Angle of Best Fit Line: 0.11803

Maximum Angular Difference: 0.00606

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00102
Angle of Best Fit Line: 0.05861

End 2:
Slope of Best Fit Line 0.00044
Angle of Best Fit Line: 0.02537

Maximum Angular Difference: 0.03323

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00330	1.980	0.00167	0.095	YES
Diameter 2, in (rotated 90°)	0.00180	1.980	0.00091	0.052	YES
END 2					
Diameter 1, in	0.00340	1.980	0.00172	0.098	YES
Diameter 2, in (rotated 90°)	0.00100	1.980	0.00051	0.029	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/10/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-066	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	25.06-25.45		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/12/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-066
Sample ID:	---
Depth, ft:	25.06-25.45

After cutting and grinding

After break

Client:	Langan Engineering	Test Date:	6/9/2025
Project Name:	Upstate Confidential Project	Tested By:	jss
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-066		
Sample ID:	---		
Depth (ft):	26.31-26.68		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.37	4.37	4.37
Specimen Diameter, in:	1.99	1.99	1.99
Specimen Mass, g:	622.3		
Bulk Density, lb/ft^3	175	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

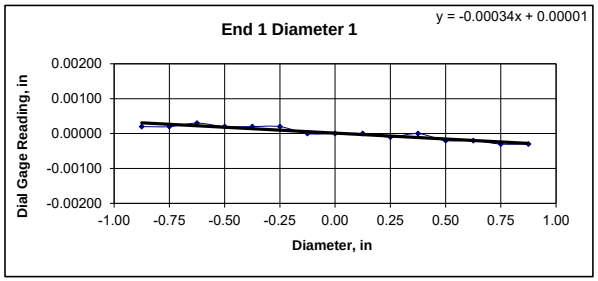
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00020	0.00020	0.00030	0.00020	0.00020	0.00020	0.00000	0.00000	0.00000	-0.00010	0.00000	-0.00020	-0.00020	-0.00030	-0.00030
Diameter 2, in (rotated 90°)	-0.00090	-0.00090	-0.00080	-0.00060	-0.00060	0.00000	-0.00010	0.00000	0.00000	0.00040	0.00030	0.00030	0.00060	0.00040	0.00070

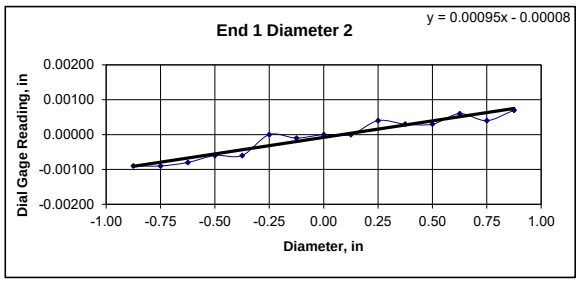
Difference between max and min readings, in:
0° = 0.00060 90° = 0.00160

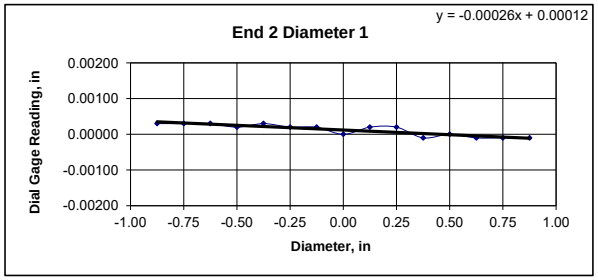
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00030	0.00030	0.00030	0.00020	0.00030	0.00020	0.00020	0.00000	0.00020	0.00020	-0.00010	0.00000	-0.00010	-0.00010	-0.00010
Diameter 2, in (rotated 90°)	0.00100	0.00100	0.00070	0.00050	0.00030	0.00010	0.00000	0.00000	0.00000	-0.00020	0.00000	-0.00040	-0.00040	-0.00070	-0.00080

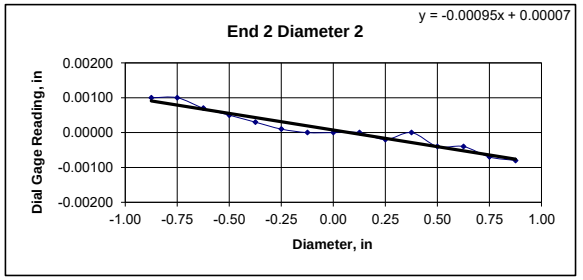
Difference between max and min readings, in:
0° = 0.0004 90° = 0.0018

Maximum difference must be < 0.0020 in. Difference = ± 0.00090
Flatness Tolerance Met? YES









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00034
Angle of Best Fit Line: 0.01932

End 2:
Slope of Best Fit Line 0.00026
Angle of Best Fit Line: 0.01506

Maximum Angular Difference: 0.00426

Parallelism Tolerance Met? YES
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00095
Angle of Best Fit Line: 0.05435

End 2:
Slope of Best Fit Line 0.00095
Angle of Best Fit Line: 0.05468

Maximum Angular Difference: 0.00033

Parallelism Tolerance Met? YES
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00060	1.987	0.00030	0.017	YES
Diameter 2, in (rotated 90°)	0.00160	1.987	0.00081	0.046	YES
END 2					
Diameter 1, in	0.00040	1.987	0.00020	0.012	YES
Diameter 2, in (rotated 90°)	0.00180	1.987	0.00091	0.052	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/12/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-066
Sample ID:	---
Depth, ft:	26.31-26.68

After cutting and grinding

After break

GeoTesting EXPRESS
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Client:	Langan Engineering	Test Date:	6/17/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-069		
Sample ID:	---		
Depth (ft):	44.54-44.92		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.36	4.36	4.36
Specimen Diameter, in:	1.97	1.98	1.98
Specimen Mass, g:	600.14		
Bulk Density, lb/ft^3	171	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

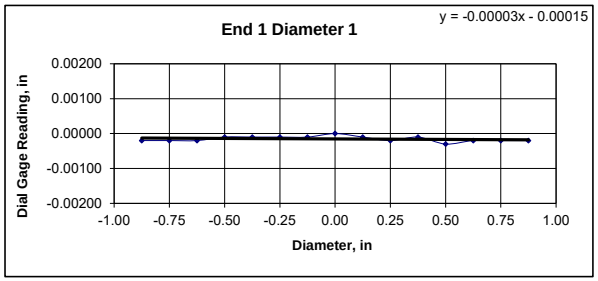
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00020	-0.00020	-0.00020	-0.00010	-0.00010	-0.00010	-0.00010	0.00000	-0.00010	-0.00020	-0.00010	-0.00030	-0.00020	-0.00020	-0.00020
Diameter 2, in (rotated 90°)	-0.00170	-0.00170	-0.00130	-0.00070	-0.00070	-0.00060	-0.00020	0.00000	-0.00010	0.00010	0.00050	0.00070	0.00130	0.00150	0.00160

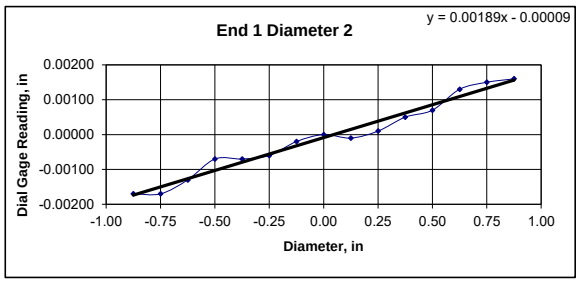
Difference between max and min readings, in:
0° = 0.00030 90° = 0.00330

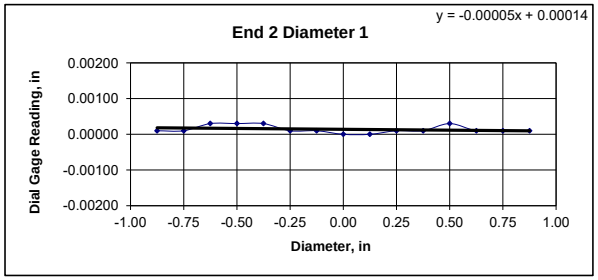
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00010	0.00010	0.00030	0.00030	0.00030	0.00010	0.00010	0.00000	0.00000	0.00010	0.00010	0.00030	0.00010	0.00010	0.00010
Diameter 2, in (rotated 90°)	0.00150	0.00140	0.00120	0.00090	0.00070	0.00030	0.00030	0.00000	-0.00020	-0.00050	-0.00090	-0.00100	-0.00150	-0.00160	-0.00200

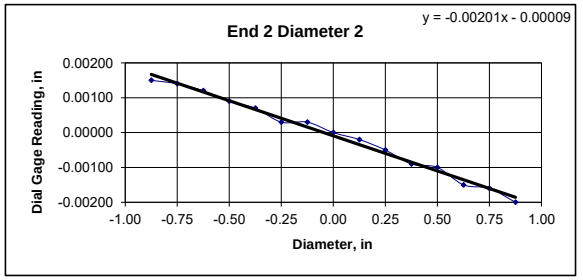
Difference between max and min readings, in:
0° = 0.0003 90° = 0.0035

Maximum difference must be < 0.0020 in. Difference = ± 0.00175
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00003
Angle of Best Fit Line: 0.00164

End 2:
Slope of Best Fit Line 0.00005
Angle of Best Fit Line: 0.00278

Maximum Angular Difference: 0.00115

Parallelism Tolerance Met? YES
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00189
Angle of Best Fit Line: 0.10804

End 2:
Slope of Best Fit Line 0.00201
Angle of Best Fit Line: 0.11541

Maximum Angular Difference: 0.00737

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00030	1.975	0.00015	0.009	YES
Diameter 2, in (rotated 90°)	0.00330	1.975	0.00167	0.096	YES
END 2					
Diameter 1, in	0.00030	1.975	0.00015	0.009	YES
Diameter 2, in (rotated 90°)	0.00350	1.975	0.00177	0.102	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/17/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-069	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	44.54-44.92		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS

END 1

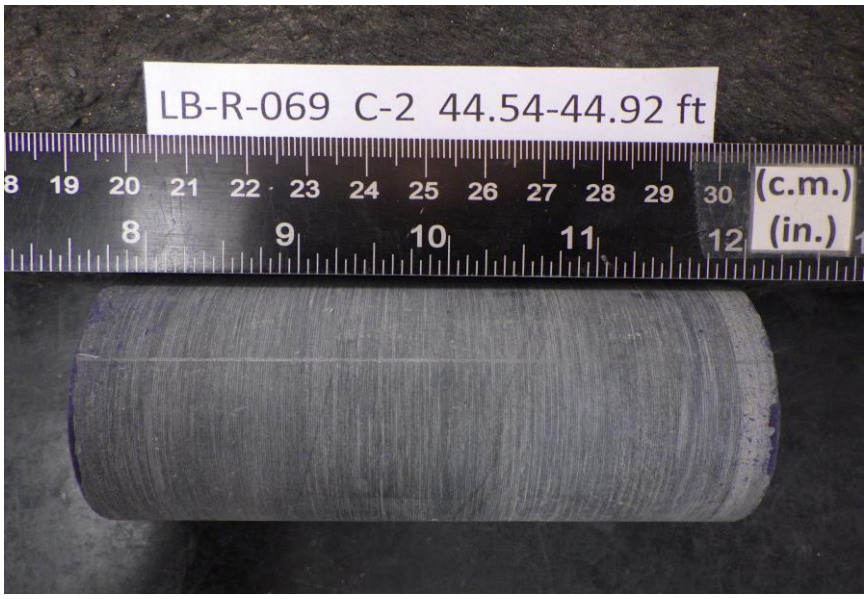
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

END 2

Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/19/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-069
Sample ID:	---
Depth, ft:	44.54-44.92



After cutting and grinding

After break

Client:	Langan Engineering	Test Date:	6/16/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-070		
Sample ID:	---		
Depth (ft):	36.55-36.93		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.35	4.35	4.35
Specimen Diameter, in:	1.96	1.96	1.96
Specimen Mass, g:	592.04		
Bulk Density, lb/ft^3	171	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? NO

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? NO

END FLATNESS AND PARALLELISM (Procedure FP1)

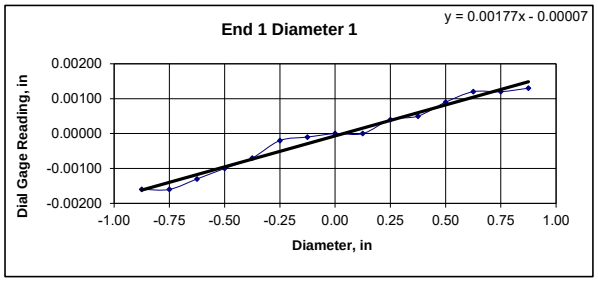
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00160	-0.00160	-0.00130	-0.00100	-0.00070	-0.00020	-0.00010	0.00000	0.00000	0.00040	0.00050	0.00090	0.00120	0.00120	0.00130
Diameter 2, in (rotated 90°)	0.00050	0.00030	0.00030	0.00030	0.00000	0.00000	0.00000	0.00000	-0.00030	-0.00040	-0.00060	-0.00060	-0.00110	-0.00110	-0.00120

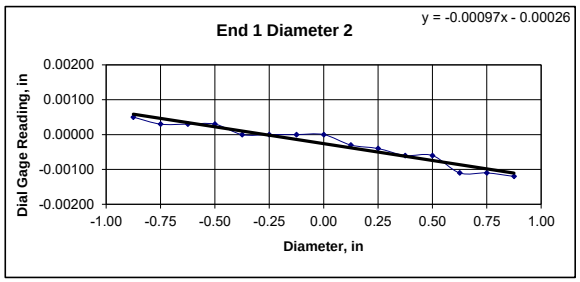
Difference between max and min readings, in:
0° = 0.00290 90° = 0.00170

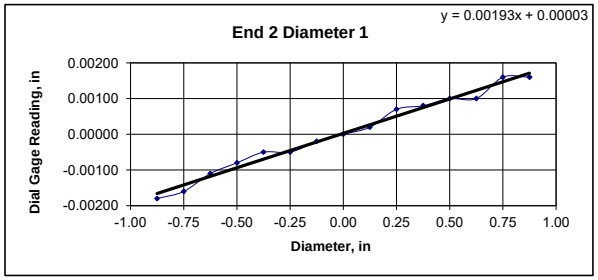
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00180	-0.00160	-0.00110	-0.00080	-0.00050	-0.00050	-0.00020	0.00000	0.00020	0.00070	0.00080	0.00100	0.00100	0.00160	0.00160
Diameter 2, in (rotated 90°)	-0.00080	-0.00070	-0.00070	-0.00040	-0.00040	-0.00010	0.00000	0.00000	-0.00010	0.00000	0.00010	0.00030	0.00050	0.00050	0.00060

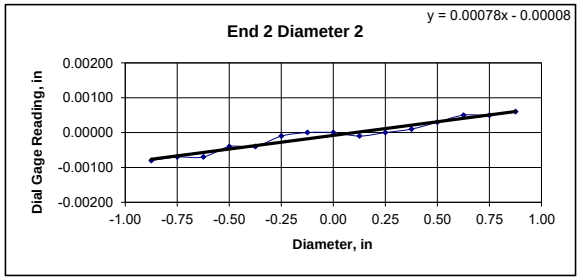
Difference between max and min readings, in:
0° = 0.0034 90° = 0.0014

Maximum difference must be < 0.0020 in. Difference = ± 0.00170
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00177
Angle of Best Fit Line: 0.10166

End 2:
Slope of Best Fit Line 0.00193
Angle of Best Fit Line: 0.11034

Maximum Angular Difference: 0.00868

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00097
Angle of Best Fit Line: 0.05533

End 2:
Slope of Best Fit Line 0.00078
Angle of Best Fit Line: 0.04485

Maximum Angular Difference: 0.01048

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00290	1.960	0.00148	0.085	YES
Diameter 2, in (rotated 90°)	0.00170	1.960	0.00087	0.050	YES
END 2					
Diameter 1, in	0.00340	1.960	0.00173	0.099	YES
Diameter 2, in (rotated 90°)	0.00140	1.960	0.00071	0.041	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/16/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-070	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	36.55-36.93		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS

END 1

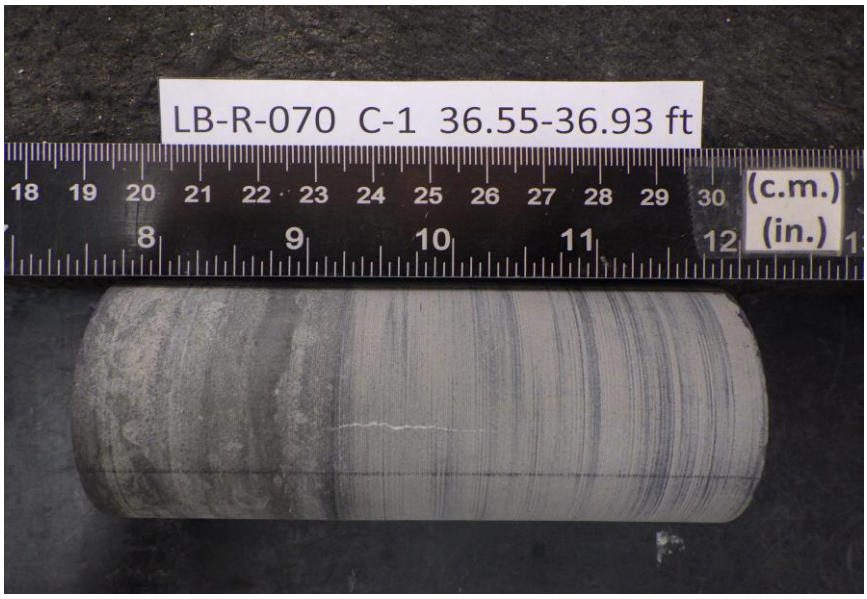
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

END 2

Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/18/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-070
Sample ID:	---
Depth, ft:	36.55-36.93



After cutting and grinding

After break

Client:	Langan Engineering	Test Date:	6/13/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-070		
Sample ID:	---		
Depth (ft):	41.5-42.5		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.15	4.15	4.15
Specimen Diameter, in:	1.97	1.97	1.97
Specimen Mass, g:	576.34		
Bulk Density, lb/ft^3	173	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.1	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? NO

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? NO

END FLATNESS AND PARALLELISM (Procedure FP1)

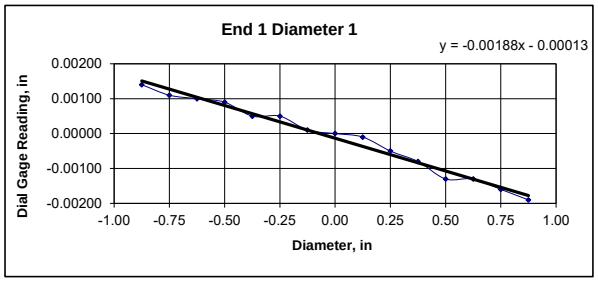
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00140	0.00110	0.00100	0.00090	0.00050	0.00050	0.00010	0.00000	-0.00010	-0.00050	-0.00080	-0.00130	-0.00130	-0.00160	-0.00190
Diameter 2, in (rotated 90°)	-0.00080	-0.00060	-0.00070	-0.00050	-0.00030	-0.00020	-0.00010	0.00000	0.00000	0.00010	0.00060	0.00060	0.00070	0.00080	0.00080

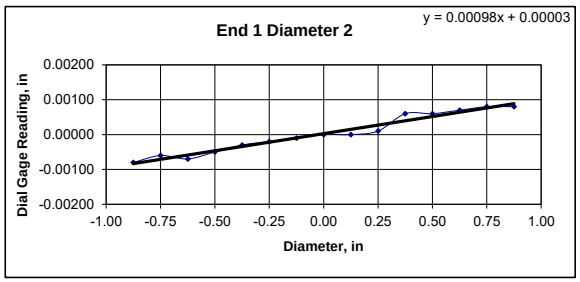
Difference between max and min readings, in:
0° = 0.00330 90° = 0.00160

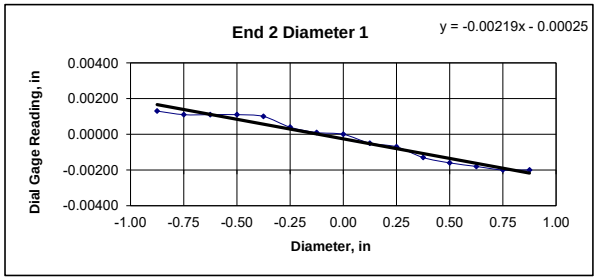
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00130	0.00110	0.00110	0.00110	0.00100	0.00040	0.00010	0.00000	-0.00050	-0.00070	-0.00130	-0.00160	-0.00180	-0.00200	-0.00200
Diameter 2, in (rotated 90°)	0.00090	0.00090	0.00080	0.00040	0.00030	0.00020	0.00000	0.00000	-0.00010	-0.00020	-0.00060	-0.00080	-0.00100	-0.00110	-0.00140

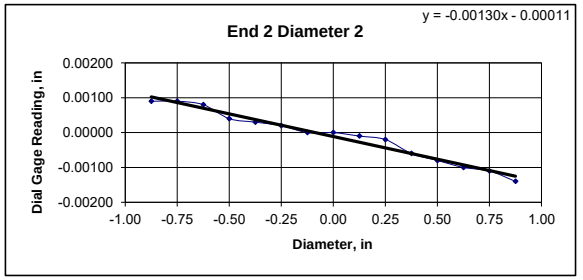
Difference between max and min readings, in:
0° = 0.0033 90° = 0.0023

Maximum difference must be < 0.0020 in. Difference = ± 0.00165
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00188
Angle of Best Fit Line: 0.10755

End 2:
Slope of Best Fit Line 0.00219
Angle of Best Fit Line: 0.12556

Maximum Angular Difference: 0.01801

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00098
Angle of Best Fit Line: 0.05631

End 2:
Slope of Best Fit Line 0.00130
Angle of Best Fit Line: 0.07448

Maximum Angular Difference: 0.01817

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00330	1.970	0.00168	0.096	YES
Diameter 2, in (rotated 90°)	0.00160	1.970	0.00081	0.047	YES
END 2					
Diameter 1, in	0.00330	1.970	0.00168	0.096	YES
Diameter 2, in (rotated 90°)	0.00230	1.970	0.00117	0.067	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/13/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-070	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	41.5-42.5		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/18/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-070
Sample ID:	---
Depth, ft:	41.5-42.5

After cutting and grinding

After break

Client:	Langan Engineering	Test Date:	6/16/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-074		
Sample ID:	---		
Depth (ft):	63.1-63.6		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.35	4.35	4.35
Specimen Diameter, in:	1.97	1.97	1.97
Specimen Mass, g:	598.72		
Bulk Density, lb/ft^3	172	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? NO

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? NO

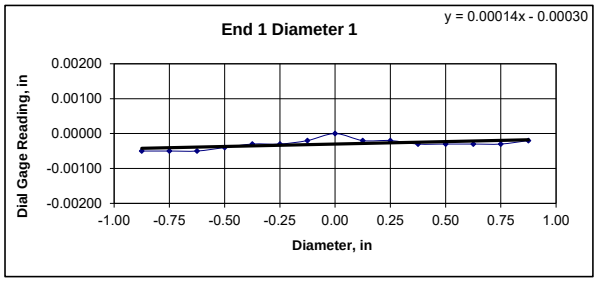
END FLATNESS AND PARALLELISM (Procedure FP1)

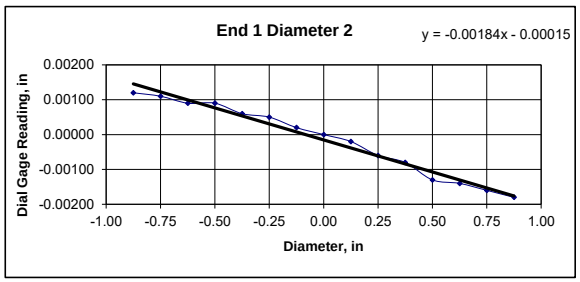
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00050	-0.00050	-0.00050	-0.00040	-0.00030	-0.00030	-0.00020	0.00000	-0.00020	-0.00020	-0.00030	-0.00030	-0.00030	-0.00030	-0.00020
Diameter 2, in (rotated 90°)	0.00120	0.00110	0.00090	0.00090	0.00060	0.00050	0.00020	0.00000	-0.00020	-0.00060	-0.00080	-0.00130	-0.00140	-0.00160	-0.00180

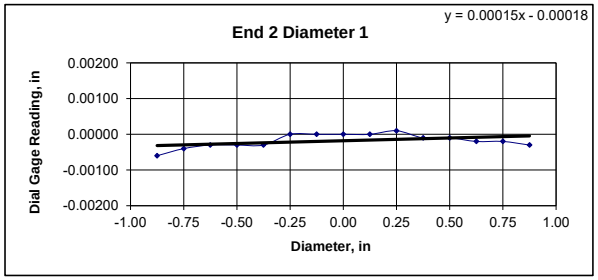
Difference between max and min readings, in:
0° = 0.00050 90° = 0.00300

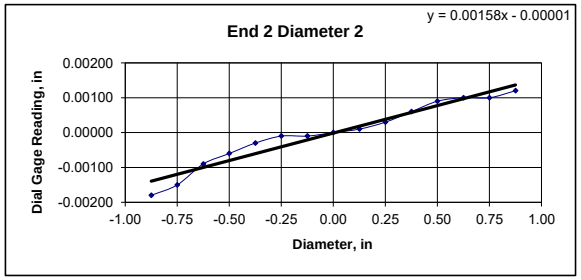
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00060	-0.00040	-0.00030	-0.00030	-0.00030	0.00000	0.00000	0.00000	0.00000	0.00010	-0.00010	-0.00010	-0.00020	-0.00020	-0.00030
Diameter 2, in (rotated 90°)	-0.00180	-0.00150	-0.00090	-0.00060	-0.00030	-0.00010	-0.00010	0.00000	0.00010	0.00030	0.00060	0.00090	0.00100	0.00100	0.00120

Difference between max and min readings, in:
0° = 0.0007 90° = 0.003
Maximum difference must be < 0.0020 in. Difference = ± 0.00150
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00014
Angle of Best Fit Line: 0.00802

End 2:
Slope of Best Fit Line 0.00015
Angle of Best Fit Line: 0.00884

Maximum Angular Difference: 0.00082

Parallelism Tolerance Met? YES
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00184
Angle of Best Fit Line: 0.10526

End 2:
Slope of Best Fit Line 0.00158
Angle of Best Fit Line: 0.09036

Maximum Angular Difference: 0.01490

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00050	1.970	0.00025	0.015	YES
Diameter 2, in (rotated 90°)	0.00300	1.970	0.00152	0.087	YES
END 2					
Diameter 1, in	0.00070	1.970	0.00036	0.020	YES
Diameter 2, in (rotated 90°)	0.00300	1.970	0.00152	0.087	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/16/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-074	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	63.1-63.6		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS

END 1

Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

END 2

Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/18/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-074
Sample ID:	---
Depth, ft:	63.1-63.6

After cutting and grinding

After break

Client:	Langan Engineering	Test Date:	6/12/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-074		
Sample ID:	---		
Depth (ft):	65.13-65.50		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.39	4.40	4.40
Specimen Diameter, in:	1.97	1.97	1.97
Specimen Mass, g:	623.93		
Bulk Density, lb/ft^3	177	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? NO

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? NO

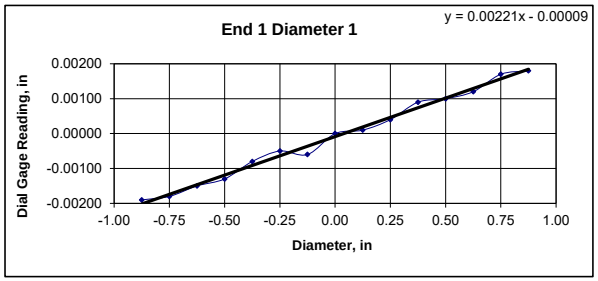
END FLATNESS AND PARALLELISM (Procedure FP1)

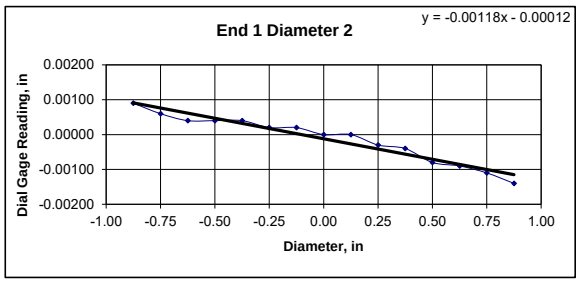
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00190	-0.00180	-0.00150	-0.00130	-0.00080	-0.00050	-0.00060	0.00000	0.00010	0.00040	0.00090	0.00100	0.00120	0.00170	0.00180
Diameter 2, in (rotated 90°)	0.00090	0.00060	0.00040	0.00040	0.00040	0.00020	0.00020	0.00000	0.00000	-0.00030	-0.00040	-0.00080	-0.00090	-0.00110	-0.00140

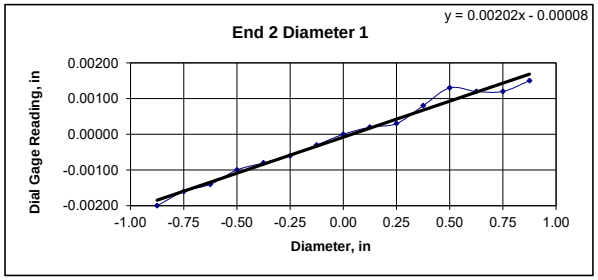
Difference between max and min readings, in:
0° = 0.00370 90° = 0.00230

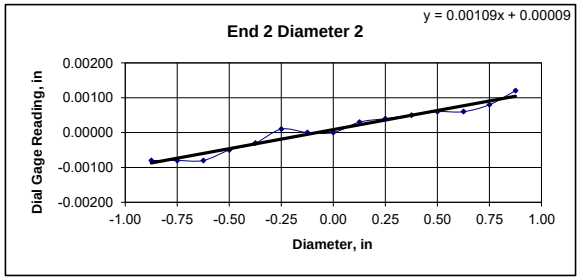
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00200	-0.00160	-0.00140	-0.00100	-0.00080	-0.00060	-0.00030	0.00000	0.00020	0.00030	0.00080	0.00130	0.00120	0.00120	0.00150
Diameter 2, in (rotated 90°)	-0.00080	-0.00080	-0.00080	-0.00050	-0.00030	0.00010	0.00000	0.00000	0.00030	0.00040	0.00050	0.00060	0.00060	0.00080	0.00120

Difference between max and min readings, in:
0° = 0.0035 90° = 0.002
Maximum difference must be < 0.0020 in. Difference = ± 0.00185
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00221
Angle of Best Fit Line: 0.12638

End 2:
Slope of Best Fit Line 0.00202
Angle of Best Fit Line: 0.11557

Maximum Angular Difference: 0.01080

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00118
Angle of Best Fit Line: 0.06745

End 2:
Slope of Best Fit Line 0.00109
Angle of Best Fit Line: 0.06270

Maximum Angular Difference: 0.00475

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00370	1.970	0.00188	0.108	YES
Diameter 2, in (rotated 90°)	0.00230	1.970	0.00117	0.067	YES
END 2					
Diameter 1, in	0.00350	1.970	0.00178	0.102	YES
Diameter 2, in (rotated 90°)	0.00200	1.970	0.00102	0.058	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/12/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-074	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	65.13-65.50		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS

END 1

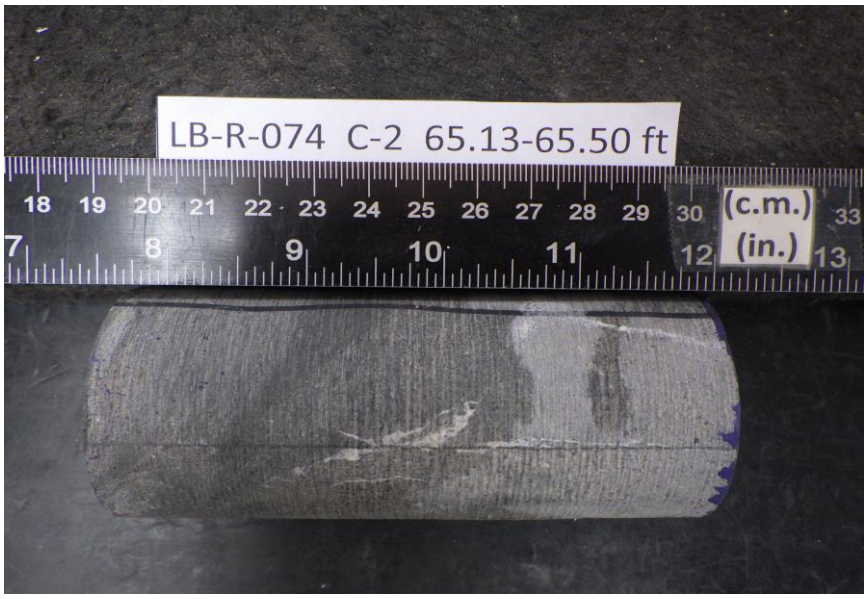
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

END 2

Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/13/2025
Tested By:	jss
Checked By:	smd
Boring ID:	LB-R-074
Sample ID:	---
Depth, ft:	65.13-65.50



After cutting and grinding

After break

GeoTesting EXPRESS
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Client:	Langan Engineering	Test Date:	6/16/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-080		
Sample ID:	---		
Depth (ft):	53.57-53.95		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.31	4.31	4.31
Specimen Diameter, in:	1.98	1.98	1.98
Specimen Mass, g:	596.21		
Bulk Density, lb/ft^3	171	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? NO

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? NO

END FLATNESS AND PARALLELISM (Procedure FP1)

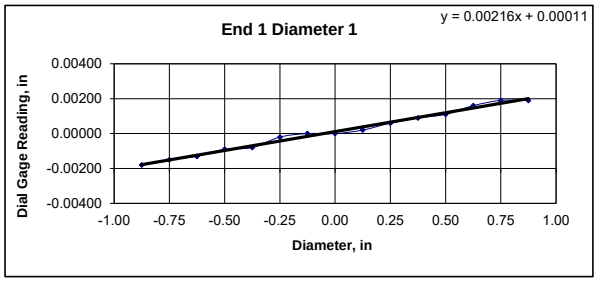
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00180	-0.00150	-0.00130	-0.00090	-0.00080	-0.00020	0.00000	0.00000	0.00020	0.00060	0.00090	0.00110	0.00160	0.00190	0.00190
Diameter 2, in (rotated 90°)	-0.00130	-0.00080	-0.00080	-0.00050	-0.00050	-0.00010	-0.00010	0.00000	0.00000	0.00000	0.00040	0.00070	0.00070	0.00070	0.00070

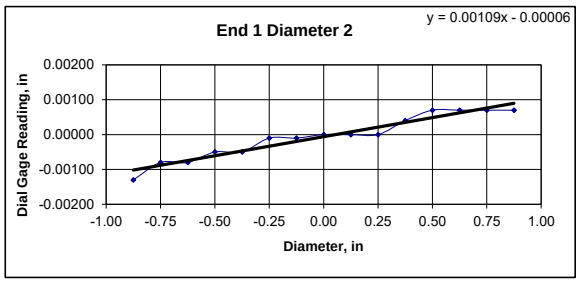
Difference between max and min readings, in:
0° = 0.00370 90° = 0.00200

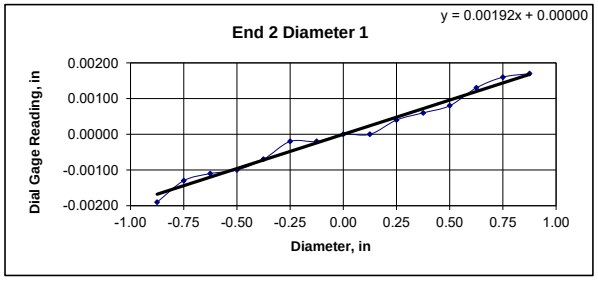
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00190	-0.00130	-0.00110	-0.00100	-0.00070	-0.00020	-0.00020	0.00000	0.00000	0.00040	0.00060	0.00080	0.00130	0.00160	0.00170
Diameter 2, in (rotated 90°)	0.00020	0.00020	0.00020	0.00010	0.00000	0.00010	-0.00010	0.00000	0.00000	-0.00030	-0.00050	-0.00060	-0.00070	-0.00080	-0.00100

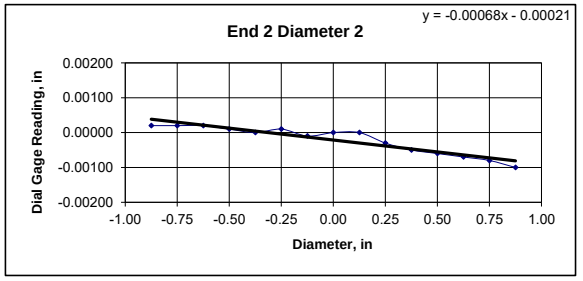
Difference between max and min readings, in:
0° = 0.0036 90° = 0.0012

Maximum difference must be < 0.0020 in. Difference = ± 0.00185
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00216
Angle of Best Fit Line: 0.12392

End 2:
Slope of Best Fit Line 0.00192
Angle of Best Fit Line: 0.10984

Maximum Angular Difference: 0.01408

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00109
Angle of Best Fit Line: 0.06270

End 2:
Slope of Best Fit Line 0.00068
Angle of Best Fit Line: 0.03912

Maximum Angular Difference: 0.02357

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00370	1.980	0.00187	0.107	YES
Diameter 2, in (rotated 90°)	0.00200	1.980	0.00101	0.058	YES
END 2					
Diameter 1, in	0.00360	1.980	0.00182	0.104	YES
Diameter 2, in (rotated 90°)	0.00120	1.980	0.00061	0.035	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/16/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-080	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	53.57-53.95		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS

END 1

Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

END 2

Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/18/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-080
Sample ID:	---
Depth, ft:	53.57-53.95

After cutting and grinding

After break

GeoTesting EXPRESS
A Sercel Business

Client:	Langan Engineering	Test Date:	6/9/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-081		
Sample ID:	---		
Depth (ft):	35.84-36.21		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.34	4.34	4.34
Specimen Diameter, in:	1.97	1.95	1.96
Specimen Mass, g:	614.17		
Bulk Density, lb/ft^3	178	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? NO

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? NO

END FLATNESS AND PARALLELISM (Procedure FP1)

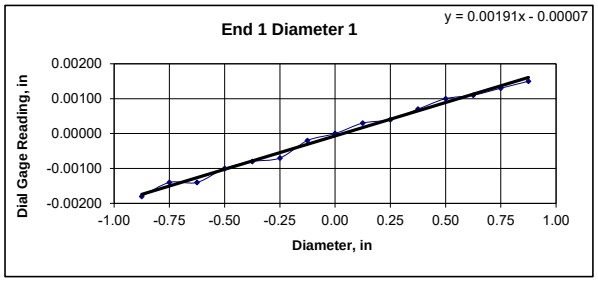
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00180	-0.00140	-0.00140	-0.00100	-0.00080	-0.00070	-0.00020	0.00000	0.00030	0.00040	0.00070	0.00100	0.00110	0.00130	0.00150
Diameter 2, in (rotated 90°)	0.00070	0.00070	0.00050	0.00040	0.00060	0.00050	0.00040	0.00000	0.00000	0.00000	0.00000	-0.00020	-0.00040	-0.00040	-0.00090

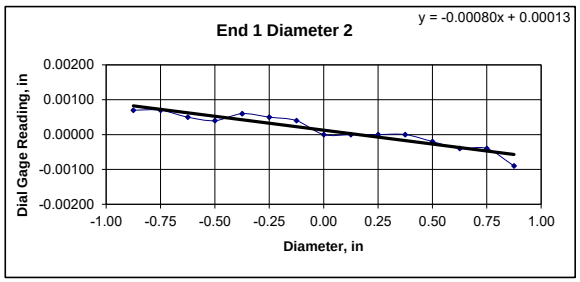
Difference between max and min readings, in:
0° = 0.00330 90° = 0.00160

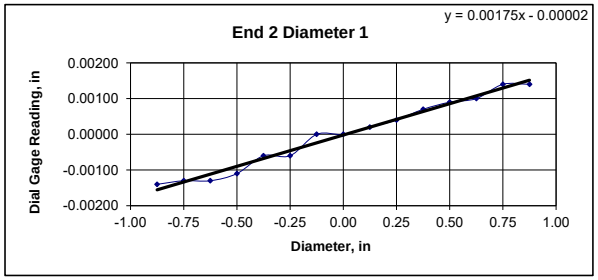
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00140	-0.00130	-0.00130	-0.00110	-0.00060	-0.00060	0.00000	0.00000	0.00020	0.00040	0.00070	0.00090	0.00100	0.00140	0.00140
Diameter 2, in (rotated 90°)	-0.00080	-0.00070	-0.00050	-0.00040	-0.00040	-0.00010	-0.00020	0.00000	0.00010	0.00020	0.00040	0.00040	0.00050	0.00060	0.00080

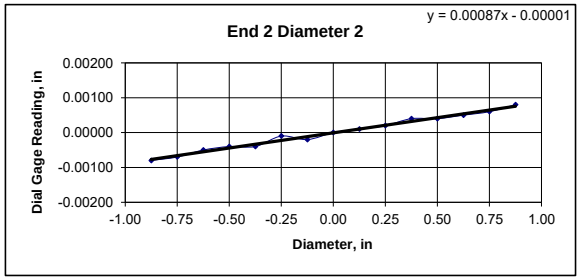
Difference between max and min readings, in:
0° = 0.0028 90° = 0.0016

Maximum difference must be < 0.0020 in. Difference = ± 0.00165
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00191
Angle of Best Fit Line: 0.10968

End 2:
Slope of Best Fit Line 0.00175
Angle of Best Fit Line: 0.10051

Maximum Angular Difference: 0.00917

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00080
Angle of Best Fit Line: 0.04567

End 2:
Slope of Best Fit Line 0.00087
Angle of Best Fit Line: 0.04993

Maximum Angular Difference: 0.00426

Parallelism Tolerance Met? YES
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00330	1.960	0.00168	0.096	YES
Diameter 2, in (rotated 90°)	0.00160	1.960	0.00082	0.047	YES
END 2					
Diameter 1, in	0.00280	1.960	0.00143	0.082	YES
Diameter 2, in (rotated 90°)	0.00160	1.960	0.00082	0.047	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/9/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-081	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	35.84-36.21		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/9/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-081
Sample ID:	---
Depth, ft:	35.84-36.21

After cutting and grinding

After break

Client:	Langan Engineering	Test Date:	6/11/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-086		
Sample ID:	---		
Depth (ft):	32.04-32.41		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.44	4.44	4.44
Specimen Diameter, in:	1.98	1.97	1.98
Specimen Mass, g:	624.4		
Bulk Density, lb/ft^3	175	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? NO

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? NO

END FLATNESS AND PARALLELISM (Procedure FP1)

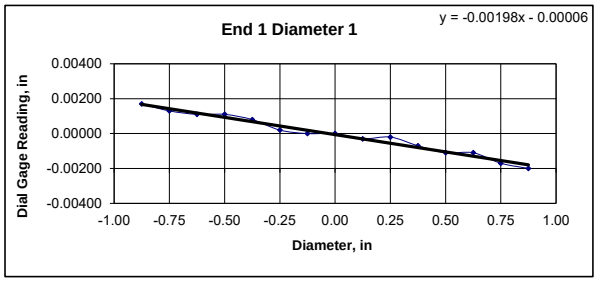
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00170	0.00130	0.00110	0.00110	0.00080	0.00020	0.00000	0.00000	-0.00030	-0.00020	-0.00070	-0.00110	-0.00110	-0.00170	-0.00200
Diameter 2, in (rotated 90°)	-0.00030	-0.00040	-0.00030	-0.00030	-0.00040	-0.00040	-0.00020	0.00000	-0.00010	-0.00020	-0.00070	-0.00070	-0.00080	-0.00080	-0.00100

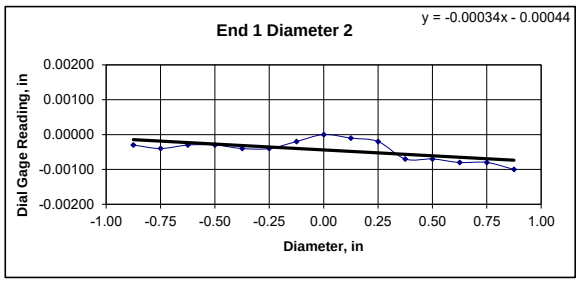
Difference between max and min readings, in:
0° = 0.00370 90° = 0.00100

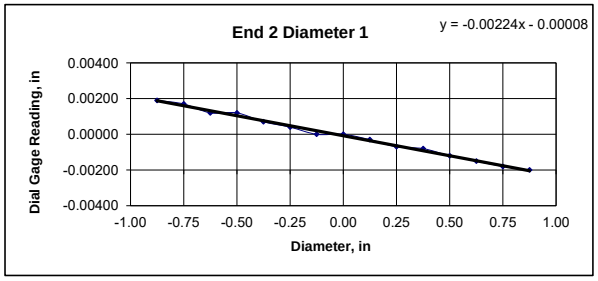
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00190	0.00170	0.00120	0.00120	0.00070	0.00040	0.00000	0.00000	-0.00030	-0.00070	-0.00080	-0.00120	-0.00150	-0.00180	-0.00200
Diameter 2, in (rotated 90°)	-0.00050	-0.00030	-0.00030	-0.00030	-0.00030	-0.00030	0.00000	0.00000	0.00030	0.00070	0.00060	0.00060	0.00040	0.00060	0.00060

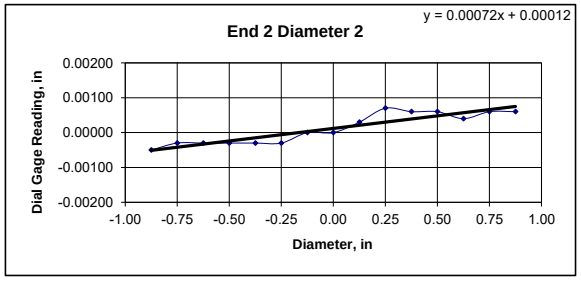
Difference between max and min readings, in:
0° = 0.0039 90° = 0.0012

Maximum difference must be < 0.0020 in. Difference = ± 0.00195
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00198
Angle of Best Fit Line: 0.11345

End 2:
Slope of Best Fit Line 0.00224
Angle of Best Fit Line: 0.12834

Maximum Angular Difference: 0.01490

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00034
Angle of Best Fit Line: 0.01932

End 2:
Slope of Best Fit Line 0.00072
Angle of Best Fit Line: 0.04125

Maximum Angular Difference: 0.02194

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00370	1.975	0.00187	0.107	YES
Diameter 2, in (rotated 90°)	0.00100	1.975	0.00051	0.029	YES
END 2					
Diameter 1, in	0.00390	1.975	0.00197	0.113	YES
Diameter 2, in (rotated 90°)	0.00120	1.975	0.00061	0.035	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

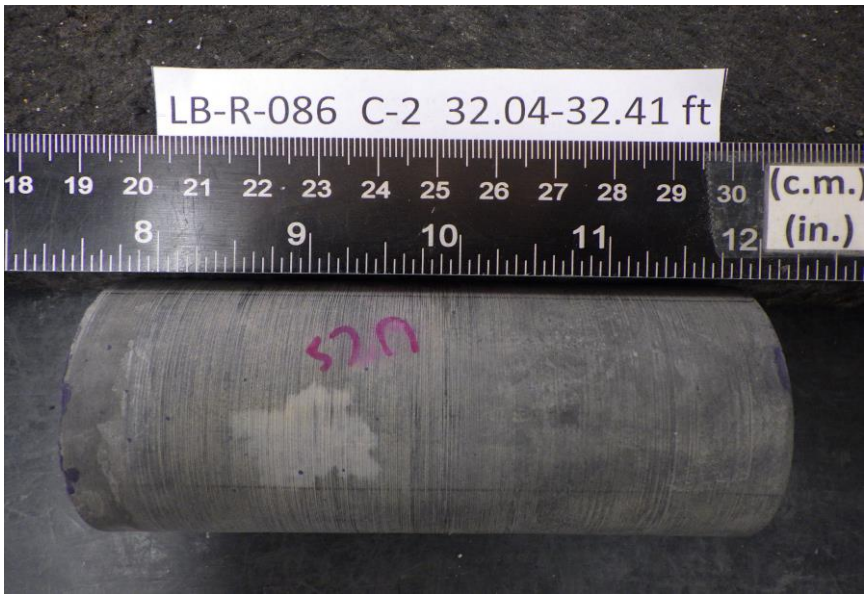
Client:	Langan Engineering	Test Date:	6/11/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-086	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	32.04-32.41		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/13/2025
Tested By:	jss
Checked By:	smd
Boring ID:	LB-R-086
Sample ID:	---
Depth, ft:	32.04-32.41



After cutting and grinding

After break

Client:	Langan Engineering	Test Date:	6/19/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-091		
Sample ID:	---		
Depth (ft):	30-30.5		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.44	4.44	4.44
Specimen Diameter, in:	1.96	1.94	1.95
Specimen Mass, g:	618.6		
Bulk Density, lb/ft^3	177	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.3	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? NO

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? NO

END FLATNESS AND PARALLELISM (Procedure FP1)

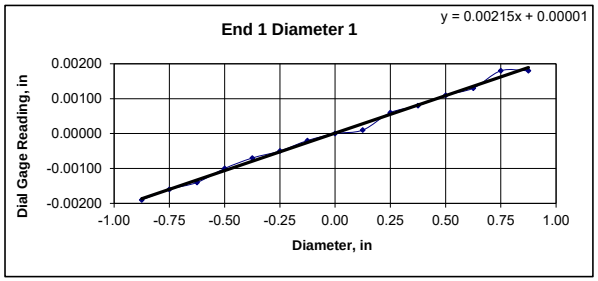
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00190	-0.00160	-0.00140	-0.00100	-0.00070	-0.00050	-0.00020	0.00000	0.00010	0.00060	0.00080	0.00110	0.00130	0.00180	0.00180
Diameter 2, in (rotated 90°)	0.00040	0.00040	0.00060	0.00050	0.00040	0.00020	0.00000	0.00000	-0.00020	-0.00050	-0.00050	-0.00080	-0.00100	-0.00110	-0.00110

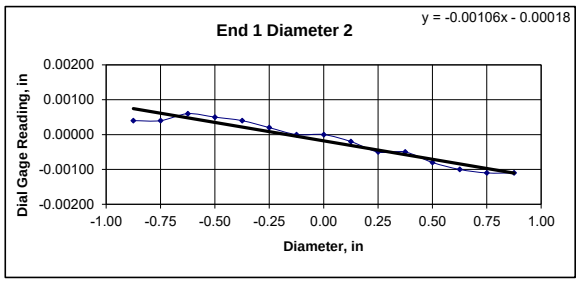
Difference between max and min readings, in:
0° = 0.00370 90° = 0.00170

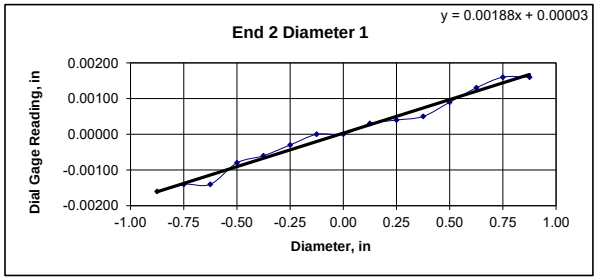
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00160	-0.00140	-0.00140	-0.00080	-0.00060	-0.00030	0.00000	0.00000	0.00030	0.00040	0.00050	0.00090	0.00130	0.00160	0.00160
Diameter 2, in (rotated 90°)	-0.00120	-0.00110	-0.00080	-0.00060	-0.00050	-0.00020	-0.00010	0.00000	0.00000	0.00020	0.00030	0.00040	0.00040	0.00040	0.00040

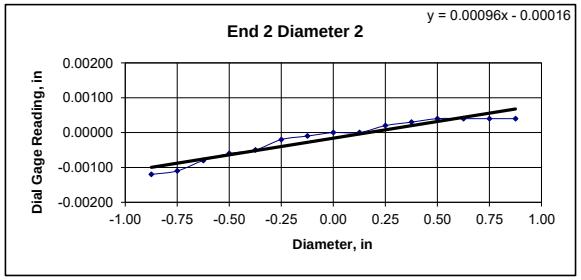
Difference between max and min readings, in:
0° = 0.0032 90° = 0.0016

Maximum difference must be < 0.0020 in. Difference = ± 0.00185
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00215
Angle of Best Fit Line: 0.12310

End 2:
Slope of Best Fit Line 0.00188
Angle of Best Fit Line: 0.10755

Maximum Angular Difference: 0.01555

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00106
Angle of Best Fit Line: 0.06057

End 2:
Slope of Best Fit Line 0.00096
Angle of Best Fit Line: 0.05484

Maximum Angular Difference: 0.00573

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00370	1.950	0.00190	0.109	YES
Diameter 2, in (rotated 90°)	0.00170	1.950	0.00087	0.050	YES
END 2					
Diameter 1, in	0.00320	1.950	0.00164	0.094	YES
Diameter 2, in (rotated 90°)	0.00160	1.950	0.00082	0.047	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/19/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-091	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	30-30.5		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/19/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-091
Sample ID:	---
Depth, ft:	30-30.5

After cutting and grinding

After break

Client:	Langan Engineering	Test Date:	6/10/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-098		
Sample ID:	---		
Depth (ft):	29.04-29.42		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.43	4.43	4.43
Specimen Diameter, in:	1.98	1.98	1.98
Specimen Mass, g:	619.85		
Bulk Density, lb/ft^3	173	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? NO

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? NO

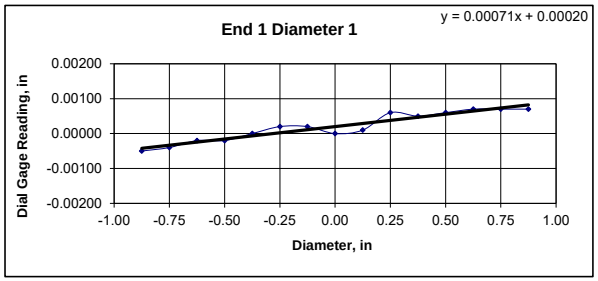
END FLATNESS AND PARALLELISM (Procedure FP1)

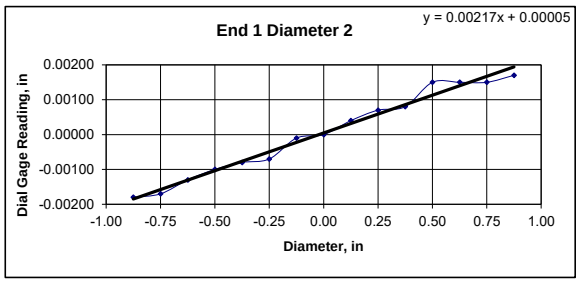
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00050	-0.00040	-0.00020	-0.00020	0.00000	0.00020	0.00020	0.00000	0.00010	0.00060	0.00050	0.00060	0.00070	0.00070	0.00070
Diameter 2, in (rotated 90°)	-0.00180	-0.00170	-0.00130	-0.00100	-0.00080	-0.00070	-0.00010	0.00000	0.00040	0.00070	0.00080	0.00150	0.00150	0.00150	0.00170

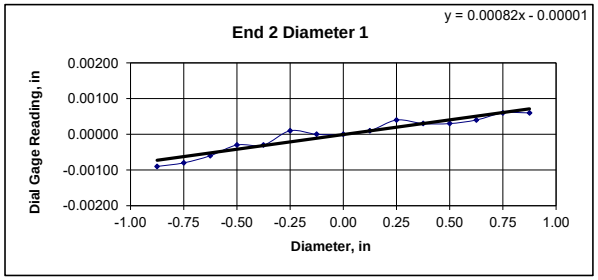
Difference between max and min readings, in:
0° = 0.00120 90° = 0.00350

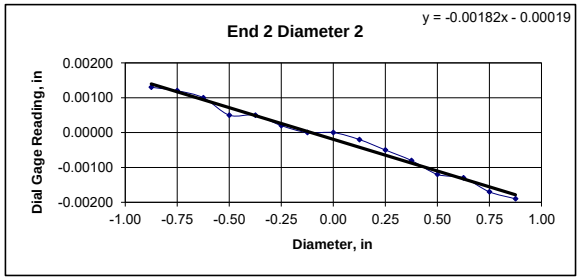
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00090	-0.00080	-0.00060	-0.00030	-0.00030	0.00010	0.00000	0.00000	0.00010	0.00040	0.00030	0.00030	0.00040	0.00060	0.00060
Diameter 2, in (rotated 90°)	0.00130	0.00120	0.00100	0.00050	0.00050	0.00020	0.00000	0.00000	-0.00020	-0.00050	-0.00080	-0.00120	-0.00130	-0.00170	-0.00190

Difference between max and min readings, in:
0° = 0.0015 90° = 0.0032
Maximum difference must be < 0.0020 in. Difference = ± 0.00175
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00071
Angle of Best Fit Line: 0.04076

End 2:
Slope of Best Fit Line 0.00082
Angle of Best Fit Line: 0.04715

Maximum Angular Difference: 0.00638

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00217
Angle of Best Fit Line: 0.12409

End 2:
Slope of Best Fit Line 0.00182
Angle of Best Fit Line: 0.10411

Maximum Angular Difference: 0.01997

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00120	1.980	0.00061	0.035	YES
Diameter 2, in (rotated 90°)	0.00350	1.980	0.00177	0.101	YES
END 2					
Diameter 1, in	0.00150	1.980	0.00076	0.043	YES
Diameter 2, in (rotated 90°)	0.00320	1.980	0.00162	0.093	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/10/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-098	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	29.04-29.42		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS

END 1

Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

END 2

Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/12/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-098
Sample ID:	---
Depth, ft:	29.04-29.42

After cutting and grinding

After break

Client:	Langan Engineering	Test Date:	6/10/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-098		
Sample ID:	---		
Depth (ft):	35-36		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.33	4.33	4.33
Specimen Diameter, in:	1.99	1.99	1.99
Specimen Mass, g:	608.09		
Bulk Density, lb/ft^3	172	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? NO

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? NO

END FLATNESS AND PARALLELISM (Procedure FP1)

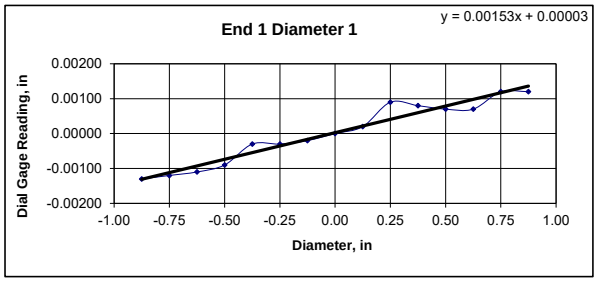
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00130	-0.00120	-0.00110	-0.00090	-0.00030	-0.00030	-0.00020	0.00000	0.00020	0.00090	0.00080	0.00070	0.00070	0.00120	0.00120
Diameter 2, in (rotated 90°)	-0.00170	-0.00130	-0.00100	-0.00100	-0.00090	-0.00070	0.00000	0.00000	0.00020	0.00060	0.00080	0.00130	0.00150	0.00150	0.00150

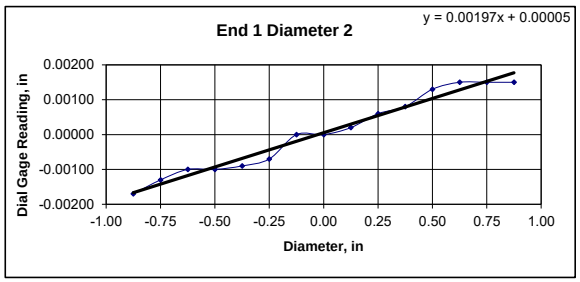
Difference between max and min readings, in:
0° = 0.00250 90° = 0.00320

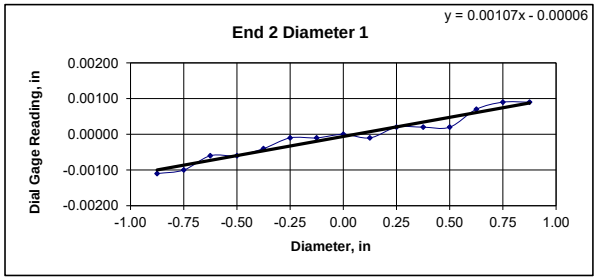
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00110	-0.00100	-0.00060	-0.00060	-0.00040	-0.00010	-0.00010	0.00000	-0.00010	0.00020	0.00020	0.00020	0.00070	0.00090	0.00090
Diameter 2, in (rotated 90°)	0.00140	0.00150	0.00100	0.00090	0.00060	0.00060	0.00070	0.00000	-0.00020	-0.00060	-0.00080	-0.00100	-0.00130	-0.00160	-0.00190

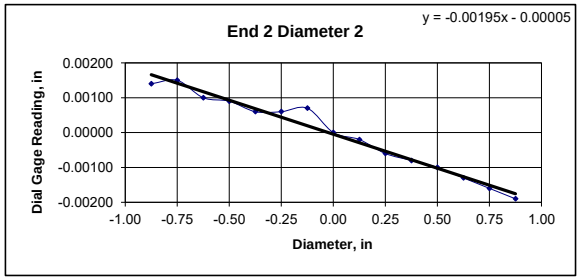
Difference between max and min readings, in:
0° = 0.002 90° = 0.0034

Maximum difference must be < 0.0020 in. Difference = ± 0.00170
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00153
Angle of Best Fit Line: 0.08742

End 2:
Slope of Best Fit Line 0.00107
Angle of Best Fit Line: 0.06139

Maximum Angular Difference: 0.02603

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00197
Angle of Best Fit Line: 0.11263

End 2:
Slope of Best Fit Line 0.00195
Angle of Best Fit Line: 0.11181

Maximum Angular Difference: 0.00082

Parallelism Tolerance Met? YES
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00250	1.990	0.00126	0.072	YES
Diameter 2, in (rotated 90°)	0.00320	1.990	0.00161	0.092	YES
END 2					
Diameter 1, in	0.00200	1.990	0.00101	0.058	YES
Diameter 2, in (rotated 90°)	0.00340	1.990	0.00171	0.098	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/10/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-098	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	35-36		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/12/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-098
Sample ID:	---
Depth, ft:	35-36

After cutting and grinding

After break

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Client:	Langan Engineering	Test Date:	6/9/2025
Project Name:	Upstate Confidential Project	Tested By:	jss
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-102		
Sample ID:	---		
Depth (ft):	25.52-25.90		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.33	4.33	4.33
Specimen Diameter, in:	1.97	1.97	1.97
Specimen Mass, g:	590.88		
Bulk Density, lb/ft^3	170	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? NO

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? NO

END FLATNESS AND PARALLELISM (Procedure FP1)

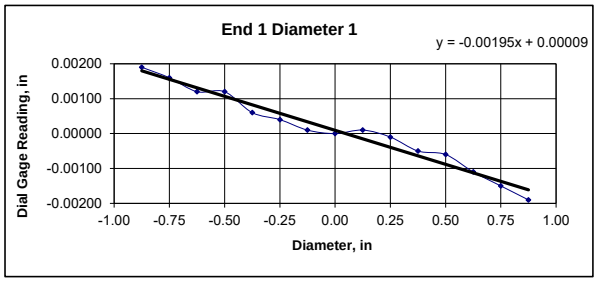
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00190	0.00160	0.00120	0.00120	0.00060	0.00040	0.00010	0.00000	0.00010	-0.00010	-0.00050	-0.00060	-0.00110	-0.00150	-0.00190
Diameter 2, in (rotated 90°)	0.00120	0.00110	0.00110	0.00080	0.00050	0.00040	0.00000	0.00000	-0.00030	-0.00060	-0.00070	-0.00090	-0.00110	-0.00130	-0.00180

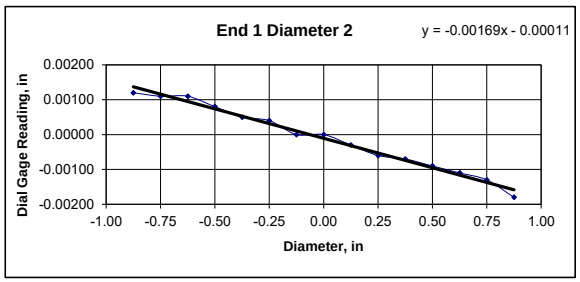
Difference between max and min readings, in:
0° = 0.00380 90° = 0.00300

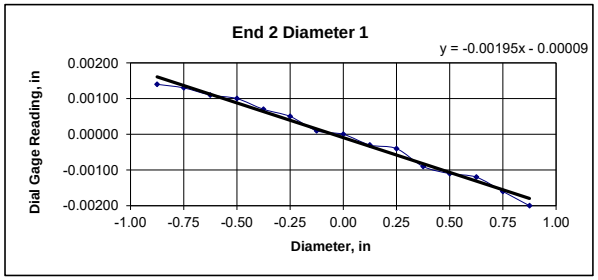
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00140	0.00130	0.00110	0.00100	0.00070	0.00050	0.00010	0.00000	-0.00030	-0.00040	-0.00090	-0.00110	-0.00120	-0.00160	-0.00200
Diameter 2, in (rotated 90°)	-0.00150	-0.00130	-0.00120	-0.00050	-0.00040	-0.00030	-0.00030	0.00000	0.00010	0.00050	0.00080	0.00070	0.00120	0.00140	0.00130

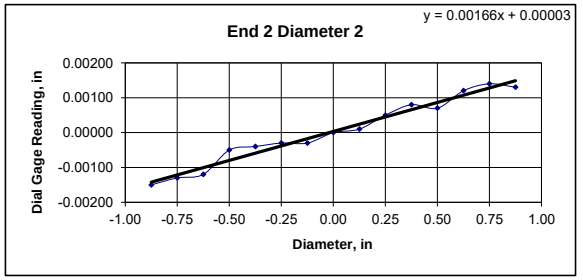
Difference between max and min readings, in:
0° = 0.0034 90° = 0.0029

Maximum difference must be < 0.0020 in. Difference = ± 0.00190
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00195
Angle of Best Fit Line: 0.11164

End 2:
Slope of Best Fit Line 0.00195
Angle of Best Fit Line: 0.11148

Maximum Angular Difference: 0.00016

Parallelism Tolerance Met? YES
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00169
Angle of Best Fit Line: 0.09675

End 2:
Slope of Best Fit Line 0.00166
Angle of Best Fit Line: 0.09527

Maximum Angular Difference: 0.00147

Parallelism Tolerance Met? YES
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00380	1.973	0.00193	0.110	YES
Diameter 2, in (rotated 90°)	0.00300	1.973	0.00152	0.087	YES
END 2					
Diameter 1, in	0.00340	1.973	0.00172	0.099	YES
Diameter 2, in (rotated 90°)	0.00290	1.973	0.00147	0.084	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

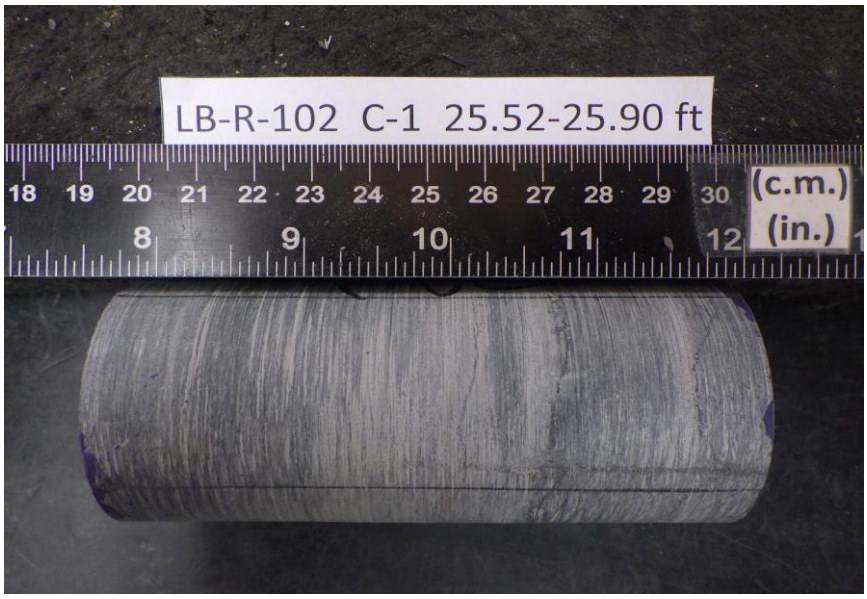
Client:	Langan Engineering	Test Date:	6/9/2025
Project Name:	Upstate Confidential Project	Tested By:	jss
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-102	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	25.52-25.90		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/12/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-102
Sample ID:	---
Depth, ft:	25.52-25.90



After cutting and grinding

After break

Client:	Langan Engineering	Test Date:	6/9/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-102		
Sample ID:	---		
Depth (ft):	32.97-33.34		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.33	4.33	4.33
Specimen Diameter, in:	1.97	1.97	1.97
Specimen Mass, g:	608.35		
Bulk Density, lb/ft^3	175	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

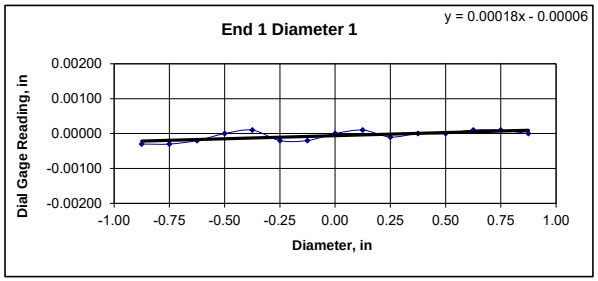
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00030	-0.00030	-0.00020	0.00000	0.00010	-0.00020	-0.00020	0.00000	0.00010	-0.00010	0.00000	0.00000	0.00010	0.00010	0.00000
Diameter 2, in (rotated 90°)	-0.00080	-0.00050	-0.00040	-0.00040	-0.00030	-0.00030	0.00000	0.00000	0.00000	0.00020	0.00020	0.00030	0.00030	0.00030	0.00030

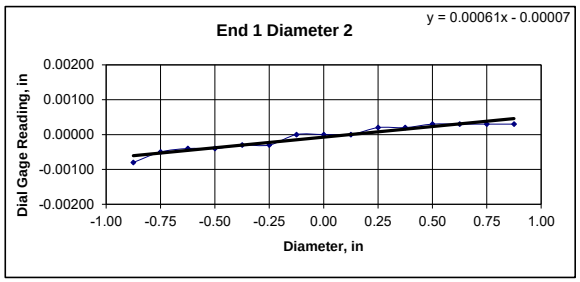
Difference between max and min readings, in:
0° = 0.00040 90° = 0.00110

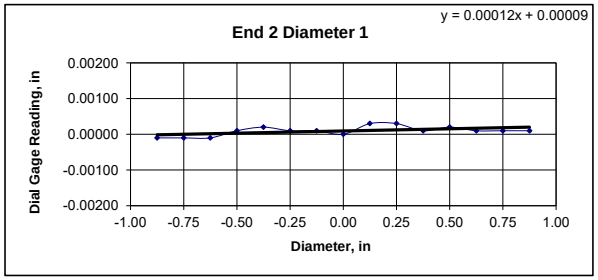
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00010	-0.00010	-0.00010	0.00010	0.00020	0.00010	0.00010	0.00000	0.00030	0.00030	0.00010	0.00020	0.00010	0.00010	0.00010
Diameter 2, in (rotated 90°)	0.00070	0.00070	0.00060	0.00040	0.00060	0.00020	0.00010	0.00000	0.00010	0.00020	0.00000	0.00020	-0.00030	-0.00040	-0.00040

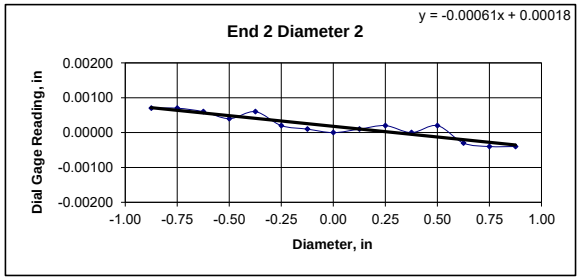
Difference between max and min readings, in:
0° = 0.0004 90° = 0.0011

Maximum difference must be < 0.0020 in. Difference = ± 0.00055
Flatness Tolerance Met? YES









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00018
Angle of Best Fit Line: 0.01015

End 2:
Slope of Best Fit Line 0.00012
Angle of Best Fit Line: 0.00704

Maximum Angular Difference: 0.00311

Parallelism Tolerance Met? YES
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00061
Angle of Best Fit Line: 0.03487

End 2:
Slope of Best Fit Line 0.00061
Angle of Best Fit Line: 0.03503

Maximum Angular Difference: 0.00016

Parallelism Tolerance Met? YES
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00040	1.970	0.00020	0.012	YES
Diameter 2, in (rotated 90°)	0.00110	1.970	0.00056	0.032	YES
END 2					
Diameter 1, in	0.00040	1.970	0.00020	0.012	YES
Diameter 2, in (rotated 90°)	0.00110	1.970	0.00056	0.032	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/9/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-102
Sample ID:	---
Depth, ft:	32.97-33.34

After cutting and grinding

After break

Client:	Langan Engineering	Test Date:	6/12/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-106		
Sample ID:	---		
Depth (ft):	55-56		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	3.72	3.72	3.72
Specimen Diameter, in:	1.97	1.98	1.98
Specimen Mass, g:	512.63		
Bulk Density, lb/ft^3	171	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	1.9	**Length to Diameter Ratio Tolerance Met?**	NO

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

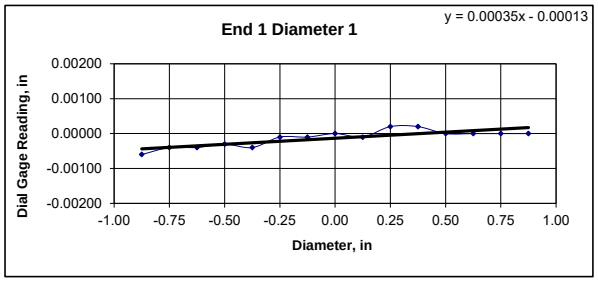
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00060	-0.00040	-0.00040	-0.00030	-0.00040	-0.00010	-0.00010	0.00000	-0.00010	0.00020	0.00020	0.00000	0.00000	0.00000	0.00000
Diameter 2, in (rotated 90°)	0.00160	0.00150	0.00110	0.00070	0.00060	0.00030	0.00000	0.00000	-0.00020	-0.00050	-0.00090	-0.00110	-0.00160	-0.00190	-0.00190

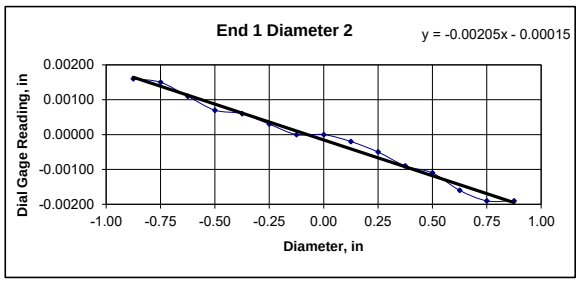
Difference between max and min readings, in:
0° = 0.00080 90° = 0.00350

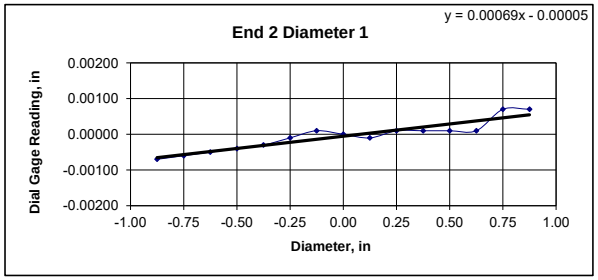
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00070	-0.00060	-0.00050	-0.00040	-0.00030	-0.00010	0.00010	0.00000	-0.00010	0.00010	0.00010	0.00010	0.00010	0.00070	0.00070
Diameter 2, in (rotated 90°)	-0.00190	-0.00180	-0.00110	-0.00100	-0.00080	-0.00040	-0.00040	0.00000	0.00010	0.00060	0.00070	0.00100	0.00160	0.00160	0.00160

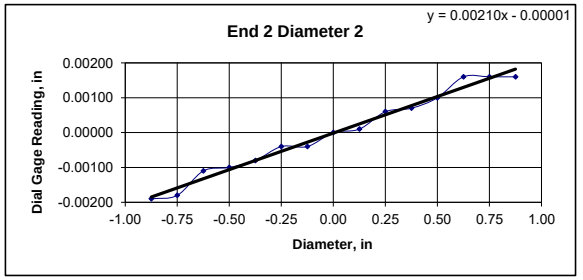
Difference between max and min readings, in:
0° = 0.0014 90° = 0.0035

Maximum difference must be < 0.0020 in. Difference = ± 0.00175
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00035
Angle of Best Fit Line: 0.01997

End 2:
Slope of Best Fit Line 0.00069
Angle of Best Fit Line: 0.03929

Maximum Angular Difference: 0.01932

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00205
Angle of Best Fit Line: 0.11770

End 2:
Slope of Best Fit Line 0.00210
Angle of Best Fit Line: 0.12016

Maximum Angular Difference: 0.00246

Parallelism Tolerance Met? YES
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00080	1.975	0.00041	0.023	YES
Diameter 2, in (rotated 90°)	0.00350	1.975	0.00177	0.102	YES
END 2					
Diameter 1, in	0.00140	1.975	0.00071	0.041	YES
Diameter 2, in (rotated 90°)	0.00350	1.975	0.00177	0.102	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

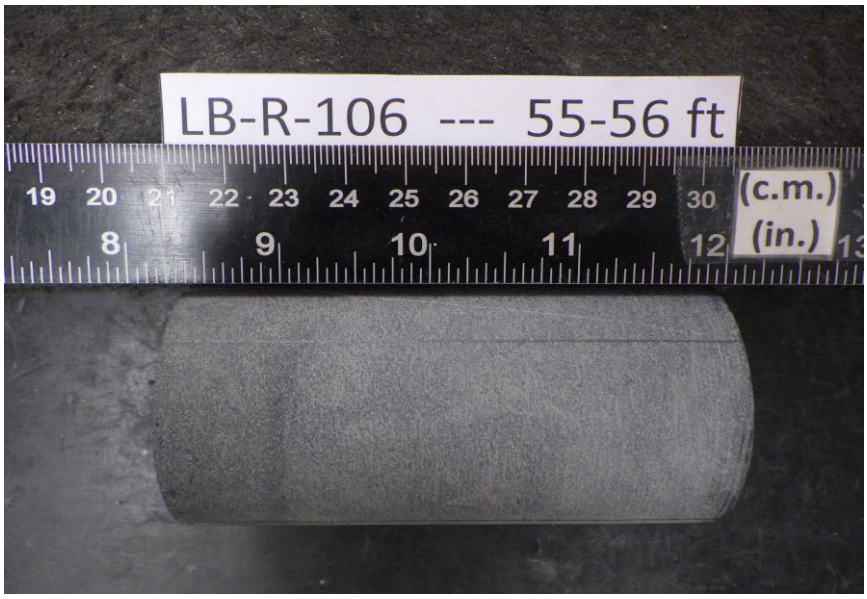
Client:	Langan Engineering	Test Date:	6/12/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-106	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	55-56		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/13/2025
Tested By:	jss
Checked By:	smd
Boring ID:	LB-R-106
Sample ID:	---
Depth, ft:	55-56



After cutting and grinding

After break

Client:	Langan Engineering	Test Date:	6/17/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-106		
Sample ID:	---		
Depth (ft):	56.5-57.5		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.30	4.30	4.30
Specimen Diameter, in:	1.98	1.98	1.98
Specimen Mass, g:	609.98		
Bulk Density, lb/ft^3	175	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

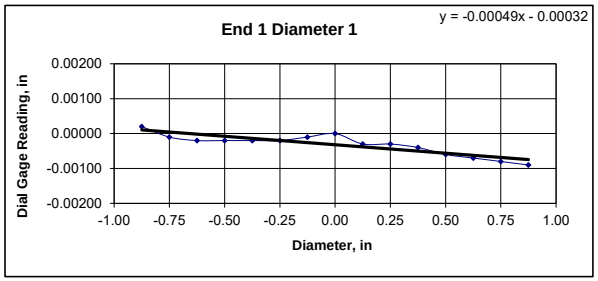
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00020	-0.00010	-0.00020	-0.00020	-0.00020	-0.00020	-0.00010	0.00000	-0.00030	-0.00030	-0.00040	-0.00060	-0.00070	-0.00080	-0.00090
Diameter 2, in (rotated 90°)	0.00140	0.00150	0.00110	0.00080	0.00070	0.00040	0.00000	0.00000	-0.00020	-0.00080	-0.00100	-0.00150	-0.00180	-0.00200	-0.00200

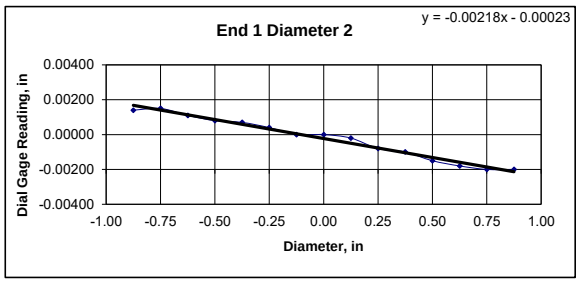
Difference between max and min readings, in:
0° = 0.00110 90° = 0.00350

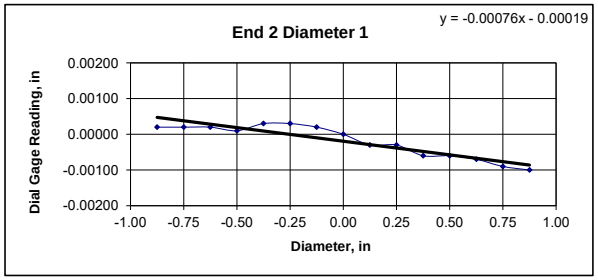
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00020	0.00020	0.00020	0.00010	0.00030	0.00030	0.00020	0.00000	-0.00030	-0.00030	-0.00060	-0.00060	-0.00070	-0.00090	-0.00100
Diameter 2, in (rotated 90°)	-0.00190	-0.00170	-0.00160	-0.00090	-0.00070	-0.00040	0.00000	0.00000	0.00040	0.00070	0.00070	0.00090	0.00150	0.00150	0.00170

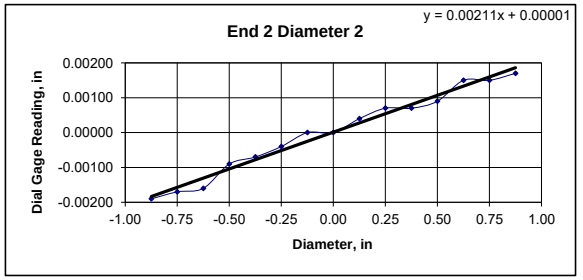
Difference between max and min readings, in:
0° = 0.0013 90° = 0.0036

Maximum difference must be < 0.0020 in. Difference = ± 0.00180
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00049
Angle of Best Fit Line: 0.02783

End 2:
Slope of Best Fit Line 0.00076
Angle of Best Fit Line: 0.04371

Maximum Angular Difference: 0.01588

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00218
Angle of Best Fit Line: 0.12474

End 2:
Slope of Best Fit Line 0.00211
Angle of Best Fit Line: 0.12098

Maximum Angular Difference: 0.00377

Parallelism Tolerance Met? YES
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00110	1.980	0.00056	0.032	YES
Diameter 2, in (rotated 90°)	0.00350	1.980	0.00177	0.101	YES
END 2					
Diameter 1, in	0.00130	1.980	0.00066	0.038	YES
Diameter 2, in (rotated 90°)	0.00360	1.980	0.00182	0.104	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/17/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-106	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	56.5-57.5		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/19/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-106
Sample ID:	---
Depth, ft:	56.5-57.5

After cutting and grinding

After break

GeoTesting EXPRESS
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Client:	Langan Engineering	Test Date:	6/10/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-108		
Sample ID:	---		
Depth (ft):	25.5-26		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.23	4.23	4.23
Specimen Diameter, in:	1.97	1.95	1.96
Specimen Mass, g:	585.39		
Bulk Density, lb/ft^3	174	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? NO

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? NO

END FLATNESS AND PARALLELISM (Procedure FP1)

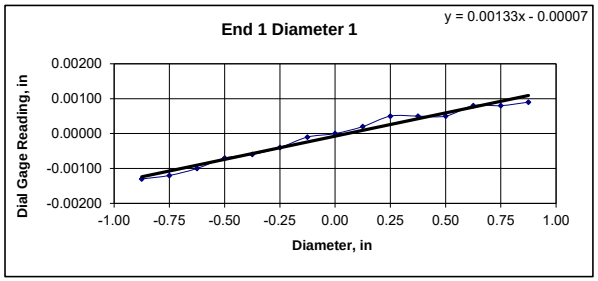
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00130	-0.00120	-0.00100	-0.00070	-0.00060	-0.00040	-0.00010	0.00000	0.00020	0.00050	0.00050	0.00050	0.00080	0.00080	0.00090
Diameter 2, in (rotated 90°)	-0.00200	-0.00160	-0.00130	-0.00110	-0.00110	-0.00050	-0.00040	0.00000	0.00010	0.00050	0.00090	0.00090	0.00110	0.00160	0.00170

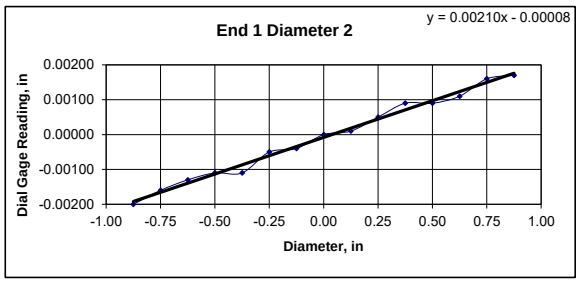
Difference between max and min readings, in:
0° = 0.00220 90° = 0.00370

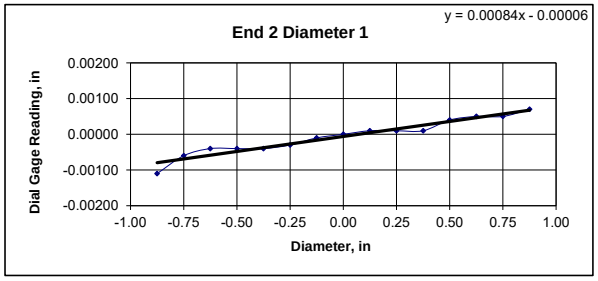
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00110	-0.00060	-0.00040	-0.00040	-0.00040	-0.00030	-0.00010	0.00000	0.00010	0.00010	0.00010	0.00040	0.00050	0.00050	0.00070
Diameter 2, in (rotated 90°)	0.00160	0.00120	0.00090	0.00080	0.00050	0.00020	0.00000	0.00000	-0.00030	-0.00060	-0.00110	-0.00140	-0.00170	-0.00180	-0.00180

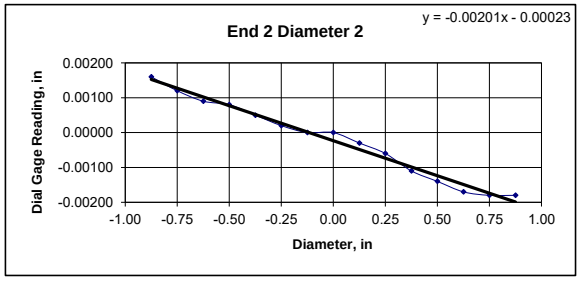
Difference between max and min readings, in:
0° = 0.0018 90° = 0.0034

Maximum difference must be < 0.0020 in. Difference = ± 0.00185
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00133
Angle of Best Fit Line: 0.07629

End 2:
Slope of Best Fit Line 0.00084
Angle of Best Fit Line: 0.04813

Maximum Angular Difference: 0.02816

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00210
Angle of Best Fit Line: 0.12048

End 2:
Slope of Best Fit Line 0.00201
Angle of Best Fit Line: 0.11508

Maximum Angular Difference: 0.00540

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00220	1.960	0.00112	0.064	YES
Diameter 2, in (rotated 90°)	0.00370	1.960	0.00189	0.108	YES
END 2					
Diameter 1, in	0.00180	1.960	0.00092	0.053	YES
Diameter 2, in (rotated 90°)	0.00340	1.960	0.00173	0.099	YES

