ENTECH
ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, CO 80907
PHONE (719) 531-5599
FAX (719) 531-5238

August 31, 2021

Gorilla Capital Colorado
c/o Saddlehorn Ranch, LLC
1345 High Street
Eugen, OR 97401

Attn: John Helmick

Re: Pavement Recommendations
Saddlehorn Ranch, Filing 1, Phase 1
El Paso County, Colorado

Dear Mr. Helmick:

As requested, Entech Engineering, Inc. obtained samples of the pavement subgrade soils from the proposed roadways at the above referenced site. Laboratory testing was performed in order to determine the pavement support characteristics of the soil. This letter presents the results of the laboratory testing and pavement recommendations for the roadways.

Project Description

The project will consist of paving of the proposed Truchas Trail, Oscuro Trail, El Raiceno Trail, Del Cerro Trail, Zaragoza Trail, and Carranza Trail, Filing 1, Phase 1, subdivision in El Paso County, Colorado. Subsurface Soil Investigation and laboratory testing were performed to determine the pavement support characteristics on the soils. The general layout of the site is presented in the Test Boring Location Maps in Figures 1 and 2.

Subgrade Conditions

A total of eighteen (18) test borings were drilled along the roadways to depths of approximately 5 and 10 feet below the existing subgrade surface at the required sample frequency. At the time of our field investigation the subgrade was in good condition and adequate for vehicle traffic.

The soils at the roadway subgrade depth consisted of Soil Type 1: slightly silty to silty sand and clayey sand, and Soil Type 2: very sandy silt and very silty sand. The Test Boring Logs are presented in Appendix A. Sieve Analyses and Atterberg Limit testing were performed on subgrade soil samples obtained from the test borings for the purpose of classification. The percent passing the No. 200 sieve for the Type 1 soils ranged from approximately 8 to 32 percent. The percent passing the No. 200 sieve for the Type 2 soils ranged from 42 to 53 percent. Atterberg Testing on the Type 1 Soils resulted in Liquid Limits of No Value to 27 percent and Plastic Indexes of Non-Plastic to 8 Percent. The Type 2 soils were non-plastic.

The site soils classified as A-2-4, A-1-b, and A-4, which commonly exhibit good pavement support characteristics. Groundwater was not encountered in the test borings. Sulfate testing resulted in less than 0.01 percent soluble sulfate by weight, indicating a negligible potential for below grade concrete degradation due to sulfate attack.

Swell/Consolidation tests were not required on the Type 1 or 2 soils, due to their classification and plastic indexes. The Type 1 and Type 2 soils are anticipated to have a low expansion potential. Mitigation for expansive soils is not required on this site.

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Pavement Recommendations
Saddlehorn Ranch, Filing 1, Phase 1
El Paso County, Colorado

California Bearing Ratio (CBR) testing was performed on a representative subgrade sample of the Type 1 materials to determine the support characteristics for the roadway sections. Due to the similarity of the Type 1 and the Type 2 soils, all sections were determined using the Type 1 values. The results of the CBR testing, are presented in Appendix B and summarized as follows:

Soil Type 1 – Silty Sand
CBR 1
R @ 90% = 50.0
R @ 95% = 76.0

Classification Testing	
Liquid Limit	NV
Plasticity Index	NP
Percent Passing 200	21.6
AASHTO Classification	A-2-4
Group Index	0
Unified Soils Classification	SM

Pavement Design

CBR testing was used to determine pavement sections for the roadways. Pavement sections were determined utilizing El Paso County Pavement Design Criteria Manual. All roadways in the development, as shown in the Test Boring Location Maps in Figure 1 and 2, classify as rural local roads, which used an 18k ESAL value of 36,500 for design purposes. Pavement sections were determined for an asphalt on aggregate basecourse composite section.

Design parameters used in the pavement analysis for the roadways are as follows:

Reliability	
Rural Local	75%
Δpsi	2.0
"R" Value Subgrade (Soil Type 1)	50.0
Resilient Modulus (Soil Type 1)	13,168 psi
Hot Bituminous Pavement	0.44
Aggregate Basecourse	0.11

The pavement design calculations are presented in Appendix C. Pavement section alternatives for the roadway sections are presented below. Any additional grading may result in subgrade soils with different support characteristics. The following pavement sections should be re-evaluated if additional grading is performed.

Gorilla Capital Colorado
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Pavement Recommendations
Saddlehorn Ranch, Filing 1, Phase 1
El Paso County, Colorado

Pavement Sections
ESAL = 13,168 – Truchas Trail, Oscuro Trail, El Raiceno Trail, Del Cerro Trail, Zaragoza Trail, and Carranza Trail
Soil Type 1

Alternative	Asphalt (in)	Basecourse (in)
1. Asphalt Over Basecourse	3.0*	4.0*

*Minimum sections required per the El Paso County Engineering Criteria Manual.

Mitigation

The El Paso County Engineering Criteria Manual requires mitigation of subgrade soils that have a swell of 2.0 percent or greater with a 150 pound per square foot surcharge. None of the soil types exceeded the threshold. Mitigation of the subgrade soils is not required. Due to the clay content of the Type 2 soils, moisture-conditioning and recompaction are recommended. Personnel of Entech Engineering, Inc. should be consulted to determine the need for and extents of scarification, if required.

Roadway Construction - Asphalt on Aggregate Basecourse

Prior to placement of the asphalt, the Type 1 subgrade should be scarified, moisture conditioned, and compacted to a minimum of 95 percent of the soils maximum Modified Proctor Dry Density, ASTM D-1557 at ± 2 percent of optimum moisture content. The Type 2 soils subgrade should be scarified, moisture conditioned, and compacted to a minimum of 95% of the soils maximum Standard Proctor Dry Density, ASTM D-698 at 0 to 4 percent over optimum moisture content and properly compacted. Any loose or soft areas should be removed and replaced with suitable materials. Basecourse materials should be compacted to a minimum of 95 percent of its maximum Modified Proctor Dry Density, ASTM D-1557 at ± 2 percent of optimum moisture content. Special attention should be given to areas adjacent to manholes, inlet structures, and valves. It is noted that full-depth asphalt is currently not allowed, per El Paso County specifications

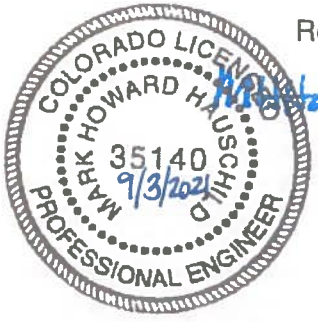
In addition to the above guidance, the asphalt, subgrade conditions, compaction of materials and roadway construction methods shall meet the El Paso County specifications.

We trust that this has provided you with the information you required. The pavement sections provided are based on general site soil types. If you have any questions or need additional information, please do not hesitate to contact us.

Respectfully Submitted,

ENTECH ENGINEERING, INC.

Daniel P. Stegman
DPS/jr
Encl.
Entech Job No. 211922
AAprojects/2021/211922 pr



Reviewed by:

Mark H. Hauschild, P.E.
Senior Engineer

EPC Project No. SF-1912

TABLE

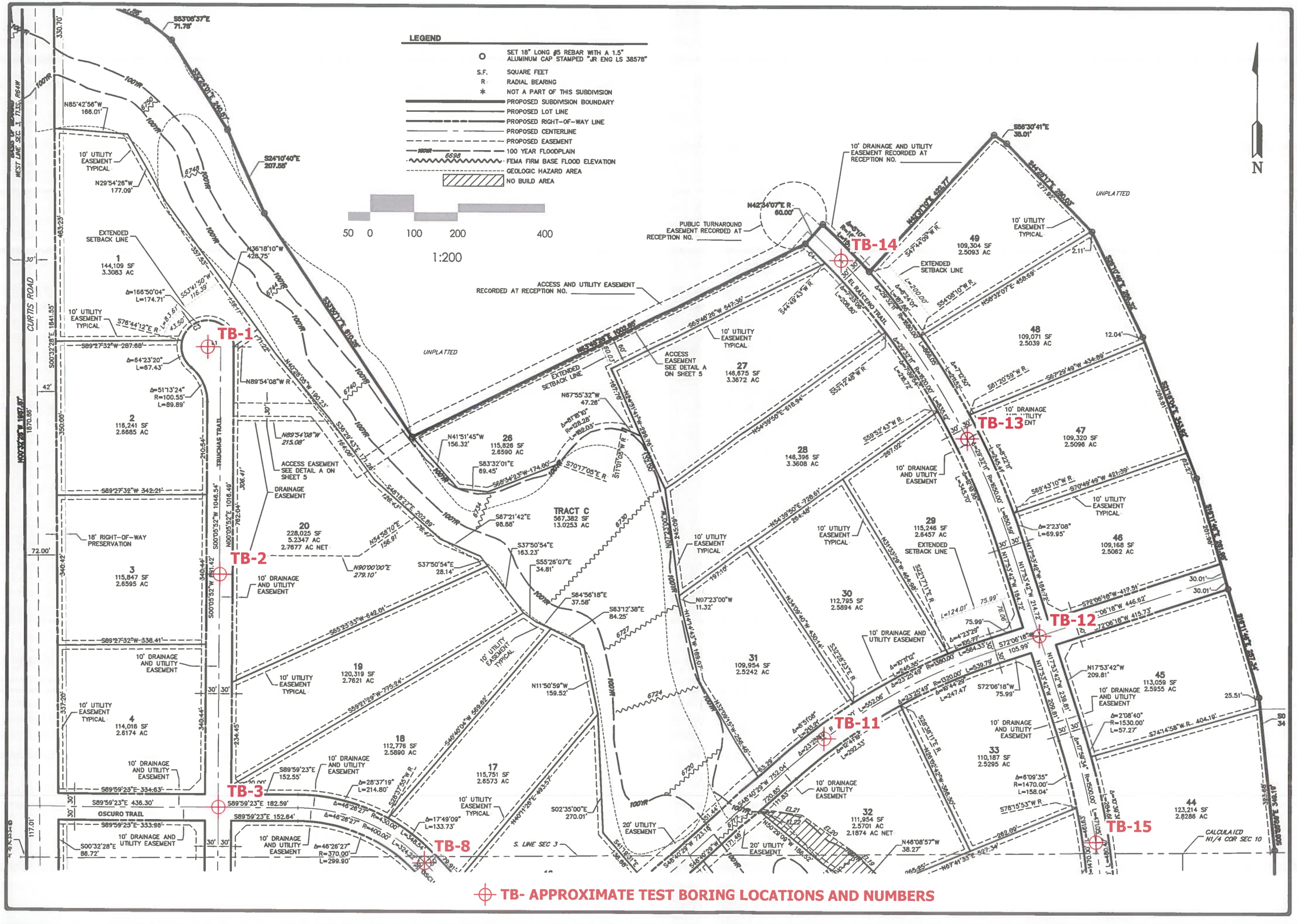
TABLE 1

SUMMARY OF LABORATORY TEST RESULTS

CLIENT GORILLA CAPITAL
PROJECT SADDLEHORN RANCH, F-1
JOB NO. 211922

SOIL TYPE	TEST BORING NO.	DEPTH (FT)	WATER (%)	DRY DENSITY (PCF)	PASSING NO. 200 SIEVE (%)	LIQUID LIMIT (%)	PLASTIC INDEX (%)	SULFATE (WT %)	AASHTO CLASS.	SWELL/ CONSOL (%)	UNIFIED CLASSIFICATION	SOIL DESCRIPTION
1, CBR	1	0-3			21.6	NV	NP		A-2-4		SM	SAND, SILTY
1	1	1-2			15.6	NV	NP		A-2-4		SM	SAND, SILTY
1	2	1-2			14.0	NV	NP		A-2-4		SM	SAND, SILTY
1	3	1-2			29.9	NV	NP		A-2-4		SM	SAND, SILTY
1	4	1-2			22.4	NV	NP	<0.01	A-2-4		SM	SAND, SILTY
1	5	1-2			16.0	NV	NP		A-2-4		SM	SAND, SILTY
1	6	1-2			14.4	NV	NP		A-2-4		SM	SAND, SILTY
1	7	1-2			32.1	NV	NP		A-2-4		SM	SAND, SILTY
1	8	1-2			10.4	NV	NP		A-1-b		SM-SW	SAND, SLIGHTLY SILTY
1	9	1-2			15.9	NV	NP	<0.01	A-2-4		SM	SAND, SILTY
1	10	1-2			15.1	NV	NP		A-2-4		SM	SAND, SILTY
1	11	1-2			23.2	NV	NP		A-2-4		SM	SAND, SILTY
1	12	1-2			10.1	NV	NP		A-1-b		SM-SW	SAND, SLIGHTLY SILTY
1	14	1-2			7.7	NV	NP		A-1-b		SM-SW	SAND, SLIGHTLY SILTY
1	15	1-2			31.2	NV	NP		A-2-4		SM	SAND, SILTY
1	17	1-2			17.7	NV	NP		A-2-4		SM	SAND, SILTY
1	18	1-2			32.4	27	8		A-2-4		SC	SAND, CLAYEY
2	13	1-2			41.9	NV	NP		A-4		SM	SAND, VERY SILTY
2	16	1-2			53.3	NV	NP		A-4		SM	SILT, VERY SANDY