Maximum angle of departure must be ≤ 0.25°

Perpendicularity Tolerance Met? YES

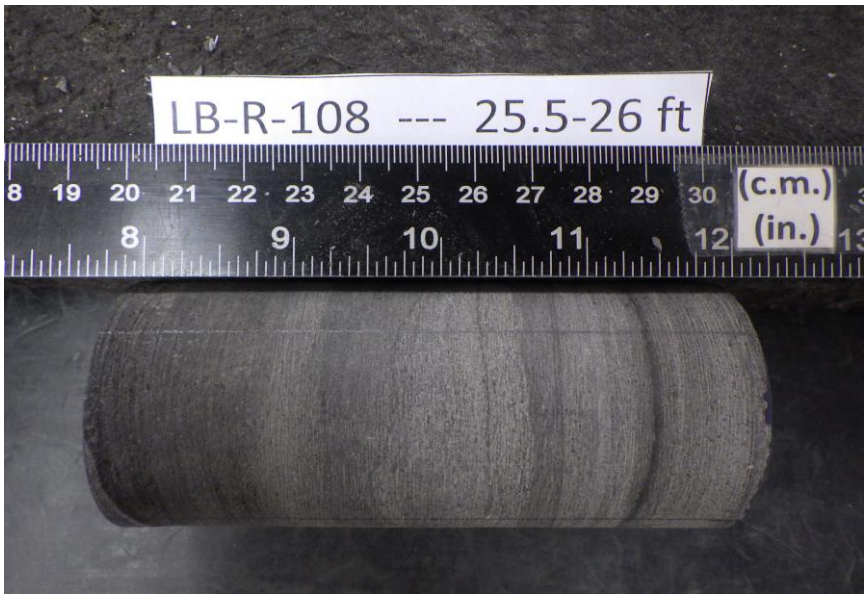
Client:	Langan Engineering	Test Date:	6/10/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-108	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	25.5-26		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/12/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-108
Sample ID:	---
Depth, ft:	25.5-26



After cutting and grinding

After break

Client:	Langan Engineering	Test Date:	6/12/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-111		
Sample ID:	---		
Depth (ft):	23.5-24.5		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.24	4.24	4.24
Specimen Diameter, in:	1.97	1.98	1.98
Specimen Mass, g:	596.47		
Bulk Density, lb/ft^3	175	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.1	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

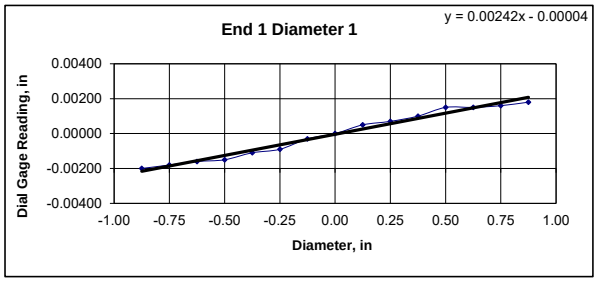
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00200	-0.00180	-0.00160	-0.00150	-0.00110	-0.00090	-0.00030	0.00000	0.00050	0.00070	0.00100	0.00150	0.00150	0.00160	0.00180
Diameter 2, in (rotated 90°)	0.00020	0.00020	0.00030	0.00030	0.00010	0.00010	0.00000	0.00000	0.00000	0.00000	-0.00010	-0.00030	-0.00050	-0.00060	-0.00060

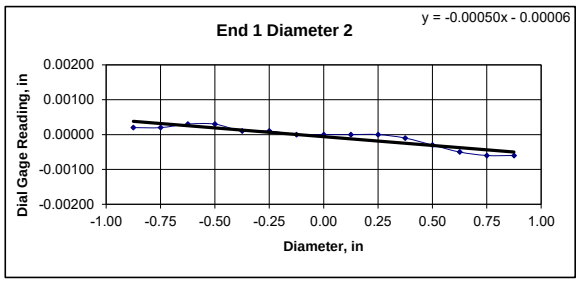
Difference between max and min readings, in:
0° = 0.00380 90° = 0.00090

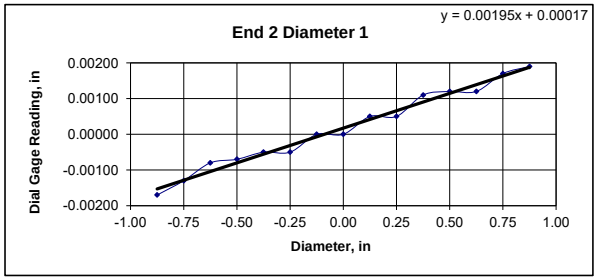
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00170	-0.00130	-0.00080	-0.00070	-0.00050	-0.00050	0.00000	0.00000	0.00050	0.00050	0.00110	0.00120	0.00120	0.00170	0.00190
Diameter 2, in (rotated 90°)	-0.00010	0.00010	-0.00020	-0.00020	0.00020	0.00020	0.00010	0.00000	-0.00010	-0.00010	0.00000	0.00030	0.00030	0.00010	0.00010

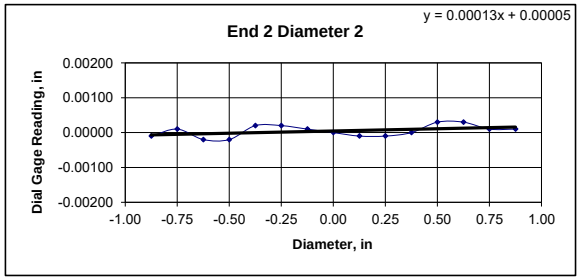
Difference between max and min readings, in:
0° = 0.0036 90° = 0.0005

Maximum difference must be < 0.0020 in. Difference = ± 0.00190
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00242
Angle of Best Fit Line: 0.13882

End 2:
Slope of Best Fit Line 0.00195
Angle of Best Fit Line: 0.11148

Maximum Angular Difference: 0.02734

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00050
Angle of Best Fit Line: 0.02881

End 2:
Slope of Best Fit Line 0.00013
Angle of Best Fit Line: 0.00737

Maximum Angular Difference: 0.02144

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00380	1.975	0.00192	0.110	YES
Diameter 2, in (rotated 90°)	0.00090	1.975	0.00046	0.026	YES
END 2					
Diameter 1, in	0.00360	1.975	0.00182	0.104	YES
Diameter 2, in (rotated 90°)	0.00050	1.975	0.00025	0.015	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/12/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-111	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	23.5-24.5		
Visual Description:	See photographs		

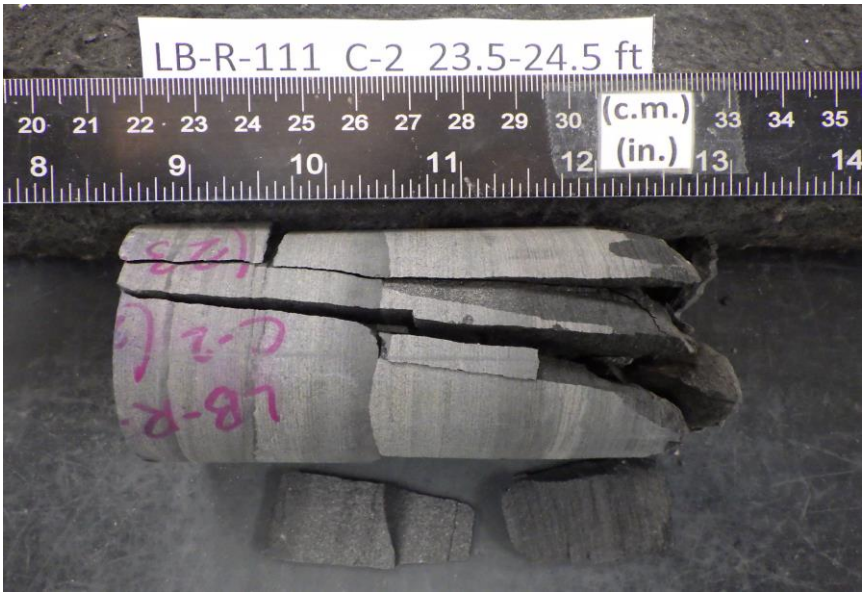
BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/13/2025
Tested By:	jss
Checked By:	smd
Boring ID:	LB-R-111
Sample ID:	---
Depth, ft:	23.5-24.5

After cutting and grinding



After break

GeoTesting EXPRESS
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Client:	Langan Engineering	Test Date:	6/9/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-115		
Sample ID:	---		
Depth (ft):	33.79-34.16		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.41	4.41	4.41
Specimen Diameter, in:	1.97	1.97	1.97
Specimen Mass, g:	616.1		
Bulk Density, lb/ft^3	174	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

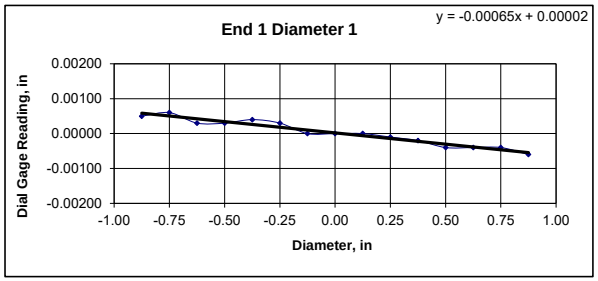
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00050	0.00060	0.00030	0.00030	0.00040	0.00030	0.00000	0.00000	0.00000	-0.00010	-0.00020	-0.00040	-0.00040	-0.00040	-0.00060
Diameter 2, in (rotated 90°)	0.00070	0.00060	0.00050	0.00040	0.00030	0.00030	0.00000	0.00000	-0.00010	-0.00020	-0.00040	-0.00040	-0.00060	-0.00060	-0.00100

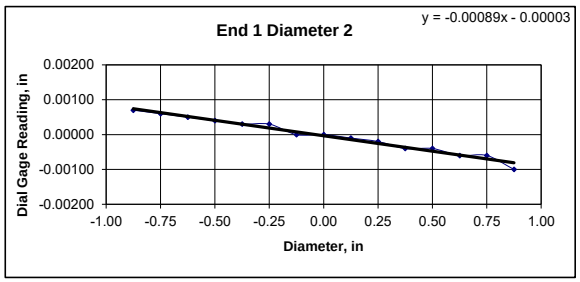
Difference between max and min readings, in:
0° = 0.00120 90° = 0.00170

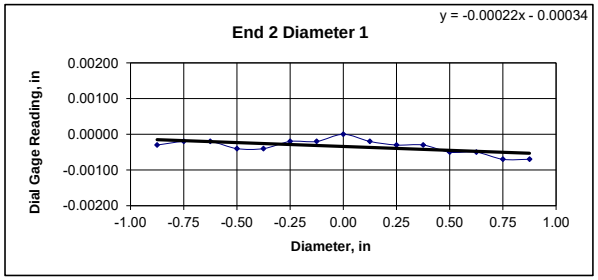
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00030	-0.00020	-0.00020	-0.00040	-0.00040	-0.00020	-0.00020	0.00000	-0.00020	-0.00030	-0.00030	-0.00050	-0.00050	-0.00070	-0.00070
Diameter 2, in (rotated 90°)	-0.00100	-0.00070	-0.00070	-0.00060	-0.00050	-0.00030	-0.00020	0.00000	0.00010	0.00040	0.00040	0.00040	0.00060	0.00070	0.00070

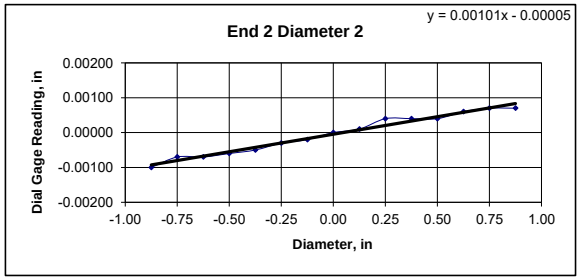
Difference between max and min readings, in:
0° = 0.0007 90° = 0.0017

Maximum difference must be < 0.0020 in. Difference = ± 0.00085
Flatness Tolerance Met? YES









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00065
Angle of Best Fit Line: 0.03700

End 2:
Slope of Best Fit Line 0.00022
Angle of Best Fit Line: 0.01244

Maximum Angular Difference: 0.02456

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00089
Angle of Best Fit Line: 0.05075

End 2:
Slope of Best Fit Line 0.00101
Angle of Best Fit Line: 0.05762

Maximum Angular Difference: 0.00688

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00120	1.970	0.00061	0.035	YES
Diameter 2, in (rotated 90°)	0.00170	1.970	0.00086	0.049	YES
END 2					
Diameter 1, in	0.00070	1.970	0.00036	0.020	YES
Diameter 2, in (rotated 90°)	0.00170	1.970	0.00086	0.049	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/9/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-115	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	33.79-34.16		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS

END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/9/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-115
Sample ID:	---
Depth, ft:	33.79-34.16

After cutting and grinding

After break

Client:	Langan Engineering	Test Date:	6/10/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-115		
Sample ID:	---		
Depth (ft):	36.60-36.98		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.37	4.37	4.37
Specimen Diameter, in:	1.97	1.97	1.97
Specimen Mass, g:	614.85		
Bulk Density, lb/ft^3	175	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

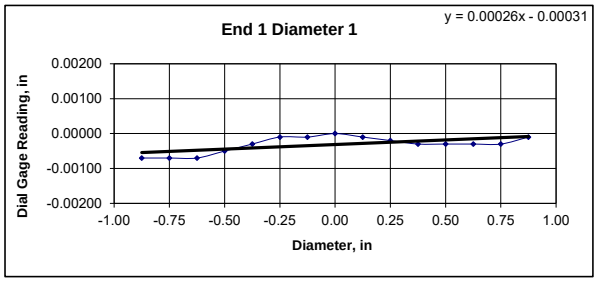
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00070	-0.00070	-0.00070	-0.00050	-0.00030	-0.00010	-0.00010	0.00000	-0.00010	-0.00020	-0.00030	-0.00030	-0.00030	-0.00030	-0.00010
Diameter 2, in (rotated 90°)	0.00180	0.00160	0.00120	0.00090	0.00100	0.00030	0.00020	0.00000	-0.00030	-0.00040	-0.00110	-0.00130	-0.00150	-0.00160	-0.00190

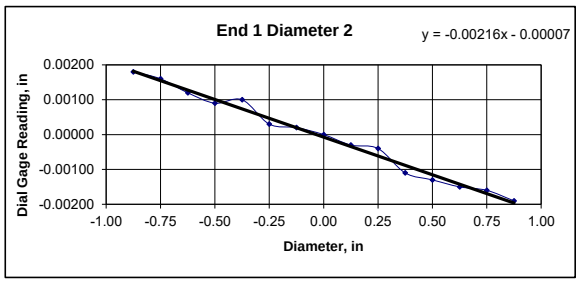
Difference between max and min readings, in:
0° = 0.00070 90° = 0.00370

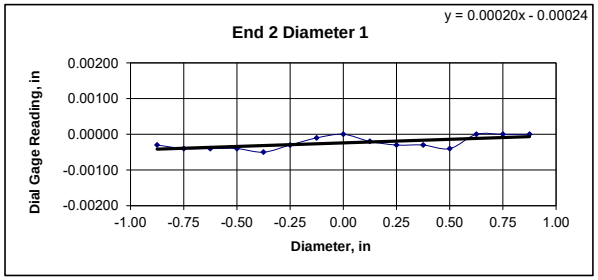
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00030	-0.00040	-0.00040	-0.00040	-0.00050	-0.00030	-0.00010	0.00000	-0.00020	-0.00030	-0.00030	-0.00040	0.00000	0.00000	0.00000
Diameter 2, in (rotated 90°)	-0.00180	-0.00160	-0.00110	-0.00100	-0.00060	-0.00020	0.00000	0.00000	-0.00010	0.00050	0.00090	0.00090	0.00110	0.00160	0.00160

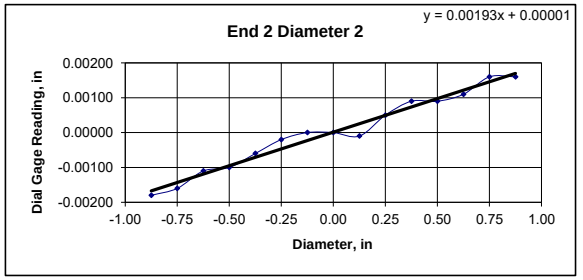
Difference between max and min readings, in:
0° = 0.0005 90° = 0.0034

Maximum difference must be < 0.0020 in. Difference = ± 0.00185
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00026
Angle of Best Fit Line: 0.01506

End 2:
Slope of Best Fit Line 0.00020
Angle of Best Fit Line: 0.01146

Maximum Angular Difference: 0.00360

Parallelism Tolerance Met? YES
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00216
Angle of Best Fit Line: 0.12376

End 2:
Slope of Best Fit Line 0.00193
Angle of Best Fit Line: 0.11034

Maximum Angular Difference: 0.01342

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00070	1.970	0.00036	0.020	YES
Diameter 2, in (rotated 90°)	0.00370	1.970	0.00188	0.108	YES
END 2					
Diameter 1, in	0.00050	1.970	0.00025	0.015	YES
Diameter 2, in (rotated 90°)	0.00340	1.970	0.00173	0.099	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

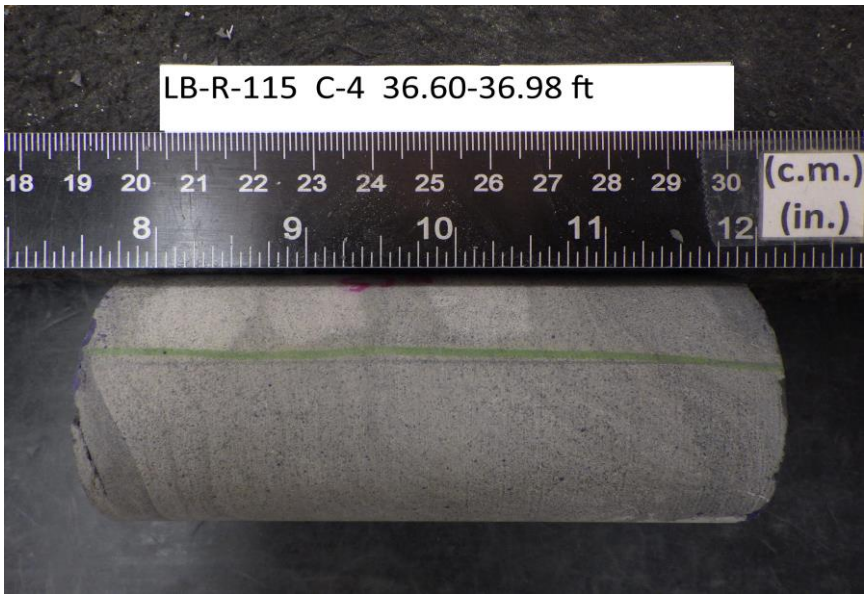
Client:	Langan Engineering	Test Date:	6/12/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-115	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	36.60-36.98		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/12/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-115
Sample ID:	---
Depth, ft:	36.60-36.98



After cutting and grinding

After break

Client:	Langan Engineering	Test Date:	6/9/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-116		
Sample ID:	---		
Depth (ft):	40.58-40.95		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.35	4.35	4.35
Specimen Diameter, in:	1.97	1.97	1.97
Specimen Mass, g:	605.02		
Bulk Density, lb/ft^3	173	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

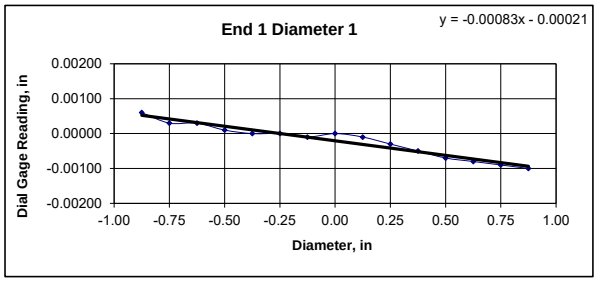
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00060	0.00030	0.00030	0.00010	0.00000	0.00000	-0.00010	0.00000	-0.00010	-0.00030	-0.00050	-0.00070	-0.00080	-0.00090	-0.00100
Diameter 2, in (rotated 90°)	0.00110	0.00110	0.00100	0.00110	0.00090	0.00070	0.00020	0.00000	-0.00030	-0.00050	-0.00080	-0.00110	-0.00150	-0.00170	-0.00180

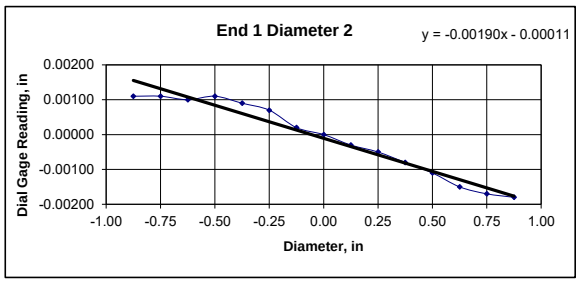
Difference between max and min readings, in:
0° = 0.00160 90° = 0.00290

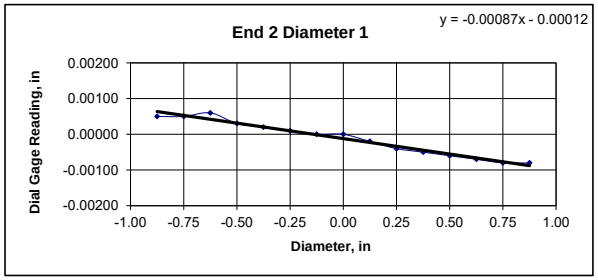
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00050	0.00050	0.00060	0.00030	0.00020	0.00010	0.00000	0.00000	-0.00020	-0.00040	-0.00050	-0.00060	-0.00070	-0.00080	-0.00080
Diameter 2, in (rotated 90°)	-0.00170	-0.00120	-0.00110	-0.00080	-0.00040	-0.00040	-0.00030	0.00000	0.00010	0.00050	0.00050	0.00090	0.00100	0.00120	0.00130

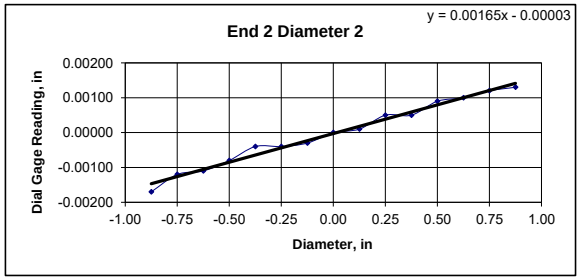
Difference between max and min readings, in:
0° = 0.0014 90° = 0.003

Maximum difference must be < 0.0020 in. Difference = ± 0.00150
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00083
Angle of Best Fit Line: 0.04780

End 2:
Slope of Best Fit Line 0.00087
Angle of Best Fit Line: 0.04960

Maximum Angular Difference: 0.00180

Parallelism Tolerance Met? YES
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00190
Angle of Best Fit Line: 0.10870

End 2:
Slope of Best Fit Line 0.00165
Angle of Best Fit Line: 0.09429

Maximum Angular Difference: 0.01441

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00160	1.970	0.00081	0.047	YES
Diameter 2, in (rotated 90°)	0.00290	1.970	0.00147	0.084	YES
END 2					
Diameter 1, in	0.00140	1.970	0.00071	0.041	YES
Diameter 2, in (rotated 90°)	0.00300	1.970	0.00152	0.087	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

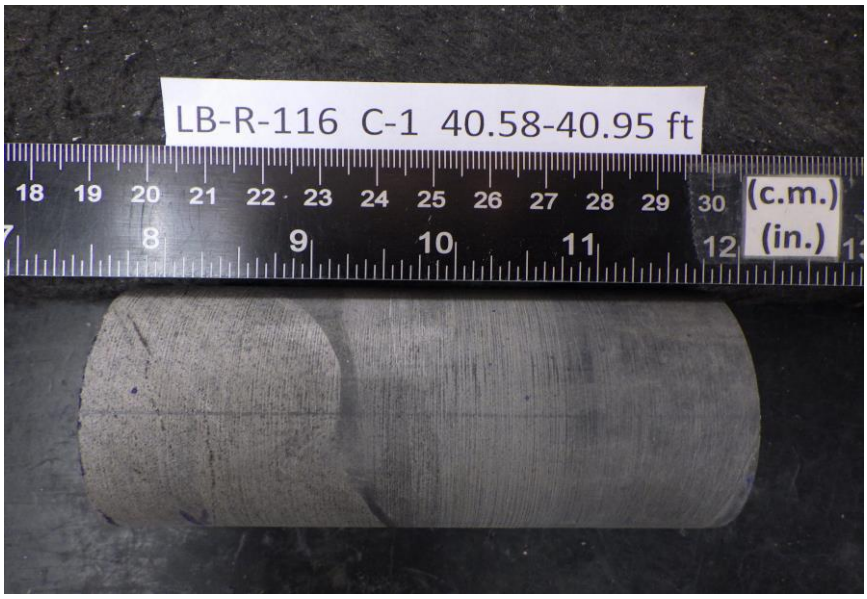
Client:	Langan Engineering	Test Date:	6/9/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-116	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	40.58-40.95		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/9/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-116
Sample ID:	---
Depth, ft:	40.58-40.95



After cutting and grinding

After break

Client:	Langan Engineering	Test Date:	6/11/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-118		
Sample ID:	---		
Depth (ft):	41.05-41.42		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.20	4.20	4.20
Specimen Diameter, in:	1.98	1.98	1.98
Specimen Mass, g:	565.75		
Bulk Density, lb/ft^3	166	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.1	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? NO

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? NO

END FLATNESS AND PARALLELISM (Procedure FP1)

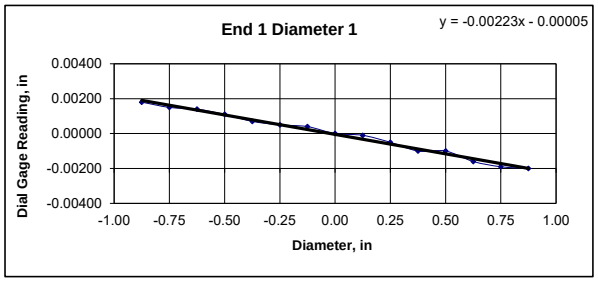
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00180	0.00150	0.00140	0.00110	0.00070	0.00050	0.00040	0.00000	-0.00010	-0.00050	-0.00100	-0.00100	-0.00160	-0.00190	-0.00200
Diameter 2, in (rotated 90°)	0.00000	0.00000	-0.00010	-0.00010	0.00000	0.00010	0.00020	0.00000	-0.00040	-0.00050	-0.00050	-0.00070	-0.00070	-0.00090	-0.00110

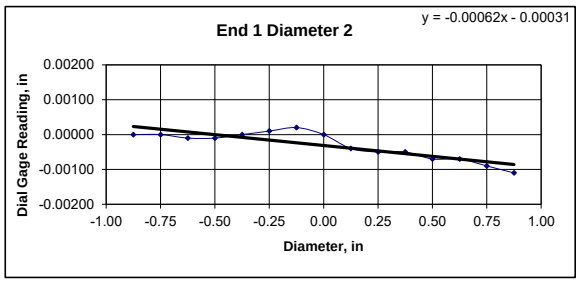
Difference between max and min readings, in:
0° = 0.00380 90° = 0.00130

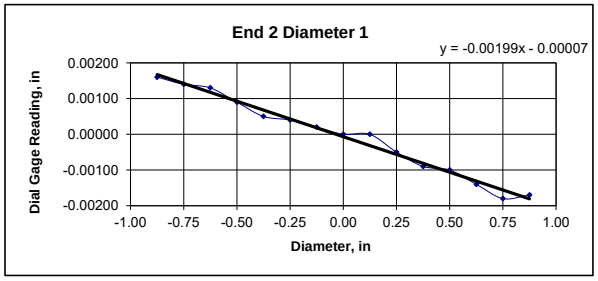
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00160	0.00140	0.00130	0.00090	0.00050	0.00040	0.00020	0.00000	0.00000	-0.00050	-0.00090	-0.00100	-0.00140	-0.00180	-0.00170
Diameter 2, in (rotated 90°)	0.00000	0.00010	0.00030	0.00010	0.00030	0.00030	0.00030	0.00000	0.00020	0.00030	0.00060	0.00060	0.00060	0.00060	0.00060

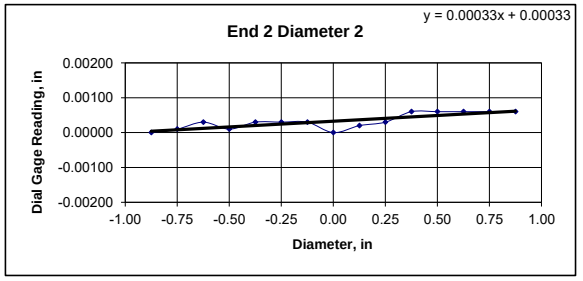
Difference between max and min readings, in:
0° = 0.0034 90° = 0.0006

Maximum difference must be < 0.0020 in. Difference = ± 0.00190
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00223
Angle of Best Fit Line: 0.12769

End 2:
Slope of Best Fit Line 0.00199
Angle of Best Fit Line: 0.11394

Maximum Angular Difference: 0.01375

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00062
Angle of Best Fit Line: 0.03569

End 2:
Slope of Best Fit Line 0.00033
Angle of Best Fit Line: 0.01883

Maximum Angular Difference: 0.01686

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00380	1.980	0.00192	0.110	YES
Diameter 2, in (rotated 90°)	0.00130	1.980	0.00066	0.038	YES
END 2					
Diameter 1, in	0.00340	1.980	0.00172	0.098	YES
Diameter 2, in (rotated 90°)	0.00060	1.980	0.00030	0.017	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/11/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-118	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	41.05-41.42		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/13/2025
Tested By:	jss
Checked By:	smd
Boring ID:	LB-R-118
Sample ID:	---
Depth, ft:	41.05-41.42

After cutting and grinding

After break

GeoTesting EXPRESS
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Client:	Langan Engineering	Test Date:	6/12/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-120		
Sample ID:	---		
Depth (ft):	49.58-49.95		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.37	4.37	4.37
Specimen Diameter, in:	1.97	1.98	1.98
Specimen Mass, g:	608.3		
Bulk Density, lb/ft^3	173	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? NO

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? NO

END FLATNESS AND PARALLELISM (Procedure FP1)

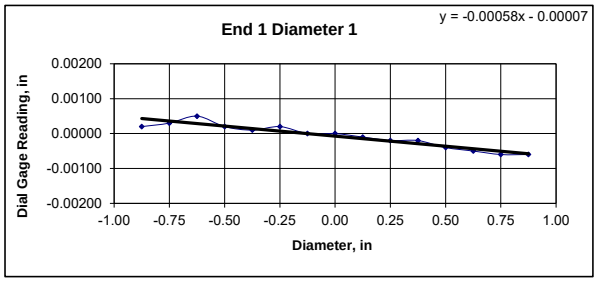
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00020	0.00030	0.00050	0.00020	0.00010	0.00020	0.00000	0.00000	-0.00010	-0.00020	-0.00020	-0.00040	-0.00050	-0.00060	-0.00060
Diameter 2, in (rotated 90°)	0.00190	0.00160	0.00130	0.00120	0.00080	0.00070	0.00040	0.00000	-0.00020	-0.00040	-0.00080	-0.00110	-0.00160	-0.00170	-0.00190

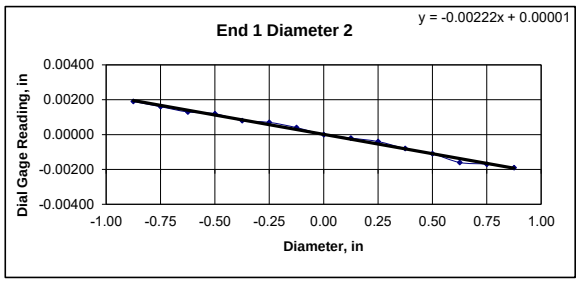
Difference between max and min readings, in:
0° = 0.00110 90° = 0.00380

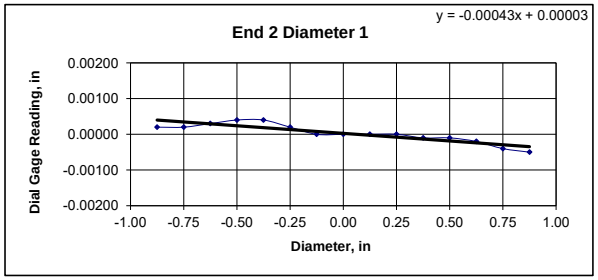
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00020	0.00020	0.00030	0.00040	0.00040	0.00020	0.00000	0.00000	0.00000	0.00000	-0.00010	-0.00010	-0.00020	-0.00040	-0.00050
Diameter 2, in (rotated 90°)	-0.00200	-0.00160	-0.00140	-0.00100	-0.00060	-0.00020	-0.00020	0.00000	0.00010	0.00070	0.00100	0.00150	0.00170	0.00190	0.00200

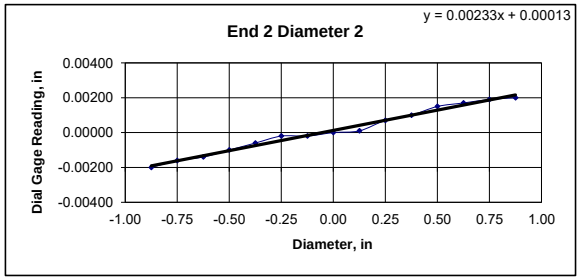
Difference between max and min readings, in:
0° = 0.0009 90° = 0.004

Maximum difference must be < 0.0020 in. Difference = ± 0.00200
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00058
Angle of Best Fit Line: 0.03307

End 2:
Slope of Best Fit Line 0.00043
Angle of Best Fit Line: 0.02439

Maximum Angular Difference: 0.00868

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00222
Angle of Best Fit Line: 0.12720

End 2:
Slope of Best Fit Line 0.00233
Angle of Best Fit Line: 0.13325

Maximum Angular Difference: 0.00606

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00110	1.975	0.00056	0.032	YES
Diameter 2, in (rotated 90°)	0.00380	1.975	0.00192	0.110	YES
END 2					
Diameter 1, in	0.00090	1.975	0.00046	0.026	YES
Diameter 2, in (rotated 90°)	0.00400	1.975	0.00203	0.116	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/12/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-120	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	49.58-49.95		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/13/2025
Tested By:	jss
Checked By:	smd
Boring ID:	LB-R-120
Sample ID:	---
Depth, ft:	49.58-49.95

After cutting and grinding

After break

Client:	Langan Engineering	Test Date:	6/9/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-124		
Sample ID:	---		
Depth (ft):	49.5-50.5		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.31	4.31	4.31
Specimen Diameter, in:	1.97	1.97	1.97
Specimen Mass, g:	606.24		
Bulk Density, lb/ft^3	175	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

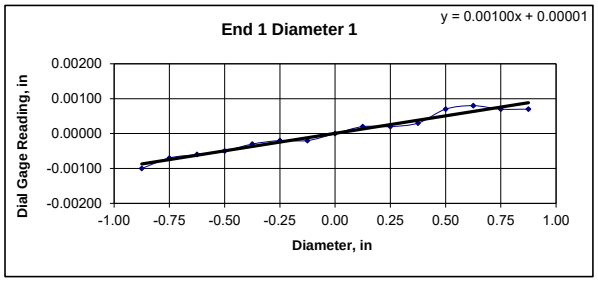
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00100	-0.00070	-0.00060	-0.00050	-0.00030	-0.00020	-0.00020	0.00000	0.00020	0.00020	0.00030	0.00070	0.00080	0.00070	0.00070
Diameter 2, in (rotated 90°)	0.00150	0.00130	0.00120	0.00090	0.00070	0.00050	0.00030	0.00000	-0.00020	-0.00050	-0.00090	-0.00100	-0.00110	-0.00170	-0.00190

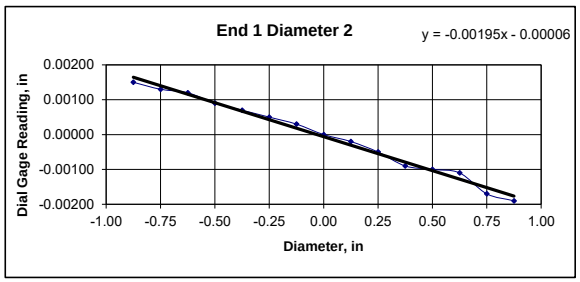
Difference between max and min readings, in:
0° = 0.00180 90° = 0.00340

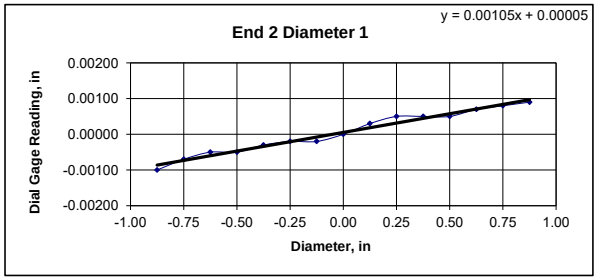
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00100	-0.00070	-0.00050	-0.00050	-0.00030	-0.00020	-0.00020	0.00000	0.00030	0.00050	0.00050	0.00050	0.00070	0.00080	0.00090
Diameter 2, in (rotated 90°)	-0.00180	-0.00160	-0.00120	-0.00090	-0.00080	-0.00040	-0.00030	0.00000	0.00020	0.00060	0.00080	0.00120	0.00130	0.00160	0.00180

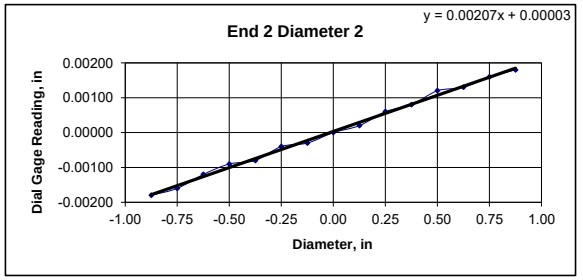
Difference between max and min readings, in:
0° = 0.0019 90° = 0.0036

Maximum difference must be < 0.0020 in. Difference = ± 0.00180
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00100
Angle of Best Fit Line: 0.05746

End 2:
Slope of Best Fit Line 0.00105
Angle of Best Fit Line: 0.05991

Maximum Angular Difference: 0.00246

Parallelism Tolerance Met? YES
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00195
Angle of Best Fit Line: 0.11164

End 2:
Slope of Best Fit Line 0.00207
Angle of Best Fit Line: 0.11885

Maximum Angular Difference: 0.00720

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00180	1.970	0.00091	0.052	YES
Diameter 2, in (rotated 90°)	0.00340	1.970	0.00173	0.099	YES
END 2					
Diameter 1, in	0.00190	1.970	0.00096	0.055	YES
Diameter 2, in (rotated 90°)	0.00360	1.970	0.00183	0.105	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/9/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-124	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	49.5-50.5		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/9/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-124
Sample ID:	---
Depth, ft:	49.5-50.5

After cutting and grinding

After break

Client:	Langan Engineering	Test Date:	6/17/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-124		
Sample ID:	---		
Depth (ft):	46.56-46.93		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.31	4.31	4.31
Specimen Diameter, in:	1.97	1.97	1.97
Specimen Mass, g:	609.1		
Bulk Density, lb/ft^3	176	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

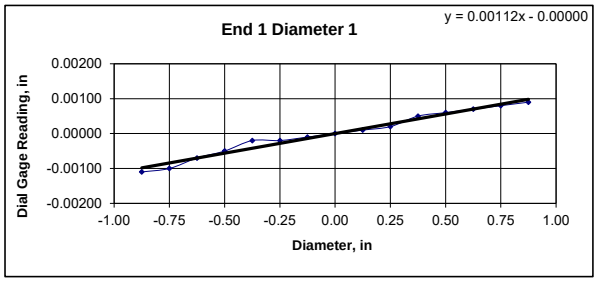
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00110	-0.00100	-0.00070	-0.00050	-0.00020	-0.00020	-0.00010	0.00000	0.00010	0.00020	0.00050	0.00060	0.00070	0.00080	0.00090
Diameter 2, in (rotated 90°)	-0.00190	-0.00140	-0.00140	-0.00120	-0.00090	-0.00030	0.00000	0.00000	0.00040	0.00070	0.00090	0.00140	0.00140	0.00170	0.00190

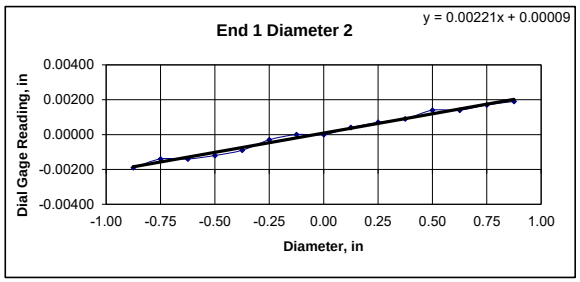
Difference between max and min readings, in:
0° = 0.00200 90° = 0.00380

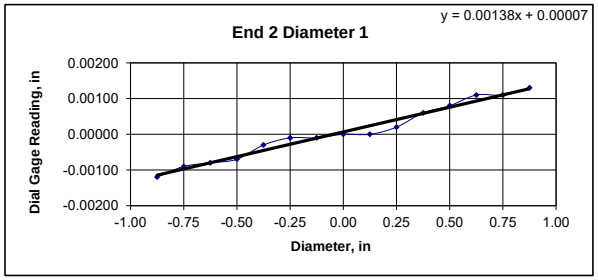
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00120	-0.00090	-0.00080	-0.00070	-0.00030	-0.00010	-0.00010	0.00000	0.00000	0.00020	0.00060	0.00080	0.00110	0.00110	0.00130
Diameter 2, in (rotated 90°)	0.00150	0.00140	0.00140	0.00100	0.00080	0.00060	0.00040	0.00000	-0.00020	-0.00070	-0.00100	-0.00120	-0.00170	-0.00170	-0.00180

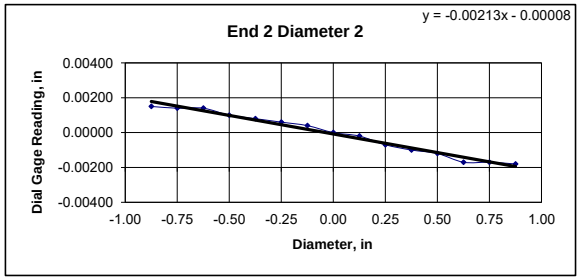
Difference between max and min readings, in:
0° = 0.0025 90° = 0.0033

Maximum difference must be < 0.0020 in. Difference = ± 0.00190
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00112
Angle of Best Fit Line: 0.06433

End 2:
Slope of Best Fit Line 0.00138
Angle of Best Fit Line: 0.07923

Maximum Angular Difference: 0.01490

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00221
Angle of Best Fit Line: 0.12671

End 2:
Slope of Best Fit Line 0.00213
Angle of Best Fit Line: 0.12212

Maximum Angular Difference: 0.00458

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00200	1.970	0.00102	0.058	YES
Diameter 2, in (rotated 90°)	0.00380	1.970	0.00193	0.111	YES
END 2					
Diameter 1, in	0.00250	1.970	0.00127	0.073	YES
Diameter 2, in (rotated 90°)	0.00330	1.970	0.00168	0.096	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/17/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-124	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	46.56-46.93		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/19/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-124
Sample ID:	---
Depth, ft:	46.56-46.93

After cutting and grinding

After break

Client:	Langan Engineering	Test Date:	6/10/2025
Project Name:	Upstate Confidential Project	Tested By:	jss
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-126		
Sample ID:	---		
Depth (ft):	19.54-19.91		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.25	4.25	4.25
Specimen Diameter, in:	1.98	1.98	1.98
Specimen Mass, g:	604.52		
Bulk Density, lb/ft^3	175	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.1	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

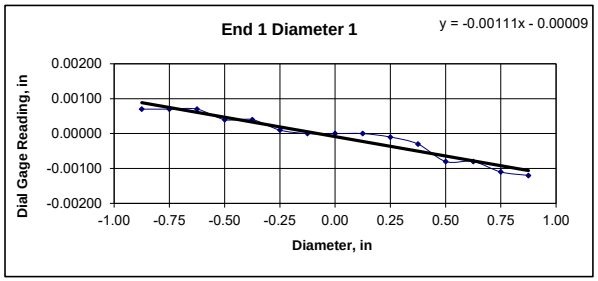
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00070	0.00070	0.00070	0.00040	0.00040	0.00010	0.00000	0.00000	0.00000	-0.00010	-0.00030	-0.00080	-0.00080	-0.00110	-0.00120
Diameter 2, in (rotated 90°)	-0.00250	-0.00190	-0.00140	-0.00110	-0.00050	-0.00040	-0.00010	0.00000	0.00040	0.00060	0.00120	0.00120	0.00130	0.00180	0.00190

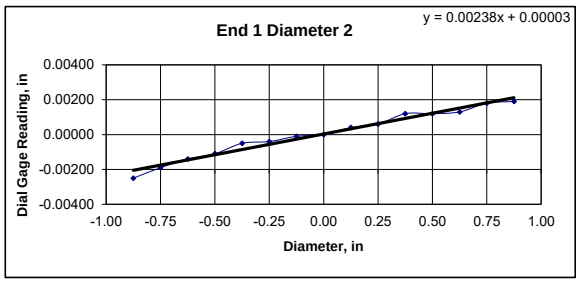
Difference between max and min readings, in:
0° = 0.00190 90° = 0.00440

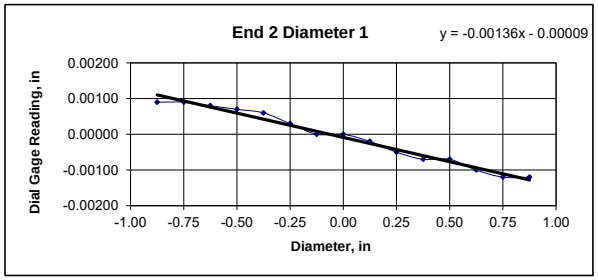
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00090	0.00090	0.00080	0.00070	0.00060	0.00030	0.00000	0.00000	-0.00020	-0.00050	-0.00070	-0.00070	-0.00100	-0.00120	-0.00120
Diameter 2, in (rotated 90°)	0.00210	0.00200	0.00150	0.00120	0.00100	0.00060	0.00040	0.00000	-0.00010	-0.00020	-0.00030	-0.00120	-0.00150	-0.00170	-0.00220

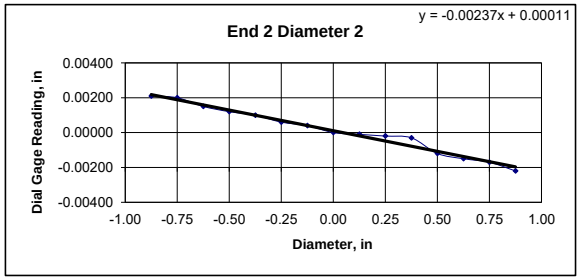
Difference between max and min readings, in:
0° = 0.0021 90° = 0.0043

Maximum difference must be < 0.0020 in. Difference = ± 0.00220
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00111
Angle of Best Fit Line: 0.06368

End 2:
Slope of Best Fit Line 0.00136
Angle of Best Fit Line: 0.07792

Maximum Angular Difference: 0.01424

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00238
Angle of Best Fit Line: 0.13636

End 2:
Slope of Best Fit Line 0.00237
Angle of Best Fit Line: 0.13571

Maximum Angular Difference: 0.00065

Parallelism Tolerance Met? YES
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00190	1.981	0.00096	0.055	YES
Diameter 2, in (rotated 90°)	0.00440	1.981	0.00222	0.127	YES
END 2					
Diameter 1, in	0.00210	1.981	0.00106	0.061	YES
Diameter 2, in (rotated 90°)	0.00430	1.981	0.00217	0.124	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/10/2025
Project Name:	Upstate Confidential Project	Tested By:	jss
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-126	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	19.54-19.91		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS

END 1

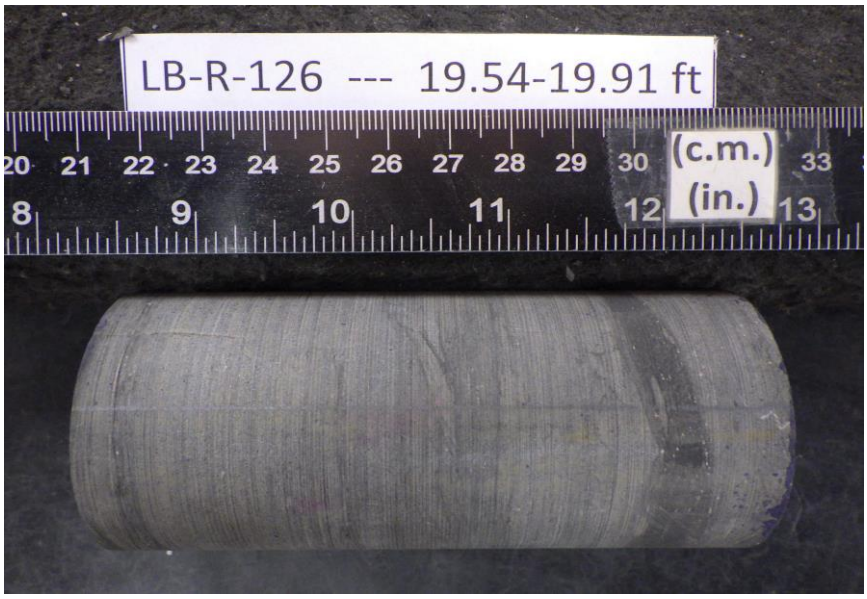
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

END 2

Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/9/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-126
Sample ID:	---
Depth, ft:	19.54-19.91



After cutting and grinding

After break

Client:	Langan Engineering	Test Date:	6/13/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-127		
Sample ID:	---		
Depth (ft):	31.80-32.16		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.24	4.24	4.24
Specimen Diameter, in:	1.97	1.98	1.98
Specimen Mass, g:	575.67		
Bulk Density, lb/ft^3	168	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.1	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

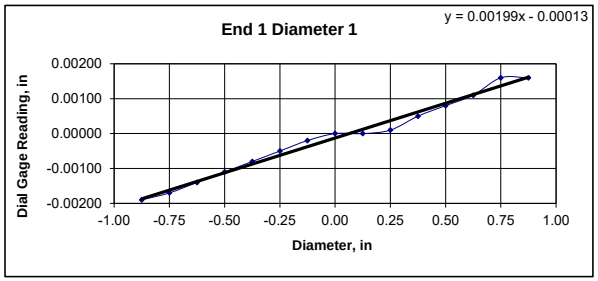
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00190	-0.00170	-0.00140	-0.00110	-0.00080	-0.00050	-0.00020	0.00000	0.00000	0.00010	0.00050	0.00080	0.00110	0.00160	0.00160
Diameter 2, in (rotated 90°)	-0.00110	-0.00110	-0.00080	-0.00070	-0.00060	-0.00060	-0.00030	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	-0.00010	-0.00010

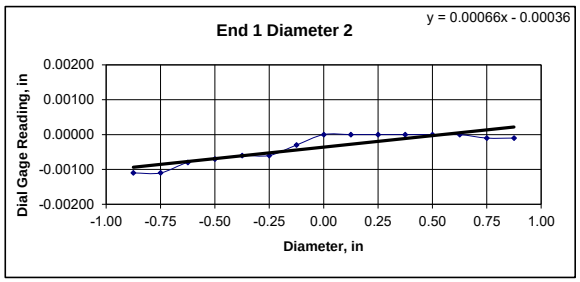
Difference between max and min readings, in:
0° = 0.00350 90° = 0.00110

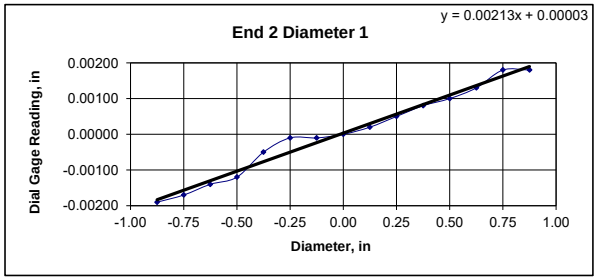
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00190	-0.00170	-0.00140	-0.00120	-0.00050	-0.00010	-0.00010	0.00000	0.00020	0.00050	0.00080	0.00100	0.00130	0.00180	0.00180
Diameter 2, in (rotated 90°)	0.00060	0.00040	0.00040	0.00020	0.00020	0.00010	0.00010	0.00000	-0.00030	-0.00040	-0.00050	-0.00070	-0.00080	-0.00090	-0.00100

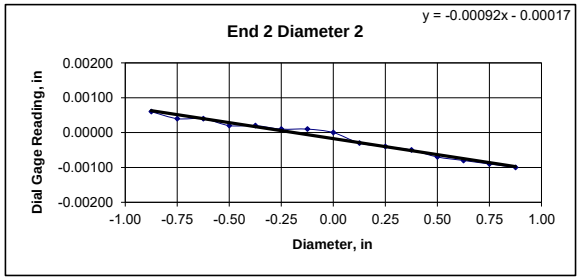
Difference between max and min readings, in:
0° = 0.0037 90° = 0.0016

Maximum difference must be < 0.0020 in. Difference = ± 0.00185
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00199
Angle of Best Fit Line: 0.11410

End 2:
Slope of Best Fit Line 0.00213
Angle of Best Fit Line: 0.12212

Maximum Angular Difference: 0.00802

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00066
Angle of Best Fit Line: 0.03782

End 2:
Slope of Best Fit Line 0.00092
Angle of Best Fit Line: 0.05255

Maximum Angular Difference: 0.01473

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00350	1.975	0.00177	0.102	YES
Diameter 2, in (rotated 90°)	0.00110	1.975	0.00056	0.032	YES
END 2					
Diameter 1, in	0.00370	1.975	0.00187	0.107	YES
Diameter 2, in (rotated 90°)	0.00160	1.975	0.00081	0.046	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/13/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-127	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	31.80-32.16		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/18/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-127
Sample ID:	---
Depth, ft:	31.80-32.16

After cutting and grinding

After break

Client:	Langan Engineering	Test Date:	6/13/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-128		
Sample ID:	---		
Depth (ft):	35.75-36.25		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.23	4.23	4.23
Specimen Diameter, in:	1.97	1.98	1.98
Specimen Mass, g:	581.71		
Bulk Density, lb/ft^3	171	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.1	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

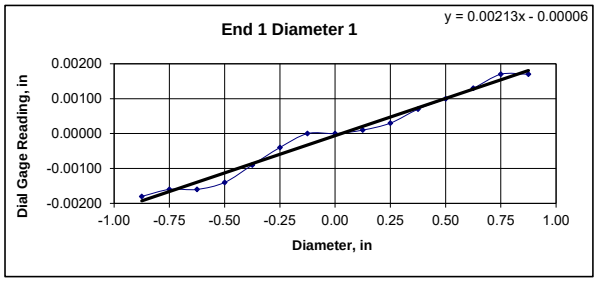
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00180	-0.00160	-0.00160	-0.00140	-0.00090	-0.00040	0.00000	0.00000	0.00010	0.00030	0.00070	0.00100	0.00130	0.00170	0.00170
Diameter 2, in (rotated 90°)	0.00110	0.00100	0.00060	0.00060	0.00030	0.00010	0.00010	0.00000	-0.00020	-0.00030	-0.00060	-0.00070	-0.00090	-0.00120	-0.00120

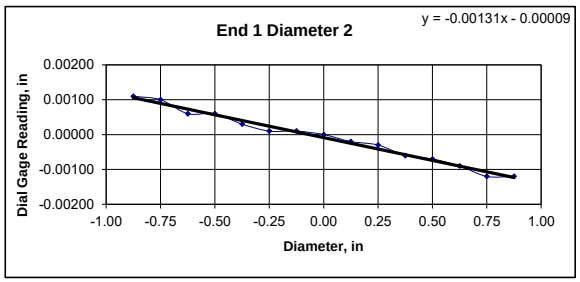
Difference between max and min readings, in:
0° = 0.00350 90° = 0.00230

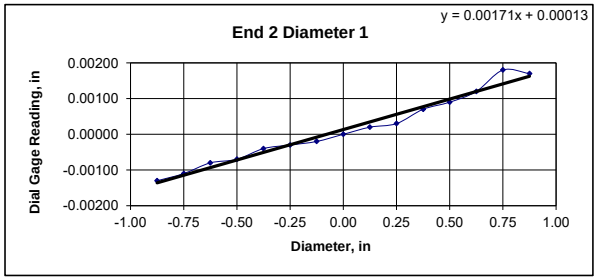
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00130	-0.00110	-0.00080	-0.00070	-0.00040	-0.00030	-0.00020	0.00000	0.00020	0.00030	0.00070	0.00090	0.00120	0.00180	0.00170
Diameter 2, in (rotated 90°)	-0.00130	-0.00140	-0.00110	-0.00100	-0.00080	-0.00050	-0.00030	0.00000	0.00010	0.00020	0.00030	0.00030	0.00030	0.00050	0.00090

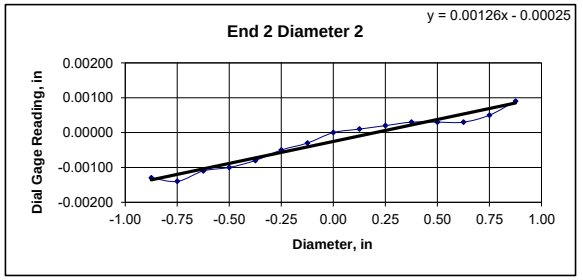
Difference between max and min readings, in:
0° = 0.0031 90° = 0.0023

Maximum difference must be < 0.0020 in. Difference = ± 0.00175
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00213
Angle of Best Fit Line: 0.12229

End 2:
Slope of Best Fit Line 0.00171
Angle of Best Fit Line: 0.09773

Maximum Angular Difference: 0.02456

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00131
Angle of Best Fit Line: 0.07498

End 2:
Slope of Best Fit Line 0.00126
Angle of Best Fit Line: 0.07219

Maximum Angular Difference: 0.00278

Parallelism Tolerance Met? YES
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00350	1.975	0.00177	0.102	YES
Diameter 2, in (rotated 90°)	0.00230	1.975	0.00116	0.067	YES
END 2					
Diameter 1, in	0.00310	1.975	0.00157	0.090	YES
Diameter 2, in (rotated 90°)	0.00230	1.975	0.00116	0.067	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

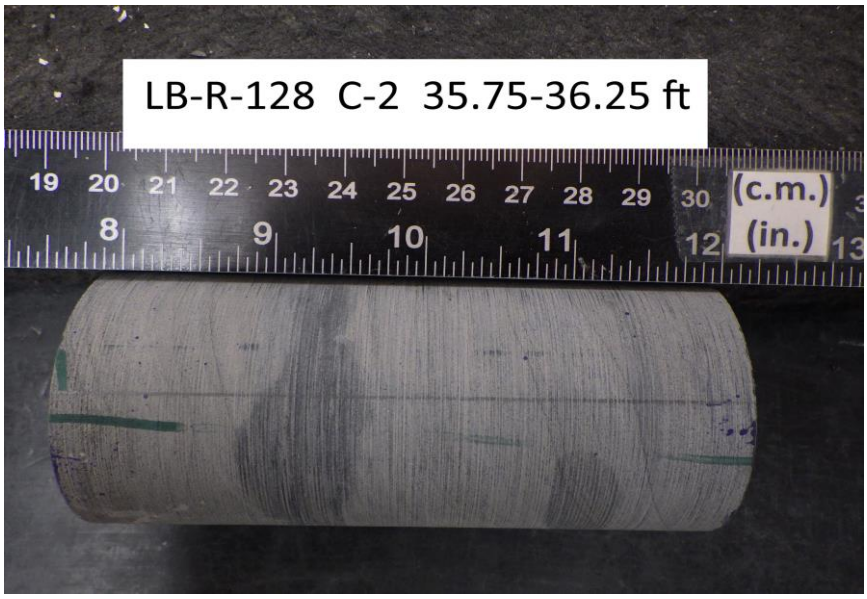
Client:	Langan Engineering	Test Date:	6/13/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-128	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	35.75-36.25		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/16/2025
Tested By:	jss
Checked By:	smd
Boring ID:	LB-R-128
Sample ID:	---
Depth, ft:	35.75-36.25



After cutting and grinding

After break

GeoTesting EXPRESS
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Client:	Langan Engineering	Test Date:	6/11/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-129		
Sample ID:	---		
Depth (ft):	44.61-44.99		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.20	4.20	4.20
Specimen Diameter, in:	1.98	1.98	1.98
Specimen Mass, g:	600.95		
Bulk Density, lb/ft^3	177	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.1	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? NO

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? NO

END FLATNESS AND PARALLELISM (Procedure FP1)

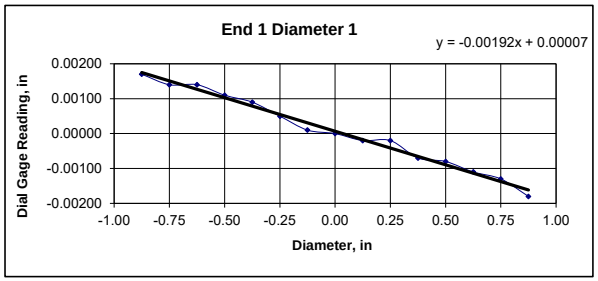
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00170	0.00140	0.00140	0.00110	0.00090	0.00050	0.00010	0.00000	-0.00020	-0.00020	-0.00070	-0.00080	-0.00110	-0.00130	-0.00180
Diameter 2, in (rotated 90°)	0.00040	0.00030	0.00030	0.00000	0.00000	0.00000	0.00000	0.00000	-0.00010	-0.00010	-0.00040	-0.00040	-0.00060	-0.00070	-0.00060

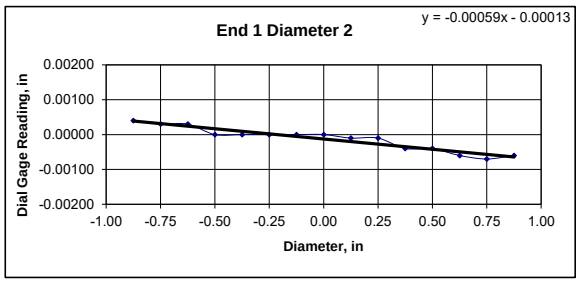
Difference between max and min readings, in:
0° = 0.00350 90° = 0.00110

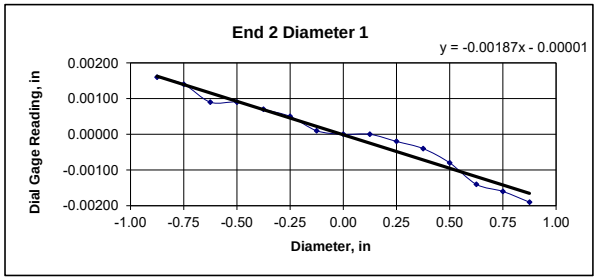
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00160	0.00140	0.00090	0.00090	0.00070	0.00050	0.00010	0.00000	0.00000	-0.00020	-0.00040	-0.00080	-0.00140	-0.00160	-0.00190
Diameter 2, in (rotated 90°)	-0.00020	-0.00030	-0.00040	-0.00020	-0.00020	-0.00010	0.00010	0.00000	0.00030	0.00010	0.00030	0.00030	0.00050	0.00020	0.00030

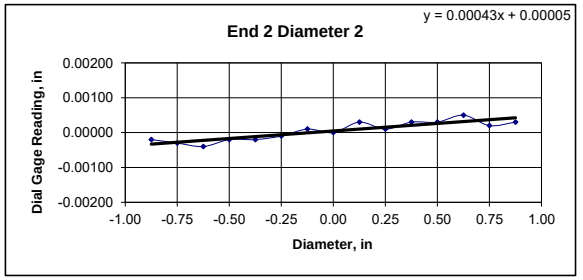
Difference between max and min readings, in:
0° = 0.0035 90° = 0.0009

Maximum difference must be < 0.0020 in. Difference = ± 0.00175
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00192
Angle of Best Fit Line: 0.11017

End 2:
Slope of Best Fit Line 0.00187
Angle of Best Fit Line: 0.10739

Maximum Angular Difference: 0.00278

Parallelism Tolerance Met? YES
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00059
Angle of Best Fit Line: 0.03372

End 2:
Slope of Best Fit Line 0.00043
Angle of Best Fit Line: 0.02472

Maximum Angular Difference: 0.00900

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00350	1.980	0.00177	0.101	YES
Diameter 2, in (rotated 90°)	0.00110	1.980	0.00056	0.032	YES
END 2					
Diameter 1, in	0.00350	1.980	0.00177	0.101	YES
Diameter 2, in (rotated 90°)	0.00090	1.980	0.00045	0.026	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/11/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-129	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	44.61-44.99		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS

END 1

Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

END 2

Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/13/2025
Tested By:	jss
Checked By:	smd
Boring ID:	LB-R-129
Sample ID:	---
Depth, ft:	44.61-44.99

After cutting and grinding

After break

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Client:	Langan Engineering	Test Date:	6/12/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-130		
Sample ID:	---		
Depth (ft):	30.74-31.11		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.23	4.23	4.23
Specimen Diameter, in:	1.99	1.99	1.99
Specimen Mass, g:	595.89		
Bulk Density, lb/ft^3	172	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.1	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? NO

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? NO

END FLATNESS AND PARALLELISM (Procedure FP1)

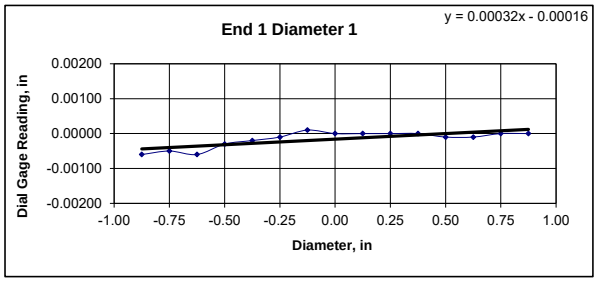
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00060	-0.00050	-0.00060	-0.00030	-0.00020	-0.00010	0.00010	0.00000	0.00000	0.00000	0.00000	-0.00010	-0.00010	0.00000	0.00000
Diameter 2, in (rotated 90°)	0.00180	0.00160	0.00100	0.00080	0.00060	0.00050	0.00010	0.00000	0.00000	-0.00020	-0.00080	-0.00090	-0.00100	-0.00170	-0.00190

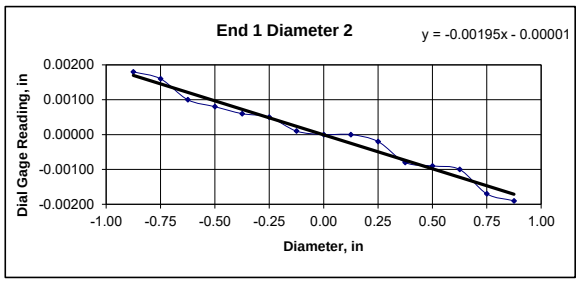
Difference between max and min readings, in:
0° = 0.00070 90° = 0.00370

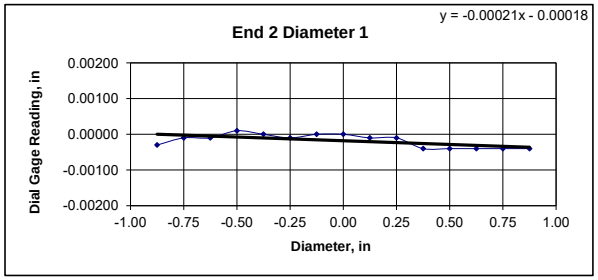
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00030	-0.00010	-0.00010	0.00010	0.00000	-0.00010	0.00000	0.00000	-0.00010	-0.00010	-0.00040	-0.00040	-0.00040	-0.00040	-0.00040
Diameter 2, in (rotated 90°)	-0.00160	-0.00170	-0.00150	-0.00100	-0.00090	-0.00020	-0.00020	0.00000	0.00050	0.00060	0.00120	0.00130	0.00170	0.00170	0.00190

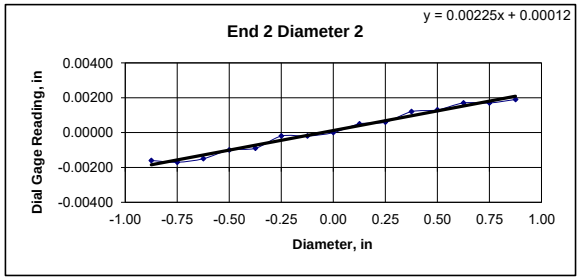
Difference between max and min readings, in:
0° = 0.0005 90° = 0.0036

Maximum difference must be < 0.0020 in. Difference = ± 0.00185
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00032
Angle of Best Fit Line: 0.01833

End 2:
Slope of Best Fit Line 0.00021
Angle of Best Fit Line: 0.01195

Maximum Angular Difference: 0.00638

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00195
Angle of Best Fit Line: 0.11164

End 2:
Slope of Best Fit Line 0.00225
Angle of Best Fit Line: 0.12883

Maximum Angular Difference: 0.01719

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00070	1.990	0.00035	0.020	YES
Diameter 2, in (rotated 90°)	0.00370	1.990	0.00186	0.107	YES
END 2					
Diameter 1, in	0.00050	1.990	0.00025	0.014	YES
Diameter 2, in (rotated 90°)	0.00360	1.990	0.00181	0.104	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

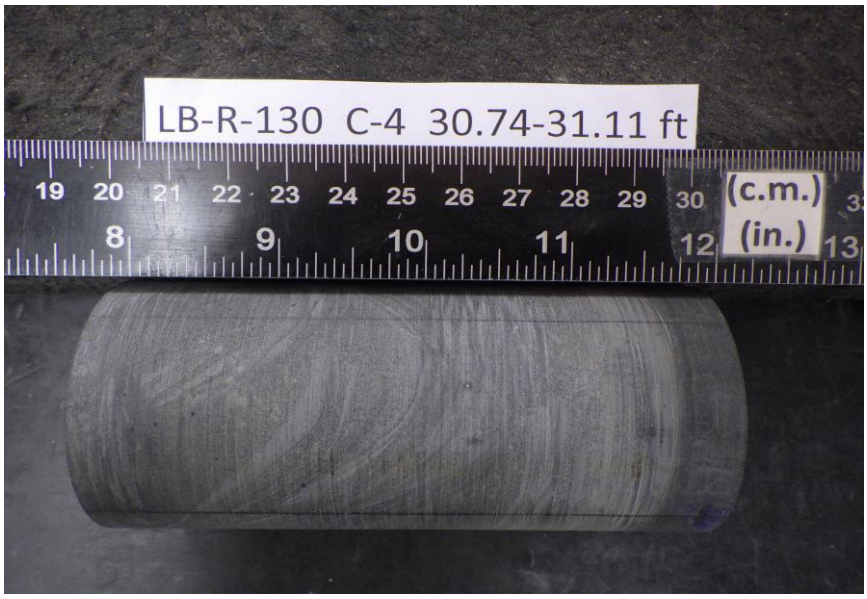
Client:	Langan Engineering	Test Date:	6/13/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-130	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	30.74-31.11		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

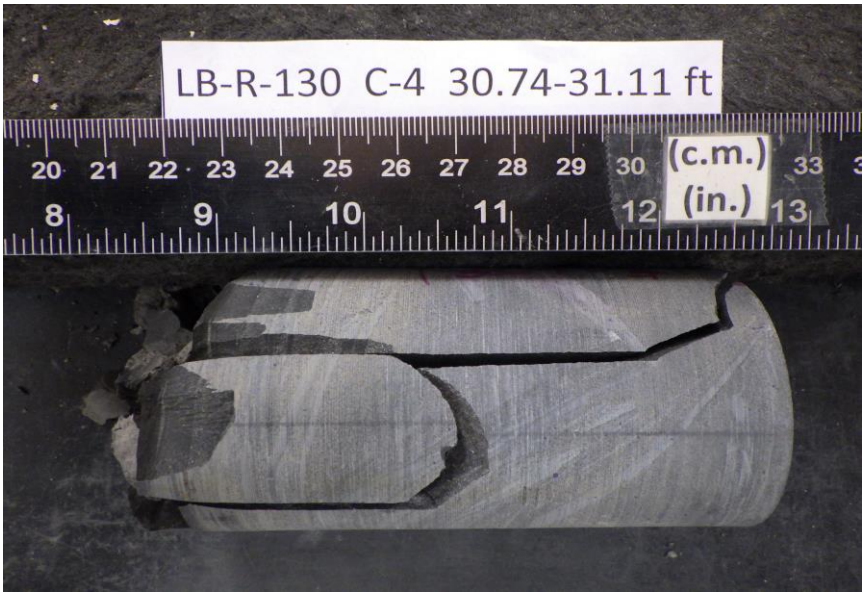
END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/13/2025
Tested By:	jss
Checked By:	smd
Boring ID:	LB-R-130
Sample ID:	---
Depth, ft:	30.74-31.11



After cutting and grinding



After break

Client:	Langan Engineering	Test Date:	6/13/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-132		
Sample ID:	---		
Depth (ft):	32.08-32.45		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.29	4.29	4.29
Specimen Diameter, in:	1.98	1.98	1.98
Specimen Mass, g:	609.26		
Bulk Density, lb/ft^3	175	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

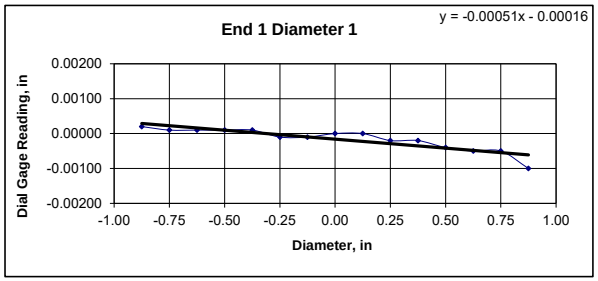
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00020	0.00010	0.00010	0.00010	0.00010	-0.00010	-0.00010	0.00000	0.00000	-0.00020	-0.00020	-0.00040	-0.00050	-0.00050	-0.00100
Diameter 2, in (rotated 90°)	0.00170	0.00190	0.00160	0.00110	0.00110	0.00070	0.00030	0.00000	-0.00020	-0.00060	-0.00100	-0.00150	-0.00180	-0.00190	-0.00190

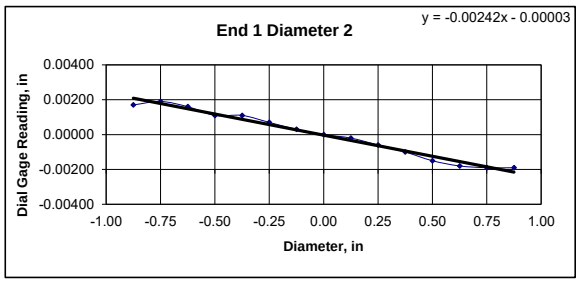
Difference between max and min readings, in:
0° = 0.00120 90° = 0.00380

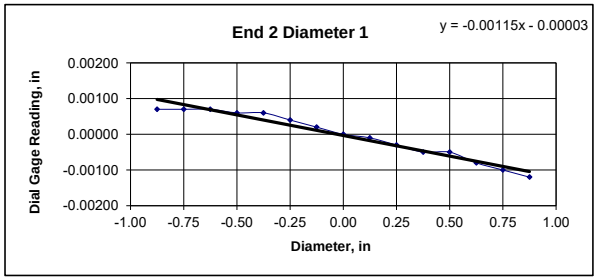
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00070	0.00070	0.00070	0.00060	0.00060	0.00040	0.00020	0.00000	-0.00010	-0.00030	-0.00050	-0.00050	-0.00080	-0.00100	-0.00120
Diameter 2, in (rotated 90°)	-0.00170	-0.00150	-0.00140	-0.00090	-0.00060	-0.00040	0.00000	0.00000	0.00000	0.00050	0.00070	0.00090	0.00150	0.00160	0.00190

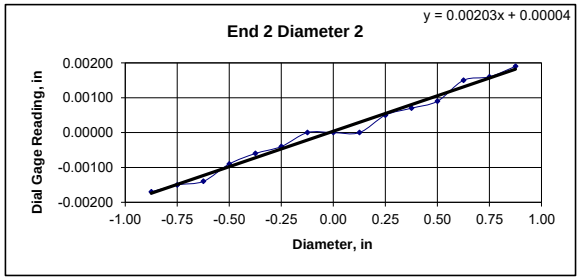
Difference between max and min readings, in:
0° = 0.0019 90° = 0.0036

Maximum difference must be < 0.0020 in. Difference = ± 0.00190
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00051
Angle of Best Fit Line: 0.02947

End 2:
Slope of Best Fit Line 0.00115
Angle of Best Fit Line: 0.06614

Maximum Angular Difference: 0.03667

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00242
Angle of Best Fit Line: 0.13882

End 2:
Slope of Best Fit Line 0.00203
Angle of Best Fit Line: 0.11656

Maximum Angular Difference: 0.02226

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00120	1.980	0.00061	0.035	YES
Diameter 2, in (rotated 90°)	0.00380	1.980	0.00192	0.110	YES
END 2					
Diameter 1, in	0.00190	1.980	0.00096	0.055	YES
Diameter 2, in (rotated 90°)	0.00360	1.980	0.00182	0.104	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/13/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-132	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	32.08-32.45		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/16/2025
Tested By:	jss
Checked By:	smd
Boring ID:	LB-R-132
Sample ID:	---
Depth, ft:	32.08-32.45

After cutting and grinding

After break

Client:	Langan Engineering	Test Date:	6/9/2025
Project Name:	Upstate Confidential Project	Tested By:	jss
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-135		
Sample ID:	---		
Depth (ft):	27-28		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.36	4.36	4.36
Specimen Diameter, in:	2.00	1.99	2.00
Specimen Mass, g:	608.33		
Bulk Density, lb/ft^3	170	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? NO

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? NO

END FLATNESS AND PARALLELISM (Procedure FP1)

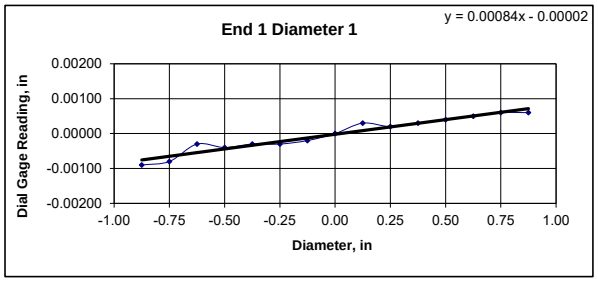
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00090	-0.00080	-0.00030	-0.00040	-0.00030	-0.00030	-0.00020	0.00000	0.00030	0.00020	0.00030	0.00040	0.00050	0.00060	0.00060
Diameter 2, in (rotated 90°)	-0.00080	-0.00040	-0.00040	-0.00040	-0.00030	-0.00020	0.00000	0.00000	-0.00020	-0.00010	-0.00010	0.00020	-0.00010	0.00010	-0.00010

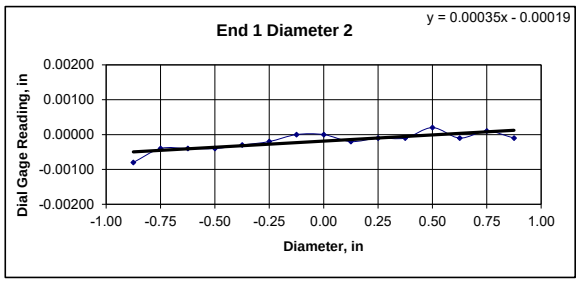
Difference between max and min readings, in:
0° = 0.00150 90° = 0.00100

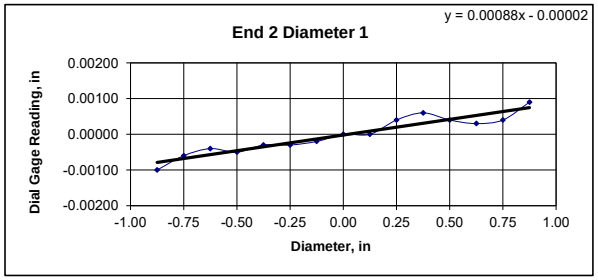
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00100	-0.00060	-0.00040	-0.00050	-0.00030	-0.00030	-0.00020	0.00000	0.00000	0.00040	0.00060	0.00040	0.00030	0.00040	0.00090
Diameter 2, in (rotated 90°)	0.00060	0.00020	0.00020	0.00010	0.00010	0.00030	0.00030	0.00000	0.00000	0.00000	0.00000	-0.00010	0.00020	-0.00030	-0.00040

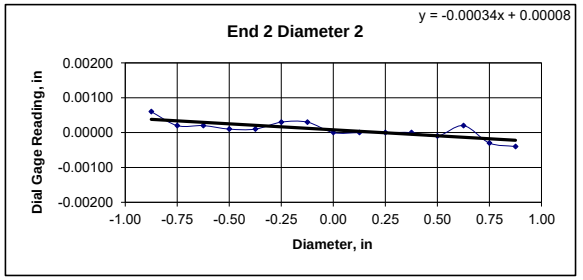
Difference between max and min readings, in:
0° = 0.0019 90° = 0.001

Maximum difference must be < 0.0020 in. Difference = ± 0.00095
Flatness Tolerance Met? YES









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00084
Angle of Best Fit Line: 0.04813

End 2:
Slope of Best Fit Line 0.00088
Angle of Best Fit Line: 0.05026

Maximum Angular Difference: 0.00213

Parallelism Tolerance Met? YES
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00035
Angle of Best Fit Line: 0.02030

End 2:
Slope of Best Fit Line 0.00034
Angle of Best Fit Line: 0.01964

Maximum Angular Difference: 0.00065

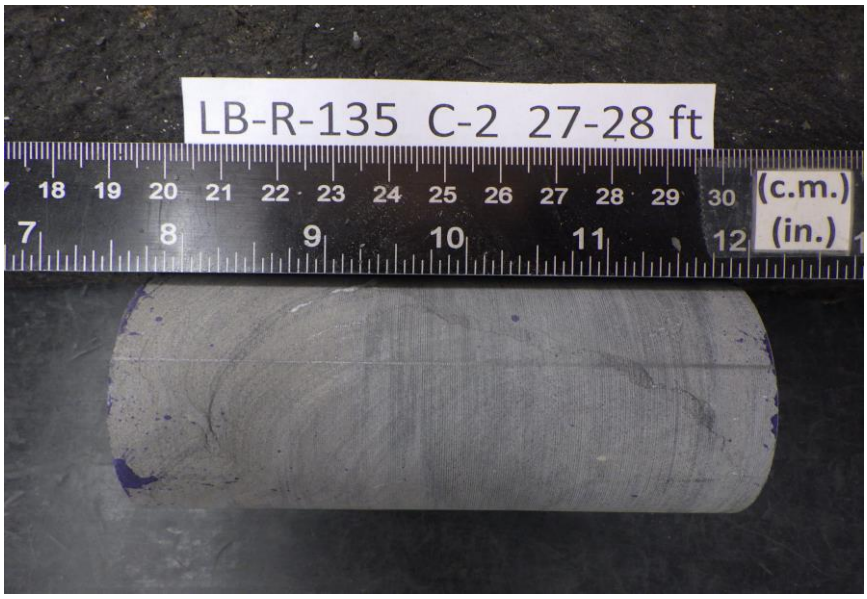
Parallelism Tolerance Met? YES
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00150	1.995	0.00075	0.043	YES
Diameter 2, in (rotated 90°)	0.00100	1.995	0.00050	0.029	YES
END 2					
Diameter 1, in	0.00190	1.995	0.00095	0.055	YES
Diameter 2, in (rotated 90°)	0.00100	1.995	0.00050	0.029	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/12/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-135
Sample ID:	---
Depth, ft:	27-28



After cutting and grinding

After break

Client:	Langan Engineering	Test Date:	6/9/2025
Project Name:	Upstate Confidential Project	Tested By:	jss
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-136		
Sample ID:	---		
Depth (ft):	24.75-25.5		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.44	4.44	4.44
Specimen Diameter, in:	1.99	1.99	1.99
Specimen Mass, g:	622.97		
Bulk Density, lb/ft^3	171	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

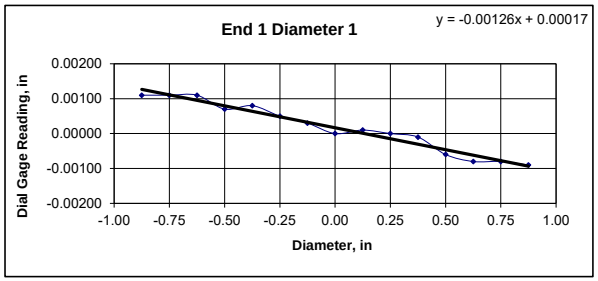
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00110	0.00110	0.00110	0.00070	0.00080	0.00050	0.00030	0.00000	0.00010	0.00000	-0.00010	-0.00060	-0.00080	-0.00080	-0.00090
Diameter 2, in (rotated 90°)	0.00240	0.00190	0.00180	0.00110	0.00080	0.00080	0.00010	0.00000	-0.00010	-0.00040	-0.00090	-0.00130	-0.00130	-0.00190	-0.00210

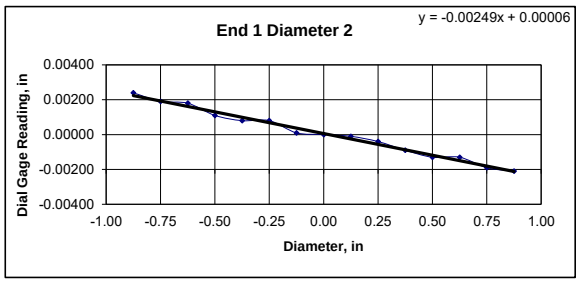
Difference between max and min readings, in:
0° = 0.00200 90° = 0.00450

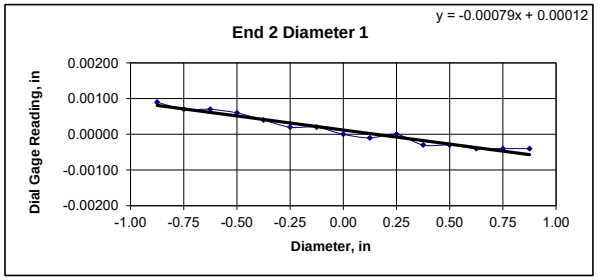
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00090	0.00070	0.00070	0.00060	0.00040	0.00020	0.00020	0.00000	-0.00010	0.00000	-0.00030	-0.00030	-0.00040	-0.00040	-0.00040
Diameter 2, in (rotated 90°)	-0.00240	-0.00220	-0.00200	-0.00140	-0.00080	-0.00050	-0.00010	0.00000	0.00010	0.00070	0.00080	0.00120	0.00150	0.00170	0.00190

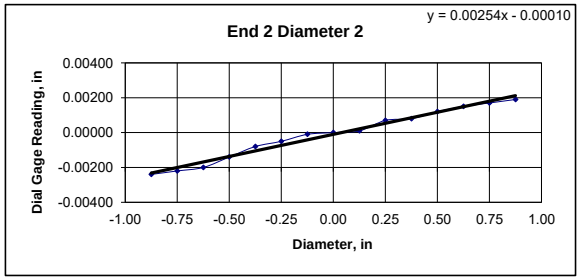
Difference between max and min readings, in:
0° = 0.0013 90° = 0.0043

Maximum difference must be < 0.0020 in. Difference = ± 0.00225
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00126
Angle of Best Fit Line: 0.07203

End 2:
Slope of Best Fit Line 0.00079
Angle of Best Fit Line: 0.04518

Maximum Angular Difference: 0.02685

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00249
Angle of Best Fit Line: 0.14258

End 2:
Slope of Best Fit Line 0.00254
Angle of Best Fit Line: 0.14537

Maximum Angular Difference: 0.00278

Parallelism Tolerance Met? YES
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00200	1.993	0.00100	0.058	YES
Diameter 2, in (rotated 90°)	0.00450	1.993	0.00226	0.129	YES
END 2					
Diameter 1, in	0.00130	1.993	0.00065	0.037	YES
Diameter 2, in (rotated 90°)	0.00430	1.993	0.00216	0.124	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/9/2025
Project Name:	Upstate Confidential Project	Tested By:	jss
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-136	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	24.75-25.5		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/12/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-136
Sample ID:	---
Depth, ft:	24.75-25.5

After cutting and grinding

After break

GeoTesting EXPRESS
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Client:	Langan Engineering	Test Date:	6/10/2025
Project Name:	Upstate Confidential Project	Tested By:	jss
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-X-003		
Sample ID:	---		
Depth (ft):	32.53-32.92		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.40	4.40	4.40
Specimen Diameter, in:	1.99	1.99	1.99
Specimen Mass, g:	615.79		
Bulk Density, lb/ft^3	171	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

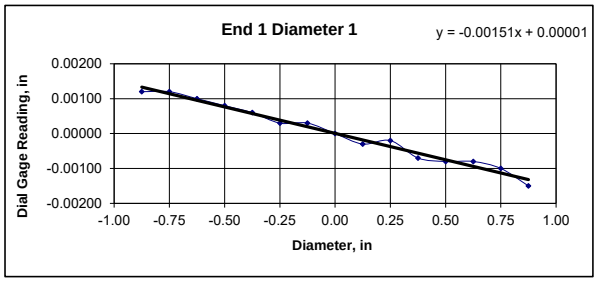
Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

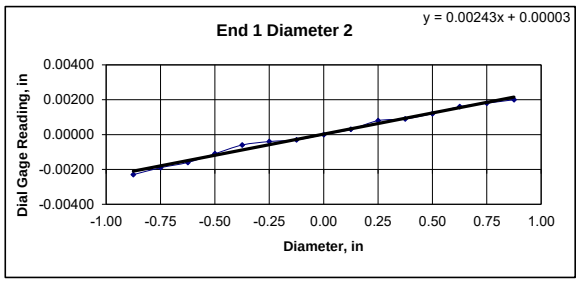
END FLATNESS AND PARALLELISM (Procedure FP1)

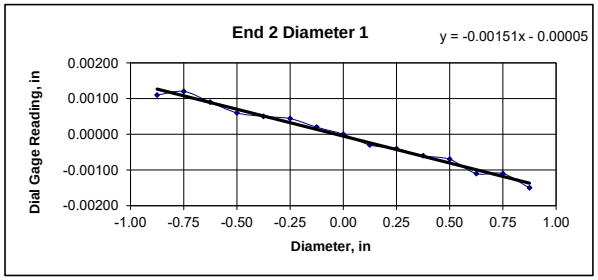
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00120	0.00120	0.00100	0.00080	0.00060	0.00030	0.00030	0.00000	-0.00030	-0.00020	-0.00070	-0.00080	-0.00080	-0.00100	-0.00150
Diameter 2, in (rotated 90°)	-0.00230	-0.00190	-0.00160	-0.00110	-0.00060	-0.00040	-0.00030	0.00000	0.00030	0.00080	0.00090	0.00120	0.00160	0.00180	0.00200
											Difference between max and min readings, in:				
											0° =	0.00270	90° =	0.00430	

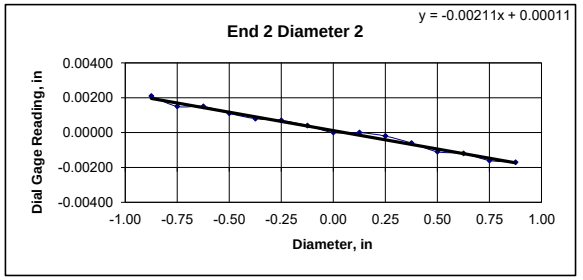
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00110	0.00120	0.00090	0.00060	0.00050	0.00044	0.00020	0.00000	-0.00030	-0.00040	-0.00060	-0.00070	-0.00110	-0.00110	-0.00150
Diameter 2, in (rotated 90°)	0.00210	0.00150	0.00150	0.00110	0.00080	0.00070	0.00040	0.00000	0.00000	-0.00020	-0.00060	-0.00110	-0.00120	-0.00160	-0.00170
											Difference between max and min readings, in:				
											0° =	0.0027	90° =	0.0038	

Maximum difference must be < 0.0020 in. Difference = ± 0.00215
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00151
Angle of Best Fit Line: 0.08676

End 2:
Slope of Best Fit Line 0.00151
Angle of Best Fit Line: 0.08624

Maximum Angular Difference: 0.00052

Parallelism Tolerance Met? YES
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00243
Angle of Best Fit Line: 0.13915

End 2:
Slope of Best Fit Line 0.00211
Angle of Best Fit Line: 0.12098

Maximum Angular Difference: 0.01817

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00270	1.988	0.00136	0.078	YES
Diameter 2, in (rotated 90°)	0.00430	1.988	0.00216	0.124	YES
END 2					
Diameter 1, in	0.00270	1.988	0.00136	0.078	YES
Diameter 2, in (rotated 90°)	0.00380	1.988	0.00191	0.110	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/10/2025
Project Name:	Upstate Confidential Project	Tested By:	jss
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-X-003	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	32.53-32.92		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS

END 1

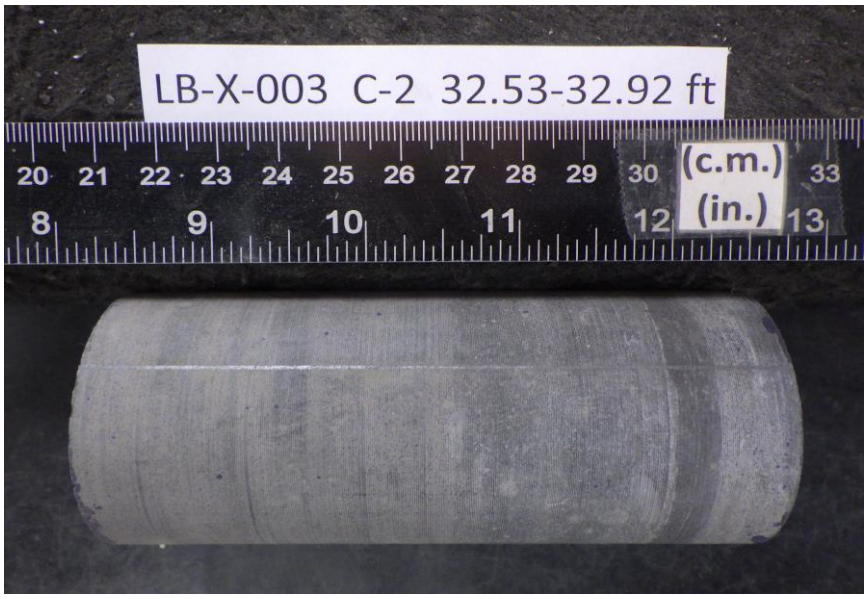
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

END 2

Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/9/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-X-003
Sample ID:	---
Depth, ft:	32.53-32.92

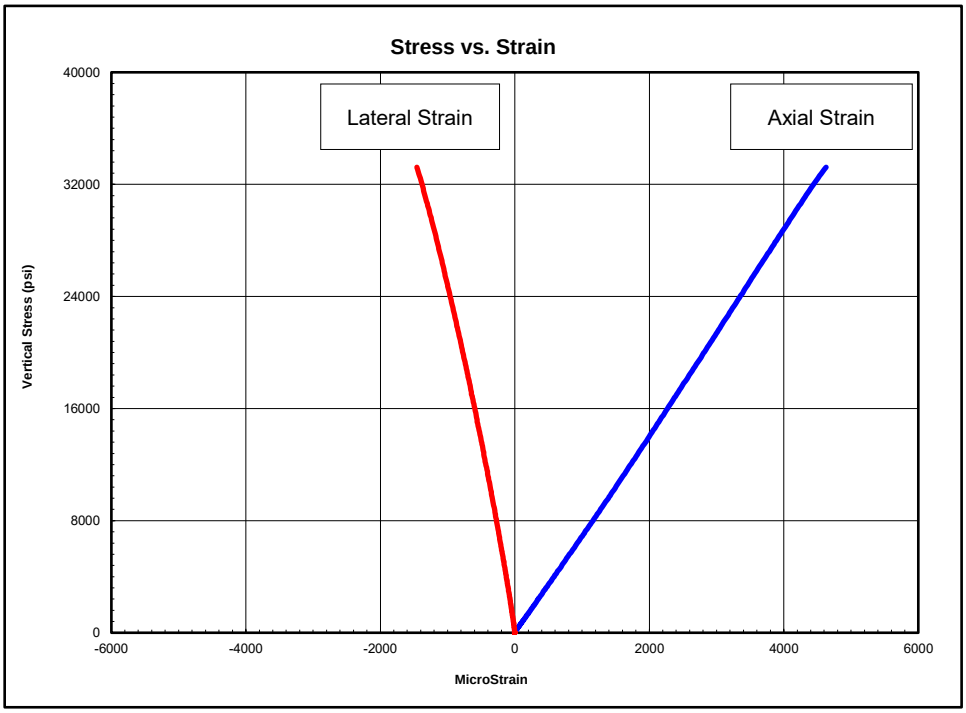


After cutting and grinding

After break

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/20/2025
Tested By:	gp
Checked By:	jsc
Boring ID:	LB-R-005
Sample ID:	C-1
Depth, ft:	24.39-24.77
Sample Type:	rock core
Sample Description:	See photographs Intact material failure Best Effort end preparation performed

Compressive Strength and Elastic Moduli of Rock by ASTM D7012 - Method D



Peak Compressive Stress: 33,275 psi

Stress Range, psi	Young's Modulus, psi	Poisson's Ratio
3300-12200	6,990,000	0.26
3300-21100	7,340,000	0.32
21100-29900	7,410,000	0.37

Notes:
Test specimen tested at the approximate as-received moisture content and at standard laboratory temperature.
The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.
Young's Modulus and Poisson's Ratio calculated using the tangent to the line in the stress range listed.
Calculations assume samples are isotropic, which is not necessarily the case.