FIGURES



REVISION	BY

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TEST BORING LOCATION MAP
SADDLEHORN RANCH FILING NO. 1
EL PASO COUNTY, COLORADO
FOR: GORILLA CAPITAL COLORADO

DRAWN	RPJ
CHECKED	DPS
DATE	8/11/21
SCALE	1:200
JOB NO.	211922
FIGURE No.	1

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TEST BORING LOCATION MAP
SADDLEHORN RANCH FILING NO. 1
EL PASO COUNTY, COLORADO
FOR: GORILLA CAPITAL COLORADO

TB-3 TB-4 TB-5 TB-6 TB-7 TB-8 TB-9 TB-10 TB-15 TB-16 TB-17 TB-18

TRUCHAS TRAIL · DEL CERRO TRAIL · EL RANCENO TRAIL · ZARAGOZA TRAIL · CARRANZA TRAIL

TRACT B 323,812 SF 7.4337 AC

8	114,889 SF	2.6375 AC
9	109,335 SF	2.5100 AC
10	109,220 SF	2.5073 AC
11	109,961 SF	2.5244 AC
12	232,188 SF	5.3303 AC 4.3565 AC NET
13	131,284 SF	3.0134 AC 1.9721 AC NET
14	112,843 SF	2.5905 AC
15	108,991 SF	2.5021 AC
16	110,022 SF	2.5258 AC
17	115,751 SF	2.6573 AC
21	109,072 SF	2.5040 AC
22	109,480 SF	2.5133 AC
23	134,700 SF	3.0923 AC
24	124,444 SF	2.8568 AC
25	155,026 SF	3.5589 AC
32	111,954 SF	2.5701 AC 2.1874 AC NET
34	113,575 SF	2.6073 AC 2.3719 AC NET
35	109,036 SF	2.5031 AC 2.3608 AC NET
36	110,397 SF	2.5344 AC 2.2176 AC NET
37	110,468 SF	2.5360 AC 1.5212 AC NET
38	116,729 SF	2.6797 AC 1.7871 AC NET
39	110,609 SF	2.5392 AC
40	114,474 SF	2.6280 AC
41	109,187 SF	2.5066 AC
42	109,117 SF	2.5050 AC
43	110,594 SF	2.5389 AC
44	123,214 SF	2.8286 AC

NO BUILD AREA & NO STORAGE AREA OF MATERIALS

PUBLIC EMERGENCY ACCESS EASEMENT SEE DETAIL C SHEET 5

DRAINAGE EASEMENT SEE DETAIL B ON SHEET 5

DRAINAGE EASEMENT SEE DETAIL B ON SHEET 3

EXTENDED SETBACK LINE

UNPLATTED

CALCULATED N1/4 COR SEC 10

EAST LINE N1/2 NW1/4 SEC 10

CN 1/16 COR SEC 10, T.13S., R.64W., 6TH P.M. NO. 6 REBAR WITH A 2-1/2" ALUMINUM CAP STAMPED: PLS 38245

S89°34'07"W 2642.73

S89°34'01"W 900.39'

50 0 100 200 400

1:200

TB- APPROXIMATE TEST BORING LOCATIONS AND NUMBERS

DRAWN	RPJ
CHECKED	DPS
DATE	6/11/21
SCALE	1:200
JOB NO.	211922
FIGURE No.	2

APPENDIX A: Test Boring Logs

TEST BORING NO. 1
DATE DRILLED 7/15/2021
Job # 211922

REMARKS

DRY TO 10', 7/15/21

SAND, SILTY, FINE TO MEDIUM GRAINED, BROWN TO TAN, MEDIUM DENSE TO DENSE, MOIST

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			27	7.5	1
5			28	5.0	1
10			45	5.8	1
15					
20					

TEST BORING NO. 2
DATE DRILLED 7/15/2021
CLIENT GORILLA CAPITAL
LOCATION SADDLEHORN RANCH, F-1

REMARKS

DRY TO 5', 7/15/21

SAND, SILTY, FINE TO MEDIUM GRAINED, TAN, MEDIUM DENSE, MOIST

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			16	5.4	1
5			28	5.6	1
10					
15					
20					

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
		DS	9/2/21

JOB NO.: 211922
FIG NO.: A- 1

TEST BORING NO. 3
DATE DRILLED 7/15/2021
Job # 211922

REMARKS

DRY TO 5', 7/15/21

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
	SAND, SILTY, FINE TO MEDIUM GRAINED, TAN, DENSE, MOIST		44	8.7	1
5			31	4.3	1
10					
15					
20					

TEST BORING NO. 4
DATE DRILLED 7/15/2021
CLIENT GORILLA CAPITAL
LOCATION SADDLEHORN RANCH, F-1

REMARKS

DRY TO 10', 7/15/21

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
	SAND, SILTY, FINE TO MEDIUM GRAINED, BROWN TO TAN, MEDIUM DENSE TO DENSE, MOIST TO DRY		31	7.8	1
5			15	1.5	1
10			39	4.4	1
15					
20					

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
		DS	9/21/21

JOB NO.: 211922
FIG NO.: A- 2

TEST BORING NO. 5
DATE DRILLED 7/15/2021
Job # 211922

REMARKS

DRY TO 5', 7/15/21

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			30	8.8	1	SAND, SILTY, FINE TO MEDIUM GRAINED, TAN, DENSE TO MEDIUM DENSE, MOIST
5			22	8.0	1	
10						
15						
20						

TEST BORING NO. 6
DATE DRILLED 7/15/2021
CLIENT GORILLA CAPITAL
LOCATION SADDLEHORN RANCH, F-1

REMARKS

DRY TO 5', 7/15/21

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			33	8.0	1	SAND, SILTY, FINE TO MEDIUM GRAINED, TAN, DENSE TO MEDIUM DENSE, MOIST
5			29	4.7	1	
10						
15						
20						

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TEST BORING LOG

DRAWN:	DATE:	CHECKED: DS	DATE: 9/2/21

JOB NO. 211922
FIG NO. A- 3

TEST BORING NO. 7
DATE DRILLED 7/15/2021
Job # 211922

REMARKS

DRY TO 10', 7/15/21

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			13	9.7	1	SAND, SILTY, FINE TO MEDIUM GRAINED, BROWN TO TAN, MEDIUM DENSE TO DENSE, MOIST
5			24	5.4	1	
10			27	8.9	1	
15						
20						

TEST BORING NO. 8
DATE DRILLED 7/15/2021
CLIENT GORILLA CAPITAL
LOCATION SADDLEHORN RANCH, F-1

REMARKS

DRY TO 5', 7/15/21

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			29	4.8	1	SAND, SLIGHTLY SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, MOIST
5			26	9.3	1	
10						
15						
20						

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
		DS	9/28/21

JOB NO.: 211922
FIG NO.: A- 4

TEST BORING NO. 9
DATE DRILLED 7/27/2021
Job # 211922

REMARKS

DRY TO 5', 7/27/21

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			23	6.8	1	SAND, SILTY, FINE TO MEDIUM GRAINED, TAN, MEDIUM DENSE, MOIST
5			14	4.4	1	
10						
15						
20						

TEST BORING NO. 10
DATE DRILLED 7/15/2021
CLIENT GORILLA CAPITAL
LOCATION SADDLEHORN RANCH, F-1

REMARKS

DRY TO 5', 7/15/21

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			33	7.8	1	SAND, SILTY, FINE TO MEDIUM GRAINED, TAN, DENSE TO MEDIUM DENSE, MOIST
5			20	3.9	1	
10						
15						
20						

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TEST BORING LOG

DRAWN:	DATE:	CHECKED: DS	DATE: 9/22/21

JOB NO.: 211922
FIG NO.: A- 5

TEST BORING NO. 11
DATE DRILLED 7/15/2021
Job # 211922

REMARKS

DRY TO 5', 7/15/21

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
						SAND, SILTY, FINE TO MEDIUM GRAINED, TAN, DENSE TO MEDIUM DENSE, MOIST TO DRY
			28	8.1	1	
5			31	2.5	1	
10						
15						
20						

TEST BORING NO. 12
DATE DRILLED 7/27/2021
CLIENT GORILLA CAPITAL
LOCATION SADDLEHORN RANCH, F-1

REMARKS

DRY TO 5', 7/27/21

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
						SAND, SLIGHTLY SILTY, FINE TO MEDIUM GRAINED, TAN, MEDIUM DENSE, DRY TO MOIST
			13	1.4	1	
5			12	10.8	1	
10						
15						
20						

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COLORADO SPRINGS, COLORADO 80907

TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
		DS	9/2/21

JOB NO.: 211922
FIG NO.: A- 6

TEST BORING NO. 13
DATE DRILLED 7/27/2021
Job # 211922

REMARKS

DRY TO 5', 7/27/21

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
	SAND, VERY SILTY, FINE GRAINED, TAN, LOOSE, MOIST		8	8.0	2
5			8	11.3	2
10					
15					
20					

TEST BORING NO. 14
DATE DRILLED 7/27/2021
CLIENT GORILLA CAPITAL
LOCATION SADDLEHORN RANCH, F-1

REMARKS

DRY TO 10', 7/27/21

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
	SAND, SLIGHTLY SILTY, FINE TO MEDIUM GRAINED, TAN, MEDIUM DENSE, DRY TO MOIST		15	1.3	1
5			21	3.3	1
10			17	3.9	1
15					
20					

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
		DS	9/22/21

JOB NO. 211922

FIG NO. A- 7

TEST BORING NO. 15
DATE DRILLED 7/27/2021
Job # 211922

REMARKS

DRY TO 10', 7/27/21

SAND, SILTY, FINE TO MEDIUM GRAINED, TAN, MEDIUM DENSE TO VERY DENSE, MOIST

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			25	11.6	1
5			32	13.6	1
10			50	15.9	1
15					
20					

TEST BORING NO. 16
DATE DRILLED 7/27/2021
CLIENT GORILLA CAPITAL
LOCATION SADDLEHORN RANCH, F-1

REMARKS

DRY TO 5', 7/27/21

SILT, VERY SANDY, TAN, FIRM TO STIFF, MOIST

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			13	15.9	2
5			18	5.0	2
10					
15					
20					

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
		DS	9/2/21

JOB NO.: 211922
FIG NO.: A- 8

TEST BORING NO. 17
DATE DRILLED 7/27/2021
Job # 211922

REMARKS

DRY TO 5', 7/27/21

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
	SAND, SILTY, FINE TO MEDIUM GRAINED, TAN, MEDIUM DENSE, MOIST		19	7.6	1
5			16	5.0	1
10					
15					
20					

TEST BORING NO. 18
DATE DRILLED 7/27/2021
CLIENT GORILLA CAPITAL
LOCATION SADDLEHORN RANCH, F-1

REMARKS

DRY TO 10', 7/27/21

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
	SAND, CLAYEY, FINE TO MEDIUM GRAINED, TAN, MEDIUM DENSE TO DENSE, MOIST		19	9.6	1
5			39	9.3	1
10			10	3.0	1
15					
20					

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COLORADO SPRINGS, COLORADO 80907