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Client:	Langan Engineering	Test Date:	6/17/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-005		
Sample ID:	C-1		
Depth (ft):	24.39-24.77		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.32	4.32	4.32
Specimen Diameter, in:	1.97	1.97	1.97
Specimen Mass, g:	618.28		
Bulk Density, lb/ft^3	179	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

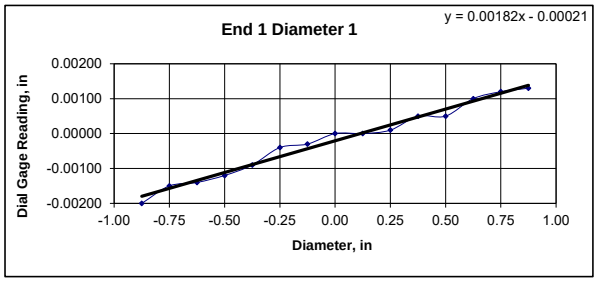
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00200	-0.00150	-0.00140	-0.00120	-0.00090	-0.00040	-0.00030	0.00000	0.00000	0.00010	0.00050	0.00050	0.00100	0.00120	0.00130
Diameter 2, in (rotated 90°)	0.00110	0.00080	0.00080	0.00080	0.00040	0.00020	0.00020	0.00000	-0.00030	-0.00040	-0.00080	-0.00110	-0.00130	-0.00140	-0.00180

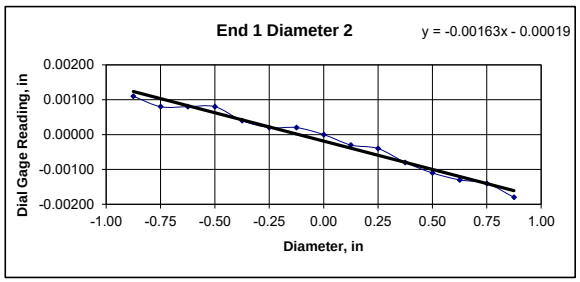
Difference between max and min readings, in:
0° = 0.00330 90° = 0.00290

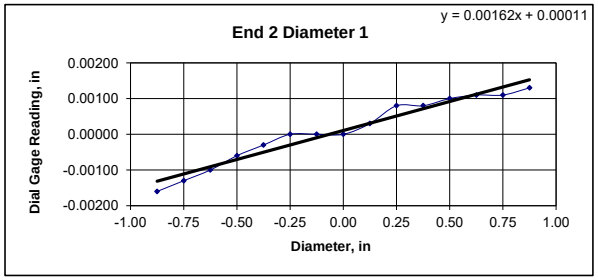
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00160	-0.00130	-0.00100	-0.00060	-0.00030	0.00000	0.00000	0.00000	0.00030	0.00080	0.00080	0.00100	0.00110	0.00110	0.00130
Diameter 2, in (rotated 90°)	-0.00200	-0.00140	-0.00140	-0.00070	-0.00060	-0.00040	-0.00010	0.00000	0.00010	0.00050	0.00080	0.00080	0.00100	0.00100	0.00160

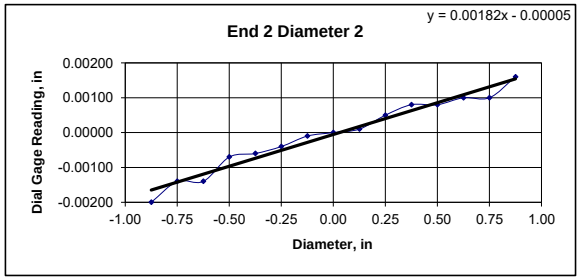
Difference between max and min readings, in:
0° = 0.0029 90° = 0.0036

Maximum difference must be < 0.0020 in. Difference = ± 0.00180
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00182
Angle of Best Fit Line: 0.10411

End 2:
Slope of Best Fit Line 0.00162
Angle of Best Fit Line: 0.09298

Maximum Angular Difference: 0.01113

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00163
Angle of Best Fit Line: 0.09315

End 2:
Slope of Best Fit Line 0.00182
Angle of Best Fit Line: 0.10444

Maximum Angular Difference: 0.01130

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00330	1.970	0.00168	0.096	YES
Diameter 2, in (rotated 90°)	0.00290	1.970	0.00147	0.084	YES
END 2					
Diameter 1, in	0.00290	1.970	0.00147	0.084	YES
Diameter 2, in (rotated 90°)	0.00360	1.970	0.00183	0.105	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/17/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-005	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	C-1		
Depth (ft):	24.39-24.77		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

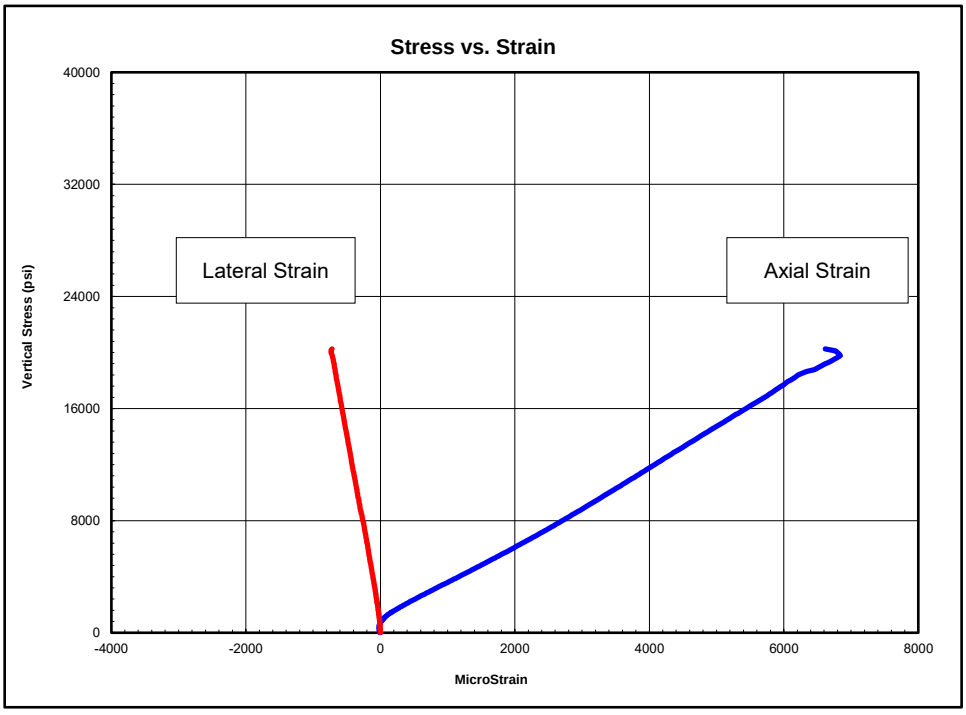
Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/20/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-005
Sample ID:	C-1
Depth, ft:	24.39-24.77

After cutting and grinding

After break

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/24/2025
Tested By:	gp
Checked By:	jsc
Boring ID:	LB-R-007
Sample ID:	C-1
Depth, ft:	22.75-23.5
Sample Type:	rock core
Sample Description:	See photographs Intact material failure Best Effort end preparation performed

Compressive Strength and Elastic Moduli of Rock by ASTM D7012 - Method D



Peak Compressive Stress: 20,257 psi

Stress Range, psi	Young's Modulus, psi	Poisson's Ratio
2000-7400	2,500,000	0.09
7400-12800	2,920,000	0.12
12800-18200	2,960,000	0.11

Notes:
Test specimen tested at the approximate as-received moisture content and at standard laboratory temperature.
The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.
Young's Modulus and Poisson's Ratio calculated using the tangent to the line in the stress range listed.
Calculations assume samples are isotropic, which is not necessarily the case.

Client:	Langan Engineering	Test Date:	6/11/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-007		
Sample ID:	C-1		
Depth (ft):	22.75-23.5		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.36	4.36	4.36
Specimen Diameter, in:	1.96	1.96	1.96
Specimen Mass, g:	621.64		
Bulk Density, lb/ft^3	180	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? NO

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? NO

END FLATNESS AND PARALLELISM (Procedure FP1)

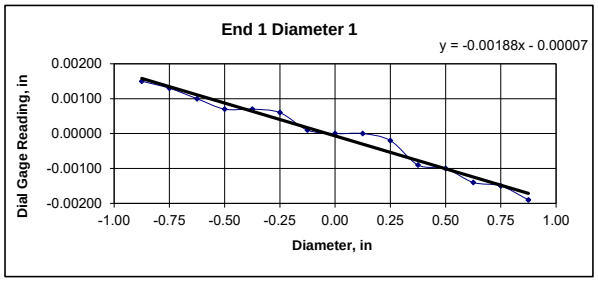
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00150	0.00130	0.00100	0.00070	0.00070	0.00060	0.00010	0.00000	0.00000	-0.00020	-0.00090	-0.00100	-0.00140	-0.00150	-0.00190
Diameter 2, in (rotated 90°)	-0.00020	-0.00020	-0.00010	-0.00010	-0.00010	0.00000	0.00000	0.00000	0.00010	0.00020	0.00000	0.00010	0.00000	-0.00020	-0.00010

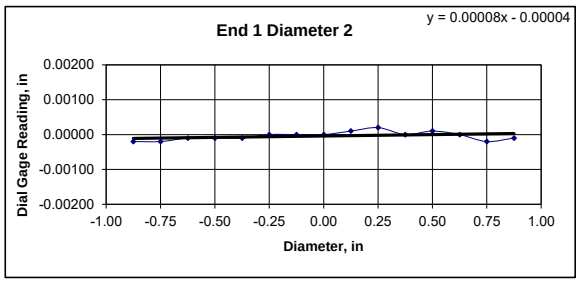
Difference between max and min readings, in:
0° = 0.00340 90° = 0.00040

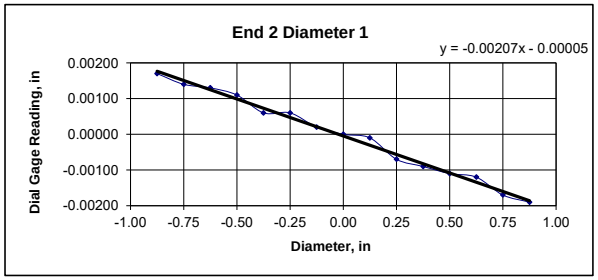
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00170	0.00140	0.00130	0.00110	0.00060	0.00060	0.00020	0.00000	-0.00010	-0.00070	-0.00090	-0.00110	-0.00120	-0.00170	-0.00190
Diameter 2, in (rotated 90°)	-0.00010	0.00010	0.00010	0.00030	0.00000	0.00000	0.00020	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00030	0.00010

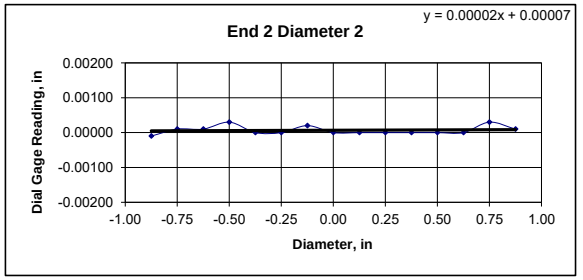
Difference between max and min readings, in:
0° = 0.0036 90° = 0.0004

Maximum difference must be < 0.0020 in. Difference = ± 0.00180
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00188
Angle of Best Fit Line: 0.10788

End 2:
Slope of Best Fit Line 0.00207
Angle of Best Fit Line: 0.11868

Maximum Angular Difference: 0.01080

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00008
Angle of Best Fit Line: 0.00458

End 2:
Slope of Best Fit Line 0.00002
Angle of Best Fit Line: 0.00115

Maximum Angular Difference: 0.00344

Parallelism Tolerance Met? YES
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00340	1.960	0.00173	0.099	YES
Diameter 2, in (rotated 90°)	0.00040	1.960	0.00020	0.012	YES
END 2					
Diameter 1, in	0.00360	1.960	0.00184	0.105	YES
Diameter 2, in (rotated 90°)	0.00040	1.960	0.00020	0.012	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/11/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-007	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	C-1		
Depth (ft):	22.75-23.5		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

GeoTesting EXPRESS
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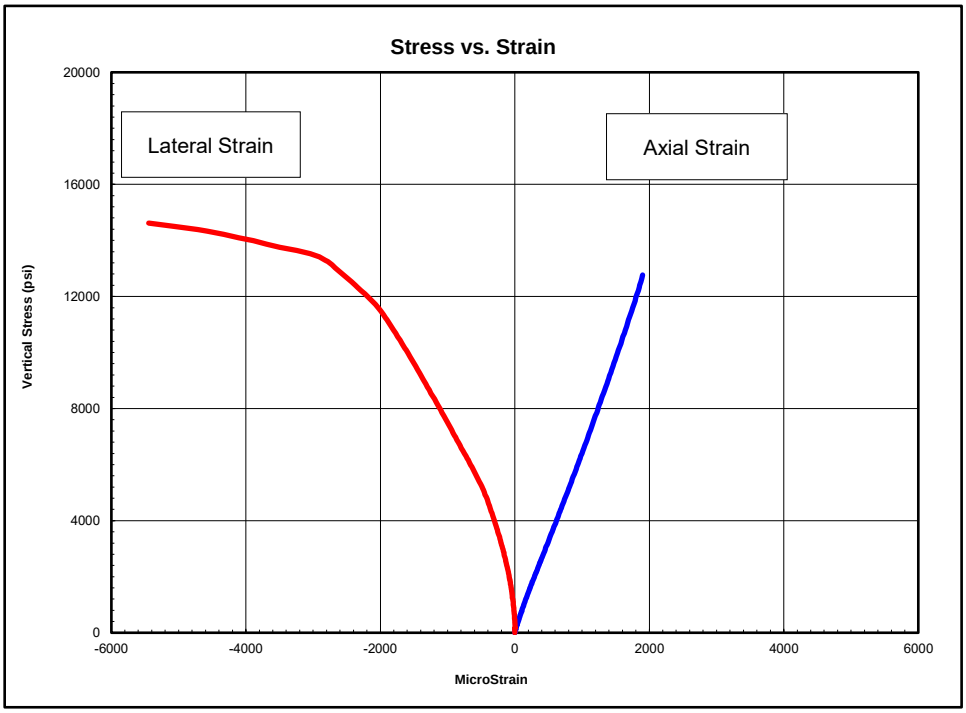
Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/24/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-007
Sample ID:	C-1
Depth, ft:	22.75-23.5

After cutting and grinding

After break

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/20/2025
Tested By:	gp
Checked By:	jsc
Boring ID:	LB-R-012
Sample ID:	---
Depth, ft:	24.10-24.50
Sample Type:	rock core
Sample Description:	See photographs Intact material failure Best Effort end preparation performed

Compressive Strength and Elastic Moduli of Rock by ASTM D7012 - Method D



Peak Compressive Stress: 14,842 psi

Stress Range, psi	Young's Modulus, psi	Poisson's Ratio
1500-5400	6,150,000	---
5400-9400	6,650,000	---
9400-13400	7,820,000	---

Notes:
Test specimen tested at the approximate as-received moisture content and at standard laboratory temperature.
The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.
Young's Modulus and Poisson's Ratio calculated using the tangent to the line in the stress range listed.
Calculations assume samples are isotropic, which is not necessarily the case.

Client:	Langan Engineering	Test Date:	6/17/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-012		
Sample ID:	---		
Depth (ft):	24.10-24.50		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.39	4.39	4.39
Specimen Diameter, in:	1.97	1.98	1.98
Specimen Mass, g:	624.4		
Bulk Density, lb/ft^3	176	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? NO

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? NO

END FLATNESS AND PARALLELISM (Procedure FP1)

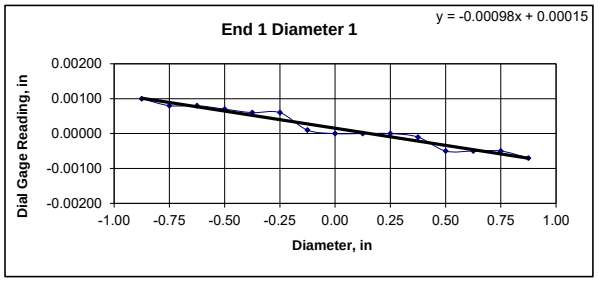
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00100	0.00080	0.00080	0.00070	0.00060	0.00060	0.00010	0.00000	0.00000	0.00000	-0.00010	-0.00050	-0.00050	-0.00050	-0.00070
Diameter 2, in (rotated 90°)	-0.00180	-0.00180	-0.00130	-0.00110	-0.00100	-0.00060	-0.00040	0.00000	0.00040	0.00090	0.00090	0.00130	0.00140	0.00150	0.00190

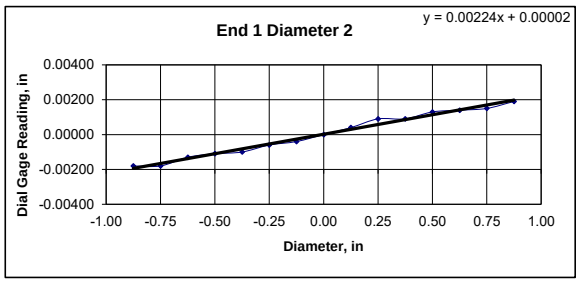
Difference between max and min readings, in:
0° = 0.00170 90° = 0.00370

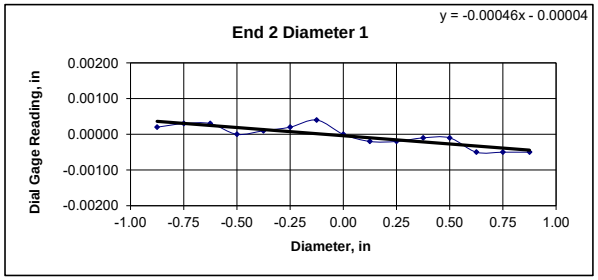
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00020	0.00030	0.00030	0.00000	0.00010	0.00020	0.00040	0.00000	-0.00020	-0.00020	-0.00010	-0.00010	-0.00050	-0.00050	-0.00050
Diameter 2, in (rotated 90°)	0.00190	0.00150	0.00140	0.00110	0.00110	0.00050	0.00040	0.00000	-0.00030	-0.00060	-0.00110	-0.00130	-0.00160	-0.00180	-0.00200

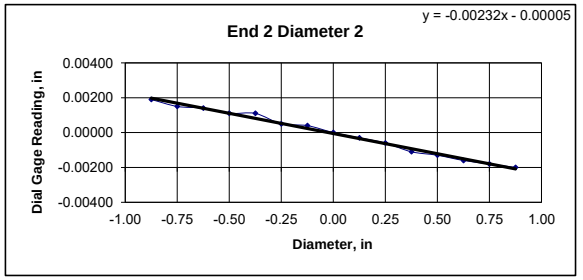
Difference between max and min readings, in:
0° = 0.0009 90° = 0.0039

Maximum difference must be < 0.0020 in. Difference = ± 0.00195
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00098
Angle of Best Fit Line: 0.05631

End 2:
Slope of Best Fit Line 0.00046
Angle of Best Fit Line: 0.02636

Maximum Angular Difference: 0.02996

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00224
Angle of Best Fit Line: 0.12818

End 2:
Slope of Best Fit Line 0.00232
Angle of Best Fit Line: 0.13293

Maximum Angular Difference: 0.00475

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00170	1.975	0.00086	0.049	YES
Diameter 2, in (rotated 90°)	0.00370	1.975	0.00187	0.107	YES
END 2					
Diameter 1, in	0.00090	1.975	0.00046	0.026	YES
Diameter 2, in (rotated 90°)	0.00390	1.975	0.00197	0.113	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/17/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-012	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	24.10-24.50		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

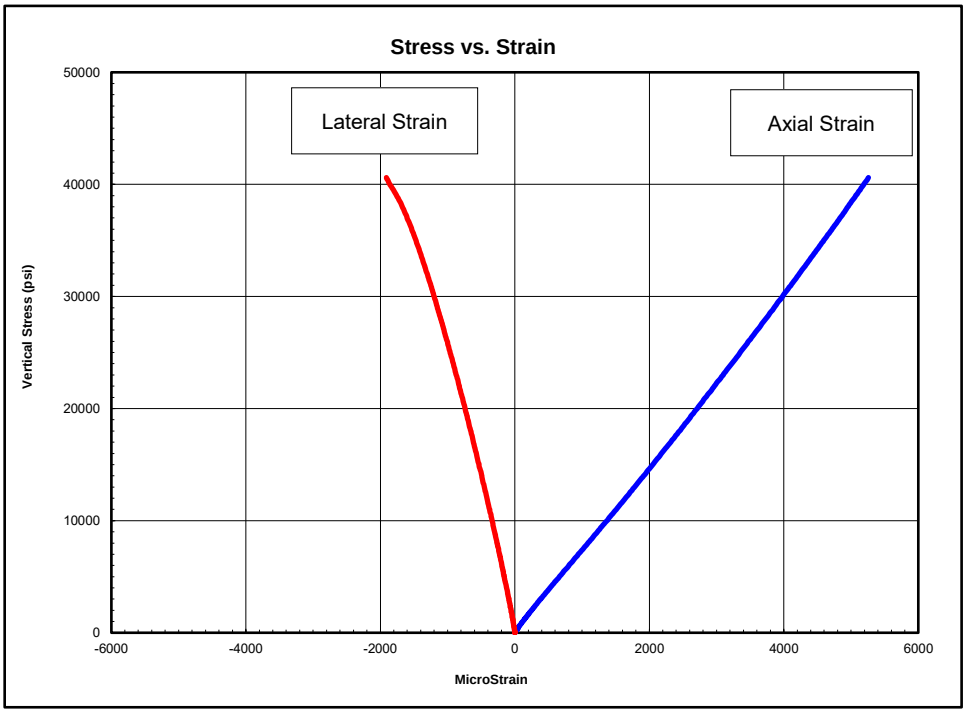
Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/20/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-012
Sample ID:	---
Depth, ft:	24.10-24.50

After cutting and grinding

After break

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/20/2025
Tested By:	gp
Checked By:	jsc
Boring ID:	LB-R-026
Sample ID:	C-1
Depth, ft:	29.05-29.42
Sample Type:	rock core
Sample Description:	See photographs Intact material failure Best Effort end preparation performed

Compressive Strength and Elastic Moduli of Rock by ASTM D7012 - Method D



Peak Compressive Stress: 40,607 psi

Stress Range, psi	Young's Modulus, psi	Poisson's Ratio
4100-14900	7,170,000	0.27
14900-25700	7,690,000	0.33
25700-36500	8,090,000	0.42

Notes:
Test specimen tested at the approximate as-received moisture content and at standard laboratory temperature.
The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.
Young's Modulus and Poisson's Ratio calculated using the tangent to the line in the stress range listed.
Calculations assume samples are isotropic, which is not necessarily the case.

Client:	Langan Engineering	Test Date:	6/17/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-026		
Sample ID:	C-1		
Depth (ft):	29.05-29.42		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.23	4.23	4.23
Specimen Diameter, in:	1.98	1.98	1.98
Specimen Mass, g:	604.57		
Bulk Density, lb/ft^3	176	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.1	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? NO

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? NO

END FLATNESS AND PARALLELISM (Procedure FP1)

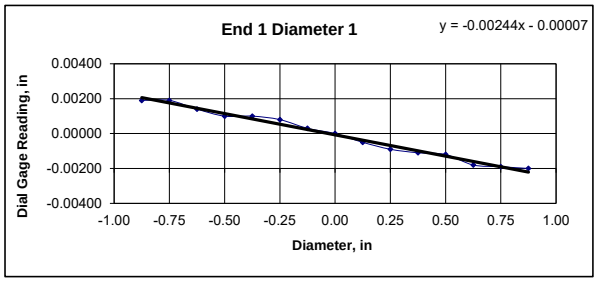
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00190	0.00190	0.00140	0.00100	0.00100	0.00080	0.00030	0.00000	-0.00050	-0.00090	-0.00110	-0.00120	-0.00180	-0.00190	-0.00200
Diameter 2, in (rotated 90°)	-0.00100	-0.00100	-0.00110	-0.00080	-0.00060	-0.00010	-0.00010	0.00000	0.00030	0.00050	0.00050	0.00050	0.00040	0.00070	0.00100

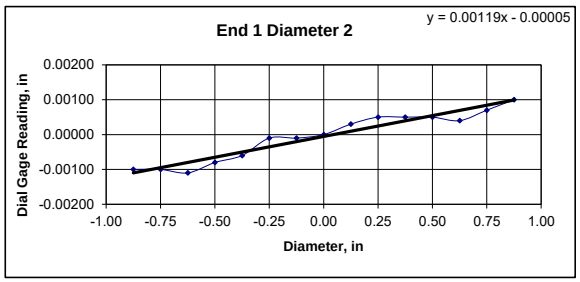
Difference between max and min readings, in:
0° = 0.00390 90° = 0.00210

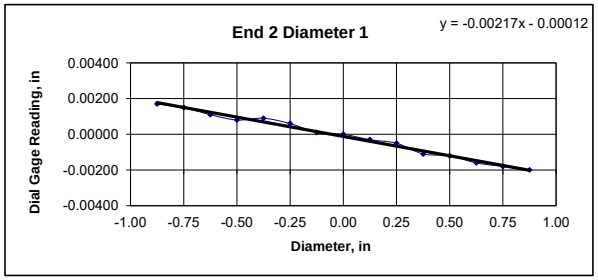
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00170	0.00150	0.00110	0.00080	0.00090	0.00060	0.00010	0.00000	-0.00030	-0.00050	-0.00110	-0.00120	-0.00160	-0.00180	-0.00200
Diameter 2, in (rotated 90°)	0.00100	0.00080	0.00080	0.00070	0.00050	0.00020	0.00010	0.00000	-0.00040	-0.00050	-0.00050	-0.00080	-0.00110	-0.00140	-0.00160

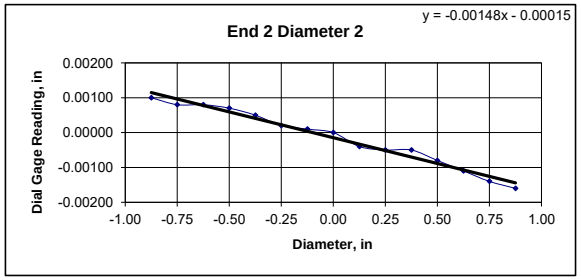
Difference between max and min readings, in:
0° = 0.0037 90° = 0.0026

Maximum difference must be < 0.0020 in. Difference = ± 0.00195
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00244
Angle of Best Fit Line: 0.13980

End 2:
Slope of Best Fit Line 0.00217
Angle of Best Fit Line: 0.12409

Maximum Angular Difference: 0.01572

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00119
Angle of Best Fit Line: 0.06843

End 2:
Slope of Best Fit Line 0.00148
Angle of Best Fit Line: 0.08480

Maximum Angular Difference: 0.01637

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00390	1.980	0.00197	0.113	YES
Diameter 2, in (rotated 90°)	0.00210	1.980	0.00106	0.061	YES
END 2					
Diameter 1, in	0.00370	1.980	0.00187	0.107	YES
Diameter 2, in (rotated 90°)	0.00260	1.980	0.00131	0.075	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/17/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-026	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	C-1		
Depth (ft):	29.05-29.42		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

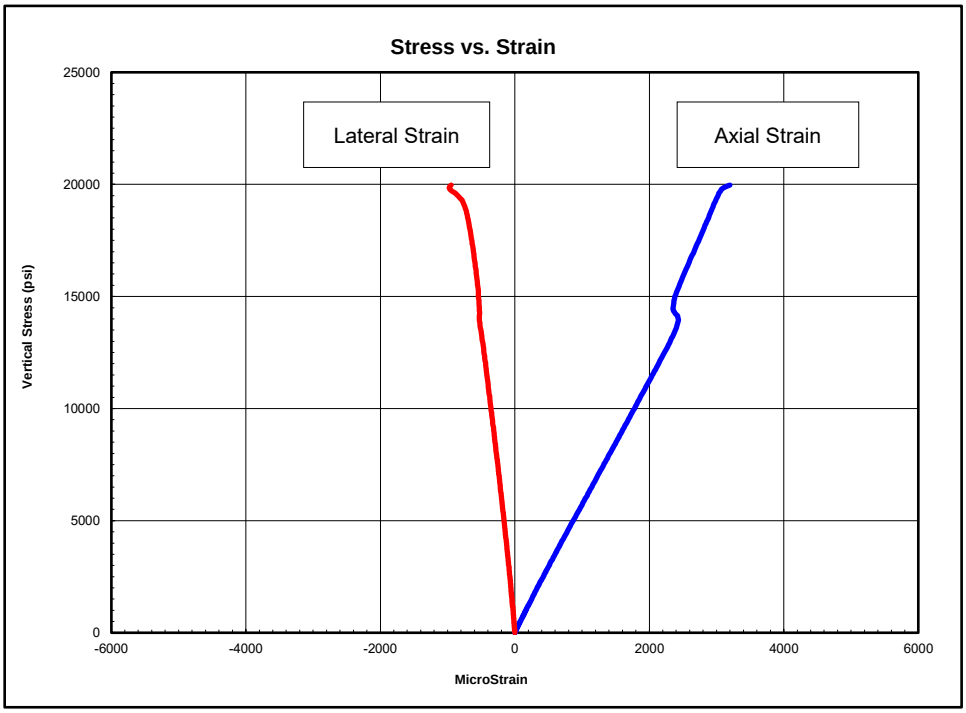
Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/20/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-026
Sample ID:	C-1
Depth, ft:	29.05-29.42

After cutting and grinding

After break

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/24/2025
Tested By:	gp
Checked By:	jsc
Boring ID:	LB-R-041
Sample ID:	C-1
Depth, ft:	17.6-18.6
Sample Type:	rock core
Sample Description:	See photographs Intact material failure Best Effort end preparation performed

Compressive Strength and Elastic Moduli of Rock by ASTM D7012 - Method D



Peak Compressive Stress: 19,968 psi

Stress Range, psi	Young's Modulus, psi	Poisson's Ratio
2000-7300	5,540,000	0.20
7300-12600	5,540,000	0.22
12600-18000	9,920,000	0.34

Notes:
Test specimen tested at the approximate as-received moisture content and at standard laboratory temperature.
The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.
Young's Modulus and Poisson's Ratio calculated using the tangent to the line in the stress range listed.
Calculations assume samples are isotropic, which is not necessarily the case.

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Client:	Langan Engineering	Test Date:	6/11/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-041		
Sample ID:	C-1		
Depth (ft):	17.6-18.6		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.29	4.30	4.30
Specimen Diameter, in:	1.98	1.98	1.98
Specimen Mass, g:	611.53		
Bulk Density, lb/ft^3	176	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

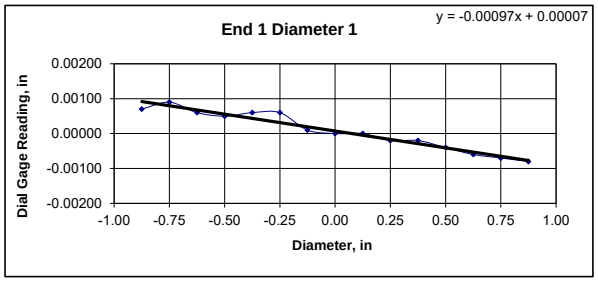
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00070	0.00090	0.00060	0.00050	0.00060	0.00060	0.00010	0.00000	0.00000	-0.00020	-0.00020	-0.00040	-0.00060	-0.00070	-0.00080
Diameter 2, in (rotated 90°)	-0.00190	-0.00170	-0.00170	-0.00110	-0.00080	-0.00060	-0.00040	0.00000	0.00010	0.00050	0.00060	0.00120	0.00150	0.00150	0.00180

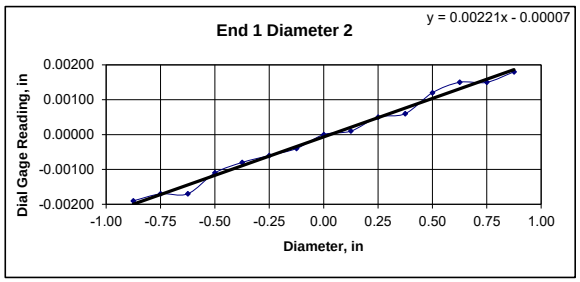
Difference between max and min readings, in:
0° = 0.00170 90° = 0.00370

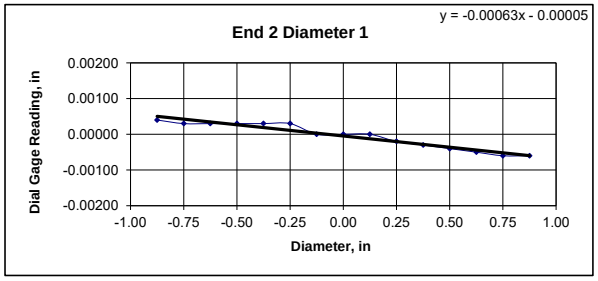
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00040	0.00030	0.00030	0.00030	0.00030	0.00030	0.00000	0.00000	0.00000	-0.00020	-0.00030	-0.00040	-0.00050	-0.00060	-0.00060
Diameter 2, in (rotated 90°)	0.00140	0.00100	0.00080	0.00040	0.00030	0.00010	-0.00020	0.00000	-0.00010	-0.00030	-0.00080	-0.00100	-0.00110	-0.00150	-0.00180

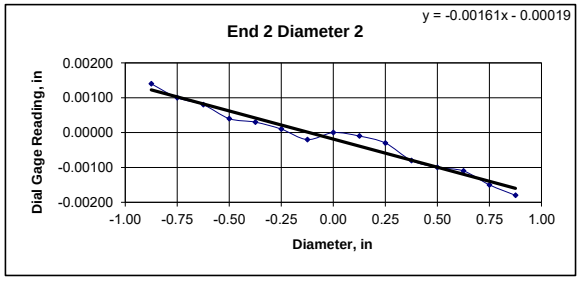
Difference between max and min readings, in:
0° = 0.001 90° = 0.0032

Maximum difference must be < 0.0020 in. Difference = ± 0.00185
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00097
Angle of Best Fit Line: 0.05533

End 2:
Slope of Best Fit Line 0.00063
Angle of Best Fit Line: 0.03601

Maximum Angular Difference: 0.01932

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00221
Angle of Best Fit Line: 0.12638

End 2:
Slope of Best Fit Line 0.00161
Angle of Best Fit Line: 0.09249

Maximum Angular Difference: 0.03389

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00170	1.980	0.00086	0.049	YES
Diameter 2, in (rotated 90°)	0.00370	1.980	0.00187	0.107	YES
END 2					
Diameter 1, in	0.00100	1.980	0.00051	0.029	YES
Diameter 2, in (rotated 90°)	0.00320	1.980	0.00162	0.093	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/11/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-041	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	C-1		
Depth (ft):	17.6-18.6		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS

END 1

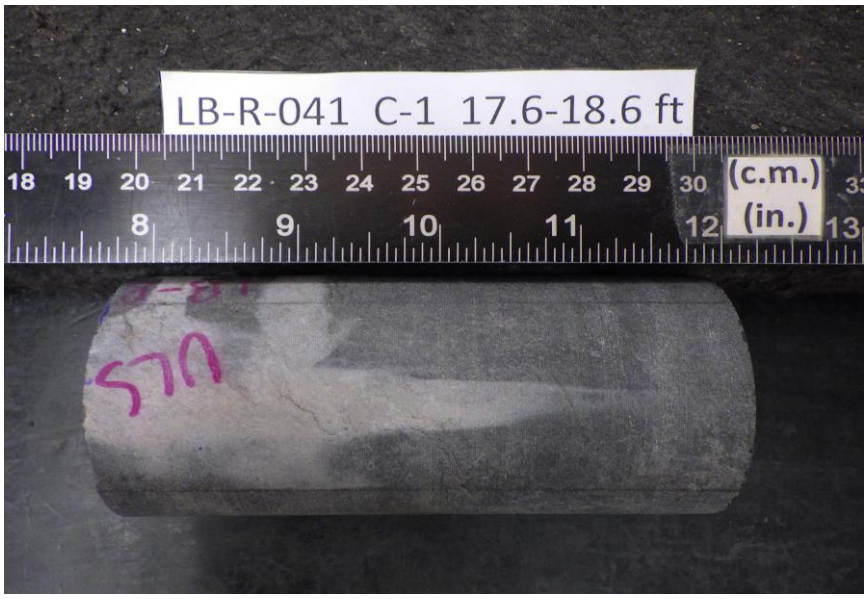
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

END 2

Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/24/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-041
Sample ID:	C-1
Depth, ft:	17.6-18.6

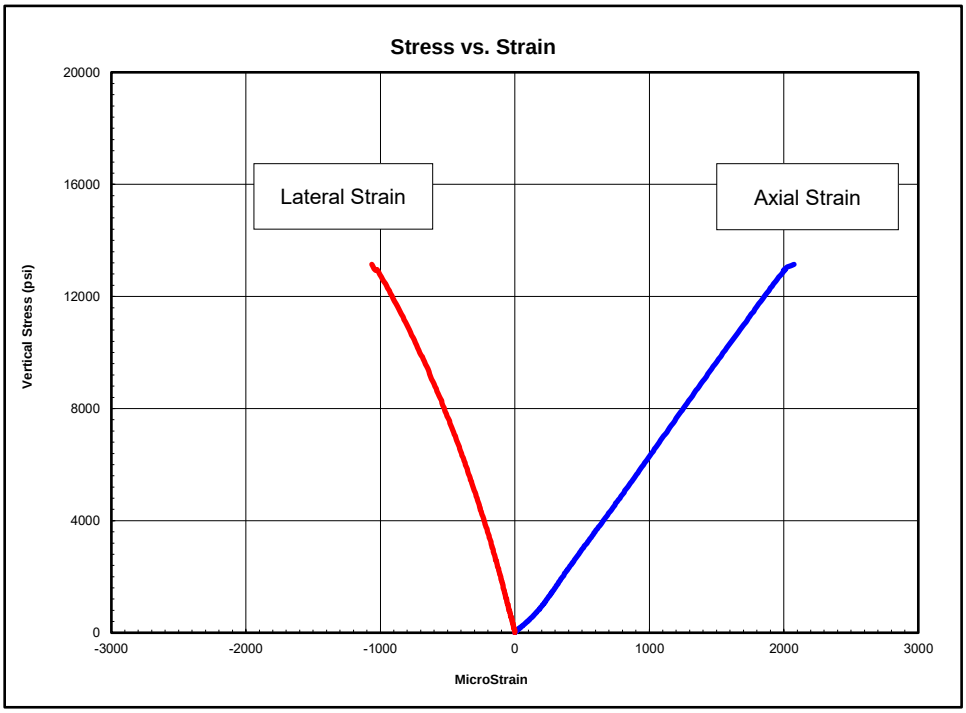


After cutting and grinding

After break

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/24/2025
Tested By:	gp
Checked By:	jsc
Boring ID:	LB-R-129
Sample ID:	C-2
Depth, ft:	35.53-35.91
Sample Type:	rock core
Sample Description:	See photographs Intact material failure Best Effort end preparation performed

Compressive Strength and Elastic Moduli of Rock by ASTM D7012 - Method D



Peak Compressive Stress: 13,145 psi

The strain values recorded within the second and third stress ranges for this test produce values of Poisson's Ratio that exceed maximum values found in rocks.

Stress Range, psi	Young's Modulus, psi	Poisson's Ratio
1300-4800	6,650,000	0.40
4800-8300	6,780,000	---
8300-11800	6,630,000	---

Notes:
Test specimen tested at the approximate as-received moisture content and at standard laboratory temperature.
The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.
Young's Modulus and Poisson's Ratio calculated using the tangent to the line in the stress range listed.
Calculations assume samples are isotropic, which is not necessarily the case.

Client:	Langan Engineering	Test Date:	6/11/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-129		
Sample ID:	C-2		
Depth (ft):	35.53-35.91		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.37	4.37	4.37
Specimen Diameter, in:	1.98	1.98	1.98
Specimen Mass, g:	616.17		
Bulk Density, lb/ft^3	174	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

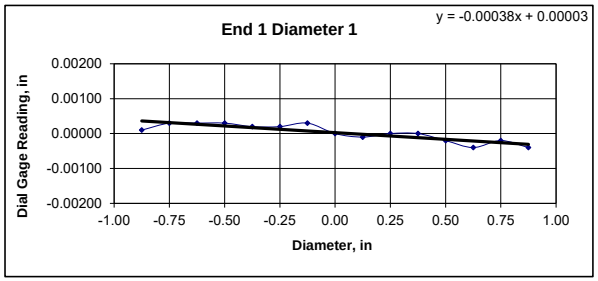
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00010	0.00030	0.00030	0.00030	0.00020	0.00020	0.00030	0.00000	-0.00010	0.00000	0.00000	-0.00020	-0.00040	-0.00020	-0.00040
Diameter 2, in (rotated 90°)	-0.00200	-0.00170	-0.00150	-0.00090	-0.00060	-0.00050	-0.00030	0.00000	0.00030	0.00060	0.00070	0.00120	0.00150	0.00150	0.00160

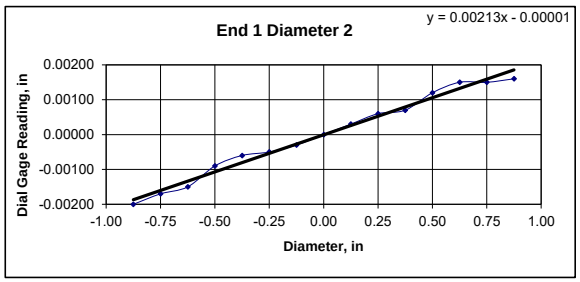
Difference between max and min readings, in:
0° = 0.00070 90° = 0.00360

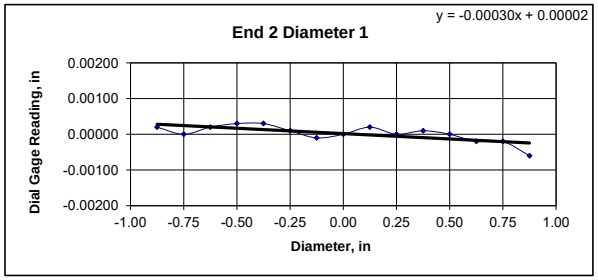
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00020	0.00000	0.00020	0.00030	0.00030	0.00010	-0.00010	0.00000	0.00020	0.00000	0.00010	0.00000	-0.00020	-0.00020	-0.00060
Diameter 2, in (rotated 90°)	0.00150	0.00140	0.00090	0.00070	0.00060	0.00040	0.00000	0.00000	-0.00020	-0.00030	-0.00090	-0.00110	-0.00140	-0.00170	-0.00200

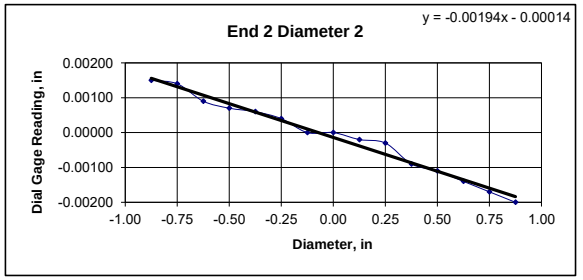
Difference between max and min readings, in:
0° = 0.0009 90° = 0.0035

Maximum difference must be < 0.0020 in. Difference = ± 0.00180
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00038
Angle of Best Fit Line: 0.02194

End 2:
Slope of Best Fit Line 0.00030
Angle of Best Fit Line: 0.01719

Maximum Angular Difference: 0.00475

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00213
Angle of Best Fit Line: 0.12196

End 2:
Slope of Best Fit Line 0.00194
Angle of Best Fit Line: 0.11115

Maximum Angular Difference: 0.01080

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00070	1.980	0.00035	0.020	YES
Diameter 2, in (rotated 90°)	0.00360	1.980	0.00182	0.104	YES
END 2					
Diameter 1, in	0.00090	1.980	0.00045	0.026	YES
Diameter 2, in (rotated 90°)	0.00350	1.980	0.00177	0.101	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/11/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-129	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	C-2		
Depth (ft):	35.53-35.91		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS

END 1

Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

END 2

Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

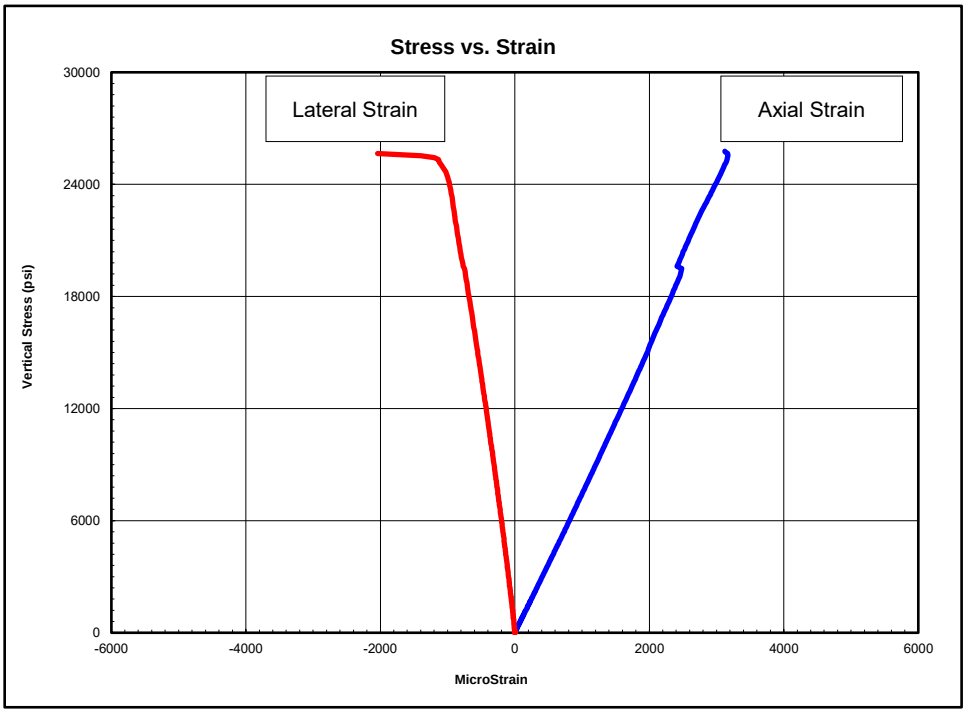
Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/24/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-129
Sample ID:	C-2
Depth, ft:	35.53-35.91

After cutting and grinding

After break

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/20/2025
Tested By:	gp
Checked By:	jsc
Boring ID:	LB-R-130
Sample ID:	C-2
Depth, ft:	22.55-22.92
Sample Type:	rock core
Sample Description:	See photographs Intact material failure Best Effort end preparation performed

Compressive Strength and Elastic Moduli of Rock by ASTM D7012 - Method D



Peak Compressive Stress: 25,773 psi

Stress Range, psi	Young's Modulus, psi	Poisson's Ratio
2600-9500	7,530,000	0.27
9500-16300	7,950,000	0.32
16300-23200	9,890,000	0.48

Notes:
Test specimen tested at the approximate as-received moisture content and at standard laboratory temperature.
The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.
Young's Modulus and Poisson's Ratio calculated using the tangent to the line in the stress range listed.
Calculations assume samples are isotropic, which is not necessarily the case.

Client:	Langan Engineering	Test Date:	6/17/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-130		
Sample ID:	C-2		
Depth (ft):	22.55-22.92		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.30	4.30	4.30
Specimen Diameter, in:	1.99	1.99	1.99
Specimen Mass, g:	619.61		
Bulk Density, lb/ft^3	176	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? NO

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? NO

END FLATNESS AND PARALLELISM (Procedure FP1)

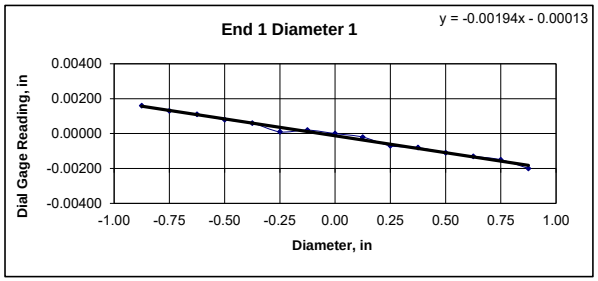
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00160	0.00130	0.00110	0.00080	0.00060	0.00010	0.00020	0.00000	-0.00020	-0.00070	-0.00080	-0.00110	-0.00130	-0.00150	-0.00200
Diameter 2, in (rotated 90°)	-0.00060	-0.00040	-0.00050	-0.00050	-0.00020	-0.00010	0.00000	0.00000	0.00000	-0.00010	-0.00020	0.00010	-0.00010	-0.00010	-0.00020

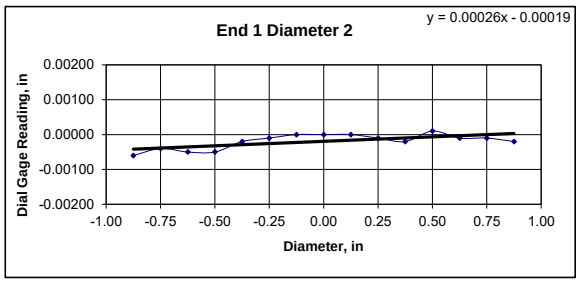
Difference between max and min readings, in:
0° = 0.00360 90° = 0.00070

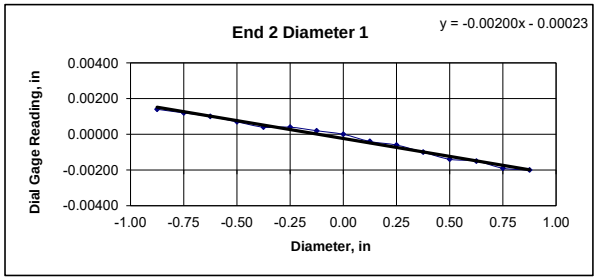
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00140	0.00120	0.00100	0.00070	0.00040	0.00040	0.00020	0.00000	-0.00040	-0.00060	-0.00100	-0.00140	-0.00150	-0.00190	-0.00200
Diameter 2, in (rotated 90°)	0.00030	0.00020	0.00020	0.00020	0.00020	0.00000	0.00000	0.00000	0.00020	0.00010	0.00000	0.00000	0.00000	0.00000	-0.00010

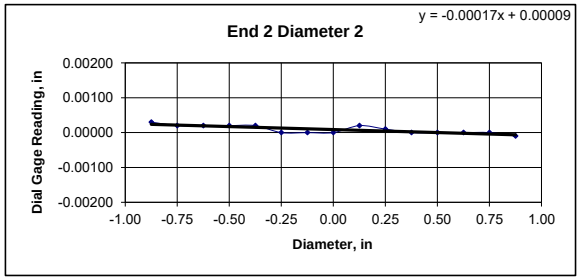
Difference between max and min readings, in:
0° = 0.0034 90° = 0.0004

Maximum difference must be < 0.0020 in. Difference = ± 0.00180
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00194
Angle of Best Fit Line: 0.11099

End 2:
Slope of Best Fit Line 0.00200
Angle of Best Fit Line: 0.11476

Maximum Angular Difference: 0.00377

Parallelism Tolerance Met? YES
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00026
Angle of Best Fit Line: 0.01473

End 2:
Slope of Best Fit Line 0.00017
Angle of Best Fit Line: 0.00982

Maximum Angular Difference: 0.00491

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00360	1.990	0.00181	0.104	YES
Diameter 2, in (rotated 90°)	0.00070	1.990	0.00035	0.020	YES
END 2					
Diameter 1, in	0.00340	1.990	0.00171	0.098	YES
Diameter 2, in (rotated 90°)	0.00040	1.990	0.00020	0.012	YES

Maximum angle of departure must be ≤ 0.25°

Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/17/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-130	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	C-2		
Depth (ft):	22.55-22.92		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS

END 1

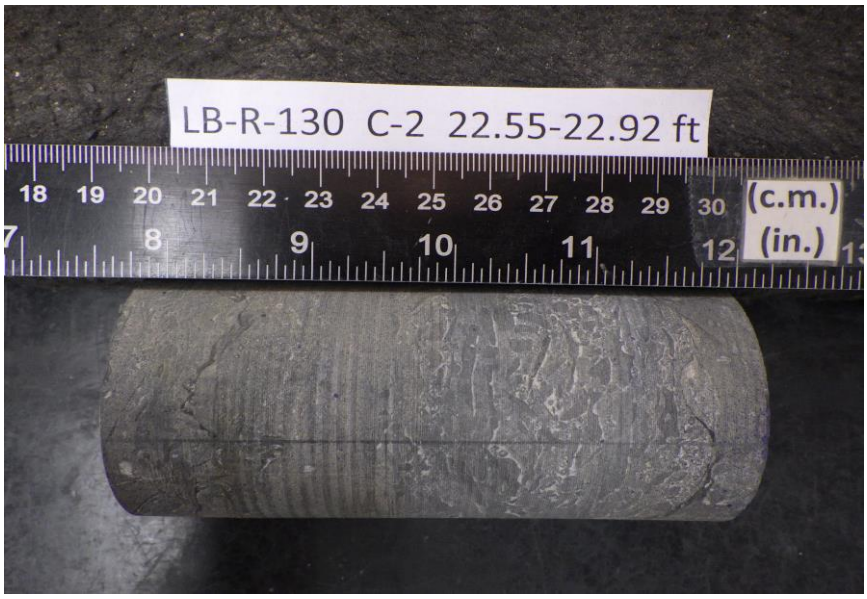
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

END 2

Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/20/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-130
Sample ID:	C-2
Depth, ft:	22.55-22.92

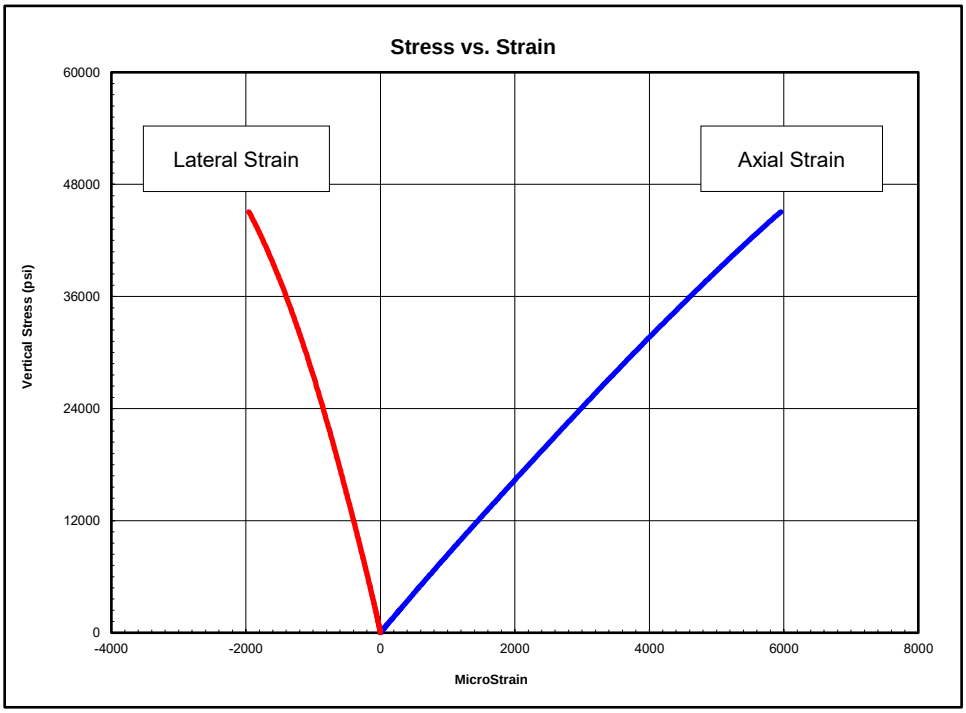


After cutting and grinding

After break

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/24/2025
Tested By:	gp
Checked By:	jsc
Boring ID:	LB-R-135
Sample ID:	C-1
Depth, ft:	22.5-23.5
Sample Type:	rock core
Sample Description:	See photographs Intact material failure Best Effort end preparation performed

Compressive Strength and Elastic Moduli of Rock by ASTM D7012 - Method D



Peak Compressive Stress: 45,054 psi

Stress Range, psi	Young's Modulus, psi	Poisson's Ratio
4500-16500	8,070,000	0.28
16500-28500	7,710,000	0.31
28500-40500	7,150,000	0.36

Notes:
Test specimen tested at the approximate as-received moisture content and at standard laboratory temperature.
The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.
Young's Modulus and Poisson's Ratio calculated using the tangent to the line in the stress range listed.
Calculations assume samples are isotropic, which is not necessarily the case.

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Client:	Langan Engineering	Test Date:	6/11/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-135		
Sample ID:	C-1		
Depth (ft):	22.5-23.5		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.37	4.37	4.37
Specimen Diameter, in:	1.99	1.99	1.99
Specimen Mass, g:	616.07		
Bulk Density, lb/ft^3	172	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

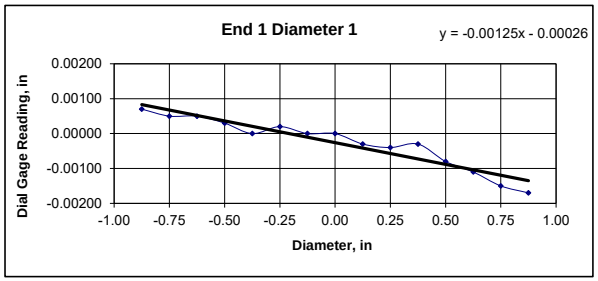
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00070	0.00050	0.00050	0.00030	0.00000	0.00020	0.00000	0.00000	-0.00030	-0.00040	-0.00030	-0.00080	-0.00110	-0.00150	-0.00170
Diameter 2, in (rotated 90°)	-0.00140	-0.00150	-0.00110	-0.00080	-0.00070	-0.00050	-0.00010	0.00000	0.00020	0.00030	0.00050	0.00100	0.00110	0.00120	0.00150

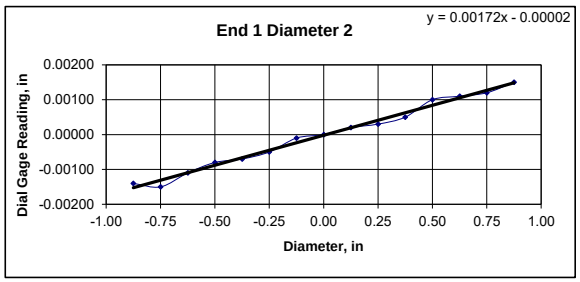
Difference between max and min readings, in:
0° = 0.00240 90° = 0.00300

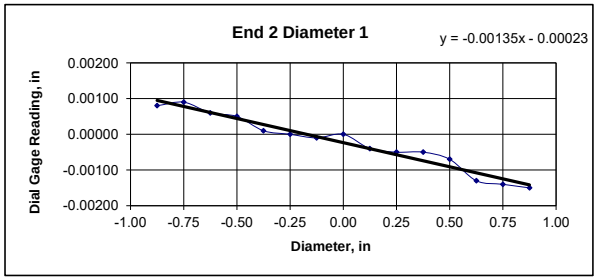
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00080	0.00090	0.00060	0.00050	0.00010	0.00000	-0.00010	0.00000	-0.00040	-0.00050	-0.00050	-0.00070	-0.00130	-0.00140	-0.00150
Diameter 2, in (rotated 90°)	0.00170	0.00130	0.00080	0.00060	0.00060	0.00040	0.00010	0.00000	0.00000	-0.00070	-0.00080	-0.00090	-0.00140	-0.00150	-0.00180

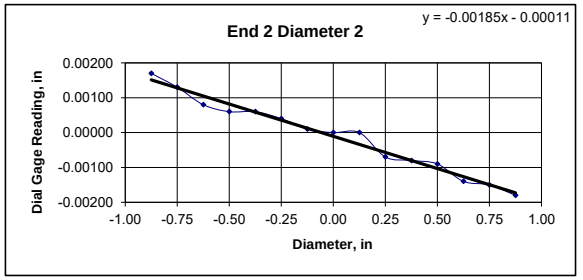
Difference between max and min readings, in:
0° = 0.0024 90° = 0.0035

Maximum difference must be < 0.0020 in. Difference = ± 0.00175
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00125
Angle of Best Fit Line: 0.07137

End 2:
Slope of Best Fit Line 0.00135
Angle of Best Fit Line: 0.07743

Maximum Angular Difference: 0.00606

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00172
Angle of Best Fit Line: 0.09855

End 2:
Slope of Best Fit Line 0.00185
Angle of Best Fit Line: 0.10608

Maximum Angular Difference: 0.00753

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00240	1.990	0.00121	0.069	YES
Diameter 2, in (rotated 90°)	0.00300	1.990	0.00151	0.086	YES
END 2					
Diameter 1, in	0.00240	1.990	0.00121	0.069	YES
Diameter 2, in (rotated 90°)	0.00350	1.990	0.00176	0.101	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

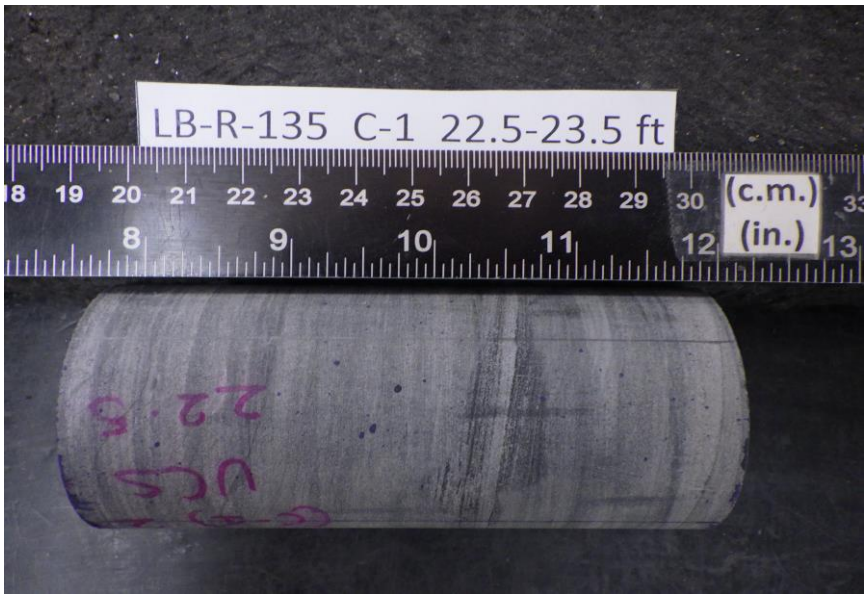
Client:	Langan Engineering	Test Date:	6/11/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-135	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	C-1		
Depth (ft):	22.5-23.5		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/24/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-135
Sample ID:	C-1
Depth, ft:	22.5-23.5



After cutting and grinding

After break

GeoTesting EXPRESS
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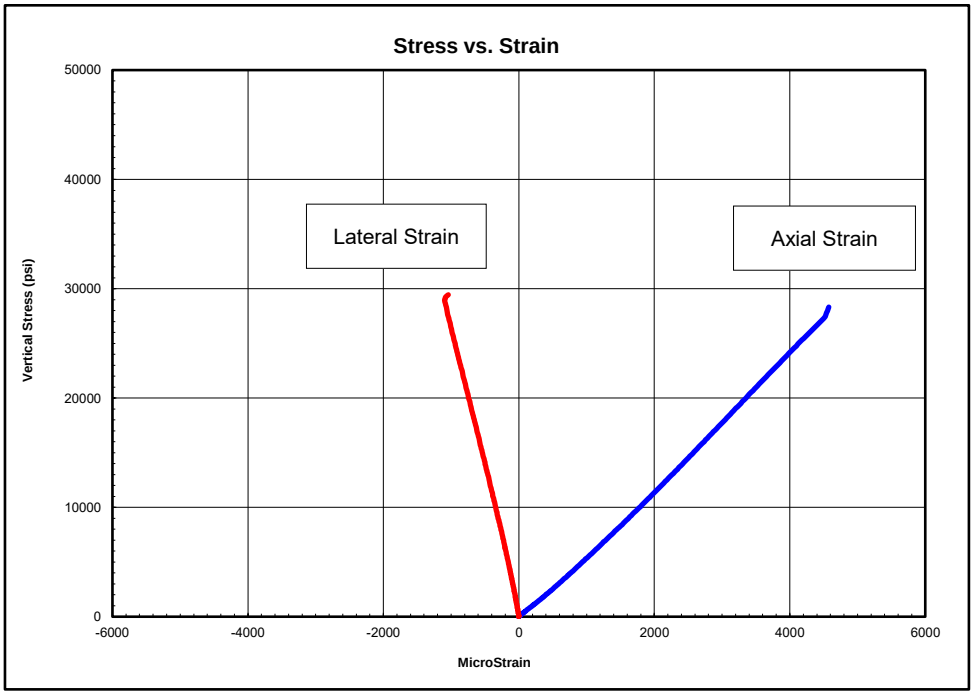
Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	7/1/2025
Tested By:	gp
Checked By:	jsc
Boring ID:	LB-R-027
Sample ID:	C-1
Depth, ft:	28.10-28.47
Sample Type:	rock core
Sample Description:	See photographs Intact material failure Best Effort end preparation performed

Compressive Strength and Elastic Moduli of Rock by ASTM D7012 - Method D



Peak Compressive Stress: 29,446 psi

Stress Range, psi	Young's Modulus, psi	Poisson's Ratio
2900-10800	5,870,000	0.21
10800-18600	6,390,000	0.25
18600-26500	6,390,000	0.26

Notes:
Test specimen tested at the approximate as-received moisture content and at standard laboratory temperature.
The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.
Young's Modulus and Poisson's Ratio calculated using the tangent to the line in the stress range listed.
Calculations assume samples are isotropic, which is not necessarily the case.

Client:	Langan Engineering	Test Date:	6/19/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-027		
Sample ID:	C-1		
Depth (ft):	28.10-28.47		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.44	4.44	4.44
Specimen Diameter, in:	1.98	1.98	1.98
Specimen Mass, g:	640.52		
Bulk Density, lb/ft^3	178	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

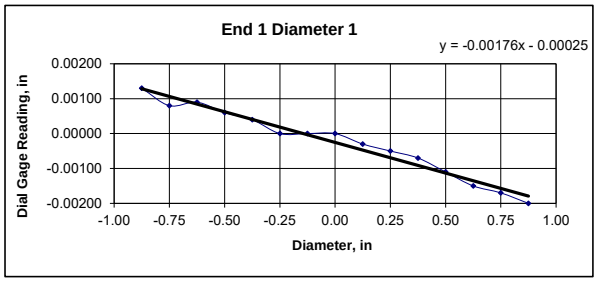
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00130	0.00080	0.00090	0.00060	0.00040	0.00000	0.00000	0.00000	-0.00030	-0.00050	-0.00070	-0.00110	-0.00150	-0.00170	-0.00200
Diameter 2, in (rotated 90°)	-0.00150	-0.00130	-0.00110	-0.00070	-0.00050	-0.00050	-0.00010	0.00000	0.00000	0.00020	0.00060	0.00060	0.00070	0.00120	0.00150

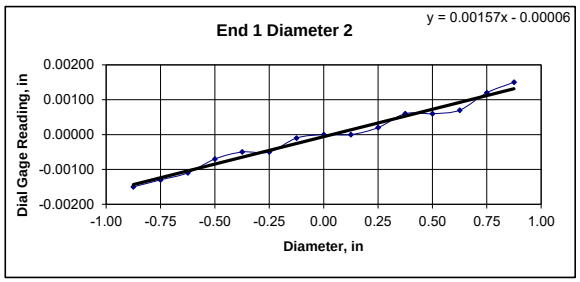
Difference between max and min readings, in:
0° = 0.00330 90° = 0.00300

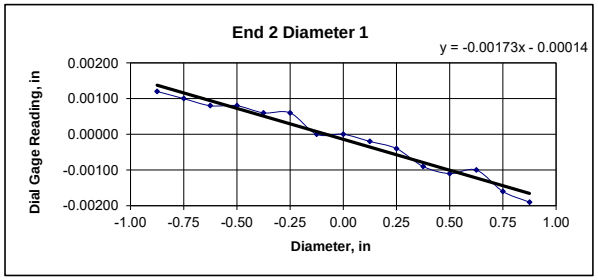
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00120	0.00100	0.00080	0.00080	0.00060	0.00060	0.00000	0.00000	-0.00020	-0.00040	-0.00090	-0.00110	-0.00100	-0.00160	-0.00190
Diameter 2, in (rotated 90°)	0.00130	0.00150	0.00110	0.00070	0.00070	0.00040	0.00030	0.00000	0.00000	-0.00020	-0.00060	-0.00080	-0.00100	-0.00130	-0.00160

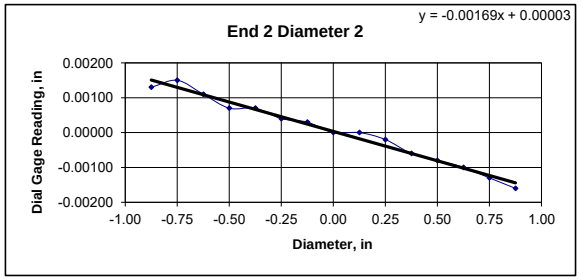
Difference between max and min readings, in:
0° = 0.0031 90° = 0.0031

Maximum difference must be < 0.0020 in. Difference = ± 0.00165
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00176
Angle of Best Fit Line: 0.10068

End 2:
Slope of Best Fit Line 0.00173
Angle of Best Fit Line: 0.09920

Maximum Angular Difference: 0.00147

Parallelism Tolerance Met? YES
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00157
Angle of Best Fit Line: 0.09004

End 2:
Slope of Best Fit Line 0.00169
Angle of Best Fit Line: 0.09658

Maximum Angular Difference: 0.00655

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00330	1.980	0.00167	0.095	YES
Diameter 2, in (rotated 90°)	0.00300	1.980	0.00152	0.087	YES
END 2					
Diameter 1, in	0.00310	1.980	0.00157	0.090	YES
Diameter 2, in (rotated 90°)	0.00310	1.980	0.00157	0.090	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/19/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-027	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	C-1		
Depth (ft):	28.10-28.47		
Visual Description:	See photographs		

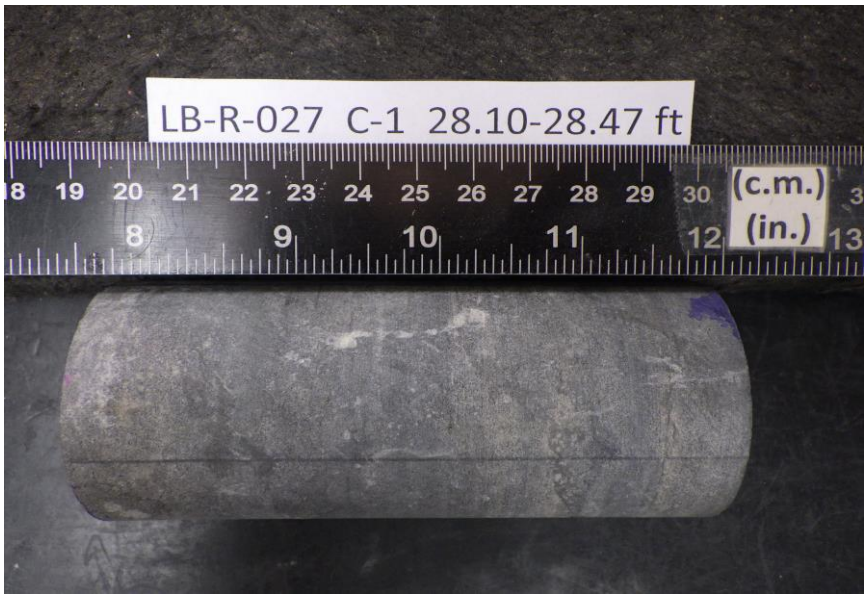
BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS

END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	7/1/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-027
Sample ID:	C-1
Depth, ft:	28.10-28.47

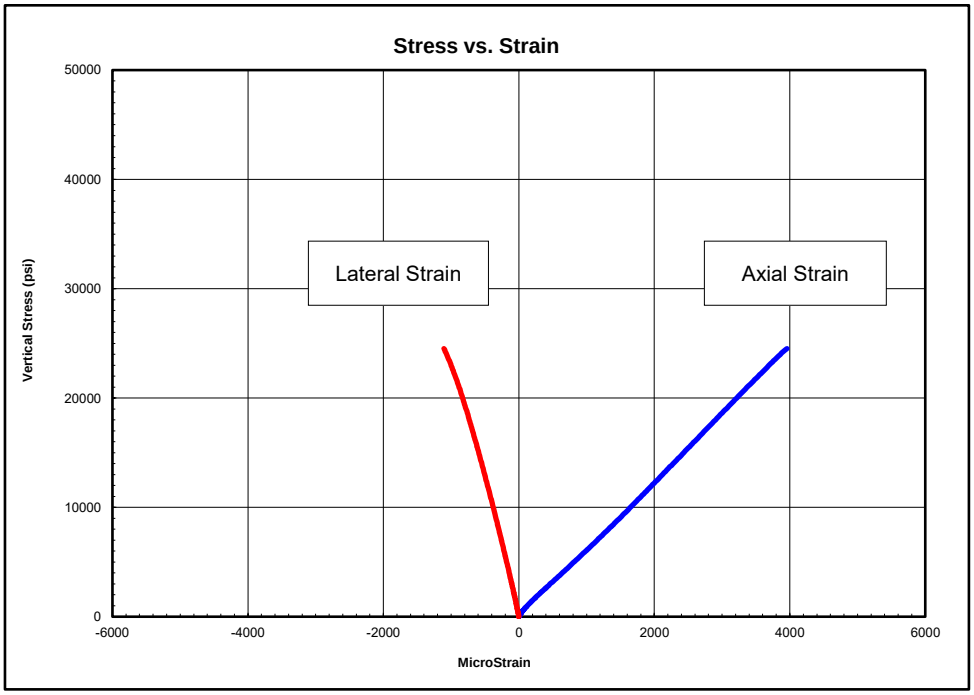


After cutting and grinding

After break

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	7/1/2025
Tested By:	gp
Checked By:	jsc
Boring ID:	LB-R-042
Sample ID:	C-1
Depth, ft:	25.24-25.62
Sample Type:	rock core
Sample Description:	See photographs Intact material failure Best Effort end preparation performed

Compressive Strength and Elastic Moduli of Rock by ASTM D7012 - Method D



Peak Compressive Stress: 24,520 psi

Stress Range, psi	Young's Modulus, psi	Poisson's Ratio
2500-9000	5,830,000	0.22
9000-15500	6,350,000	0.27
15500-22100	6,380,000	0.31

Notes:
Test specimen tested at the approximate as-received moisture content and at standard laboratory temperature.
The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.
Young's Modulus and Poisson's Ratio calculated using the tangent to the line in the stress range listed.
Calculations assume samples are isotropic, which is not necessarily the case.

Client:	Langan Engineering	Test Date:	6/16/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-042		
Sample ID:	C-1		
Depth (ft):	25.24-25.62		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.24	4.24	4.24
Specimen Diameter, in:	1.98	1.98	1.98
Specimen Mass, g:	602.83		
Bulk Density, lb/ft^3	176	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.1	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

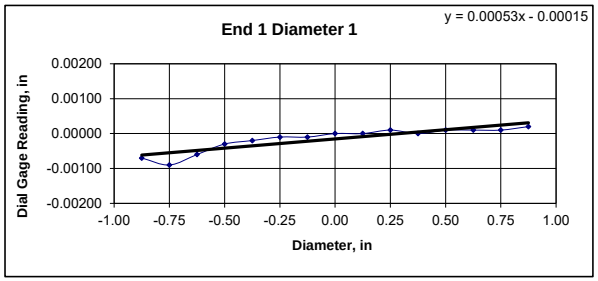
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00070	-0.00090	-0.00060	-0.00030	-0.00020	-0.00010	-0.00010	0.00000	0.00000	0.00010	0.00000	0.00010	0.00010	0.00010	0.00020
Diameter 2, in (rotated 90°)	-0.00190	-0.00180	-0.00120	-0.00090	-0.00080	-0.00030	-0.00020	0.00000	0.00040	0.00050	0.00090	0.00120	0.00140	0.00190	0.00190

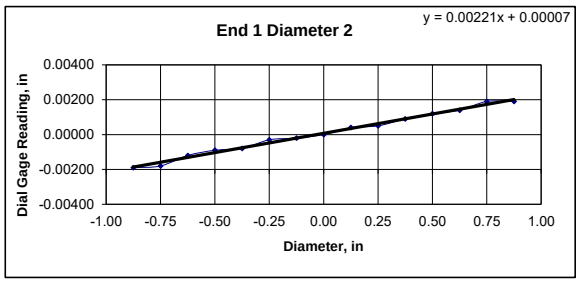
Difference between max and min readings, in:
0° = 0.00110 90° = 0.00380

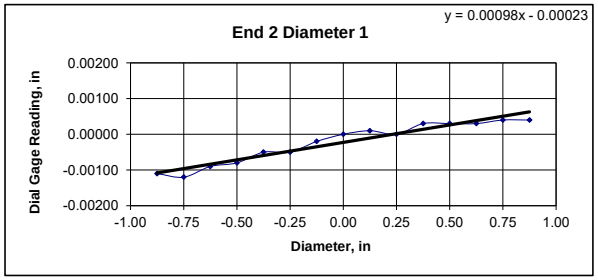
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00110	-0.00120	-0.00090	-0.00080	-0.00050	-0.00050	-0.00020	0.00000	0.00010	0.00000	0.00030	0.00030	0.00030	0.00040	0.00040
Diameter 2, in (rotated 90°)	0.00160	0.00160	0.00110	0.00080	0.00070	0.00030	0.00020	0.00000	-0.00020	-0.00060	-0.00090	-0.00110	-0.00120	-0.00140	-0.00200

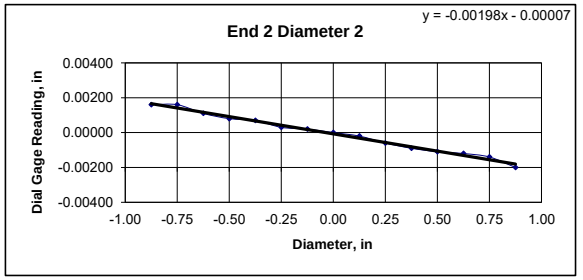
Difference between max and min readings, in:
0° = 0.0016 90° = 0.0036

Maximum difference must be < 0.0020 in. Difference = ± 0.00190
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00053
Angle of Best Fit Line: 0.03028

End 2:
Slope of Best Fit Line 0.00098
Angle of Best Fit Line: 0.05599

Maximum Angular Difference: 0.02570

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00221
Angle of Best Fit Line: 0.12687

End 2:
Slope of Best Fit Line 0.00198
Angle of Best Fit Line: 0.11345

Maximum Angular Difference: 0.01342

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00110	1.980	0.00056	0.032	YES
Diameter 2, in (rotated 90°)	0.00380	1.980	0.00192	0.110	YES
END 2					
Diameter 1, in	0.00160	1.980	0.00081	0.046	YES
Diameter 2, in (rotated 90°)	0.00360	1.980	0.00182	0.104	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/16/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-042	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	C-1		
Depth (ft):	25.24-25.62		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS

END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

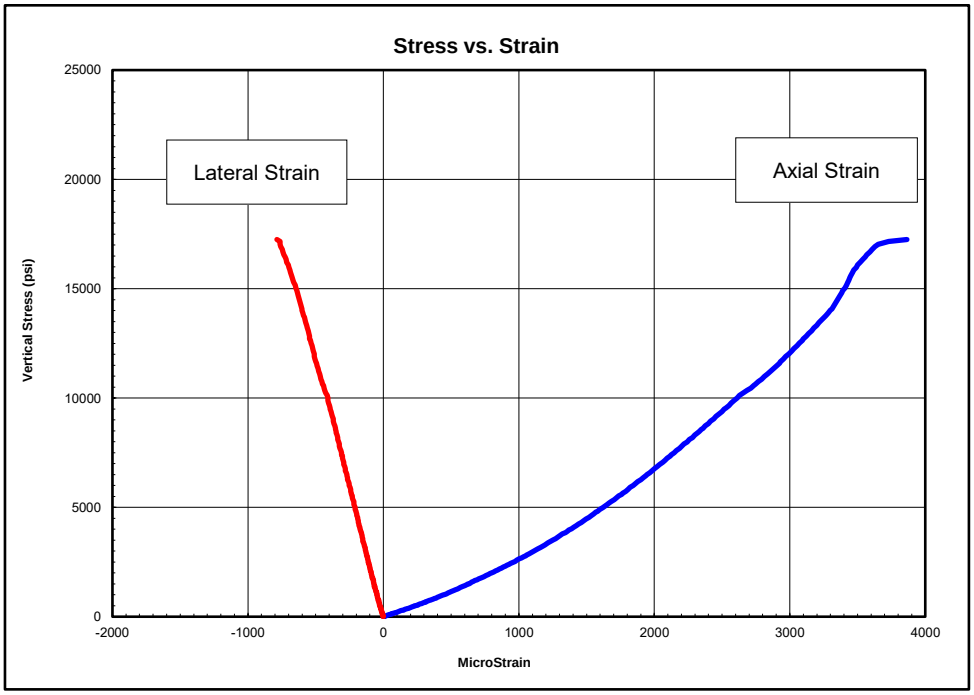
Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	7/1/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-042
Sample ID:	C-1
Depth, ft:	25.24-25.62

After cutting and grinding

After break

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/30/2025
Tested By:	gp
Checked By:	jsc
Boring ID:	LB-R-045
Sample ID:	---
Depth, ft:	21.54-21.92
Sample Type:	rock core
Sample Description:	See photographs Intact material failure Best Effort end preparation performed

Compressive Strength and Elastic Moduli of Rock by ASTM D7012 - Method D



Peak Compressive Stress: 17,250 psi

Stress Range, psi	Young's Modulus, psi	Poisson's Ratio
1700-6300	3,760,000	0.15
6300-10900	5,250,000	0.22
10900-15500	6,780,000	0.30

Notes:
Test specimen tested at the approximate as-received moisture content and at standard laboratory temperature.
The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.
Young's Modulus and Poisson's Ratio calculated using the tangent to the line in the stress range listed.
Calculations assume samples are isotropic, which is not necessarily the case.

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Client:	Langan Engineering	Test Date:	6/16/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-045		
Sample ID:	---		
Depth (ft):	21.54-21.92		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.32	4.33	4.33
Specimen Diameter, in:	1.98	1.98	1.98
Specimen Mass, g:	609.65		
Bulk Density, lb/ft^3	174	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? NO

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? NO

END FLATNESS AND PARALLELISM (Procedure FP1)

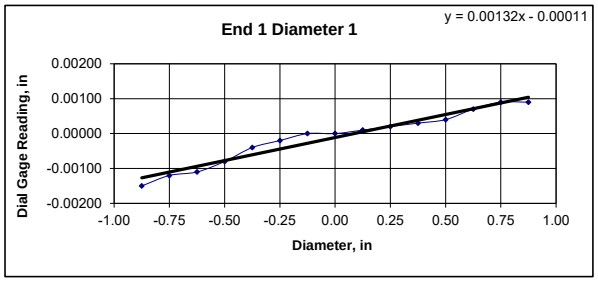
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00150	-0.00120	-0.00110	-0.00080	-0.00040	-0.00020	0.00000	0.00000	0.00010	0.00020	0.00030	0.00040	0.00070	0.00090	0.00090
Diameter 2, in (rotated 90°)	0.00160	0.00110	0.00110	0.00060	0.00050	0.00020	-0.00010	0.00000	-0.00030	-0.00060	-0.00090	-0.00110	-0.00150	-0.00190	-0.00200

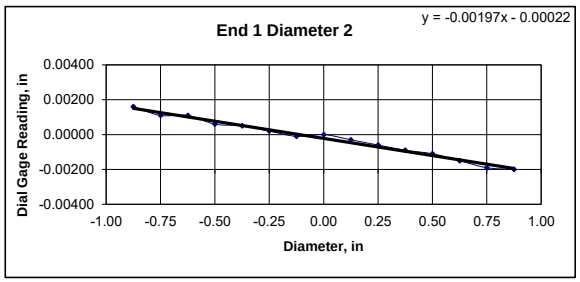
Difference between max and min readings, in:
0° = 0.00240 90° = 0.00360

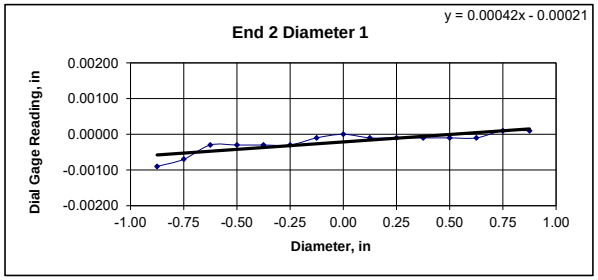
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00090	-0.00070	-0.00030	-0.00030	-0.00030	-0.00030	-0.00010	0.00000	-0.00010	-0.00010	-0.00010	-0.00010	-0.00010	0.00010	0.00010
Diameter 2, in (rotated 90°)	-0.00200	-0.00180	-0.00130	-0.00080	-0.00070	-0.00040	-0.00010	0.00000	0.00000	0.00040	0.00080	0.00090	0.00100	0.00150	0.00160

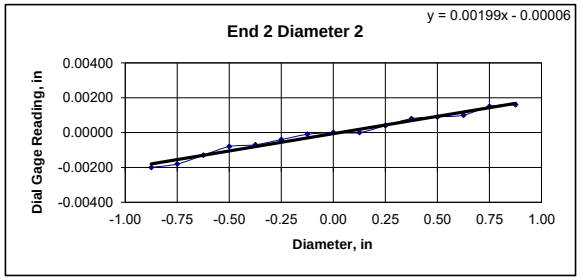
Difference between max and min readings, in:
0° = 0.001 90° = 0.0036

Maximum difference must be < 0.0020 in. Difference = ± 0.00180
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00132
Angle of Best Fit Line: 0.07563

End 2:
Slope of Best Fit Line 0.00042
Angle of Best Fit Line: 0.02390

Maximum Angular Difference: 0.05173

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00197
Angle of Best Fit Line: 0.11295

End 2:
Slope of Best Fit Line 0.00199
Angle of Best Fit Line: 0.11377

Maximum Angular Difference: 0.00082

Parallelism Tolerance Met? YES
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00240	1.980	0.00121	0.069	YES
Diameter 2, in (rotated 90°)	0.00360	1.980	0.00182	0.104	YES
END 2					
Diameter 1, in	0.00100	1.980	0.00051	0.029	YES
Diameter 2, in (rotated 90°)	0.00360	1.980	0.00182	0.104	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/16/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-045	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	21.54-21.92		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS

END 1

Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

END 2

Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

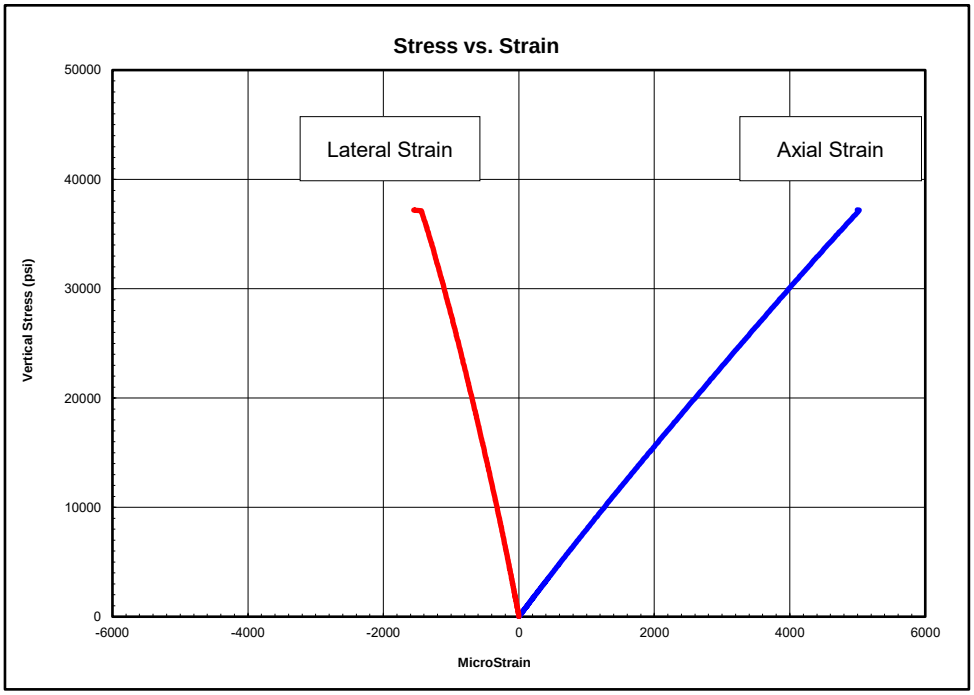
Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/30/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-045
Sample ID:	---
Depth, ft:	21.54-21.92

After cutting and grinding

After break

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/24/2025
Tested By:	gp
Checked By:	jsc
Boring ID:	LB-R-059
Sample ID:	---
Depth, ft:	37-38
Sample Type:	rock core
Sample Description:	See photographs Intact material failure Best Effort end preparation performed

Compressive Strength and Elastic Moduli of Rock by ASTM D7012 - Method D



Peak Compressive Stress: 37,214 psi

Stress Range, psi	Young's Modulus, psi	Poisson's Ratio
3700-13600	7,750,000	0.26
13600-23600	7,360,000	0.28
23600-33500	7,120,000	0.31

Notes:
Test specimen tested at the approximate as-received moisture content and at standard laboratory temperature.
The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.
Young's Modulus and Poisson's Ratio calculated using the tangent to the line in the stress range listed.
Calculations assume samples are isotropic, which is not necessarily the case.

Client:	Langan Engineering	Test Date:	6/17/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-059		
Sample ID:	---		
Depth (ft):	37-38		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.35	4.35	4.35
Specimen Diameter, in:	1.98	1.98	1.98
Specimen Mass, g:	607.88		
Bulk Density, lb/ft^3	173	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? NO

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? NO

END FLATNESS AND PARALLELISM (Procedure FP1)

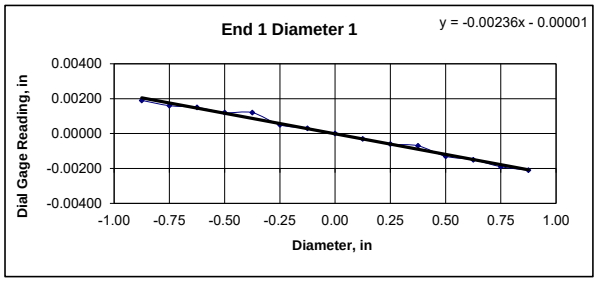
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00190	0.00160	0.00150	0.00120	0.00120	0.00050	0.00030	0.00000	-0.00030	-0.00060	-0.00070	-0.00130	-0.00150	-0.00190	-0.00210
Diameter 2, in (rotated 90°)	-0.00070	-0.00060	-0.00010	-0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	0.00030	0.00030	0.00060	0.00060	0.00040	0.00040

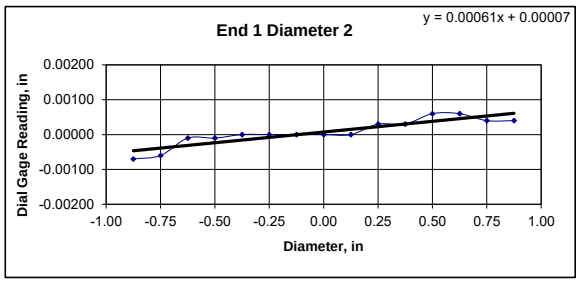
Difference between max and min readings, in:
0° = 0.00400 90° = 0.00130

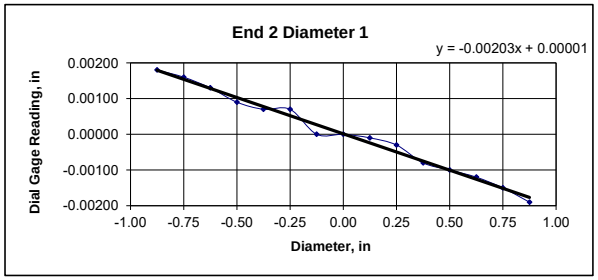
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00180	0.00160	0.00130	0.00090	0.00070	0.00070	0.00000	0.00000	-0.00010	-0.00030	-0.00080	-0.00100	-0.00120	-0.00150	-0.00190
Diameter 2, in (rotated 90°)	0.00070	0.00050	0.00070	0.00040	0.00020	0.00030	0.00020	0.00000	-0.00010	-0.00030	-0.00030	-0.00040	-0.00050	-0.00070	-0.00100

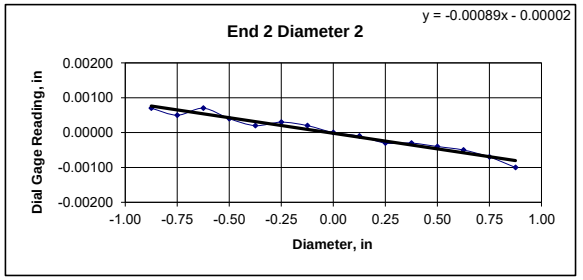
Difference between max and min readings, in:
0° = 0.0037 90° = 0.0017

Maximum difference must be < 0.0020 in. Difference = ± 0.00200
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00236
Angle of Best Fit Line: 0.13505

End 2:
Slope of Best Fit Line 0.00203
Angle of Best Fit Line: 0.11656

Maximum Angular Difference: 0.01850

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00061
Angle of Best Fit Line: 0.03520

End 2:
Slope of Best Fit Line 0.00089
Angle of Best Fit Line: 0.05124

Maximum Angular Difference: 0.01604

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00400	1.980	0.00202	0.116	YES
Diameter 2, in (rotated 90°)	0.00130	1.980	0.00066	0.038	YES
END 2					
Diameter 1, in	0.00370	1.980	0.00187	0.107	YES
Diameter 2, in (rotated 90°)	0.00170	1.980	0.00086	0.049	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/17/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-059	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	C-2		
Depth (ft):	37-38		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/20/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-059
Sample ID:	---
Depth, ft:	37-38

After cutting and grinding

After break

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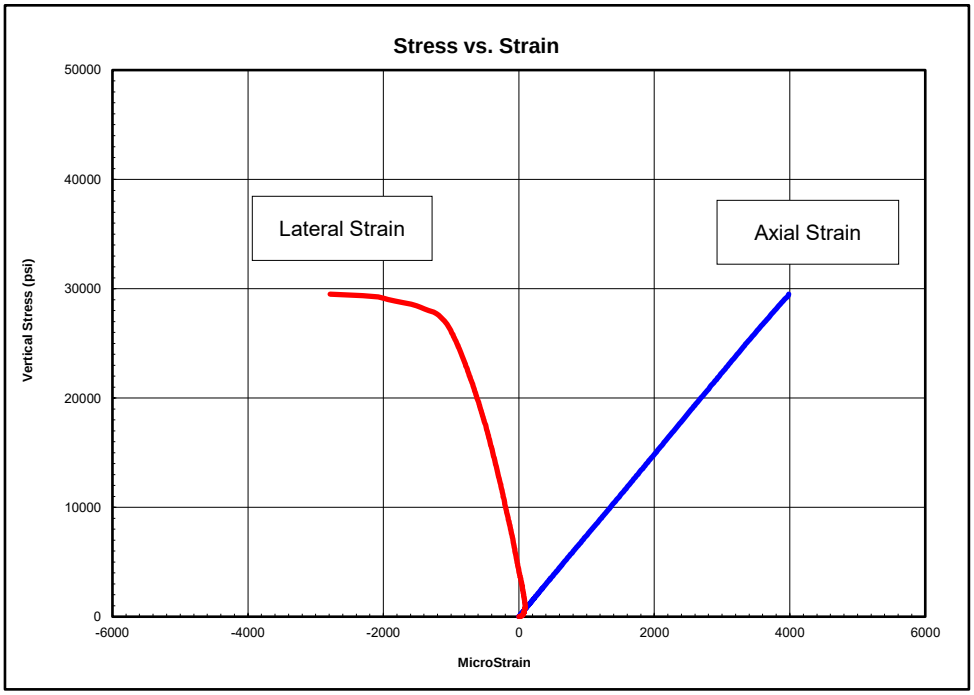
Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/30/2025
Tested By:	gp
Checked By:	jsc
Boring ID:	LB-R-062
Sample ID:	C-1
Depth, ft:	28-28.5
Sample Type:	rock core
Sample Description:	See photographs Intact material failure Best Effort end preparation performed

Compressive Strength and Elastic Moduli of Rock by ASTM D7012 - Method D



Peak Compressive Stress: 29,565 psi

Stress Range, psi	Young's Modulus, psi	Poisson's Ratio
3000-10800	7,370,000	0.25
10800-18700	7,490,000	0.31
18700-26600	7,430,000	0.45

Notes:
Test specimen tested at the approximate as-received moisture content and at standard laboratory temperature.
The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.
Young's Modulus and Poisson's Ratio calculated using the tangent to the line in the stress range listed.
Calculations assume samples are isotropic, which is not necessarily the case.

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Client:	Langan Engineering	Test Date:	6/16/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-062		
Sample ID:	C-1		
Depth (ft):	28-28.5		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.28	4.28	4.28
Specimen Diameter, in:	1.98	1.98	1.98
Specimen Mass, g:	611.34		
Bulk Density, lb/ft^3	176	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? NO

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? NO

END FLATNESS AND PARALLELISM (Procedure FP1)

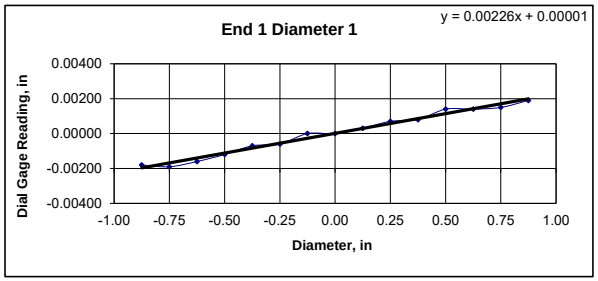
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00180	-0.00190	-0.00160	-0.00120	-0.00070	-0.00060	0.00000	0.00000	0.00030	0.00070	0.00080	0.00140	0.00140	0.00150	0.00190
Diameter 2, in (rotated 90°)	-0.00140	-0.00130	-0.00090	-0.00080	-0.00060	-0.00050	-0.00010	0.00000	-0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	0.00010

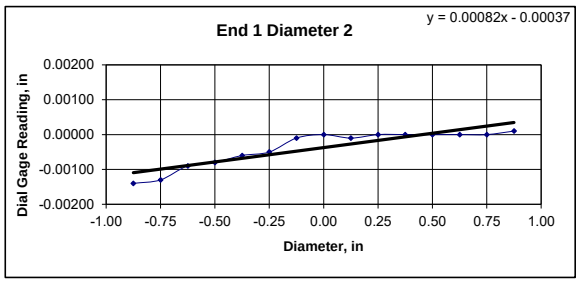
Difference between max and min readings, in:
0° = 0.00380 90° = 0.00150

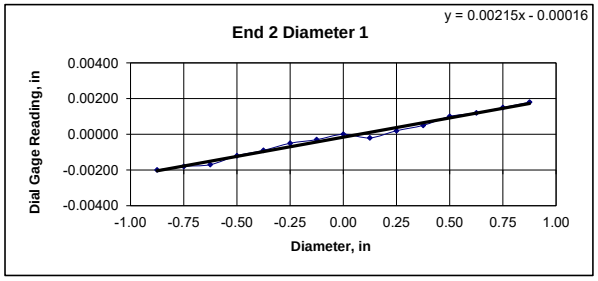
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00200	-0.00180	-0.00170	-0.00120	-0.00090	-0.00050	-0.00030	0.00000	-0.00020	0.00020	0.00050	0.00100	0.00120	0.00150	0.00180
Diameter 2, in (rotated 90°)	0.00070	0.00060	0.00030	0.00020	0.00010	0.00010	0.00010	0.00000	-0.00010	-0.00010	-0.00050	-0.00060	-0.00080	-0.00080	-0.00080

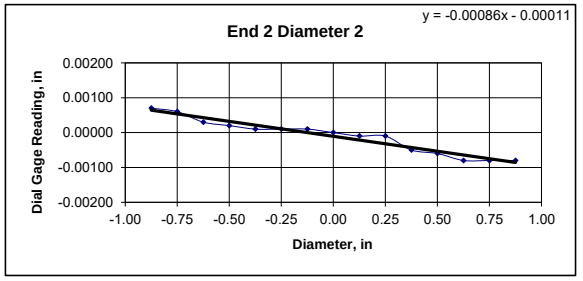
Difference between max and min readings, in:
0° = 0.0038 90° = 0.0015

Maximum difference must be < 0.0020 in. Difference = ± 0.00190
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00226
Angle of Best Fit Line: 0.12949

End 2:
Slope of Best Fit Line 0.00215
Angle of Best Fit Line: 0.12343

Maximum Angular Difference: 0.00606

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00082
Angle of Best Fit Line: 0.04715

End 2:
Slope of Best Fit Line 0.00086
Angle of Best Fit Line: 0.04911

Maximum Angular Difference: 0.00196

Parallelism Tolerance Met? YES
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00380	1.980	0.00192	0.110	YES
Diameter 2, in (rotated 90°)	0.00150	1.980	0.00076	0.043	YES
END 2					
Diameter 1, in	0.00380	1.980	0.00192	0.110	YES
Diameter 2, in (rotated 90°)	0.00150	1.980	0.00076	0.043	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/16/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-062	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	C-1		
Depth (ft):	28-28.5		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

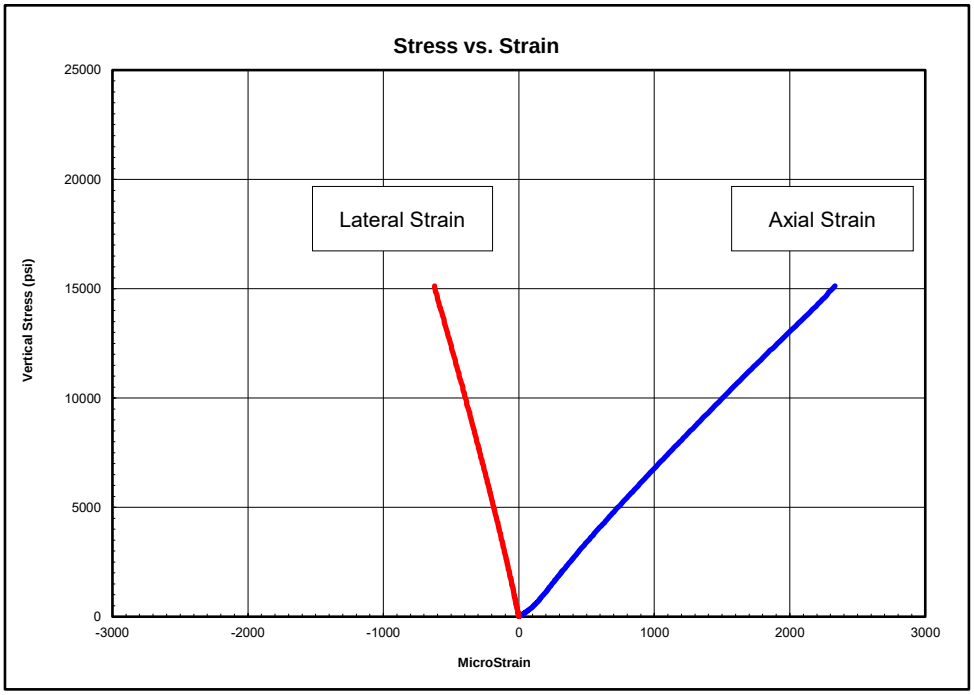
Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/30/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-062
Sample ID:	C-1
Depth, ft:	28-28.5

After cutting and grinding

After break

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	7/1/2025
Tested By:	gp
Checked By:	jsc
Boring ID:	LB-R-064
Sample ID:	---
Depth, ft:	36-37
Sample Type:	rock core
Sample Description:	See photographs Intact material failure Best Effort end preparation performed

Compressive Strength and Elastic Moduli of Rock by ASTM D7012 - Method D



Peak Compressive Stress: 15,127 psi

Stress Range, psi	Young's Modulus, psi	Poisson's Ratio
1500-5500	7,160,000	0.27
5500-9600	6,470,000	0.27
9600-13600	6,110,000	0.27

Notes:
Test specimen tested at the approximate as-received moisture content and at standard laboratory temperature.
The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.
Young's Modulus and Poisson's Ratio calculated using the tangent to the line in the stress range listed.
Calculations assume samples are isotropic, which is not necessarily the case.

Client:	Langan Engineering	Test Date:	6/13/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-064		
Sample ID:	---		
Depth (ft):	36-37		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.09	4.09	4.09
Specimen Diameter, in:	1.96	1.96	1.96
Specimen Mass, g:	548.21		
Bulk Density, lb/ft^3	169	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.1	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

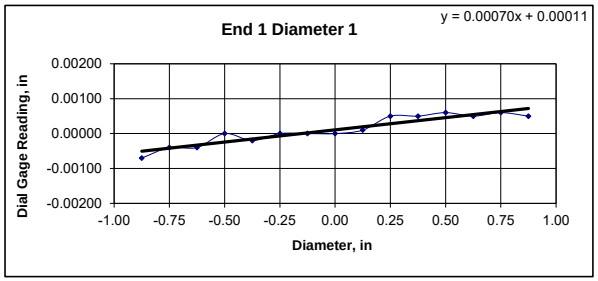
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00070	-0.00040	-0.00040	0.00000	-0.00020	0.00000	0.00000	0.00000	0.00010	0.00050	0.00050	0.00060	0.00050	0.00060	0.00050
Diameter 2, in (rotated 90°)	0.00170	0.00160	0.00110	0.00110	0.00080	0.00030	0.00020	0.00000	-0.00030	-0.00070	-0.00110	-0.00140	-0.00160	-0.00170	-0.00200

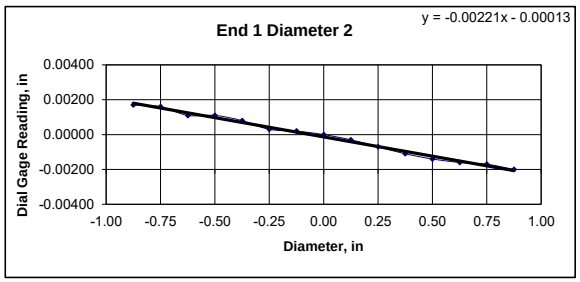
Difference between max and min readings, in:
0° = 0.00130 90° = 0.00370

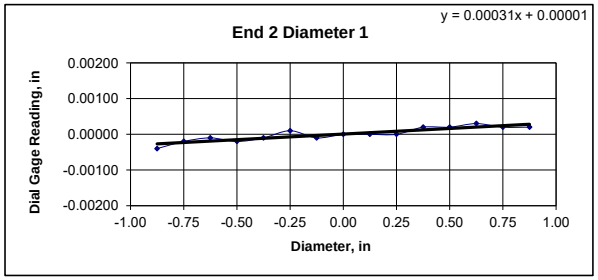
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00040	-0.00020	-0.00010	-0.00020	-0.00010	0.00010	-0.00010	0.00000	0.00000	0.00000	0.00020	0.00020	0.00030	0.00020	0.00020
Diameter 2, in (rotated 90°)	-0.00190	-0.00180	-0.00170	-0.00150	-0.00070	-0.00070	-0.00040	0.00000	0.00000	0.00020	0.00040	0.00060	0.00090	0.00090	0.00100

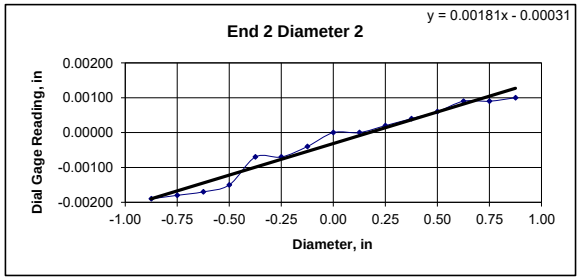
Difference between max and min readings, in:
0° = 0.0007 90° = 0.0029

Maximum difference must be < 0.0020 in. Difference = ± 0.00185
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00070
Angle of Best Fit Line: 0.04011

End 2:
Slope of Best Fit Line 0.00031
Angle of Best Fit Line: 0.01801

Maximum Angular Difference: 0.02210

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00221
Angle of Best Fit Line: 0.12671

End 2:
Slope of Best Fit Line 0.00181
Angle of Best Fit Line: 0.10379

Maximum Angular Difference: 0.02292

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00130	1.960	0.00066	0.038	YES
Diameter 2, in (rotated 90°)	0.00370	1.960	0.00189	0.108	YES
END 2					
Diameter 1, in	0.00070	1.960	0.00036	0.020	YES
Diameter 2, in (rotated 90°)	0.00290	1.960	0.00148	0.085	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

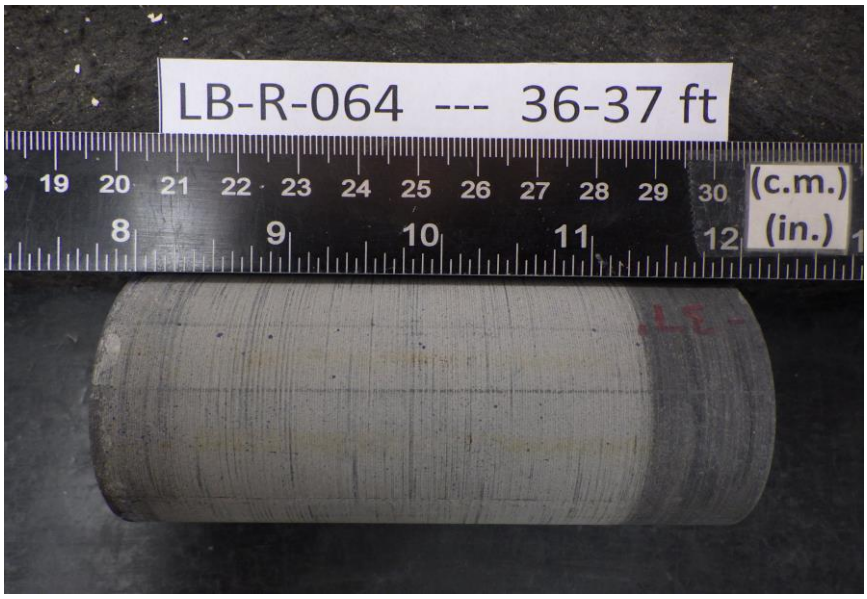
Client:	Langan Engineering	Test Date:	6/13/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-064	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	36-37		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	7/1/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-064
Sample ID:	---
Depth, ft:	36-37

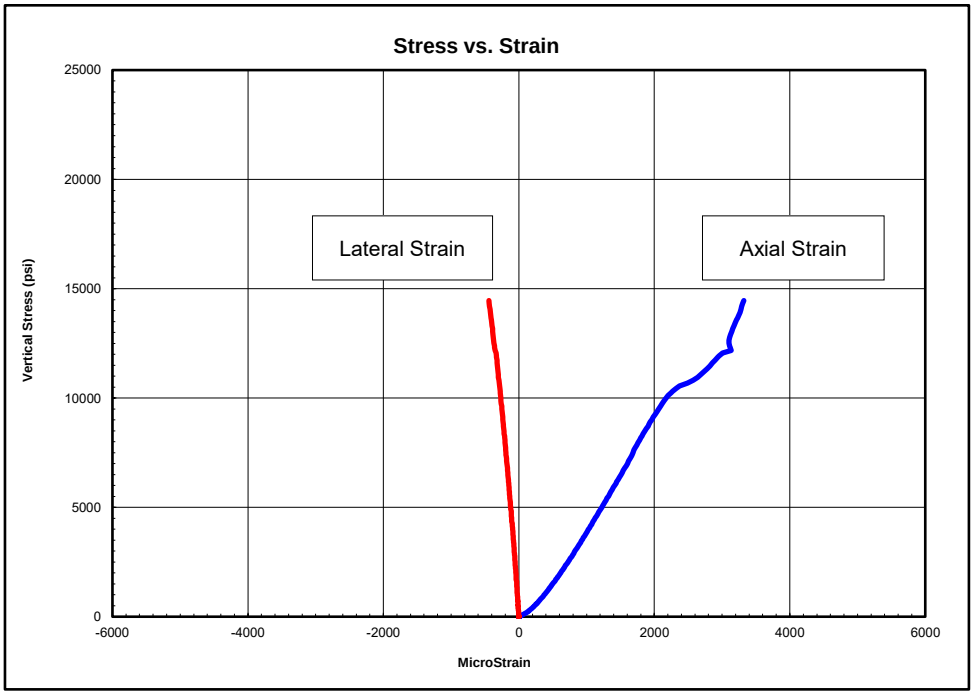


After cutting and grinding

After break

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	7/1/2025
Tested By:	gp
Checked By:	jsc
Boring ID:	LB-R-065
Sample ID:	---
Depth, ft:	28-29
Sample Type:	rock core
Sample Description:	See photographs Intact material failure Best Effort end preparation performed

Compressive Strength and Elastic Moduli of Rock by ASTM D7012 - Method D



Peak Compressive Stress: 14,459 psi

Stress Range, psi	Young's Modulus, psi	Poisson's Ratio
1400-5300	4,850,000	0.12
5300-9200	5,530,000	0.16
9200-13000	2,710,000	0.10

Notes:
Test specimen tested at the approximate as-received moisture content and at standard laboratory temperature.
The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.
Young's Modulus and Poisson's Ratio calculated using the tangent to the line in the stress range listed.
Calculations assume samples are isotropic, which is not necessarily the case.

Client:	Langan Engineering	Test Date:	6/18/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-065		
Sample ID:	---		
Depth (ft):	28-29		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.22	4.22	4.22
Specimen Diameter, in:	1.98	1.98	1.98
Specimen Mass, g:	605.66		
Bulk Density, lb/ft^3	177	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.1	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

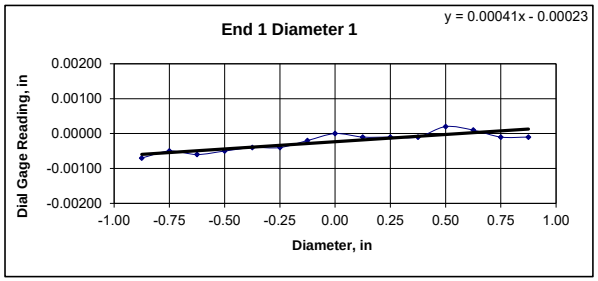
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00070	-0.00050	-0.00060	-0.00050	-0.00040	-0.00040	-0.00020	0.00000	-0.00010	-0.00010	-0.00010	0.00020	0.00010	-0.00010	-0.00010
Diameter 2, in (rotated 90°)	-0.00180	-0.00150	-0.00110	-0.00100	-0.00090	-0.00030	-0.00030	0.00000	0.00020	0.00070	0.00090	0.00140	0.00160	0.00170	0.00200

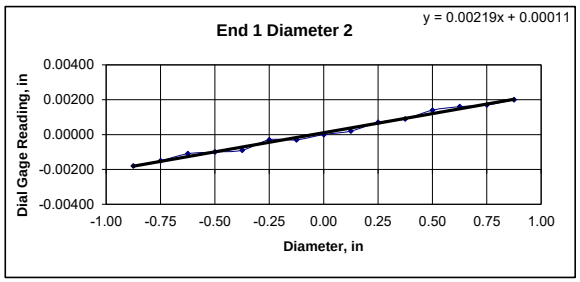
Difference between max and min readings, in:
0° = 0.00090 90° = 0.00380

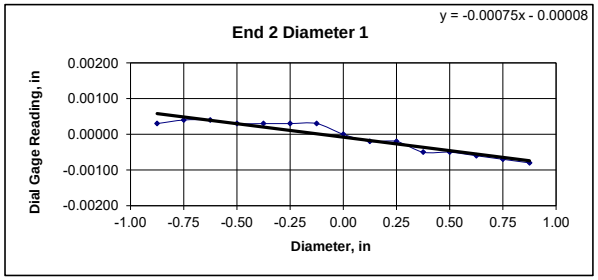
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00030	0.00040	0.00040	0.00030	0.00030	0.00030	0.00030	0.00000	-0.00020	-0.00020	-0.00050	-0.00050	-0.00060	-0.00070	-0.00080
Diameter 2, in (rotated 90°)	0.00160	0.00140	0.00140	0.00100	0.00060	0.00050	0.00010	0.00000	-0.00020	-0.00050	-0.00110	-0.00140	-0.00170	-0.00190	-0.00200

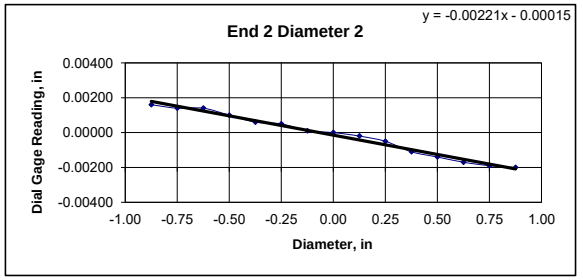
Difference between max and min readings, in:
0° = 0.0012 90° = 0.0036

Maximum difference must be < 0.0020 in. Difference = ± 0.00190
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00041
Angle of Best Fit Line: 0.02374

End 2:
Slope of Best Fit Line 0.00075
Angle of Best Fit Line: 0.04322

Maximum Angular Difference: 0.01948

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00219
Angle of Best Fit Line: 0.12572

End 2:
Slope of Best Fit Line 0.00221
Angle of Best Fit Line: 0.12687

Maximum Angular Difference: 0.00115

Parallelism Tolerance Met? YES
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00090	1.980	0.00045	0.026	YES
Diameter 2, in (rotated 90°)	0.00380	1.980	0.00192	0.110	YES
END 2					
Diameter 1, in	0.00120	1.980	0.00061	0.035	YES
Diameter 2, in (rotated 90°)	0.00360	1.980	0.00182	0.104	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/18/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-065	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	28-29		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

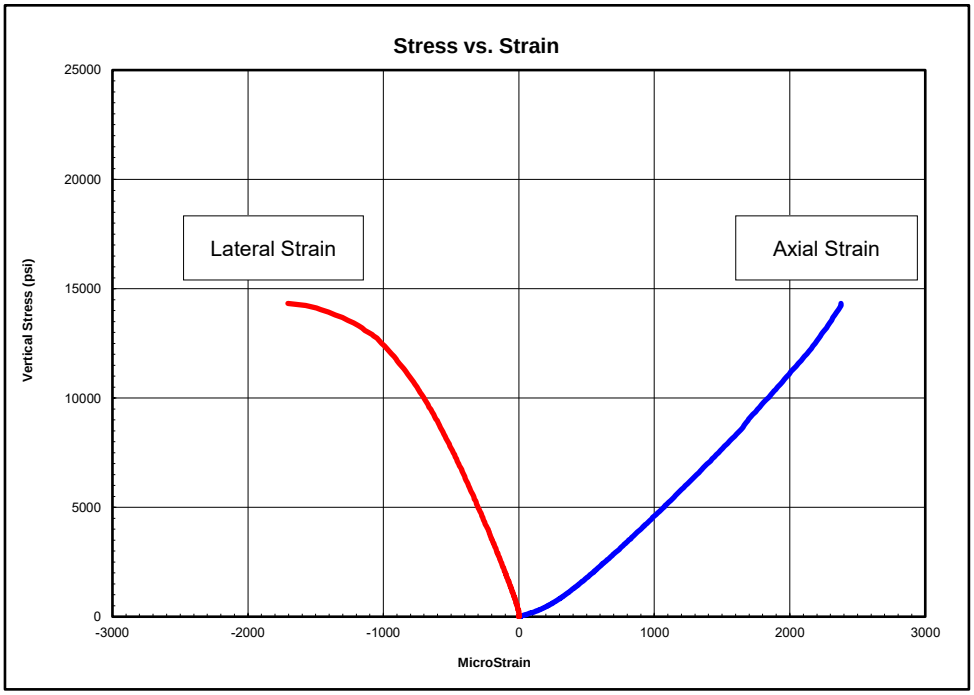
Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	7/1/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-065
Sample ID:	---
Depth, ft:	28-29

After cutting and grinding

After break

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	7/1/2025
Tested By:	gp
Checked By:	jsc
Boring ID:	LB-R-069
Sample ID:	C-1
Depth, ft:	41-41.5
Sample Type:	rock core
Sample Description:	See photographs Intact material failure Best Effort end preparation performed

Compressive Strength and Elastic Moduli of Rock by ASTM D7012 - Method D



Peak Compressive Stress: 14,326 psi

The strain values recorded within the third stress range for this test produce values of Poisson's Ratio that exceed maximum values found in rocks.

Stress Range, psi	Young's Modulus, psi	Poisson's Ratio
1400-5300	5,640,000	0.37
5300-9100	6,330,000	0.49
9100-12900	7,100,000	---

Notes:
Test specimen tested at the approximate as-received moisture content and at standard laboratory temperature.
The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.
Young's Modulus and Poisson's Ratio calculated using the tangent to the line in the stress range listed.
Calculations assume samples are isotropic, which is not necessarily the case.

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Client:	Langan Engineering	Test Date:	6/13/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-069		
Sample ID:	C-1		
Depth (ft):	41-41.5		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.44	4.44	4.44
Specimen Diameter, in:	1.98	1.98	1.98
Specimen Mass, g:	619.77		
Bulk Density, lb/ft^3	172	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? NO

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? NO

END FLATNESS AND PARALLELISM (Procedure FP1)

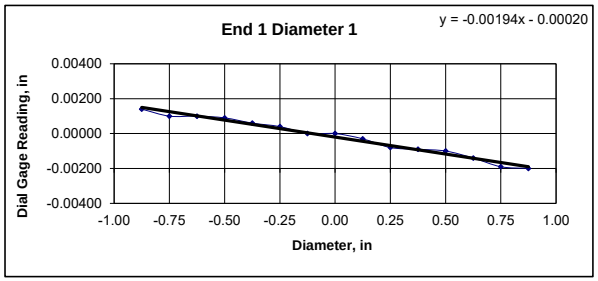
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00140	0.00100	0.00100	0.00090	0.00060	0.00040	0.00000	0.00000	-0.00030	-0.00080	-0.00090	-0.00100	-0.00140	-0.00190	-0.00200
Diameter 2, in (rotated 90°)	-0.00020	-0.00010	-0.00010	-0.00040	-0.00040	-0.00030	-0.00030	0.00000	-0.00010	-0.00030	-0.00040	-0.00060	-0.00060	-0.00090	-0.00090

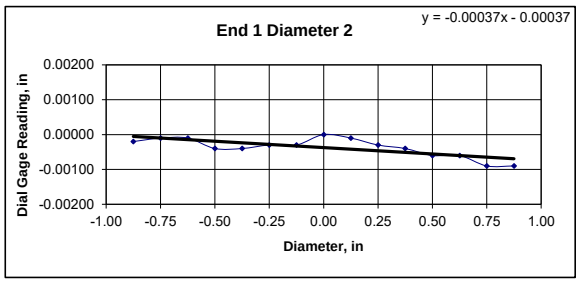
Difference between max and min readings, in:
0° = 0.00340 90° = 0.00090

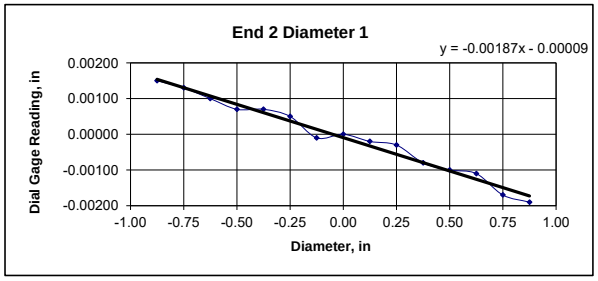
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00150	0.00130	0.00100	0.00070	0.00070	0.00050	-0.00010	0.00000	-0.00020	-0.00030	-0.00080	-0.00100	-0.00110	-0.00170	-0.00190
Diameter 2, in (rotated 90°)	-0.00030	-0.00030	-0.00010	0.00000	0.00010	0.00000	0.00000	0.00000	0.00000	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010

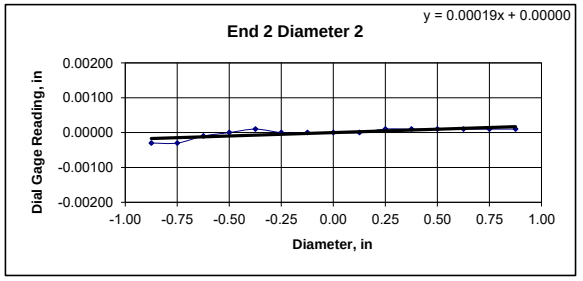
Difference between max and min readings, in:
0° = 0.0034 90° = 0.0004

Maximum difference must be < 0.0020 in. Difference = ± 0.00170
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00194
Angle of Best Fit Line: 0.11132

End 2:
Slope of Best Fit Line 0.00187
Angle of Best Fit Line: 0.10690

Maximum Angular Difference: 0.00442

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00037
Angle of Best Fit Line: 0.02095

End 2:
Slope of Best Fit Line 0.00019
Angle of Best Fit Line: 0.01113

Maximum Angular Difference: 0.00982

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00340	1.980	0.00172	0.098	YES
Diameter 2, in (rotated 90°)	0.00090	1.980	0.00045	0.026	YES
END 2					
Diameter 1, in	0.00340	1.980	0.00172	0.098	YES
Diameter 2, in (rotated 90°)	0.00040	1.980	0.00020	0.012	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/13/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-069	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	C-1		
Depth (ft):	41-41.5		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS

END 1

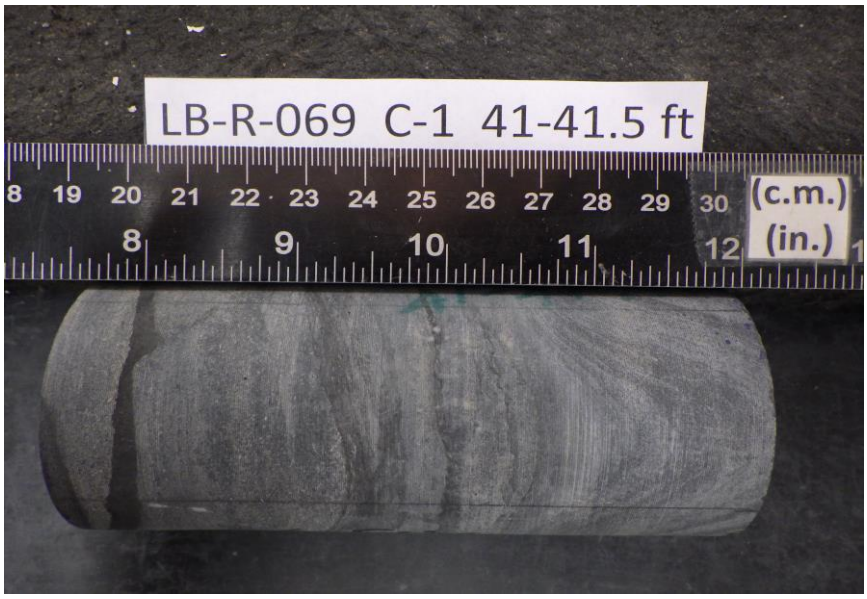
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

END 2

Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	7/1/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-069
Sample ID:	C-1
Depth, ft:	41-41.5

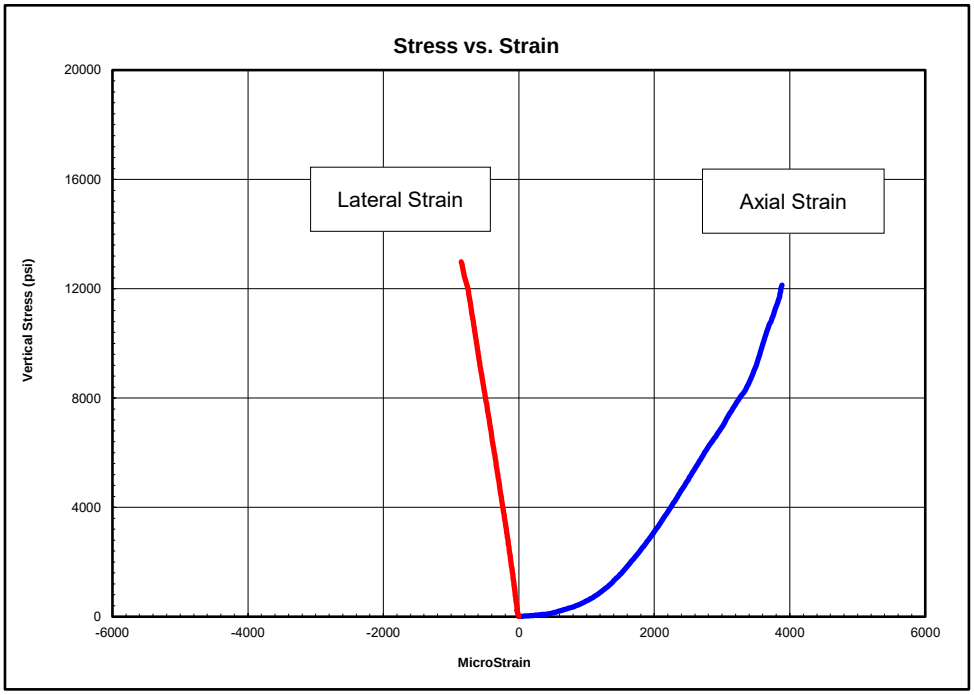


After cutting and grinding

After break

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	7/1/2025
Tested By:	gp
Checked By:	jsc
Boring ID:	LB-R-071
Sample ID:	C-2
Depth, ft:	33.07-33.44
Sample Type:	rock core
Sample Description:	See photographs Intact material failure Best Effort end preparation performed

Compressive Strength and Elastic Moduli of Rock by ASTM D7012 - Method D



Peak Compressive Stress: 12,985 psi

Stress Range, psi	Young's Modulus, psi	Poisson's Ratio
1300-4800	3,330,000	0.20
4800-8200	3,900,000	0.25
8200-11700	6,800,000	0.44

Notes:
Test specimen tested at the approximate as-received moisture content and at standard laboratory temperature.
The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.
Young's Modulus and Poisson's Ratio calculated using the tangent to the line in the stress range listed.
Calculations assume samples are isotropic, which is not necessarily the case.

GeoTesting EXPRESS
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Client:	Langan Engineering	Test Date:	6/18/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-071		
Sample ID:	C-2		
Depth (ft):	33.07-33.44		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.25	4.25	4.25
Specimen Diameter, in:	1.98	1.98	1.98
Specimen Mass, g:	584.77		
Bulk Density, lb/ft^3	170	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.1	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? NO

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? NO

END FLATNESS AND PARALLELISM (Procedure FP1)

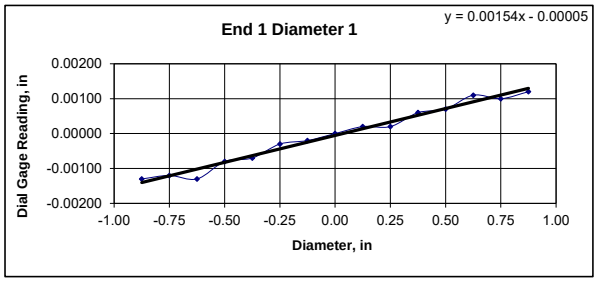
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00130	-0.00120	-0.00130	-0.00080	-0.00070	-0.00030	-0.00020	0.00000	0.00020	0.00020	0.00060	0.00070	0.00110	0.00100	0.00120
Diameter 2, in (rotated 90°)	-0.00170	-0.00150	-0.00140	-0.00080	-0.00050	-0.00020	-0.00010	0.00000	0.00010	0.00050	0.00070	0.00110	0.00160	0.00160	0.00160

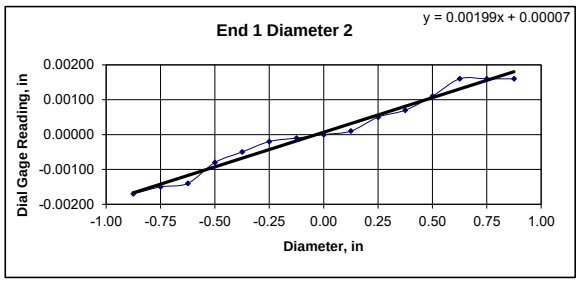
Difference between max and min readings, in:
0° = 0.00250 90° = 0.00330

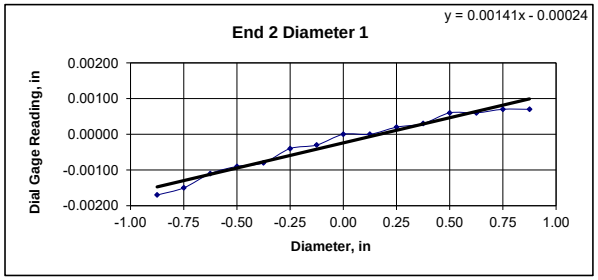
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00170	-0.00150	-0.00110	-0.00090	-0.00080	-0.00040	-0.00030	0.00000	0.00000	0.00020	0.00030	0.00060	0.00060	0.00070	0.00070
Diameter 2, in (rotated 90°)	0.00170	0.00170	0.00150	0.00120	0.00080	0.00080	0.00050	0.00000	-0.00030	-0.00070	-0.00110	-0.00120	-0.00160	-0.00190	-0.00190

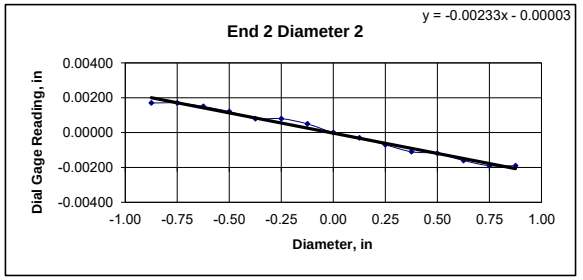
Difference between max and min readings, in:
0° = 0.0024 90° = 0.0036

Maximum difference must be < 0.0020 in. Difference = ± 0.00180
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00154
Angle of Best Fit Line: 0.08840

End 2:
Slope of Best Fit Line 0.00141
Angle of Best Fit Line: 0.08071

Maximum Angular Difference: 0.00769

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00199
Angle of Best Fit Line: 0.11377

End 2:
Slope of Best Fit Line 0.00233
Angle of Best Fit Line: 0.13325

Maximum Angular Difference: 0.01948

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00250	1.980	0.00126	0.072	YES
Diameter 2, in (rotated 90°)	0.00330	1.980	0.00167	0.095	YES
END 2					
Diameter 1, in	0.00240	1.980	0.00121	0.069	YES
Diameter 2, in (rotated 90°)	0.00360	1.980	0.00182	0.104	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/18/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-071	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	C-2		
Depth (ft):	33.07-33.44		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

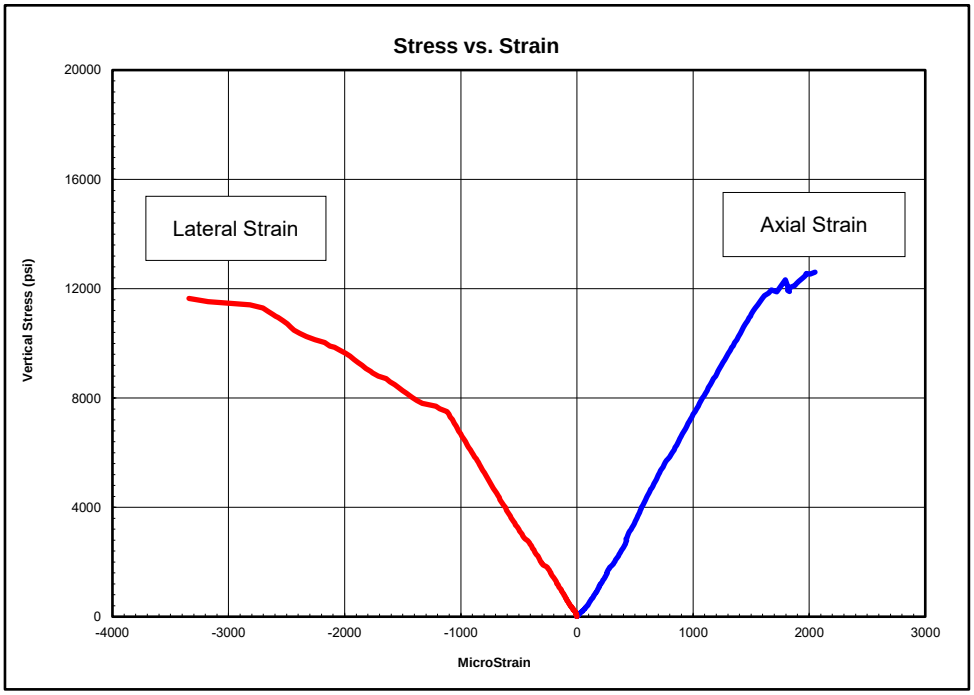
Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	7/1/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-071
Sample ID:	C-2
Depth, ft:	33.07-33.44

After cutting and grinding

After break

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/30/2025
Tested By:	gp
Checked By:	jsc
Boring ID:	LB-R-075
Sample ID:	C-2
Depth, ft:	29-29.75
Sample Type:	rock core
Sample Description:	See photographs Intact material failure Best Effort end preparation performed

Compressive Strength and Elastic Moduli of Rock by ASTM D7012 - Method D



Peak Compressive Stress: 12,607 psi

The strain values recorded for this test produce values of Poisson's Ratio that exceed maximum values found in rocks.

Stress Range, psi	Young's Modulus, psi	Poisson's Ratio
1300-4600	8,080,000	---
4600-8000	7,430,000	---
8000-11300	7,310,000	---

Notes:
Test specimen tested at the approximate as-received moisture content and at standard laboratory temperature.
The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.
Young's Modulus and Poisson's Ratio calculated using the tangent to the line in the stress range listed.
Calculations assume samples are isotropic, which is not necessarily the case.

Client:	Langan Engineering	Test Date:	6/19/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-075		
Sample ID:	C-2		
Depth (ft):	29-29.75		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.27	4.27	4.27
Specimen Diameter, in:	1.98	1.98	1.98
Specimen Mass, g:	608.81		
Bulk Density, lb/ft^3	176	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

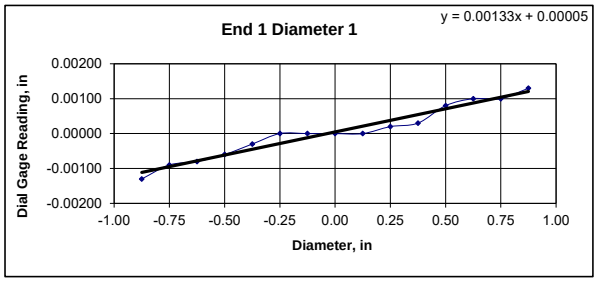
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00130	-0.00090	-0.00080	-0.00060	-0.00030	0.00000	0.00000	0.00000	0.00000	0.00020	0.00030	0.00080	0.00100	0.00100	0.00130
Diameter 2, in (rotated 90°)	-0.00170	-0.00160	-0.00160	-0.00120	-0.00100	-0.00070	-0.00020	0.00000	0.00010	0.00060	0.00080	0.00090	0.00120	0.00120	0.00120

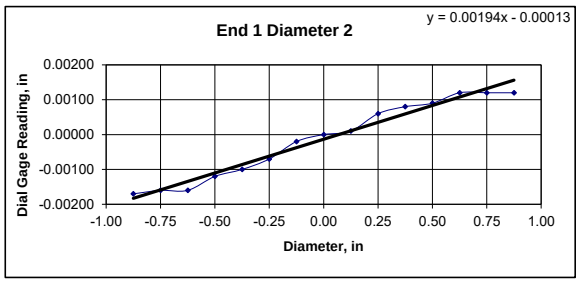
Difference between max and min readings, in:
0° = 0.00260 90° = 0.00290

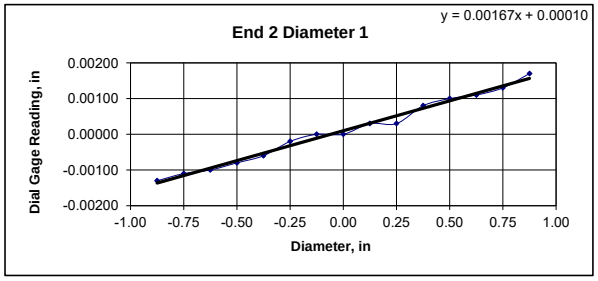
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00130	-0.00110	-0.00100	-0.00080	-0.00060	-0.00020	0.00000	0.00000	0.00030	0.00030	0.00080	0.00100	0.00110	0.00130	0.00170
Diameter 2, in (rotated 90°)	0.00140	0.00110	0.00130	0.00100	0.00060	0.00040	0.00020	0.00000	-0.00010	-0.00030	-0.00060	-0.00100	-0.00100	-0.00120	-0.00140

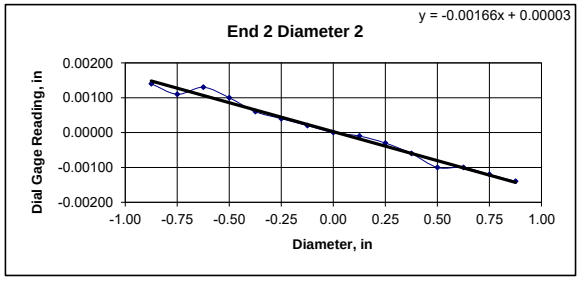
Difference between max and min readings, in:
0° = 0.003 90° = 0.0028

Maximum difference must be < 0.0020 in. Difference = ± 0.00150
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00133
Angle of Best Fit Line: 0.07596

End 2:
Slope of Best Fit Line 0.00167
Angle of Best Fit Line: 0.09593

Maximum Angular Difference: 0.01997

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00194
Angle of Best Fit Line: 0.11099

End 2:
Slope of Best Fit Line 0.00166
Angle of Best Fit Line: 0.09527

Maximum Angular Difference: 0.01572

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00260	1.980	0.00131	0.075	YES
Diameter 2, in (rotated 90°)	0.00290	1.980	0.00146	0.084	YES
END 2					
Diameter 1, in	0.00300	1.980	0.00152	0.087	YES
Diameter 2, in (rotated 90°)	0.00280	1.980	0.00141	0.081	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/19/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-075	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	C-2		
Depth (ft):	29-29.75		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

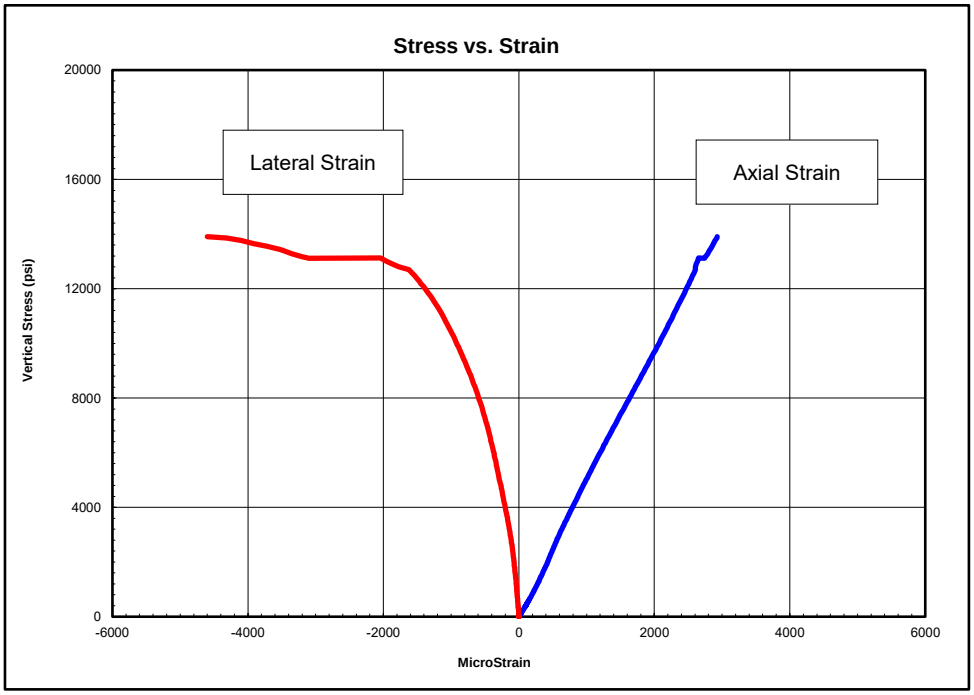
Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/30/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-075
Sample ID:	C-2
Depth, ft:	29-29.75

After cutting and grinding

After break

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/20/2025
Tested By:	gp
Checked By:	jsc
Boring ID:	LB-R-082
Sample ID:	---
Depth, ft:	36.02-36.40
Sample Type:	rock core
Sample Description:	See photographs Intact material failure Best Effort end preparation performed

Compressive Strength and Elastic Moduli of Rock by ASTM D7012 - Method D



Peak Compressive Stress: 13,903 psi

The strain values recorded within the second and third stress ranges for this test produce values of Poisson's Ratio that exceed maximum values found in rocks.

Stress Range, psi	Young's Modulus, psi	Poisson's Ratio
1400-5100	5,380,000	0.35
5100-8800	4,650,000	---
8800-12500	4,830,000	---

Notes:
Test specimen tested at the approximate as-received moisture content and at standard laboratory temperature.
The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.
Young's Modulus and Poisson's Ratio calculated using the tangent to the line in the stress range listed.
Calculations assume samples are isotropic, which is not necessarily the case.

Client:	Langan Engineering	Test Date:	6/17/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-082		
Sample ID:	---		
Depth (ft):	36.02-36.40		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.30	4.30	4.30
Specimen Diameter, in:	1.96	1.96	1.96
Specimen Mass, g:	594.03		
Bulk Density, lb/ft^3	174	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

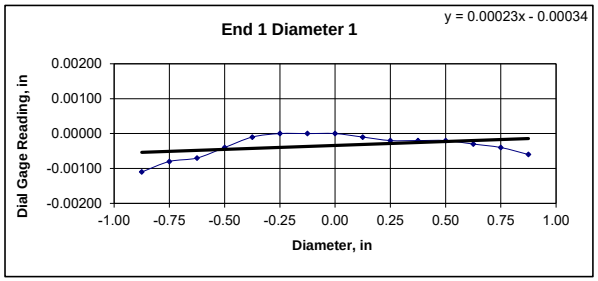
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00110	-0.00080	-0.00070	-0.00040	-0.00010	0.00000	0.00000	0.00000	-0.00010	-0.00020	-0.00020	-0.00020	-0.00030	-0.00040	-0.00060
Diameter 2, in (rotated 90°)	-0.00200	-0.00150	-0.00140	-0.00100	-0.00080	-0.00030	-0.00010	0.00000	0.00020	0.00040	0.00050	0.00100	0.00130	0.00140	0.00150

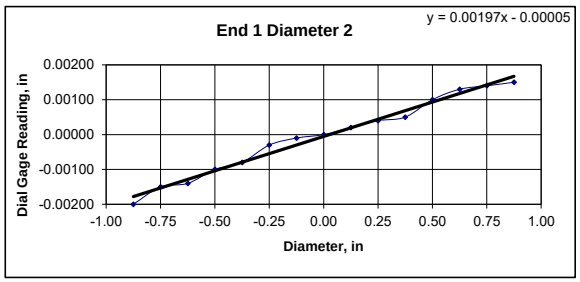
Difference between max and min readings, in:
0° = 0.00110 90° = 0.00350

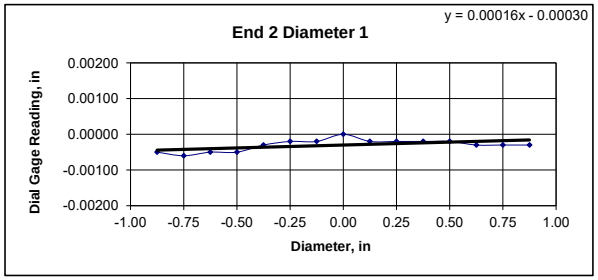
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00050	-0.00060	-0.00050	-0.00050	-0.00030	-0.00020	-0.00020	0.00000	-0.00020	-0.00020	-0.00020	-0.00020	-0.00030	-0.00030	-0.00030
Diameter 2, in (rotated 90°)	0.00190	0.00180	0.00170	0.00160	0.00130	0.00100	0.00030	0.00000	-0.00010	-0.00070	-0.00100	-0.00120	-0.00150	-0.00170	-0.00200

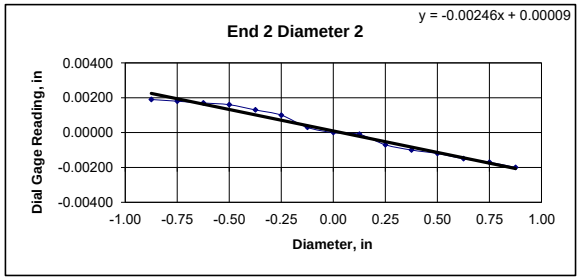
Difference between max and min readings, in:
0° = 0.0006 90° = 0.0039

Maximum difference must be < 0.0020 in. Difference = ± 0.00195
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00023
Angle of Best Fit Line: 0.01293

End 2:
Slope of Best Fit Line 0.00016
Angle of Best Fit Line: 0.00933

Maximum Angular Difference: 0.00360

Parallelism Tolerance Met? YES
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00197
Angle of Best Fit Line: 0.11295

End 2:
Slope of Best Fit Line 0.00246
Angle of Best Fit Line: 0.14111

Maximum Angular Difference: 0.02816

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00110	1.960	0.00056	0.032	YES
Diameter 2, in (rotated 90°)	0.00350	1.960	0.00179	0.102	YES
END 2					
Diameter 1, in	0.00060	1.960	0.00031	0.018	YES
Diameter 2, in (rotated 90°)	0.00390	1.960	0.00199	0.114	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/17/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-082	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	36.02-36.40		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

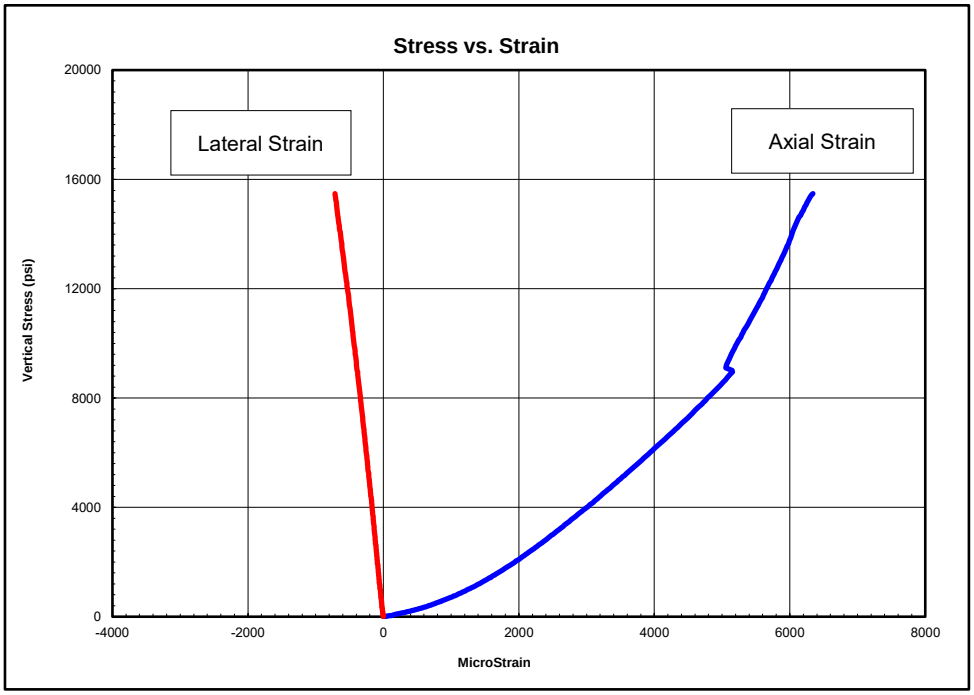
Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/20/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-082
Sample ID:	---
Depth, ft:	36.02-36.40

After cutting and grinding

After break

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	7/1/2025
Tested By:	gp
Checked By:	jsc
Boring ID:	LB-R-084
Sample ID:	C-2
Depth, ft:	25.7-26.5
Sample Type:	rock core
Sample Description:	See photographs Intact material failure Best Effort end preparation performed

Compressive Strength and Elastic Moduli of Rock by ASTM D7012 - Method D



Peak Compressive Stress: 15,480 psi

Stress Range, psi	Young's Modulus, psi	Poisson's Ratio
1500-5700	1,930,000	0.08
5700-9800	2,660,000	0.12
9800-13900	4,780,000	0.24

Notes:
Test specimen tested at the approximate as-received moisture content and at standard laboratory temperature.
The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.
Young's Modulus and Poisson's Ratio calculated using the tangent to the line in the stress range listed.
Calculations assume samples are isotropic, which is not necessarily the case.

Client:	Langan Engineering	Test Date:	6/16/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-084		
Sample ID:	C-2		
Depth (ft):	25.7-26.5		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.22	4.22	4.22
Specimen Diameter, in:	1.98	1.98	1.98
Specimen Mass, g:	574.87		
Bulk Density, lb/ft^3	168	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.1	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

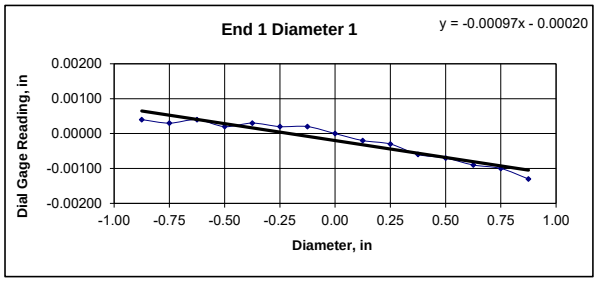
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00040	0.00030	0.00040	0.00020	0.00030	0.00020	0.00020	0.00000	-0.00020	-0.00030	-0.00060	-0.00070	-0.00090	-0.00100	-0.00130
Diameter 2, in (rotated 90°)	0.00180	0.00160	0.00150	0.00110	0.00100	0.00060	0.00020	0.00000	-0.00040	-0.00060	-0.00110	-0.00120	-0.00150	-0.00200	-0.00200

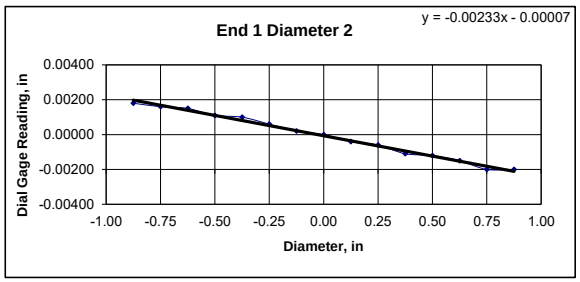
Difference between max and min readings, in:
0° = 0.00170 90° = 0.00380

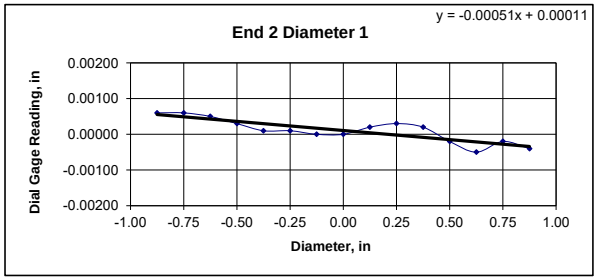
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00060	0.00060	0.00050	0.00030	0.00010	0.00010	0.00000	0.00000	0.00020	0.00030	0.00020	-0.00020	-0.00050	-0.00020	-0.00040
Diameter 2, in (rotated 90°)	-0.00190	-0.00150	-0.00110	-0.00090	-0.00070	-0.00030	-0.00020	0.00000	0.00010	0.00040	0.00100	0.00110	0.00150	0.00170	0.00170

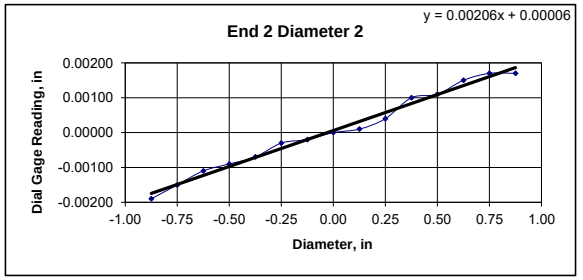
Difference between max and min readings, in:
0° = 0.0011 90° = 0.0036

Maximum difference must be < 0.0020 in. Difference = ± 0.00190
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00097
Angle of Best Fit Line: 0.05550

End 2:
Slope of Best Fit Line 0.00051
Angle of Best Fit Line: 0.02930

Maximum Angular Difference: 0.02619

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00233
Angle of Best Fit Line: 0.13374

End 2:
Slope of Best Fit Line 0.00206
Angle of Best Fit Line: 0.11819

Maximum Angular Difference: 0.01555

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00170	1.980	0.00086	0.049	YES
Diameter 2, in (rotated 90°)	0.00380	1.980	0.00192	0.110	YES
END 2					
Diameter 1, in	0.00110	1.980	0.00056	0.032	YES
Diameter 2, in (rotated 90°)	0.00360	1.980	0.00182	0.104	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/16/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-084	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	C-2		
Depth (ft):	25.7-26.5		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

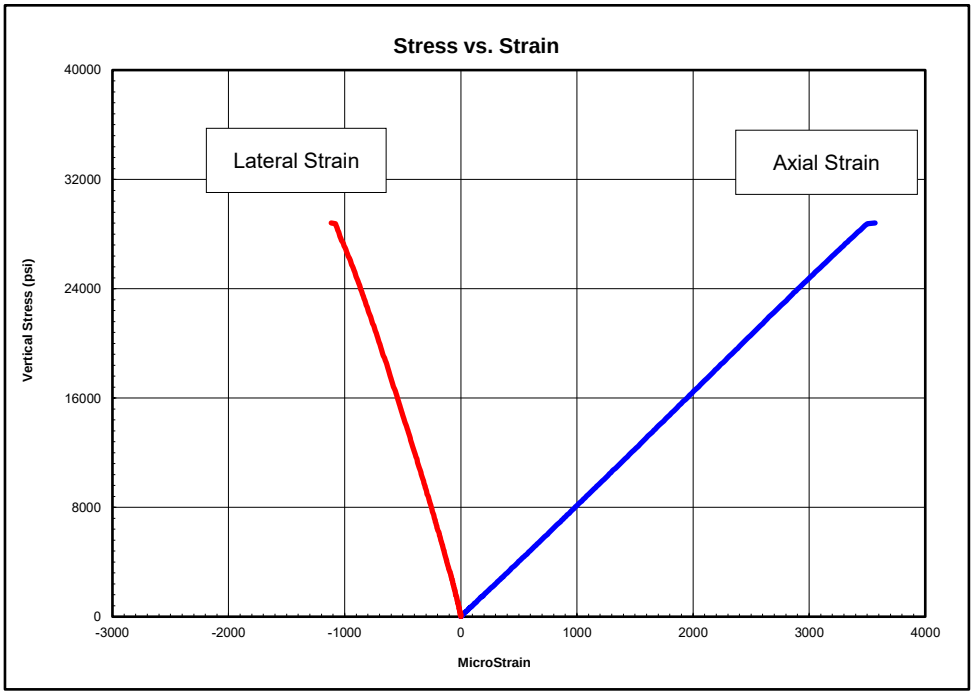
Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	7/1/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-084
Sample ID:	C-2
Depth, ft:	25.7-26.5

After cutting and grinding

After break

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/20/2025
Tested By:	gp
Checked By:	jsc
Boring ID:	LB-R-096
Sample ID:	---
Depth, ft:	50.54-50.93
Sample Type:	rock core
Sample Description:	See photographs Intact material failure Best Effort end preparation performed

Compressive Strength and Elastic Moduli of Rock by ASTM D7012 - Method D



Peak Compressive Stress: 29,099 psi

Stress Range, psi	Young's Modulus, psi	Poisson's Ratio
2900-10700	8,190,000	0.28
10700-18400	8,350,000	0.31
18400-26200	8,290,000	0.34

Notes:
Test specimen tested at the approximate as-received moisture content and at standard laboratory temperature.
The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.
Young's Modulus and Poisson's Ratio calculated using the tangent to the line in the stress range listed.
Calculations assume samples are isotropic, which is not necessarily the case.

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Client:	Langan Engineering	Test Date:	6/17/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-096		
Sample ID:	---		
Depth (ft):	50.54-50.93		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.31	4.31	4.31
Specimen Diameter, in:	1.98	1.98	1.98
Specimen Mass, g:	608.39		
Bulk Density, lb/ft^3	174	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? NO

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? NO

END FLATNESS AND PARALLELISM (Procedure FP1)

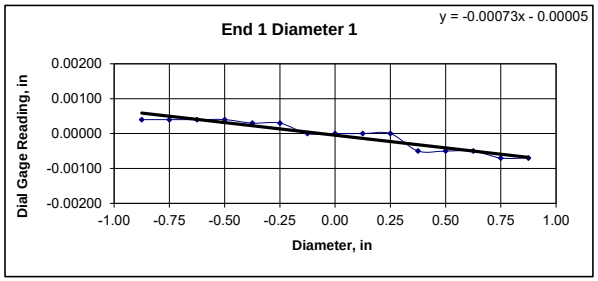
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00040	0.00040	0.00040	0.00040	0.00030	0.00030	0.00000	0.00000	0.00000	0.00000	-0.00050	-0.00050	-0.00050	-0.00070	-0.00070
Diameter 2, in (rotated 90°)	0.00180	0.00150	0.00110	0.00110	0.00080	0.00030	0.00000	0.00000	-0.00030	-0.00050	-0.00090	-0.00130	-0.00150	-0.00180	-0.00200

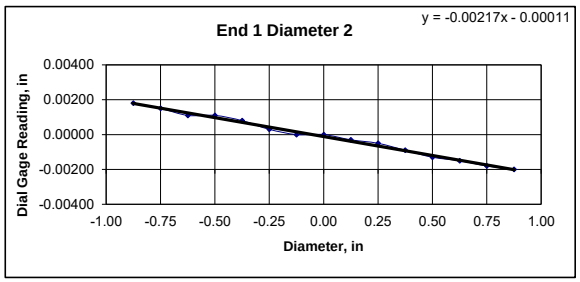
Difference between max and min readings, in:
0° = 0.00110 90° = 0.00380

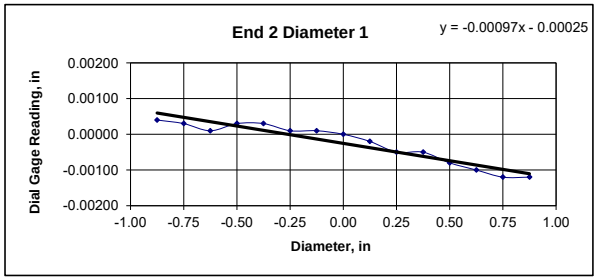
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00040	0.00030	0.00010	0.00030	0.00030	0.00010	0.00010	0.00000	-0.00020	-0.00050	-0.00050	-0.00080	-0.00100	-0.00120	-0.00120
Diameter 2, in (rotated 90°)	-0.00170	-0.00140	-0.00120	-0.00120	-0.00050	-0.00050	0.00000	0.00000	0.00030	0.00050	0.00110	0.00120	0.00170	0.00190	0.00190

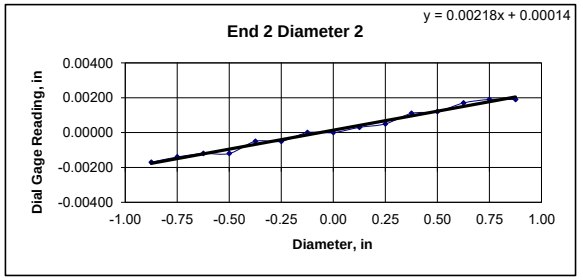
Difference between max and min readings, in:
0° = 0.0016 90° = 0.0036

Maximum difference must be < 0.0020 in. Difference = ± 0.00190
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00073
Angle of Best Fit Line: 0.04158

End 2:
Slope of Best Fit Line 0.00097
Angle of Best Fit Line: 0.05566

Maximum Angular Difference: 0.01408

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00217
Angle of Best Fit Line: 0.12441

End 2:
Slope of Best Fit Line 0.00218
Angle of Best Fit Line: 0.12474

Maximum Angular Difference: 0.00033

Parallelism Tolerance Met? YES
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00110	1.980	0.00056	0.032	YES
Diameter 2, in (rotated 90°)	0.00380	1.980	0.00192	0.110	YES
END 2					
Diameter 1, in	0.00160	1.980	0.00081	0.046	YES
Diameter 2, in (rotated 90°)	0.00360	1.980	0.00182	0.104	YES

Maximum angle of departure must be ≤ 0.25°

Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/17/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-096	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	50.54-50.93		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

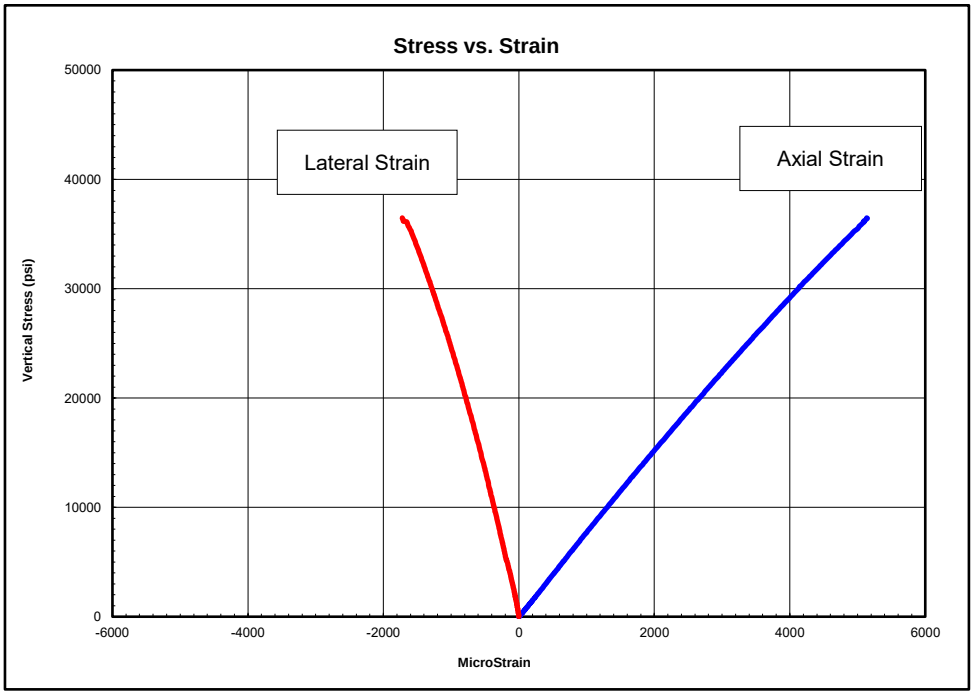
Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/20/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-096
Sample ID:	---
Depth, ft:	50.54-50.93

After cutting and grinding

After break

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	7/1/2025
Tested By:	gp
Checked By:	jsc
Boring ID:	LB-R-106
Sample ID:	C-1
Depth, ft:	51.04-51.41
Sample Type:	rock core
Sample Description:	See photographs Intact material failure Best Effort end preparation performed

Compressive Strength and Elastic Moduli of Rock by ASTM D7012 - Method D



Peak Compressive Stress: 36,479 psi

Stress Range, psi	Young's Modulus, psi	Poisson's Ratio
3600-13400	7,640,000	0.30
13400-23100	7,190,000	0.32
23100-32800	6,680,000	0.35

Notes:
Test specimen tested at the approximate as-received moisture content and at standard laboratory temperature.
The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.
Young's Modulus and Poisson's Ratio calculated using the tangent to the line in the stress range listed.
Calculations assume samples are isotropic, which is not necessarily the case.