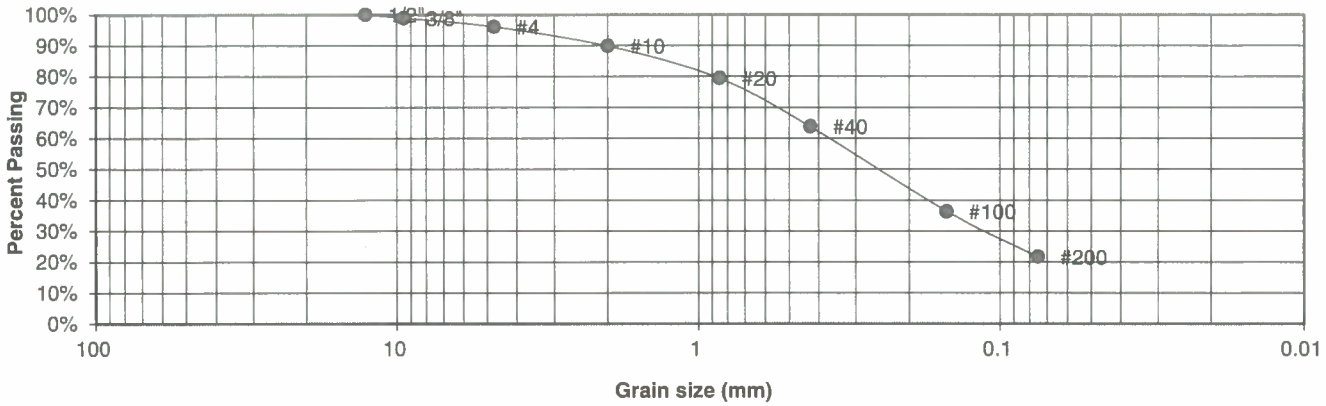
TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
		DS	9/2/21

JOB NO.: 211922
FIG NO.: A- 9

APPENDIX B: Laboratory Test Results

UNIFIED CLASSIFICATION	SM	CLIENT	GORILLA CAPITAL
SOIL TYPE #	1, CBR	PROJECT	SADDLEHORN RANCH, F-1
TEST BORING #	1	JOB NO.	211922
DEPTH (FT)	0-3	TEST BY	BL
AASHTO CLASSIFICATION	A-2-4	GROUP INDEX	0



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	98.9%
4	96.1%
10	89.9%
20	79.4%
40	63.8%
100	36.3%
200	21.6%

Atterberg Limits

Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

Swell

Moisture at start

Moisture at finish

Moisture increase

Initial dry density (pcf)

Swell (psf)

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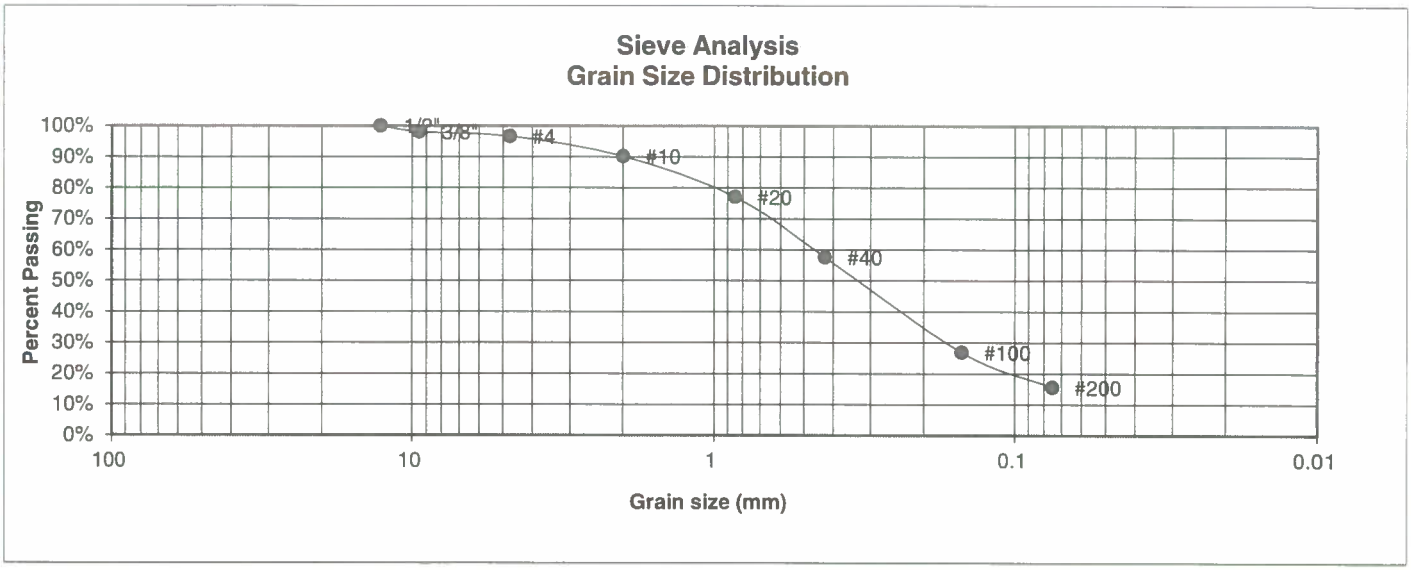
COLORADO SPRINGS, COLORADO 80907

LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		BS	9/12/21

JOB NO.: 211922
FIG NO.: B-1

UNIFIED CLASSIFICATION	SM	CLIENT	GORILLA CAPITAL
SOIL TYPE #	1	PROJECT	SADDLEHORN RANCH, F-1
TEST BORING #	1	JOB NO.	211922
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-2-4	GROUP INDEX	0



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	98.1%
4	96.6%
10	90.2%
20	77.0%
40	57.6%
100	26.8%
200	15.6%

Atterberg Limits

Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

Swell

Moisture at start	
Moisture at finish	
Moisture increase	
Initial dry density (pcf)	
Swell (psf)	

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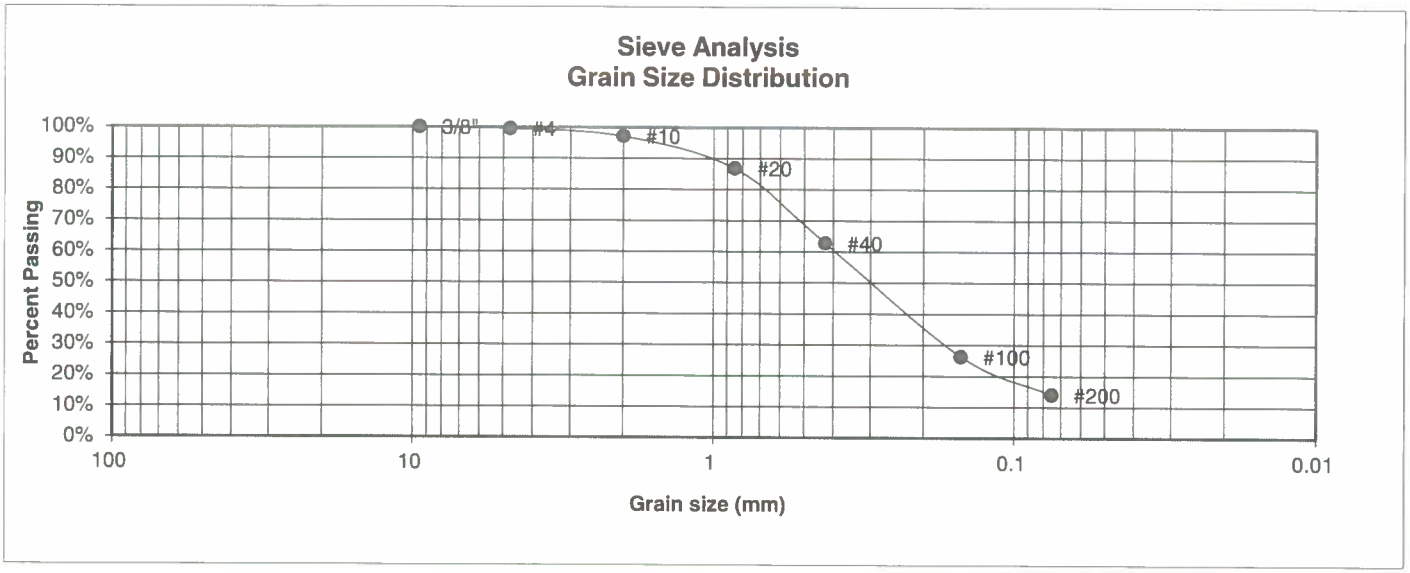
505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		DS	9/12/24

JOB NO.: 211922
FIG NO.: B-2.

UNIFIED CLASSIFICATION	SM	CLIENT	GORILLA CAPITAL
SOIL TYPE #	1	PROJECT	SADDLEHORN RANCH, F-1
TEST BORING #	2	JOB NO.	211922
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-2-4	GROUP INDEX	0



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	99.5%
10	97.1%
20	86.8%
40	62.8%
100	26.3%
200	14.0%

Atterberg Limits

Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

Swell

Moisture at start

Moisture at finish

Moisture increase

Initial dry density (pcf)

Swell (psf)

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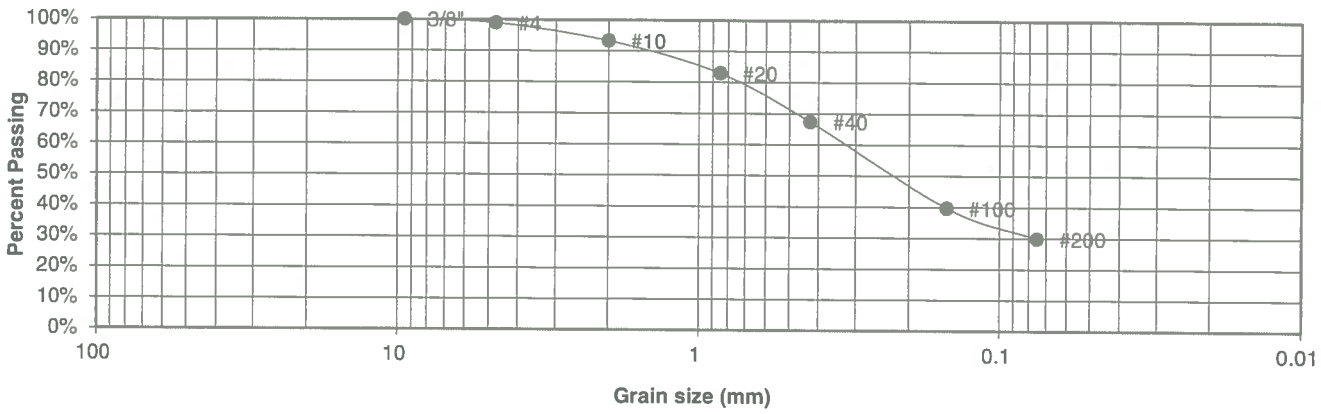
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		DS	9/21/21

JOB NO.: 211922
FIG NO.: B-3

UNIFIED CLASSIFICATION	SM	CLIENT	GORILLA CAPITAL
SOIL TYPE #	1	PROJECT	SADDLEHORN RANCH, F-1
TEST BORING #	3	JOB NO.	211922
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-2-4	GROUP INDEX	0



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	98.9%
10	93.3%
20	82.9%
40	67.3%
100	39.6%
200	29.9%

Atterberg Limits

Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

Swell

Moisture at start

Moisture at finish

Moisture increase

Initial dry density (pcf)

Swell (psf)