Client:	Langan Engineering	Test Date:	6/13/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-106		
Sample ID:	C-1		
Depth (ft):	51.04-51.41		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.18	4.18	4.18
Specimen Diameter, in:	1.98	1.98	1.98
Specimen Mass, g:	581.91		
Bulk Density, lb/ft^3	172	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.1	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

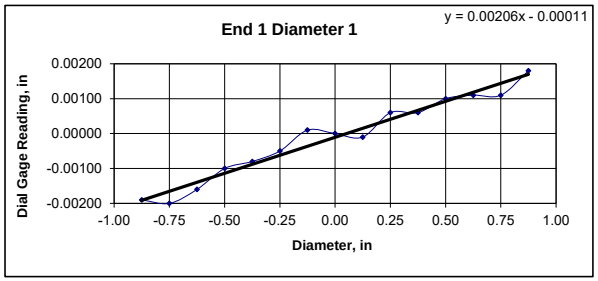
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00190	-0.00200	-0.00160	-0.00100	-0.00080	-0.00050	0.00010	0.00000	-0.00010	0.00060	0.00060	0.00100	0.00110	0.00110	0.00180
Diameter 2, in (rotated 90°)	0.00130	0.00120	0.00120	0.00090	0.00090	0.00050	0.00030	0.00000	0.00010	0.00010	-0.00010	-0.00030	-0.00050	-0.00050	-0.00080

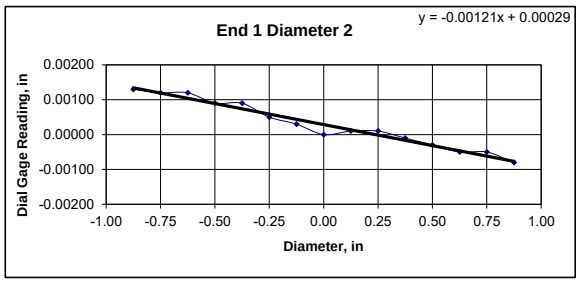
Difference between max and min readings, in:
0° = 0.00380 90° = 0.00210

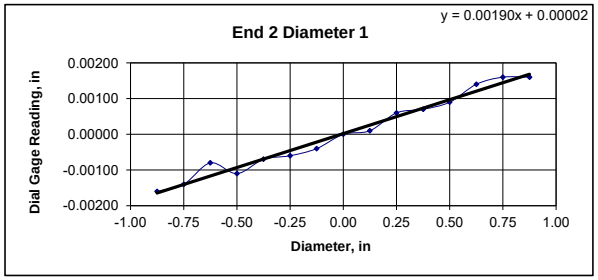
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00160	-0.00140	-0.00080	-0.00110	-0.00070	-0.00060	-0.00040	0.00000	0.00010	0.00060	0.00070	0.00090	0.00140	0.00160	0.00160
Diameter 2, in (rotated 90°)	-0.00160	-0.00150	-0.00120	-0.00070	-0.00060	-0.00050	-0.00030	0.00000	0.00010	0.00020	0.00050	0.00070	0.00090	0.00090	0.00100

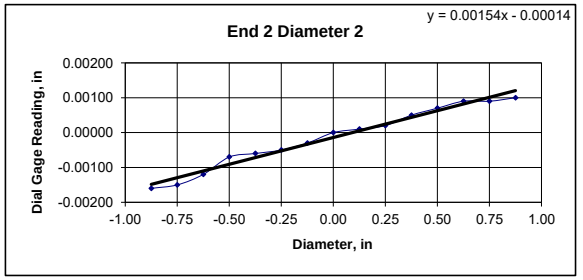
Difference between max and min readings, in:
0° = 0.0032 90° = 0.0026

Maximum difference must be < 0.0020 in. Difference = ± 0.00190
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00206
Angle of Best Fit Line: 0.11819

End 2:
Slope of Best Fit Line 0.00190
Angle of Best Fit Line: 0.10886

Maximum Angular Difference: 0.00933

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00121
Angle of Best Fit Line: 0.06908

End 2:
Slope of Best Fit Line 0.00154
Angle of Best Fit Line: 0.08807

Maximum Angular Difference: 0.01899

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00380	1.980	0.00192	0.110	YES
Diameter 2, in (rotated 90°)	0.00210	1.980	0.00106	0.061	YES
END 2					
Diameter 1, in	0.00320	1.980	0.00162	0.093	YES
Diameter 2, in (rotated 90°)	0.00260	1.980	0.00131	0.075	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

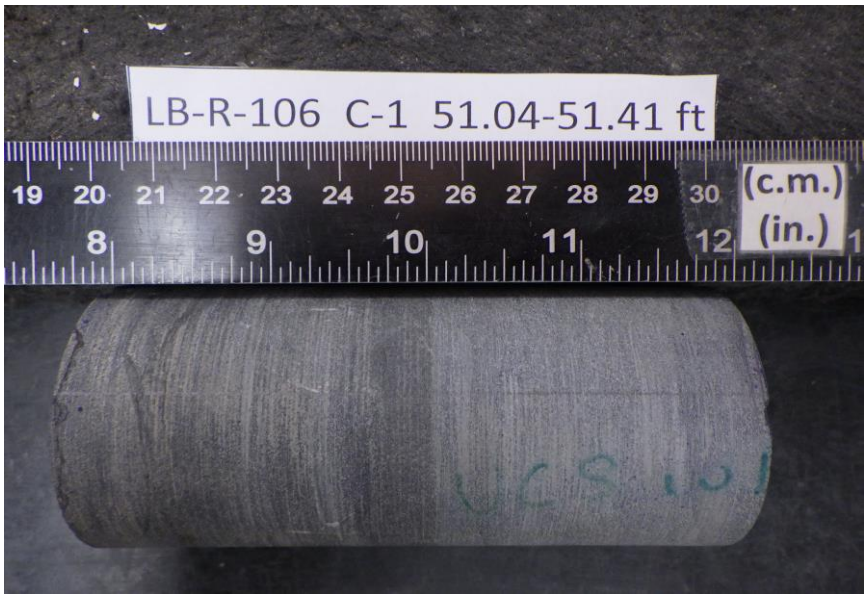
Client:	Langan Engineering	Test Date:	6/13/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-106	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	C-1		
Depth (ft):	51.04-51.41		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	7/1/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-106
Sample ID:	C-1
Depth, ft:	51.04-51.41

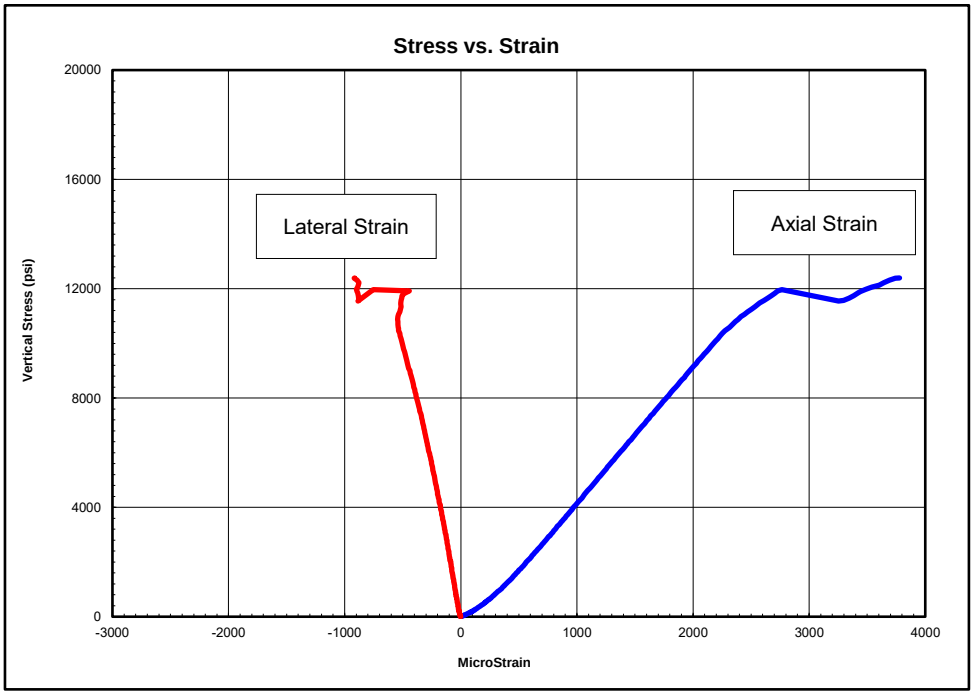


After cutting and grinding

After break

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/30/2025
Tested By:	gp
Checked By:	jsc
Boring ID:	LB-R-107
Sample ID:	C-1
Depth, ft:	39-39.75
Sample Type:	rock core
Sample Description:	See photographs Intact material failure Best Effort end preparation performed

Compressive Strength and Elastic Moduli of Rock by ASTM D7012 - Method D



Peak Compressive Stress: 12,394 psi

Stress Range, psi	Young's Modulus, psi	Poisson's Ratio
1200-4500	4,860,000	0.21
4500-7900	5,020,000	0.26
7900-11200	4,710,000	0.28

Notes:
Test specimen tested at the approximate as-received moisture content and at standard laboratory temperature.
The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.
Young's Modulus and Poisson's Ratio calculated using the tangent to the line in the stress range listed.
Calculations assume samples are isotropic, which is not necessarily the case.

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Client:	Langan Engineering	Test Date:	6/16/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-107		
Sample ID:	C-1		
Depth (ft):	39-39.75		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.29	4.29	4.29
Specimen Diameter, in:	1.97	1.97	1.97
Specimen Mass, g:	591.98		
Bulk Density, lb/ft^3	172	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? NO

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? NO

END FLATNESS AND PARALLELISM (Procedure FP1)

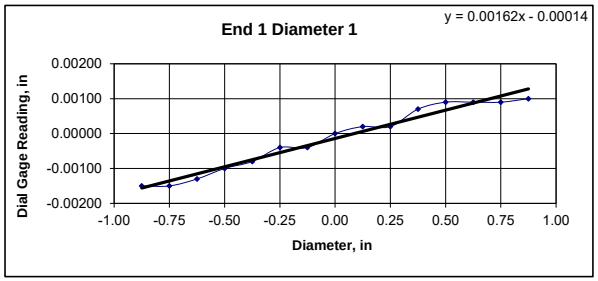
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00150	-0.00150	-0.00130	-0.00100	-0.00080	-0.00040	-0.00040	0.00000	0.00020	0.00020	0.00070	0.00090	0.00090	0.00090	0.00100
Diameter 2, in (rotated 90°)	-0.00040	-0.00030	-0.00030	-0.00010	-0.00010	-0.00020	-0.00010	0.00000	0.00020	0.00030	0.00010	0.00010	0.00020	0.00020	0.00020

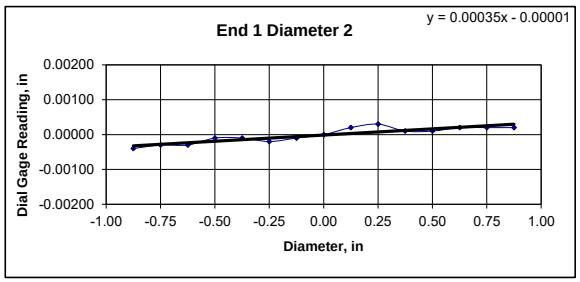
Difference between max and min readings, in:
0° = 0.00250 90° = 0.00070

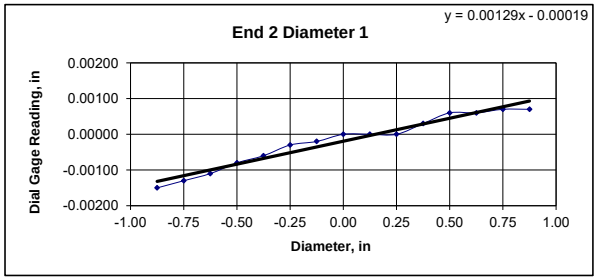
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00150	-0.00130	-0.00110	-0.00080	-0.00060	-0.00030	-0.00020	0.00000	0.00000	0.00000	0.00030	0.00060	0.00060	0.00070	0.00070
Diameter 2, in (rotated 90°)	0.00010	0.00010	0.00000	0.00000	-0.00010	-0.00010	0.00010	0.00000	-0.00010	-0.00010	-0.00030	-0.00050	-0.00050	-0.00050	-0.00060

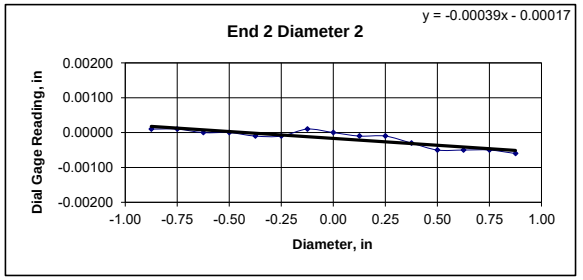
Difference between max and min readings, in:
0° = 0.0022 90° = 0.0007

Maximum difference must be < 0.0020 in. Difference = ± 0.00125
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00162
Angle of Best Fit Line: 0.09298

End 2:
Slope of Best Fit Line 0.00129
Angle of Best Fit Line: 0.07367

Maximum Angular Difference: 0.01932

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00035
Angle of Best Fit Line: 0.02030

End 2:
Slope of Best Fit Line 0.00039
Angle of Best Fit Line: 0.02259

Maximum Angular Difference: 0.00229

Parallelism Tolerance Met? YES
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00250	1.970	0.00127	0.073	YES
Diameter 2, in (rotated 90°)	0.00070	1.970	0.00036	0.020	YES
END 2					
Diameter 1, in	0.00220	1.970	0.00112	0.064	YES
Diameter 2, in (rotated 90°)	0.00070	1.970	0.00036	0.020	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/16/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-107	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	C-1		
Depth (ft):	39-39.75		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS

END 1

Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

END 2

Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

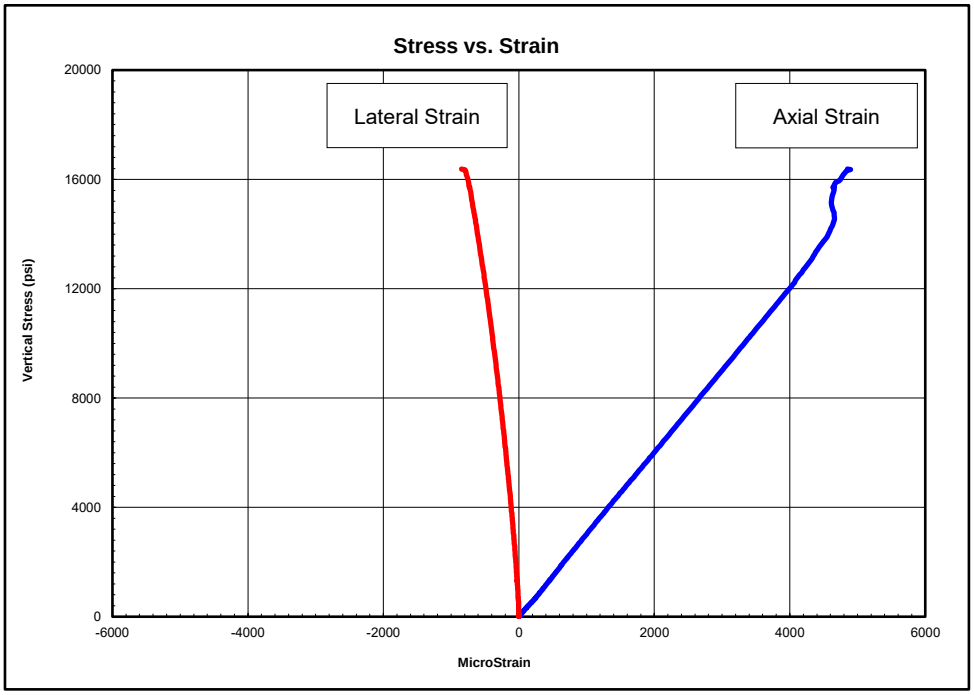
Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/30/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-107
Sample ID:	C-1
Depth, ft:	39-39.75

After cutting and grinding

After break

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	7/1/2025
Tested By:	gp
Checked By:	jsc
Boring ID:	LB-R-110
Sample ID:	C-2
Depth, ft:	21.54-21.91
Sample Type:	rock core
Sample Description:	See photographs Intact material failure Best Effort end preparation performed

Compressive Strength and Elastic Moduli of Rock by ASTM D7012 - Method D



Peak Compressive Stress: 16,379 psi

Stress Range, psi	Young's Modulus, psi	Poisson's Ratio
1600-6000	3,020,000	0.11
6000-10400	3,000,000	0.14
10400-14700	3,360,000	0.20

Notes:
Test specimen tested at the approximate as-received moisture content and at standard laboratory temperature.
The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.
Young's Modulus and Poisson's Ratio calculated using the tangent to the line in the stress range listed.
Calculations assume samples are isotropic, which is not necessarily the case.

Client:	Langan Engineering	Test Date:	6/12/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-110		
Sample ID:	C-2		
Depth (ft):	21.54-21.91		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.30	4.30	4.30
Specimen Diameter, in:	1.98	1.98	1.98
Specimen Mass, g:	605.88		
Bulk Density, lb/ft^3	174	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

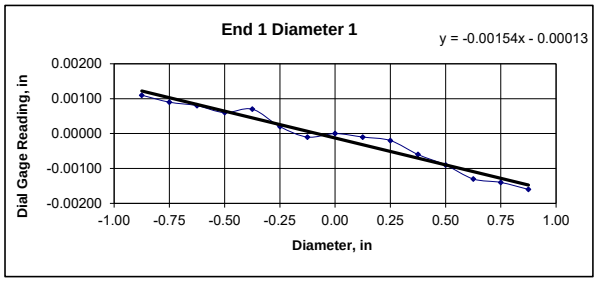
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00110	0.00090	0.00080	0.00060	0.00070	0.00020	-0.00010	0.00000	-0.00010	-0.00020	-0.00060	-0.00090	-0.00130	-0.00140	-0.00160
Diameter 2, in (rotated 90°)	-0.00180	-0.00140	-0.00130	-0.00090	-0.00050	0.00000	-0.00010	0.00000	0.00030	0.00030	0.00060	0.00090	0.00110	0.00150	0.00170

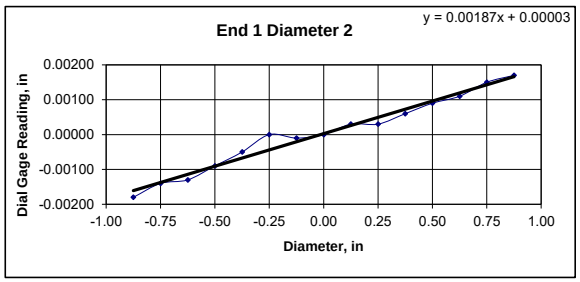
Difference between max and min readings, in:
0° = 0.00270 90° = 0.00350

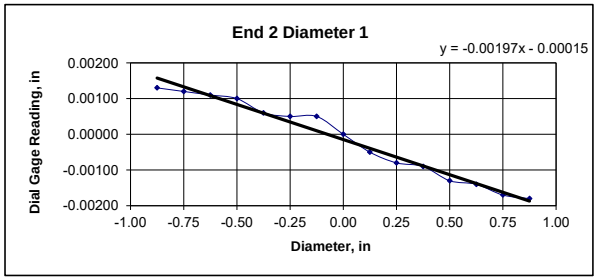
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00130	0.00120	0.00110	0.00100	0.00060	0.00050	0.00050	0.00000	-0.00050	-0.00080	-0.00090	-0.00130	-0.00140	-0.00170	-0.00180
Diameter 2, in (rotated 90°)	0.00170	0.00110	0.00110	0.00100	0.00080	0.00030	0.00010	0.00000	-0.00010	-0.00040	-0.00060	-0.00090	-0.00110	-0.00150	-0.00180

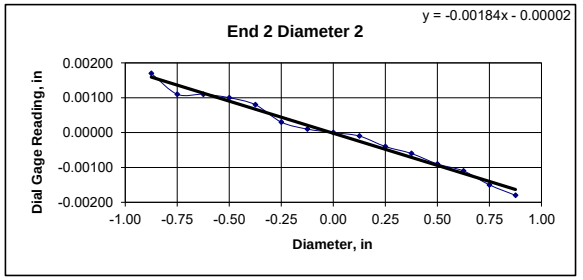
Difference between max and min readings, in:
0° = 0.0031 90° = 0.0035

Maximum difference must be < 0.0020 in. Difference = ± 0.00175
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00154
Angle of Best Fit Line: 0.08824

End 2:
Slope of Best Fit Line 0.00197
Angle of Best Fit Line: 0.11279

Maximum Angular Difference: 0.02456

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00187
Angle of Best Fit Line: 0.10706

End 2:
Slope of Best Fit Line 0.00184
Angle of Best Fit Line: 0.10559

Maximum Angular Difference: 0.00147

Parallelism Tolerance Met? YES
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00270	1.980	0.00136	0.078	YES
Diameter 2, in (rotated 90°)	0.00350	1.980	0.00177	0.101	YES
END 2					
Diameter 1, in	0.00310	1.980	0.00157	0.090	YES
Diameter 2, in (rotated 90°)	0.00350	1.980	0.00177	0.101	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/12/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-110	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	C-2		
Depth (ft):	21.54-21.91		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	7/1/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-110
Sample ID:	C-2
Depth, ft:	21.54-21.91

After cutting and grinding

After break

GeoTesting EXPRESS
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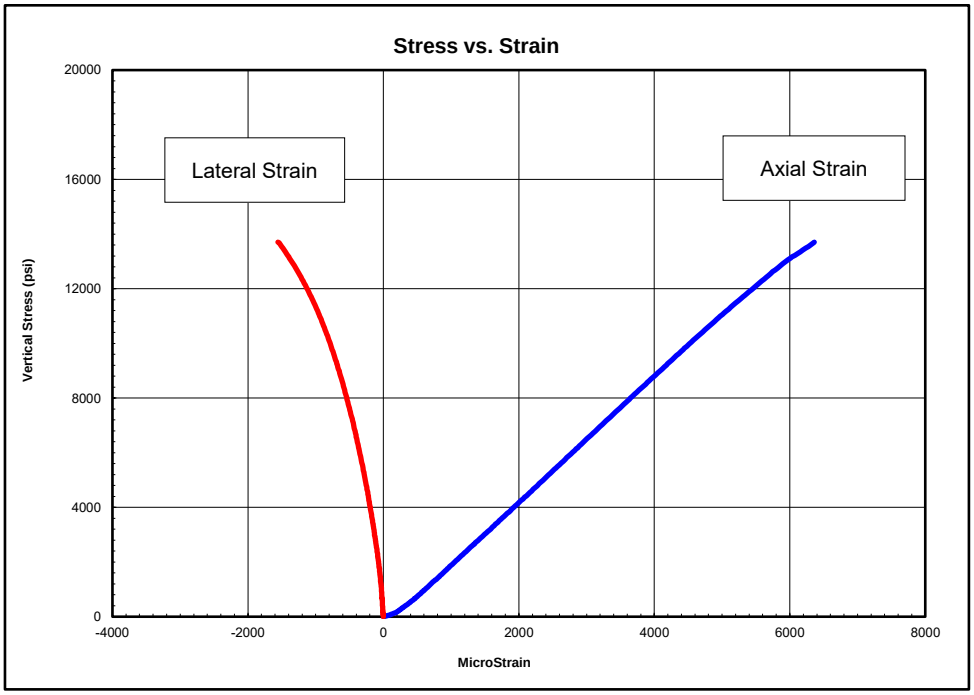
Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	7/1/2025
Tested By:	gp
Checked By:	jsc
Boring ID:	LB-R-111
Sample ID:	C-1
Depth, ft:	18.5-19.5
Sample Type:	rock core
Sample Description:	See photographs Intact material failure Best Effort end preparation performed

Compressive Strength and Elastic Moduli of Rock by ASTM D7012 - Method D



Peak Compressive Stress: 13,703 psi

Stress Range, psi	Young's Modulus, psi	Poisson's Ratio
1400-5000	2,300,000	0.14
5000-8700	2,320,000	0.22
8700-12300	2,200,000	0.34

Notes:
Test specimen tested at the approximate as-received moisture content and at standard laboratory temperature.
The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.
Young's Modulus and Poisson's Ratio calculated using the tangent to the line in the stress range listed.
Calculations assume samples are isotropic, which is not necessarily the case.

Client:	Langan Engineering	Test Date:	6/12/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-111		
Sample ID:	C-1		
Depth (ft):	18.5-19.5		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.30	4.30	4.30
Specimen Diameter, in:	1.96	1.96	1.96
Specimen Mass, g:	583.07		
Bulk Density, lb/ft^3	171	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

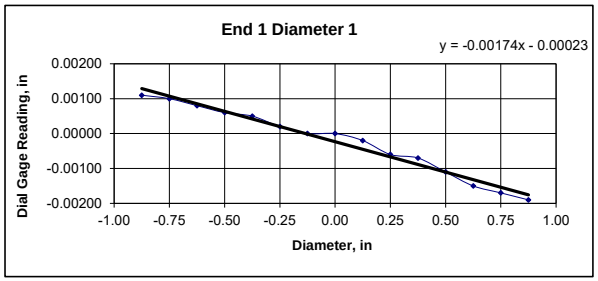
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00110	0.00100	0.00080	0.00060	0.00050	0.00020	0.00000	0.00000	-0.00020	-0.00060	-0.00070	-0.00110	-0.00150	-0.00170	-0.00190
Diameter 2, in (rotated 90°)	0.00060	0.00060	0.00050	0.00020	0.00020	0.00010	0.00000	0.00000	-0.00020	-0.00040	-0.00070	-0.00100	-0.00130	-0.00110	-0.00120

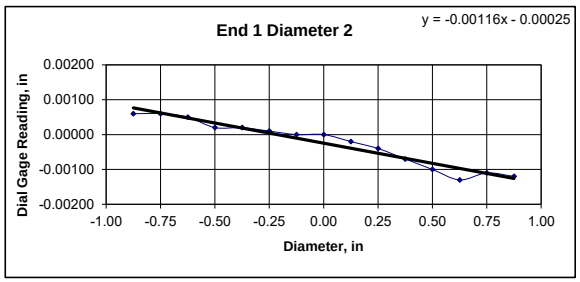
Difference between max and min readings, in:
0° = 0.00300 90° = 0.00190

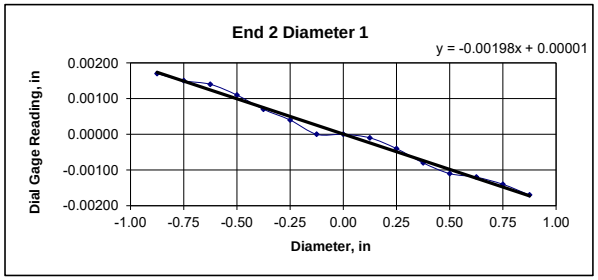
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00170	0.00150	0.00140	0.00110	0.00070	0.00040	0.00000	0.00000	-0.00010	-0.00040	-0.00080	-0.00110	-0.00120	-0.00140	-0.00170
Diameter 2, in (rotated 90°)	-0.00100	-0.00090	-0.00090	-0.00070	-0.00070	-0.00070	-0.00020	0.00000	-0.00010	-0.00010	0.00010	0.00010	0.00050	0.00070	0.00090

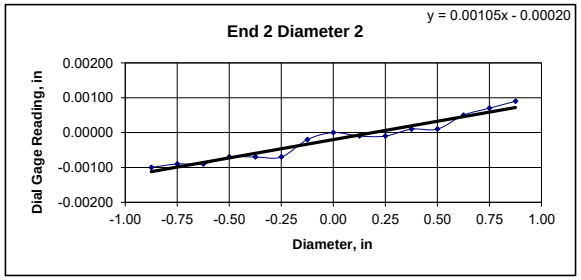
Difference between max and min readings, in:
0° = 0.0034 90° = 0.0019

Maximum difference must be < 0.0020 in. Difference = ± 0.00170
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00174
Angle of Best Fit Line: 0.09969

End 2:
Slope of Best Fit Line 0.00198
Angle of Best Fit Line: 0.11328

Maximum Angular Difference: 0.01359

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00116
Angle of Best Fit Line: 0.06630

End 2:
Slope of Best Fit Line 0.00105
Angle of Best Fit Line: 0.06024

Maximum Angular Difference: 0.00606

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00300	1.960	0.00153	0.088	YES
Diameter 2, in (rotated 90°)	0.00190	1.960	0.00097	0.056	YES
END 2					
Diameter 1, in	0.00340	1.960	0.00173	0.099	YES
Diameter 2, in (rotated 90°)	0.00190	1.960	0.00097	0.056	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/12/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-111	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	C-1		
Depth (ft):	18.5-19.5		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

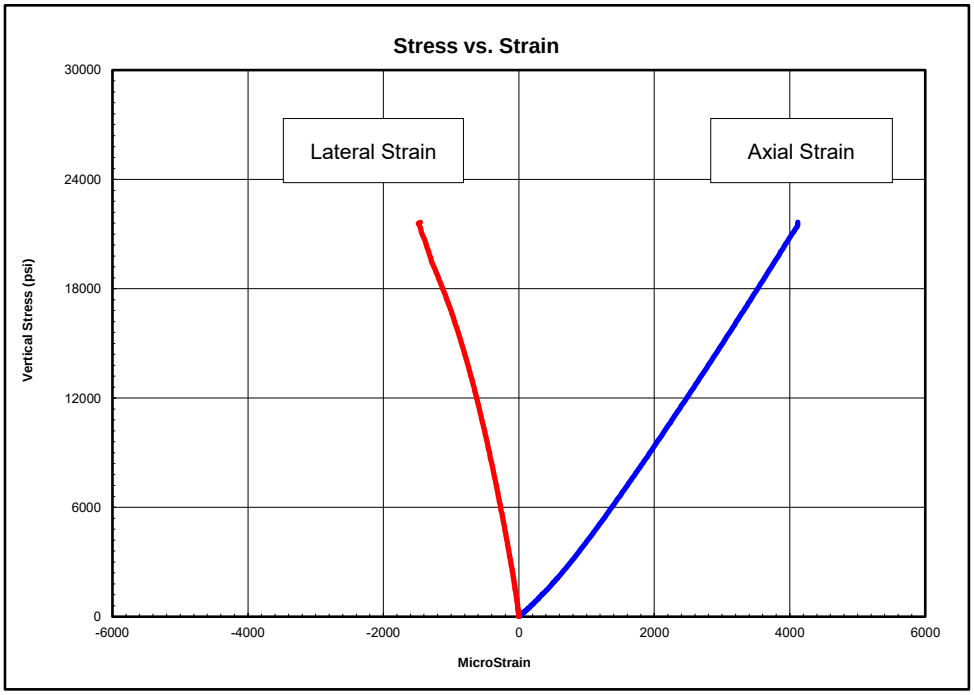
Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	7/1/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-111
Sample ID:	C-1
Depth, ft:	18.5-19.5

After cutting and grinding

After break

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/30/2025
Tested By:	gp
Checked By:	jsc
Boring ID:	LB-R-113
Sample ID:	C-2
Depth, ft:	23.25-24
Sample Type:	rock core
Sample Description:	See photographs Intact material failure Best Effort end preparation performed

Compressive Strength and Elastic Moduli of Rock by ASTM D7012 - Method D



Peak Compressive Stress: 21,651 psi

The strain values recorded within the third stress range for this test produce values of Poisson's Ratio that exceed maximum values found in rocks.

Stress Range, psi	Young's Modulus, psi	Poisson's Ratio
2200-7900	5,000,000	0.25
7900-13700	5,530,000	0.35
13700-19500	5,790,000	---

Notes:
Test specimen tested at the approximate as-received moisture content and at standard laboratory temperature.
The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.
Young's Modulus and Poisson's Ratio calculated using the tangent to the line in the stress range listed.
Calculations assume samples are isotropic, which is not necessarily the case.

Client:	Langan Engineering	Test Date:	6/13/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-113		
Sample ID:	C-2		
Depth (ft):	23.25-24		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.35	4.35	4.35
Specimen Diameter, in:	1.97	1.97	1.97
Specimen Mass, g:	616.25		
Bulk Density, lb/ft^3	177	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

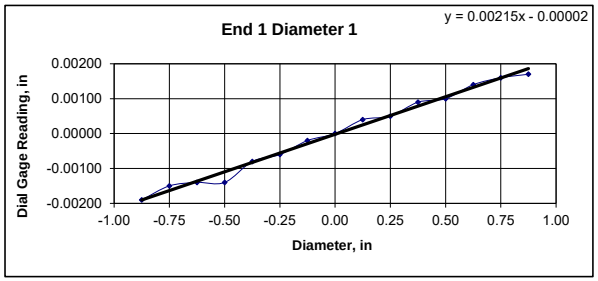
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00190	-0.00150	-0.00140	-0.00140	-0.00080	-0.00060	-0.00020	0.00000	0.00040	0.00050	0.00090	0.00100	0.00140	0.00160	0.00170
Diameter 2, in (rotated 90°)	0.00050	0.00050	0.00040	0.00040	0.00040	0.00040	0.00000	0.00000	-0.00030	-0.00040	-0.00040	-0.00070	-0.00090	-0.00100	-0.00100

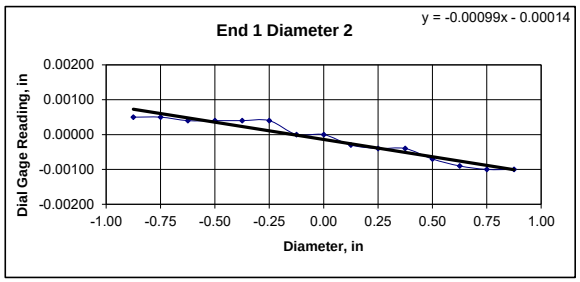
Difference between max and min readings, in:
0° = 0.00360 90° = 0.00150

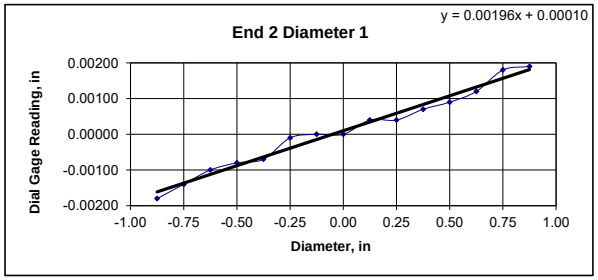
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00180	-0.00140	-0.00100	-0.00080	-0.00070	-0.00010	0.00000	0.00000	0.00040	0.00040	0.00070	0.00090	0.00120	0.00180	0.00190
Diameter 2, in (rotated 90°)	-0.00110	-0.00080	-0.00080	-0.00060	-0.00040	0.00010	-0.00010	0.00000	-0.00010	0.00030	0.00030	0.00030	0.00030	0.00030	0.00060

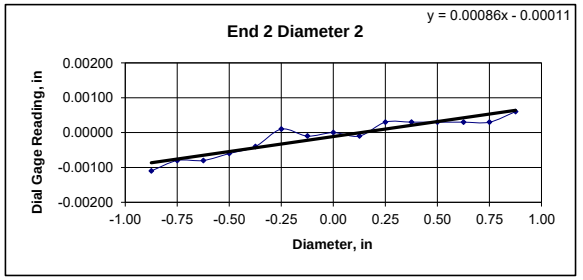
Difference between max and min readings, in:
0° = 0.0037 90° = 0.0017

Maximum difference must be < 0.0020 in. Difference = ± 0.00185
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00215
Angle of Best Fit Line: 0.12327

End 2:
Slope of Best Fit Line 0.00196
Angle of Best Fit Line: 0.11214

Maximum Angular Difference: 0.01113

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00099
Angle of Best Fit Line: 0.05680

End 2:
Slope of Best Fit Line 0.00086
Angle of Best Fit Line: 0.04927

Maximum Angular Difference: 0.00753

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00360	1.970	0.00183	0.105	YES
Diameter 2, in (rotated 90°)	0.00150	1.970	0.00076	0.044	YES
END 2					
Diameter 1, in	0.00370	1.970	0.00188	0.108	YES
Diameter 2, in (rotated 90°)	0.00170	1.970	0.00086	0.049	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/13/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-113	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	C-2		
Depth (ft):	23.25-24		
Visual Description:	See photographs		

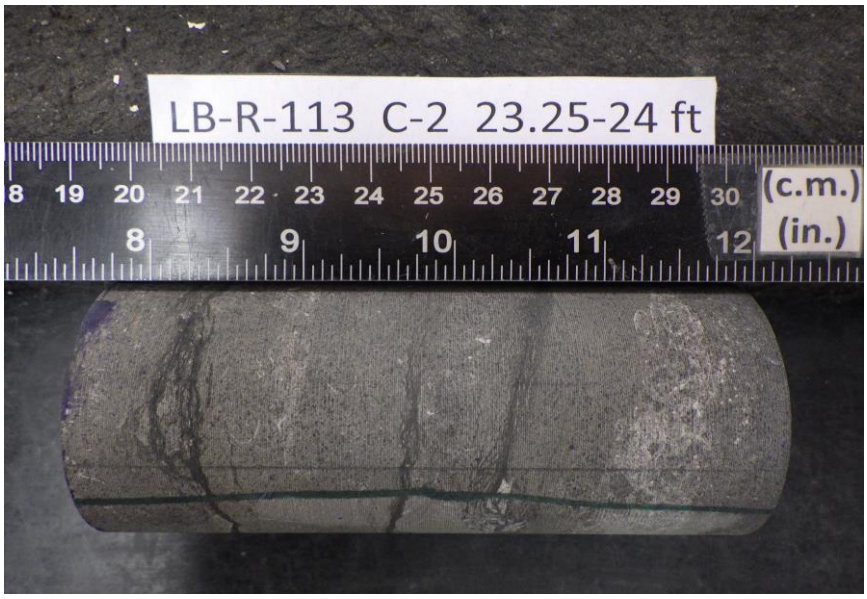
BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS

END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/30/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-113
Sample ID:	C-2
Depth, ft:	23.25-24



After cutting and grinding

After break

GeoTesting EXPRESS
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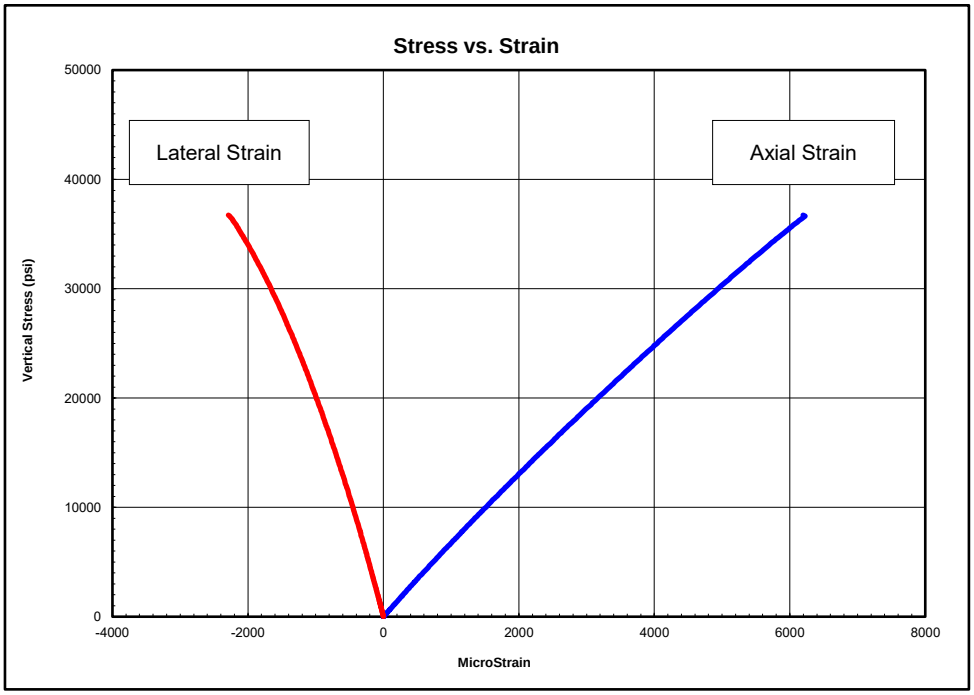
Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/30/2025
Tested By:	gp
Checked By:	jsc
Boring ID:	LB-R-121
Sample ID:	C-2
Depth, ft:	58.07-58.43
Sample Type:	rock core
Sample Description:	See photographs Intact material failure Best Effort end preparation performed

Compressive Strength and Elastic Moduli of Rock by ASTM D7012 - Method D



Peak Compressive Stress: 36,730 psi

Stress Range, psi	Young's Modulus, psi	Poisson's Ratio
3700-13500	6,390,000	0.30
13500-23300	5,890,000	0.34
23300-33100	5,490,000	0.41

Notes:
Test specimen tested at the approximate as-received moisture content and at standard laboratory temperature.
The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.
Young's Modulus and Poisson's Ratio calculated using the tangent to the line in the stress range listed.
Calculations assume samples are isotropic, which is not necessarily the case.

Client:	Langan Engineering	Test Date:	6/19/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-121		
Sample ID:	C-2		
Depth (ft):	58.07-58.43		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.29	4.29	4.29
Specimen Diameter, in:	1.97	1.98	1.98
Specimen Mass, g:	582.44		
Bulk Density, lb/ft^3	168	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

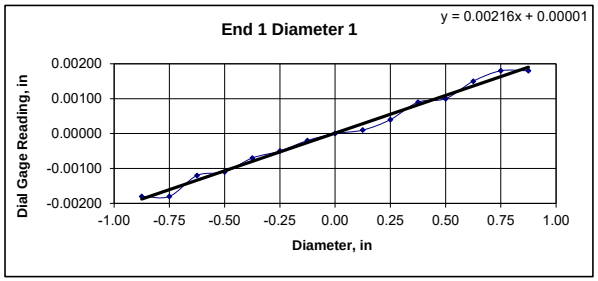
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00180	-0.00180	-0.00120	-0.00110	-0.00070	-0.00050	-0.00020	0.00000	0.00010	0.00040	0.00090	0.00100	0.00150	0.00180	0.00180
Diameter 2, in (rotated 90°)	0.00020	0.00030	0.00000	0.00010	0.00010	0.00020	0.00000	0.00000	0.00000	0.00000	0.00000	-0.00010	-0.00010	-0.00010	0.00010

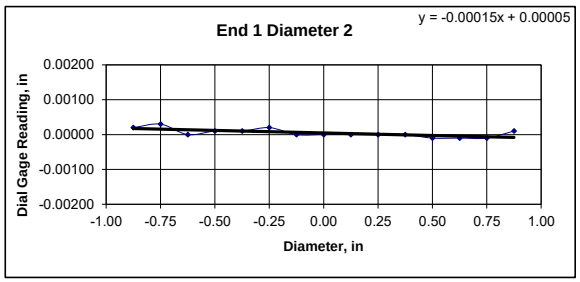
Difference between max and min readings, in:
0° = 0.00360 90° = 0.00040

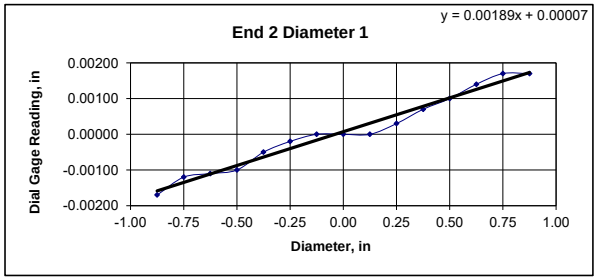
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00170	-0.00120	-0.00110	-0.00100	-0.00050	-0.00020	0.00000	0.00000	0.00000	0.00030	0.00070	0.00100	0.00140	0.00170	0.00170
Diameter 2, in (rotated 90°)	-0.00030	-0.00040	-0.00020	0.00010	0.00020	0.00010	0.00010	0.00000	0.00010	0.00010	0.00010	0.00020	0.00020	0.00000	0.00000

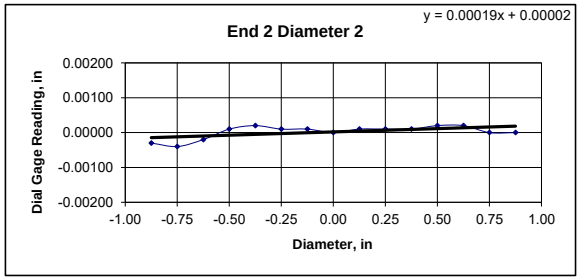
Difference between max and min readings, in:
0° = 0.0034 90° = 0.0006

Maximum difference must be < 0.0020 in. Difference = ± 0.00180
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00216
Angle of Best Fit Line: 0.12376

End 2:
Slope of Best Fit Line 0.00189
Angle of Best Fit Line: 0.10853

Maximum Angular Difference: 0.01522

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00015
Angle of Best Fit Line: 0.00835

End 2:
Slope of Best Fit Line 0.00019
Angle of Best Fit Line: 0.01080

Maximum Angular Difference: 0.00246

Parallelism Tolerance Met? YES
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00360	1.975	0.00182	0.104	YES
Diameter 2, in (rotated 90°)	0.00040	1.975	0.00020	0.012	YES
END 2					
Diameter 1, in	0.00340	1.975	0.00172	0.099	YES
Diameter 2, in (rotated 90°)	0.00060	1.975	0.00030	0.017	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/19/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-121	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	C-2		
Depth (ft):	58.07-58.43		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

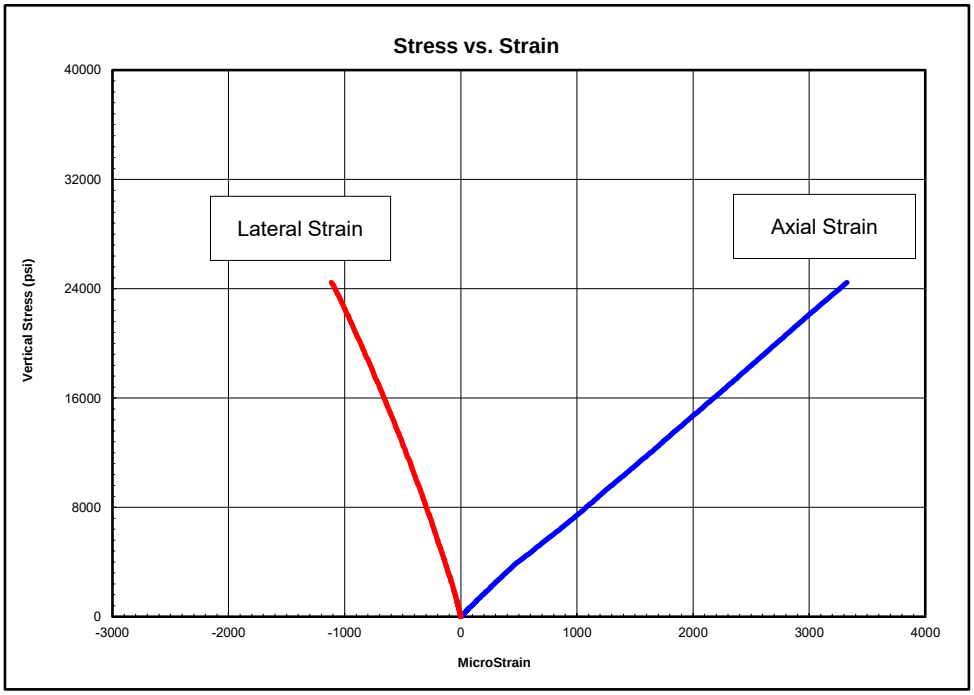
Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/30/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-121
Sample ID:	C-2
Depth, ft:	58.07-58.43

After cutting and grinding

After break

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/30/2025
Tested By:	gp
Checked By:	jsc
Boring ID:	LB-R-126
Sample ID:	C-2
Depth, ft:	21-22
Sample Type:	rock core
Sample Description:	See photographs Intact material failure Best Effort end preparation performed

Compressive Strength and Elastic Moduli of Rock by ASTM D7012 - Method D



Peak Compressive Stress: 24,456 psi

Stress Range, psi	Young's Modulus, psi	Poisson's Ratio
2400-9000	6,940,000	0.27
9000-15500	7,270,000	0.33
15500-22000	7,440,000	0.38

Notes:
Test specimen tested at the approximate as-received moisture content and at standard laboratory temperature.
The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.
Young's Modulus and Poisson's Ratio calculated using the tangent to the line in the stress range listed.
Calculations assume samples are isotropic, which is not necessarily the case.

Client:	Langan Engineering	Test Date:	6/19/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-126		
Sample ID:	C-2		
Depth (ft):	21-22		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.36	4.36	4.36
Specimen Diameter, in:	1.98	1.98	1.98
Specimen Mass, g:	621.56		
Bulk Density, lb/ft^3	176	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

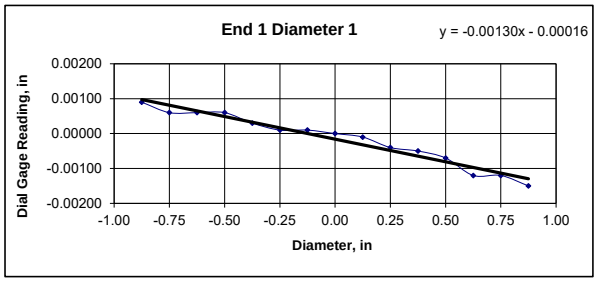
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00090	0.00060	0.00060	0.00060	0.00030	0.00010	0.00010	0.00000	-0.00010	-0.00040	-0.00050	-0.00070	-0.00120	-0.00120	-0.00150
Diameter 2, in (rotated 90°)	0.00190	0.00160	0.00140	0.00100	0.00090	0.00090	0.00040	0.00000	-0.00040	-0.00050	-0.00090	-0.00140	-0.00170	-0.00190	-0.00200

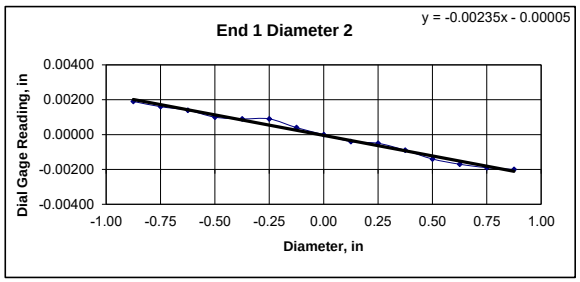
Difference between max and min readings, in:
0° = 0.00240 90° = 0.00390

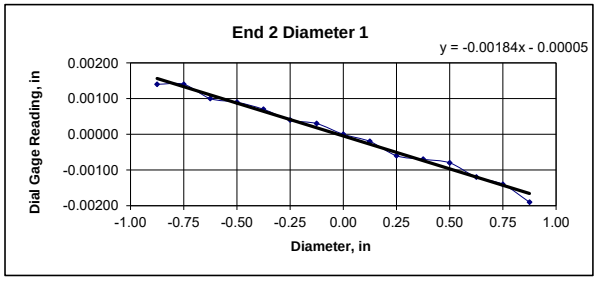
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00140	0.00140	0.00100	0.00090	0.00070	0.00040	0.00030	0.00000	-0.00020	-0.00060	-0.00070	-0.00080	-0.00120	-0.00140	-0.00190
Diameter 2, in (rotated 90°)	-0.00170	-0.00170	-0.00140	-0.00080	-0.00070	-0.00060	-0.00010	0.00000	0.00030	0.00070	0.00090	0.00120	0.00160	0.00160	0.00190

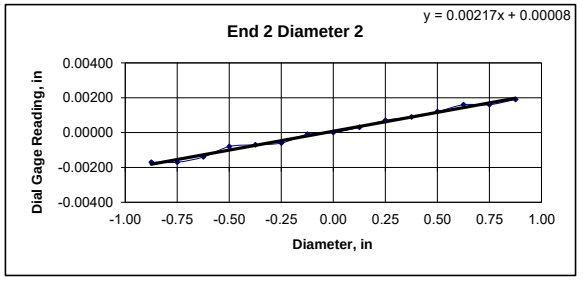
Difference between max and min readings, in:
0° = 0.0033 90° = 0.0036

Maximum difference must be < 0.0020 in. Difference = ± 0.00195
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00130
Angle of Best Fit Line: 0.07432

End 2:
Slope of Best Fit Line 0.00184
Angle of Best Fit Line: 0.10542

Maximum Angular Difference: 0.03110

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00235
Angle of Best Fit Line: 0.13489

End 2:
Slope of Best Fit Line 0.00217
Angle of Best Fit Line: 0.12409

Maximum Angular Difference: 0.01080

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00240	1.980	0.00121	0.069	YES
Diameter 2, in (rotated 90°)	0.00390	1.980	0.00197	0.113	YES
END 2					
Diameter 1, in	0.00330	1.980	0.00167	0.095	YES
Diameter 2, in (rotated 90°)	0.00360	1.980	0.00182	0.104	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

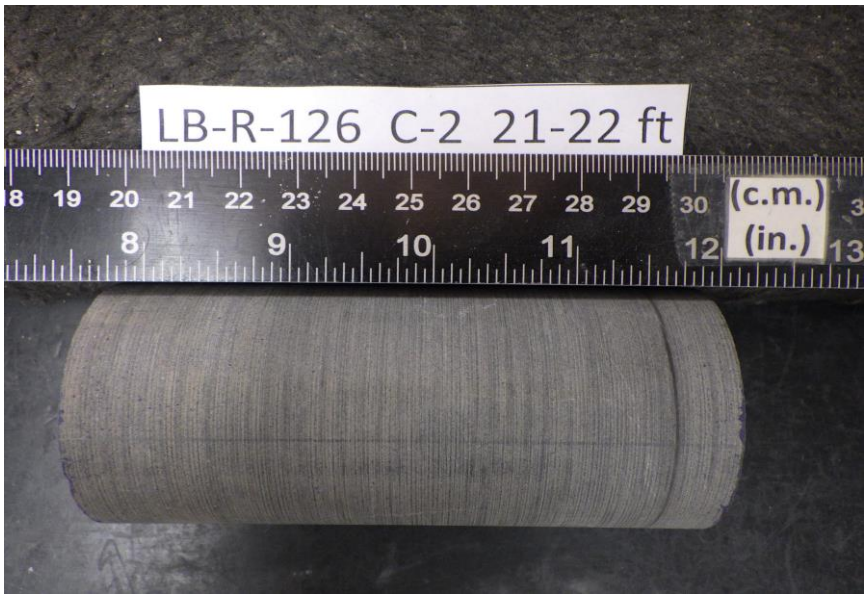
Client:	Langan Engineering	Test Date:	6/19/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-126	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	C-2		
Depth (ft):	21-22		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/30/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-126
Sample ID:	C-2
Depth, ft:	21-22

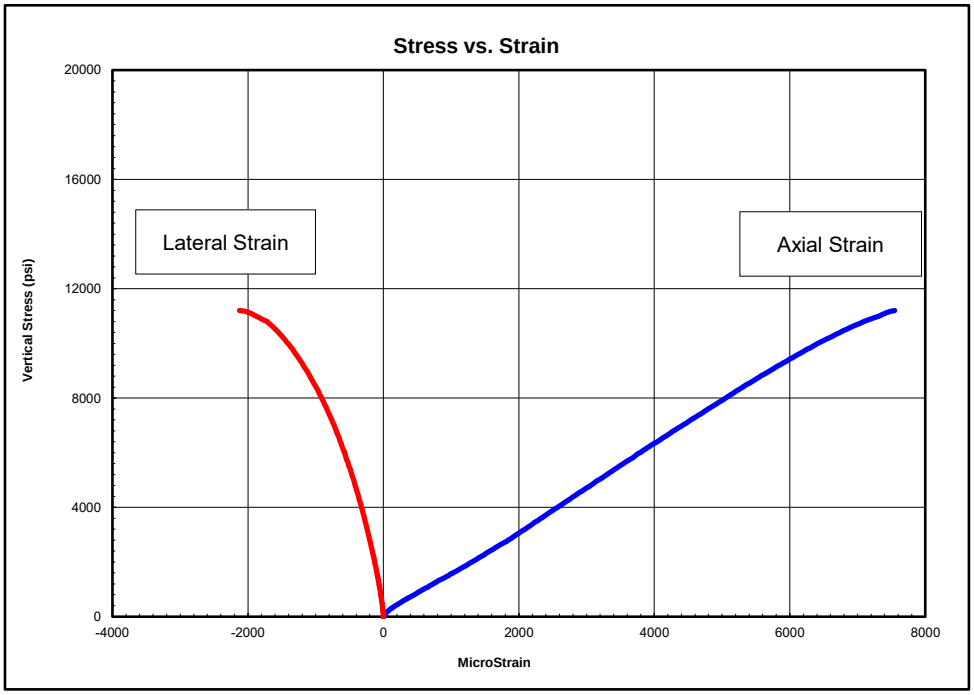


After cutting and grinding

After break

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/30/2025
Tested By:	gp
Checked By:	jsc
Boring ID:	LB-R-127
Sample ID:	---
Depth, ft:	30.80-31.17
Sample Type:	rock core
Sample Description:	See photographs Intact material failure Best Effort end preparation performed

Compressive Strength and Elastic Moduli of Rock by ASTM D7012 - Method D



Peak Compressive Stress: 11,202 psi

Stress Range, psi	Young's Modulus, psi	Poisson's Ratio
1100-4100	1,520,000	0.14
4100-7100	1,630,000	0.22
7100-10100	1,500,000	0.34

Notes:
Test specimen tested at the approximate as-received moisture content and at standard laboratory temperature.
The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.
Young's Modulus and Poisson's Ratio calculated using the tangent to the line in the stress range listed.
Calculations assume samples are isotropic, which is not necessarily the case.

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Client:	Langan Engineering	Test Date:	6/16/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-127		
Sample ID:	---		
Depth (ft):	30.80-31.17		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.20	4.20	4.20
Specimen Diameter, in:	1.98	1.98	1.98
Specimen Mass, g:	571.4		
Bulk Density, lb/ft^3	168	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.1	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

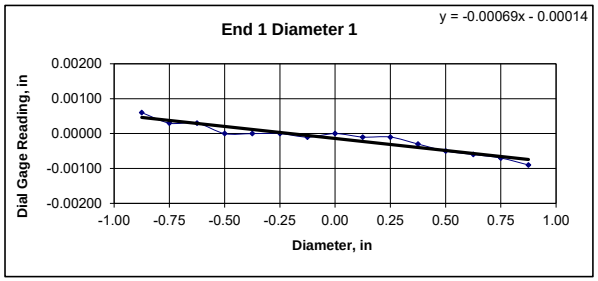
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00060	0.00030	0.00030	0.00000	0.00000	0.00000	-0.00010	0.00000	-0.00010	-0.00010	-0.00030	-0.00050	-0.00060	-0.00070	-0.00090
Diameter 2, in (rotated 90°)	-0.00070	-0.00050	-0.00020	-0.00020	-0.00020	-0.00020	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00010	0.00000	0.00010

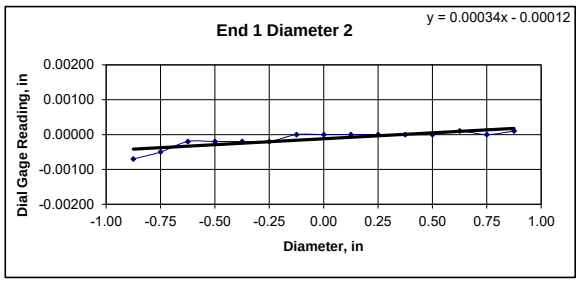
Difference between max and min readings, in:
0° = 0.00150 90° = 0.00080

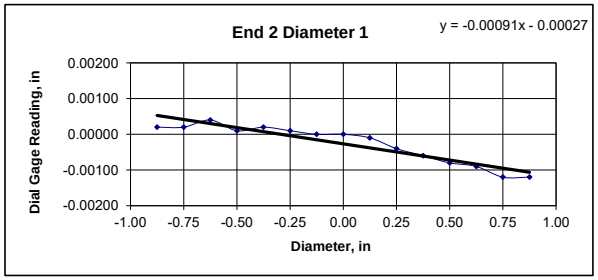
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00020	0.00020	0.00040	0.00010	0.00020	0.00010	0.00000	0.00000	-0.00010	-0.00040	-0.00060	-0.00080	-0.00090	-0.00120	-0.00120
Diameter 2, in (rotated 90°)	-0.00060	-0.00040	-0.00030	-0.00050	-0.00040	-0.00040	-0.00020	0.00000	-0.00020	-0.00010	-0.00050	-0.00050	-0.00040	-0.00080	-0.00080

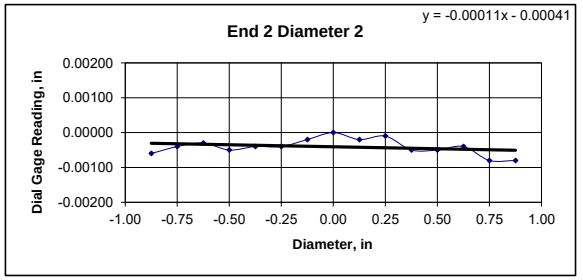
Difference between max and min readings, in:
0° = 0.0016 90° = 0.0008

Maximum difference must be < 0.0020 in. Difference = ± 0.00080
Flatness Tolerance Met? YES









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00069
Angle of Best Fit Line: 0.03945

End 2:
Slope of Best Fit Line 0.00091
Angle of Best Fit Line: 0.05206

Maximum Angular Difference: 0.01261

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00034
Angle of Best Fit Line: 0.01948

End 2:
Slope of Best Fit Line 0.00011
Angle of Best Fit Line: 0.00655

Maximum Angular Difference: 0.01293

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00150	1.980	0.00076	0.043	YES
Diameter 2, in (rotated 90°)	0.00080	1.980	0.00040	0.023	YES
END 2					
Diameter 1, in	0.00160	1.980	0.00081	0.046	YES
Diameter 2, in (rotated 90°)	0.00080	1.980	0.00040	0.023	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/16/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-127	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	30.80-31.17		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS

END 1

Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

END 2

Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

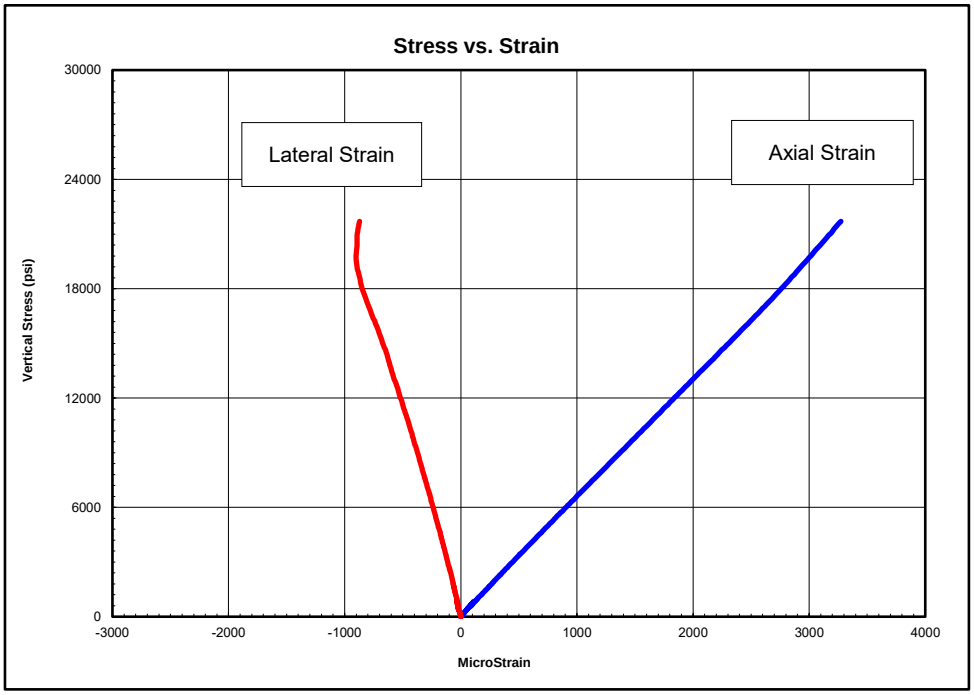
Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/30/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-127
Sample ID:	---
Depth, ft:	30.80-31.17

After cutting and grinding

After break

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/30/2025
Tested By:	gp
Checked By:	jsc
Boring ID:	LB-R-128
Sample ID:	---
Depth, ft:	37.69-38.07
Sample Type:	rock core
Sample Description:	See photographs Intact material failure Best Effort end preparation performed

Compressive Strength and Elastic Moduli of Rock by ASTM D7012 - Method D



Peak Compressive Stress: 21,761 psi

Stress Range, psi	Young's Modulus, psi	Poisson's Ratio
2200-8000	6,500,000	0.28
8000-13800	6,430,000	0.31
13800-19600	6,650,000	0.37

Notes:
Test specimen tested at the approximate as-received moisture content and at standard laboratory temperature.
The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.
Young's Modulus and Poisson's Ratio calculated using the tangent to the line in the stress range listed.
Calculations assume samples are isotropic, which is not necessarily the case.

Client:	Langan Engineering	Test Date:	6/16/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-128		
Sample ID:	---		
Depth (ft):	37.69-38.07		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.47	4.47	4.47
Specimen Diameter, in:	1.97	1.97	1.97
Specimen Mass, g:	612.18		
Bulk Density, lb/ft^3	171	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.3	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

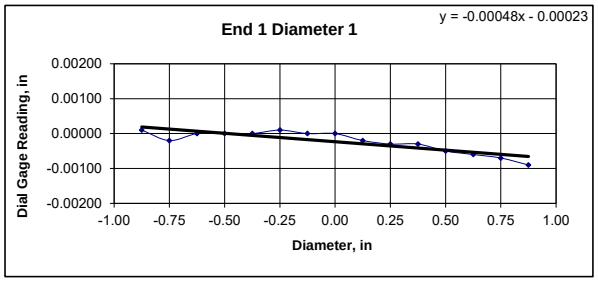
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00010	-0.00020	0.00000	0.00000	0.00000	0.00010	0.00000	0.00000	-0.00020	-0.00030	-0.00030	-0.00050	-0.00060	-0.00070	-0.00090
Diameter 2, in (rotated 90°)	0.00120	0.00110	0.00100	0.00060	0.00050	0.00030	0.00000	0.00000	-0.00050	-0.00090	-0.00120	-0.00140	-0.00170	-0.00200	-0.00210

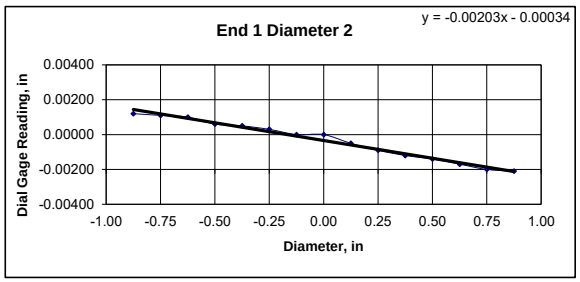
Difference between max and min readings, in:
0° = 0.00100 90° = 0.00330

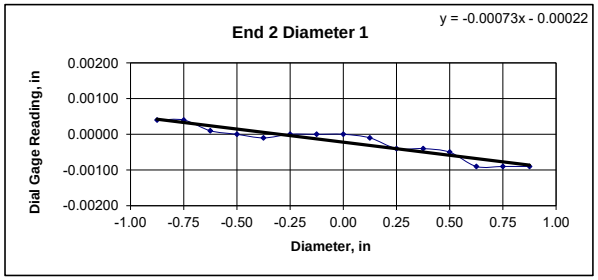
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00040	0.00040	0.00010	0.00000	-0.00010	0.00000	0.00000	0.00000	-0.00010	-0.00040	-0.00040	-0.00050	-0.00090	-0.00090	-0.00090
Diameter 2, in (rotated 90°)	-0.00180	-0.00140	-0.00110	-0.00100	-0.00040	-0.00010	-0.00030	0.00000	-0.00010	0.00030	0.00050	0.00060	0.00100	0.00140	0.00140

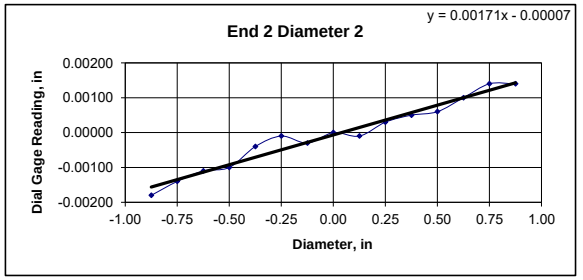
Difference between max and min readings, in:
0° = 0.0013 90° = 0.0032

Maximum difference must be < 0.0020 in. Difference = ± 0.00165
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00048
Angle of Best Fit Line: 0.02767

End 2:
Slope of Best Fit Line 0.00073
Angle of Best Fit Line: 0.04207

Maximum Angular Difference: 0.01441

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00203
Angle of Best Fit Line: 0.11656

End 2:
Slope of Best Fit Line 0.00171
Angle of Best Fit Line: 0.09789

Maximum Angular Difference: 0.01866

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00100	1.970	0.00051	0.029	YES
Diameter 2, in (rotated 90°)	0.00330	1.970	0.00168	0.096	YES
END 2					
Diameter 1, in	0.00130	1.970	0.00066	0.038	YES
Diameter 2, in (rotated 90°)	0.00320	1.970	0.00162	0.093	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/16/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-128	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	---		
Depth (ft):	37.69-38.07		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS		
END 1		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES
END 2		
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

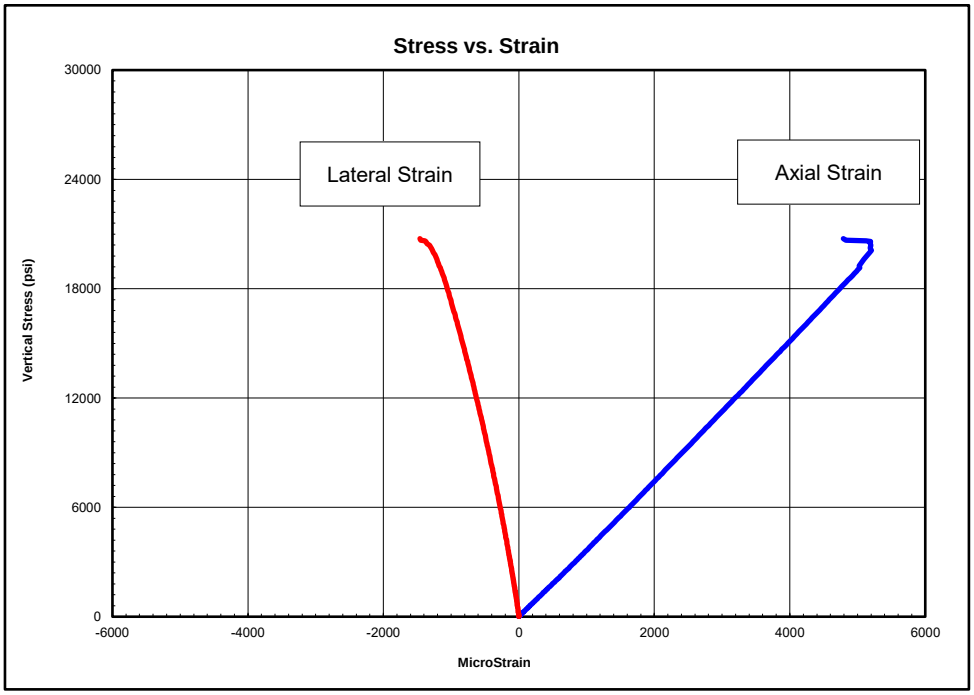
Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	6/30/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-128
Sample ID:	---
Depth, ft:	37.69-38.07

After cutting and grinding

After break

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	7/1/2025
Tested By:	gp
Checked By:	jsc
Boring ID:	LB-R-129
Sample ID:	C-3
Depth, ft:	41.5-42.5
Sample Type:	rock core
Sample Description:	See photographs Intact material failure Best Effort end preparation performed

Compressive Strength and Elastic Moduli of Rock by ASTM D7012 - Method D



Peak Compressive Stress: 20,748 psi

Stress Range, psi	Young's Modulus, psi	Poisson's Ratio
2100-7600	3,750,000	0.19
7600-13100	3,840,000	0.23
13100-18700	3,890,000	0.29

Notes:
Test specimen tested at the approximate as-received moisture content and at standard laboratory temperature.
The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.
Young's Modulus and Poisson's Ratio calculated using the tangent to the line in the stress range listed.
Calculations assume samples are isotropic, which is not necessarily the case.

Client:	Langan Engineering	Test Date:	6/12/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-129		
Sample ID:	C-3		
Depth (ft):	41.5-42.5		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.32	4.32	4.32
Specimen Diameter, in:	1.98	1.98	1.98
Specimen Mass, g:	611.89		
Bulk Density, lb/ft^3	175	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

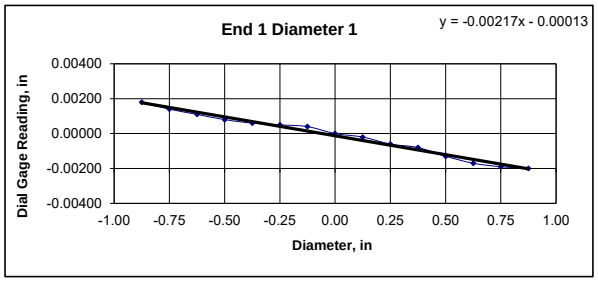
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00180	0.00140	0.00110	0.00080	0.00060	0.00050	0.00040	0.00000	-0.00020	-0.00060	-0.00080	-0.00130	-0.00170	-0.00190	-0.00200
Diameter 2, in (rotated 90°)	0.00040	0.00040	0.00020	0.00020	0.00000	0.00010	0.00010	0.00000	0.00010	-0.00040	-0.00070	-0.00070	-0.00110	-0.00110	-0.00100

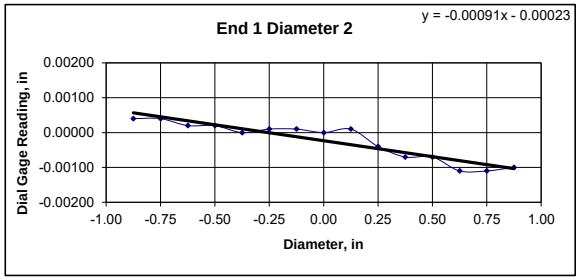
Difference between max and min readings, in:
0° = 0.00380 90° = 0.00150

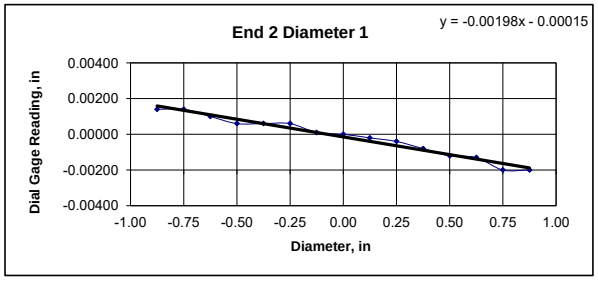
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00140	0.00140	0.00100	0.00060	0.00060	0.00060	0.00010	0.00000	-0.00020	-0.00040	-0.00080	-0.00120	-0.00130	-0.00200	-0.00200
Diameter 2, in (rotated 90°)	-0.00130	-0.00110	-0.00100	-0.00070	-0.00020	-0.00040	-0.00040	0.00000	0.00020	0.00040	0.00040	0.00050	0.00050	0.00070	0.00120

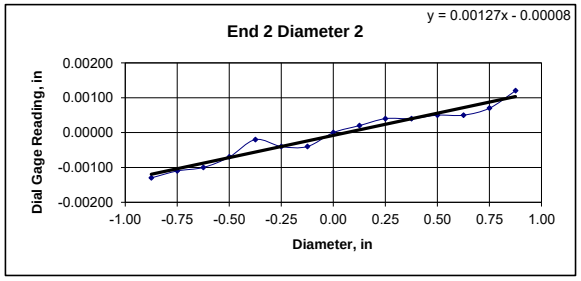
Difference between max and min readings, in:
0° = 0.0034 90° = 0.0025

Maximum difference must be < 0.0020 in. Difference = ± 0.00190
Flatness Tolerance Met? NO









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00217
Angle of Best Fit Line: 0.12409

End 2:
Slope of Best Fit Line 0.00198
Angle of Best Fit Line: 0.11361

Maximum Angular Difference: 0.01048

Parallelism Tolerance Met? NO
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00091
Angle of Best Fit Line: 0.05238

End 2:
Slope of Best Fit Line 0.00127
Angle of Best Fit Line: 0.07301

Maximum Angular Difference: 0.02063

Parallelism Tolerance Met? NO
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00380	1.980	0.00192	0.110	YES
Diameter 2, in (rotated 90°)	0.00150	1.980	0.00076	0.043	YES
END 2					
Diameter 1, in	0.00340	1.980	0.00172	0.098	YES
Diameter 2, in (rotated 90°)	0.00250	1.980	0.00126	0.072	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Langan Engineering	Test Date:	6/12/2025
Project Name:	Upstate Confidential Project	Tested By:	rik
Project Location:	NY	Checked By:	smd
GTX #:	321096		
Boring ID:	LB-R-129	Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a machinist straightedge and feeler gauges to ASTM specifications.	
Sample ID:	C-3		
Depth (ft):	41.5-42.5		
Visual Description:	See photographs		

BEST EFFORT END FLATNESS TOLERANCES OF ROCK CORE SPECIMENS TO ASTM D4543

END FLATNESS

END 1

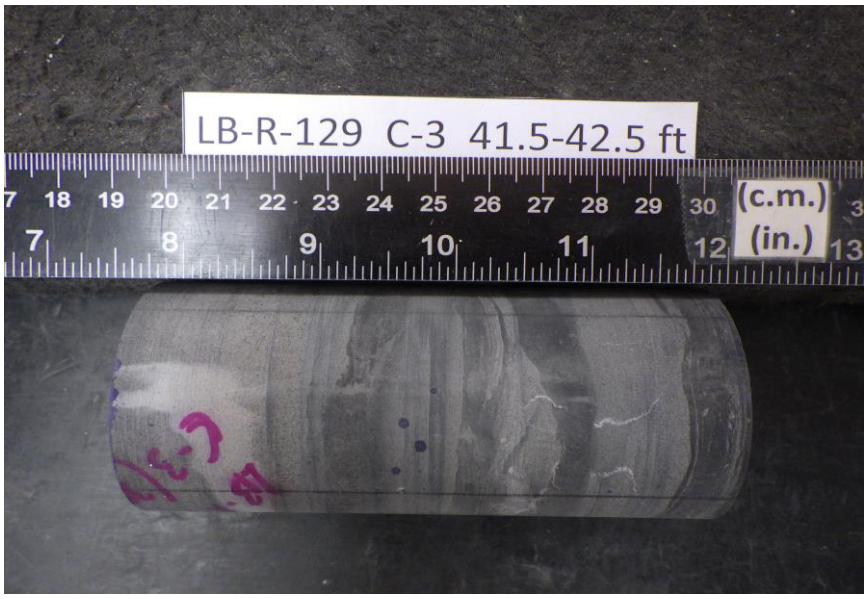
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

END 2

Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES

End Flatness Tolerance Met? YES

Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Test Date:	7/1/2025
Tested By:	gp
Checked By:	smd
Boring ID:	LB-R-129
Sample ID:	C-3
Depth, ft:	41.5-42.5



After cutting and grinding

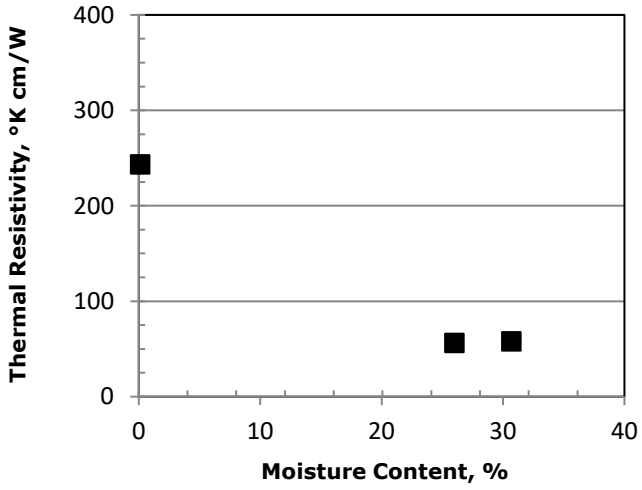
After break

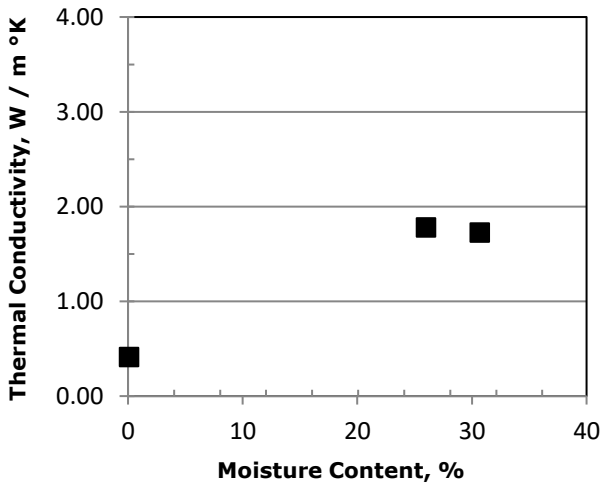
Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	06/19/25
End Date:	06/26/25
Tested By:	jb
Checked By:	ank
Preparation:	Tested on a 3 point curve. Specimens compacted to 95% of the requested dry density (111 pcf), at dry, as-received, and wet moisture contents.GTX was unable to meet requested compaction.Needle was pushed into specimen

Thermal Conductivity of Soil by ANSI IEEE 442

Boring	Sample	Depth, ft	Sample Description	Moisture Content, %	Wet Density, pcf	Dry Density, pcf	Thermal Conductivity, $^{W}/_{m°K}$	Thermal Resistivity, $^{°K\ cm}/_{W}$
TP-02	---	---	Moist, brown clay	0.10	100.5	100.4	0.41	243
TP-02	---	---	Moist, brown clay	26.00	121.9	96.7	1.78	56
TP-02	---	---	Moist, brown clay	30.69	114.0	87.3	1.73	58

Notes: $^{W}/_{m°K}$ = Watts per Meter °Kelvin
$^{°K\ cm}/_{W}$ = °Kelvin Centimeter per Watt



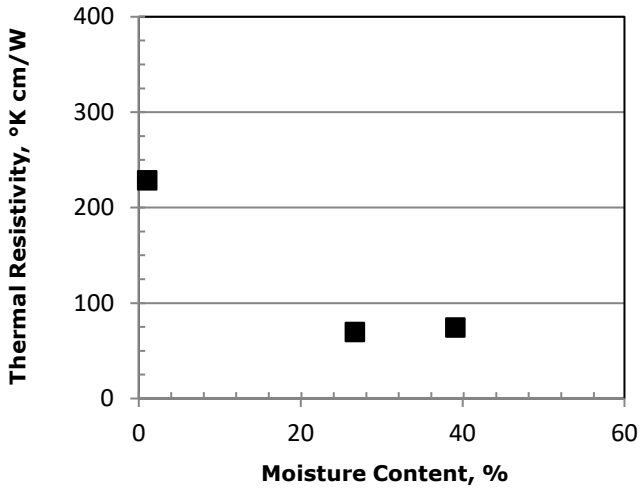


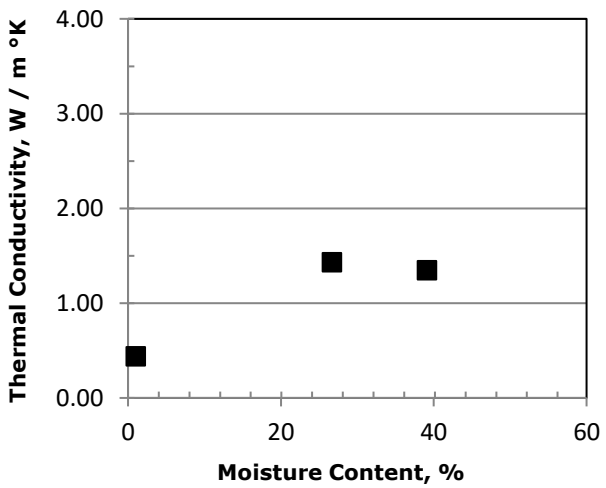
Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	06/19/25
End Date:	06/26/25
Tested By:	jb
Checked By:	ank
Preparation:	Tested on a 3 point curve. Specimens compacted to 95% of the requested dry density (111 pcf), at dry, as-received, and wet moisture contents. GTX was unable to meet requested compaction.Needle was pushed into specimen.