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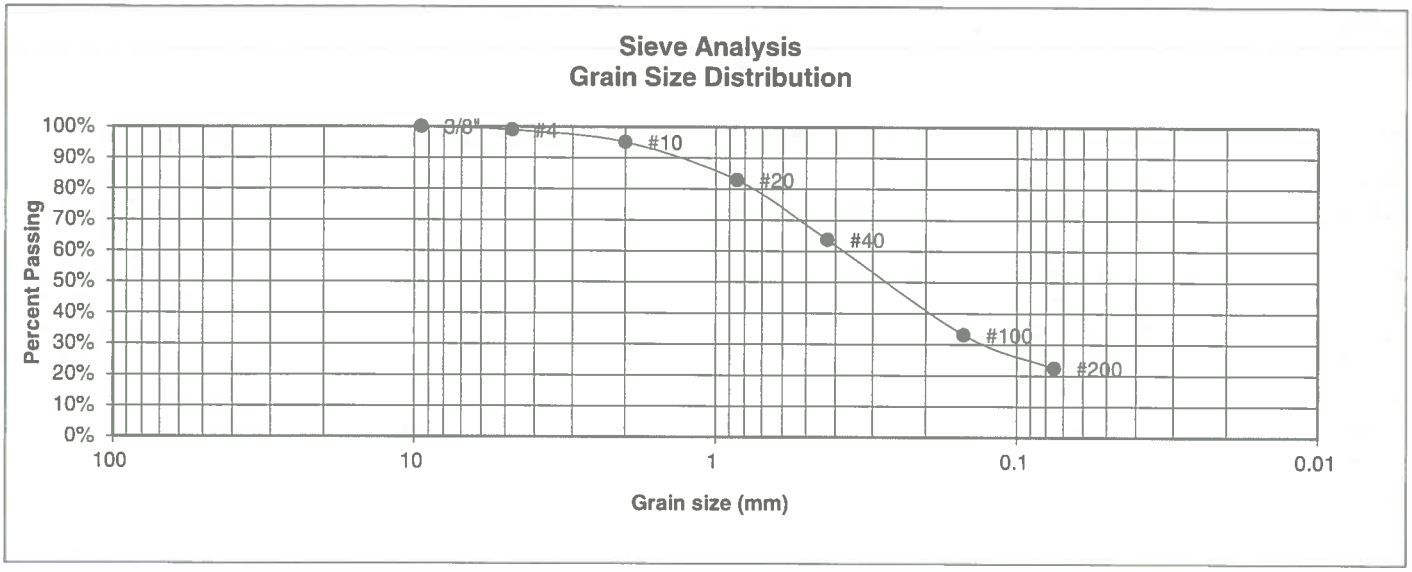
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		DS	9/12/21

JOB NO.: 211922
FIG NO.: B-4

UNIFIED CLASSIFICATION	SM	CLIENT	GORILLA CAPITAL
SOIL TYPE #	1	PROJECT	SADDLEHORN RANCH, F-1
TEST BORING #	4	JOB NO.	211922
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-2-4	GROUP INDEX	0



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	98.9%
10	95.1%
20	82.9%
40	63.7%
100	33.1%
200	22.4%

Atterberg Limits

Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

Swell

Moisture at start

Moisture at finish

Moisture increase

Initial dry density (pcf)

Swell (psf)

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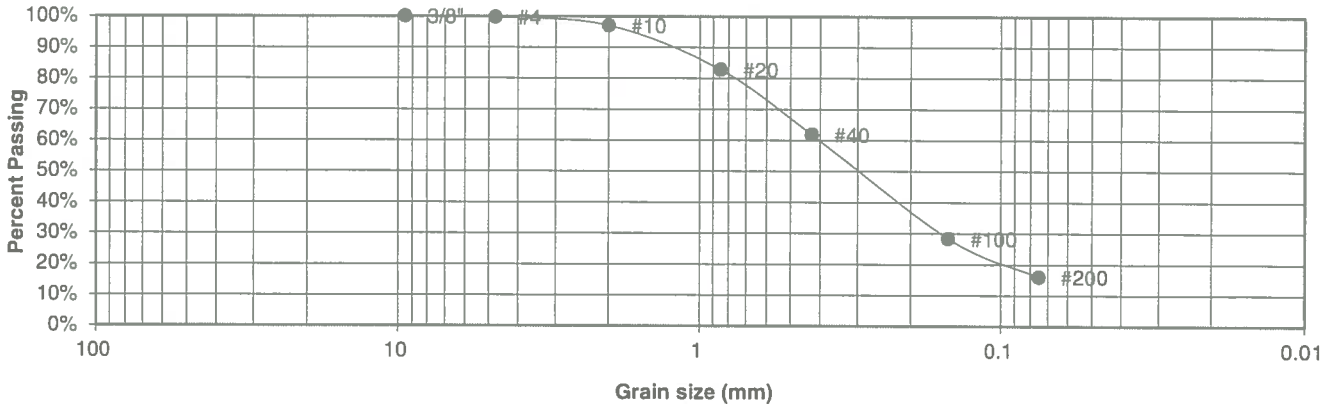
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		DS	9/2/21

JOB NO.: 211922
FIG NO.: B-5

UNIFIED CLASSIFICATION	SM	CLIENT	GORILLA CAPITAL
SOIL TYPE #	1	PROJECT	SADDLEHORN RANCH, F-1
TEST BORING #	5	JOB NO.	211922
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-2-4	GROUP INDEX	0



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	99.7%
10	97.0%
20	82.8%
40	61.9%
100	28.3%
200	16.0%

Atterberg Limits

Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

Swell

Moisture at start

Moisture at finish

Moisture increase

Initial dry density (pcf)

Swell (psf)

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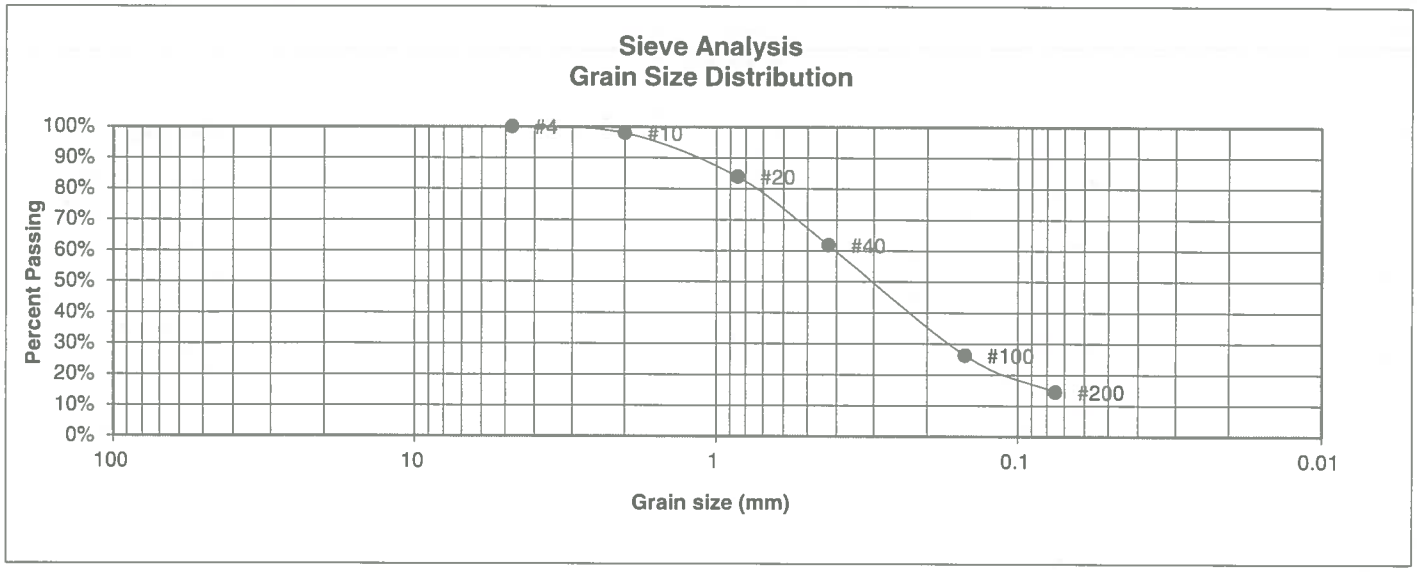
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		DJ	9/2/21

JOB NO.: 211922
FIG NO.: B-6

UNIFIED CLASSIFICATION	SM	CLIENT	GORILLA CAPITAL
SOIL TYPE #	1	PROJECT	SADDLEHORN RANCH, F-1
TEST BORING #	6	JOB NO.	211922
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-2-4	GROUP INDEX	0



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	98.0%
20	83.9%
40	61.8%
100	26.2%
200	14.4%

Atterberg Limits

Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

Swell

Moisture at start	
Moisture at finish	
Moisture increase	
Initial dry density (pcf)	
Swell (psf)	

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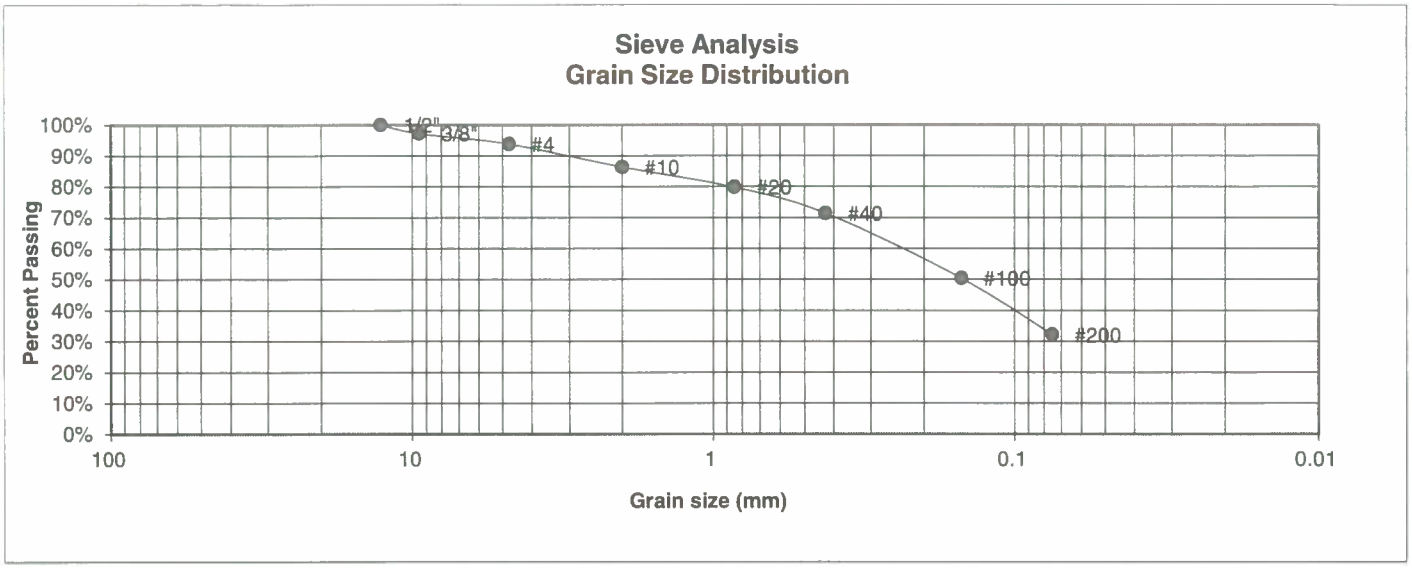
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		DS	9/2/21

JOB NO.: 211922
FIG NO.: B-7

UNIFIED CLASSIFICATION	SM	CLIENT	GORILLA CAPITAL
SOIL TYPE #	1	PROJECT	SADDLEHORN RANCH, F-1
TEST BORING #	7	JOB NO.	211922
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-2-4	GROUP INDEX	0



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	97.2%
4	93.8%
10	86.3%
20	79.8%
40	71.4%
100	50.4%
200	32.1%

Atterberg Limits

Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

Swell

Moisture at start

Moisture at finish

Moisture increase

Initial dry density (pcf)

Swell (psf)

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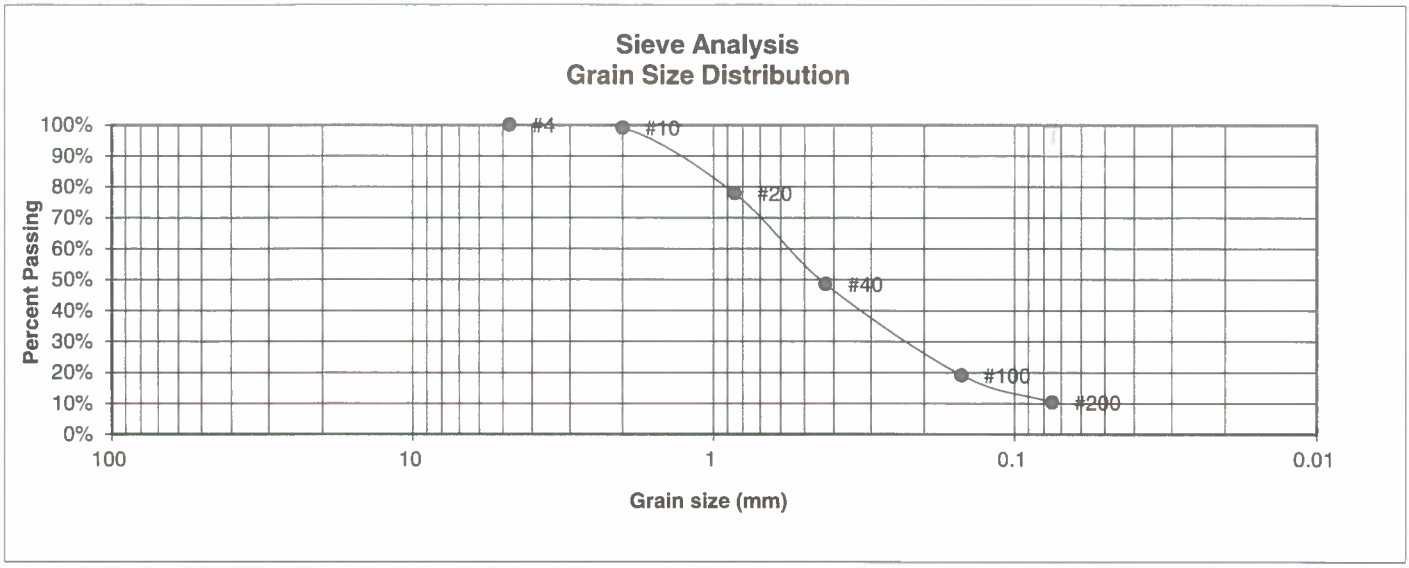
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		DS	9/2/21

JOB NO.: 211922
FIG NO.: B-8

UNIFIED CLASSIFICATION	SM-SW	CLIENT	GORILLA CAPITAL
SOIL TYPE #	1	PROJECT	SADDLEHORN RANCH, F-1
TEST BORING #	8	JOB NO.	211922
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-1-b	GROUP INDEX	0



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	99.1%
20	77.9%
40	48.5%
100	19.1%
200	10.4%

Atterberg Limits	
Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

Swell	
Moisture at start	
Moisture at finish	
Moisture increase	
Initial dry density (pcf)	
Swell (psf)	

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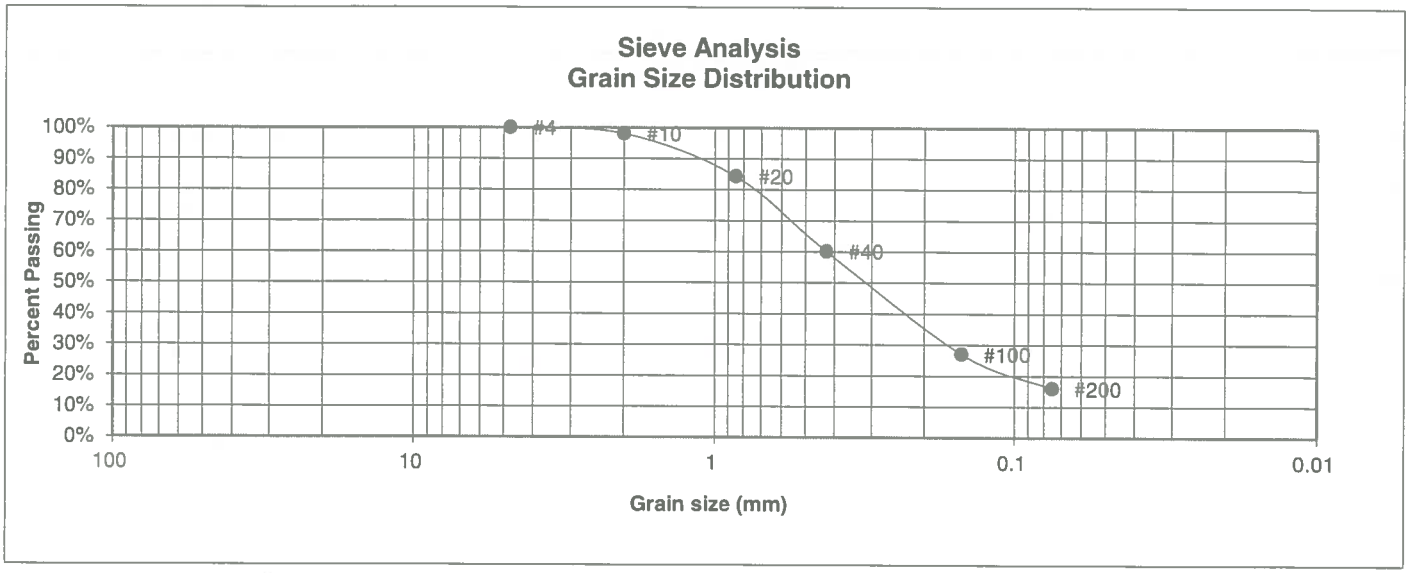
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		DJ	9/6/21

JOB NO.: 211922
FIG NO.: B-9

UNIFIED CLASSIFICATION	SM	CLIENT	GORILLA CAPITAL
SOIL TYPE #	1	PROJECT	SADDLEHORN RANCH, F-1
TEST BORING #	9	JOB NO.	211922
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-2-4	GROUP INDEX	0



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	98.0%
20	84.3%
40	60.2%
100	27.0%
200	15.9%

Atterberg Limits

Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

Swell

Moisture at start

Moisture at finish

Moisture increase

Initial dry density (pcf)

Swell (psf)

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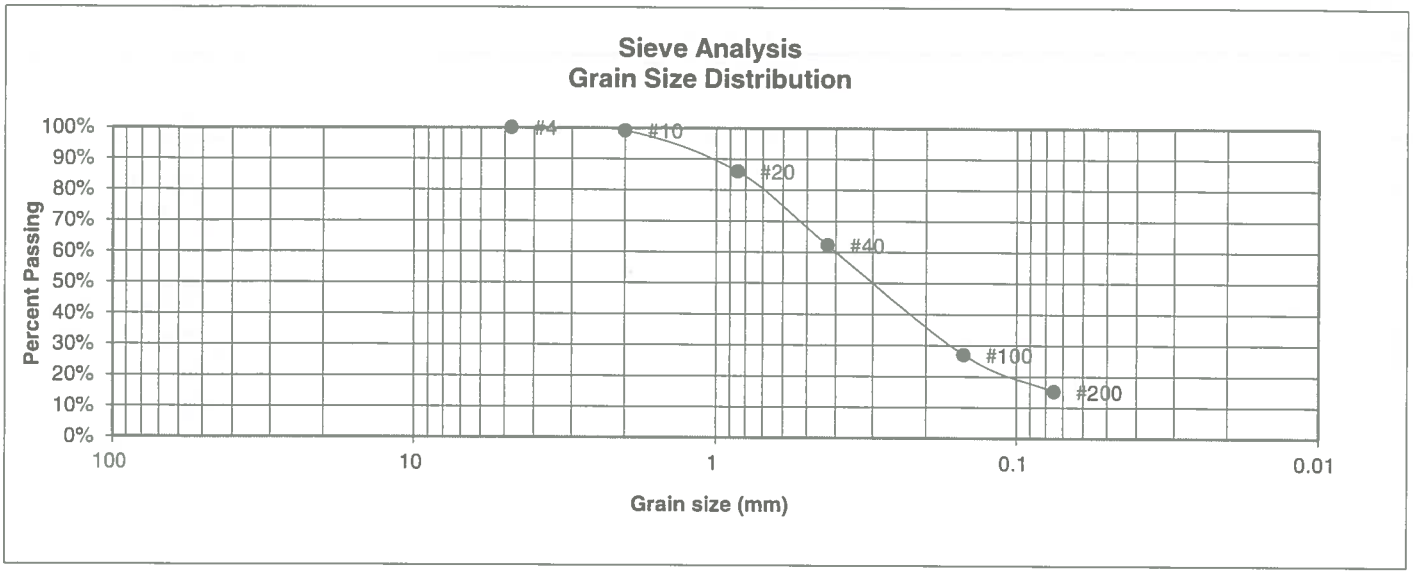
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		DS	9/21/21

JOB NO.: 211922
FIG NO.: B-16

UNIFIED CLASSIFICATION	SM	CLIENT	GORILLA CAPITAL
SOIL TYPE #	1	PROJECT	SADDLEHORN RANCH, F-1
TEST BORING #	10	JOB NO.	211922
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-2-4	GROUP INDEX	0



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	99.1%
20	86.0%
40	62.2%
100	27.0%
200	15.1%

Atterberg Limits

Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

Swell

Moisture at start	
Moisture at finish	
Moisture increase	
Initial dry density (pcf)	
Swell (psf)	

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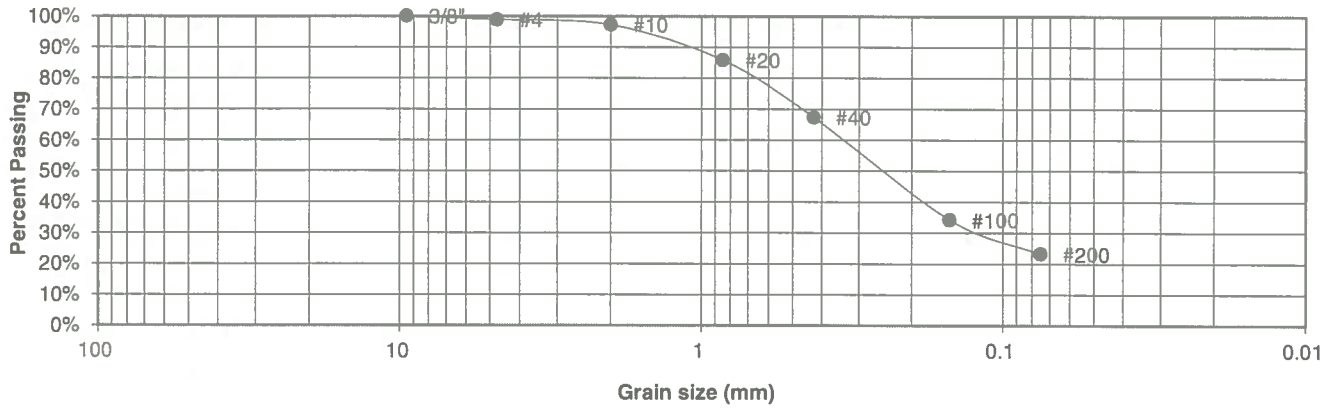
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		DS	9/2/21

JOB NO.: 211922
FIG NO.: B-11.

UNIFIED CLASSIFICATION	SM	CLIENT	GORILLA CAPITAL
SOIL TYPE #	1	PROJECT	SADDLEHORN RANCH, F-1
TEST BORING #	11	JOB NO.	211922
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-2-4	GROUP INDEX	0

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	98.9%
10	97.2%
20	85.8%
40	67.4%
100	34.3%
200	23.2%

Atterberg Limits

Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

Swell

Moisture at start	
Moisture at finish	
Moisture increase	
Initial dry density (pcf)	
Swell (psf)	

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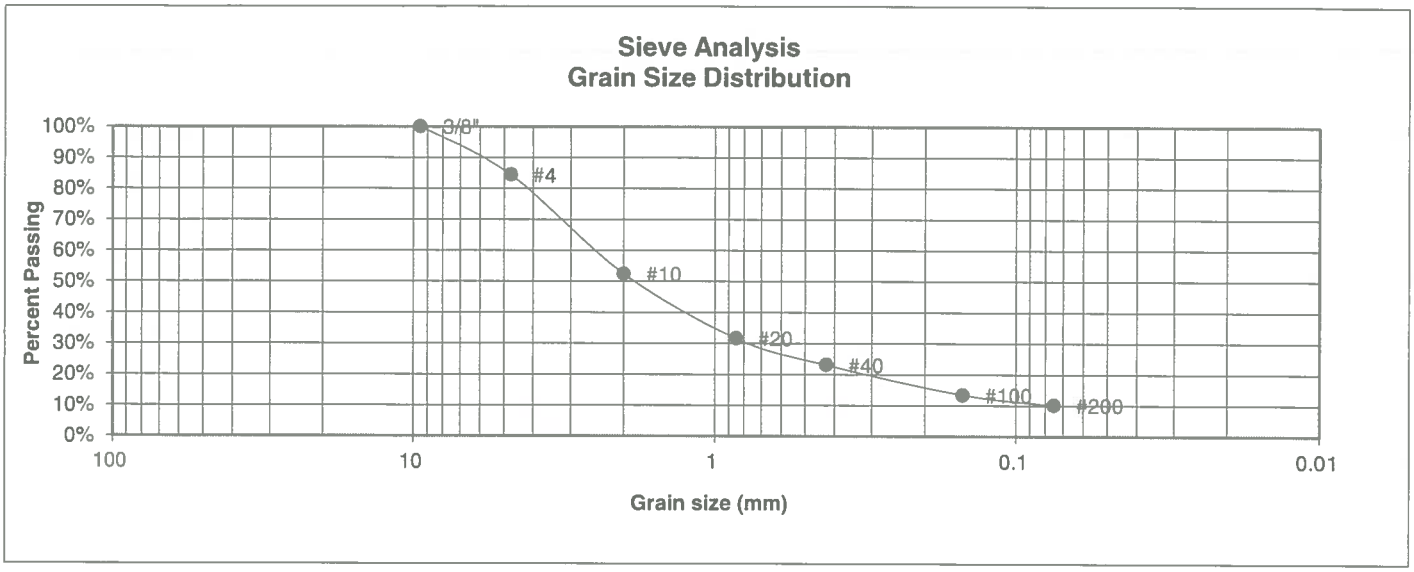
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		DS	9/21/21

JOB NO.: 211922
FIG NO.: B-12

UNIFIED CLASSIFICATION	SM-SW	CLIENT	GORILLA CAPITAL
SOIL TYPE #	1	PROJECT	SADDLEHORN RANCH, F-1
TEST BORING #	12	JOB NO.	211922
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-1-b	GROUP INDEX	0



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	84.4%
10	52.4%
20	31.6%
40	23.1%
100	13.4%
200	10.1%

Atterberg Limits

Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

Swell

Moisture at start	
Moisture at finish	
Moisture increase	
Initial dry density (pcf)	
Swell (psf)	

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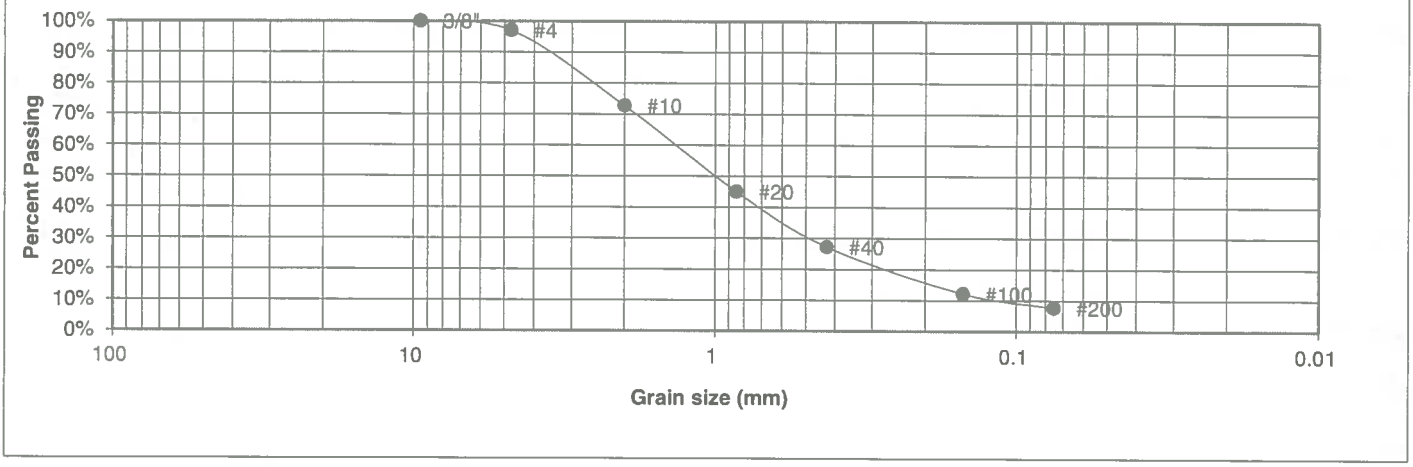
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		DS	9/21/21

JOB NO.: 211922
FIG NO.: B-13

UNIFIED CLASSIFICATION	SM-SW	CLIENT	GORILLA CAPITAL
SOIL TYPE #	1	PROJECT	SADDLEHORN RANCH, F-1
TEST BORING #	14	JOB NO.	211922
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-1-b	GROUP INDEX	0



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	97.0%
10	72.7%
20	45.0%
40	27.2%
100	12.2%
200	7.7%

Atterberg Limits

Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

Swell

Moisture at start

Moisture at finish

Moisture increase

Initial dry density (pcf)

Swell (psf)

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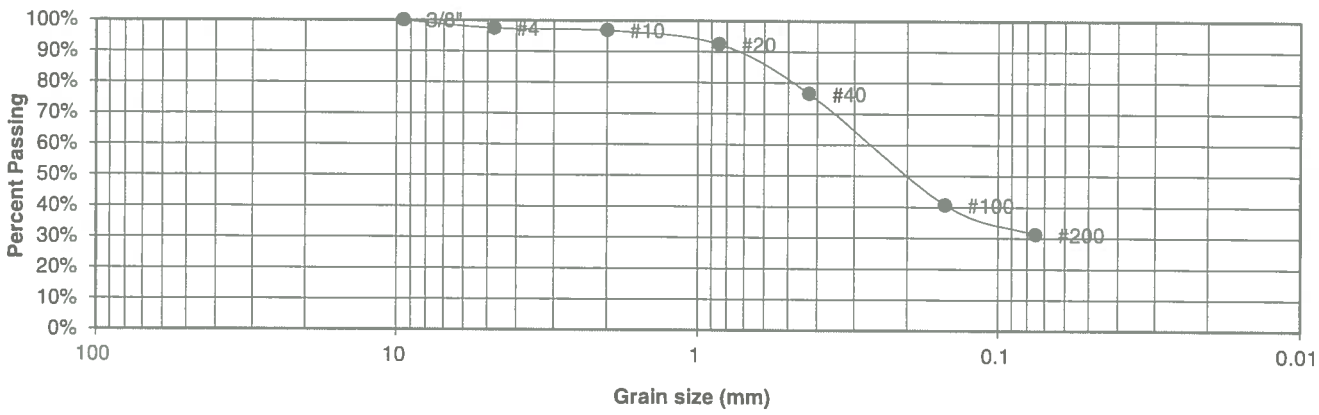
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		DS	9/2/21

JOB NO.: 211922
FIG NO.: B-14

UNIFIED CLASSIFICATION	SM	CLIENT	GORILLA CAPITAL
SOIL TYPE #	1	PROJECT	SADDLEHORN RANCH, F-1
TEST BORING #	15	JOB NO.	211922
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-2-4	GROUP INDEX	0



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	97.4%
10	96.8%
20	92.4%
40	76.5%
100	40.7%
200	31.2%

Atterberg Limits

Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

Swell

Moisture at start

Moisture at finish

Moisture increase

Initial dry density (pcf)

Swell (psf)

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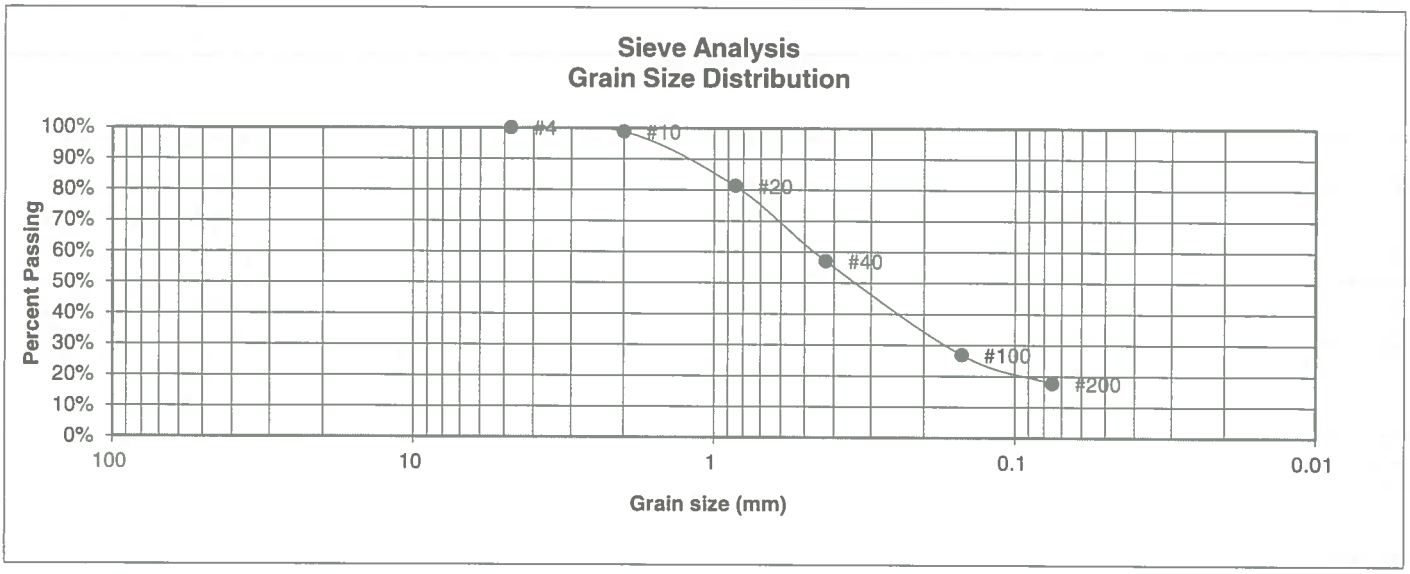
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		DS	9/21/21

JOB NO.: 211922
FIG NO.: B-15

UNIFIED CLASSIFICATION	SM	CLIENT	GORILLA CAPITAL
SOIL TYPE #	1	PROJECT	SADDLEHORN RANCH, F-1
TEST BORING #	17	JOB NO.	211922
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-2-4	GROUP INDEX	0



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	98.8%
20	81.3%
40	57.1%
100	26.8%
200	17.7%

Atterberg Limits

Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

Swell

Moisture at start	
Moisture at finish	
Moisture increase	
Initial dry density (pcf)	
Swell (psf)	

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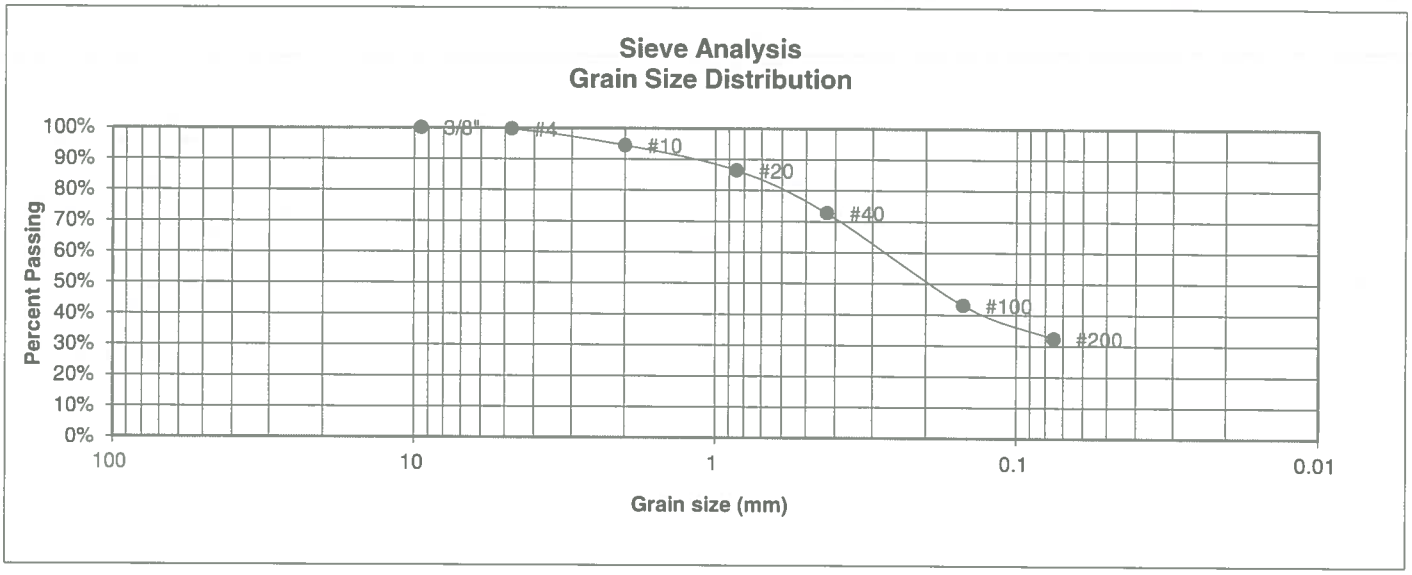
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		DS	9/21/21

JOB NO.: 211922
FIG NO.: B-4

UNIFIED CLASSIFICATION	SC	CLIENT	GORILLA CAPITAL
SOIL TYPE #	1	PROJECT	SADDLEHORN RANCH, F-1
TEST BORING #	18	JOB NO.	211922
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-2-4	GROUP INDEX	0



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	99.7%
10	94.4%
20	86.5%
40	72.7%
100	43.0%
200	32.4%

Atterberg Limits	
Plastic Limit	19
Liquid Limit	27
Plastic Index	8

Swell	
Moisture at start	
Moisture at finish	
Moisture increase	
Initial dry density (pcf)	
Swell (psf)	

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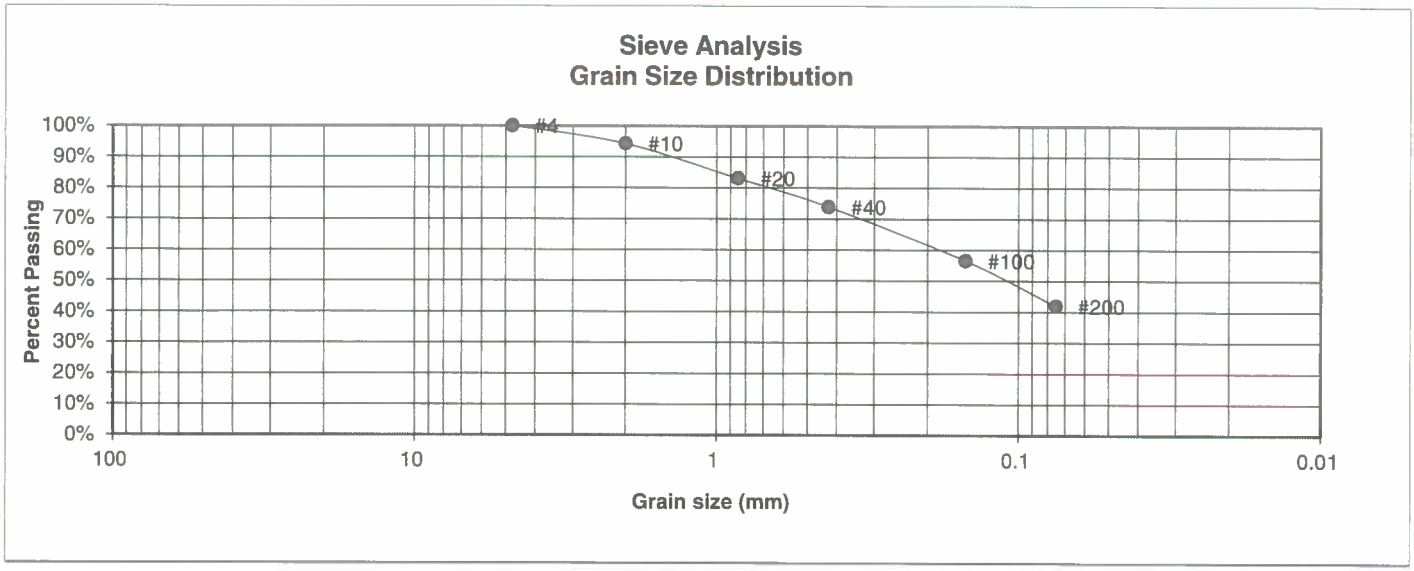
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		DS	9/2/21

JOB NO.: 211922
FIG NO.: B-17

UNIFIED CLASSIFICATION	SM	CLIENT	GORILLA CAPITAL
SOIL TYPE #	2	PROJECT	SADDLEHORN RANCH, F-1
TEST BORING #	13	JOB NO.	211922
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-4	GROUP INDEX	0



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	94.3%
20	83.1%
40	73.9%
100	56.6%
200	41.9%

Atterberg Limits	
Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

Swell	
Moisture at start	
Moisture at finish	
Moisture increase	
Initial dry density (pcf)	
Swell (psf)	

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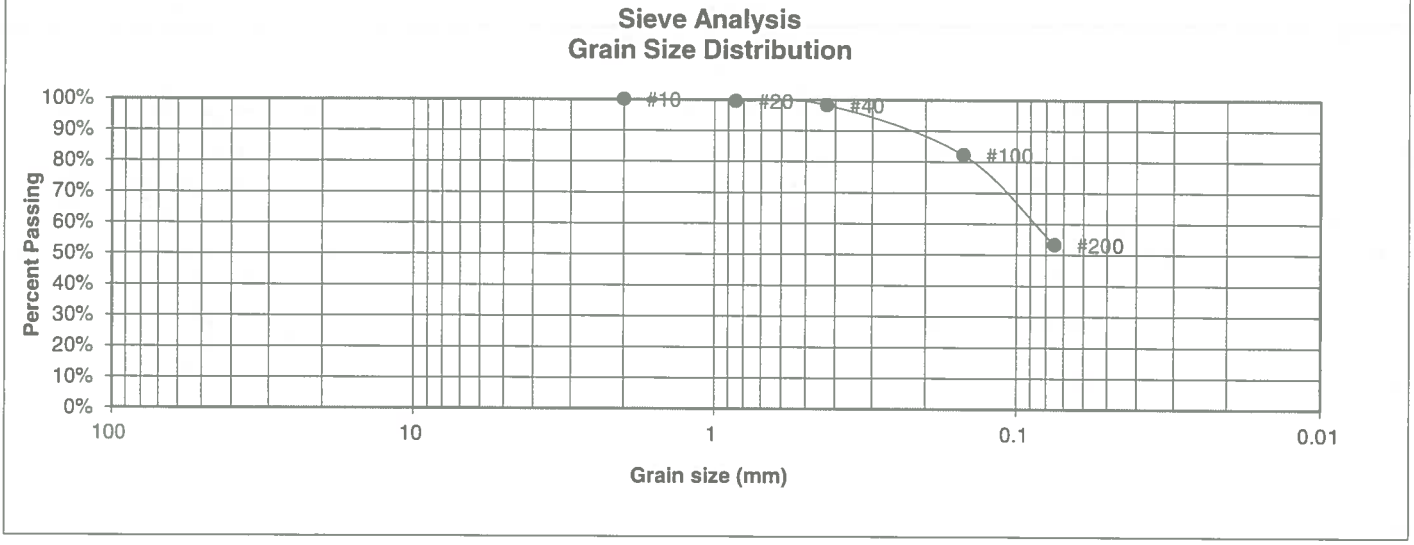
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		DS	9/21/21

JOB NO.: 211922
FIG NO.: B-18

UNIFIED CLASSIFICATION	SM	CLIENT	GORILLA CAPITAL
SOIL TYPE #	2	PROJECT	SADDLEHORN RANCH, F-1
TEST BORING #	16	JOB NO.	211922
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-4	GROUP INDEX	0



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	
10	100.0%
20	99.5%
40	98.3%
100	82.2%
200	53.3%

Atterberg Limits

Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

Swell

Moisture at start	
Moisture at finish	
Moisture increase	
Initial dry density (pcf)	
Swell (psf)	

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LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		DS	9/2/21

JOB NO.: 211922
FIG NO.: B-19

CLIENT	GORILLA CAPITAL	JOB NO.	211922
PROJECT	SADDLEHORN RANCH, F-1	DATE	7/30/2021
LOCATION	SADDLEHORN RANCH, F-1	TEST BY	BL

BORING NUMBER	DEPTH, (ft)	SOIL TYPE NUMBER	UNIFIED CLASSIFICATION	WATER SOLUBLE SULFATE, (wt%)
TB-4	1-2	1	SM	<0.01
TB-9	1-2	1	SM	<0.01

QC BLANK PASS

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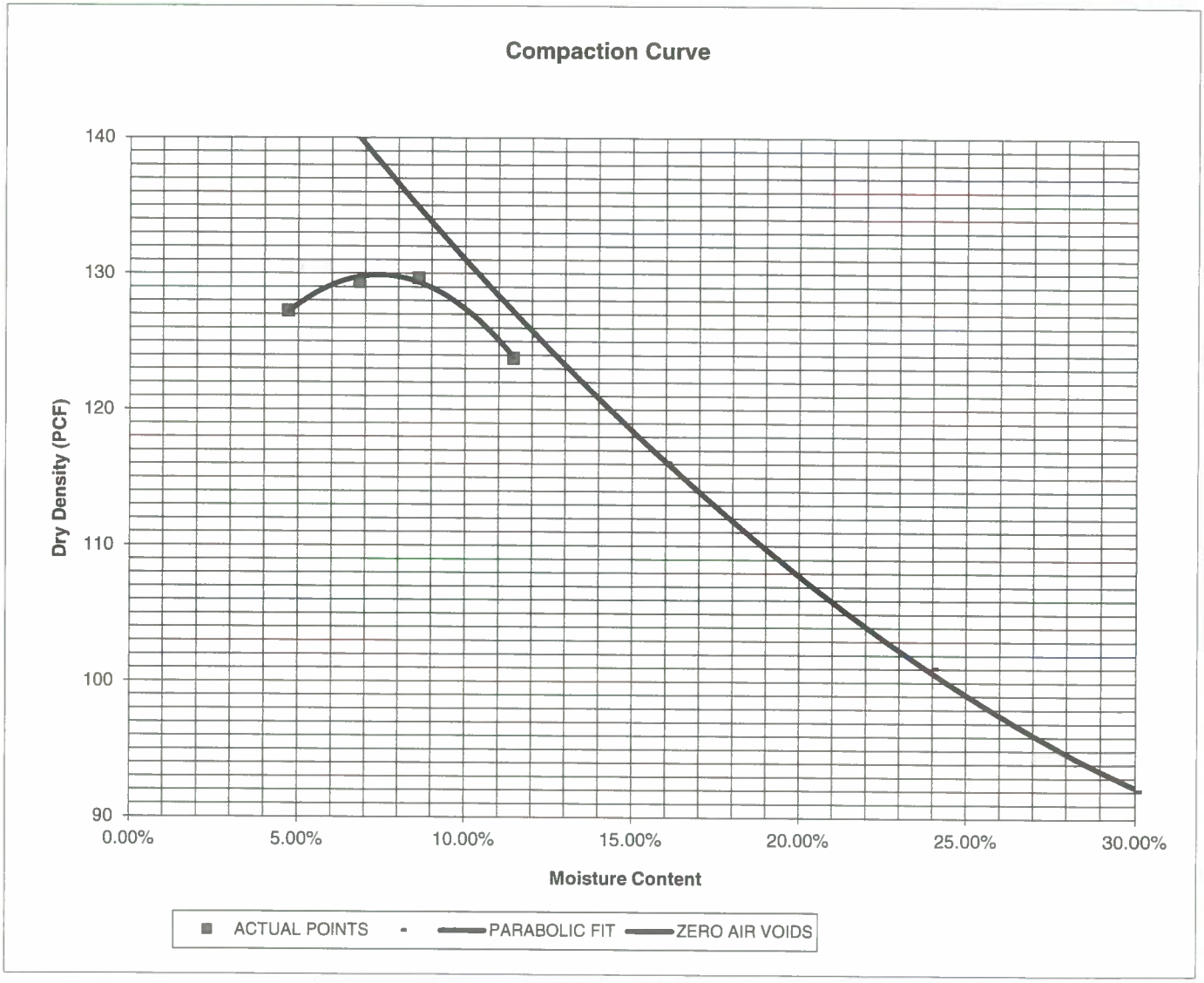
LABORATORY TEST
SULFATE RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		DS	9/21/21

JOB NO.: 211922
FIG NO.: B-20

PROJECT	SADDLEHORN RANCH, F-1	CLIENT	GORILLA CAPITAL
SAMPLE LOCATION	TB-1 @ 0-3'	JOB NO.	211922
SOIL DESCRIPTION	SAND, SILTY, BROWN	DATE	07/30/21

IDENTIFICATION	SM	COMPACTION TEST #	1
TEST DESIGNATION / METHOD	ASTM D-1557-A	TEST BY	BL
MAXIMUM DRY DENSITY (PCF)	129.9	OPTIMUM MOISTURE	7.4%



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MOISTURE DENSITY RELATION

DRAWN:	DATE:	CHECKED:	DATE:
		DS	8/16/21

JOB NO.: 211922

FIG NO.: B-21

CBR TEST LOAD DATA

JOB NO: 211922
CLIENT: GORILLA CAPITAL
PROJECT: SADDLEHORN RANCH, F-1
SOIL TYPE: 1

PISTON DIAMETER (cm)	PISTON AREA (in^2)
4.958	2.993

PENETRATION DEPTH (INCHES)	*10 BLOWS* MOLD # 1 LOAD(LBS) (LBS)	STRESS (PSI)	*25 BLOWS* MOLD # 2 LOAD(LBS) (LBS)	STRESS (PSI)	*56 BLOWS* MOLD # 3 LOAD(LBS) (LBS)	STRESS (PSI)
0.000	0	0.00	0	0.00	0	0.00
0.025	95	31.75	168	56.14	289	96.57
0.050	121	40.43	317	105.93	726	242.61
0.075	136	45.45	416	139.01	1380	461.15
0.100	146	48.79	517	172.76	1532	511.94
0.125	155	51.80	636	212.53	2148	717.79
0.150	163	54.47	736	245.95	2696	900.92
0.175	171	57.14	834	278.70	3146	1051.29
0.200	178	59.48	933	311.78	3560	1189.64
0.300	201	67.17	1180	394.32	3790	1266.50
0.400	223	74.52	1211	404.68	3929	1312.95
0.500	248	82.87	1241	414.70	4165	1391.81

FINAL MOISTURE CONTENT

	MOLD # 1	MOLD # 2	MOLD # 3
CAN #	312	314	304
WT. CAN	7.78	7.98	8.08
WT. CAN+WET	352.3	321	280.57
WT. CAN+DRY	315.2	281.3	256.5
WT. H20	37.1	39.7	24.07
WT. DRY SOIL	307.42	273.32	248.42
MOISTURE CONTENT	12.07%	14.53%	9.69%

WET DENSITY (PCF)	119.4	126.5	131.8
DRY DENSITY (PCF)	111.1	117.8	122.7

BEARING RATIO	4.88	17.28	51.19

90% OF DRY DENSITY	116.9
95% OF DRY DENSITY	123.4

BEARING RATIO AT 90% OF MAX	15.58	~ R VALUE	50
BEARING RATIO AT 95% OF MAX	55.92	~ R VALUE	76

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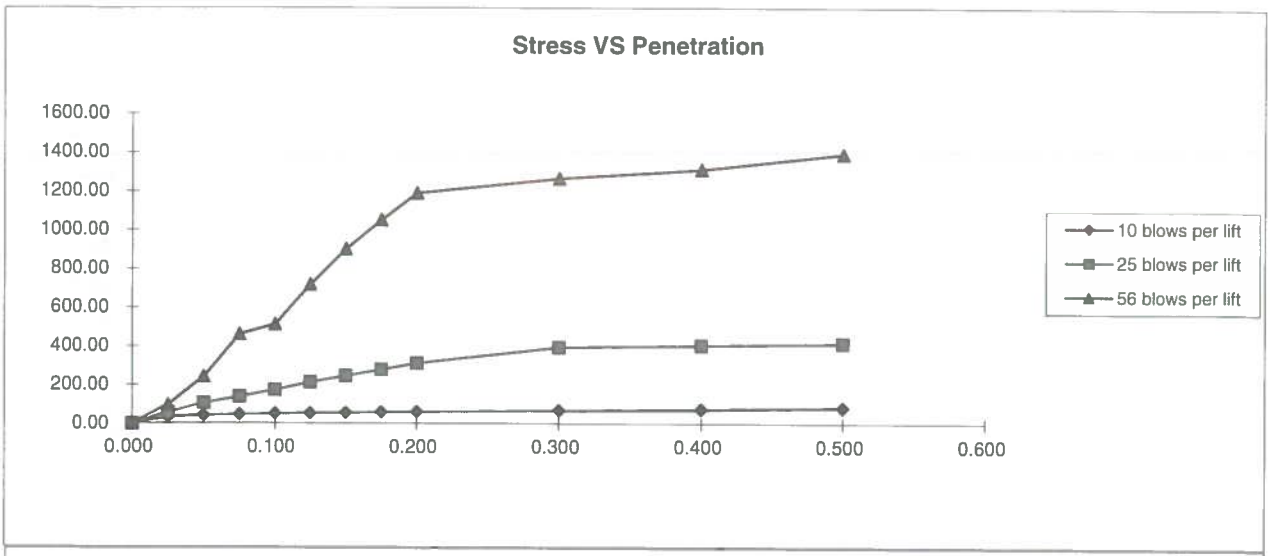
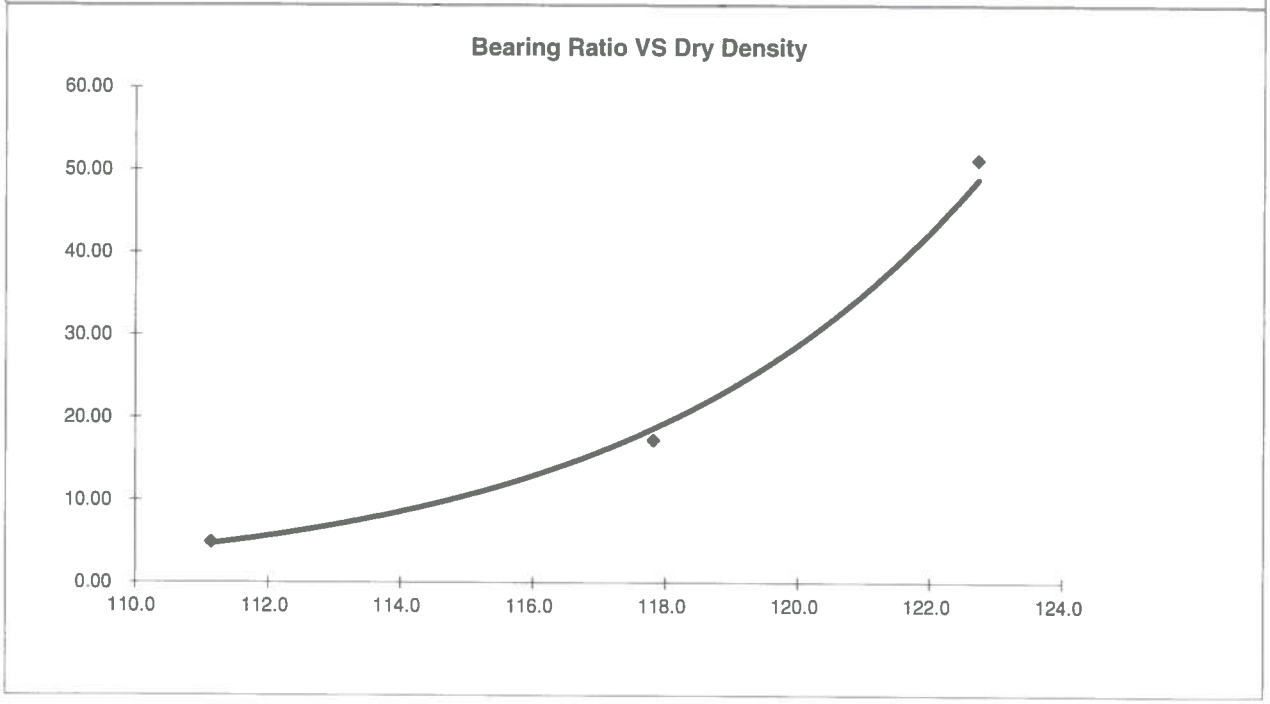
CBR TEST DATA

DRAWN:	DATE:	CHECKED:	DATE:
		DS	9/2/21

JOB NO.: 211922
FIG NO.: B-22





BEARING RATIO AT 90% OF MAX	15.58	~ R VALUE	50.00
BEARING RATIO AT 95% OF MAX	55.92	~ R VALUE	76.00

JOB NO: 211922
SOIL TYPE: 1

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CALIFORNIA BEARING RATIO

DRAWN:	DATE:	CHECKED:	DATE:
		DJ	9/12/12

JOB NO.: 211922
FIG NO.: B-23

APPENDIX C: Design Calculations

FLEXIBLE PAVEMENT DESIGN

DESIGN DATA — GORILLA CAPITAL COLORADO SADDLEHORN RANCH, LLC
SADDLE HORN RANCH

Equivalent (18 kip) Single Axle Load Applications (ESAL):	ESAL (W_{18}) =	36,500
Hveem Stabilometer (R Value) Results:	R =	50
Standard Deviation	S_o =	0.44
Loss in Serviceability	Δpsi =	2.0
Reliability	Reliability =	75
Reliability (z-statistic)	Z_R =	-0.674
Soil Resilient Modulus	M_R =	13168

Weighted Structural Number (WSN): → WSN = 1.41

DESIGN TABLES AND EQUATIONS

$S_1 = [(R - 5) / 11.29] + 3$

$M_R = 10^{[(S_1 + 18.72) / 6.24]}$

$k = M_R / 19.4$

Where:

M_R = resilient modulus (psi)

S_1 = the soil support value

R = R-value obtained from the Hveem stabilometer

CBR = California Bearing Ratio

Reliability (%)	Z_R (z-statistic)
50	0
60	-0.253
70	-0.524
75	-0.674
80	-0.841
90	-1.282
95	-1.65
97	-1.88
98	-2.05
99	-2.33
99.9	-3.09
99.99	-3.75

$$\log_{10}W_{18} = Z_R * S_O + 9.36*\log_{10}(SN+1) - 0.20 + \frac{\log_{10}\left[\frac{\Delta PSI}{4.2 - 1.5}\right]}{0.40 + \frac{1094}{(SN+1)^{5.19}}} + 2.32*\log_{10}M_R - 8.07$$

Left	Right	Difference
4.56	4.56	0.0

Job No. 211922
Fig. No. C-1

DESIGN CALCULATIONS

DESIGN DATA GORILLA CAPITAL COLORADO SADDLEHORN RANCH, LLC
SADDLE HORN RANCH

Equivalent (18 kip) Single Axle Load Applications (ESAL):	ESAL =	36,500
Hveem Stabilometer (R Value) Results:	R =	50
Weighted Structural Number (WSN):	WSN =	1.41

DESIGN EQUATION

$$WSN = C_1D_1 + C_2D_2$$

C_1 = 0.44 Strength Coefficient - Hot Bituminous Asphalt
C_2 = 0.11 Strength Coefficient - Base Course

D_1 = Depth of Asphalt (inches)
D_2 = Depth of Base Course (inches)

FOR FULL DEPTH ASPHALT SECTION

$D_1 = (WSN)/C_1$ = 3.2 inches of Full Depth Asphalt
Use 5.0 inches Full Depth

FOR ASPHALT + AGGREGATE BASE COURSE SECTION

Asphalt Thickness (t) = 3 inches
$D_2 = ((WSN) - (t)(C_1))/C_2$ = 0.9 inches of Aggregate
Base Course, use 4.0 inches

RECOMMENDED ALTERNATIVES

1. 3.0 inches of Asphalt + 4.0 inches of Aggregate Base Course, or
2. 5.0 inches of Full-Depth Asphalt

Job No. 211922
Fig. No. C-2