Thermal Conductivity of Soil by ANSI IEEE 442

Boring	Sample	Depth, ft	Sample Description	Moisture Content, %	Wet Density, pcf	Dry Density, pcf	Thermal Conductivity, $^{W}/_{m°K}$	Thermal Resistivity, $^{°K\ cm}/_{W}$
TP-03	---	---	Moist, dark brown clay	1.03	98.7	97.7	0.44	228
TP-03	---	---	Moist, dark brown clay	26.70	120.4	95.0	1.43	70
TP-03	---	---	Moist, dark brown clay	39.11	110.7	79.6	1.35	74

Notes: $^{W}/_{m°K}$ = Watts per Meter °Kelvin
$^{°K\ cm}/_{W}$ = °Kelvin Centimeter per Watt



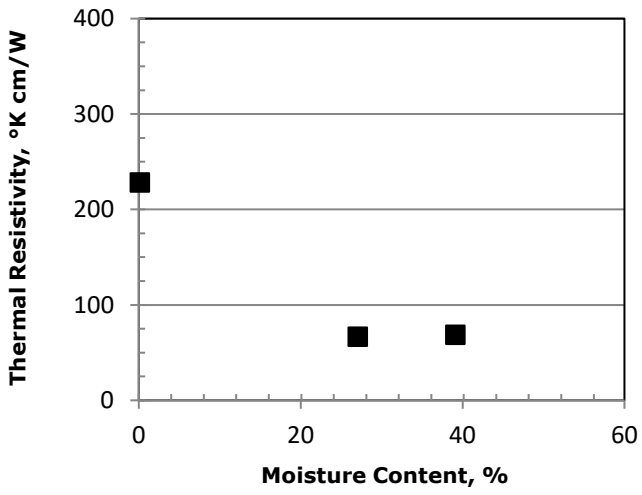


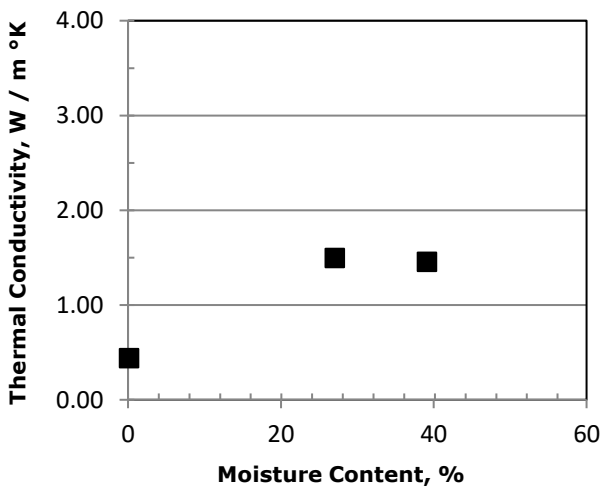
Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	06/19/25
End Date:	06/26/25
Tested By:	jb
Checked By:	ank
Preparation:	Tested on a 3 point curve. Specimens compacted to 95% of the requested dry density (111 pcf), at dry, as-received, and wet moisture contents. GTX was unable to meet requested compaction.Needle was pushed into specimen

Thermal Conductivity of Soil by ANSI IEEE 442

Boring	Sample	Depth, ft	Sample Description	Moisture Content, %	Wet Density, pcf	Dry Density, pcf	Thermal Conductivity, $^{W}/_{m°K}$	Thermal Resistivity, $^{°K\ cm}/_{W}$
TP-04	---	---	Moist, dark yellowish brown clay with organics	0.13	103.5	103.4	0.44	228
TP-04	---	---	Moist, dark yellowish brown clay with organics	27.04	117.6	92.5	1.50	67
TP-04	---	---	Moist, dark yellowish brown clay with organics	39.11	111.9	80.5	1.46	69

Notes: $^{W}/_{m°K}$ = Watts per Meter °Kelvin
$^{°K\ cm}/_{W}$ = °Kelvin Centimeter per Watt



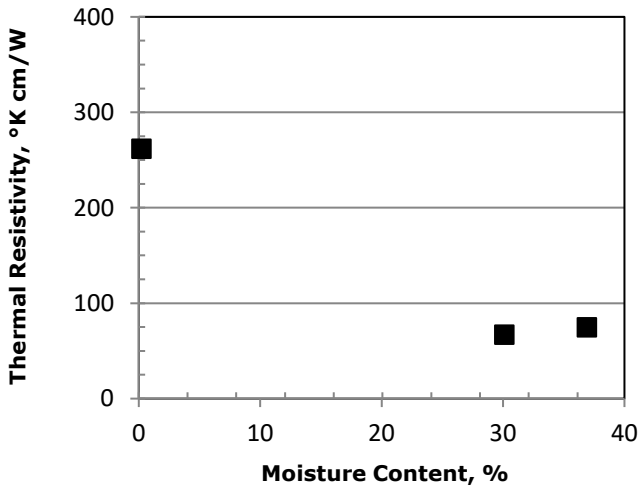


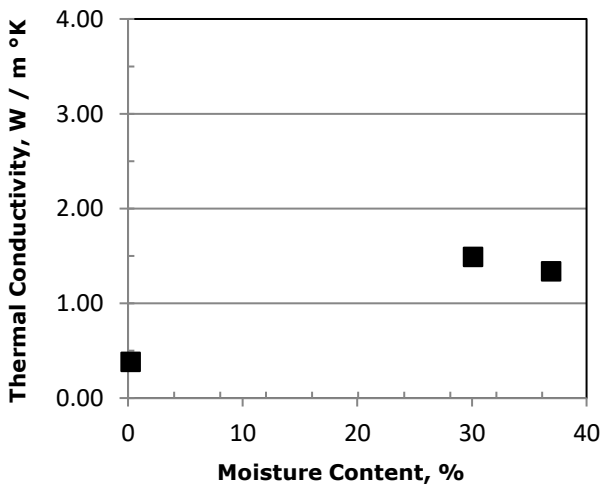
Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	06/11/25
End Date:	06/17/25
Tested By:	ges/jb
Checked By:	ank
Preparation:	Tested on a 3 point curve. Specimens compacted to 95% of the requested dry density (111 pcf), at dry, as-received, and wet moisture contents. GTX was unable to meet requested compaction at wet and dry moisture contents.Needle was pushed into specimen

Thermal Conductivity of Soil by ANSI IEEE 442

Boring	Sample	Depth, ft	Sample Description	Moisture Content, %	Wet Density, pcf	Dry Density, pcf	Thermal Conductivity, $^{W}/_{m°K}$	Thermal Resistivity, $^{°K\ cm}/_{W}$
TP-05	---	---	Moist, dark yellowish brown clay	0.23	94.4	94.2	0.38	262
TP-05	---	---	Moist, dark yellowish brown clay	30.10	116.3	89.4	1.49	67
TP-05	---	---	Moist, dark yellowish brown clay	36.90	113.1	82.6	1.34	75

Notes: $^{W}/_{m°K}$ = Watts per Meter °Kelvin
$^{°K\ cm}/_{W}$ = °Kelvin Centimeter per Watt



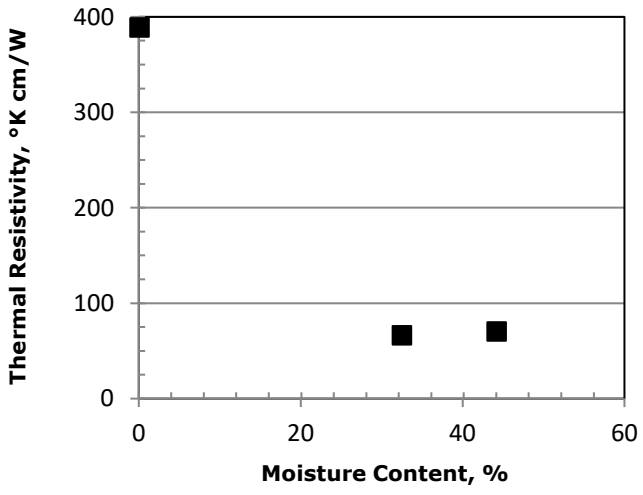


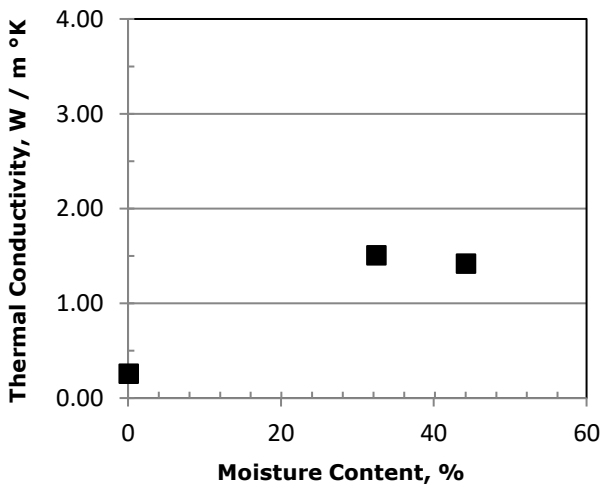
Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	06/05/25
End Date:	06/11/25
Tested By:	ges/jb
Checked By:	ank
Preparation:	Tested on a 3 point curve. Specimens compacted to 95% of the requested dry density (111 pcf), at dry, as-received, and wet moisture contents. GTX was unable to meet requested compaction at wet and dry moisture contents.Needle was pushed into specimen

Thermal Conductivity of Soil by ANSI IEEE 442

Boring	Sample	Depth, ft	Sample Description	Moisture Content, %	Wet Density, pcf	Dry Density, pcf	Thermal Conductivity, $^{W}/_{m°K}$	Thermal Resistivity, $^{°K\ cm}/_{W}$
TP-06	---	---	Moist, brown silt with organics	0.09	89.5	89.4	0.26	389
TP-06	---	---	Moist, brown silt with organics	32.50	111.7	84.3	1.51	66
TP-06	---	---	Moist, brown silt with organics	44.21	105.9	73.4	1.42	70

Notes: $^{W}/_{m°K}$ = Watts per Meter °Kelvin
$^{°K\ cm}/_{W}$ = °Kelvin Centimeter per Watt



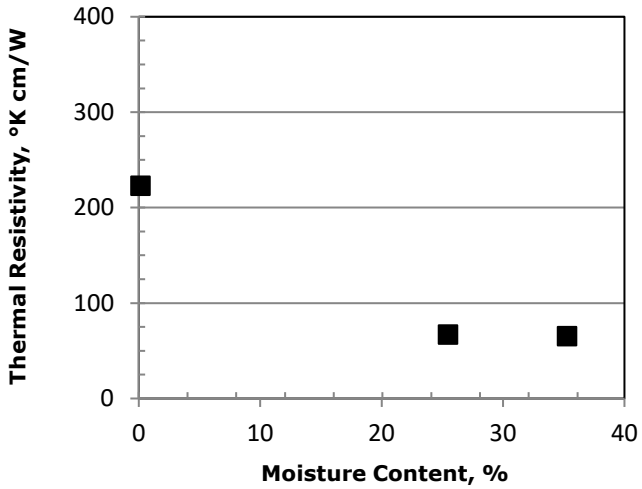


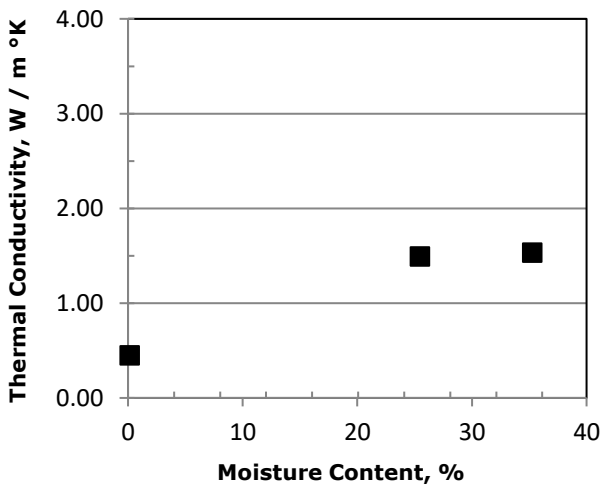
Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	06/19/25
End Date:	06/25/25
Tested By:	jb
Checked By:	ank
Preparation:	Tested on a 3 point curve. Specimens compacted to 95% of the requested dry density (111 pcf), at dry, as-received, and wet moisture contents. GTX was unable to meet requested compaction.Needle was pushed into specimen

Thermal Conductivity of Soil by ANSI IEEE 442

Boring	Sample	Depth, ft	Sample Description	Moisture Content, %	Wet Density, pcf	Dry Density, pcf	Thermal Conductivity, $^{W}/_{m°K}$	Thermal Resistivity, $^{°K\ cm}/_{W}$
TP-07	---	---	Moist, brown clay	0.13	101.7	101.5	0.45	223
TP-07	---	---	Moist, brown clay	25.46	121.4	96.7	1.49	67
TP-07	---	---	Moist, brown clay	35.27	112.3	83.0	1.53	65

Notes: $^{W}/_{m°K}$ = Watts per Meter °Kelvin
$^{°K\ cm}/_{W}$ = °Kelvin Centimeter per Watt



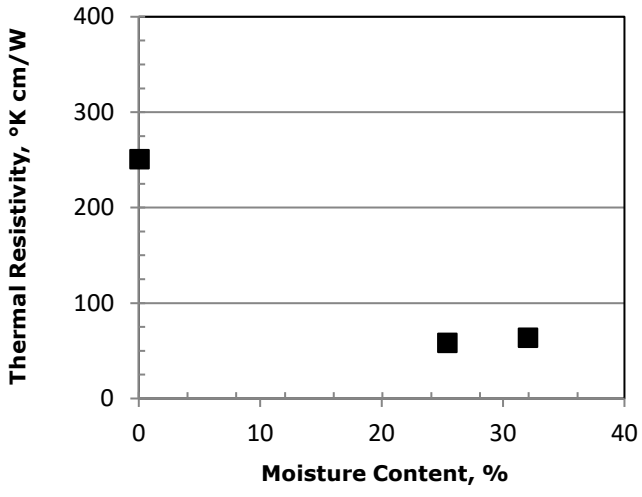


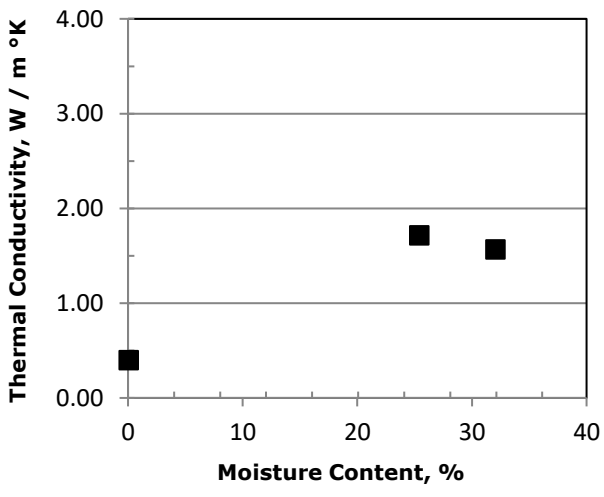
Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	06/19/25
End Date:	06/25/25
Tested By:	jb
Checked By:	ank
Preparation:	Tested on a 3 point curve. Specimens compacted to 95% of the requested dry density (111 pcf), at dry, as-received, and wet moisture contents. GTX was unable to meet requested compaction.Needle was pushed into specimen.

Thermal Conductivity of Soil by ANSI IEEE 442

Boring	Sample	Depth, ft	Sample Description	Moisture Content, %	Wet Density, pcf	Dry Density, pcf	Thermal Conductivity, $^{W}/_{m°K}$	Thermal Resistivity, $^{°K\ cm}/_{W}$
TP-08	---	---	Moist, brown silty sand	0.06	103.5	103.5	0.40	251
TP-08	---	---	Moist, brown silty sand	25.40	122.4	97.6	1.71	58
TP-08	---	---	Moist, brown silty sand	32.05	115.6	87.5	1.57	64

Notes: $^{W}/_{m°K}$ = Watts per Meter °Kelvin
$^{°K\ cm}/_{W}$ = °Kelvin Centimeter per Watt



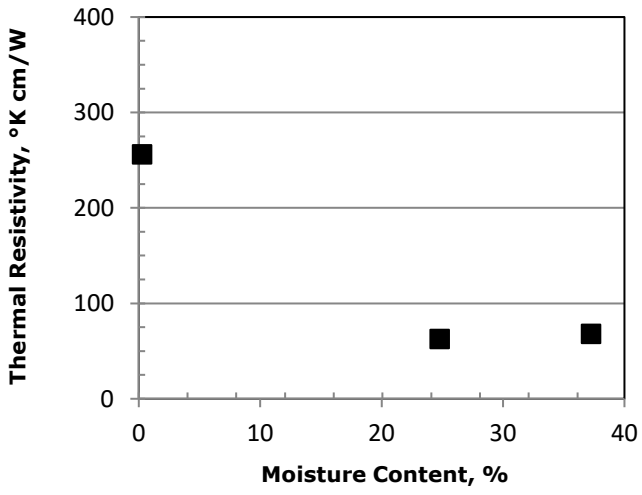


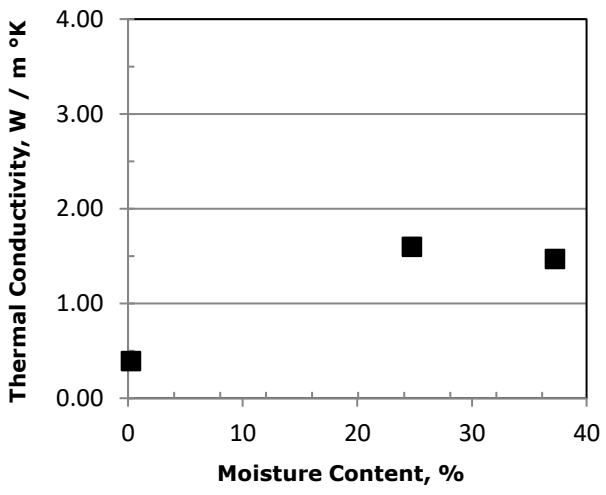
Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	06/19/25
End Date:	06/23/25
Tested By:	jb
Checked By:	ank
Preparation:	Tested on a 3 point curve. Specimens compacted to 95% of the requested dry density (111 pcf), at dry, as-received, and wet moisture contents. GTX was unable to meet requested compaction.Needle was pushed into specimen.

Thermal Conductivity of Soil by ANSI IEEE 442

Boring	Sample	Depth, ft	Sample Description	Moisture Content, %	Wet Density, pcf	Dry Density, pcf	Thermal Conductivity, $^{W}/_{m°K}$	Thermal Resistivity, $^{°K\ cm}/_{W}$
TP-09	---	---	Moist, yellowish brown silt	0.26	96.9	96.7	0.39	256
TP-09	---	---	Moist, yellowish brown silt	24.77	119.6	95.9	1.60	63
TP-09	---	---	Moist, yellowish brown silt	37.25	110.8	80.8	1.47	68

Notes: $^{W}/_{m°K}$ = Watts per Meter °Kelvin
$^{°K\ cm}/_{W}$ = °Kelvin Centimeter per Watt



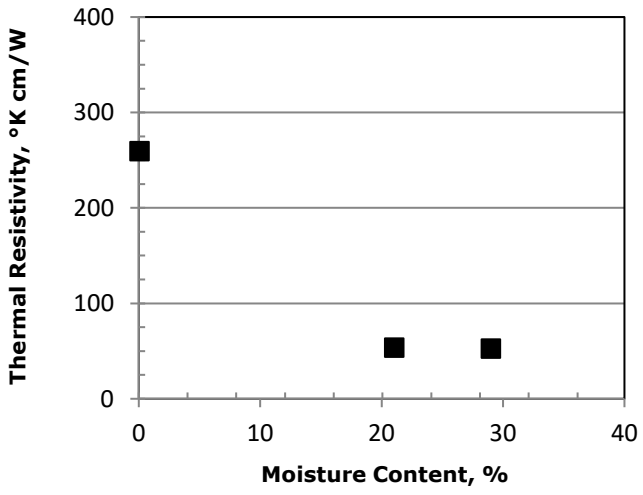


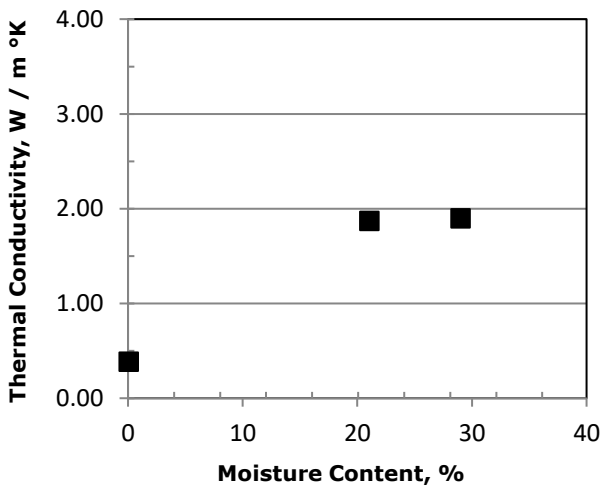
Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	06/11/25
End Date:	06/16/25
Tested By:	ges/jb
Checked By:	ank
Preparation:	Tested on a 3 point curve. Specimens compacted to 95% of the requested dry density (111 pcf), at dry, as-received, and wet moisture contents. GTX was unable to meet requested compaction at wet and dry moisture content.Needle was pushed into specimen.

Thermal Conductivity of Soil by ANSI IEEE 442

Boring	Sample	Depth, ft	Sample Description	Moisture Content, %	Wet Density, pcf	Dry Density, pcf	Thermal Conductivity, $^{W}/_{m°K}$	Thermal Resistivity, $^{°K\ cm}/_{W}$
TP-10	---	---	Moist, yellowish brown silt with organics	0.06	105.5	105.5	0.39	260
TP-10	---	---	Moist, yellowish brown silt with organics	21.04	127.6	105.4	1.87	53
TP-10	---	---	Moist, yellowish brown silt with organics	29.00	119.3	92.5	1.90	53

Notes: $^{W}/_{m°K}$ = Watts per Meter °Kelvin
$^{°K\ cm}/_{W}$ = °Kelvin Centimeter per Watt



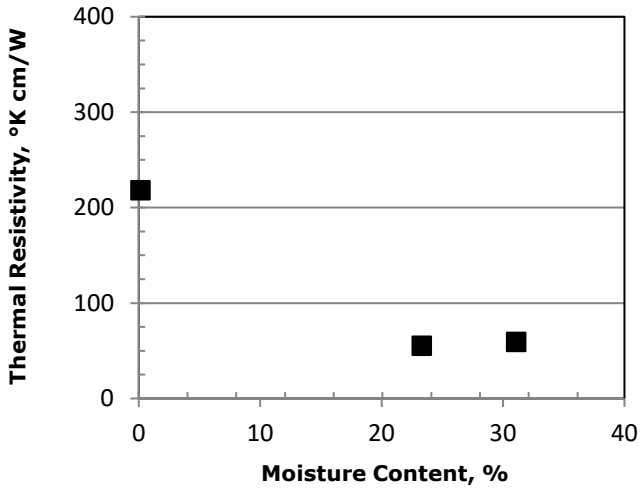


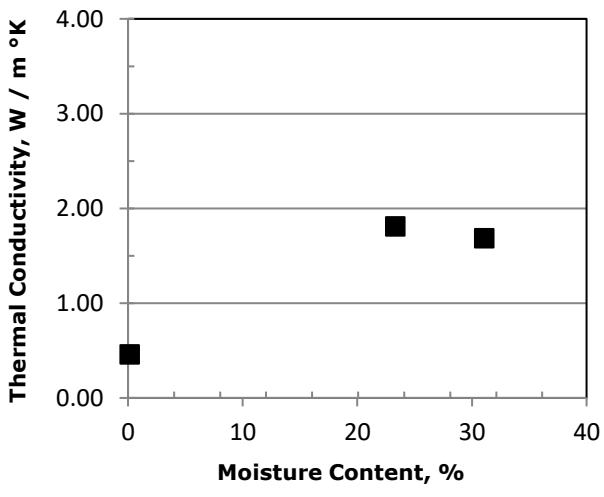
Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	06/19/25
End Date:	06/23/25
Tested By:	jb
Checked By:	ank
Preparation:	Tested on a 3 point curve. Specimens compacted to 95% of the requested dry density (111 pcf), at dry, as-received, and wet moisture contents. GTX was unable to meet requested compaction.Needle was pushed into specimen.

Thermal Conductivity of Soil by ANSI IEEE 442

Boring	Sample	Depth, ft	Sample Description	Moisture Content, %	Wet Density, pcf	Dry Density, pcf	Thermal Conductivity, $^{W}/_{m°K}$	Thermal Resistivity, $^{°K\ cm}/_{W}$
TP-11	---	---	Moist, olive brown silt	0.14	103.6	103.4	0.46	218
TP-11	---	---	Moist, olive brown silt	23.31	122.7	99.5	1.81	55
TP-11	---	---	Moist, olive brown silt	31.08	117.0	89.3	1.68	59

Notes: $^{W}/_{m°K}$ = Watts per Meter °Kelvin
$^{°K\ cm}/_{W}$ = °Kelvin Centimeter per Watt



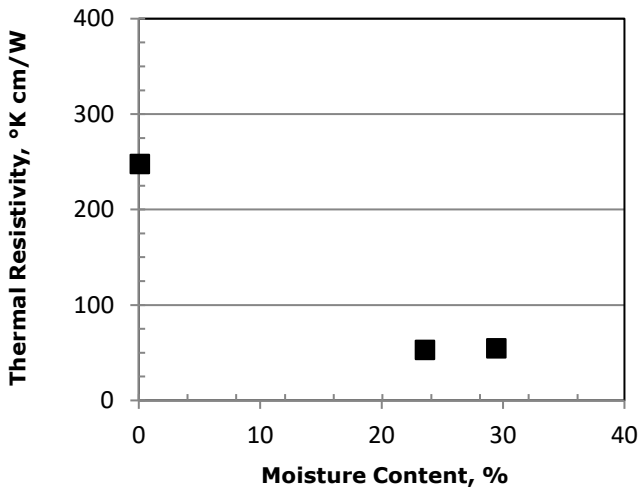


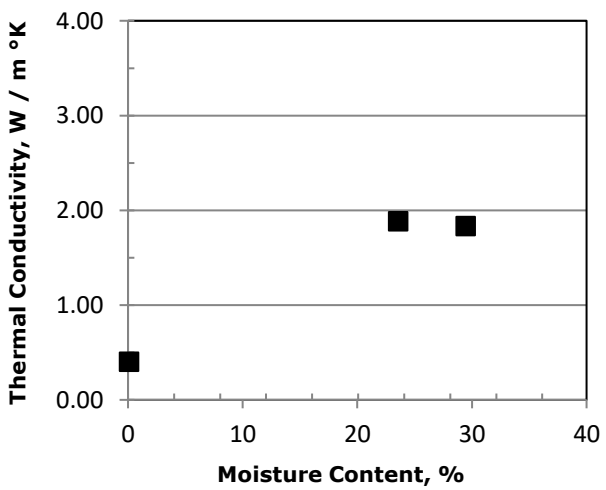
Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	06/05/25
End Date:	06/10/25
Tested By:	ges
Checked By:	ank
Preparation:	Tested on a 3 point curve. Specimens compacted to 95% of the requested dry density (111 pcf), at dry, as-received, and wet moisture contents. GTX was unable to meet the requested compaction. Needle was pushed into specimen.

Thermal Conductivity of Soil by ANSI IEEE 442

Boring	Sample	Depth, ft	Sample Description	Moisture Content, %	Wet Density, pcf	Dry Density, pcf	Thermal Conductivity, $^{W}/_{m°K}$	Thermal Resistivity, $^{°K\ cm}/_{W}$
TP-12	---	---	Moist, yellowish brown silt with organics	0.10	99.5	99.4	0.40	248
TP-12	---	---	Moist, yellowish brown silt with organics	23.58	122.9	99.5	1.88	53
TP-12	---	---	Moist, yellowish brown silt with organics	29.46	117.7	90.9	1.83	55

Notes: $^{W}/_{m°K}$ = Watts per Meter °Kelvin
$^{°K\ cm}/_{W}$ = °Kelvin Centimeter per Watt



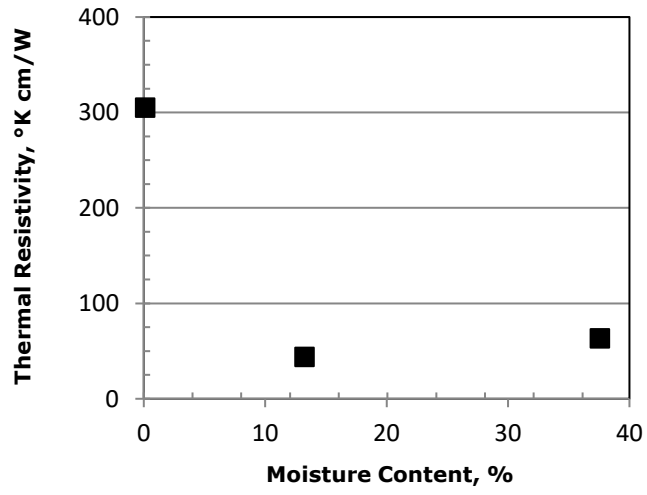


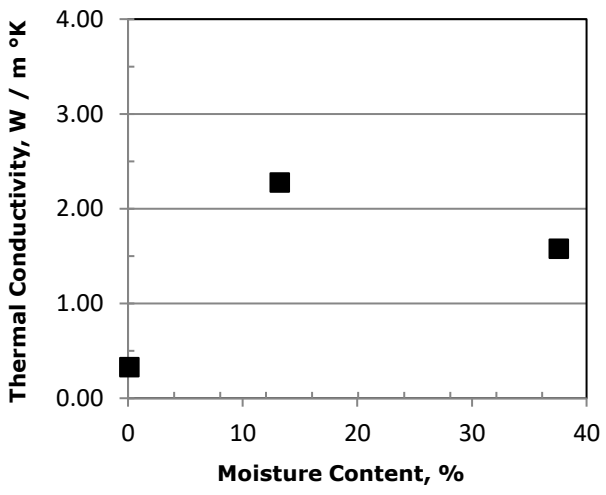
Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	06/19/25
End Date:	06/24/25
Tested By:	ges/jb
Checked By:	ank
Preparation:	Tested on a 3 point curve. Specimens compacted to 95% of the requested dry density (111 pcf), at dry, as-received, and wet moisture contents. GTX was unable to meet requested compaction at wet and dry moisture contents.Needle was pushed into specimen.

Thermal Conductivity of Soil by ANSI IEEE 442

Boring	Sample	Depth, ft	Sample Description	Moisture Content, %	Wet Density, pcf	Dry Density, pcf	Thermal Conductivity, $^{W}/_{m°K}$	Thermal Resistivity, $^{°K\ cm}/_{W}$
TP-14	---	---	Moist, yellowish brown silt with organics	0.11	100.5	100.4	0.33	305
TP-14	---	---	Moist, yellowish brown silt with organics	13.24	119.4	105.4	2.27	44
TP-14	---	---	Moist, yellowish brown silt with organics	37.57	108.8	79.1	1.58	63

Notes: $^{W}/_{m°K}$ = Watts per Meter °Kelvin
$^{°K\ cm}/_{W}$ = °Kelvin Centimeter per Watt



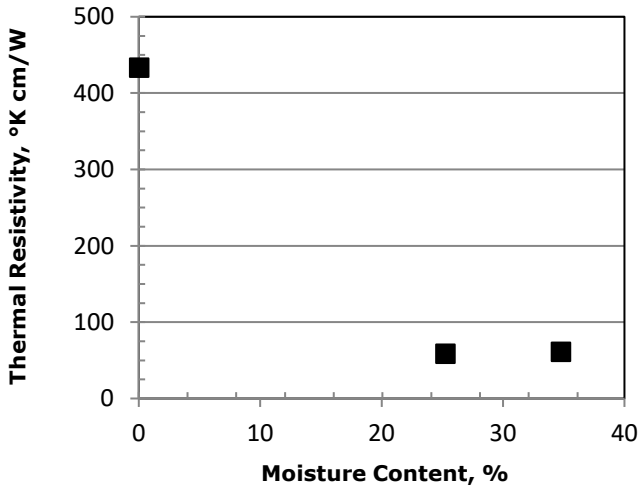


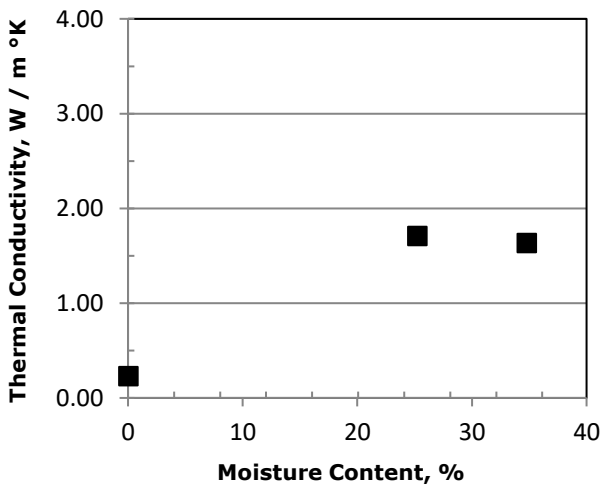
Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	05/30/25
End Date:	06/09/25
Tested By:	JL/ges
Checked By:	ank
Preparation:	Tested on a 3 point curve. Specimens compacted to 95% of the requested dry density (111 pcf), at dry, as-received, and wet moisture contents. GTX was unable to meet the requested compaction. Needle was pushed into specimen.

Thermal Conductivity of Soil by ANSI IEEE 442

Boring	Sample	Depth, ft	Sample Description	Moisture Content, %	Wet Density, pcf	Dry Density, pcf	Thermal Conductivity, $^{W}/_{m°K}$	Thermal Resistivity, $^{°K\ cm}/_{W}$
TP-15	---	---	Moist, yellowish brown silt	0.03	84.4	84.4	0.23	433
TP-15	---	---	Moist, yellowish brown silt	25.24	110.4	88.1	1.71	59
TP-15	---	---	Moist, yellowish brown silt	34.78	111.5	82.7	1.64	61

Notes: $^{W}/_{m°K}$ = Watts per Meter °Kelvin
$^{°K\ cm}/_{W}$ = °Kelvin Centimeter per Watt



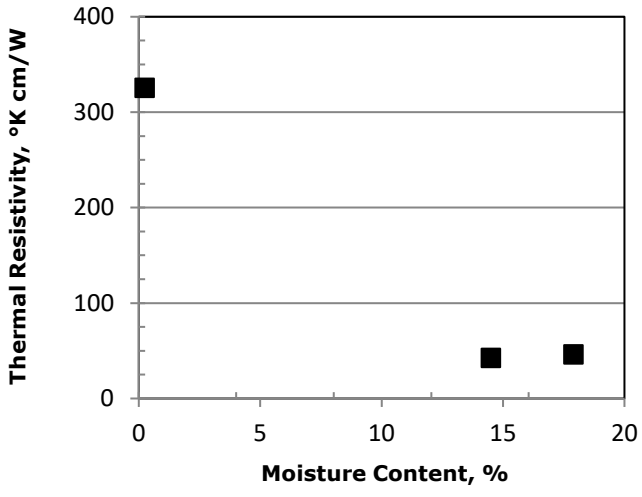


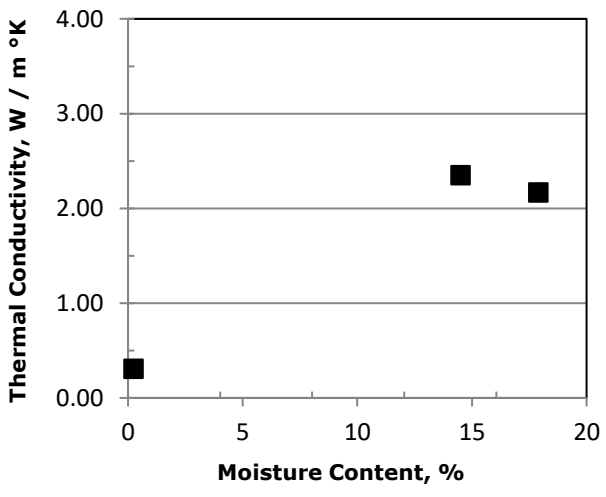
Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	06/11/25
End Date:	06/18/25
Tested By:	ges/jb
Checked By:	ank
Preparation:	Tested on a 3 point curve. Specimens compacted to 95% of the requested dry density (111 pcf), at dry, as-received, and wet moisture contents. Needle was pushed into specimen.

Thermal Conductivity of Soil by ANSI IEEE 442

Boring	Sample	Depth, ft	Sample Description	Moisture Content, %	Wet Density, pcf	Dry Density, pcf	Thermal Conductivity, $^{W}/_{m°K}$	Thermal Resistivity, $^{°K\ cm}/_{W}$
TP-16	---	---	Moist, yellowish brown silt with sand	0.23	105.8	105.5	0.31	326
TP-16	---	---	Moist, yellowish brown silt with sand	14.50	120.7	105.4	2.35	43
TP-16	---	---	Moist, yellowish brown silt with sand	17.90	124.4	105.5	2.17	46

Notes: $^{W}/_{m°K}$ = Watts per Meter °Kelvin
$^{°K\ cm}/_{W}$ = °Kelvin Centimeter per Watt



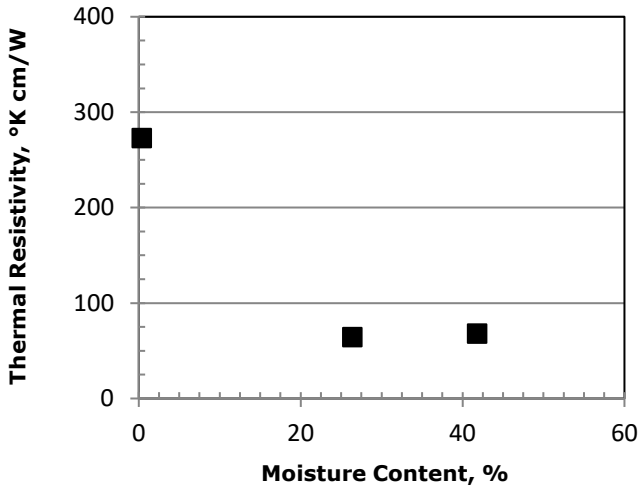


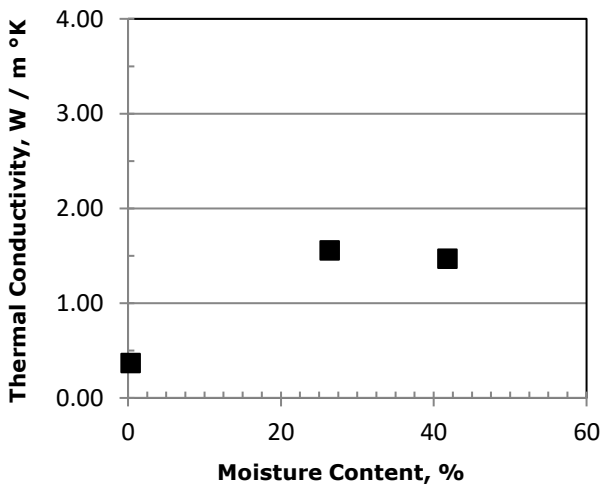
Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	06/19/25
End Date:	06/23/25
Tested By:	jb
Checked By:	ank
Preparation:	Tested on a 3 point curve. Specimens compacted to 95% of the requested dry density (111 pcf), at dry, as-received, and wet moisture contents. GTX was unable to meet requested compaction.Needle was pushed into specimen.

Thermal Conductivity of Soil by ANSI IEEE 442

Boring	Sample	Depth, ft	Sample Description	Moisture Content, %	Wet Density, pcf	Dry Density, pcf	Thermal Conductivity, $^{W}/_{m°K}$	Thermal Resistivity, $^{°K\ cm}/_{W}$
TP-17	---	---	Moist, yellowish brown silty clay with organics	0.36	94.5	94.2	0.37	273
TP-17	---	---	Moist, yellowish brown silty clay with organics	26.39	118.3	93.6	1.56	64
TP-17	---	---	Moist, yellowish brown silty clay with organics	41.78	110.0	77.6	1.47	68

Notes: $^{W}/_{m°K}$ = Watts per Meter °Kelvin
$^{°K\ cm}/_{W}$ = °Kelvin Centimeter per Watt



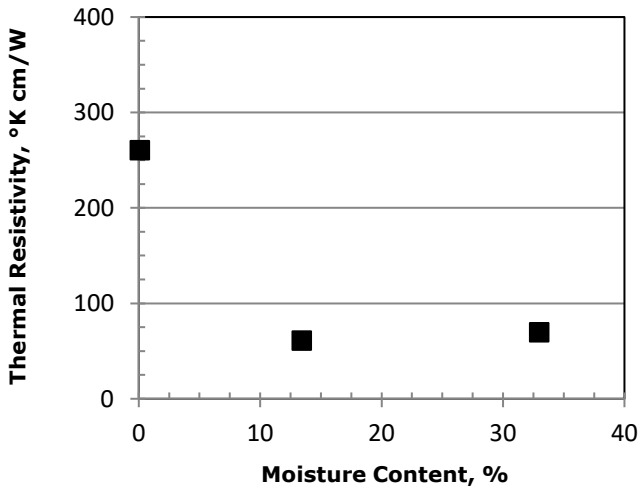


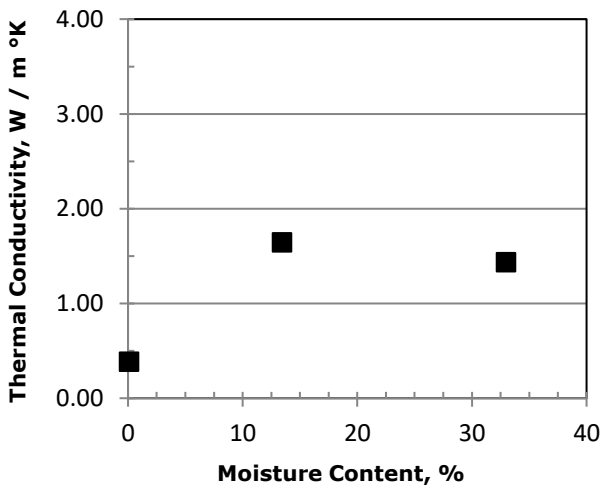
Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	05/29/25
End Date:	06/06/25
Tested By:	JL/ges
Checked By:	ank
Preparation:	Tested on a 3 point curve. Specimens compacted to 95% of the requested dry density (111 pcf), at dry, as-received, and wet moisture contents. GTX was unable to meet requested compaction at wet and dry moisture contents.Needle was pushed into specimen.

Thermal Conductivity of Soil by ANSI IEEE 442

Boring	Sample	Depth, ft	Sample Description	Moisture Content, %	Wet Density, pcf	Dry Density, pcf	Thermal Conductivity, $^{W}/_{m°K}$	Thermal Resistivity, $^{°K\ cm}/_{W}$
TP-18	---	---	Moist, yellowish brown clay	0.07	95.1	95.0	0.38	260
TP-18	---	---	Moist, yellowish brown clay	13.42	119.5	105.3	1.64	61
TP-18	---	---	Moist, yellowish brown clay	32.98	114.9	86.4	1.44	70

Notes: $^{W}/_{m°K}$ = Watts per Meter °Kelvin
$^{°K\ cm}/_{W}$ = °Kelvin Centimeter per Watt



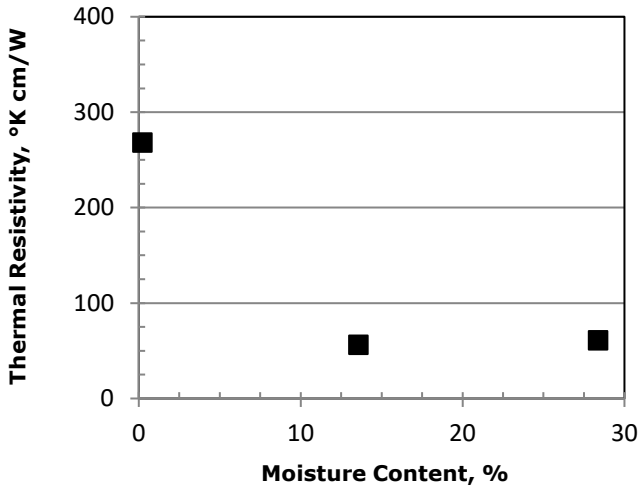


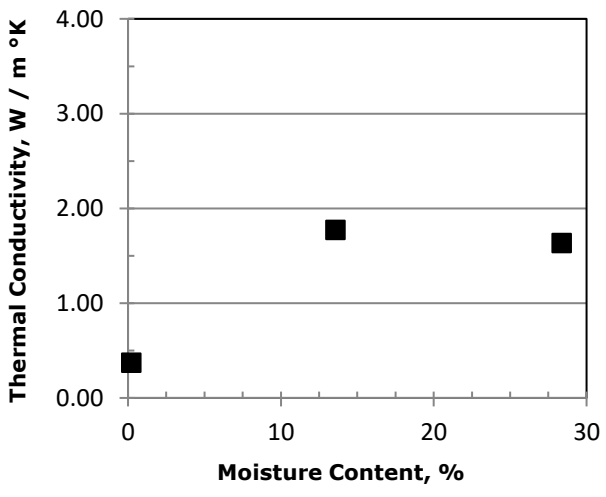
Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	05/29/25
End Date:	06/06/25
Tested By:	JL/ges
Checked By:	ank
Preparation:	Tested on a 3 point curve. Specimens compacted to 95% of the requested dry density (111 pcf), at dry, 13.5%, and as-received moisture contents.GTX was unable to meet requested compaction.Needle was pushed into specimen.

Thermal Conductivity of Soil by ANSI IEEE 442

Boring	Sample	Depth, ft	Sample Description	Moisture Content, %	Wet Density, pcf	Dry Density, pcf	Thermal Conductivity, $^{W}/_{m°K}$	Thermal Resistivity, $^{°K\ cm}/_{W}$
TP-19	---	---	Moist, dark yellowish brown clay	0.22	95.6	95.4	0.37	268
TP-19	---	---	Moist, dark yellowish brown clay	13.56	118.5	104.4	1.77	56
TP-19	---	---	Moist, dark yellowish brown clay	28.38	116.9	91.1	1.64	61

Notes: $^{W}/_{m°K}$ = Watts per Meter °Kelvin
$^{°K\ cm}/_{W}$ = °Kelvin Centimeter per Watt



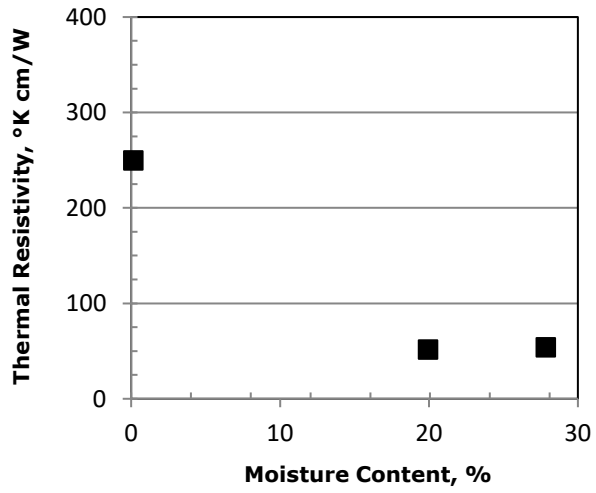


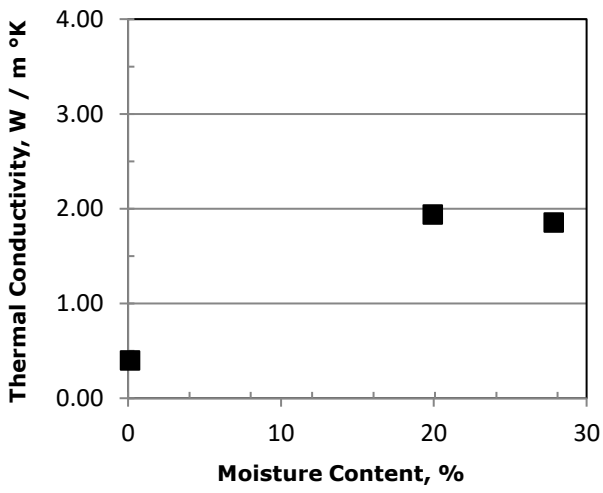
Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	06/11/25
End Date:	06/17/25
Tested By:	ges/jb
Checked By:	ank
Preparation:	Tested on a 3 point curve. Specimens compacted to 95% of the requested dry density (111 pcf), at dry, as-received, and wet moisture contents.GTX was unable to meet requested compaction.Needle was pushed into specimen.

Thermal Conductivity of Soil by ANSI IEEE 442

Boring	Sample	Depth, ft	Sample Description	Moisture Content, %	Wet Density, pcf	Dry Density, pcf	Thermal Conductivity, $^{W}/_{m°K}$	Thermal Resistivity, $^{°K\ cm}/_{W}$
TP-20	---	---	Moist, yellowish brown silt	0.14	101.6	101.5	0.40	250
TP-20	---	---	Moist, yellowish brown silt	19.94	119.3	99.5	1.94	52
TP-20	---	---	Moist, yellowish brown silt	27.85	117.3	91.8	1.85	54

Notes: $^{W}/_{m°K}$ = Watts per Meter °Kelvin
$^{°K\ cm}/_{W}$ = °Kelvin Centimeter per Watt



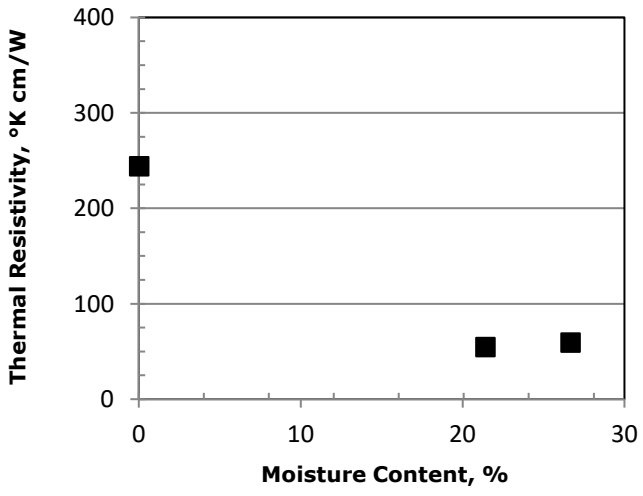


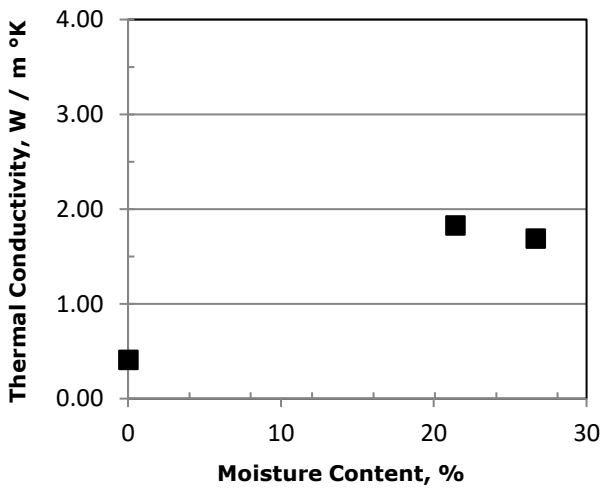
Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	06/19/25
End Date:	06/25/25
Tested By:	jb
Checked By:	ank
Preparation:	Tested on a 3 point curve. Specimens compacted to 95% of the requested dry density (111 pcf), at dry, as-received, and wet moisture contents. GTX was unable to meet requested compaction.Needle was pushed into specimen.

Thermal Conductivity of Soil by ANSI IEEE 442

Boring	Sample	Depth, ft	Sample Description	Moisture Content, %	Wet Density, pcf	Dry Density, pcf	Thermal Conductivity, $^{W}/_{m°K}$	Thermal Resistivity, $^{°K\ cm}/_{W}$
TP-21	---	---	Moist, brown clay	0.03	105.6	105.6	0.41	244
TP-21	---	---	Moist, brown clay	21.41	125.6	103.5	1.83	55
TP-21	---	---	Moist, brown clay	26.67	117.4	92.7	1.69	59

Notes: $^{W}/_{m°K}$ = Watts per Meter °Kelvin
$^{°K\ cm}/_{W}$ = °Kelvin Centimeter per Watt



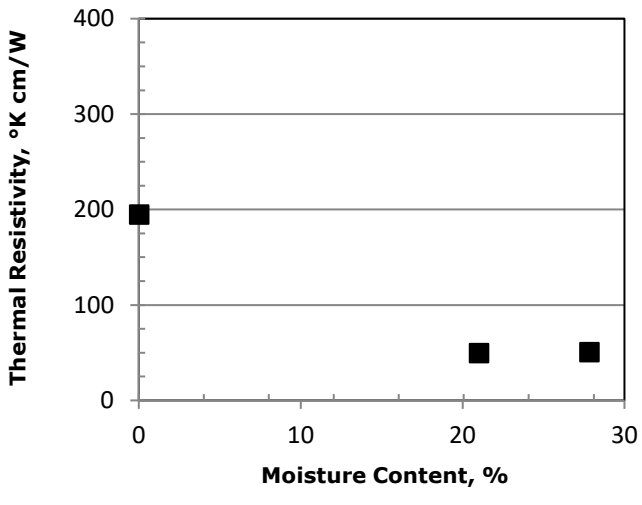


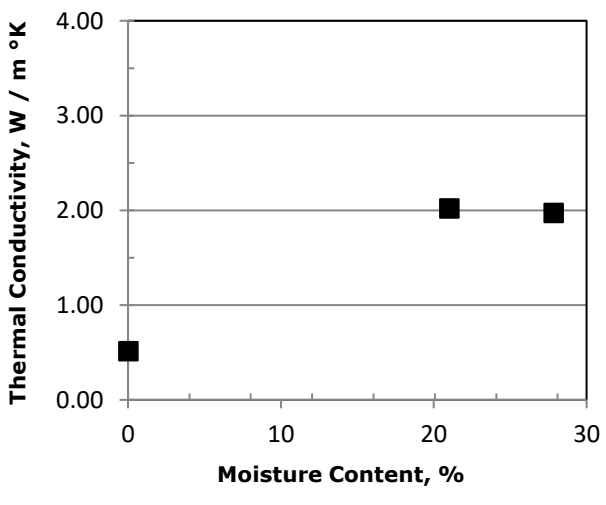
Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	06/19/25
End Date:	06/25/25
Tested By:	jb
Checked By:	ank
Preparation:	Tested on a 3 point curve. Specimens compacted to 95% of the requested dry density (111 pcf), at dry, as-received, and wet moisture contents.GTX was unable to meet requested compaction.Needle was pushed into specimen.

Thermal Conductivity of Soil by ANSI IEEE 442

Boring	Sample	Depth, ft	Sample Description	Moisture Content, %	Wet Density, pcf	Dry Density, pcf	Thermal Conductivity, $^{W}/_{m°K}$	Thermal Resistivity, $^{°K\ cm}/_{W}$
TP-22	---	---	Moist, brown clay with sand	0.02	105.6	105.6	0.51	195
TP-22	---	---	Moist, brown clay with sand	21.02	126.3	104.4	2.02	49
TP-22	---	---	Moist, brown clay with sand	27.84	117.5	91.9	1.97	51

Notes: $^{W}/_{m°K}$ = Watts per Meter °Kelvin
$^{°K\ cm}/_{W}$ = °Kelvin Centimeter per Watt



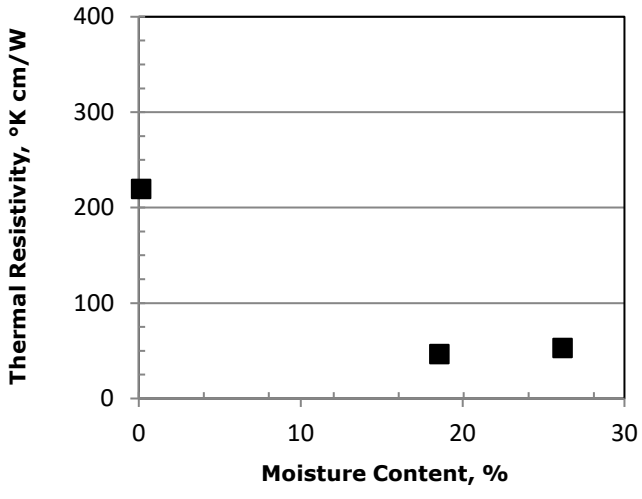


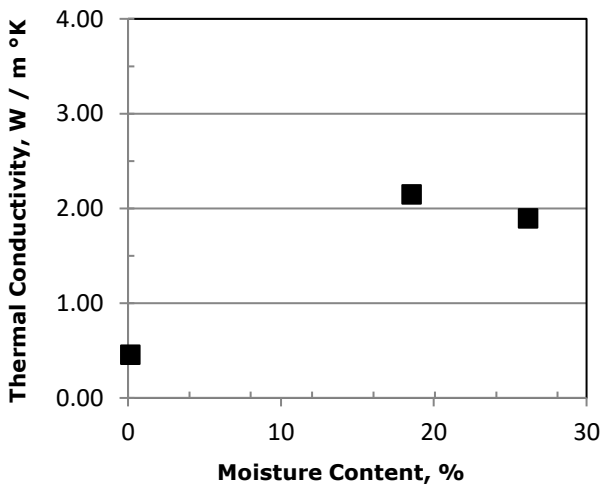
Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	06/19/25
End Date:	06/23/25
Tested By:	jb
Checked By:	ank
Preparation:	Tested on a 3 point curve. Specimens compacted to 95% of the requested dry density (111 pcf), at dry, as-received, and wet moisture contents.GTX was unable to meet requested compaction.Needle was pushed into specimen.

Thermal Conductivity of Soil by ANSI IEEE 442

Boring	Sample	Depth, ft	Sample Description	Moisture Content, %	Wet Density, pcf	Dry Density, pcf	Thermal Conductivity, $^{W}/_{m°K}$	Thermal Resistivity, $^{°K\ cm}/_{W}$
TP-23	---	---	Moist, dark yellowish brown silt	0.15	105.6	105.5	0.46	219
TP-23	---	---	Moist, dark yellowish brown silt	18.56	125.0	105.5	2.15	47
TP-23	---	---	Moist, dark yellowish brown silt	26.18	119.8	94.9	1.89	53

Notes: $^{W}/_{m°K}$ = Watts per Meter °Kelvin
$^{°K\ cm}/_{W}$ = °Kelvin Centimeter per Watt



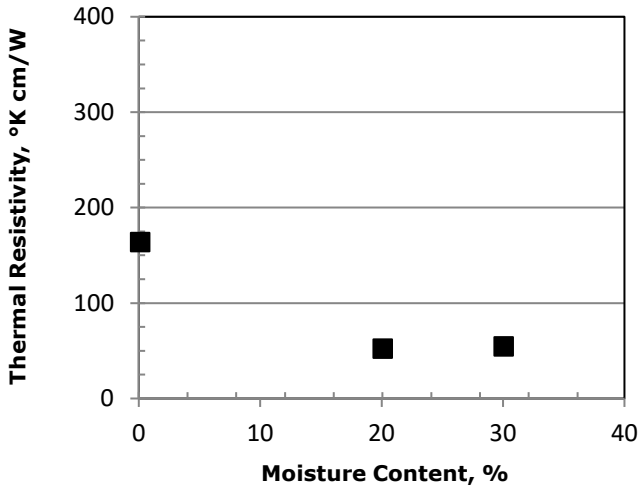


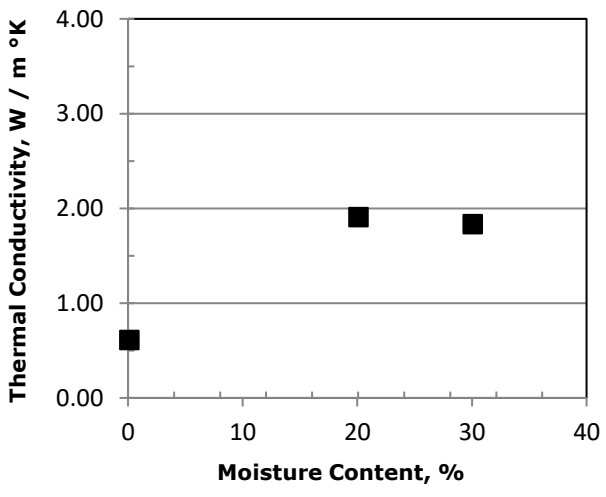
Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	06/05/25
End Date:	06/05/25
Tested By:	ges/jb
Checked By:	ank
Preparation:	Tested on a 3 point curve. Specimens compacted to 95% of the requested dry density (111 pcf), at dry, as-received, and wet moisture contents. GTX was unable to meet requested compaction.Needle was pushed into specimen.

Thermal Conductivity of Soil by ANSI IEEE 442

Boring	Sample	Depth, ft	Sample Description	Moisture Content, %	Wet Density, pcf	Dry Density, pcf	Thermal Conductivity, $^{W}/_{m°K}$	Thermal Resistivity, $^{°K\ cm}/_{W}$
TP-24	---	---	Moist, dark yellowish brown clay with sand	0.11	105.5	105.3	0.61	164
TP-24	---	---	Moist, dark yellowish brown clay with sand	20.10	124.2	103.4	1.91	52
TP-24	---	---	Moist, dark yellowish brown clay with sand	30.06	117.4	90.3	1.83	55

Notes: $^{W}/_{m°K}$ = Watts per Meter °Kelvin
$^{°K\ cm}/_{W}$ = °Kelvin Centimeter per Watt



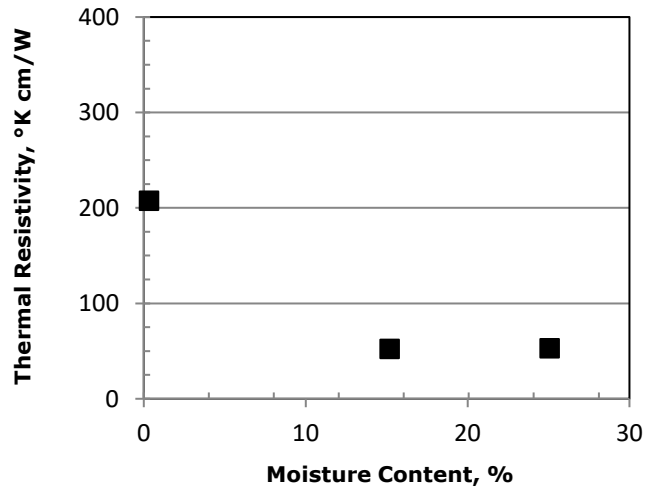


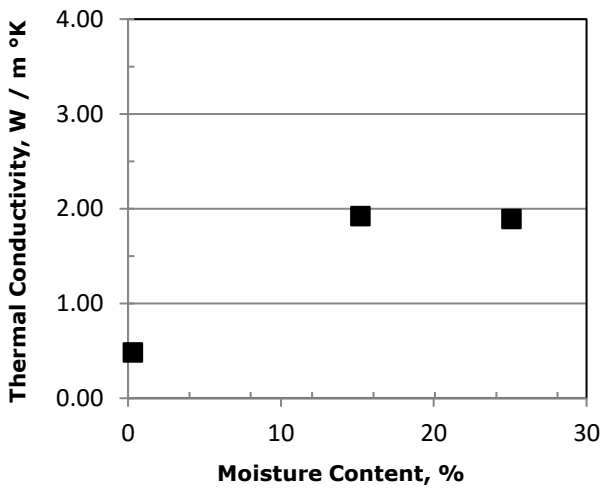
Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	06/11/25
End Date:	06/17/25
Tested By:	ges/jb
Checked By:	ank
Preparation:	Tested on a 3 point curve. Specimens compacted to 95% of the requested dry density (111 pcf), at dry, as-received, and wet moisture contents. Needle was pushed into specimen. GTX was unable to meet requested compaction at wet moisture content

Thermal Conductivity of Soil by ANSI IEEE 442

Boring	Sample	Depth, ft	Sample Description	Moisture Content, %	Wet Density, pcf	Dry Density, pcf	Thermal Conductivity, $^{W}/_{m°K}$	Thermal Resistivity, $^{°K\ cm}/_{W}$
TP-25	---	---	Moist, dark yellowish brown clay with sand	0.32	105.8	105.5	0.48	207
TP-25	---	---	Moist, dark yellowish brown clay with sand	15.20	121.5	105.5	1.92	52
TP-25	---	---	Moist, dark yellowish brown clay with sand	25.08	124.4	99.5	1.89	53

Notes: $^{W}/_{m°K}$ = Watts per Meter °Kelvin
$^{°K\ cm}/_{W}$ = °Kelvin Centimeter per Watt



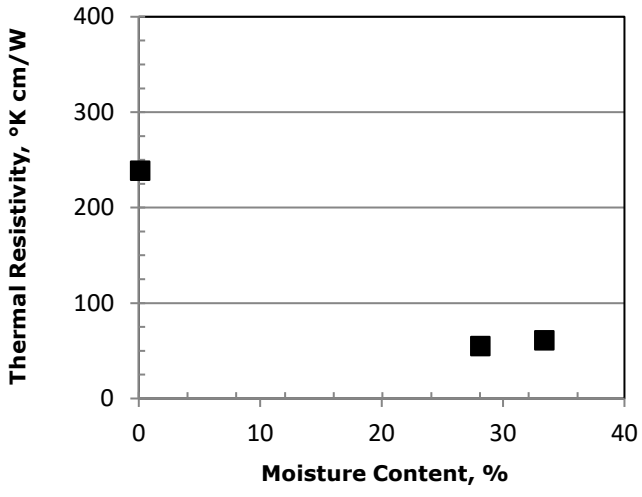


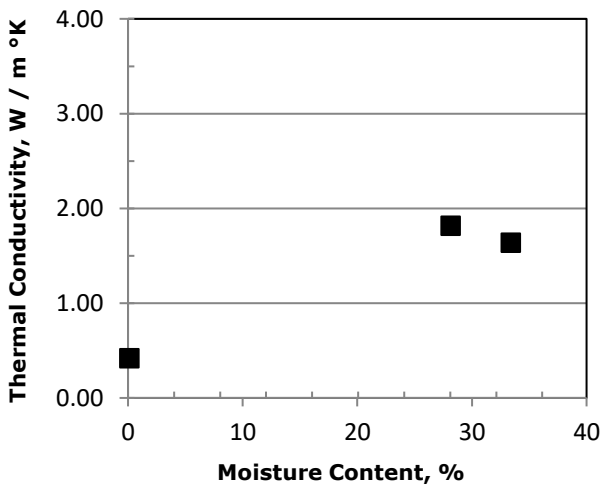
Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	06/19/25
End Date:	06/26/25
Tested By:	jb
Checked By:	ank
Preparation:	Tested on a 3 point curve. Specimens compacted to 95% of the requested dry density (111 pcf), at dry, as-received, and wet moisture contents.GTX was unable to meet requested compaction.Needle was pushed into specimen.

Thermal Conductivity of Soil by ANSI IEEE 442

Boring	Sample	Depth, ft	Sample Description	Moisture Content, %	Wet Density, pcf	Dry Density, pcf	Thermal Conductivity, $^{W}/_{m°K}$	Thermal Resistivity, $^{°K\ cm}/_{W}$
TP-26	---	---	Moist, brown silty clay	0.12	99.7	99.6	0.42	239
TP-26	---	---	Moist, brown silty clay	28.14	120.6	94.2	1.82	55
TP-26	---	---	Moist, brown silty clay	33.39	114.1	85.5	1.64	61

Notes: $^{W}/_{m°K}$ = Watts per Meter °Kelvin
$^{°K\ cm}/_{W}$ = °Kelvin Centimeter per Watt



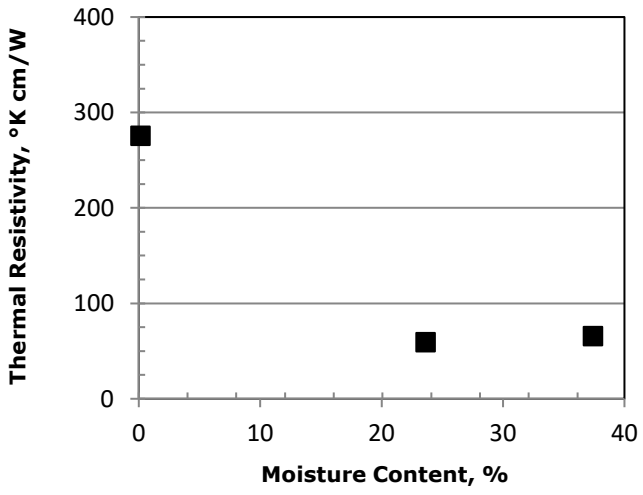


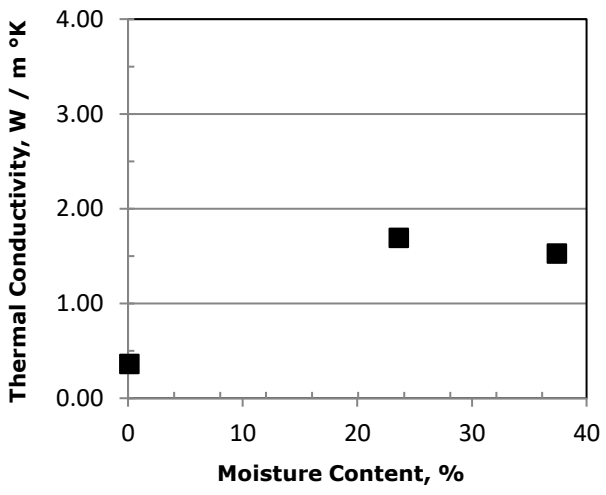
Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	06/19/25
End Date:	06/23/25
Tested By:	jb
Checked By:	ank
Preparation:	Tested on a 3 point curve. Specimens compacted to 95% of the requested dry density (111 pcf), at dry, as-received, and wet moisture contents. GTX was unable to meet requested compaction.Needle was pushed into specimen.

Thermal Conductivity of Soil by ANSI IEEE 442

Boring	Sample	Depth, ft	Sample Description	Moisture Content, %	Wet Density, pcf	Dry Density, pcf	Thermal Conductivity, $^{W}/_{m°K}$	Thermal Resistivity, $^{°K\ cm}/_{W}$
TP-27	---	---	Moist, yellowish brown silty clay with organics	0.13	99.6	99.5	0.36	275
TP-27	---	---	Moist, yellowish brown silty clay with organics	23.61	120.7	97.6	1.69	59
TP-27	---	---	Moist, yellowish brown silty clay with organics	37.41	111.7	81.3	1.53	66

Notes: $^{W}/_{m°K}$ = Watts per Meter °Kelvin
$^{°K\ cm}/_{W}$ = °Kelvin Centimeter per Watt



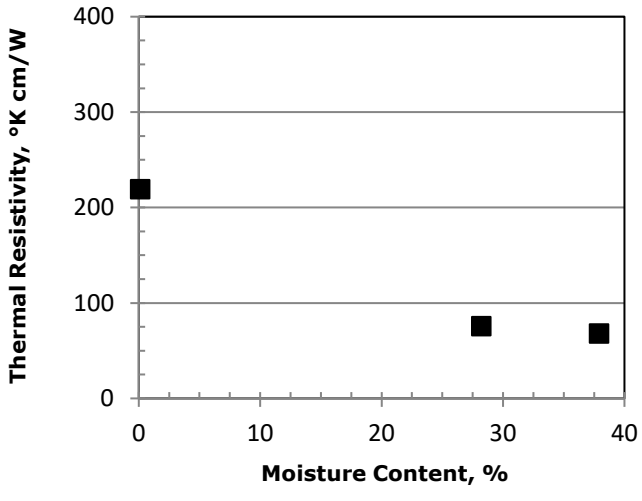


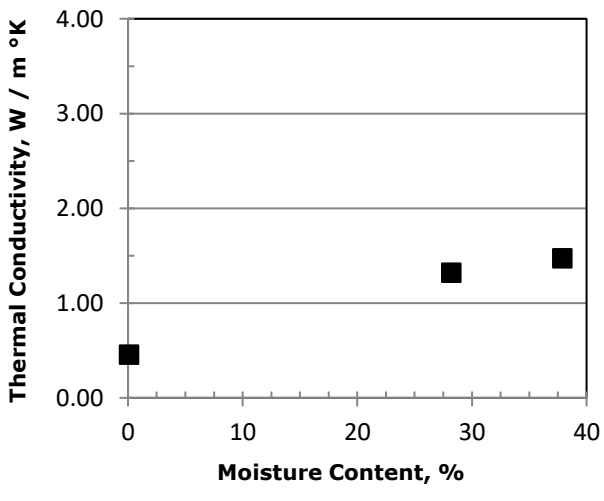
Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	05/27/25
End Date:	06/09/25
Tested By:	JL/ges
Checked By:	ank
Preparation:	Tested on a 3 point curve. Specimens compacted to 95% of the requested dry density (111 pcf), at dry, as-received, and wet moisture contents. GTX was unable to meet the requested compaction. Needle was pushed into specimen.

Thermal Conductivity of Soil by ANSI IEEE 442

Boring	Sample	Depth, ft	Sample Description	Moisture Content, %	Wet Density, pcf	Dry Density, pcf	Thermal Conductivity, $^{W}/_{m°K}$	Thermal Resistivity, $^{°K\ cm}/_{W}$
TP-28	---	---	Moist, yellowish brown clay	0.10	99.2	99.1	0.46	219
TP-28	---	---	Moist, yellowish brown clay	28.21	119.8	93.4	1.32	76
TP-28	---	---	Moist, yellowish brown clay	37.89	117.0	84.9	1.47	68

Notes: $^{W}/_{m°K}$ = Watts per Meter °Kelvin
$^{°K\ cm}/_{W}$ = °Kelvin Centimeter per Watt



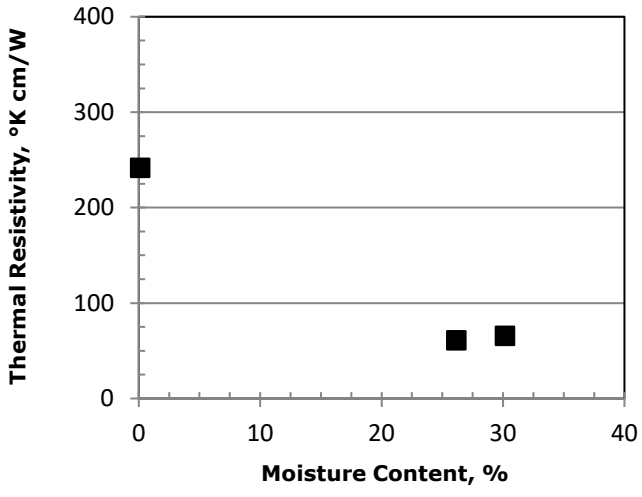


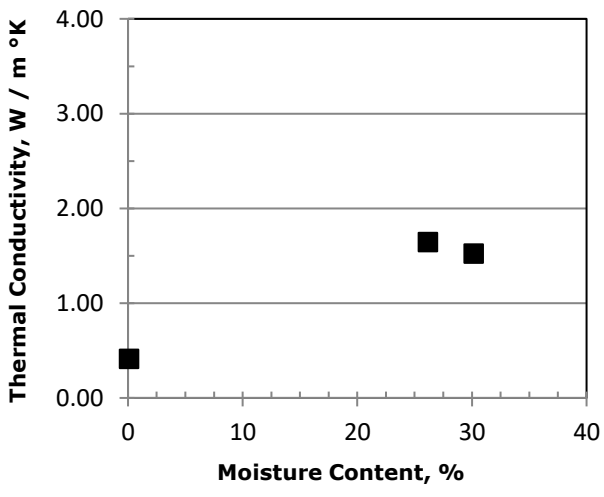
Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	05/29/25
End Date:	06/05/25
Tested By:	JL/ges
Checked By:	ank
Preparation:	Tested on a 3 point curve. Specimens compacted to 95% of the requested dry density (111 pcf), at dry, as-received, and wet moisture contents. GTX was unable to meet requested compaction.Needle was pushed into specimen.

Thermal Conductivity of Soil by ANSI IEEE 442

Boring	Sample	Depth, ft	Sample Description	Moisture Content, %	Wet Density, pcf	Dry Density, pcf	Thermal Conductivity, $^{W}/_{m°K}$	Thermal Resistivity, $^{°K\ cm}/_{W}$
TP-29	---	---	Moist, dark yellowish brown clay with sand	0.10	97.7	97.6	0.41	242
TP-29	---	---	Moist, dark yellowish brown clay with sand	26.16	118.5	93.9	1.64	61
TP-29	---	---	Moist, dark yellowish brown clay with sand	30.16	117.2	90.0	1.52	66

Notes: $^{W}/_{m°K}$ = Watts per Meter °Kelvin
$^{°K\ cm}/_{W}$ = °Kelvin Centimeter per Watt



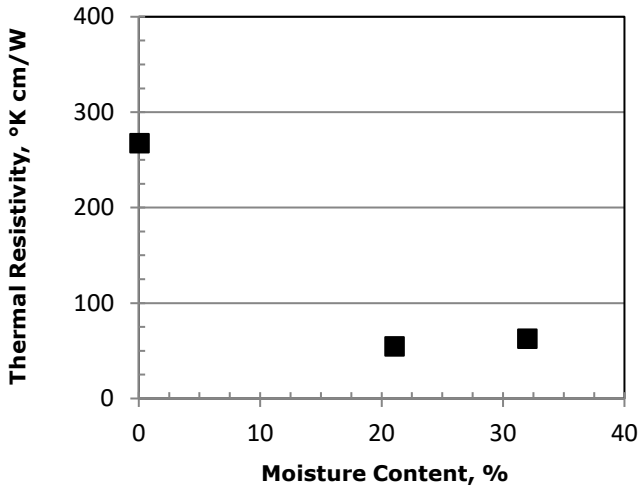


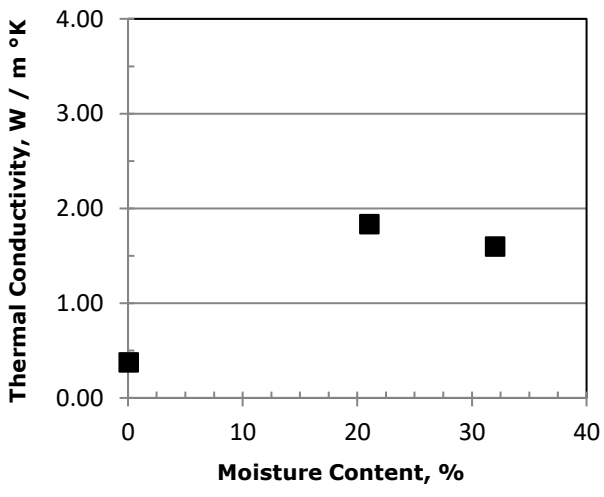
Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	05/29/25
End Date:	06/06/25
Tested By:	JL/ges
Checked By:	ank
Preparation:	Tested on a 3 point curve. Specimens compacted to 95% of the requested dry density (111 pcf), at dry, as-received, and wet moisture contents. GTX was unable to meet the requested compaction. Needle was pushed into specimen.

Thermal Conductivity of Soil by ANSI IEEE 442

Boring	Sample	Depth, ft	Sample Description	Moisture Content, %	Wet Density, pcf	Dry Density, pcf	Thermal Conductivity, $^{W}/_{m°K}$	Thermal Resistivity, $^{°K\ cm}/_{W}$
TP-30	---	---	Moist, dark yellowish brown clay with sand	0.07	99.2	99.1	0.37	267
TP-30	---	---	Moist, dark yellowish brown clay with sand	21.06	121.6	100.5	1.83	55
TP-30	---	---	Moist, dark yellowish brown clay with sand	32.01	115.4	87.4	1.60	63

Notes: $^{W}/_{m°K}$ = Watts per Meter °Kelvin
$^{°K\ cm}/_{W}$ = °Kelvin Centimeter per Watt



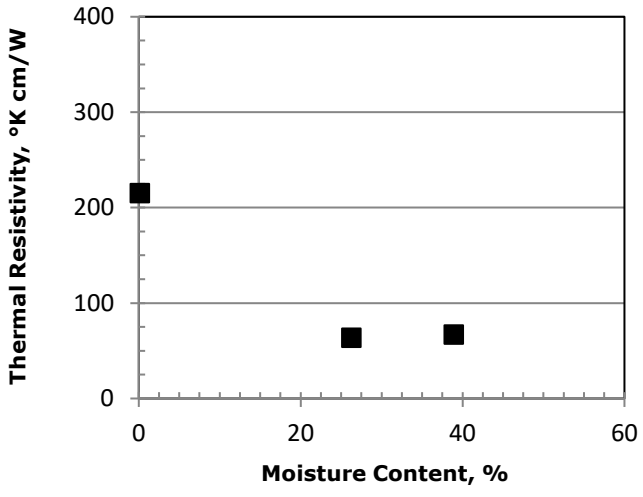


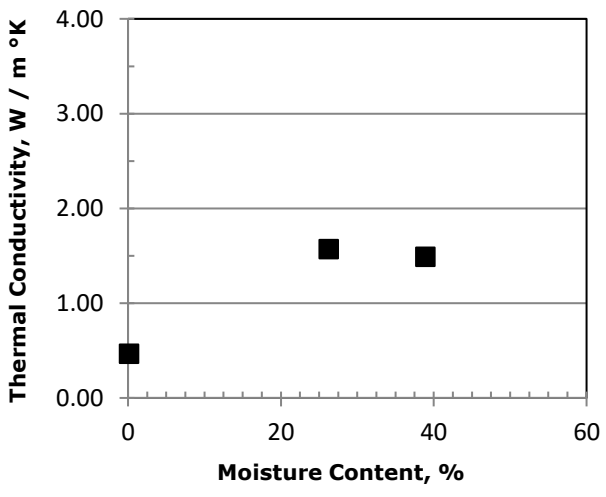
Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	05/27/25
End Date:	06/25/25
Tested By:	JL/ges
Checked By:	ank
Preparation:	Tested on a 3 point curve. Specimens compacted to 95% of the requested dry density (111 pcf), at dry, as-received, and wet moisture contents. GTX was unable to meet the requested compaction. Needle was pushed into specimen.

Thermal Conductivity of Soil by ANSI IEEE 442

Boring	Sample	Depth, ft	Sample Description	Moisture Content, %	Wet Density, pcf	Dry Density, pcf	Thermal Conductivity, $^{W}/_{m°K}$	Thermal Resistivity, $^{°K\ cm}/_{W}$
TP-31	---	---	Moist, brown clay with organics	0.13	99.6	99.5	0.46	215
TP-31	---	---	Moist, brown clay with organics	26.26	118.4	93.7	1.57	64
TP-31	---	---	Moist, brown clay with organics	38.91	125.3	90.2	1.49	67

Notes: $^{W}/_{m°K}$ = Watts per Meter °Kelvin
$^{°K\ cm}/_{W}$ = °Kelvin Centimeter per Watt



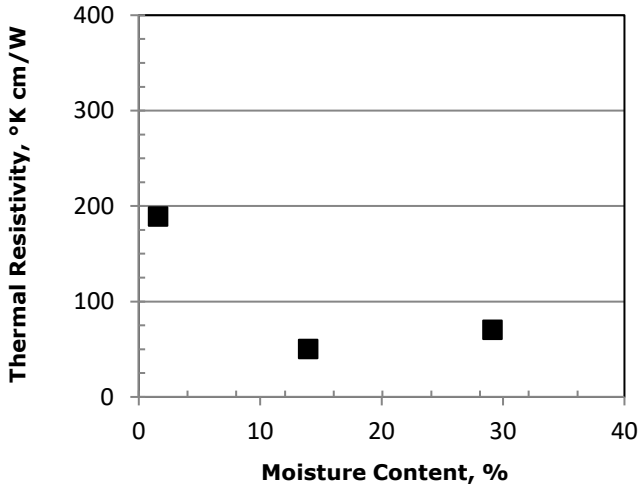


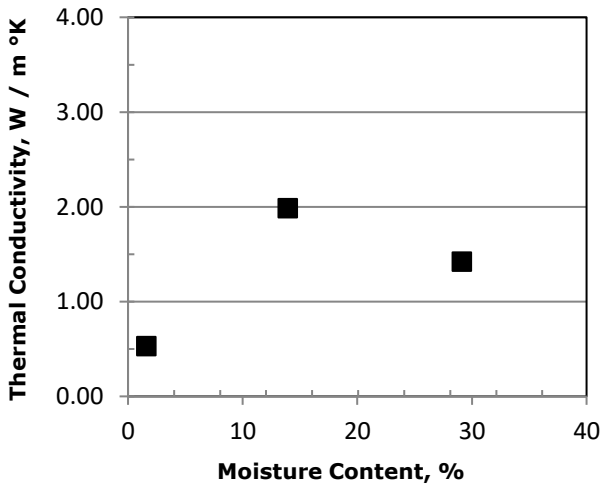
Client:	Langan Engineering
Project Name:	Upstate Confidential Project
Project Location:	NY
GTX #:	321096
Start Date:	06/11/25
End Date:	06/18/25
Tested By:	ges/jb
Checked By:	ank
Preparation:	Tested on a 3 point curve. Specimens compacted to 95% of the requested dry density (111 pcf), at dry, as-received, and wet moisture contents. GTX was unable to meet requested compaction at wet and dry moisture contents.Needle was pushed into specimen.

Thermal Conductivity of Soil by ANSI IEEE 442

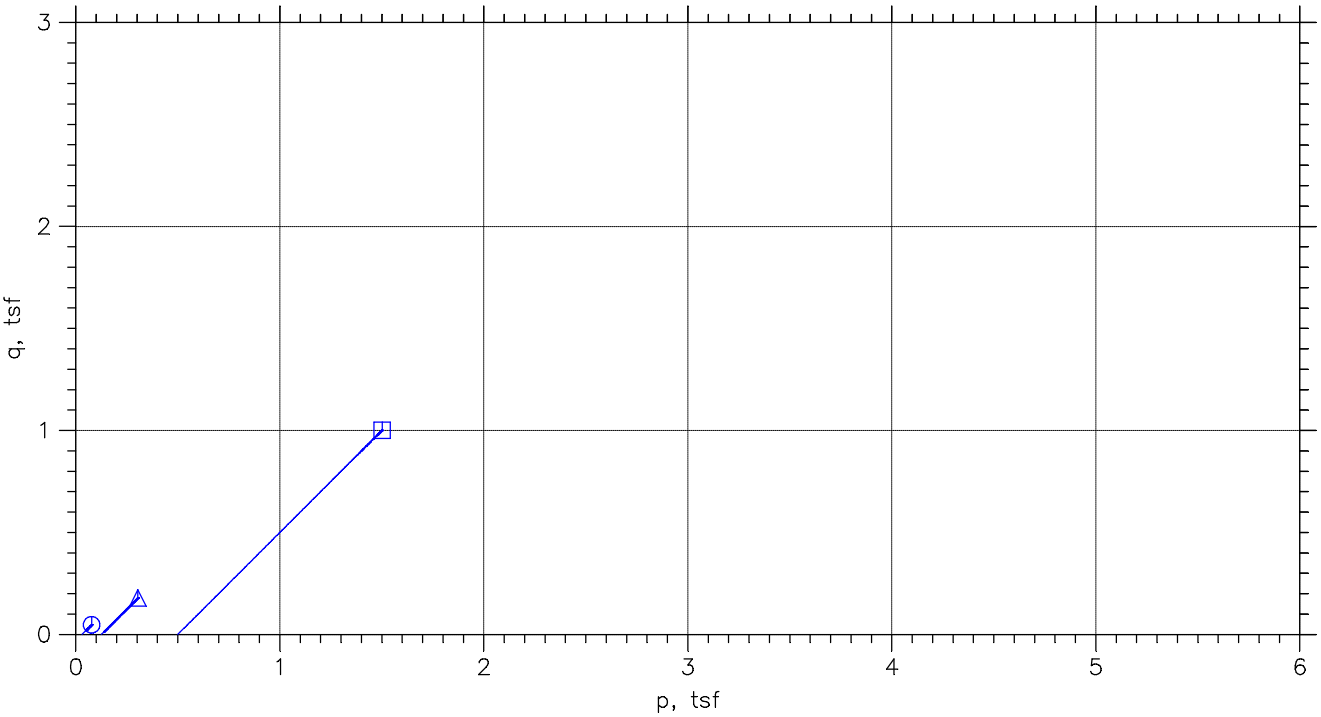
Boring	Sample	Depth, ft	Sample Description	Moisture Content, %	Wet Density, pcf	Dry Density, pcf	Thermal Conductivity, $^{W}/_{m°K}$	Thermal Resistivity, $^{°K\ cm}/_{W}$
TP-32	---	---	Moist, brown silt with organics	1.59	103.0	101.4	0.53	189
TP-32	---	---	Moist, yellowish brown silt with organics	13.94	120.2	105.5	1.99	50
TP-32	---	---	Moist, brown silt with organics	29.13	113.9	88.2	1.42	70

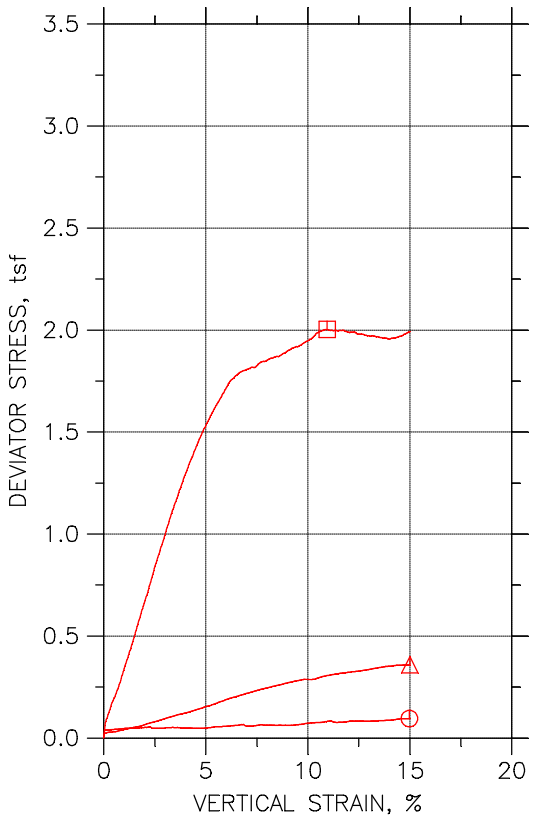
Notes: $^{W}/_{m°K}$ = Watts per Meter °Kelvin
$^{°K\ cm}/_{W}$ = °Kelvin Centimeter per Watt





UNCONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D2850





Symbol	○	△	□	
Sample No.	U-1	U-1	U-1	
Test No.	UU-11-1	UU-11-2	UU-11-3	
Depth	6-8'	6-8'	6-8'	
Tested by	sjt	sjt	sjt	
Test Date	5/22/25	5/22/25	5/22/25	
Checked by	trm	trm	trm	
Check Date	6/3/25	6/3/25	6/3/25	
Diameter, in	2	1.95	2.03	
Height, in	4.4	4.38	4.5	
Water Content, %	29.6	26.3	22.8	
Dry Density, pcf	90.07	97.97	103.7	
Saturation, %	92.5	99.6	99.5	
Void Ratio	0.858	0.708	0.614	
Confining Stress, tsf	0.03	0.125	0.5	
Undrained Strength, tsf	0.04762	0.1793	1.001	
Max. Dev. Stress, tsf	0.09525	0.3585	2.003	
Strain at Failure, %	15	15	11	
Strain Rate, %/min	1	1	1	
Estimated Specific Gravity	2.68	2.68	2.68	
Liquid Limit	24	24	24	
Plastic Limit	19	19	19	
Plasticity Index	5	5	5	

GeoTesting EXPRESS
A Sercel Business

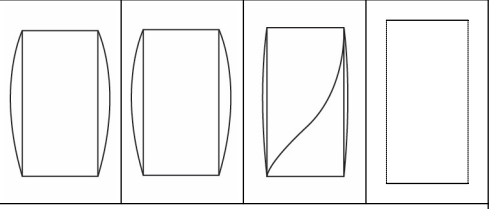
Project: Upstate Confidential Proj

Location: NY

Project No.: GTX-321096

Boring No.: LB-006

Sample Type: intact



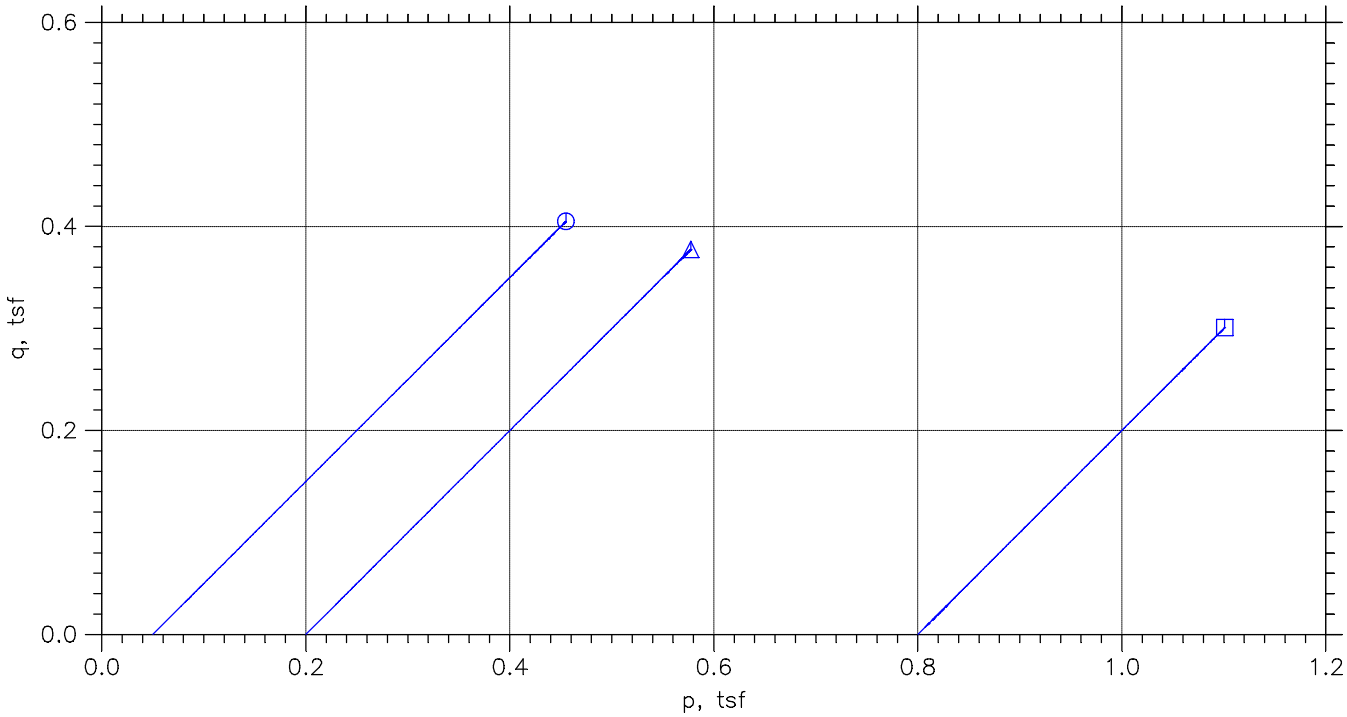
Description: Moist, yellowish brown silt

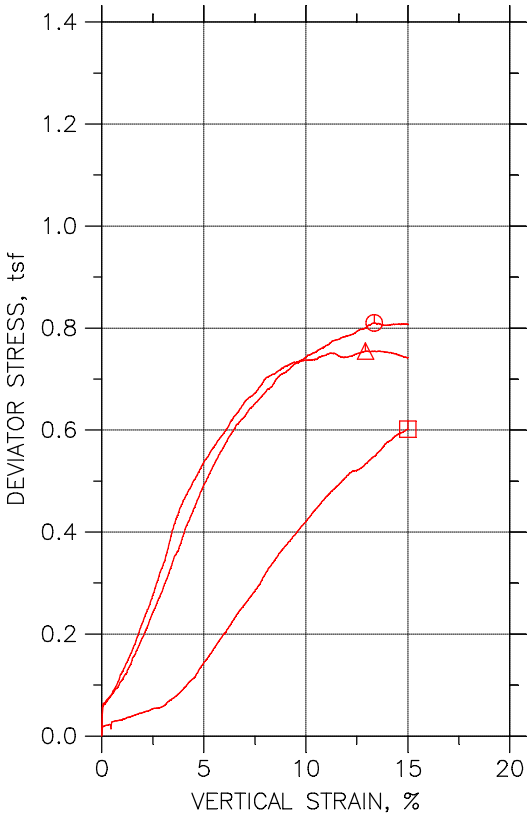
Remarks: TX-017

Phase calculations based on start of test.

Tue, 03-JUN-2025 11:03:08

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D2850

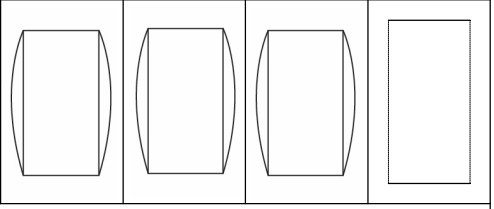




Symbol	◷	△	◫	
Sample No.	U-1	U-1	U-1	
Test No.	UU-6-1	UU-6-2	UU-6-3	
Depth	8-10'	8-10'	8-10'	
Tested by	dmt	dmt	sjt	
Test Date	5/21/25	5/21/25	5/22/25	
Checked by	trm	trm	trm	
Check Date	6/3/25	6/3/25	6/3/25	
Diameter, in	2.03	2	2.02	
Height, in	4.3	4.45	4.2	
Water Content, %	22.4	23.7	23.6	
Dry Density, pcf	104.7	102.6	101.9	
Saturation, %	99.4	99.5	97.4	
Void Ratio	0.609	0.642	0.655	
Confining Stress, tsf	0.05	0.2	0.8	
Undrained Strength, tsf	0.405	0.3774	0.3008	
Max. Dev. Stress, tsf	0.81	0.7549	0.6017	
Strain at Failure, %	13.4	12.9	15	
Strain Rate, %/min	1	1	1	
Estimated Specific Gravity	2.7	2.7	2.7	
Liquid Limit	21	21	21	
Plastic Limit	16	16	16	
Plasticity Index	5	5	5	

GeoTesting EXPRESS
A Sercel Business

Project: Upstate Confidential Proj
Location: NY
Project No.: GTX-321096
Boring No.: LB-R-026
Sample Type: intact

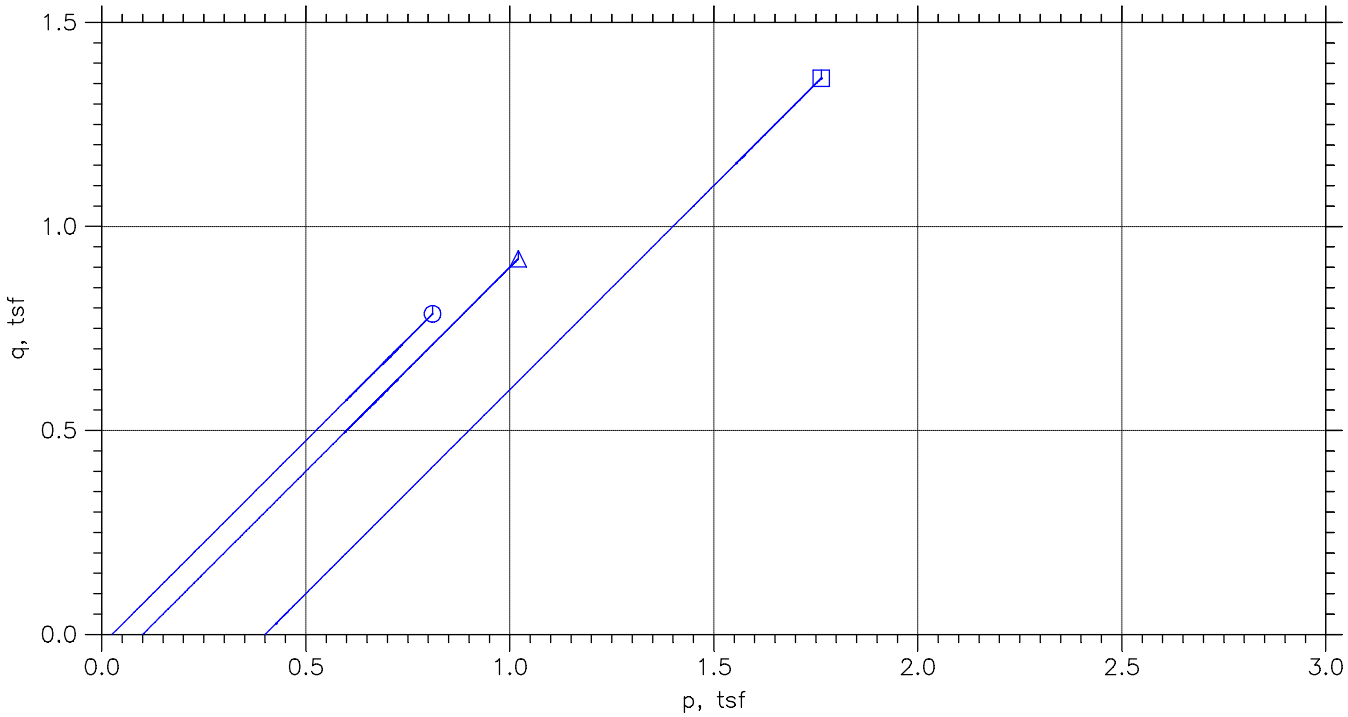


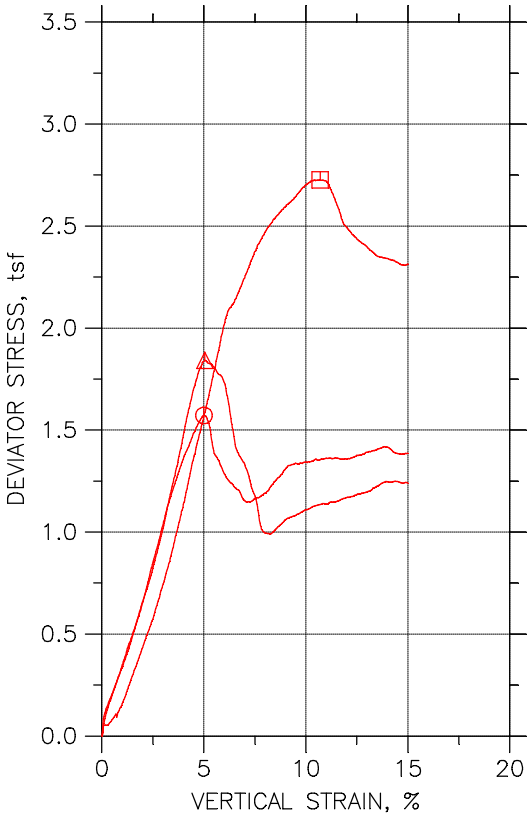
Description: Moist, brown silty clay
Remarks: TX-017

Phase calculations based on start of test.

Tue, 03-JUN-2025 10:50:55

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D2850

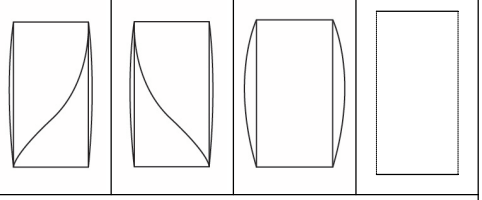




Symbol	◷	△	◫	
Sample No.	U-1	U-1	U-1	
Test No.	UU-3-1	UU-3-2	UU-3-3	
Depth	4-6'	4-6'	4-6'	
Tested by	sjt	sjt	sjt	
Test Date	5/22/25	5/22/25	5/22/25	
Checked by	trm	trm	trm	
Check Date	6/3/25	6/3/25	6/3/25	
Diameter, in	1.99	1.99	2	
Height, in	4.3	4.28	4.38	
Water Content, %	23.1	23.6	22.2	
Dry Density, pcf	93.88	96.93	102.2	
Saturation, %	79.3	87.3	93.4	
Void Ratio	0.782	0.726	0.637	
Confining Stress, tsf	0.025	0.1	0.4	
Undrained Strength, tsf	0.7857	0.9208	1.363	
Max. Dev. Stress, tsf	1.571	1.842	2.727	
Strain at Failure, %	5	5.05	10.7	
Strain Rate, %/min	1	1	1	
Estimated Specific Gravity	2.68	2.68	2.68	
Liquid Limit	24	24	24	
Plastic Limit	19	19	19	
Plasticity Index	5	5	5	

GeoTesting EXPRESS
A Sercel Business

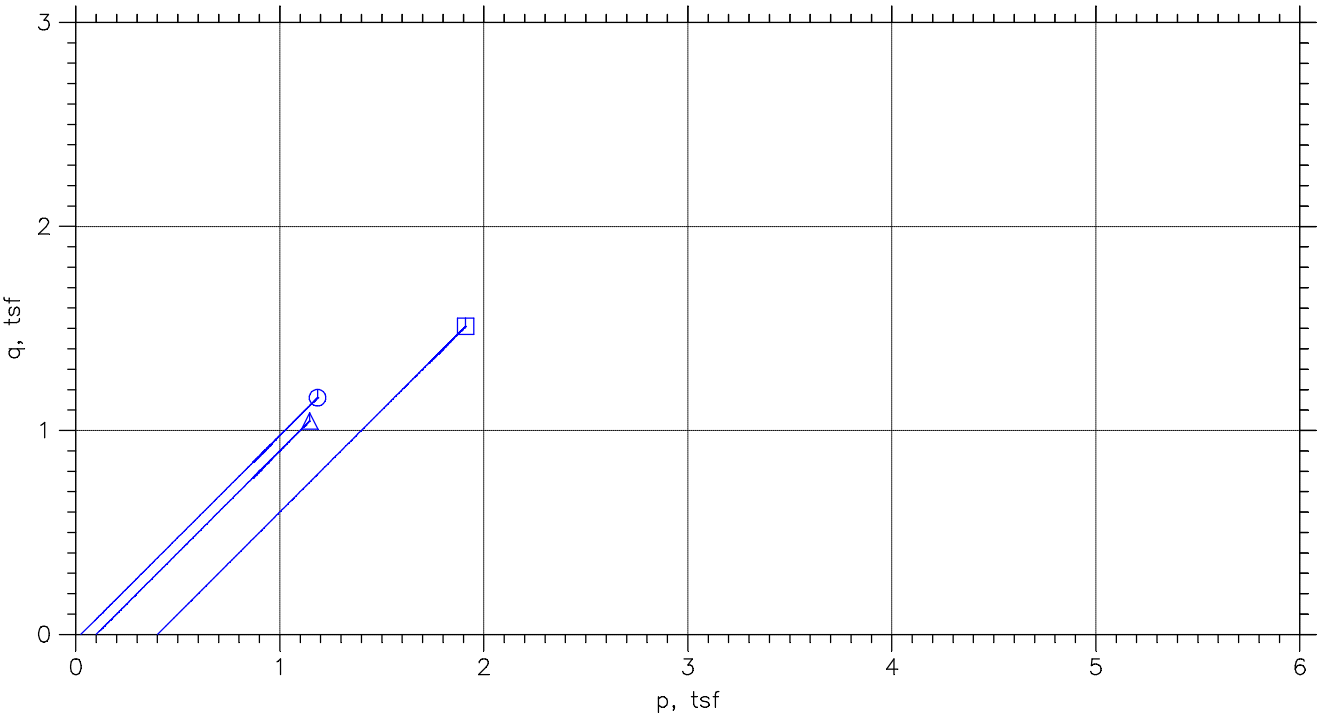
Project: Upstate Confidential Proj
Location: NY
Project No.: GTX-321096
Boring No.: LB-029
Sample Type: intact
Description: Moist, brown silt
Remarks: TX-017

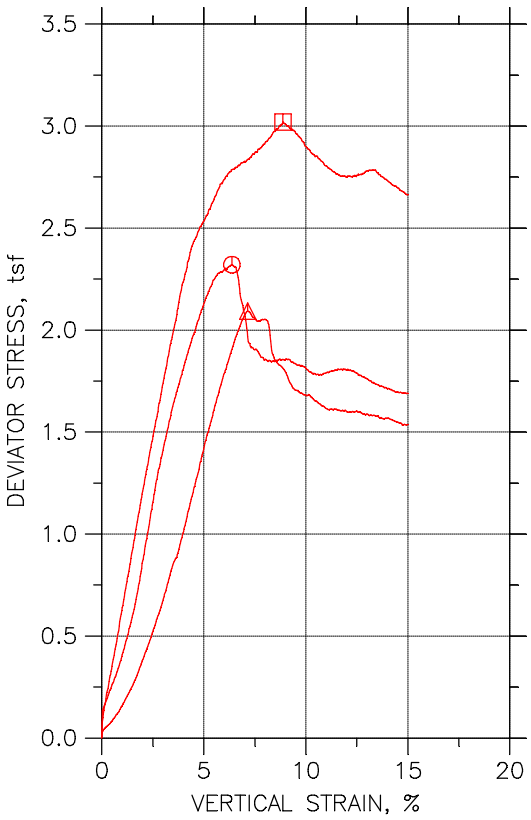


Phase calculations based on start of test.

Tue, 03-JUN-2025 10:44:29

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D2850





Symbol	◷	△	◫	
Sample No.	U-1	U-1	U-1	
Test No.	UU-1-1	UU-1-2	UU-1-3	
Depth	6-8'	6-8'	6-8'	
Tested by	dmt	dmt	dmt	
Test Date	5/22/25	5/22/25	5/22/25	
Checked by	trm	trm	trm	
Check Date	6/12/25	6/12/25	6/12/25	
Diameter, in	2.05	2.05	2.01	
Height, in	4.5	4.4	4.45	
Water Content, %	22.6	21.7	22.7	
Dry Density, pcf	101.4	105.7	102.9	
Saturation, %	92.2	98.4	96.0	
Void Ratio	0.662	0.594	0.639	
Confining Stress, tsf	0.025	0.1	0.4	
Undrained Strength, tsf	1.16	1.046	1.51	
Max. Dev. Stress, tsf	2.32	2.093	3.02	
Strain at Failure, %	6.38	7.15	8.88	
Strain Rate, %/min	1	1	1	
Estimated Specific Gravity	2.7	2.7	2.7	
Liquid Limit	22	22	22	
Plastic Limit	18	18	18	
Plasticity Index	4	4	4	

GeoTesting EXPRESS
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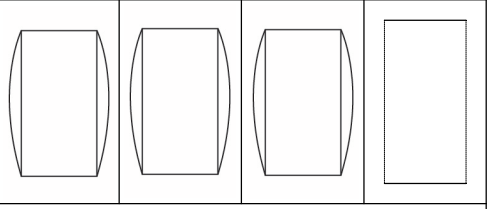
Project: Upstate Confidential Proj

Location: NY

Project No.: GTX-321096

Boring No.: LB-R-033

Sample Type: intact



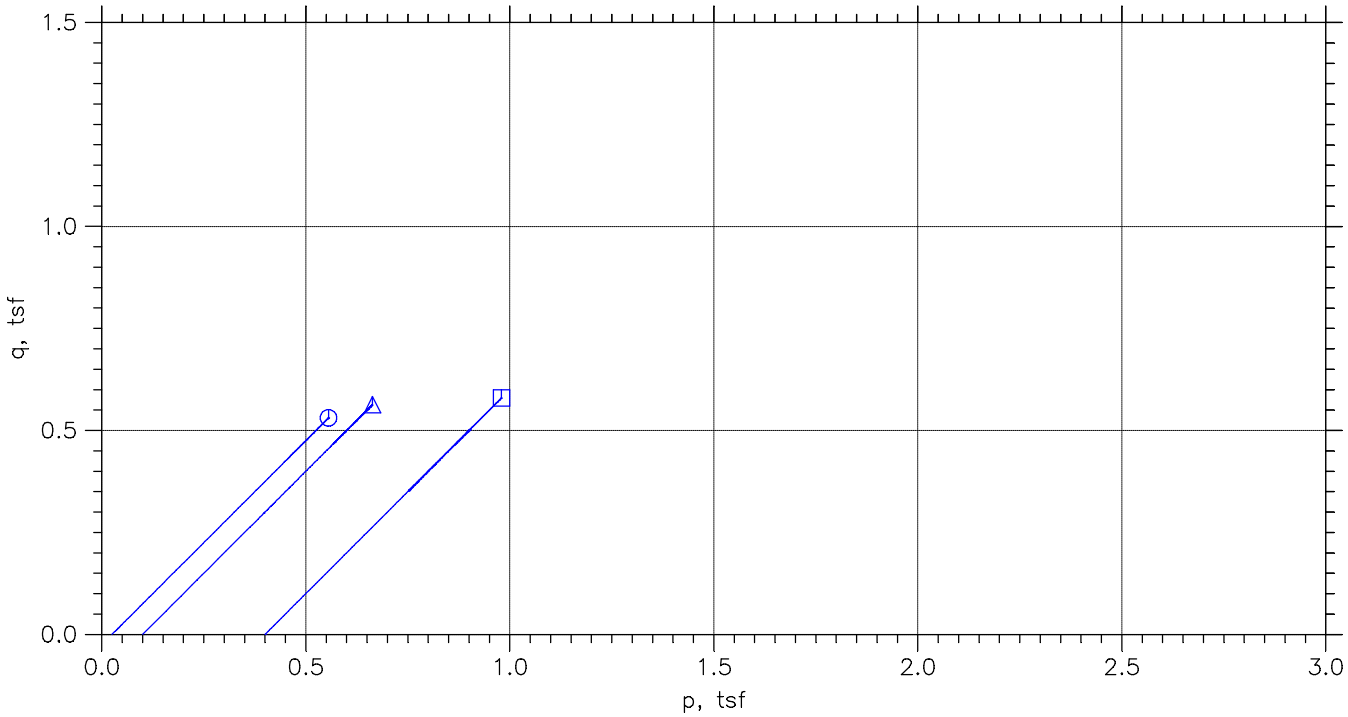
Description: Moist, brown silty clay

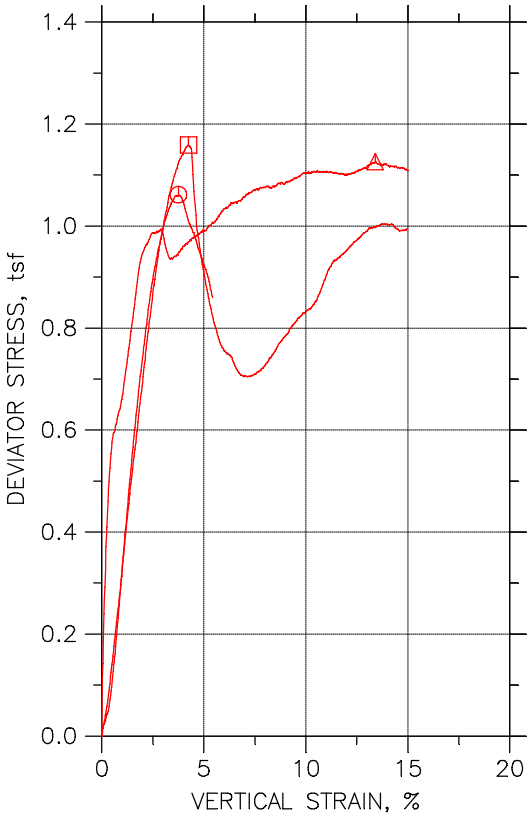
Remarks: TX-016

Phase calculations based on start of test.

Thu, 12-JUN-2025 10:21:55

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D2850

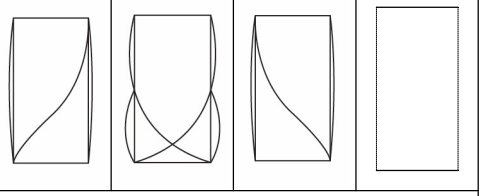




Symbol	◷	△	◫	
Sample No.	U-1	U-1	U-1	
Test No.	UU-9-1	UU-9-2	UU-9-3	
Depth	4-6'	4-6'	4-6'	
Tested by	sjt	sjt	dmt	
Test Date	05/22/25	05/22/25	05/22/25	
Checked by	anm	anm	anm	
Check Date	6/12/25	6/12/25	6/12/25	
Diameter, in	1.99	1.99	2	
Height, in	4.5	4.52	4.52	
Water Content, %	28.6	26.5	25.9	
Dry Density, pcf	85.79	89.56	91.	
Saturation, %	80.1	81.1	81.9	
Void Ratio	0.965	0.882	0.852	
Confining Stress, tsf	0.025	0.1	0.4	
Undrained Strength, tsf	0.5307	0.5633	0.5794	
Max. Dev. Stress, tsf	1.061	1.127	1.159	
Strain at Failure, %	3.75	13.4	4.25	
Strain Rate, %/min	1	1	1	
Estimated Specific Gravity	2.7	2.7	2.7	
Liquid Limit	26	26	26	
Plastic Limit	20	20	20	
Plasticity Index	6	6	6	

GeoTesting EXPRESS
A Sercel Business

Project: Upstate Confidential Proj
Location: NY
Project No.: GTX-321096
Boring No.: LB-037
Sample Type: intact

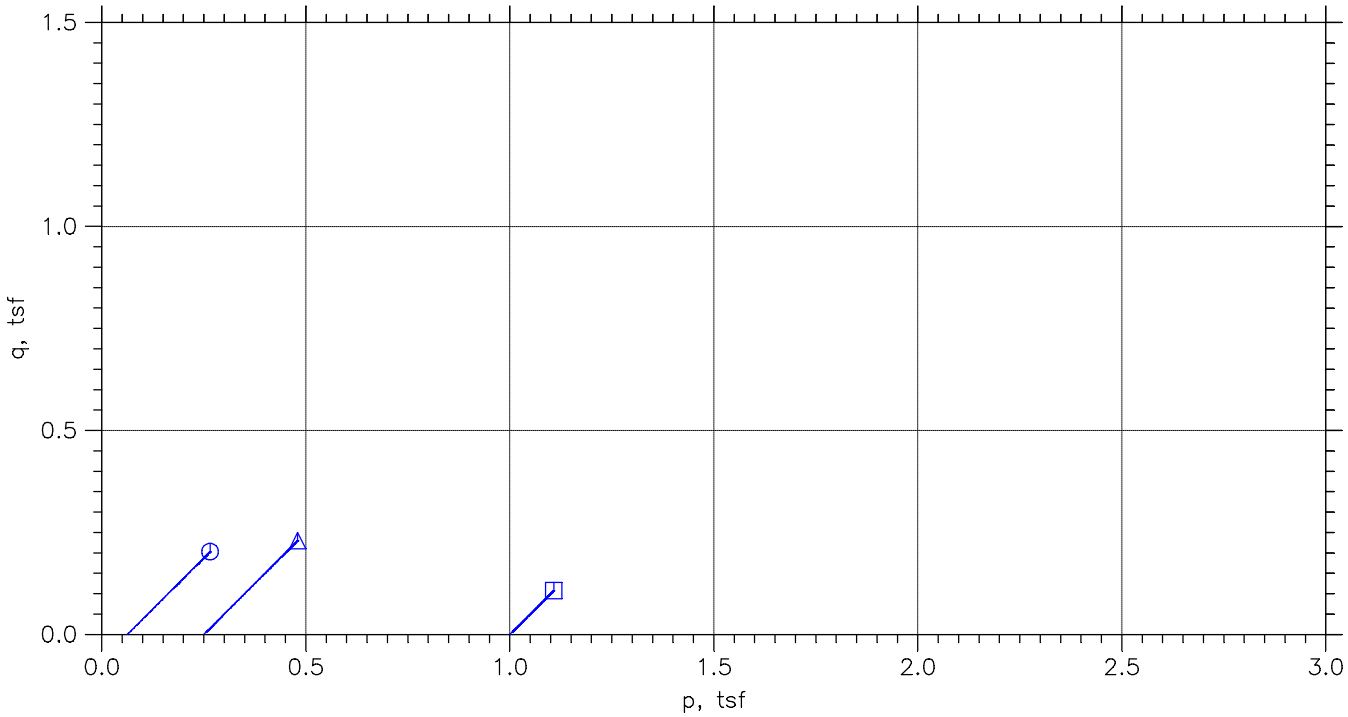


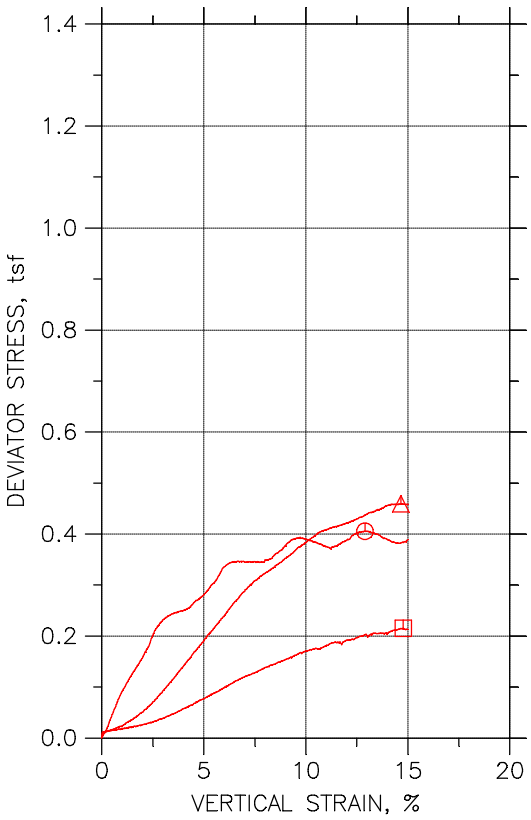
Description: Moist, brown silty clay
Remarks: TX-015

Phase calculations based on start of test.

Thu, 12-JUN-2025 10:52:26

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D2850

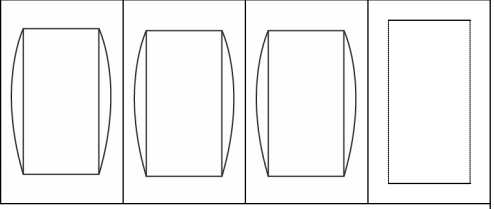




Symbol	◷	△	◫	
Sample No.	U-1	U-1	U-1	
Test No.	UU-8-1	UU-8-2	UU-8-3	
Depth	10-12'	10-12'	10-12'	
Tested by	sjt	sjt	sjt	
Test Date	5/23/25	5/27/25	5/27/25	
Checked by	trm	trm	trm	
Check Date	6/3/25	6/3/25	6/3/25	
Diameter, in	2.86	2.86	2.86	
Height, in	6.3	6	6.3	
Water Content, %	12.6	12.5	11.2	
Dry Density, pcf	116.5	115.8	116.3	
Saturation, %	77.5	75.3	68.6	
Void Ratio	0.436	0.445	0.439	
Confining Stress, tsf	0.0625	0.25	1	
Undrained Strength, tsf	0.2028	0.2297	0.1076	
Max. Dev. Stress, tsf	0.4056	0.4595	0.2153	
Strain at Failure, %	12.9	14.7	14.8	
Strain Rate, %/min	1	1	1	
Estimated Specific Gravity	2.68	2.68	2.68	
Liquid Limit	12	12	12	
Plastic Limit	10	10	10	
Plasticity Index	2	2	2	

GeoTesting EXPRESS
A Sercel Business

Project: Upstate Confidential Proj
Location: NY
Project No.: GTX-321096
Boring No.: LB-R-052
Sample Type: intact

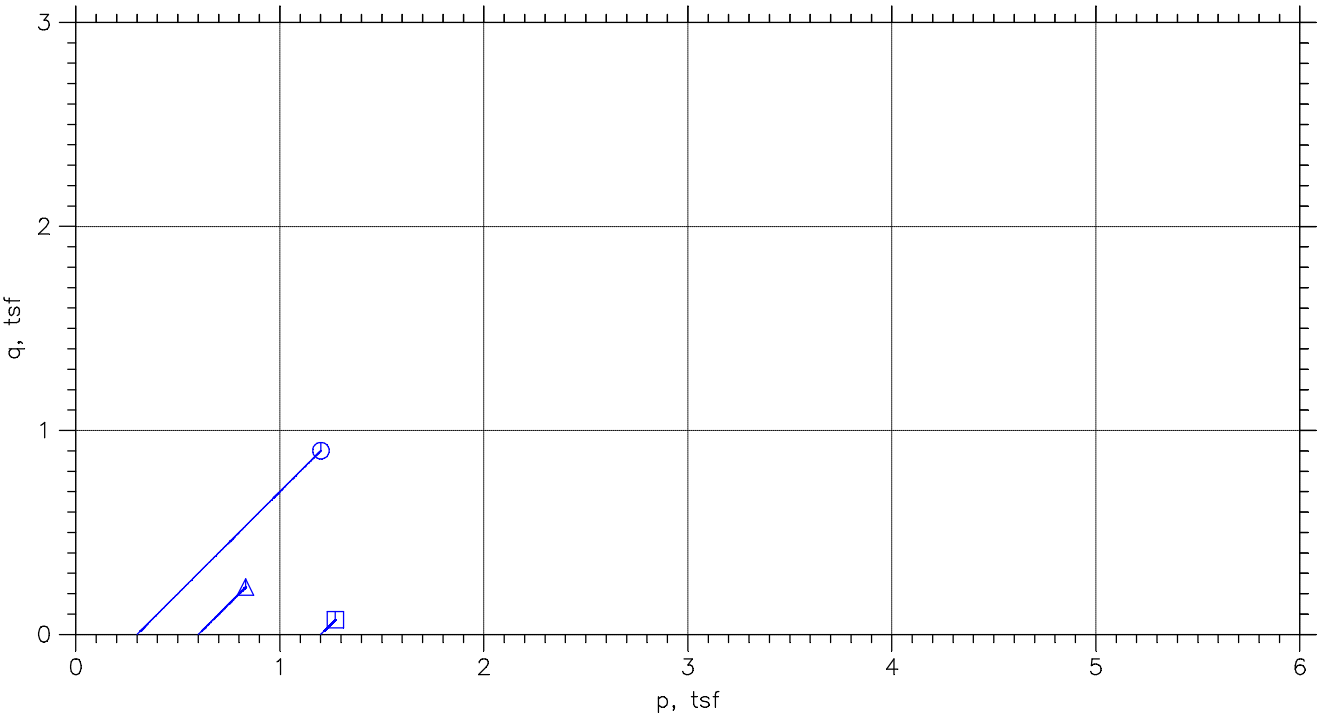


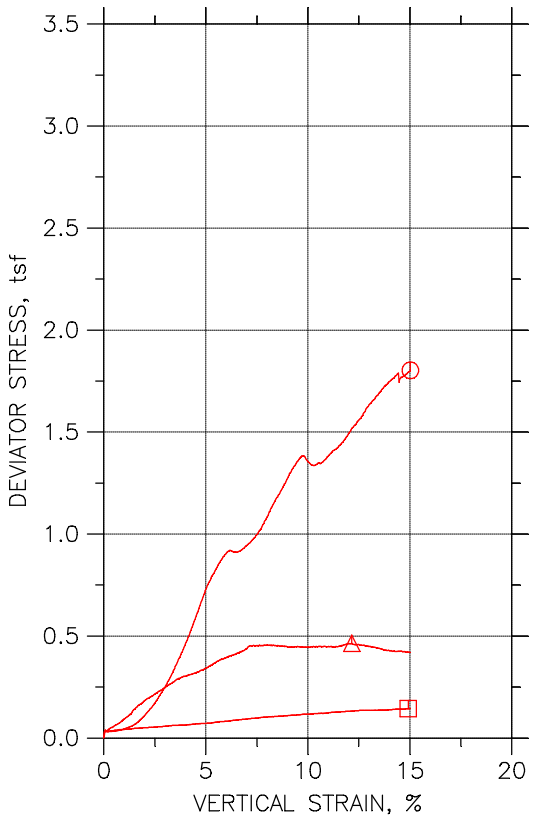
Description: Moist, brown silt
Remarks: TX-016

Phase calculations based on start of test.

Tue, 03-JUN-2025 10:57:35

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D2850

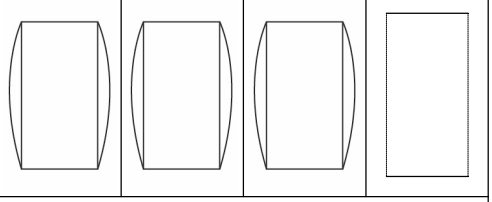




Symbol	○	△	□	
Sample No.	U-1	U-1	U-1	
Test No.	UU-2-1	UU-2-2	UU-2-3	
Depth	12-14'	12-14'	12-14'	
Tested by	dmt	dmt	dmt	
Test Date	5/27/25	5/27/25	5/27/25	
Checked by	trm	trm	trm	
Check Date	6/16/25	6/16/25	6/16/25	
Diameter, in	2.04	2.03	1.98	
Height, in	4.2	4.1	4.2	
Water Content, %	19.6	24.2	24.4	
Dry Density, pcf	109.3	98.54	96.62	
Saturation, %	97.6	92.0	88.5	
Void Ratio	0.542	0.711	0.744	
Confining Stress, tsf	0.3	0.6	1.2	
Undrained Strength, tsf	0.9011	0.2318	0.072	
Max. Dev. Stress, tsf	1.802	0.4637	0.144	
Strain at Failure, %	15	12.2	14.9	
Strain Rate, %/min	1	1	1	
Estimated Specific Gravity	2.7	2.7	2.7	
Liquid Limit	25	25	25	
Plastic Limit	14	14	14	
Plasticity Index	11	11	11	

GeoTesting EXPRESS
A Sercel Business

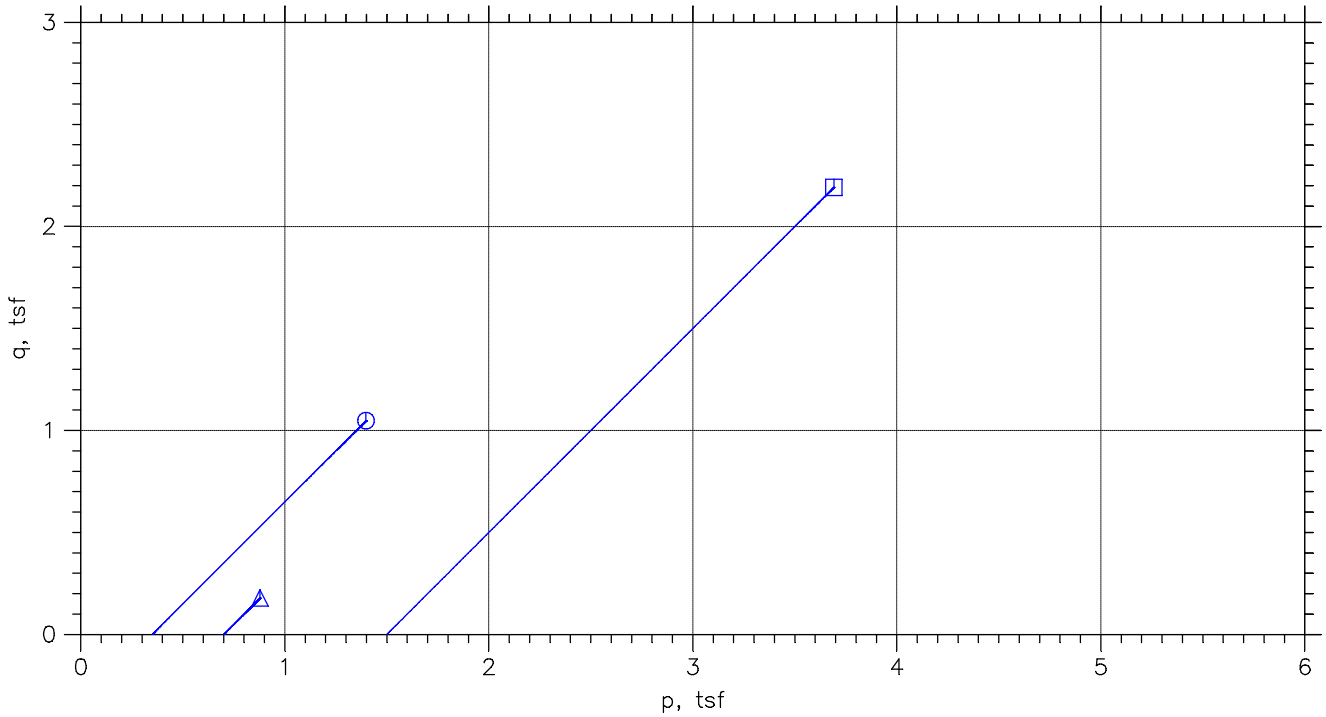
Project: Upstate Confidential Proj
Location: NY
Project No.: GTX-321096
Boring No.: LB-R-053
Sample Type: intact
Description: Moist, brown clay
Remarks: TX-017

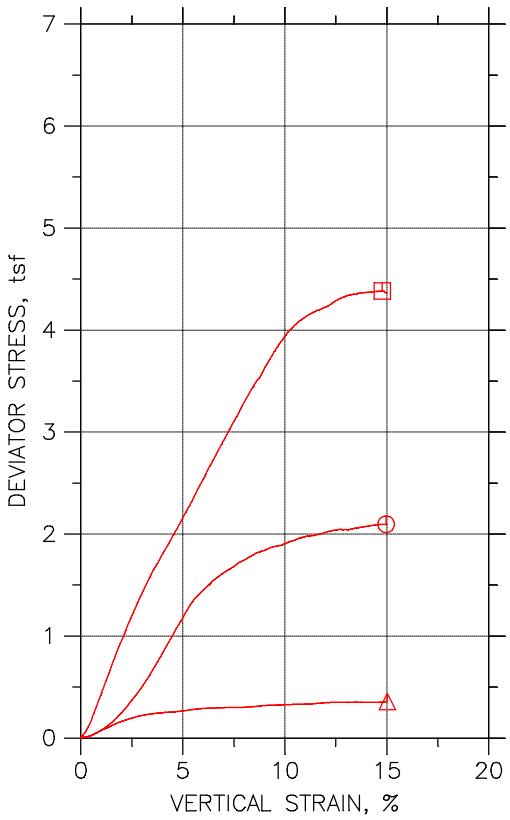


Phase calculations based on start of test.

Mon, 16-JUN-2025 08:17:31

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D2850





Symbol	○	△	□	
Sample No.	U-1	U-1	U-1	
Test No.	UU-7-1	UU-7-2	UU-7-3	
Depth	12-14'	12-14'	12-14'	
Tested by	sjt	sjt	sjt	
Test Date	6/5/25	6/5/25	6/6/25	
Checked by	trm	trm	trm	
Check Date	6/12/25	6/12/25	6/12/25	
Diameter, in	2.8	2.8	2.8	
Height, in	5.8	6.25	6	
Water Content, %	20.4	15.5	8.5	
Dry Density, pcf	106.6	117.4	135.7	
Saturation, %	95.9	98.0	98.0	
Void Ratio	0.569	0.425	0.233	
Confining Stress, tsf	0.35	0.7	1.5	
Undrained Strength, tsf	1.048	0.1782	2.192	
Max. Dev. Stress, tsf	2.095	0.3563	4.383	
Strain at Failure, %	15	15	14.8	
Strain Rate, %/min	1	1	1	
Estimated Specific Gravity	2.68	2.68	2.68	
Liquid Limit	NP	NP	NP	
Plastic Limit	NP	NP	NP	
Plasticity Index	NP	NP	NP	

GeoTesting EXPRESS
A Sercel Business

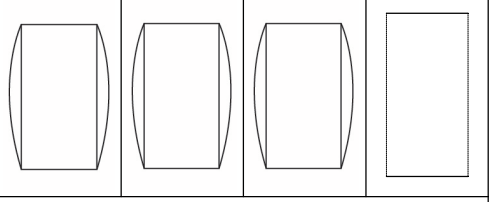
Project: Upstate Confidential Proj

Location: NY

Project No.: GTX-321096

Boring No.: LB-R-114

Sample Type: intact



Description: Moist, brown silt

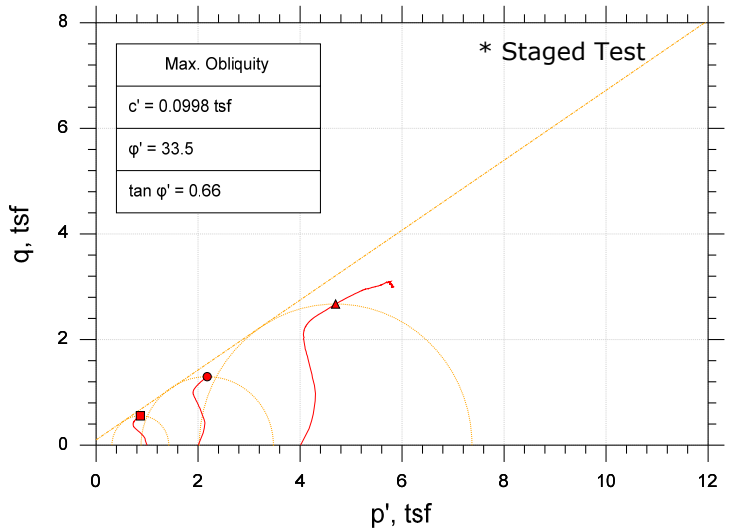
Remarks: TX-015

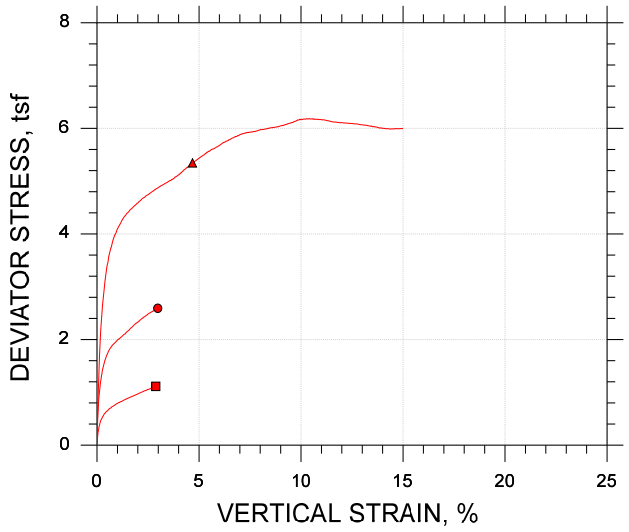
Phase calculations based on start and end of test.

GeoTesting EXPRESS
A Sercel Business

Client: Langan Engineering	
Project Name: Upstate Confidential Project	
Project Location: NY	
Project Number: GTX-321096	
Tested By: dmt	Checked By: anm
Boring ID: LB-004	
Preparation: intact	
Description: Moist, brown clay	
Classification: ---	
Group Symbol: ---	
Liquid Limit: 25	Plastic Limit: 14
Plasticity Index: 11	Estimated Specific Gravity: 2.82

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



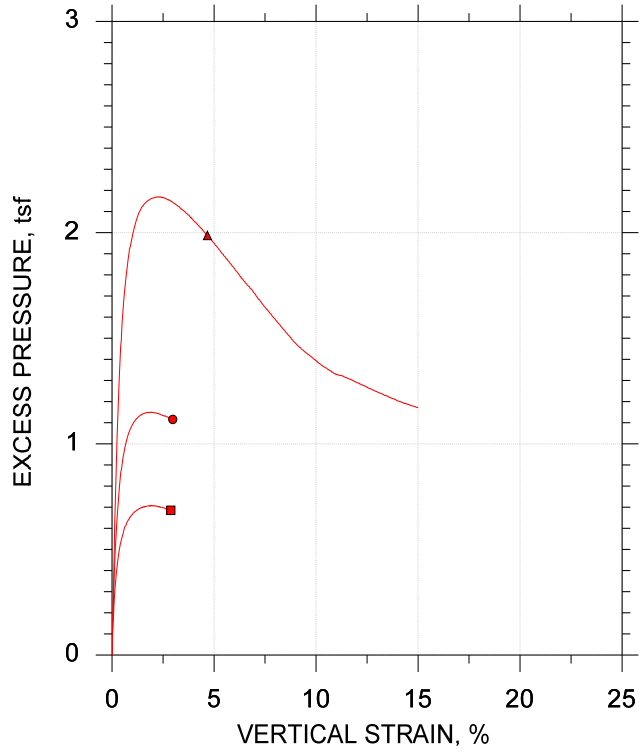


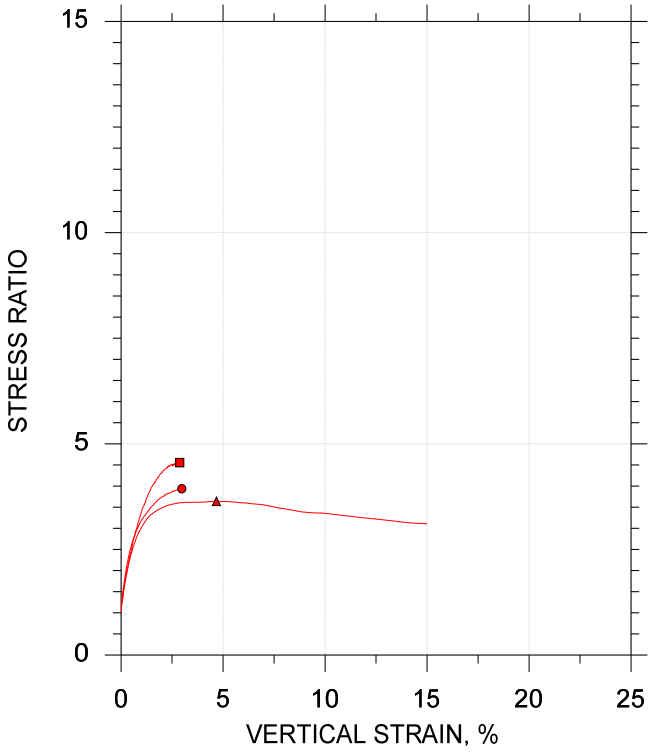
Symbol		■	●	▲	
Sample ID		U-1	U-1	U-1	
Depth, ft		10-12'	10-12'	10-12'	
Test Number		CU-3-1	CU-3-2	CU-3-2	
Initial	Height, in	4.100	3.925	3.813	
	Diameter, in	2.050	2.050	2.050	
	Moisture Content (from Cuttings), %	24.0	---	---	
	Dry Density, pcf	105.	---	---	
	Saturation (Wet Method), %	99.8	---	---	
	Void Ratio	0.679	---	---	
Before Shear	Moisture Content, %	---	---	23.0	
	Dry Density, pcf	---	---	107.	
	Cross-sectional Area (Method A), in²	---	---	3.295	
	Saturation, %	---	---	100.0	
	Void Ratio	---	---	0.649	
	Back Pressure, tsf	14.47	15.66	18.38	
Vertical Effective Consolidation Stress, tsf		0.9952	2.002	4.012	
Horizontal Effective Consolidation Stress, tsf		0.9986	2.002	4.011	
Vertical Strain after Consolidation, %		0.6672	-0.005047	-0.01944	
Volumetric Strain after Consolidation, %		1.345	0.6834	0.8363	
Time to 50% Consolidation, min		---	---	---	
Shear Strength, tsf		0.5566	1.296	2.673	
Strain at Failure, %		2.88	2.98	4.68	
Strain Rate, %/min		0.01600	0.01600	0.01600	
Deviator Stress at Failure, tsf		1.113	2.593	5.345	
Effective Minor Principal Stress at Failure, tsf		0.3130	0.8825	2.024	
Effective Major Principal Stress at Failure, tsf		1.426	3.476	7.369	
B-Value		0.92	---	---	

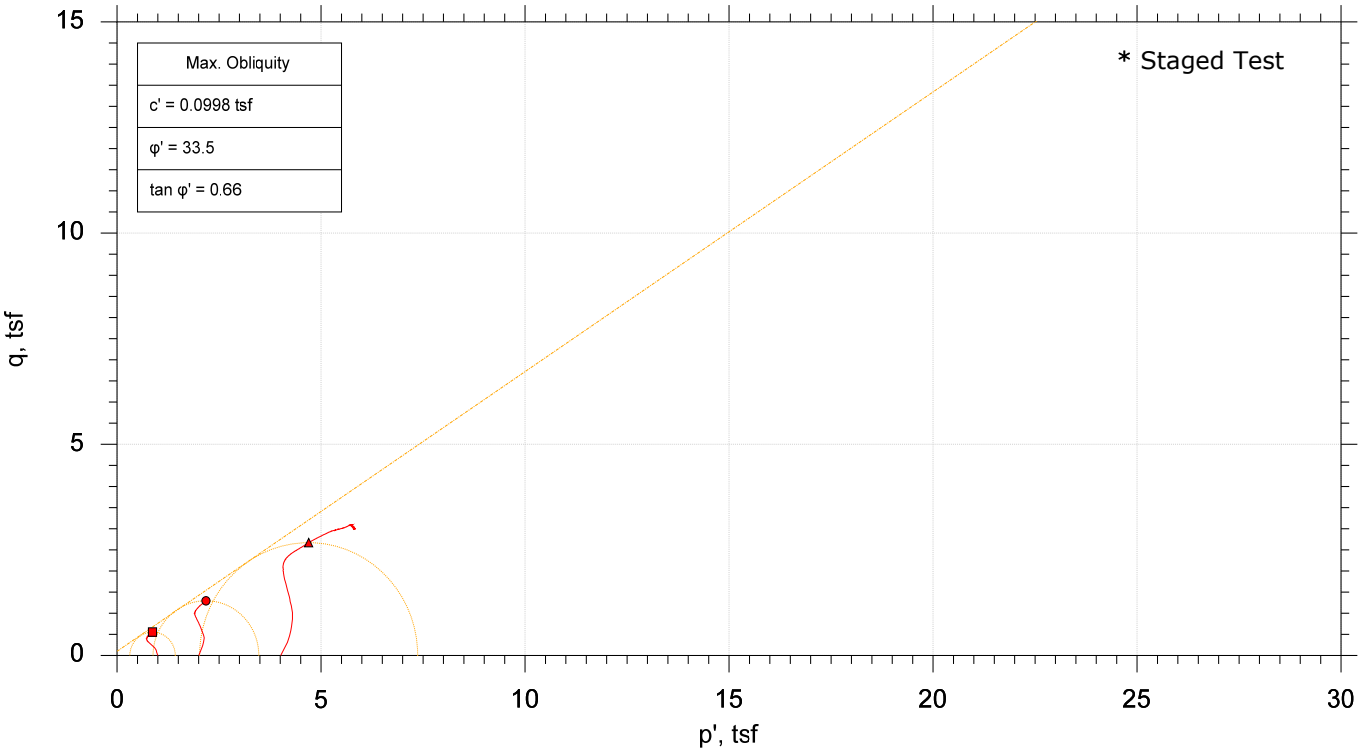
Notes:
- Before Shear Saturation set to 100% for phase calculation.
- Moisture Content determined by ASTM D2216.
- Atterberg Limits determined by ASTM D4318.
- Deviator Stress includes membrane correction.
- Values for c and φ determined from best-fit straight line for the specific test conditions. Actual strength parameters may vary and should be determined by an engineer for site conditions.

Remarks:

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767







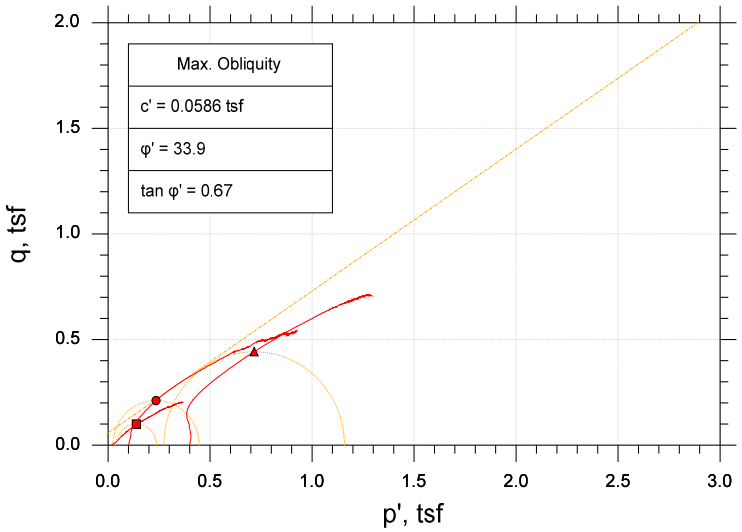
	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
■	U-1	CU-3-1	10-12'	dmt	6/4/25	anm	6/18/25	321096-CU-3-1v.dat
●	U-1	CU-3-2	10-12'	dmt	6/4/25	anm	6/18/25	321096-CU-3-2v.dat
▲	U-1	CU-3-2	10-12'	dmt	6/4/25	anm	6/18/25	321096-CU-3-3v.dat

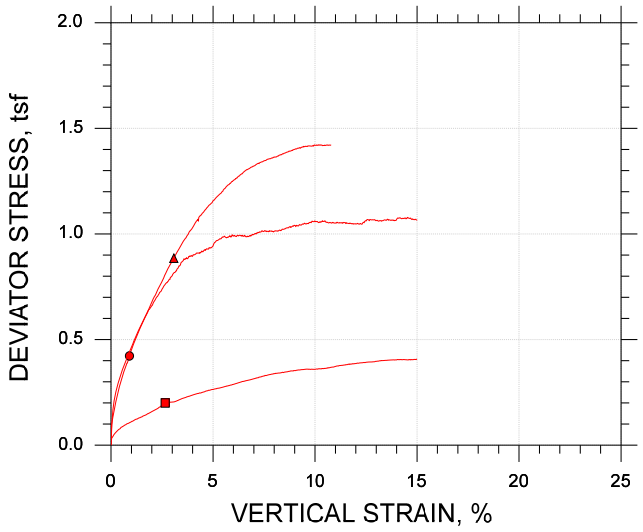
GeoTesting EXPRESS
A Sercel Business

Project: Upstate Confidential Project	Location: NY	Project No.: GTX-321096
Boring No.: LB-004	Sample Type: intact	
Description: Moist, brown clay		
Remarks: TX-029		

Client: Langan Engineering	
Project Name: Upstate Confidential Project	
Project Location: NY	
Project Number: GTX-321096	
Tested By: dmt	Checked By: anm
Boring ID: LB-R-005	
Preparation: intact	
Description: Moist, brown clay	
Classification: ---	
Group Symbol: ---	
Liquid Limit: 29	Plastic Limit: 19
Plasticity Index: 10	Estimated Specific Gravity: 2.7

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767

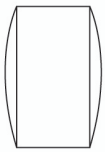


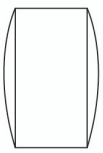


Symbol		■	●	▲	
Sample ID		U-1	U-1	U-1	
Depth, ft		4-6'	4-6'	4-6'	
Test Number		CU-2-1R	CU-2-2	CU-2-3	
Initial	Height, in	4.400	4.500	4.510	
	Diameter, in	2.000	2.030	2.020	
	Moisture Content (from Cuttings), %	33.8	31.6	28.4	
	Dry Density, pcf	88.1	88.9	93.4	
	Saturation (Wet Method), %	99.9	95.1	95.2	
	Void Ratio	0.913	0.896	0.804	
Before Shear	Moisture Content, %	34.5	33.3	28.5	
	Dry Density, pcf	87.3	88.8	95.3	
	Cross-sectional Area (Method A), in²	3.169	3.239	3.166	
	Saturation, %	100.0	100.0	100.0	
	Void Ratio	0.932	0.898	0.769	
	Back Pressure, tsf	2.448	7.380	11.59	
Vertical Effective Consolidation Stress, tsf		0.01687	0.09995	0.3978	
Horizontal Effective Consolidation Stress, tsf		0.01681	0.1001	0.3993	
Vertical Strain after Consolidation, %		-0.003445	0.08296	0.2789	
Volumetric Strain after Consolidation, %		-0.6977	0.1936	0.5237	
Time to 50% Consolidation, min		0.0000	0.0000	32.49	
Shear Strength, tsf		0.09964	0.2112	0.4425	
Strain at Failure, %		2.65	0.900	3.08	
Strain Rate, %/min		0.01600	0.01600	0.01600	
Deviator Stress at Failure, tsf		0.1993	0.4223	0.8851	
Effective Minor Principal Stress at Failure, tsf		0.03898	0.02378	0.2734	
Effective Major Principal Stress at Failure, tsf		0.2383	0.4461	1.158	
B-Value		0.96	0.95	0.95	

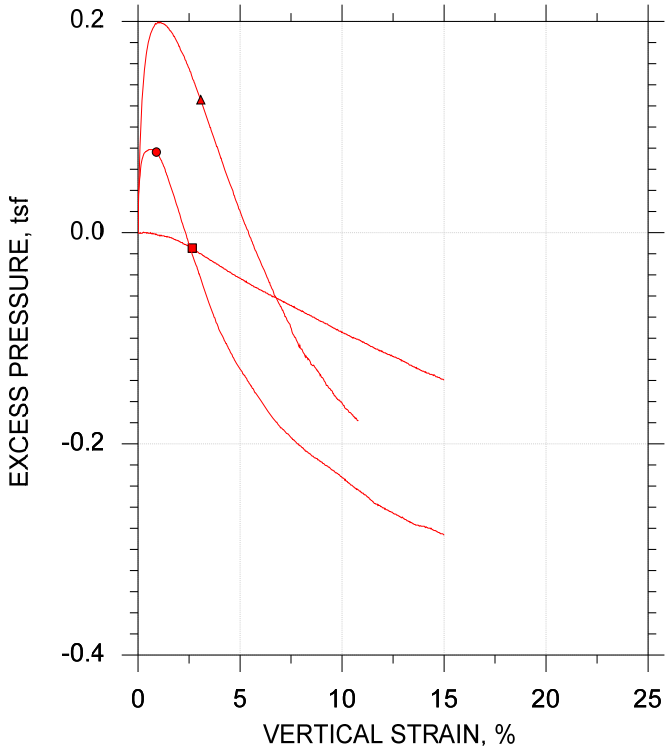
Notes:
- Before Shear Saturation set to 100% for phase calculation.
- Moisture Content determined by ASTM D2216.
- Atterberg Limits determined by ASTM D4318.
- Deviator Stress includes membrane correction.
- Values for c and φ determined from best-fit straight line for the specific test conditions. Actual strength parameters may vary and should be determined by an engineer for site conditions.

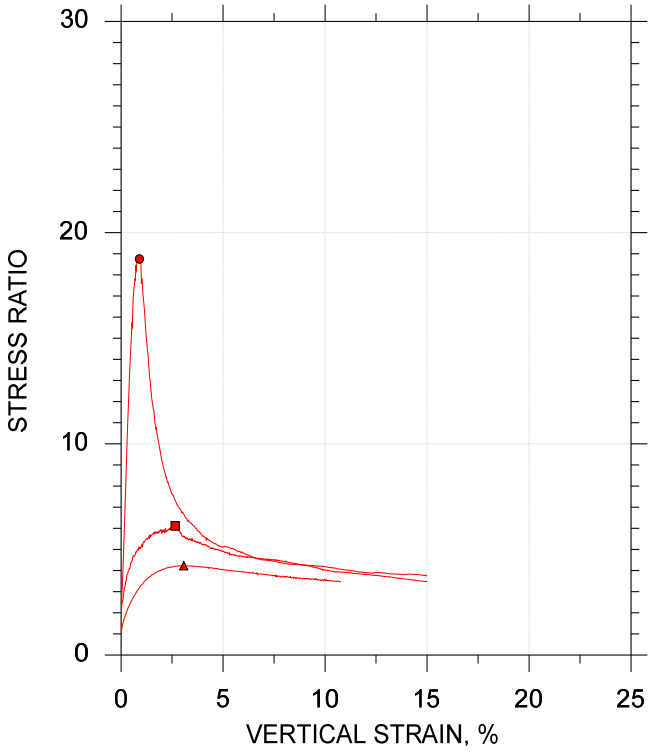
Remarks:

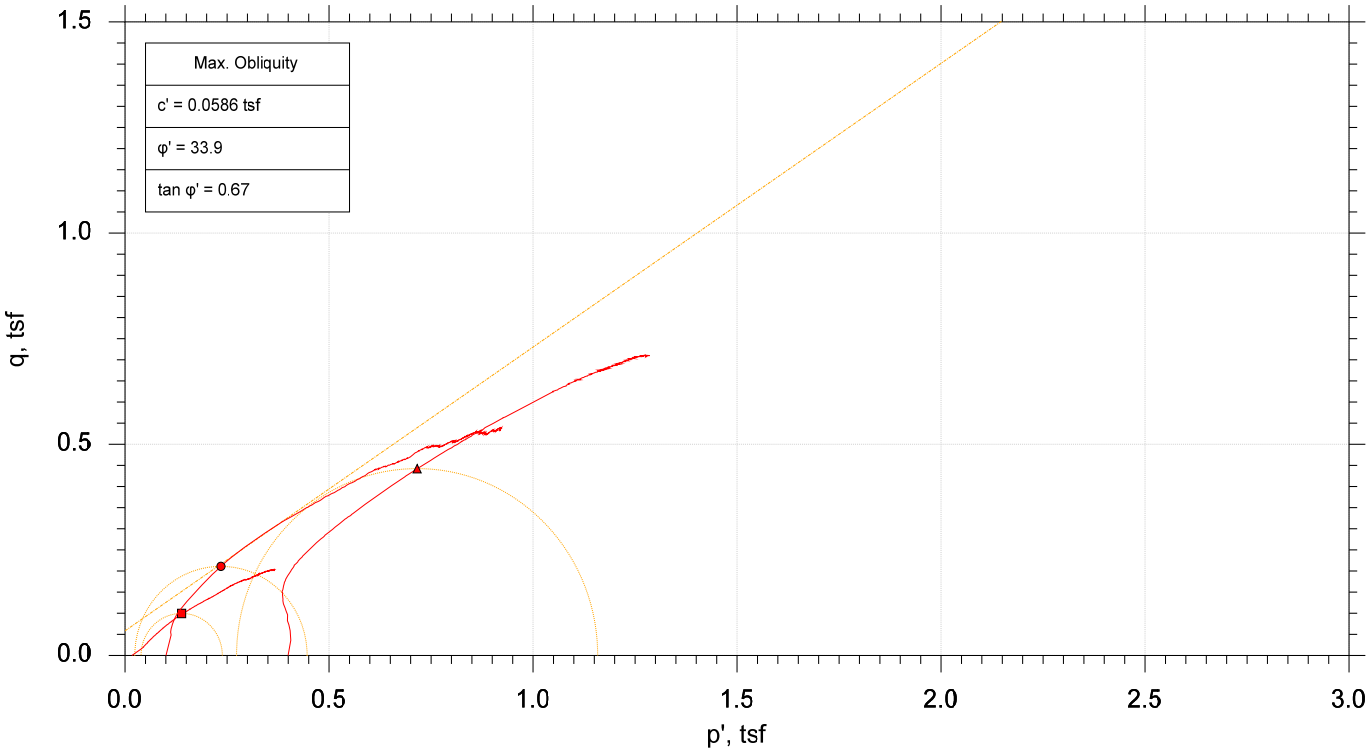




CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767







	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
■	U-1	CU-2-1R	4-6'	dmt	6/4/25	anm	6/10/25	321096-CU-2-1Rv.dat
●	U-1	CU-2-2	4-6'	dmt	5/30/25	anm	6/10/25	321096-CU-2-2v.dat
▲	U-1	CU-2-3	4-6'	jlw	5/21/25	anm	6/10/25	321096-CU-2-3v.dat

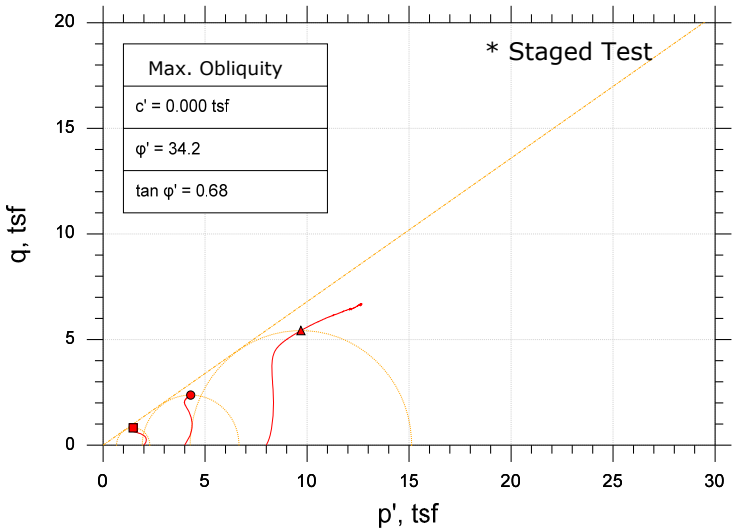
GeoTesting EXPRESS
A Sercel Business

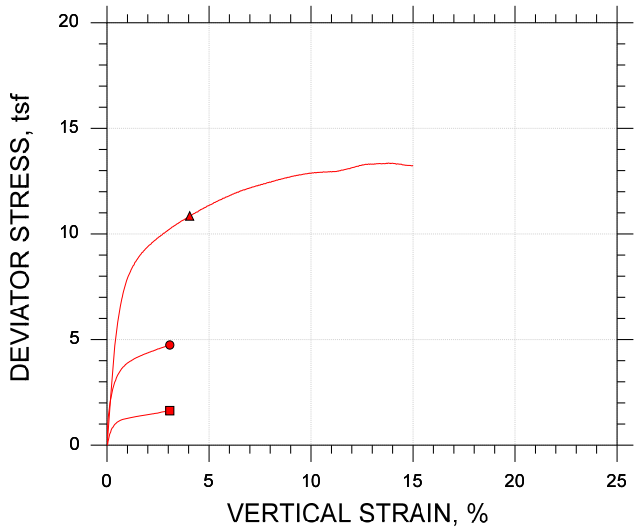
Project: Upstate Confidential Project	Location: NY	Project No.: GTX-321096
Boring No.: LB-R-005	Sample Type: intact	
Description: Moist, brown clay		
Remarks: TX-002		

GeoTesting EXPRESS
A Sercel Business

Client: Langan Engineering	
Project Name: Upstate Confidential Project	
Project Location: NY	
Project Number: GTX-321096	
Tested By: dmt	Checked By: anm
Boring ID: LB-R-035	
Preparation: intact	
Description: Moist, dark gray silt	
Classification: ---	
Group Symbol: ---	
Liquid Limit: 14	Plastic Limit: 11
Plasticity Index: 3	Estimated Specific Gravity: 2.7

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



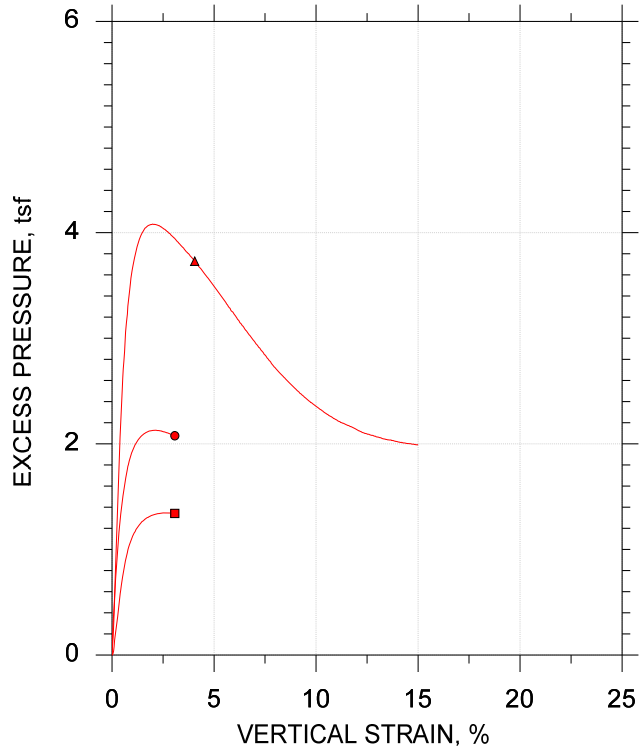


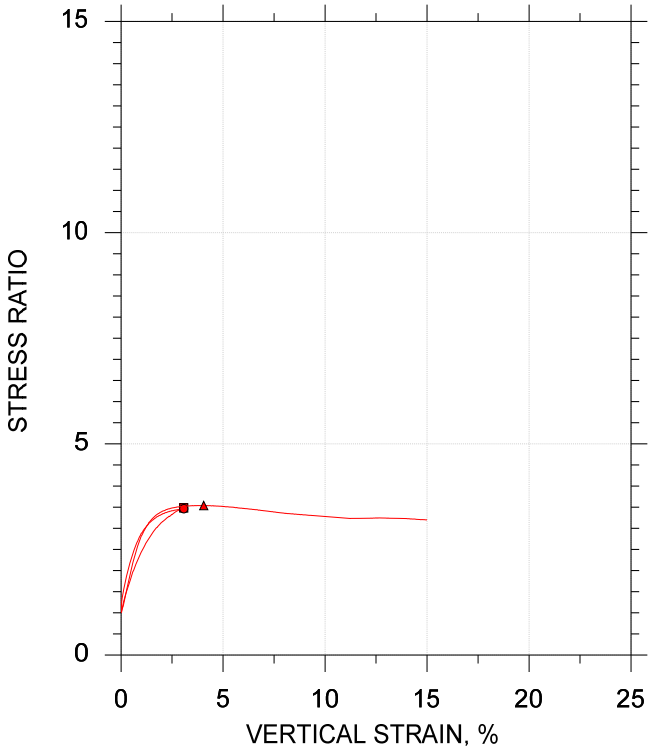
Symbol		■	●	▲	
Sample ID		U-1	U-1	U-1	
Depth, ft		10-12'	10-12'	10-12'	
Test Number		CU-4-1	CU-4-2	CU-4-3	
Initial	Height, in	4.200	3.886	3.776	
	Diameter, in	2.030	2.030	2.030	
	Moisture Content (from Cuttings), %	15.9	---	---	
	Dry Density, pcf	118.	---	---	
	Saturation (Wet Method), %	99.4	---	---	
	Void Ratio	0.433	---	---	
Before Shear	Moisture Content, %	---	---	11.3	
	Dry Density, pcf	---	---	129.	
	Cross-sectional Area (Method A), in²	---	---	3.255	
	Saturation, %	---	---	100.0	
	Void Ratio	---	---	0.304	
	Back Pressure, tsf	2.520	4.239	9.241	
Vertical Effective Consolidation Stress, tsf		1.992	4.000	8.000	
Horizontal Effective Consolidation Stress, tsf		1.999	4.000	7.999	
Vertical Strain after Consolidation, %		1.441	0.1443	0.0000	
Volumetric Strain after Consolidation, %		3.557	0.7606	0.6686	
Time to 50% Consolidation, min		---	---	---	
Shear Strength, tsf		0.8170	2.371	5.427	
Strain at Failure, %		3.08	3.07	4.05	
Strain Rate, %/min		0.01600	0.01600	0.01600	
Deviator Stress at Failure, tsf		1.634	4.742	10.85	
Effective Minor Principal Stress at Failure, tsf		0.6577	1.923	4.269	
Effective Major Principal Stress at Failure, tsf		2.292	6.665	15.12	
B-Value		0.96	---	---	

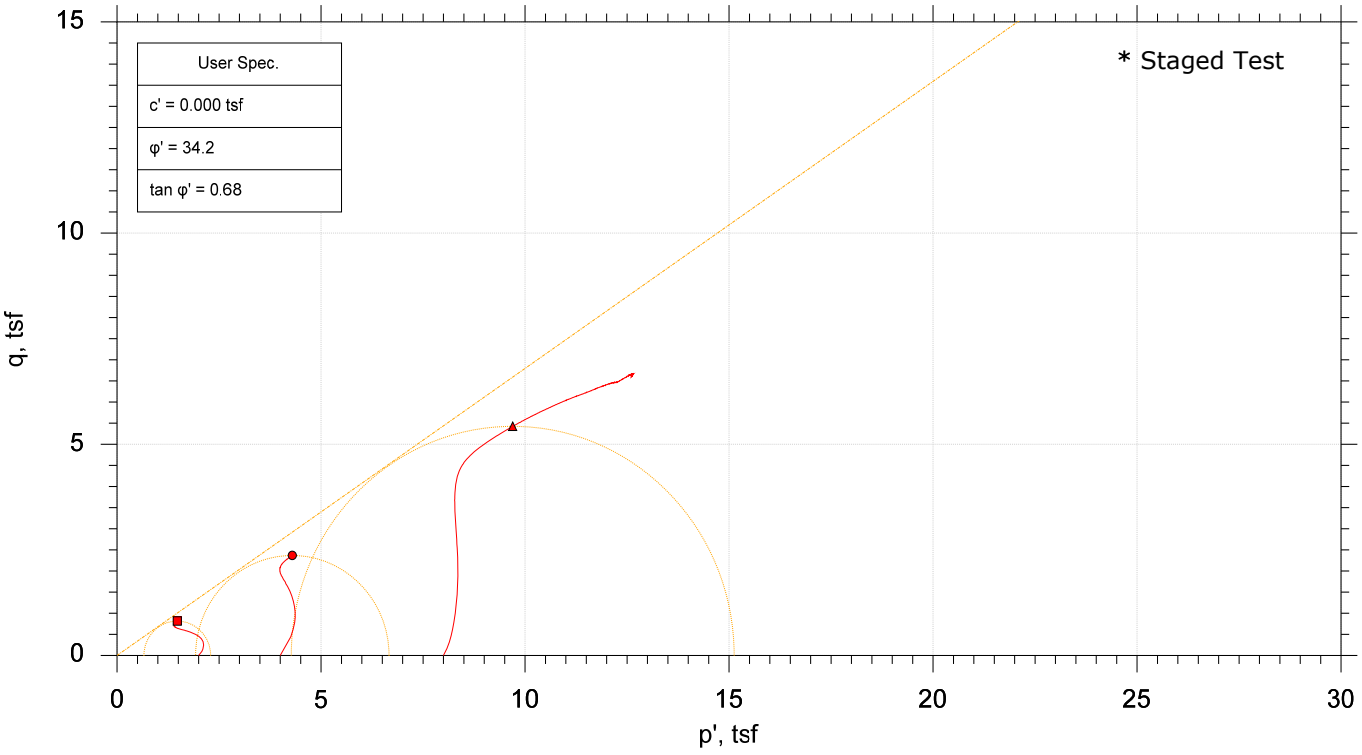
Notes:
- Before Shear Saturation set to 100% for phase calculation.
- Moisture Content determined by ASTM D2216.
- Atterberg Limits determined by ASTM D4318.
- Deviator Stress includes membrane correction.
- Values for c and φ determined from best-fit straight line for the specific test conditions. Actual strength parameters may vary and should be determined by an engineer for site conditions.

Remarks:

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767







	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
■	U-1	CU-4-1	10-12'	dmt	5/29/25	anm	6/10/25	321096-CU-4-1v.dat
●	U-1	CU-4-2	10-12'	dmt	5/29/25	anm	6/10/25	321096-CU-4-2v.dat
▲	U-1	CU-4-3	10-12'	dmt	5/29/25	anm	6/10/25	321096-CU-4-3v.dat

GeoTesting EXPRESS
A Sercel Business

Project: Upstate Confidential Project	Location: NY	Project No.: GTX-321096
Boring No.: LB-R-035	Sample Type: intact	
Description: Moist, dark gray silt		
Remarks: TX-006		

APPENDIX G
GEOTECHNICAL STUDIES BY OTHERS

CME Report No.: 28062B-02-0623-R1

LANGAN

CME Associates, Inc.

6035 Corporate Drive
East Syracuse, New York 13057
(315) 701-0522
(315) 701-0526 (Fax)

www.cmeassociates.com

Transmittal

July 11, 2023

Ramboll (Client)
94 New Karner Road
Albany, New York
Phone: 518.339.8829

Attn: Mr. Steve Maxwell, Construction Manager
Stephen.Maxwell@Ramboll.com

Re: Micron Campus
Clay, New York
CME Project No.: 28062-05

Gentlepeople:

Enclosed you will find….

Number of Copies	Report Number	Description
1	28062B-02-0623-R1	Memorandum - Revision 1

The above report was emailed to Mr. Steve Maxwell, at Stephen.Maxwell@Ramboll.com, and Mr. Andy Philips, at Andy.Philips@Ramboll.com, on 07/11/2023.

Respectfully submitted,
CME Associates, Inc.

Anas N. Anasthas, PE
Senior Geotechnical Engineer

AA.bs

CME Associates, Inc.

6035 Corporate Drive
East Syracuse, New York 13057
(315) 701-0522
(315) 701-0526 (Fax)

www.cmeassociates.com

MEMORANDUM

CME REPORT NUMBER: 28062B-02-0623-R1

To:	Ramboll 94 New Karner Road Suite 106 Albany, New York 12203
	Attn: Mr. Steve Maxwell, Construction Manager Mr. Andy Philips, P.E.
	Email: Stephen.Maxwell@Ramboll.com Andy.Philips@Ramboll.com, Senior Project Manager
From:	Mr. Anas Anasthas, P.E., Senior Geotechnical Engineer
Date:	06/30/2023
Project:	Micron Campus, Clay, New York

This memorandum has been prepared in response to Ramboll's request during the 06/08/2023 meeting referenced in the *Cover Letter*[1], to present key items that CME has identified via the Phase 1 Exploration, which will affect the design and construction of the new campus. For the purposes of this memorandum, the Phase 1 Exploration areas are labeled Area 1 to Area 4, as shown on the attached Phase 1 Exploration Location Map. Generalized subsurface profiles along the 11 lines shown on said map are also attached.

1. Variable Subsurface Stratigraphy: All four areas of exploration exhibit distinct subsurface profiles.

Area 1 explorations identified surfacings (Topsoil and Organic Matter) underlain by a subsurface profile consisting of a Silt stratum, underlain by a Silt and Sand stratum, underlain by bedrock at about 18 to 24 feet below grade.

Area 2 explorations identified surfacings at grade, underlain by a Silt and Sand stratum, underlain by bedrock at about 4 to 18 feet below grade.

Area 3 explorations identified surfacings at grade, underlain by a Silt and Sand stratum to boring termination depth, where auger or sampler refusal was noted. Bedrock was not encountered within the exploration depths. Auger refusal in Boring B-129 was investigated via coring to 5 feet below auger refusal depth. The coring revealed dense Glacial Till-like material at this depth.

[1] Geotechnical Data Report and Memorandum Cover Letter, labeled CME Report Number: 28062A-02-0623

Area 4 explorations identified a somewhat similar subsurface profile as that noted in Area 1, except the Silt stratum contained a Clay layer near the bottom of this stratum in two of the Borings advanced within Area 4. The Borings advanced within Area 4 were terminated upon sampler or auger refused on probable bedrock at about 16 to 29 feet below grade.

2. Magnitude of New Fill Needed: Mr. Thomas Behm of Micron stated during the meeting that a significant amount of Fill material would need to be delivered to the site to raise grades (mass fill) to achieve proposed finish grade elevation. Mr. Behm also stated that Micron desires to start construction for the first building (Fab No. 1) in 2024. Consideration should be given to lowering the finish floor of the buildings (and the surrounding finish grades) as much as possible to reduce the amount of mass fill needed for this project.

3. Topsoil and Organic Material Removals: Grades to be exposed after removal of Topsoil and Organic Matter can generally be untrafficable by construction equipment, except during the driest months of the year. An early site preparation package, which includes clearing, grubbing, striping topsoil and organic material and then hauling it away, followed by installation of granular fill, should be considered to start as soon as possible during the dry months. Typical conditions in spring and winter with high groundwater levels can render the site non-trafficable to the bulldozers and scrapers needed to remove the topsoil off-site. Additionally, careful consideration shall be given to controlling groundwater during the stripping and filling operations. Temporary dewatering and constructing diversion trenches and swales would be critical to allow for a workable mass filling operation.

Prior to cutting and filling at the site, CME recommends that a pre-construction earthwork meeting be convened to discuss the overall operation and to convey the concerns presented herein.

4. Compressible Soils: The Silt stratum noted in Areas 1 and 4, and the Clay stratum noted in Area 4 are compressible.

Silt: The Silt stratum identified in Area 1 and Area 4 is generally soft to stiff in consistency. The soft to medium stiff portions of this stratum will compress/consolidate under the weight of the new fill to be placed, as well as building loads. This soil is non-plastic to slightly plastic, and the compression/consolidation is expected to occur relatively quickly (in weeks/months rather than years) after applying the loads.

Clay: The Clay noted in Area 4 is generally soft in consistency and is susceptible to consolidation under the weight of the new Fill and building loads. The Clay soil is plastic, and consolidation is expected to occur relatively slowly (in months or years) after applying loading above.

5. Shallow Groundwater: Shallow groundwater conditions (within a couple of feet of existing grade) were noted in several borings during the exploration. Further, groundwater was noted in the Groundwater Observation Wells installed at the site, within a couple inches of existing grade to several feet below existing grade, during readings taken from April to June of 2023. Please refer to the Groundwater Level Monitoring Table in the Geotechnical Data Report (CME Report Number: 28062B-01-0523R1, dated 6/20/2023), for further information. Mottled soils were also noted in several borings within 2 to 4 feet of grade, indicative of repeated wetting and drying of soils within these

depths due to seasonal groundwater fluctuations. Therefore, constructing basements and/or below-grade parking structures will require temporary and permanent dewatering.

6. Unstable Grade: The silty soils present at grade are sensitive to moisture and disturbance. These soils become unstable and lose integrity in the presence of water and construction traffic. During CME's fieldwork, the drill rigs got stuck in the soft, muddy soils at grade, several times. The ruts caused by the drill rig were over 18 inches deep, in areas. Undercuts and replacement with Granular Fill should be anticipated to stabilize failed or unstable grades, along with the use of geotextile and/or geogrid reinforcement. Construction haul-ways and low-ground pressure construction equipment will be required during site preparation to reduce the volume of unnecessary undercuts. Further, final pavement sections will likely consist of thicker than normal subbase course and asphalt, along with geotextile and geogrids to provide the required design life for pavement sections.

7. Weight of New Fill: Significant and variable thicknesses of new Structural Fill will be required to raise grades to achieve the proposed finish grade of 400 feet. The existing grade near the northeast end of the site is at about elevation 385 feet. Up to about 15 feet of Structural Fill will be required to raise grades near this end of the site. The variable thicknesses of the Silt stratum and the Clay stratum, and the variability in the rate of compression/consolidation in these strata, combined with the variable thicknesses of new Structural Fill to be placed, complicate the geotechnical evaluation of this site from a foundation settlement, infrastructure settlement, and grade settlement standpoint. As discussed herein, filling the site to finish grade as soon as possible will give the underlying soils a longer period of time to compress and settle under this new weight, which will help minimize long term building, pavement and infrastructure settlement.

8. Foundation Options: Based on the limited subsurface information available at this time and our understanding of the proposed construction, conventional shallow foundation and slab-on-grade construction may not be feasible for most, if not all, of the proposed buildings. Ground Improvement (such as Aggregate Piers or Rigid Inclusions) and/or Deep Foundations (Driven Piles or Drilled Piers) will likely be required to support the proposed buildings. Regardless of which foundation system is selected, the fab sites will need to be "pad ready" to accommodate the foundation construction. A successful early earthwork package will be paramount in the overall success of this project.

9. Second Phase Subsurface Exploration: We understand that the site will not be released until sometime after August 15, 2023, for CME to mobilize for the second phase of the exploration (Phase 2). CME will need Site Plans, Grading Plans, Building Finish Floor Elevation, Underground Parking Elevation (if elected), Building Loading Information (column, wall, and slab loads), and settlement tolerances before said mobilization, so we can adjust and optimize the exploration program. CME anticipates that additional rock coring at select locations, additional undisturbed Shelby tube sampling in the Clay stratum, groundwater monitoring wells in the underground parking areas, downhole shear wave velocity testing (if requested by the vibration consultant), etc., will be required during said exploration. Once we receive the requested information, CME can provide a work scope for the required additional services.

ATTACHMENTS:

Phase 1 Exploration Location Map (1 page)
Generalized Subsurface Profiles (11 pages)

PHASE 1 EXPLORATION LOCATION MAP

ATTACHMENT TO CME REPORT NUMBER: 28062B-02-0623

AREA 1

AREA 2

AREA 3

AREA 4

LINE 1

LINE 2

LINE 3

LINE 4

LINE 5

LINE 6

LINE 7

LINE 8

LINE 9

LINE 10

LINE 11

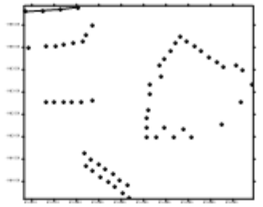
299A

ATTACHMENT TO CME REPORT NUMBER: 28062B-02-0623

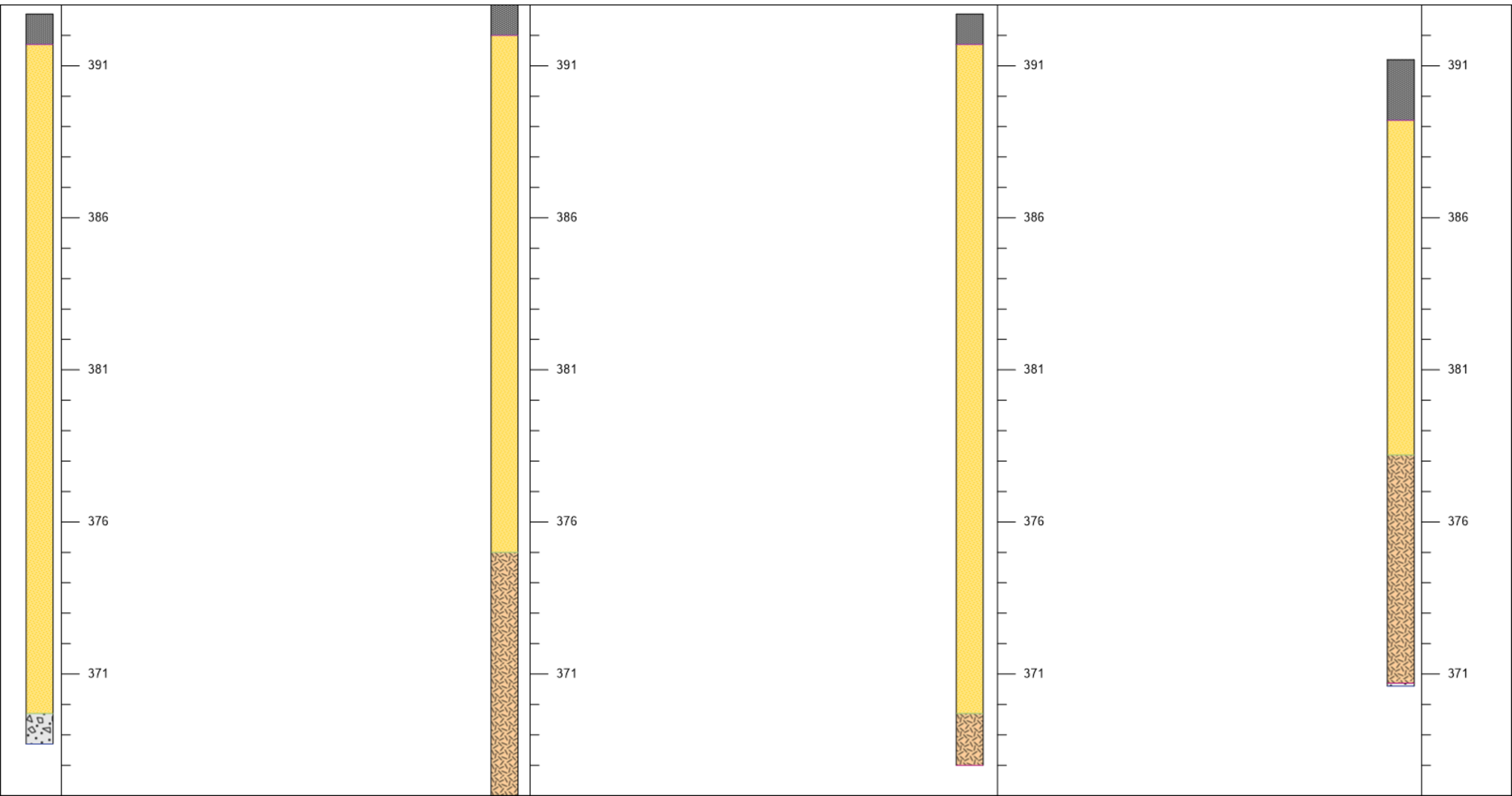
GENERALIZED SUBSURFACE PROFILE - LINE 1

LEGEND

- TOPSOIL
- SILT
- SILT AND SAND
- ROCK



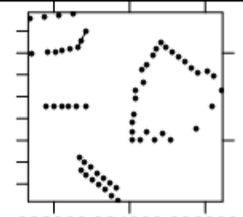
B-1 392.7 — 400 ft — B-3 393 — 400 ft — B-5 392.7 — 371 ft — B-7 391.2



ATTACHMENT TO CME REPORT NUMBER: 28062B-02-0623

GENERALIZED SUBSURFACE PROFILE - LINE 2

LEGEND
- TOPSOIL
- SILT
- SILT AND SAND
- ROCK



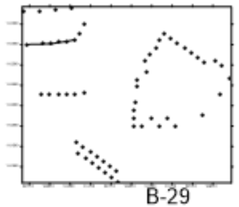
B-29 389.7 — 190 ft — B-23 387.3 — 242 ft — B-20 392.4

389
384
379
374
369

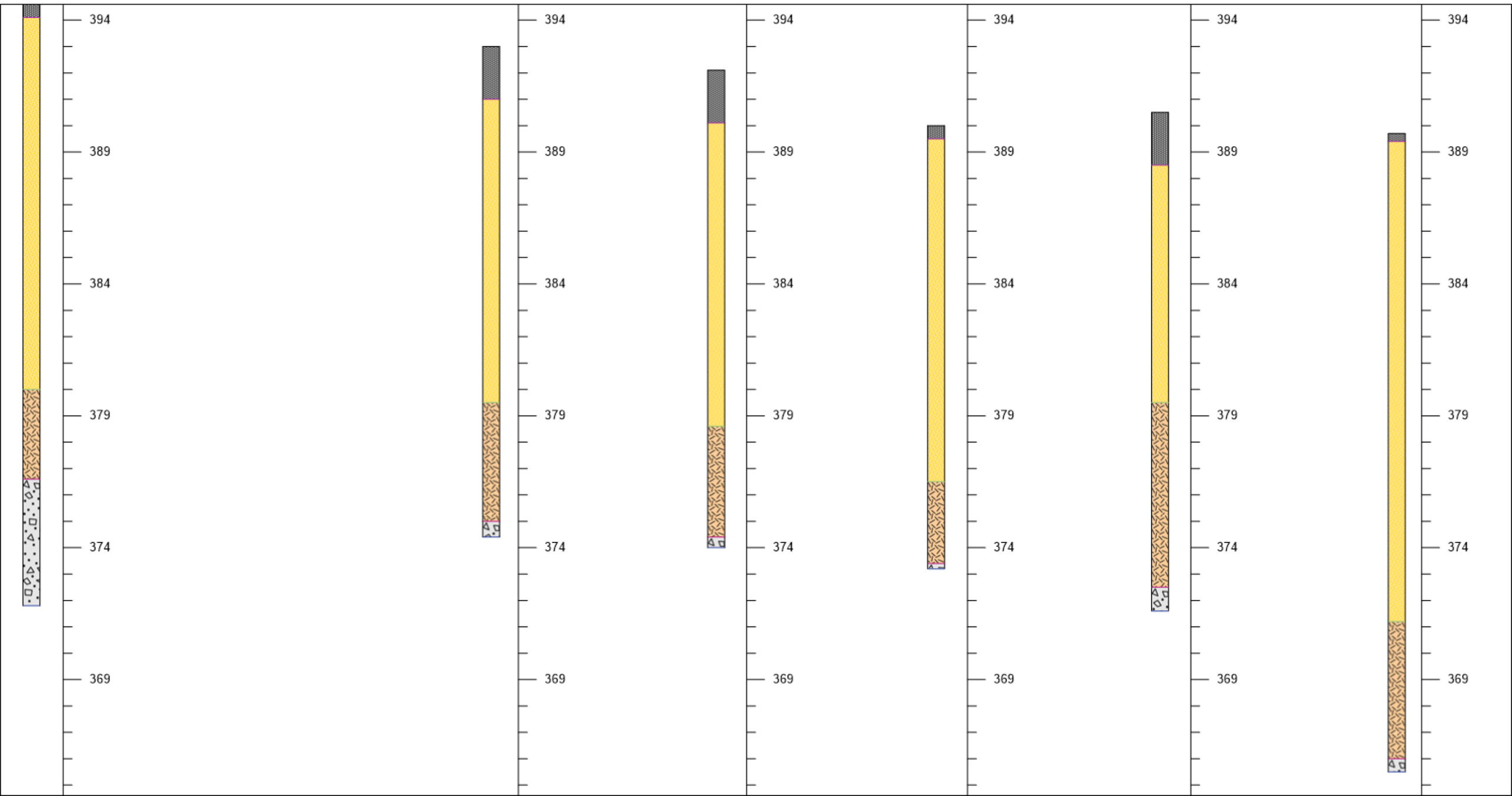
ATTACHMENT TO CME REPORT NUMBER: 28062B-02-0623

GENERALIZED SUBSURFACE PROFILE - LINE 3

Legend
- TOPSOIL
- SILT
- SILT AND SAND
- ROCK



B-24	408	B-25	200	B-26	195	B-27	199	B-28	210	B-29
394.6		393		392.1		390		390.5		389.7

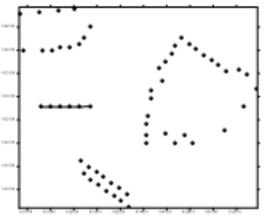


ATTACHMENT TO CME REPORT NUMBER: 28062B-02-0623

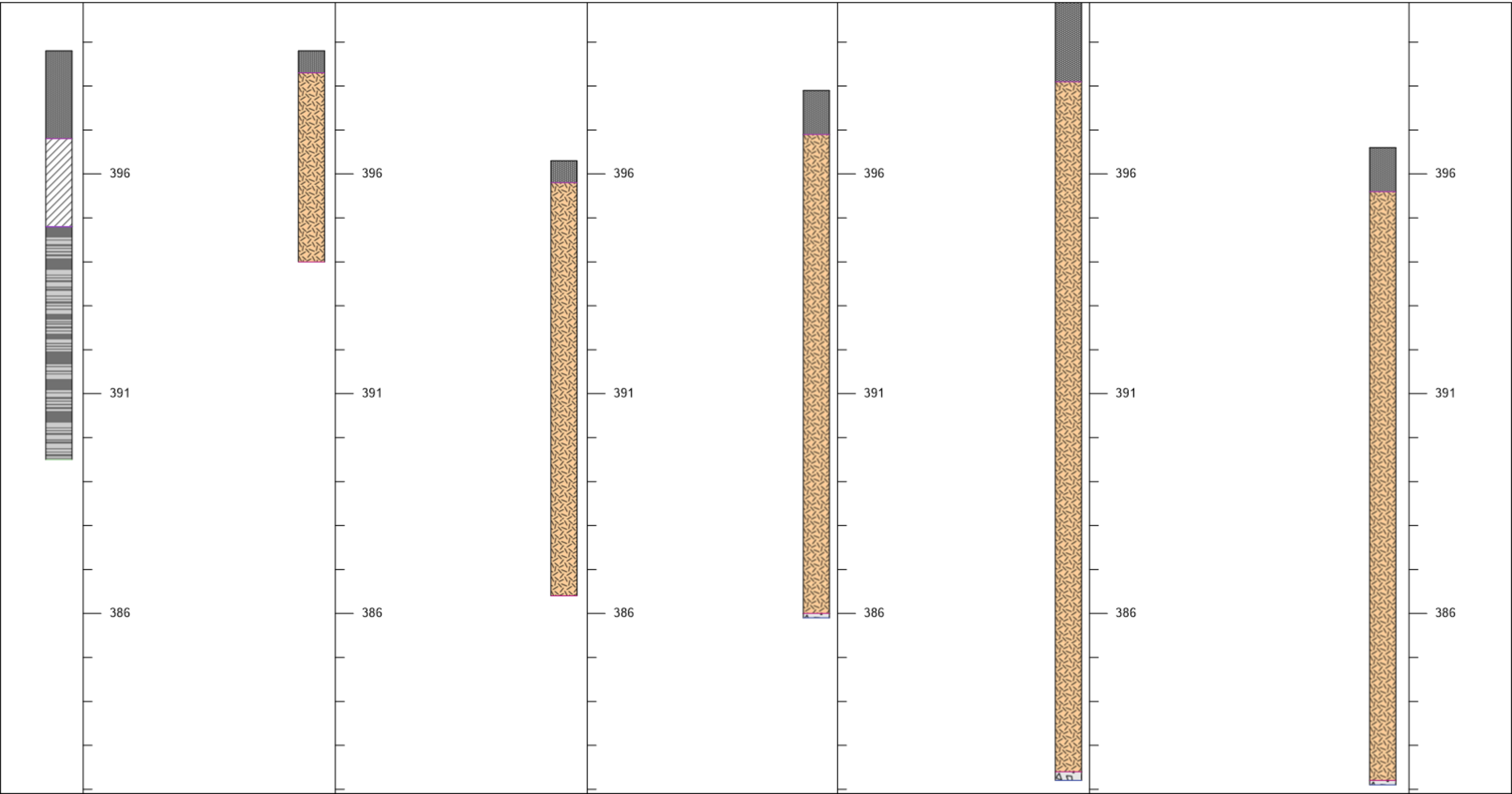
GENERALIZED SUBSURFACE PROFILE - LINE 4

LEGEND

- TOPSOIL
- FILL
- SILT AND SAND
- ROCK
- BEDROCK



B-41	200 ft	B-42	200 ft	B-43	200 ft	B-44	200 ft	B-45	249 ft	B-50
398.8		398.8		396.3		397.9		399.9		396.6



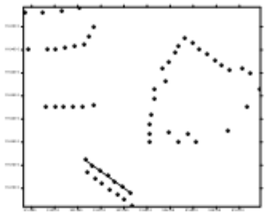
ATTACHMENT TO CME REPORT NUMBER: 28062B-02-0623

LEGEND

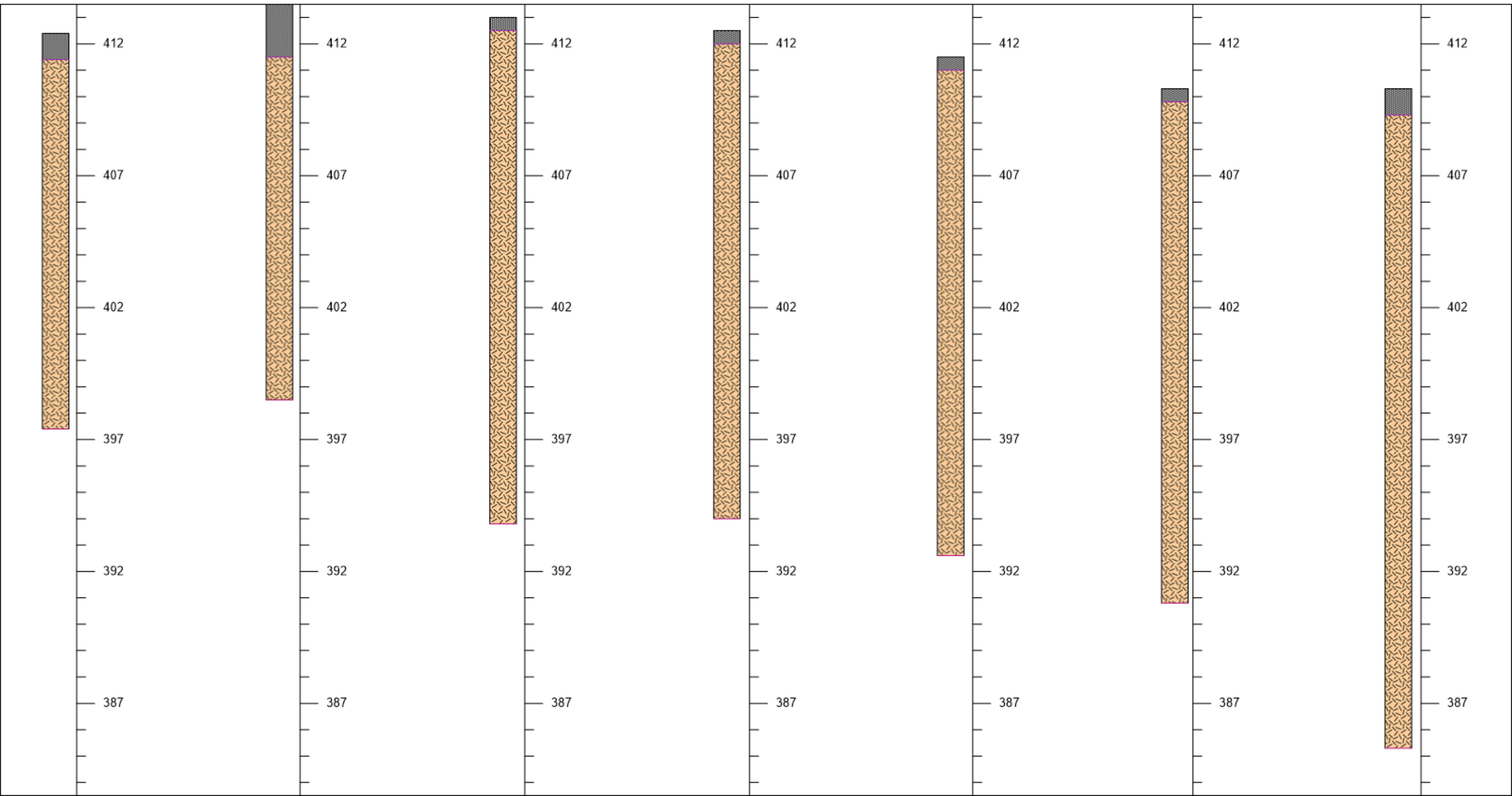
TOPSOIL

SILT AND SAND

GENERALIZED SUBSURFACE PROFILE - LINE 5

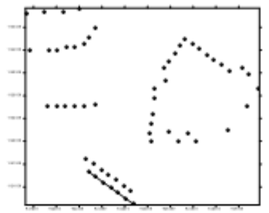


B-138	200 ft	B-137	200 ft	B-136	200 ft	B-135	200 ft	B-134	200 ft	B-133	200 ft	B-132
412.4		413.5		413		412.5		411.5		410.3		410.3



ATTACHMENT TO CME REPORT NUMBER: 28062B-02-0623

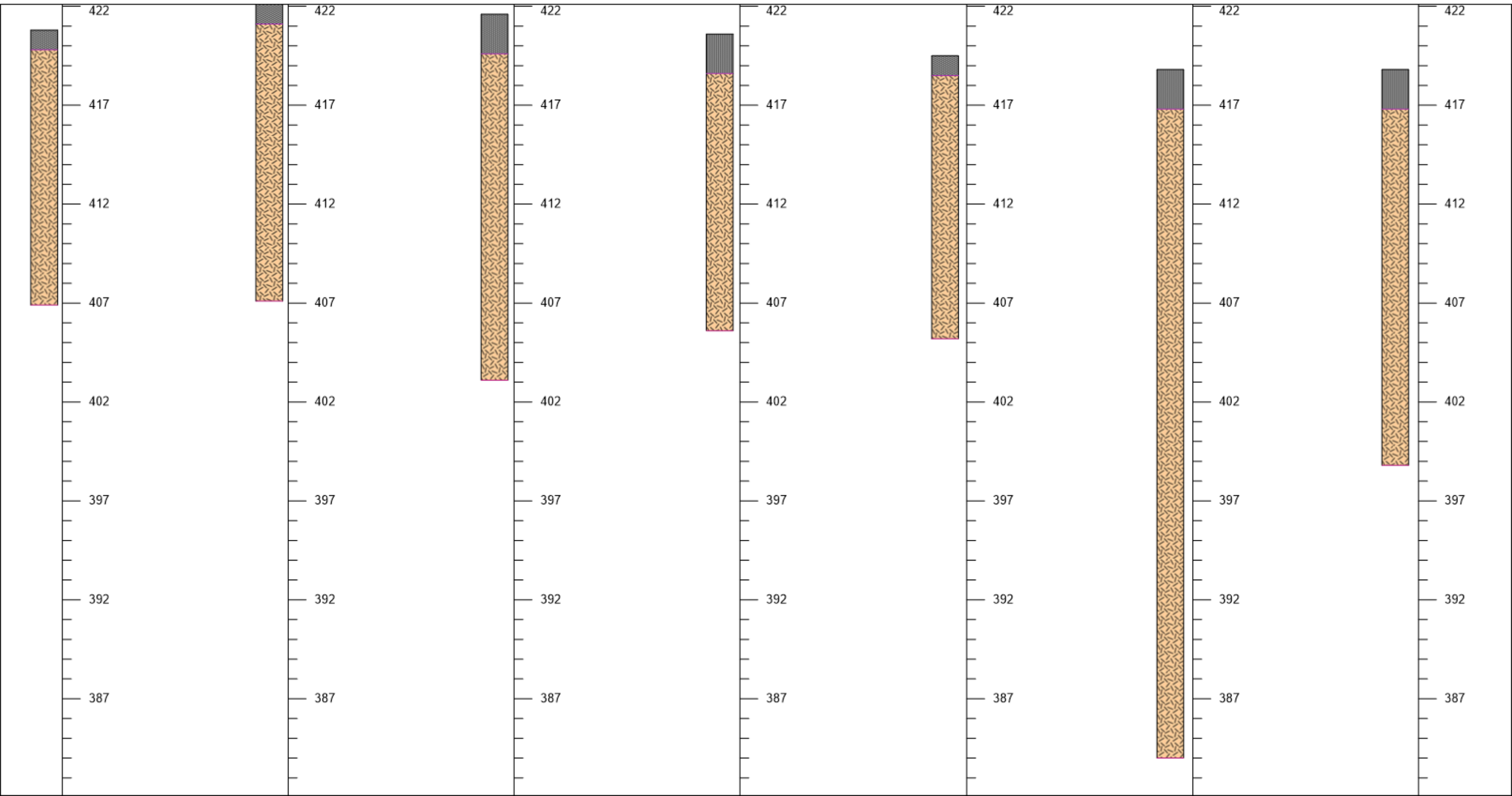
GENERALIZED SUBSURFACE PROFILE - LINE 6



LEGEND

- TOPSOIL
- SILT AND SAND

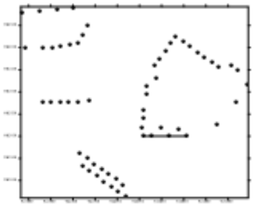
B-124	200 ft	B-125	200 ft	B-126	200 ft	B-127	200 ft	B-128	200 ft	B-129	200 ft	B-130
420.8		422.1		421.6		420.6		419.5		418.8		418.8



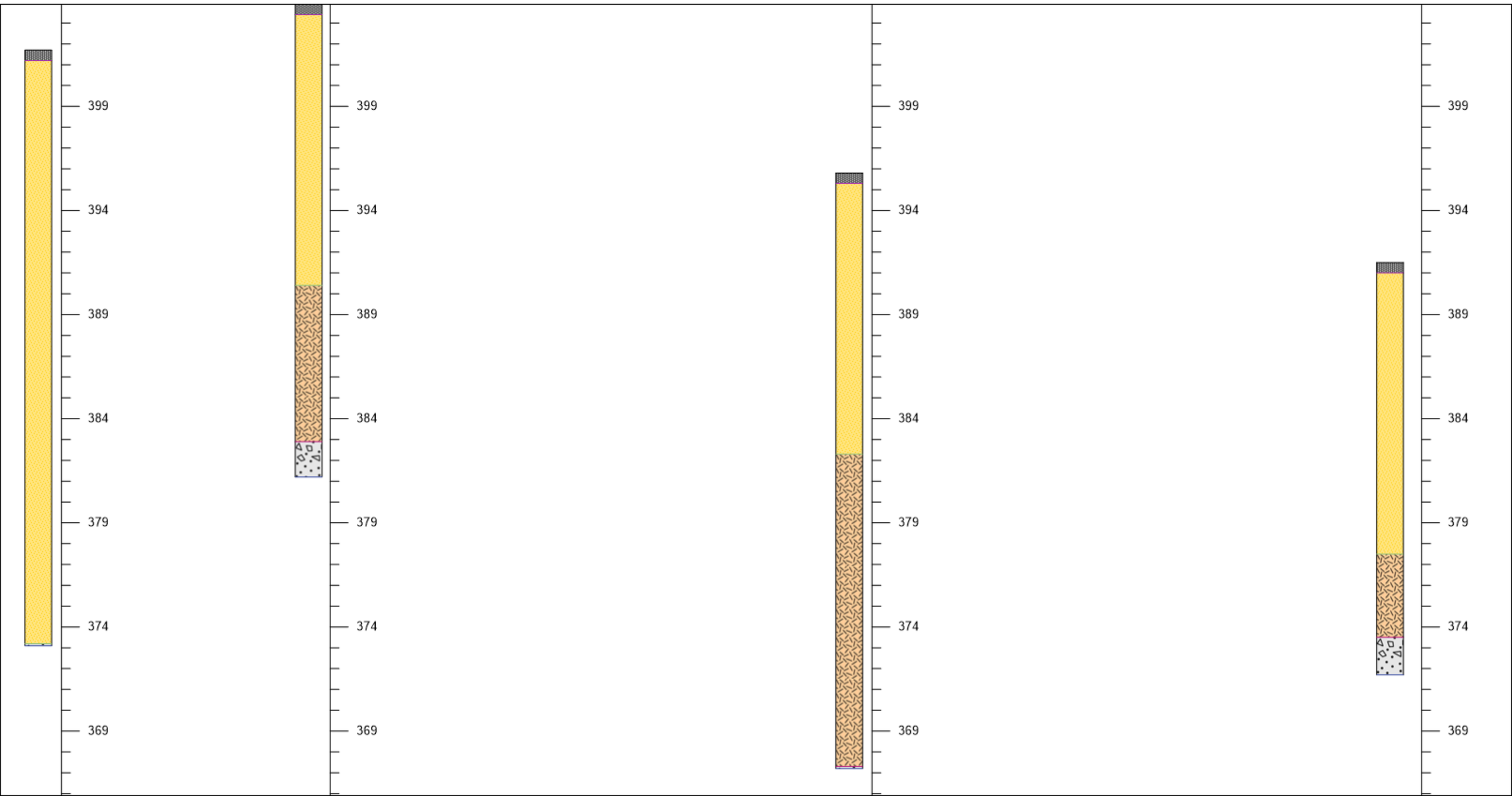
ATTACHMENT TO CME REPORT NUMBER: 28062B-02-0623

GENERALIZED SUBSURFACE PROFILE - LINE 7

LEGEND
- TOPSOIL
- SILT
- SILT AND SAND
- ROCK

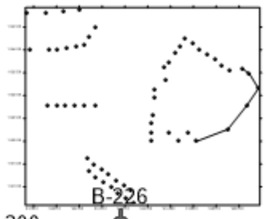


B-347 401.7 — 200 — B-346 403.9 — 400 — B-344 395.8 — 400 — B-342 391.5

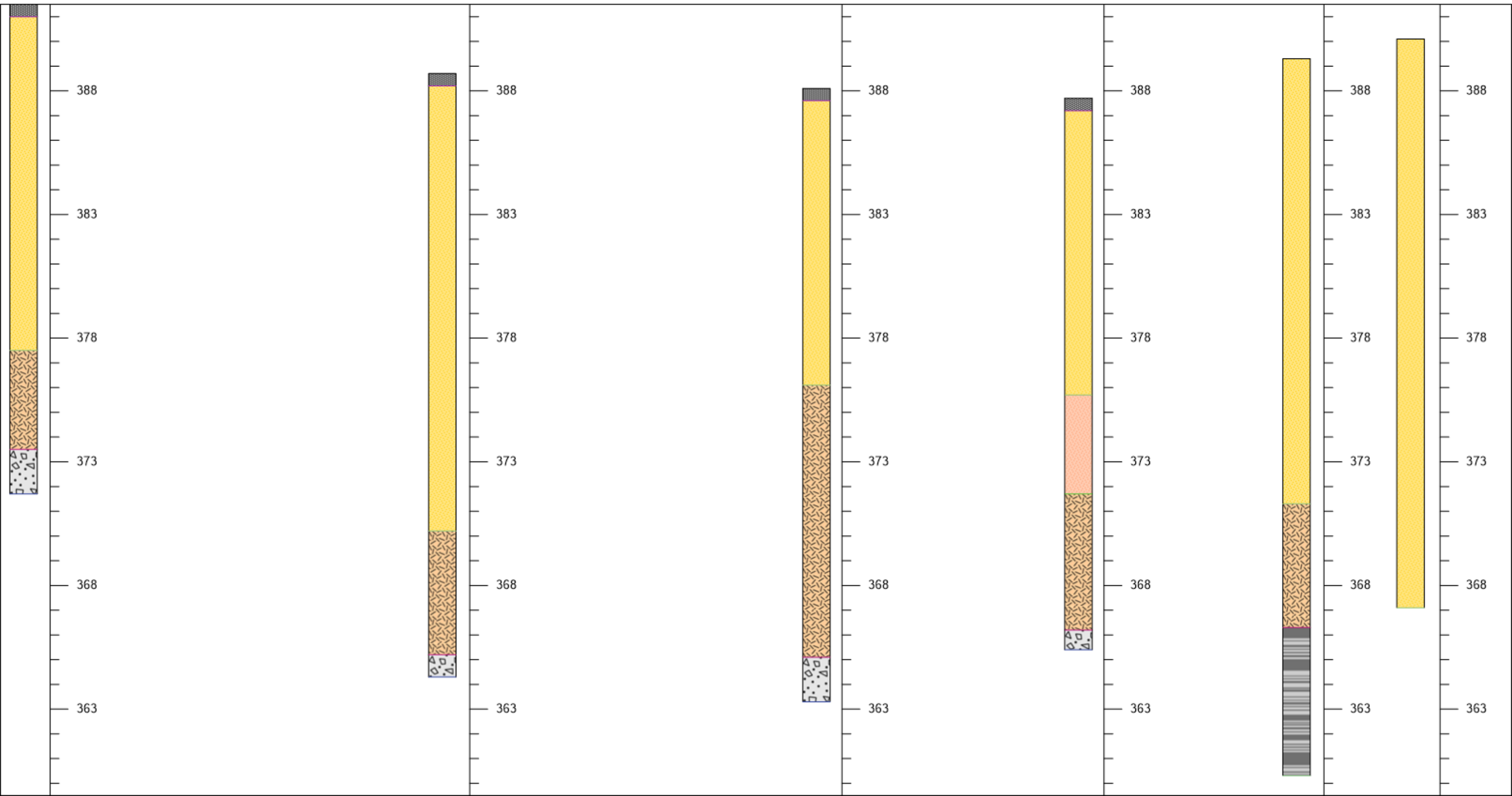


ATTACHMENT TO CME REPORT NUMBER: 28062B-02-0623

GENERALIZED SUBSURFACE PROFILE - LINE 8



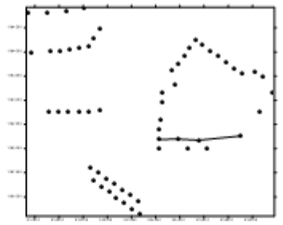
B-342	735	B-352	656	B-305	460	B-299A	382	B-227	200	B-226
391.5		388.7		388.1		387.7		389.3		390.1



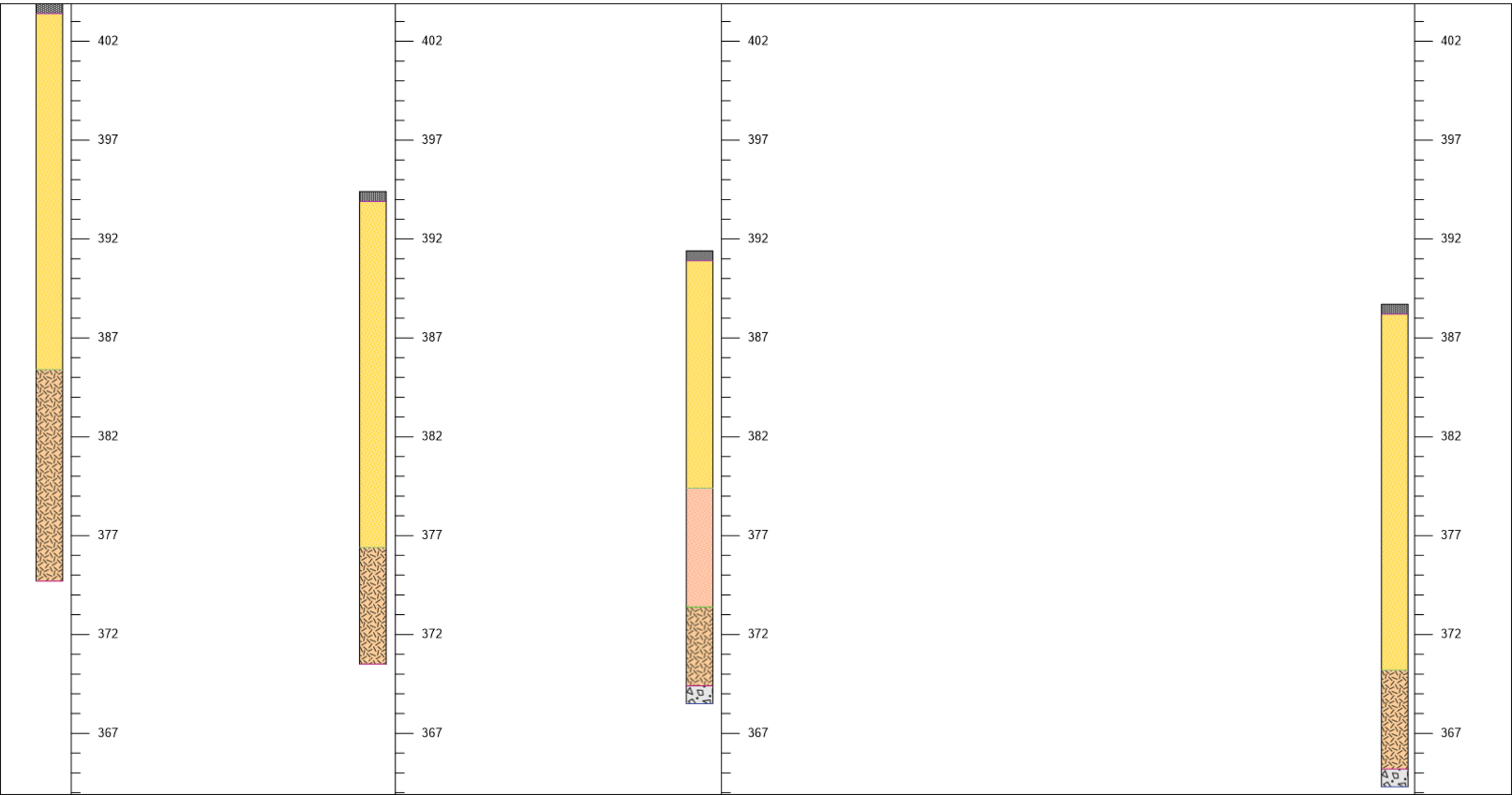
ATTACHMENT TO CME REPORT NUMBER: 28062B-02-0623

GENERALIZED SUBSURFACE PROFILE - LINE 9

LEGEND
- TOPSOIL
- SILT
- CLAY
- SILT AND SAND
- ROCK



B-336	409	B-338	413	B-340	878	B-352
403.9		394.4		391.4		388.7

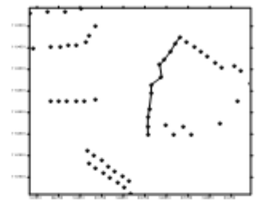


ATTACHMENT TO CME REPORT NUMBER: 28062B-02-0623

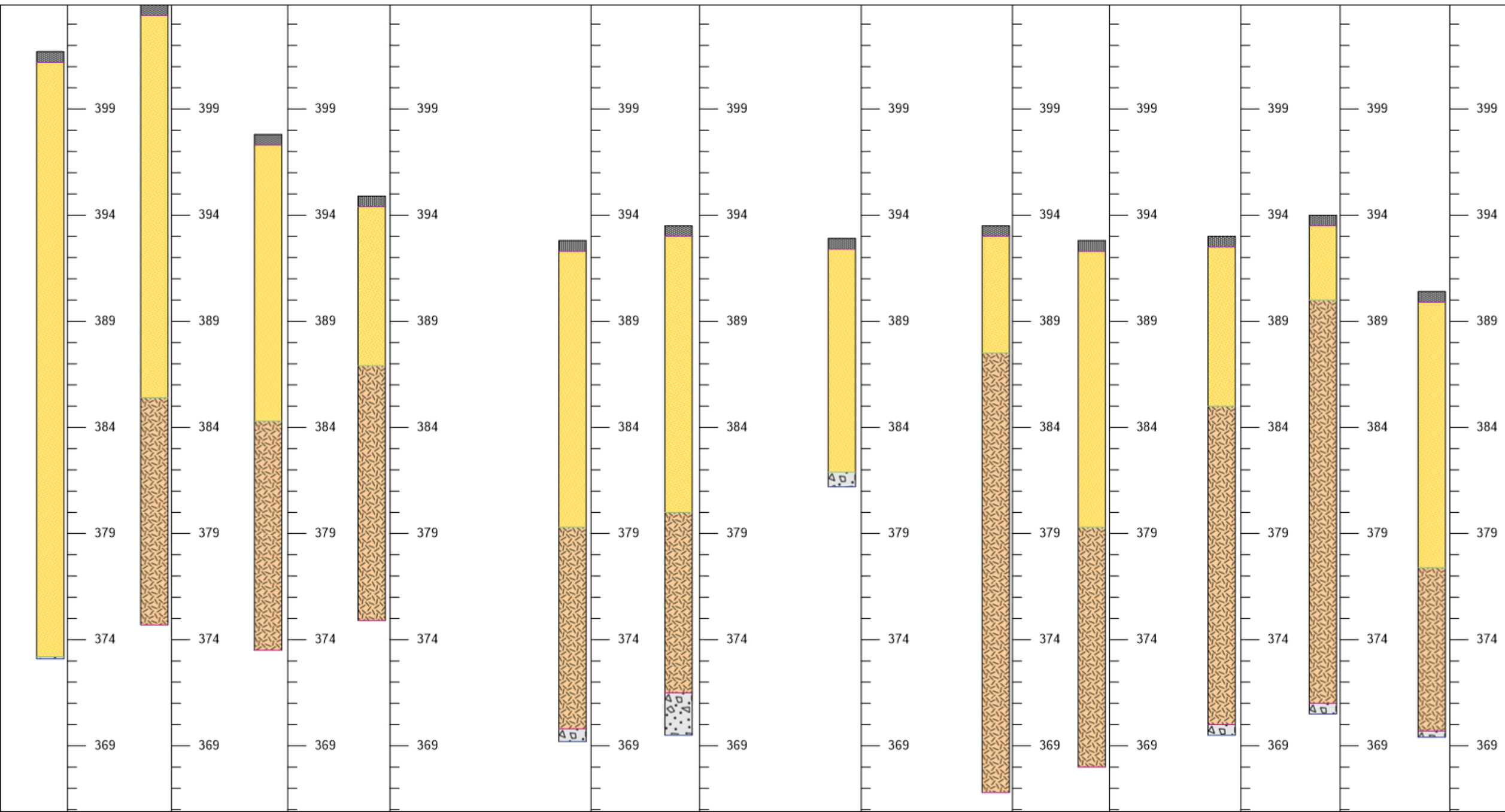
GENERALIZED SUBSURFACE PROFILE - LINE 10

LEGEND

- TOPSOIL
- SILT
- SILT AND SAND
- ROCK

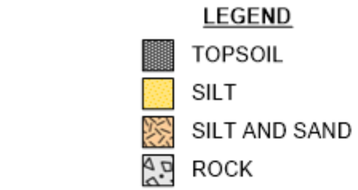


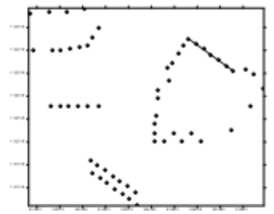
B-347	191 ft	B-336	209 ft	B-334	191 ft	B-333	369 ft	B-390	195 ft	B-392	300 ft	B-317	283 ft	B-241	177 ft	B-240	239 ft	B-239	186 ft	B-236	200 ft	B-235
401.7		403.9		397.8		394.9		392.8		393.5		392.9		393.5		392.8		393		394		390.4

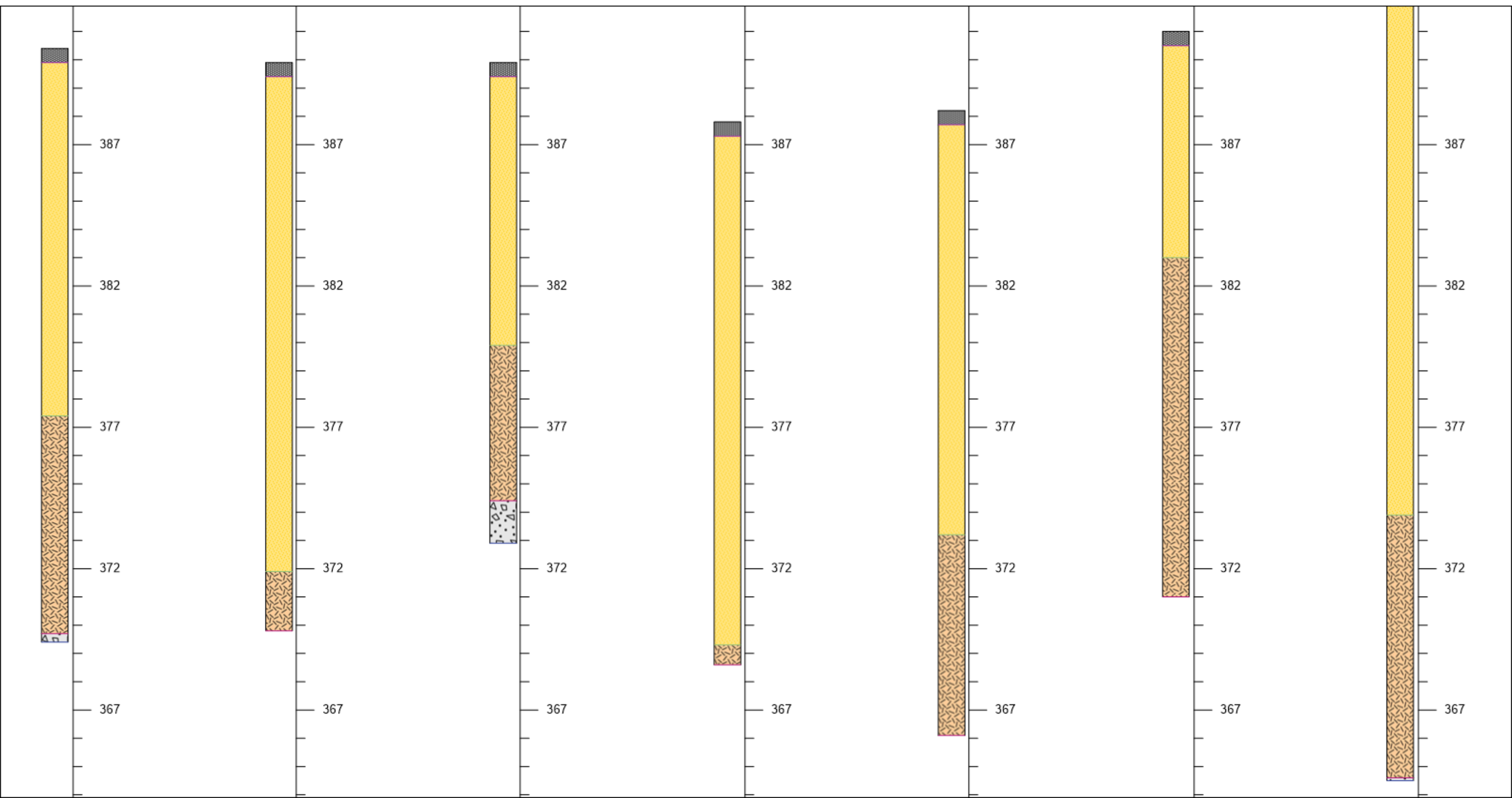


ATTACHMENT TO CME REPORT NUMBER: 28062B-02-0623

GENERALIZED SUBSURFACE PROFILE - LINE 11







CME Report No. 28124B-01-1023

LANGAN

CME Associates, Inc.

6035 Corporate Drive
East Syracuse, New York 13057
(315) 701-0522
(315) 701-0526 (Fax)

www.cmeassociates.com

Transmittal

October 27, 2023

Ramboll (Client)
333 West Washington Street
Syracuse, New York, 13202
Phone: 315.420.8439

Attn: Mr. Andy Philips, Senior Project Manager
Email: andy.philips@ramboll.com

Re: Test Pit Exploration East of Burnet Road
Clay, New York
CME Job No. 28124-05

Gentlepeople:

Attached you will find….

Number of Copies	Report Number	Description
1	28124B-01-1023	Geotechnical Data Report

This report was emailed to Mr. Andy Philips, at andy.philips@ramboll.com on 10/27/2023.

Respectfully submitted,
CME Associates, Inc.

Astitwa Sharma, EIT
Staff Engineer

AA.sa

CME Associates, Inc.

6035 Corporate Drive
East Syracuse, New York 13057
(315) 701-0522
(315) 701-0526 (Fax)

www.cmeassociates.com

October 27, 2023

Ramboll (Client)
333 West Washington Street
Syracuse, New York, 13202
Phone: 315.420.8439

Attn: Mr. Andy Philips, Senior Project Manager
andy.philips@ramboll.com

Re: Geotechnical Data Report
Test Pit Exploration East of Burnet Road
Clay, New York
CME Report No. 28124B-01-1023

1.0 INTRODUCTION

CME Associates, Inc. (CME) was retained by Ramboll (Client) to provide subsurface exploration and geotechnical services for the subject project. CME conducted a limited subsurface exploration at the subject project site in October 2023.

The Scope of Basic Services and this report have been provided pursuant to CME Proposal/Agreement No.: 05.7126, Addendum 3, dated 04/07/2023, and a Subsequent Change Order authorized by Client via a Purchase Order (Ramboll PO # 1950006347, dated 10/19/2023, Line Item 4).

This report provides a summary of exploration activities conducted at the subject project site.

2.0 EXPLORATION METHODOLOGY

2.1 Exploration Layout and Utility Clearance

The exploration locations were selected by the Client and staked by Thew Associates (Thew). Following the field stakeout, CME contacted UDig NY to clear public utilities at the exploration locations. Private utilities at the exploration locations were cleared by Thew. No utility conflicts were noted at the exploration locations.

The attached *CME Exploration Location Plan* depicts the approximate locations of the explorations. Elevation at grade at the exploration locations, along with Northing and Easting coordinates, was provided by Thew (See Table 1, attached).

2.3 Test Pits

A total of 10 Test Pits were excavated using a Link Belt Model LNK 27 excavator, equipped with a 24-inch-wide general-purpose bucket. The Test Pits were excavated and backfilled by a subcontractor to CME. The backfill consisted of excavated materials placed in 2 to 3 feet thick lifts, with each lift compacted using the excavator bucket making several hits. CME Engineer Astitwa Sharma, E.I.T. was on-site to observe the Test Pit excavation, take photographs and prepare Test Pit Logs. *Test Pit Logs,* labeled TP-1 through TP-10 and *Test Pit Photographs,* are attached to this Report.

Soil samples were logged and visually classified in the field by Mr. Sharma. The visual soil and classifications were made using a modified Burmister Classification System, as practiced by CME and as generally described in the attached document entitled, *General Information & Key to the Test Boring Logs*.

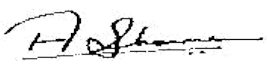
3.0 STANDARD OF CARE

CME endeavored to conduct services identified herein in a manner consistent with that level of care and skill ordinarily exercised by members of the industry currently practicing in the same locality and under similar conditions as this project. No warranty, either expressed or implied, is made or intended by CME's proposal, contract, and written and oral reports, all of which warranties are hereby expressly disclaimed. CME shall not be responsible for the acts or omissions of the Client, its contractors, agents, and consultants. CME may rely upon information supplied by Client, its contractors, agents, and consultants or information available from generally accepted reputable sources, without independent verification, and CME assumes no responsibility for the accuracy thereof.

4.0 CLOSING

CME's services have been provided according to the requirements of the referenced CME Proposal/Agreement. No other representations, expressed or implied, are intended or made with respect to the information provided herein, including but not limited to, its suitability for use by others.

Respectfully Submitted,
CME Associates, Inc.



Astitwa Sharma, E.I.T.
Staff Engineer

Reviewed by:
CME Associates, Inc.

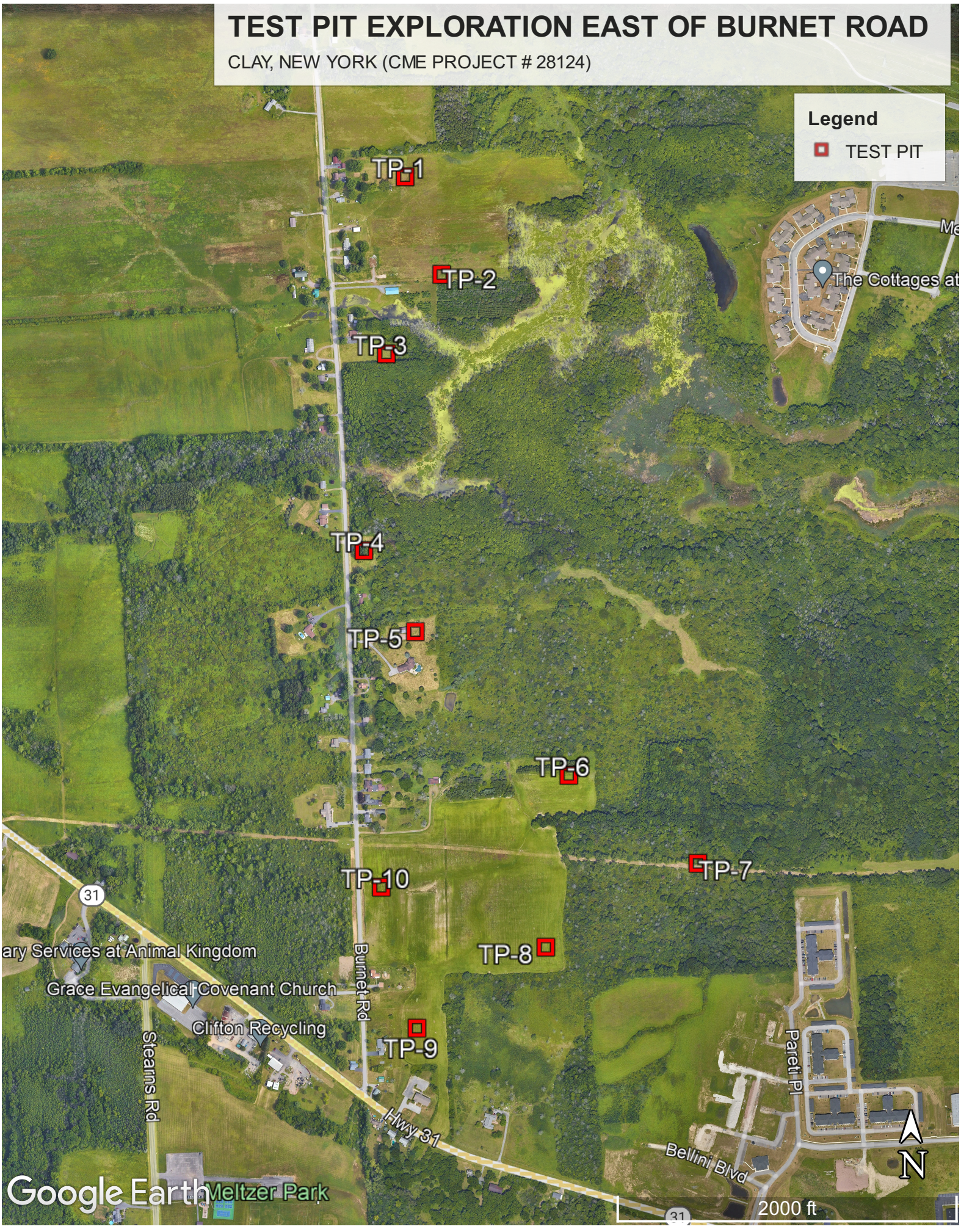
Astitwa Sharma, E.I.T. for
Anas N. Anasthas, P.E.
Senior Geotechnical Engineer

Attachment Listing:

Exploration Location Plan (1 of 1)
Table 1 (1 of 1)
Test Pit Logs (10 of 10)
Test Pit Photographs (10 of 10)
General Information & Key to Test Boring Logs (4 of 4)

TEST PIT EXPLORATION EAST OF BURNET ROAD

CLAY, NEW YORK (CME PROJECT # 28124)



ATTACHMENT TO CME REPORT NO. 28124B-01-1023

TABLE 1 - GPS COORDINATES AND ELEVATIONS

Point IT	Latitude	Longitude	Northing	Easting	Elevation	Boring ID
100001	43.19257	-76.1453	1163564	937021.2	385.9	TP-1
100002	43.19097	-76.1444	1162985	937251.4	385.7	TP-2
100003	43.18958	-76.1458	1162475	936885.9	388.4	TP-3
100004	43.18621	-76.1464	1161246	936743.6	385.3	TP-4
100005	43.18523	-76.1451	1160889	937082.5	391.7	TP-5
100006	43.18244	-76.1417	1159876	937986.2	396.6	TP-6
100007	43.18144	-76.1396	1159518	938551.1	398.9	TP-7
100008	43.17986	-76.1422	1158938	937865.2	406.6	TP-8
100009	43.17836	-76.1452	1158387	937083.6	418.8	TP-9
100010	43.18076	-76.1459	1159260	936878	406.8	TP-10

CME Associates, Inc.	6035 Corporate Drive East Syracuse, NY 13057 Phone: 315-701-0522	**SUBSURFACE EXPLORATION TEST PIT LOG**	**Test Pit ID**	**TP-1**
			Page No.	1 of 1
			Report No.	28124B-01-1023

Project Name:	Test Pit Exploration East of Burnet Road, Clay, New York	**Date Started**	10/17/23
Client:	Ramboll	**Date Finished**	10/17/23
Location:	See Exploration Location Plan	**Surface Elev.**	385.9'

METHOD OF INVESTIGATION

Operator:	Daryl Sherman
Inspector:	Astitwa Sharma, EIT
Equipment:	Link Belt Model LNK 27
Type:	Toothed Bucket
Bucket Width:	24"

GROUNDWATER OBSERVATIONS

Date	Time	Depth (Ft.)	Comment
10/17/2023	8:35	None Noted	See Remark 3

VISUAL CLASSIFICATION OF MATERIAL

Depth Scale (Feet)	Sample No.	Sample Depth (Ft.) From	Sample Depth (Ft.) To	Depth of Change (Ft.)	c - coarse m - medium f - fine	and - 35 to 50% / some - 20 to 35% little - 10 to 20% / trace - 0 to 10%	
0					**Topsoil**; Brown SILT, little CLAY, trace fine SAND (moist, easy digging)		
				1.0			
1					Brown SILT, some CLAY, trace fine SAND (moist, moderate digging)		
					Boulder noted during excavation		
2							
				3.0			
3					Brown mottled SILT, some CLAY (moist, moderate digging)		
4							
5							
				6.0			
6					Grey/Brown SILT and CLAY, trace mf SAND (wet, moderate digging)		
7							
8							
9							
10					Bottom of Test Pit @ 10'		
11							
12							
13							
14							
15							
16							

Remarks:

1. See Test Pit Photographs, attached.
2. Test Pit excavated and backfilled by a subcontractor to CME, utilizing a Link Belt Model LNK 27 excavator, equipped with a 24" wide bucket with teeth.
3. The Clayey Silt soils exhibit low permeability, and groundwater movement through this stratum is slow. Groundwater did not collect and accumulate in the test pit duting the short time the test pit was left open. Wet and/or grey soils were noted, which may be indicative of soils present below groundwater.

CME Associates, Inc.	6035 Corporate Drive East Syracuse, NY 13057 Phone: 315-701-0522	**SUBSURFACE EXPLORATION TEST PIT LOG**	**Test Pit ID**	**TP-2**
			Page No.	1 of 1
			Report No.	28124B-01-1023

Project Name:	Test Pit Exploration East of Burnet Road, Clay, New York	**Date Started**	10/17/23
Client:	Ramboll	**Date Finished**	10/17/23
Location:	See Exploration Location Plan	**Surface Elev.**	385.7'

METHOD OF INVESTIGATION

Operator:	Daryl Sherman
Inspector:	Astitwa Sharma, EIT
Equipment:	Link Belt Model LNK 27
Type:	Toothed Bucket
Bucket Width:	24"

GROUNDWATER OBSERVATIONS

Date	Time	Depth (Ft.)	Comment
10/17/2023	8:57	None Noted	See Remark 3

VISUAL CLASSIFICATION OF MATERIAL

Depth Scale (Feet)	Sample No.	Sample Depth (Ft.) From	Sample Depth (Ft.) To	Depth of Change (Ft.)	c - coarse m - medium f - fine	and - 35 to 50% / some - 20 to 35% little - 10 to 20% / trace - 0 to 10%	
0				0.5	**Topsoil**; Grey/Black SILT, trace fine SAND, trace CLAY, trace ROOTS (moist, easy digging)		
1					Brown SILT, little CLAY, trace fine SAND (moist, moderate digging)		
2							
				3.0			
3					Brown mottled SILT and CLAY, trace fine SAND (moist, moderate digging)		
4							
5							
6							
				7.0			
7					Brown mottled SILT, some CLAY, trace mf SAND (wet, moderate digging)		
8							
9							
				10.0			
10					Grey CLAY and SILT (wet, easy digging)		
					Bottom of Test Pit @ 10.5'		
11							
12							
13							
14							
15							
16							

Remarks:

1. See Test Pit Photographs, attached.
2. Test Pit excavated and backfilled by a subcontractor to CME, utilizing a Link Belt Model LNK 27 excavator, equipped with a 24" wide bucket with teeth.
3. The Clayey Silt soils exhibit low permeability, and groundwater movement through this stratum is slow. Groundwater did not collect and accumulate in the test pit duting the short time the test pit was left open. Wet and/or grey soils were noted, which may be indicative of soils present below groundwater.

CME Associates, Inc.	6035 Corporate Drive East Syracuse, NY 13057 Phone: 315-701-0522	**SUBSURFACE EXPLORATION TEST PIT LOG**	**Test Pit ID**	**TP-3**
			Page No.	1 of 1
			Report No.	28124B-01-1023

Project Name:	Test Pit Exploration East of Burnet Road, Clay, New York	**Date Started**	10/17/23
Client:	Ramboll	**Date Finished**	10/17/23
Location:	See Exploration Location Plan	**Surface Elev.**	388.4'

METHOD OF INVESTIGATION

Operator:	Daryl Sherman
Inspector:	Astitwa Sharma, EIT
Equipment:	Link Belt Model LNK 27
Type:	Toothed Bucket
Bucket Width:	24"

GROUNDWATER OBSERVATIONS

Date	Time	Depth (Ft.)	Comment
10/17/2023	9:21	11	See Remark 3

VISUAL CLASSIFICATION OF MATERIAL

Depth Scale (Feet)	Sample No.	Sample Depth (Ft.) From	Sample Depth (Ft.) To	Depth of Change (Ft.)	c - coarse m - medium f - fine	and - 35 to 50% / some - 20 to 35% little - 10 to 20% / trace - 0 to 10%	
0					Brown SILT, little mf SAND, trace CLAY, trace ROOTS (moist, easy digging)		
				1.0			
1					Brown SILT, little CLAY, trace fine SAND (moist, easy digging)		
2							
3							
				4.0			
4					Grey/Brown mottled SILT, some CLAY, trace fine SAND (moist, easy to moderate digging)		
5							
6							
7							
				8.0			
8					Reddish Brown SILT and CLAY (moist, moderate digging)		
9							
				10.0			
10					Grey CLAY and SILT (wet, easy digging)		
11							
					Bottom of Test Pit @ 11.5'		
12							
13							
14							
15							
16							

Remarks:

1. See Test Pit Photographs, attached.
2. Test Pit excavated and backfilled by a subcontractor to CME, utilizing a Link Belt Model LNK 27 excavator, equipped with a 24" wide bucket with teeth.
3. The Clayey Silt soils exhibit low permeability, and groundwater movement through this stratum is slow. Groundwater did not collect and accumulate in the test pit duting the short time the test pit was left open. Wet and/or grey soils were noted, which may be indicative of soils present below groundwater.

CME Associates, Inc.	6035 Corporate Drive East Syracuse, NY 13057 Phone: 315-701-0522	**SUBSURFACE EXPLORATION TEST PIT LOG**	**Test Pit ID**	**TP-4**
			Page No.	1 of 1
			Report No.	28124B-01-1023

Project Name:	Test Pit Exploration East of Burnet Road, Clay, New York	**Date Started**	10/17/23
Client:	Ramboll	**Date Finished**	10/17/23
Location:	See Exploration Location Plan	**Surface Elev.**	385.3'

METHOD OF INVESTIGATION

Operator:	Daryl Sherman
Inspector:	Astitwa Sharma, EIT
Equipment:	Link Belt Model LNK 27
Type:	Toothed Bucket
Bucket Width:	24"

GROUNDWATER OBSERVATIONS

Date	Time	Depth (Ft.)	Comment
10/17/2023	9:43	9	See Remark 3

VISUAL CLASSIFICATION OF MATERIAL

Depth Scale (Feet)	Sample No.	Sample Depth (Ft.) From	Sample Depth (Ft.) To	Depth of Change (Ft.)	c - coarse m - medium f - fine	and - 35 to 50% / some - 20 to 35% little - 10 to 20% / trace - 0 to 10%	
0					**Topsoil;** Grey/Black SILT, little mf SAND, trace CLAY, trace ROOTS (moist, easy digging)		
1							
				2.0			
2					Grey/Brown mottled SILT, some CLAY, trace fine SAND (moist, moderate digging)		
3							
4							
				5.0			
5					Grey CLAY and SILT (wet, easy digging)		
6							
7							
8							
9							
10							
11					Bottom of Test Pit @ 11'		
12							
13							
14							
15							
16							

Remarks:

1. See Test Pit Photographs, attached.
2. Test Pit excavated and backfilled by a subcontractor to CME, utilizing a Link Belt Model LNK 27 excavator, equipped with a 24" wide bucket with teeth.
3. The Clayey Silt soils exhibit low permeability, and groundwater movement through this stratum is slow. Groundwater did not collect and accumulate in the test pit duting the short time the test pit was left open. Wet and/or grey soils were noted, which may be indicative of soils present below groundwater.

CME Associates, Inc.	6035 Corporate Drive East Syracuse, NY 13057 Phone: 315-701-0522	**SUBSURFACE EXPLORATION TEST PIT LOG**	**Test Pit ID**	**TP-5**
			Page No.	1 of 1
			Report No.	28124B-01-1023

Project Name:	Test Pit Exploration East of Burnet Road, Clay, New York	**Date Started**	10/17/23
Client:	Ramboll	**Date Finished**	10/17/23
Location:	See Exploration Location Plan	**Surface Elev.**	391.7'

METHOD OF INVESTIGATION		**GROUNDWATER OBSERVATIONS**			
Operator:	Daryl Sherman	**Date**	**Time**	**Depth (Ft.)**	**Comment**
Inspector:	Astitwa Sharma, EIT	10/17/2023	10:10	11	See Remark 3
Equipment:	Link Belt Model LNK 27				
Type:	Toothed Bucket				
Bucket Width:	24"				

VISUAL CLASSIFICATION OF MATERIAL

Depth Scale (Feet)	Sample No.	Sample Depth (Ft.) From	Sample Depth (Ft.) To	Depth of Change (Ft.)	c - coarse m - medium f - fine	and - 35 to 50% / some - 20 to 35% little - 10 to 20% / trace - 0 to 10%	
0					**Topsoil;** Dark Brown SILT, little CLAY, trace fine SAND, trace ROOTS (moist, easy digging)		
1							
				2.0			
2					Brown SILT, little CLAY, trace fine SAND (moist, easy digging)		
3							
				4.0			
4					Brown mottled SILT, some CLAY, trace fine SAND (moist, moderate digging)		
5							
6							
7							
8							
9							
				10.0			
10					Grey CLAY and SILT (wet, easy digging)		
11					Bottom of Test Pit @ 11'		
12							
13							
14							
15							
16							

Remarks:

1. See Test Pit Photographs, attached.
2. Test Pit excavated and backfilled by a subcontractor to CME, utilizing a Link Belt Model LNK 27 excavator, equipped with a 24" wide bucket with teeth.
3. The Clayey Silt soils exhibit low permeability, and groundwater movement through this stratum is slow. Groundwater did not collect and accumulate in the test pit duting the short time the test pit was left open. Wet and/or grey soils were noted, which may be indicative of soils present below groundwater.

CME Associates, Inc.	6035 Corporate Drive East Syracuse, NY 13057 Phone: 315-701-0522	**SUBSURFACE EXPLORATION TEST PIT LOG**	**Test Pit ID**	**TP-6**
			Page No.	1 of 1
			Report No.	28124B-01-1023

Project Name:	Test Pit Exploration East of Burnet Road, Clay, New York	**Date Started**	10/17/23
Client:	Ramboll	**Date Finished**	10/17/23
Location:	See Exploration Location Plan	**Surface Elev.**	396.6'

METHOD OF INVESTIGATION

Operator:	Daryl Sherman
Inspector:	Astitwa Sharma, EIT
Equipment:	Link Belt Model LNK 27
Type:	Toothed Bucket
Bucket Width:	24"

GROUNDWATER OBSERVATIONS

Date	Time	Depth (Ft.)	Comment
10/17/2023	11:07	None Noted	See Remark 3

VISUAL CLASSIFICATION OF MATERIAL

Depth Scale (Feet)	Sample No.	Sample Depth (Ft.) From	Sample Depth (Ft.) To	Depth of Change (Ft.)	c - coarse m - medium f - fine	and - 35 to 50% / some - 20 to 35% little - 10 to 20% / trace - 0 to 10%	
0				0.5	**Topsoil;** Dark Brown SILT, little fine SAND, trace CLAY, trace ROOTS (moist, easy digging)		
1					Brown SILT, little mf SAND, trace CLAY (moist, moderate digging)		
				2.0			
2					Brown mottled SILT, some CLAY, trace mf GRAVEL (moist, moderate digging)		
3							
4							
				5.0			
5					Brown/Reddish SILT and CLAY, trace fine SAND (wet, moderate digging)		
6							
7							
8							
9				9.5			
					Grey CLAY and SILT (wet, easy digging)		
10							
					Bottom of Test Pit @ 10.5'		
11							
12							
13							
14							
15							
16							

Remarks:

1. See Test Pit Photographs, attached.
2. Test Pit excavated and backfilled by a subcontractor to CME, utilizing a Link Belt Model LNK 27 excavator, equipped with a 24" wide bucket with teeth.
3. The Clayey Silt soils exhibit low permeability, and groundwater movement through this stratum is slow. Groundwater did not collect and accumulate in the test pit duting the short time the test pit was left open. Wet and/or grey soils were noted, which may be indicative of soils present below groundwater.

CME Associates, Inc.
6035 Corporate Drive
East Syracuse, NY 13057
Phone: 315-701-0522

SUBSURFACE EXPLORATION TEST PIT LOG

Test Pit ID	**TP-7**
Page No.	1 of 1
Report No.	28124B-01-1023

Project Name:	Test Pit Exploration East of Burnet Road, Clay, New York	**Date Started**	10/17/23
Client:	Ramboll	**Date Finished**	10/17/23
Location:	See Exploration Location Plan	**Surface Elev.**	398.9'

METHOD OF INVESTIGATION

Operator:	Daryl Sherman
Inspector:	Astitwa Sharma, EIT
Equipment:	Link Belt Model LNK 27
Type:	Toothed Bucket
Bucket Width:	24"

GROUNDWATER OBSERVATIONS

Date	Time	Depth (Ft.)	Comment
10/17/2023	11:32	None Noted	See Remark 3

VISUAL CLASSIFICATION OF MATERIAL

c - coarse
m - medium
f - fine

and - 35 to 50% / some - 20 to 35%
little - 10 to 20% / trace - 0 to 10%

Depth Scale (Feet)	Sample No.	Sample Depth (Ft.) From	Sample Depth (Ft.) To	Depth of Change (Ft.)	
0					**Topsoil;** Dark Brown SILT, little CLAY, trace fine SAND, trace ROOTS (moist, easy digging)
				1.0	
1					Brown mottled SILT and CLAY, little mf SAND (moist, moderate digging)
2					
3					
				4.0	
4					Brown mottled SILT and CLAY, little mf SAND (moist, moderate digging)
5					
6					
7					
8					
9					
				10.0	
10					Grey CLAY and SILT (wet, moderate digging)
11					
12					Bottom of Test Pit @ 12'
13					
14					
15					
16					

Remarks:

1. See Test Pit Photographs, attached.
2. Test Pit excavated and backfilled by a subcontractor to CME, utilizing a Link Belt Model LNK 27 excavator, equipped with a 24" wide bucket with teeth.
3. The Clayey Silt soils exhibit low permeability, and groundwater movement through this stratum is slow. Groundwater did not collect and accumulate in the test pit duting the short time the test pit was left open. Wet and/or grey soils were noted, which may be indicative of soils present below groundwater.

CME Associates, Inc.
6035 Corporate Drive
East Syracuse, NY 13057
Phone: 315-701-0522

SUBSURFACE EXPLORATION TEST PIT LOG

Test Pit ID	**TP-8**
Page No.	1 of 1
Report No.	28124B-01-1023

Project Name:	Test Pit Exploration East of Burnet Road, Clay, New York	**Date Started**	10/17/23
Client:	Ramboll	**Date Finished**	10/17/23
Location:	See Exploration Location Plan	**Surface Elev.**	406.6'

METHOD OF INVESTIGATION

Operator:	Daryl Sherman
Inspector:	Astitwa Sharma, EIT
Equipment:	Link Belt Model LNK 27
Type:	Toothed Bucket
Bucket Width:	24"

GROUNDWATER OBSERVATIONS

Date	Time	Depth (Ft.)	Comment
10/17/2023	12:00	None Noted	See Remark 3

VISUAL CLASSIFICATION OF MATERIAL

Depth Scale (Feet)	Sample No.	Sample Depth (Ft.) From	Sample Depth (Ft.) To	Depth of Change (Ft.)	c - coarse m - medium f - fine	and - 35 to 50% / some - 20 to 35% little - 10 to 20% / trace - 0 to 10%	
0					**Topsoil;** Grey/Brown SILT, little fine SAND, trace ROOTS (moist, easy digging)		
				1.0			
1					Brown SILT, trace fine SAND, trace CLAY (moist, easy digging)		
2							
				3.0			
3					Brown mottled SILT, some CLAY, trace fine SAND (moist, moderate digging)		
4							
5							
6							
7							
8							
				9.0			
9					Grey CLAY and SILT, trace fine SAND (wet, moderate digging)		
10							
					Bottom of Test Pit @ 10.5'		
11							
12							
13							
14							
15							
16							

Remarks:

1. See Test Pit Photographs, attached.
2. Test Pit excavated and backfilled by a subcontractor to CME, utilizing a Link Belt Model LNK 27 excavator, equipped with a 24" wide bucket with teeth.
3. The Clayey Silt soils exhibit low permeability, and groundwater movement through this stratum is slow. Groundwater did not collect and accumulate in the test pit duting the short time the test pit was left open. Wet and/or grey soils were noted, which may be indicative of soils present below groundwater.

CME Associates, Inc.	6035 Corporate Drive East Syracuse, NY 13057 Phone: 315-701-0522	**SUBSURFACE EXPLORATION TEST PIT LOG**	**Test Pit ID**	**TP-9**
			Page No.	1 of 1
			Report No.	28124B-01-1023

Project Name:	Test Pit Exploration East of Burnet Road, Clay, New York	**Date Started**	10/17/23
Client:	Ramboll	**Date Finished**	10/17/23
Location:	See Exploration Location Plan	**Surface Elev.**	418.8'

METHOD OF INVESTIGATION

Operator:	Daryl Sherman
Inspector:	Astitwa Sharma, EIT
Equipment:	Link Belt Model LNK 27
Type:	Toothed Bucket
Bucket Width:	24"

GROUNDWATER OBSERVATIONS

Date	Time	Depth (Ft.)	Comment
10/17/2023	12:24	None Noted	See Remark 3

VISUAL CLASSIFICATION OF MATERIAL

Depth Scale (Feet)	Sample No.	Sample Depth (Ft.) From	Sample Depth (Ft.) To	Depth of Change (Ft.)	c - coarse m - medium f - fine	and - 35 to 50% / some - 20 to 35% little - 10 to 20% / trace - 0 to 10%	
0					**Topsoil;** Dark Brown SILT, trace fine SAND, trace ROOTS (moist, easy digging)		
				1.0			
1					Brown SILT, trace cmf SAND (moist, easy digging)		
				2.0			
2					Brown SILT and cmf SAND, some GRAVEL, some COBBLES (moist, medium to hard digging)		
3							
4							
5							
				6.0			
6					Brown cmf SAND and cmf GRAVEL, little SILT (moist, hard digging)		
7							
8							
				9.0			
9					Grey cmf SAND and SILT, some cmf GRAVEL (moist, hard digging) *Possible Till*		
					Bottom of Test Pit @ 9.5'		
10							
11							
12							
13							
14							
15							
16							

Remarks:

1. See Test Pit Photographs, attached.
2. Test Pit excavated and backfilled by a subcontractor to CME, utilizing a Link Belt Model LNK 27 excavator, equipped with a 24" wide bucket with teeth.
3. The Clayey Silt soils exhibit low permeability, and groundwater movement through this stratum is slow. Groundwater did not collect and accumulate in the test pit duting the short time the test pit was left open. Wet and/or grey soils were noted, which may be indicative of soils present below groundwater.

CME Associates, Inc.	6035 Corporate Drive East Syracuse, NY 13057 Phone: 315-701-0522	**SUBSURFACE EXPLORATION TEST PIT LOG**	**Test Pit ID**	**TP-10**
			Page No.	1 of 1
			Report No.	28124B-01-1023

Project Name:	Test Pit Exploration East of Burnet Road, Clay, New York	**Date Started**	10/17/23
Client:	Ramboll	**Date Finished**	10/17/23
Location:	See Exploration Location Plan	**Surface Elev.**	406.8'

METHOD OF INVESTIGATION

Operator:	Daryl Sherman
Inspector:	Astitwa Sharma, EIT
Equipment:	Link Belt Model LNK 27
Type:	Toothed Bucket
Bucket Width:	24"

GROUNDWATER OBSERVATIONS

Date	Time	Depth (Ft.)	Comment
10/17/2023	10:43	None Noted	See Remark 3

VISUAL CLASSIFICATION OF MATERIAL

Depth Scale (Feet)	Sample No.	Sample Depth (Ft.) From	Sample Depth (Ft.) To	Depth of Change (Ft.)	c - coarse m - medium f - fine	and - 35 to 50% / some - 20 to 35% little - 10 to 20% / trace - 0 to 10%	
0				0.5	**Topsoil;** Dark Brown SILT, little CLAY, trace ROOTS (moist, easy digging)		
1					Brown mottled SILT, little CLAY, trace fine SAND (moist, easy digging)		
2							
3							
4							
5				5.0	Brown/Reddish SILT, some cmf GRAVEL, little cmf SAND, little COBBLES (moist, hard digging)		
6							
7							
8							
9				9.0	Grey SILT, some cmf SAND, little cmf GRAVEL, trace COBBLES (moist, hard digging) *Possible Till*		
10					Bottom of Test Pit @ 10'		
11							
12							
13							
14							
15							
16							

Remarks:

1. See Test Pit Photographs, attached.
2. Test Pit excavated and backfilled by a subcontractor to CME, utilizing a Link Belt Model LNK 27 excavator, equipped with a 24" wide bucket with teeth.
3. The Clayey Silt soils exhibit low permeability, and groundwater movement through this stratum is slow. Groundwater did not collect and accumulate in the test pit duting the short time the test pit was left open. Wet and/or grey soils were noted, which may be indicative of soils present below groundwater.

Figure 1: Test Pit TP-1

Figure 2: Materials Excavated from TP-1

Figure 3: Test Pit TP-2

Figure 4: Materials Excavated from TP-2

Figure 5: Test Pit TP-3

Figure 6: Materials Excavated from TP-3

Figure 7: Test Pit TP-4

Figure 8: Materials Excavated from TP-4

Figure 9: Test Pit TP-5

Figure 10: Materials Excavated from TP-5

Figure 11: Test Pit TP-6

Figure 12: Materials Excavated from TP-6

Figure 13: Test Pit TP-7

Figure 14: Materials Excavated from TP-7

Figure 15: Test Pit TP-8

Figure 16: Materials Excavated from TP-8

Figure 17: Test Pit TP-9

Figure 18: Materials Excavated from TP-9

Figure 19: Test Pit TP-10

Figure 20: Materials Excavated from TP-10

GENERAL INFORMATION & KEY TO TEST BORING LOGS

The **Subsurface Exploration – Test Boring Logs** produced **by CME Associates, Inc.** (CME) present observations and mechanical data collected by the CME Drill Crew while at the site, supplemented, at times, by classification of the materials removed from the borings determined through visual identification by technicians in the laboratory. It is cautioned that the materials removed from the borings represent only a fraction of the total volume of the deposits at the site and may not necessarily be representative of the subsurface conditions between adjacent borings or between the sampled intervals. The data presented on the Exploration Logs together with the recovered samples will provide a basis for evaluating the character of the subsurface conditions relative to the proposed construction. The evaluation must consider all the recorded details and their significance relative to each other. Often, analyses of standard boring data indicate the need for additional testing and sampling procedures to more accurately evaluate the subsurface conditions. Any evaluations of the contents of CME's report and the recovered samples must be performed by Licensed Professionals having experience in Soil Mechanics, Geological Sciences and Geotechnical Engineering. The information presented in this Key defines some of the methods, procedures and terms used on the CME Exploration Logs to describe the conditions encountered. Refer to the Log on page 4 for key number.

Key No. **Description**

1. The figures in the **DEPTH SCALE** column define the vertical scale of the Boring Log.

2. The **SAMPLE NO.** is used for identification on the sample containers and in the Laboratory Test Report or Summary.

3. The **SAMPLE DEPTH** column gives the depth range from which a sample was recovered.

4. The **TYPE / SAMPLE RECOVERY** column is used to signify the various types of samples. "SS is Split Spoon, "U" is Undisturbed Tube, and "C" is Rock Core. For soil and rock samples, the recovered length of the sample is recorded in inches.

5. **BLOWS ON SAMPLER** – This column shows the results of the "Standard Penetration Test (SPT) ASTM D1586", recording the number of blows required to drive a 2-inch outside diameter (O.D.) split spoon sampler into the ground beneath the casing. The number of blows required for each six inches of penetration is recorded. The total number of blows required for the 6-inch to 18-inch interval is summarized in the **SPT "N"** column and represents the "Standard Penetration Number". The outside diameter of the sampler, the hammer weight and the length of drop are noted in the **Methods of Investigation** portion of the log. A "WH" or "WR" in this column indicates that the sample spoon advanced a 6-inch interval under the **W**eight of **H**ammer + Rod or **W**eight of **R**od, respectively. If a rock core sample is taken, the core bit size designation is given here.

6. The **DEPTH OF CHANGE** column designates the depth (in feet) that the driller noted a compactness or stratum change. In soft materials or soil strata exhibiting a consistent relative density, it is difficult for the driller to determine the exact change from one stratum to the next. In addition, a grading or gradual change may exist. In such cases the depth noted is approximate or estimated only and may be represented by a dashed line. When continuous split spoon sampling is not employed, or an interval of several feet exists between samplings, the Depth of Change may not be indicated at all.

7. **VISUAL CLASSIFICATION OF MATERIAL** – Soil materials sampled and recovered are described by the Driller or Geotechnical Representative on the original field log. Notes of the Drillers observations are also placed in this column. Recovered samples may also be visually classified by a Geologist, Engineer, or Soil Technician. Visual soil classifications are made using a modified Burmister System as practiced by CME and as generally described in this Key and abbreviated on the Test Boring Log. This modified Burmister System is a type of visual-manual textural classification estimated by the Driller, Geologist, Engineer, or Technician on the basis of weight-fraction of the recovered material and estimated plasticity, among other characteristics. See Table 1 **"Classification of Materials"**. The description of the relative compactness or consistency is based upon the standard penetration number as defined in Table 2. The description of the recovered sample moisture condition is described as dry, moist, wet, or saturated. Water used to advance the boring may affect the moisture content of the recovered sample. Special terms may be used to describe recovered materials in greater detail, such terms are listed in ASTM D653. When sampling gravelly soils with a standard two-inch O.D. Split Spoon, the true percentage of gravel is often not recovered due to the relatively small sampler diameter. The presence of boulders, cobbles, and large gravel is sometimes, but not necessarily, detected by observation of the casing advancement and sampler blows and/or through the "action" of the drill rig, sampler and/or casing as reported by the Driller.

   The description of **Rock** is based upon the recovered rock core. Terms frequently used in the description are included in Tables 3, 4 and 5. The length of core run is defined as length of penetration between retrievals of the core barrel from the bore hole, expressed in inches. The core recovery expresses the length of core recovered from the core barrel per core run, in percent. The size core barrel used is noted in Column 5. An "N" size core, being larger in diameter than "A" size core, often produces better recovery, and is frequently utilized where accurate information regarding the geologic conditions and engineering properties is needed. An estimate of in-situ rock quality is provided by a modified core recovery ratio known as the **"Rock Quality Designation" (RQD)**. This ratio is determined by considering only pieces of core that are at least 4 inches long and are hard and sound. Breaks obviously caused by drilling are ignored. The percentage ratio between the total length of such core recovered and the length of core drilled on a given run is the RQD. Table 4 indicates in-situ rock quality as related to the **RQD**.

8. The **SPT "N"** or **RQD** is given in this column as applicable to the specific sample taken. In Very Compact coarse-grained soils and in Hard fine-grained soils the N-value may be indicated as 50+ or 100+. This typically means that the blow count was achieved prior to driving the sampler the entire 6-inch interval or the sampler refused further penetration. For an "N"size rock core, the RQD is reported here, expressed in percent (%).

9. **GROUNDWATER OBSERVATIONS** and timing noted by the Drill Crew are shown in this section. It is important to realize that the reliability of the water level observations depend upon the soil type (e.g. water does not readily stabilize in a hole through fine grained soils), and that drill water used to advance the boring may have influenced the observations. Groundwater levels typically fluctuate seasonally so those noted on the log are only representative of that exhibited during the period of time noted on the log. One or more perched or trapped water levels may exist in the ground seasonally. All the available resources and data should be evaluated. If definite conclusions cannot be made, it is often prudent to examine the conditions more thoroughly through test pit excavations or through groundwater observation well installations.

10. **METHODS of INVESTIGATION** provides pertinent information regarding the identity of the Drill Crew members, inspector (if any), drill rig make and model, drill rig mount vehicle, casing and type of advancement, soil and rock sampling tools and appurtenances used in the installation of the Test Boring.

TABLE 1 - CLASSIFICATION OF MATERIALS	
GROUP	**COARSE GRAINED SOILS TEXTURAL SIZES**
BOULDERS	larger than 12" diameter
COBBLES	12" diameter to 3" sieve
GRAVEL	3" - coarse - 1" - medium - 1/2" - fine - #4 sieve
SAND	#4 - coarse - #10 - medium - #40 - fine - #200 sieve
GROUP	**FINE GRAINED SOILS SIZE (PLASTICITY*)**
SILT	#200 sieve (0.074mm) to 0.005mm size (see below *)
CLAY	0.005mm size to 0.001 mm size (see below *)
GROUP	**ORGANIC SOILS, PEAT, MUCK, MARL**
ORGANIC	Based on smell, visual-manual and laboratory testing

ABBREVIATIONS	**TERM**	**ESTIMATED PERCENT OF TOTAL SAMPLE BY WEIGHT**
f - fine	and	35 to 50%
m - medium	some	20 to 35%
c - coarse	little	10 to 20%
	trace	0 to 10%

***PLASTICITY DESCRIPTIONS and INDICATOR FIELD TESTS**			
		DRY STRENGTH TEST	
TERM	**PLASTICITY INDEX**	**INDICATION**	**FIELD TEST RESULT**
non-plastic	0 - 3	Very low	falls apart easily
slightly plastic	4 - 15	Slight	easily crushed by fingers
plastic	15 - 30	Medium	difficult to crush
highly plastic	31 or more	High	impossible to crush with fingers
Other Field Tests include: Dilatancy, Thread and Shine Testing			

*TABLE 2 - DESCRIPTION OF SOIL COMPACTNESS OR CONSISTENCY based on SPT "N"**		
Primary Soil Type	**Descriptive Term of Compactness**	**Range of Standard Penetration Resistance (N)**
COARSE GRAINED SOILS	Very Loose	less than 4 blows per foot
(More than half of Material is larger than No. 200 sieve size)	Loose	4 to 10
	Medium Compact	10 to 30
	Compact	30 to 50
	Very Compact	Greater than 50
FINE GRAINED SOILS	**Descriptive Term of Consistency**	**Range of Standard Penetration Resistance (N)**
(More than half of material is smaller than No. 200 sieve size)	Very Soft	less than 2 blows per foot
	Soft	2 to 4
	Medium Stiff	4 to 8
	Stiff	8 to 15
	Very Stiff	15 to 30
	Hard	Greater than 30
*The number of blows of 140-pound weight falling 30 inches to drive a 2-inch O.D., 1-3/8 inch I.D. sampler 12 inches is defined as the Standard Penetration Resistance, designated "N".		

TABLE 3 - ROCK CLASSIFICATION TERMS		
Rock Classification Terms		**Field Test or Meaning of Term**
Hardness	Soft	Scratched by fingernail. Crumbles under firm blows with a geologic pick.
	Medium Soft	Shallow indentations (1 to 3 mm) can be made by firm blows of a geologic pick. Can be peeled with a pocketknife with difficulty.
	Medium Hard	Scratched distinctly by penknife or steel nail. Can't be peeled or scraped with knife.
	Hard	Scratched with difficulty by penknife or steel nail. Requires more than one blow with a geologic hammer to break it
	Very Hard	Cannot be scratched by penknife or steel nail. Breaks only by repeated heavy blows with a geologic hammer.
Bedding (Divisional planes and/or surfaces separating it from layers above and below)	Thinly Laminated Laminated Thinly Bedded Medium Bedded Thickly Bedded Massive	less than 1/8th inch 1/8th to 1 inch 1 inch to 4 inches 4 inches to 12 inches 12 inches to 48 inches greater than 48 inches

TABLE 4 **Relation of Rock Quality Designation (RQD) and in-situ Rock Quality**	
RQD %	**Rock Quality Term Used**
90 to 100	Excellent
75 to 90	Good
50 to 75	Fair
25 to 50	Poor
0 to 25	Very Poor

TABLE 5 – BEDROCK WEATHERING CLASSIFICATION	
Classification	**Diagnostic Features**
Fresh	No visible sign of decomposition or discoloration. Rings under hammer impact.
Slightly Weathered	Slight discoloration inwards from open fractures, otherwise similar to Fresh.
Moderately Weathered	Discoloration throughout. Strength somewhat less than fresh rock but cores cannot be broken by hand or scraped with knife. Texture observed.
Highly Weathered	Most minerals somewhat decomposed. Specimens can be broken by hand with effort or shaved with knife. Core stones present in rock mass. Texture becoming indistinct but fabric preserved.
Completely Weathered	Minerals decomposed to soil, but fabric and structure preserved (e.g. Saprolite). Specimens easily crumbled or penetrated.
Residual Soil	Advanced state of decomposition resulting in plastic soils. Rock fabric and structure completely destroyed. Large volume change.

CME Associates, Inc. 6035 Corporate Drive East Syracuse, NY 13057 Phone: 315-701-0522	SUBSURFACE EXPLORATION TEST BORING LOG	Boring No.	B-2
		Page No.	1 of 1
		Report No.	
Project Name:		Date Started	
Client:		Date Finished	
Location:		Surface Elev.	

METHODS OF INVESTIGATION			
Driller: 10	**Casing:** 10		
Driller:	**Casing Hammer:**		
Inspector:	**Other:**		
Drill Rig:	**Soil Sampler:**		
Type:	**Hammer Wt:**		
Rod Size:	**Hammer Fall:**		

GROUNDWATER OBSERVATIONS			
Date	**Time**	**Depth (Ft.)**	**Casing At (Ft.)**
	While Drilling	9	9
	Before Casing Removed		
	After Casing Removed		
	After Casing Removed		

LOG OF BORING SAMPLES						VISUAL CLASSIFICATION OF MATERIAL		
Depth Scale (Feet)	Sample No.	Sample Depth (Ft.) From	Sample Depth (Ft.) To	Type / Sample Rec. (in.)	Blows on Sampler Per 6 Inches	Depth of Change (Ft.)	c - coarse m - medium f - fine	and - 35 to 50% / some - 20 to 35% little - 10 to 20% / trace - 0 to 10%	SPT "N" or RQD %
1	2	3	3	4	5	6	7		8

SS - Split Spoon, U - Undisturbed Tube, C - Core, WH - Weight of Hammer + Rod, WR - Weight of Rod

Remarks: