GEOTECHNICAL ENGINEERING STUDY

TRES LAURELS SUBDIVISION
WEST MONTGOMERY ROAD EXTENSION
SAN ANTONIO, TEXAS
PAVEMENT DESIGN

FROST GEOSCIENCES, INC. PROJECT NO.: FGS-G 20016
(PAVEMENT SUPPLEMENT)
NOVEMBER 2, 2022

Prepared Exclusively for:

Mr. Allen Hoover
Mosiac Land Development
6812 West Avenue, Suite 100
San Antonio, Texas 78213

Frost GeoSciences
Construction Materials ▪ Forensics
Environmental ▪ Geotechnical

Frost GeoSciences

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Helotes, Texas 78023
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TBPE Firm Registration # F-9227
TBPG Firm Registration # 50040

July 23, 2020

Mr. Allen Hoover
Mosaic Land Development
6812 West Avenue, Suite # 100
San Antonio, Texas 78213

SUBJECT:
Geotechnical Engineering Services
Tres Laurels Subdivision
San Antonio, Texas
FGS Project No: FGS-G20016, Paving Supplement

Dear Mr. Hoover;

We have addressed the issues and questions that Bexar County submitted in their first review. Attached are paving designs with and without lime stabilization USING A CBR VALUE OF 4.5 multiplied by 1500 as per Bexar County design criteria. The UCS Curves have also been included as per Bexar County request.

FGS appreciates this opportunity to be of service to you in this phase of your project. If you have any questions pertaining to this report, or if we may be of further service, please contact our office.

Respectfully submitted,
Frost GeoSciences, Inc.

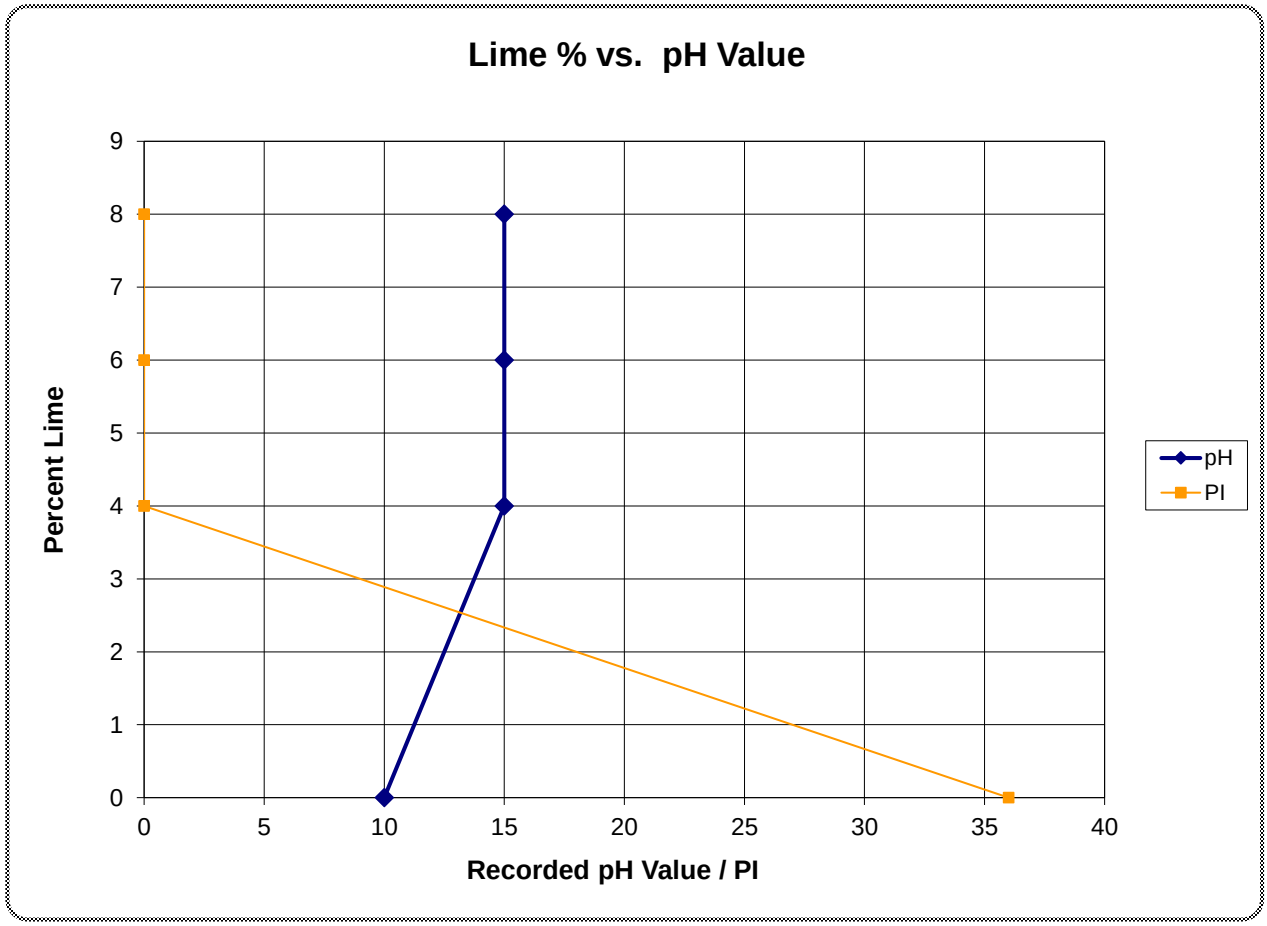
STATE OF TEXAS
F. J. CABALLERO
66952
LICENSED
PROFESSIONAL ENGINEER

F. J. Caballero, P.E.
Project Engineer

Copies Submitted: I: Mr. Allen Hoover, Mosaic Land Development
II: File

LIME CURVE

FGS Project No: FGS-G20116-A



Project Name: Tres Laurels
Project Number: FGS-G20016
Soil Description: Light Brown Clay

%Lime	pH	PI
0	10	36
4	15	0
6	15	0
8	15	0

	6`/.		8`/.
Set #1	160	Set #1	175
Set #2	155	Set #2	180

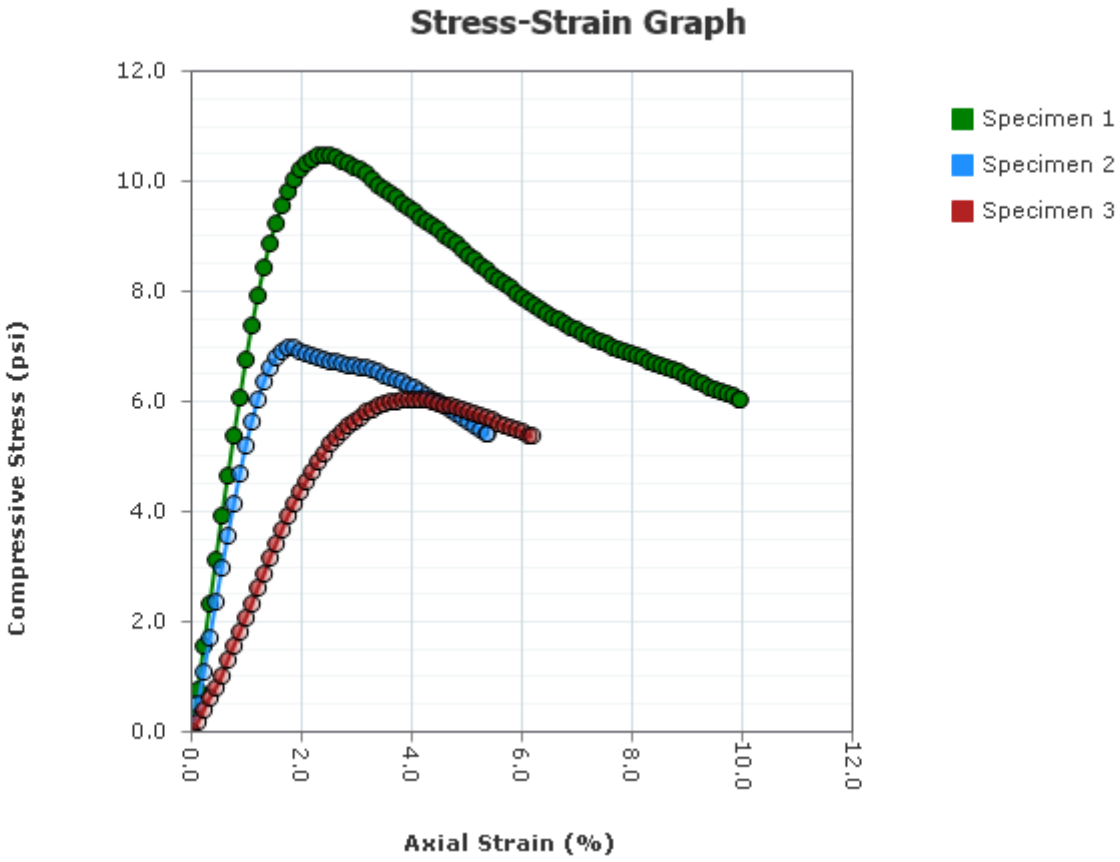
UCS CURVES

FGS Project No: FGS-G20116-A

0 % LIME CURVE

Unconfined Compression Test

D2166



Project:	Tres Laurels Subdivision
Project Number:	FGS-G-20016
Received Date:	10/19/2022
Sampling Date:	10/27/2022
Sample Number:	1
Sample Depth:	
Boring Number:	
Location:	Tres Laurels Subdivision /Montgomery Rd
Client Name:	Mosiac Land Development
Remarks:	0% Lime

Unconfined Compression Test

D2166

	Specimen Number							
Before Test	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Moisture Content (%):	0.0	0.0	0.0					
Wet Density (pcf)	0.0	0.0	0.0					
Dry Density (pcf)	0.0	0.0	0.0					
Saturation (%):	0.0	0.0	0.0					
Void Ratio:	0.000	0.000	0.000					
Height (in)	4.5763	4.5763	4.5763					
Diameter (in)	3.8307	3.8307	3.8307					
Strain Limit @ 15% (in)	0.7	0.7	0.7					
Height To Diameter Ratio:	1.19	1.19	1.19					
Test Data	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Failure Angle (°):	0	0	0					
Strain Rate (in/min)	0.09	0.09	0.09					
Strain Rate (%/min):	1.97	1.97	1.97					
Unconfined Compressive Strength (psi)	10.5	7.0	6.0					
Undrained Shear Strength (psi)	5.2	3.5	3.0					
Strain at Failure (%):	2.5	1.9	4.2					

Specific Gravity:	2.72	Plastic Limit:	26	Liquid Limit:	77
Type:	Grab	Soil Classification:	CH		

Project:	Tres Laurels Subdivision
Project Number:	FGS-G-20016
Sampling Date:	10/27/2022
Sample Number:	1
Sample Depth:	
Boring Number:	
Location:	Tres Laurels Subdivision /Montgomery Rd
Client Name:	Mosiac Land Development
Remarks:	0% Lime

Specimen 1 Failure Sketch	Specimen 2 Failure Sketch	Specimen 3 Failure Sketch	Specimen 4 Failure Sketch	Specimen 5 Failure Sketch	Specimen 6 Failure Sketch	Specimen 7 Failure Sketch	Specimen 8 Failure Sketch
							

Unconfined Compression Test

D2166

LIMS Code: [TO COME FROM LIMS]

Specimen 1

Other Associated Tests:

Sampling Method:	Reconstituted	Material Moisture:	Trimmings	Source Moisture:	Before Shear
Molding Date:	10/19/2022	Test Date:	10/27/2022		
Large Particle:	NO	Sensitivity:	0		
Technician:	Miguel Gonzalez Jr	Test Time:	10/27/2022		
Specimen Description:	Dark Brown Clay				
Test Remarks:					

Specimen 2

Other Associated Tests:

Sampling Method:	Reconstituted	Material Moisture:	Trimmings	Source Moisture:	Before Shear
Molding Date:	10/19/2022	Test Date:	10/27/2022		
Large Particle:	NO	Sensitivity:	0		
Technician:	Miguel Gonzalez Jr	Test Time:	10/27/2022		
Specimen Description:	Dark Brown Clay				
Test Remarks:	0% Lime				

Specimen 3

Other Associated Tests:

Sampling Method:	Reconstituted	Material Moisture:	Trimmings	Source Moisture:	Before Shear
Molding Date:	10/19/2022	Test Date:	10/27/2022		
Large Particle:	NO	Sensitivity:	0		
Technician:	Miguel Gonzalez Jr	Test Time:	10/27/2022		
Specimen Description:	Dark Brown Clay				
Test Remarks:	0% Lime				

Unconfined Compression Test - Specimen 1

D2166

LIMS Specimen Code: [TO COME FROM LIMS]

Index	Elapsed Time (hh:mm:ss)	Load (Lbf)	Displacement (in)	Corrected Load (Lbf)	Corrected Displacement (in)	Axial Strain (%)	Cross Sectional Area (in²)	Stress (psi)	Compressive Stress (psi)
0	00:00:00	25.0036	0.0449	0.0	0.0000	0.0	0.000	0.0	0.0
1	00:00:03	34.00588	0.0500	9.0	0.0050	0.1	11.538	0.8	0.8
2	00:00:07	42.90013	0.0550	17.9	0.0100	0.2	11.550	1.6	1.5
3	00:00:10	52.07398	0.0599	27.1	0.0150	0.3	11.563	2.3	2.3
4	00:00:14	61.13785	0.0650	36.1	0.0200	0.4	11.576	3.1	3.1
5	00:00:17	70.3161	0.0700	45.3	0.0250	0.5	11.588	3.9	3.9
6	00:00:21	79.094	0.0750	54.1	0.0300	0.7	11.601	4.7	4.7
7	00:00:24	87.58203	0.0800	62.6	0.0350	0.8	11.614	5.4	5.4
8	00:00:27	95.71223	0.0850	70.7	0.0400	0.9	11.627	6.1	6.1
9	00:00:31	103.579	0.0899	78.6	0.0450	1.0	11.639	6.8	6.8
10	00:00:34	110.8425	0.0949	85.8	0.0500	1.1	11.652	7.4	7.4
11	00:00:38	117.407	0.1000	92.4	0.0550	1.2	11.665	8.0	7.9
12	00:00:41	123.3966	0.1050	98.4	0.0600	1.3	11.678	8.5	8.4
13	00:00:45	128.5415	0.1100	103.5	0.0650	1.4	11.691	9.0	8.9
14	00:00:48	132.9713	0.1149	108.0	0.0700	1.5	11.704	9.4	9.2
15	00:00:51	136.9308	0.1200	111.9	0.0750	1.6	11.717	9.7	9.6
16	00:00:55	140.1634	0.1250	115.2	0.0800	1.7	11.730	10.0	9.8
17	00:00:58	142.8319	0.1300	117.8	0.0850	1.9	11.743	10.2	10.0
18	00:01:02	144.997	0.1350	120.0	0.0900	2.0	11.756	10.4	10.2
19	00:01:05	146.594	0.1400	121.6	0.0950	2.1	11.769	10.6	10.3
20	00:01:08	147.6987	0.1450	122.7	0.1000	2.2	11.782	10.6	10.4
21	00:01:12	148.3782	0.1499	123.4	0.1050	2.3	11.796	10.7	10.5
22	00:01:15	148.6959	0.1550	123.7	0.1100	2.4	11.809	10.7	10.5
23	00:01:18	148.7825	0.1600	123.8	0.1150	2.5	11.822	10.7	10.5
24	00:01:21	148.4515	0.1650	123.4	0.1200	2.6	11.835	10.7	10.4
25	00:01:25	147.9514	0.1700	122.9	0.1250	2.7	11.849	10.7	10.4
26	00:01:28	147.425	0.1750	122.4	0.1300	2.8	11.862	10.6	10.3
27	00:01:31	146.9273	0.1800	121.9	0.1350	3.0	11.875	10.6	10.3
28	00:01:34	146.3021	0.1850	121.3	0.1400	3.1	11.889	10.5	10.2
29	00:01:38	145.5889	0.1899	120.6	0.1450	3.2	11.902	10.5	10.1
30	00:01:41	144.5169	0.1950	119.5	0.1500	3.3	11.916	10.4	10.0
31	00:01:45	143.4782	0.2000	118.5	0.1550	3.4	11.929	10.3	9.9
32	00:01:48	142.7312	0.2050	117.7	0.1600	3.5	11.943	10.2	9.9
33	00:01:51	141.8856	0.2100	116.9	0.1650	3.6	11.956	10.1	9.8

Project Name: Tres Laurels Subdivision Project Number: FGS-G-20016

Test Date: 10/27/2022 Technician: Miguel Gonzalez Jr Checked By: _____ Date: _____

Unconfined Compression Test - Specimen 1

D2166 LIMS Specimen Code: [TO COME FROM LIMS]

Index	Elapsed Time (hh:mm:ss)	Load (Lbf)	Displacement (in)	Corrected Load (Lbf)	Corrected Displacement (in)	Axial Strain (%)	Cross Sectional Area (in²)	Stress (psi)	Compressive Stress (psi)
34	00:01:54	141.0115	0.2150	116.0	0.1700	3.7	11.970	10.1	9.7
35	00:01:57	140.2089	0.2200	115.2	0.1750	3.8	11.983	10.0	9.6
36	00:02:00	139.2884	0.2250	114.3	0.1800	3.9	11.997	9.9	9.5
37	00:02:03	138.3523	0.2300	113.3	0.1850	4.0	12.011	9.8	9.4
38	00:02:07	137.5008	0.2350	112.5	0.1900	4.2	12.024	9.8	9.4
39	00:02:10	136.7695	0.2399	111.8	0.1950	4.3	12.038	9.7	9.3
40	00:02:13	135.8353	0.2450	110.8	0.2000	4.4	12.052	9.6	9.2
41	00:02:17	134.9955	0.2500	110.0	0.2050	4.5	12.065	9.5	9.1
42	00:02:20	134.0765	0.2550	109.1	0.2100	4.6	12.079	9.5	9.0
43	00:02:23	133.1546	0.2600	108.2	0.2150	4.7	12.093	9.4	8.9
44	00:02:26	132.2722	0.2650	107.3	0.2200	4.8	12.107	9.3	8.9
45	00:02:30	131.209	0.2700	106.2	0.2250	4.9	12.121	9.2	8.8
46	00:02:33	130.1468	0.2750	105.1	0.2300	5.0	12.135	9.1	8.7
47	00:02:37	129.2029	0.2800	104.2	0.2350	5.1	12.149	9.0	8.6
48	00:02:40	128.2272	0.2850	103.2	0.2400	5.2	12.163	9.0	8.5
49	00:02:43	127.2231	0.2900	102.2	0.2450	5.4	12.177	8.9	8.4
50	00:02:47	126.2289	0.2949	101.2	0.2500	5.5	12.191	8.8	8.3
51	00:02:50	125.347	0.3000	100.3	0.2550	5.6	12.205	8.7	8.2
52	00:02:54	124.429	0.3050	99.4	0.2600	5.7	12.219	8.6	8.1
53	00:02:57	123.5662	0.3100	98.6	0.2650	5.8	12.233	8.6	8.1
54	00:03:00	122.634	0.3150	97.6	0.2700	5.9	12.248	8.5	8.0
55	00:03:04	121.8641	0.3199	96.9	0.2750	6.0	12.262	8.4	7.9
56	00:03:07	121.0306	0.3250	96.0	0.2800	6.1	12.276	8.3	7.8
57	00:03:11	120.2896	0.3300	95.3	0.2850	6.2	12.290	8.3	7.8
58	00:03:14	119.5128	0.3350	94.5	0.2900	6.3	12.305	8.2	7.7
59	00:03:17	118.7996	0.3400	93.8	0.2950	6.4	12.319	8.1	7.6
60	00:03:21	117.9901	0.3450	93.0	0.3000	6.6	12.333	8.1	7.5
61	00:03:24	117.3283	0.3500	92.3	0.3050	6.7	12.348	8.0	7.5
62	00:03:27	116.6923	0.3549	91.7	0.3100	6.8	12.362	8.0	7.4
63	00:03:30	116.1306	0.3600	91.1	0.3150	6.9	12.377	7.9	7.4
64	00:03:33	115.5	0.3650	90.5	0.3200	7.0	12.391	7.9	7.3
65	00:03:37	114.8602	0.3700	89.9	0.3250	7.1	12.406	7.8	7.2
66	00:03:40	114.253	0.3750	89.2	0.3300	7.2	12.421	7.7	7.2
67	00:03:44	113.7877	0.3799	88.8	0.3350	7.3	12.435	7.7	7.1

Unconfined Compression Test - Specimen 1

D2166 LIMS Specimen Code: [TO COME FROM LIMS]

Index	Elapsed Time (hh:mm:ss)	Load (Lbf)	Displacement (in)	Corrected Load (Lbf)	Corrected Displacement (in)	Axial Strain (%)	Cross Sectional Area (in²)	Stress (psi)	Compressive Stress (psi)
68	00:03:47	113.2759	0.3850	88.3	0.3400	7.4	12.450	7.7	7.1
69	00:03:51	112.8154	0.3900	87.8	0.3450	7.5	12.465	7.6	7.0
70	00:03:54	112.3119	0.3950	87.3	0.3500	7.6	12.479	7.6	7.0
71	00:03:57	111.8764	0.4000	86.9	0.3550	7.8	12.494	7.5	7.0
72	00:04:00	111.4134	0.4050	86.4	0.3600	7.9	12.509	7.5	6.9
73	00:04:04	111.0155	0.4100	86.0	0.3650	8.0	12.524	7.5	6.9
74	00:04:07	110.5286	0.4150	85.5	0.3700	8.1	12.539	7.4	6.8
75	00:04:10	110.1493	0.4200	85.1	0.3750	8.2	12.554	7.4	6.8
76	00:04:14	109.7294	0.4250	84.7	0.3800	8.3	12.569	7.4	6.7
77	00:04:17	109.3046	0.4300	84.3	0.3850	8.4	12.584	7.3	6.7
78	00:04:20	108.8559	0.4350	83.9	0.3900	8.5	12.599	7.3	6.7
79	00:04:23	108.4917	0.4400	83.5	0.3950	8.6	12.614	7.2	6.6
80	00:04:27	108.0009	0.4450	83.0	0.4000	8.7	12.629	7.2	6.6
81	00:04:30	107.5365	0.4500	82.5	0.4050	8.9	12.644	7.2	6.5
82	00:04:33	107.0594	0.4550	82.1	0.4100	9.0	12.659	7.1	6.5
83	00:04:37	106.3902	0.4599	81.4	0.4150	9.1	12.674	7.1	6.4
84	00:04:40	105.8452	0.4650	80.8	0.4200	9.2	12.690	7.0	6.4
85	00:04:44	105.3422	0.4700	80.3	0.4250	9.3	12.705	7.0	6.3
86	00:04:47	104.7883	0.4750	79.8	0.4300	9.4	12.720	6.9	6.3
87	00:04:51	104.2306	0.4799	79.2	0.4350	9.5	12.736	6.9	6.2
88	00:04:54	103.8312	0.4850	78.8	0.4400	9.6	12.751	6.8	6.2
89	00:04:57	103.316	0.4899	78.3	0.4450	9.7	12.766	6.8	6.1
90	00:05:01	102.8975	0.4950	77.9	0.4500	9.8	12.782	6.8	6.1
91	00:05:04	102.4287	0.4999	77.4	0.4550	9.9	12.797	6.7	6.1
92	00:05:04	102.3857	0.5005	77.4	0.4555	10.0	12.799	6.7	6.0

Unconfined Compression Test - Specimen 2

D2166

LIMS Specimen Code: [TO COME FROM LIMS]

Index	Elapsed Time (hh:mm:ss)	Load (Lbf)	Displacement (in)	Corrected Load (Lbf)	Corrected Displacement (in)	Axial Strain (%)	Cross Sectional Area (in²)	Stress (psi)	Compressive Stress (psi)
0	00:00:00	25.00801	0.0726	0.0	0.0000	0.0	0.000	0.0	0.0
1	00:00:03	30.9639	0.0776	6.0	0.0050	0.1	11.538	0.5	0.5
2	00:00:06	37.45799	0.0826	12.4	0.0100	0.2	11.550	1.1	1.1
3	00:00:10	44.59441	0.0876	19.6	0.0150	0.3	11.563	1.7	1.7
4	00:00:13	52.20156	0.0926	27.2	0.0200	0.4	11.576	2.4	2.3
5	00:00:17	59.40055	0.0976	34.4	0.0250	0.5	11.588	3.0	3.0
6	00:00:20	66.48613	0.1026	41.5	0.0300	0.7	11.601	3.6	3.6
7	00:00:24	73.16744	0.1076	48.2	0.0350	0.8	11.614	4.2	4.1
8	00:00:27	79.54275	0.1126	54.5	0.0400	0.9	11.627	4.7	4.7
9	00:00:31	85.56464	0.1176	60.6	0.0450	1.0	11.639	5.3	5.2
10	00:00:34	90.84644	0.1226	65.8	0.0500	1.1	11.652	5.7	5.7
11	00:00:37	95.54799	0.1276	70.5	0.0550	1.2	11.665	6.1	6.0
12	00:00:41	99.39312	0.1326	74.4	0.0600	1.3	11.678	6.5	6.4
13	00:00:44	102.4732	0.1376	77.5	0.0650	1.4	11.691	6.7	6.6
14	00:00:48	104.7448	0.1426	79.7	0.0700	1.5	11.704	6.9	6.8
15	00:00:51	106.1663	0.1476	81.2	0.0750	1.6	11.717	7.0	6.9
16	00:00:55	106.8566	0.1526	81.8	0.0800	1.7	11.730	7.1	7.0
17	00:00:58	106.9245	0.1576	81.9	0.0850	1.9	11.743	7.1	7.0
18	00:01:01	106.4142	0.1626	81.4	0.0900	2.0	11.756	7.1	6.9
19	00:01:05	105.853	0.1676	80.8	0.0950	2.1	11.769	7.0	6.9
20	00:01:08	105.3852	0.1726	80.4	0.1000	2.2	11.782	7.0	6.8
21	00:01:12	105.1442	0.1776	80.1	0.1050	2.3	11.796	7.0	6.8
22	00:01:15	104.913	0.1826	79.9	0.1100	2.4	11.809	6.9	6.8
23	00:01:18	104.67	0.1876	79.7	0.1150	2.5	11.822	6.9	6.7
24	00:01:21	104.4916	0.1926	79.5	0.1200	2.6	11.835	6.9	6.7
25	00:01:24	104.2311	0.1976	79.2	0.1250	2.7	11.849	6.9	6.7
26	00:01:28	104.0605	0.2026	79.1	0.1300	2.8	11.862	6.9	6.7
27	00:01:31	103.9128	0.2076	78.9	0.1350	3.0	11.875	6.8	6.6
28	00:01:34	103.7945	0.2126	78.8	0.1400	3.1	11.889	6.8	6.6
29	00:01:38	103.5873	0.2176	78.6	0.1450	3.2	11.902	6.8	6.6
30	00:01:41	103.3145	0.2226	78.3	0.1500	3.3	11.916	6.8	6.6
31	00:01:44	102.9171	0.2276	77.9	0.1550	3.4	11.929	6.8	6.5
32	00:01:48	102.462	0.2326	77.5	0.1600	3.5	11.943	6.7	6.5
33	00:01:51	102.025	0.2376	77.0	0.1650	3.6	11.956	6.7	6.4

Project Name: Tres Laurels Subdivision Project Number: FGS-G-20016

Test Date: 10/27/2022 Technician: Miguel Gonzalez Jr Checked By: _____ Date: _____

Unconfined Compression Test - Specimen 2

D2166 LIMS Specimen Code: [TO COME FROM LIMS]

Index	Elapsed Time (hh:mm:ss)	Load (Lbf)	Displacement (in)	Corrected Load (Lbf)	Corrected Displacement (in)	Axial Strain (%)	Cross Sectional Area (in²)	Stress (psi)	Compressive Stress (psi)
34	00:01:54	101.5283	0.2426	76.5	0.1700	3.7	11.970	6.6	6.4
35	00:01:57	101.127	0.2476	76.1	0.1750	3.8	11.983	6.6	6.4
36	00:02:01	100.5648	0.2526	75.6	0.1800	3.9	11.997	6.6	6.3
37	00:02:04	99.967	0.2576	75.0	0.1850	4.0	12.010	6.5	6.2
38	00:02:07	99.35646	0.2626	74.3	0.1900	4.2	12.024	6.5	6.2
39	00:02:10	98.69312	0.2676	73.7	0.1950	4.3	12.038	6.4	6.1
40	00:02:14	97.95499	0.2726	72.9	0.2000	4.4	12.052	6.3	6.1
41	00:02:17	97.30191	0.2776	72.3	0.2050	4.5	12.065	6.3	6.0
42	00:02:20	96.53152	0.2826	71.5	0.2100	4.6	12.079	6.2	5.9
43	00:02:23	95.76797	0.2876	70.8	0.2150	4.7	12.093	6.1	5.9
44	00:02:27	95.01321	0.2926	70.0	0.2200	4.8	12.107	6.1	5.8
45	00:02:30	94.24282	0.2976	69.2	0.2250	4.9	12.121	6.0	5.7
46	00:02:33	93.44847	0.3026	68.4	0.2300	5.0	12.135	5.9	5.6
47	00:02:37	92.69518	0.3076	67.7	0.2350	5.1	12.149	5.9	5.6
48	00:02:41	91.80161	0.3126	66.8	0.2400	5.2	12.163	5.8	5.5
49	00:02:44	90.95642	0.3176	65.9	0.2450	5.4	12.177	5.7	5.4
50	00:02:45	90.84644	0.3184	65.8	0.2458	5.4	12.179	5.7	5.4

Unconfined Compression Test - Specimen 3

D2166

LIMS Specimen Code: [TO COME FROM LIMS]

Index	Elapsed Time (hh:mm:ss)	Load (Lbf)	Displacement (in)	Corrected Load (Lbf)	Corrected Displacement (in)	Axial Strain (%)	Cross Sectional Area (in²)	Stress (psi)	Compressive Stress (psi)
0	00:00:00	25.00165	0.1121	0.0	0.0000	0.0	0.000	0.0	0.0
1	00:00:03	27.36074	0.1171	2.4	0.0050	0.1	11.538	0.2	0.2
2	00:00:06	29.75454	0.1221	4.8	0.0100	0.2	11.550	0.4	0.4
3	00:00:09	32.23534	0.1271	7.2	0.0150	0.3	11.563	0.6	0.6
4	00:00:13	34.30651	0.1321	9.3	0.0200	0.4	11.576	0.8	0.8
5	00:00:16	36.8318	0.1371	11.8	0.0250	0.5	11.588	1.0	1.0
6	00:00:19	39.99453	0.1421	15.0	0.0300	0.7	11.601	1.3	1.3
7	00:00:22	43.03016	0.1471	18.0	0.0350	0.8	11.614	1.6	1.6
8	00:00:26	46.10831	0.1521	21.1	0.0400	0.9	11.627	1.8	1.8
9	00:00:29	49.20798	0.1571	24.2	0.0450	1.0	11.639	2.1	2.1
10	00:00:32	52.30177	0.1621	27.3	0.0500	1.1	11.652	2.4	2.3
11	00:00:36	55.47232	0.1671	30.5	0.0550	1.2	11.665	2.6	2.6
12	00:00:39	58.70935	0.1721	33.7	0.0600	1.3	11.678	2.9	2.9
13	00:00:43	61.80119	0.1771	36.8	0.0650	1.4	11.691	3.2	3.1
14	00:00:46	64.91894	0.1821	39.9	0.0700	1.5	11.704	3.5	3.4
15	00:00:49	67.92867	0.1871	42.9	0.0750	1.6	11.717	3.7	3.7
16	00:00:53	70.93203	0.1921	45.9	0.0800	1.7	11.730	4.0	3.9
17	00:00:56	73.76088	0.1971	48.8	0.0850	1.9	11.743	4.2	4.2
18	00:01:00	76.3287	0.2021	51.3	0.0900	2.0	11.756	4.5	4.4
19	00:01:03	78.68339	0.2071	53.7	0.0950	2.1	11.769	4.7	4.6
20	00:01:06	80.91196	0.2121	55.9	0.1000	2.2	11.782	4.9	4.7
21	00:01:10	82.94451	0.2171	57.9	0.1050	2.3	11.796	5.0	4.9
22	00:01:13	84.87001	0.2221	59.9	0.1100	2.4	11.809	5.2	5.1
23	00:01:17	86.70165	0.2271	61.7	0.1150	2.5	11.822	5.4	5.2
24	00:01:20	88.30843	0.2321	63.3	0.1200	2.6	11.835	5.5	5.3
25	00:01:23	89.7671	0.2371	64.8	0.1250	2.7	11.849	5.6	5.5
26	00:01:27	91.11578	0.2421	66.1	0.1300	2.8	11.862	5.7	5.6
27	00:01:30	92.0778	0.2471	67.1	0.1350	3.0	11.875	5.8	5.6
28	00:01:34	93.04861	0.2521	68.0	0.1400	3.1	11.889	5.9	5.7
29	00:01:37	94.04142	0.2571	69.0	0.1450	3.2	11.902	6.0	5.8
30	00:01:40	94.88954	0.2621	69.9	0.1500	3.3	11.916	6.1	5.9
31	00:01:44	95.55826	0.2671	70.6	0.1550	3.4	11.929	6.1	5.9
32	00:01:47	96.16489	0.2721	71.2	0.1600	3.5	11.943	6.2	6.0
33	00:01:51	96.67377	0.2771	71.7	0.1650	3.6	11.956	6.2	6.0

Unconfined Compression Test - Specimen 3

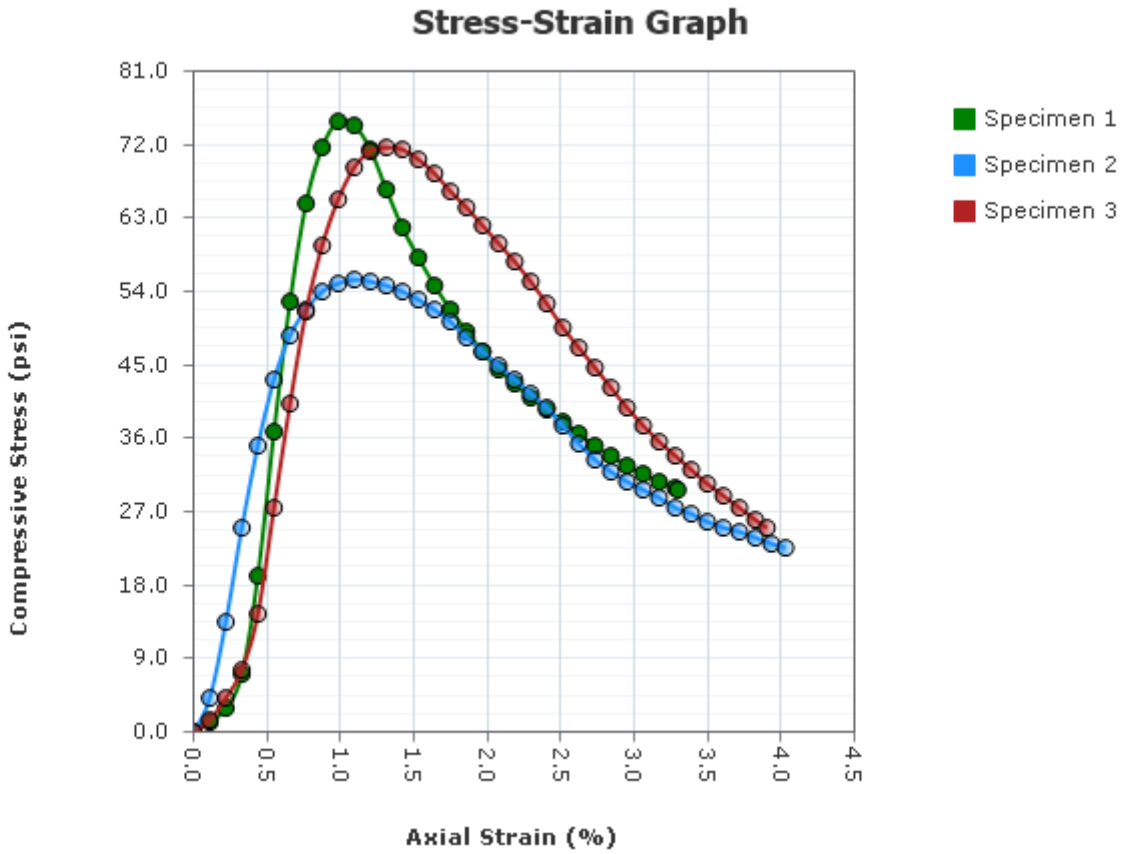
D2166 LIMS Specimen Code: [TO COME FROM LIMS]

Index	Elapsed Time (hh:mm:ss)	Load (Lbf)	Displacement (in)	Corrected Load (Lbf)	Corrected Displacement (in)	Axial Strain (%)	Cross Sectional Area (in²)	Stress (psi)	Compressive Stress (psi)
34	00:01:54	97.02523	0.2821	72.0	0.1700	3.7	11.970	6.2	6.0
35	00:01:57	97.36008	0.2871	72.4	0.1750	3.8	11.983	6.3	6.0
36	00:02:01	97.54339	0.2921	72.5	0.1800	3.9	11.997	6.3	6.0
37	00:02:04	97.6133	0.2971	72.6	0.1850	4.0	12.011	6.3	6.0
38	00:02:07	97.68026	0.3021	72.7	0.1900	4.2	12.024	6.3	6.0
39	00:02:10	97.56294	0.3071	72.6	0.1950	4.3	12.038	6.3	6.0
40	00:02:14	97.25547	0.3121	72.3	0.2000	4.4	12.052	6.3	6.0
41	00:02:17	97.04967	0.3171	72.0	0.2050	4.5	12.065	6.3	6.0
42	00:02:20	96.80037	0.3221	71.8	0.2100	4.6	12.079	6.2	5.9
43	00:02:23	96.50903	0.3271	71.5	0.2150	4.7	12.093	6.2	5.9
44	00:02:27	96.27293	0.3321	71.3	0.2200	4.8	12.107	6.2	5.9
45	00:02:30	95.98207	0.3371	71.0	0.2250	4.9	12.121	6.2	5.9
46	00:02:33	95.62767	0.3421	70.6	0.2300	5.0	12.135	6.1	5.8
47	00:02:37	95.18919	0.3471	70.2	0.2350	5.1	12.149	6.1	5.8
48	00:02:40	94.80692	0.3521	69.8	0.2400	5.2	12.163	6.1	5.7
49	00:02:43	94.41146	0.3571	69.4	0.2450	5.4	12.177	6.0	5.7
50	00:02:46	93.98521	0.3621	69.0	0.2500	5.5	12.191	6.0	5.7
51	00:02:50	93.52766	0.3671	68.5	0.2550	5.6	12.205	5.9	5.6
52	00:02:53	93.04176	0.3721	68.0	0.2600	5.7	12.219	5.9	5.6
53	00:02:56	92.62772	0.3771	67.6	0.2650	5.8	12.233	5.9	5.5
54	00:03:00	92.16236	0.3821	67.2	0.2700	5.9	12.248	5.8	5.5
55	00:03:03	91.71215	0.3871	66.7	0.2750	6.0	12.262	5.8	5.4
56	00:03:07	91.23994	0.3921	66.2	0.2800	6.1	12.276	5.7	5.4
57	00:03:09	90.94958	0.3951	65.9	0.2830	6.2	12.285	5.7	5.4

2 % LIME CURVE

Unconfined Compression Test

D2166



Project:	Tres Laurels Subdivision
Project Number:	FGS-P-20032
Received Date:	10/19/2022
Sampling Date:	10/27/2022
Sample Number:	1
Sample Depth:	
Boring Number:	
Location:	Tres Laurels Subdivision/Montgomery Rd
Client Name:	Mosiac Land Development
Remarks:	2% Lime

Unconfined Compression Test

D2166

	Specimen Number							
Before Test	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Moisture Content (%):	0.0	0.0	0.0					
Wet Density (pcf)	0.0	0.0	0.0					
Dry Density (pcf)	0.0	0.0	0.0					
Saturation (%):	0.0	0.0	0.0					
Void Ratio:	0.000	0.000	0.000					
Height (in)	4.5763	4.5763	4.5763					
Diameter (in)	3.8307	3.8307	3.8307					
Strain Limit @ 15% (in)	0.7	0.7	0.7					
Height To Diameter Ratio:	1.19	1.19	1.19					
Test Data	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Failure Angle (°):	0	0	0					
Strain Rate (in/min)	0.09	0.09	0.09					
Strain Rate (%/min):	1.97	1.97	1.97					
Unconfined Compressive Strength (psi)	74.9	55.4	71.8					
Undrained Shear Strength (psi)	37.4	27.7	35.9					
Strain at Failure (%):	1.0	1.1	1.3					

Specific Gravity:	2.72	Plastic Limit:	26	Liquid Limit:	77
Type:	Grab	Soil Classification:	CH		

Project:	Tres Laurels Subdivision
Project Number:	FGS-P-20032
Sampling Date:	10/27/2022
Sample Number:	1
Sample Depth:	
Boring Number:	
Location:	Tres Laurels Subdivision/Montgomery Rd
Client Name:	Mosiac Land Development
Remarks:	2% Lime

Specimen 1 Failure Sketch

Specimen 2 Failure Sketch

Specimen 3 Failure Sketch

Specimen 4 Failure Sketch

Specimen 5 Failure Sketch

Specimen 6 Failure Sketch

Specimen 7 Failure Sketch

Specimen 8 Failure Sketch

Unconfined Compression Test

D2166

LIMS Code: [TO COME FROM LIMS]

Specimen 1

Other Associated Tests:

Sampling Method:	Reconstituted	Material Moisture:	Trimmings	Source Moisture:	Before Shear
Molding Date:	10/19/2022	Test Date:	10/27/2022		
Large Particle:	NO	Sensitivity:	0		
Technician:	Miguel Gonzalez Jr	Test Time:	10/27/2022		
Specimen Description:	Dark Brown Clay				
Test Remarks:	2% Lime				

Specimen 2

Other Associated Tests:

Sampling Method:	Reconstituted	Material Moisture:	Trimmings	Source Moisture:	Before Shear
Molding Date:	10/19/2022	Test Date:	10/27/2022		
Large Particle:	NO	Sensitivity:	0		
Technician:	Miguel Gonzalez Jr	Test Time:	10/27/2022		
Specimen Description:	Dark Brown Clay				
Test Remarks:	2% Lime				

Specimen 3

Other Associated Tests:

Sampling Method:	Reconstituted	Material Moisture:	Trimmings	Source Moisture:	Before Shear
Molding Date:	10/19/2022	Test Date:	10/27/2022		
Large Particle:	NO	Sensitivity:	0		
Technician:	Miguel Gonzalez Jr	Test Time:	10/27/2022		
Specimen Description:	Dark Brown Clay				
Test Remarks:	2% Lime				

Unconfined Compression Test - Specimen 1

D2166

LIMS Specimen Code: [TO COME FROM LIMS]

Index	Elapsed Time (hh:mm:ss)	Load (Lbf)	Displacement (in)	Corrected Load (Lbf)	Corrected Displacement (in)	Axial Strain (%)	Cross Sectional Area (in²)	Stress (psi)	Compressive Stress (psi)
0	00:00:00	25.00458	0.0008	0.0	0.0000	0.0	0.000	0.0	0.0
1	00:00:03	39.6411	0.0059	14.6	0.0050	0.1	11.538	1.3	1.3
2	00:00:06	58.93518	0.0108	33.9	0.0100	0.2	11.550	2.9	2.9
3	00:00:10	106.7417	0.0159	81.7	0.0150	0.3	11.563	7.1	7.1
4	00:00:15	247.6618	0.0208	222.7	0.0200	0.4	11.576	19.3	19.2
5	00:00:19	451.5666	0.0259	426.6	0.0250	0.5	11.588	37.0	36.8
6	00:00:24	637.7181	0.0309	612.7	0.0300	0.7	11.601	53.2	52.8
7	00:00:29	776.8422	0.0359	751.8	0.0350	0.8	11.614	65.2	64.7
8	00:00:32	859.1449	0.0408	834.1	0.0400	0.9	11.627	72.4	71.7
9	00:00:36	896.6542	0.0458	871.6	0.0450	1.0	11.639	75.6	74.9
10	00:00:40	892.6087	0.0509	867.6	0.0500	1.1	11.652	75.3	74.5
11	00:00:43	857.8309	0.0558	832.8	0.0550	1.2	11.665	72.3	71.4
12	00:00:47	801.9348	0.0609	776.9	0.0600	1.3	11.678	67.4	66.5
13	00:00:50	749.2107	0.0658	724.2	0.0650	1.4	11.691	62.8	61.9
14	00:00:53	705.8217	0.0708	680.8	0.0700	1.5	11.704	59.1	58.2
15	00:00:56	666.6709	0.0759	641.7	0.0750	1.6	11.717	55.7	54.8
16	00:00:59	632.1527	0.0809	607.1	0.0800	1.7	11.730	52.7	51.8
17	00:01:03	602.1318	0.0858	577.1	0.0850	1.9	11.743	50.1	49.1
18	00:01:06	574.2436	0.0908	549.2	0.0900	2.0	11.756	47.7	46.7
19	00:01:10	548.062	0.0958	523.1	0.0950	2.1	11.769	45.4	44.4
20	00:01:13	526.9249	0.1009	501.9	0.1000	2.2	11.782	43.6	42.6
21	00:01:17	509.3569	0.1058	484.4	0.1050	2.3	11.796	42.0	41.1
22	00:01:20	491.6315	0.1108	466.6	0.1100	2.4	11.809	40.5	39.5
23	00:01:23	473.9501	0.1159	448.9	0.1150	2.5	11.822	39.0	38.0
24	00:01:26	456.8376	0.1208	431.8	0.1200	2.6	11.835	37.5	36.5
25	00:01:29	441.0001	0.1258	416.0	0.1250	2.7	11.849	36.1	35.1
26	00:01:32	425.7354	0.1308	400.7	0.1300	2.8	11.862	34.8	33.8
27	00:01:35	412.1826	0.1359	387.2	0.1350	3.0	11.875	33.6	32.6
28	00:01:38	400.3828	0.1408	375.4	0.1400	3.1	11.889	32.6	31.6
29	00:01:41	390.2479	0.1459	365.2	0.1450	3.2	11.902	31.7	30.7
30	00:01:45	381.4402	0.1509	356.4	0.1500	3.3	11.916	30.9	29.9
31	00:01:45	379.9331	0.1517	354.9	0.1509	3.3	11.918	30.8	29.8

Unconfined Compression Test - Specimen 2

D2166

LIMS Specimen Code: [TO COME FROM LIMS]

Index	Elapsed Time (hh:mm:ss)	Load (Lbf)	Displacement (in)	Corrected Load (Lbf)	Corrected Displacement (in)	Axial Strain (%)	Cross Sectional Area (in²)	Stress (psi)	Compressive Stress (psi)
0	00:00:00	25.05493	0.0345	0.0	0.0000	0.0	0.000	0.0	0.0
1	00:00:03	73.75746	0.0396	48.7	0.0050	0.1	11.538	4.2	4.2
2	00:00:08	180.8139	0.0445	155.8	0.0100	0.2	11.550	13.5	13.5
3	00:00:13	314.5942	0.0495	289.5	0.0150	0.3	11.563	25.1	25.0
4	00:00:17	432.25	0.0545	407.2	0.0200	0.4	11.576	35.3	35.2
5	00:00:21	524.3337	0.0595	499.3	0.0250	0.5	11.588	43.3	43.1
6	00:00:24	588.6519	0.0645	563.6	0.0300	0.7	11.601	48.9	48.6
7	00:00:28	627.1711	0.0695	602.1	0.0350	0.8	11.614	52.2	51.8
8	00:00:31	651.9929	0.0746	626.9	0.0400	0.9	11.627	54.4	53.9
9	00:00:35	665.5222	0.0795	640.5	0.0450	1.0	11.639	55.6	55.0
10	00:00:38	671.1495	0.0845	646.1	0.0500	1.1	11.652	56.1	55.4
11	00:00:42	669.994	0.0896	644.9	0.0550	1.2	11.665	56.0	55.3
12	00:00:45	665.6292	0.0946	640.6	0.0600	1.3	11.678	55.6	54.9
13	00:00:48	657.106	0.0996	632.1	0.0650	1.4	11.691	54.8	54.1
14	00:00:52	646.3459	0.1045	621.3	0.0700	1.5	11.704	53.9	53.1
15	00:00:55	632.0652	0.1096	607.0	0.0750	1.6	11.717	52.7	51.8
16	00:00:59	614.3872	0.1146	589.3	0.0800	1.7	11.730	51.1	50.2
17	00:01:02	594.2191	0.1196	569.2	0.0850	1.9	11.743	49.4	48.5
18	00:01:05	574.5931	0.1246	549.5	0.0900	2.0	11.756	47.7	46.7
19	00:01:08	554.2344	0.1295	529.2	0.0950	2.1	11.769	45.9	45.0
20	00:01:12	534.2882	0.1345	509.2	0.1000	2.2	11.782	44.2	43.2
21	00:01:15	515.1735	0.1396	490.1	0.1050	2.3	11.796	42.5	41.6
22	00:01:18	495.0733	0.1446	470.0	0.1100	2.4	11.809	40.8	39.8
23	00:01:21	470.4119	0.1496	445.4	0.1150	2.5	11.822	38.6	37.7
24	00:01:24	443.7336	0.1546	418.7	0.1200	2.6	11.835	36.3	35.4
25	00:01:27	421.5911	0.1596	396.5	0.1250	2.7	11.849	34.4	33.5
26	00:01:30	404.4836	0.1646	379.4	0.1300	2.8	11.862	32.9	32.0
27	00:01:33	389.5967	0.1695	364.5	0.1350	3.0	11.875	31.6	30.7
28	00:01:36	377.4626	0.1745	352.4	0.1400	3.1	11.889	30.6	29.6
29	00:01:39	366.0464	0.1795	341.0	0.1450	3.2	11.902	29.6	28.6
30	00:01:42	353.812	0.1845	328.8	0.1500	3.3	11.916	28.5	27.6
31	00:01:46	343.3731	0.1896	318.3	0.1550	3.4	11.929	27.6	26.7
32	00:01:49	334.1323	0.1945	309.1	0.1600	3.5	11.942	26.8	25.9
33	00:01:52	325.6031	0.1995	300.5	0.1650	3.6	11.956	26.1	25.1

Project Name: Tres Laurels Subdivision Project Number: FGS-P-20032

Test Date: 10/27/2022 Technician: Miguel Gonzalez Jr Checked By: _____ Date: _____

Unconfined Compression Test - Specimen 2

D2166 LIMS Specimen Code: [TO COME FROM LIMS]

Index	Elapsed Time (hh:mm:ss)	Load (Lbf)	Displacement (in)	Corrected Load (Lbf)	Corrected Displacement (in)	Axial Strain (%)	Cross Sectional Area (in²)	Stress (psi)	Compressive Stress (psi)
34	00:01:55	317.5194	0.2046	292.5	0.1700	3.7	11.970	25.4	24.4
35	00:01:59	309.4645	0.2096	284.4	0.1750	3.8	11.983	24.7	23.7
36	00:02:02	302.3471	0.2145	277.3	0.1800	3.9	11.997	24.1	23.1
37	00:02:04	296.2734	0.2190	271.2	0.1844	4.0	12.009	23.5	22.6

Unconfined Compression Test - Specimen 3

D2166

LIMS Specimen Code: [TO COME FROM LIMS]

Index	Elapsed Time (hh:mm:ss)	Load (Lbf)	Displacement (in)	Corrected Load (Lbf)	Corrected Displacement (in)	Axial Strain (%)	Cross Sectional Area (in²)	Stress (psi)	Compressive Stress (psi)
0	00:00:00	25.04858	0.0239	0.0	0.0000	0.0	0.000	0.0	0.0
1	00:00:03	42.46996	0.0289	17.4	0.0050	0.1	11.538	1.5	1.5
2	00:00:07	71.86373	0.0339	46.8	0.0100	0.2	11.550	4.1	4.1
3	00:00:10	111.9458	0.0389	86.9	0.0150	0.3	11.563	7.5	7.5
4	00:00:15	192.8743	0.0439	167.8	0.0200	0.4	11.576	14.6	14.5
5	00:00:21	343.4792	0.0489	318.4	0.0250	0.5	11.588	27.6	27.5
6	00:00:25	491.4203	0.0539	466.4	0.0300	0.7	11.601	40.5	40.2
7	00:00:30	623.9262	0.0590	598.9	0.0350	0.8	11.614	52.0	51.6
8	00:00:33	717.2941	0.0639	692.2	0.0400	0.9	11.627	60.1	59.5
9	00:00:37	785.5977	0.0689	760.5	0.0450	1.0	11.639	66.0	65.3
10	00:00:41	830.7625	0.0739	805.7	0.0500	1.1	11.652	69.9	69.1
11	00:00:44	855.2851	0.0789	830.2	0.0550	1.2	11.665	72.0	71.2
12	00:00:47	863.4021	0.0839	838.4	0.0600	1.3	11.678	72.7	71.8
13	00:00:51	859.5931	0.0889	834.5	0.0650	1.4	11.691	72.4	71.4
14	00:00:54	846.648	0.0939	821.6	0.0700	1.5	11.704	71.3	70.2
15	00:00:58	826.407	0.0989	801.4	0.0750	1.6	11.717	69.5	68.4
16	00:01:01	803.6252	0.1039	778.6	0.0800	1.7	11.730	67.6	66.4
17	00:01:04	779.0161	0.1090	754.0	0.0850	1.9	11.743	65.4	64.2
18	00:01:07	755.083	0.1139	730.0	0.0900	2.0	11.756	63.3	62.1
19	00:01:10	730.0759	0.1190	705.0	0.0950	2.1	11.769	61.2	59.9
20	00:01:13	705.2615	0.1239	680.2	0.1000	2.2	11.782	59.0	57.7
21	00:01:17	676.6186	0.1290	651.6	0.1050	2.3	11.796	56.5	55.2
22	00:01:20	644.7596	0.1339	619.7	0.1100	2.4	11.809	53.8	52.5
23	00:01:23	612.3659	0.1389	587.3	0.1150	2.5	11.822	51.0	49.7
24	00:01:26	582.937	0.1439	557.9	0.1200	2.6	11.835	48.4	47.1
25	00:01:30	553.5031	0.1490	528.5	0.1250	2.7	11.849	45.9	44.6
26	00:01:33	525.6667	0.1539	500.6	0.1300	2.8	11.862	43.4	42.2
27	00:01:36	498.2742	0.1589	473.2	0.1350	3.0	11.875	41.1	39.8
28	00:01:39	472.8346	0.1640	447.8	0.1400	3.1	11.889	38.9	37.7
29	00:01:43	449.446	0.1690	424.4	0.1450	3.2	11.902	36.8	35.7
30	00:01:46	427.8833	0.1739	402.8	0.1500	3.3	11.916	35.0	33.8
31	00:01:49	408.093	0.1789	383.0	0.1550	3.4	11.929	33.2	32.1
32	00:01:52	389.0424	0.1840	364.0	0.1600	3.5	11.943	31.6	30.5
33	00:01:55	370.4107	0.1890	345.4	0.1650	3.6	11.956	30.0	28.9

Unconfined Compression Test - Specimen 3

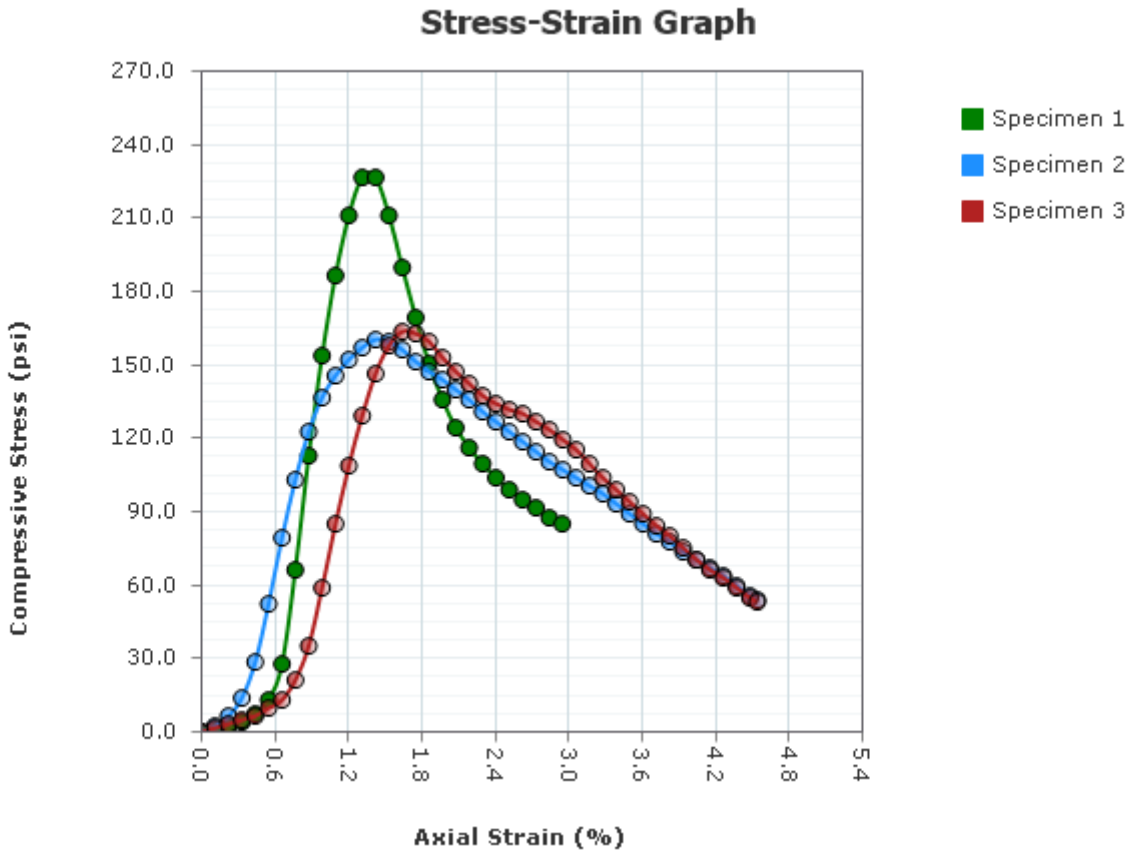
D2166 LIMS Specimen Code: [TO COME FROM LIMS]

Index	Elapsed Time (hh:mm:ss)	Load (Lbf)	Displacement (in)	Corrected Load (Lbf)	Corrected Displacement (in)	Axial Strain (%)	Cross Sectional Area (in²)	Stress (psi)	Compressive Stress (psi)
34	00:01:58	352.939	0.1940	327.9	0.1700	3.7	11.970	28.5	27.4
35	00:02:01	337.0075	0.1989	312.0	0.1750	3.8	11.983	27.1	26.0
36	00:02:03	325.6384	0.2025	300.6	0.1786	3.9	11.993	26.1	25.1

4 % LIME CURVE

Unconfined Compression Test

D2166



Project:	Tres Laurels Subdivision
Project Number:	FGS-P-20032
Received Date:	10/19/2022
Sampling Date:	10/27/2022
Sample Number:	1
Sample Depth:	
Boring Number:	
Location:	Tres Lurels Subdivision/Montgomery Rd
Client Name:	Mosiac Land Development
Remarks:	4% Lime

Unconfined Compression Test

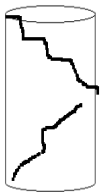
D2166

Before Test	Specimen Number 1	2	3	4	5	6	7	8
Moisture Content (%):	0.0	0.0	0.0					
Wet Density (pcf)	0.0	0.0	0.0					
Dry Density (pcf)	0.0	0.0	0.0					
Saturation (%):	0.0	0.0	0.0					
Void Ratio:	0.000	0.000	0.000					
Height (in)	4.5763	4.5763	4.5763					
Diameter (in)	3.8307	3.8307	3.8307					
Strain Limit @ 15% (in)	0.7	0.7	0.7					
Height To Diameter Ratio:	1.19	1.19	1.19					
Test Data	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Failure Angle (°):	0	0	0					
Strain Rate (in/min)	0.09	0.09	0.09					
Strain Rate (%/min):	1.97	1.97	1.97					
Unconfined Compressive Strength (psi)	226.7	159.9	163.7					
Undrained Shear Strength (psi)	113.3	79.9	81.9					
Strain at Failure (%):	1.4	1.5	1.6					

Specific Gravity:	2.72	Plastic Limit:	26	Liquid Limit:	77
Type:		Soil Classification:	CH		

Project:	Tres Laurels Subdivision
Project Number:	FGS-P-20032
Sampling Date:	10/27/2022
Sample Number:	1
Sample Depth:	
Boring Number:	
Location:	Tres Lurels Subdivision/Montgomery Rd
Client Name:	Mosiac Land Development
Remarks:	4% Lime

Specimen 1 Failure Sketch



Specimen 2 Failure Sketch

Specimen 3 Failure Sketch

Specimen 4 Failure Sketch

Specimen 5 Failure Sketch

Specimen 6 Failure Sketch

Specimen 7 Failure Sketch

Specimen 8 Failure Sketch

Unconfined Compression Test

D2166

LIMS Code: [TO COME FROM LIMS]

Specimen 1

Other Associated Tests:

Sampling Method:	Reconstituted	Material Moisture:	Trimmings	Source Moisture:	Before Shear
Molding Date:	10/19/2022	Test Date:	10/27/2022		
Large Particle:	NO	Sensitivity:	0		
Technician:	Miguel Gonzalez Jr	Test Time:	10/27/2022		
Specimen Description:	Dark Brown Clay				
Test Remarks:	4% Lime				

Specimen 2

Other Associated Tests:

Sampling Method:	Reconstituted	Material Moisture:	Trimmings	Source Moisture:	Before Shear
Molding Date:	10/19/2022	Test Date:	10/27/2022		
Large Particle:	NO	Sensitivity:	0		
Technician:	Miguel Gonzalez Jr	Test Time:	10/27/2022		
Specimen Description:	Dark Brown Clay				
Test Remarks:	4% Lime				

Specimen 3

Other Associated Tests:

Sampling Method:	Reconstituted	Material Moisture:	Trimmings	Source Moisture:	Before Shear
Molding Date:	10/19/2022	Test Date:	10/27/2022		
Large Particle:	NO	Sensitivity:	0		
Technician:	Miguel Gonzalez Jr	Test Time:	10/27/2022		
Specimen Description:	Dark Brown Clay				
Test Remarks:	4% Lime				

Unconfined Compression Test - Specimen 1

D2166

LIMS Specimen Code: [TO COME FROM LIMS]

Index	Elapsed Time (hh:mm:ss)	Load (Lbf)	Displacement (in)	Corrected Load (Lbf)	Corrected Displacement (in)	Axial Strain (%)	Cross Sectional Area (in²)	Stress (psi)	Compressive Stress (psi)
0	00:00:00	25.0256	0.0277	0.0	0.0000	0.0	0.000	0.0	0.0
1	00:00:03	38.54319	0.0327	13.5	0.0050	0.1	11.538	1.2	1.2
2	00:00:06	49.84052	0.0377	24.8	0.0100	0.2	11.550	2.2	2.1
3	00:00:10	73.82883	0.0427	48.8	0.0150	0.3	11.563	4.2	4.2
4	00:00:14	109.9171	0.0477	84.9	0.0200	0.4	11.576	7.4	7.3
5	00:00:18	177.8697	0.0527	152.8	0.0250	0.5	11.588	13.3	13.2
6	00:00:23	349.3822	0.0577	324.4	0.0300	0.7	11.601	28.1	28.0
7	00:00:30	798.8948	0.0627	773.9	0.0350	0.8	11.614	67.1	66.6
8	00:00:37	1338.997	0.0677	1,314.0	0.0400	0.9	11.627	114.0	113.0
9	00:00:42	1818.424	0.0727	1,793.4	0.0450	1.0	11.639	155.6	154.1
10	00:00:47	2201.366	0.0777	2,176.3	0.0500	1.1	11.652	188.8	186.8
11	00:00:52	2491.631	0.0827	2,466.6	0.0550	1.2	11.665	214.0	211.5
12	00:00:56	2670.252	0.0877	2,645.2	0.0600	1.3	11.678	229.5	226.5
13	00:01:00	2675.345	0.0927	2,650.3	0.0650	1.4	11.691	230.0	226.7
14	00:01:03	2492.896	0.0977	2,467.9	0.0700	1.5	11.704	214.1	210.9
15	00:01:06	2250.788	0.1027	2,225.8	0.0750	1.6	11.717	193.1	190.0
16	00:01:09	2008.693	0.1077	1,983.7	0.0800	1.7	11.730	172.1	169.1
17	00:01:12	1788.843	0.1127	1,763.8	0.0850	1.9	11.743	153.0	150.2
18	00:01:15	1621.852	0.1177	1,596.8	0.0900	2.0	11.756	138.6	135.8
19	00:01:18	1492.684	0.1227	1,467.7	0.0950	2.1	11.769	127.3	124.7
20	00:01:21	1395.436	0.1277	1,370.4	0.1000	2.2	11.782	118.9	116.3
21	00:01:24	1316.705	0.1327	1,291.7	0.1050	2.3	11.796	112.1	109.5
22	00:01:27	1250.3	0.1377	1,225.3	0.1100	2.4	11.809	106.3	103.8
23	00:01:30	1196.217	0.1427	1,171.2	0.1150	2.5	11.822	101.6	99.1
24	00:01:33	1152.586	0.1477	1,127.6	0.1200	2.6	11.835	97.8	95.3
25	00:01:36	1110.133	0.1527	1,085.1	0.1250	2.7	11.849	94.2	91.6
26	00:01:40	1067.046	0.1577	1,042.0	0.1300	2.8	11.862	90.4	87.8
27	00:01:42	1030.889	0.1625	1,005.9	0.1348	2.9	11.875	87.3	84.7

Unconfined Compression Test - Specimen 2

D2166 LIMS Specimen Code: [TO COME FROM LIMS]

Index	Elapsed Time (hh:mm:ss)	Load (Lbf)	Displacement (in)	Corrected Load (Lbf)	Corrected Displacement (in)	Axial Strain (%)	Cross Sectional Area (in²)	Stress (psi)	Compressive Stress (psi)
0	00:00:00	25.10479	0.0255	0.0	0.0000	0.0	0.000	0.0	0.0
1	00:00:03	55.00402	0.0305	29.9	0.0050	0.1	11.538	2.6	2.6
2	00:00:08	100.2305	0.0355	75.1	0.0100	0.2	11.550	6.5	6.5
3	00:00:12	187.1062	0.0405	162.0	0.0150	0.3	11.563	14.1	14.0
4	00:00:16	356.2454	0.0455	331.1	0.0200	0.4	11.576	28.7	28.6
5	00:00:22	635.9485	0.0505	610.8	0.0250	0.5	11.588	53.0	52.7
6	00:00:27	949.1804	0.0555	924.1	0.0300	0.7	11.601	80.2	79.7
7	00:00:31	1226.328	0.0605	1,201.2	0.0350	0.8	11.614	104.2	103.4
8	00:00:35	1456.064	0.0655	1,431.0	0.0400	0.9	11.627	124.2	123.1
9	00:00:39	1619.358	0.0705	1,594.3	0.0450	1.0	11.639	138.3	137.0
10	00:00:43	1722.11	0.0755	1,697.0	0.0500	1.1	11.652	147.2	145.6
11	00:00:47	1802.738	0.0805	1,777.6	0.0550	1.2	11.665	154.2	152.4
12	00:00:51	1863.539	0.0855	1,838.4	0.0600	1.3	11.678	159.5	157.4
13	00:00:55	1895.714	0.0905	1,870.6	0.0650	1.4	11.691	162.3	160.0
14	00:00:58	1896.233	0.0955	1,871.1	0.0700	1.5	11.704	162.4	159.9
15	00:01:02	1853.849	0.1006	1,828.7	0.0750	1.6	11.717	158.7	156.1
16	00:01:05	1799.047	0.1055	1,773.9	0.0800	1.7	11.730	153.9	151.2
17	00:01:09	1755.174	0.1105	1,730.1	0.0850	1.9	11.743	150.1	147.3
18	00:01:12	1715.153	0.1156	1,690.0	0.0900	2.0	11.756	146.6	143.8
19	00:01:15	1674.201	0.1205	1,649.1	0.0950	2.1	11.769	143.1	140.1
20	00:01:19	1627.388	0.1255	1,602.3	0.1000	2.2	11.782	139.0	136.0
21	00:01:22	1571.271	0.1305	1,546.2	0.1050	2.3	11.796	134.2	131.1
22	00:01:25	1520.954	0.1356	1,495.8	0.1100	2.4	11.809	129.8	126.7
23	00:01:28	1472.146	0.1405	1,447.0	0.1150	2.5	11.822	125.6	122.4
24	00:01:31	1427.156	0.1456	1,402.1	0.1200	2.6	11.835	121.7	118.5
25	00:01:34	1381.899	0.1506	1,356.8	0.1250	2.7	11.849	117.7	114.5
26	00:01:37	1338.051	0.1555	1,312.9	0.1300	2.8	11.862	113.9	110.7
27	00:01:40	1300.549	0.1605	1,275.4	0.1350	3.0	11.875	110.7	107.4
28	00:01:43	1259.901	0.1655	1,234.8	0.1400	3.1	11.889	107.1	103.9
29	00:01:46	1222.588	0.1705	1,197.5	0.1450	3.2	11.902	103.9	100.6
30	00:01:48	1186.825	0.1755	1,161.7	0.1500	3.3	11.916	100.8	97.5
31	00:01:51	1141.284	0.1805	1,116.2	0.1550	3.4	11.929	96.8	93.6
32	00:01:54	1092.569	0.1855	1,067.5	0.1600	3.5	11.943	92.6	89.4
33	00:01:57	1042.995	0.1905	1,017.9	0.1650	3.6	11.956	88.3	85.1

Project Name: Tres Laurels Subdivision Project Number: FGS-P-20032

Test Date: 10/27/2022 Technician: Miguel Gonzalez Jr Checked By: _____ Date: _____

Unconfined Compression Test - Specimen 2

D2166 LIMS Specimen Code: [TO COME FROM LIMS]

Index	Elapsed Time (hh:mm:ss)	Load (Lbf)	Displacement (in)	Corrected Load (Lbf)	Corrected Displacement (in)	Axial Strain (%)	Cross Sectional Area (in²)	Stress (psi)	Compressive Stress (psi)
34	00:02:00	996.7518	0.1956	971.6	0.1700	3.7	11.970	84.3	81.2
35	00:02:03	951.9281	0.2005	926.8	0.1750	3.8	11.983	80.4	77.3
36	00:02:06	912.002	0.2055	886.9	0.1800	3.9	11.997	77.0	73.9
37	00:02:09	873.2222	0.2105	848.1	0.1850	4.0	12.010	73.6	70.6
38	00:02:12	833.2047	0.2155	808.1	0.1900	4.2	12.024	70.1	67.2
39	00:02:15	792.8915	0.2206	767.8	0.1950	4.3	12.038	66.6	63.8
40	00:02:18	747.554	0.2255	722.4	0.2000	4.4	12.052	62.7	59.9
41	00:02:21	698.7327	0.2306	673.6	0.2050	4.5	12.065	58.4	55.8
42	00:02:23	672.4899	0.2333	647.4	0.2078	4.5	12.073	56.2	53.6

Unconfined Compression Test - Specimen 3

D2166 LIMS Specimen Code: [TO COME FROM LIMS]

Index	Elapsed Time (hh:mm:ss)	Load (Lbf)	Displacement (in)	Corrected Load (Lbf)	Corrected Displacement (in)	Axial Strain (%)	Cross Sectional Area (in²)	Stress (psi)	Compressive Stress (psi)
0	00:00:00	25.0041	0.0126	0.0	0.0000	0.0	0.000	0.0	0.0
1	00:00:03	41.11297	0.0176	16.1	0.0050	0.1	11.538	1.4	1.4
2	00:00:06	59.85956	0.0226	34.9	0.0100	0.2	11.550	3.0	3.0
3	00:00:10	81.53962	0.0276	56.5	0.0150	0.3	11.563	4.9	4.9
4	00:00:13	105.4375	0.0326	80.4	0.0200	0.4	11.576	7.0	6.9
5	00:00:17	134.5644	0.0376	109.6	0.0250	0.5	11.588	9.5	9.5
6	00:00:20	180.1198	0.0426	155.1	0.0300	0.7	11.601	13.5	13.4
7	00:00:25	274.6305	0.0476	249.6	0.0350	0.8	11.614	21.7	21.5
8	00:00:30	434.0338	0.0526	409.0	0.0400	0.9	11.627	35.5	35.2
9	00:00:35	706.5276	0.0576	681.5	0.0450	1.0	11.639	59.1	58.6
10	00:00:40	1014.202	0.0626	989.2	0.0500	1.1	11.652	85.8	84.9
11	00:00:44	1295.406	0.0676	1,270.4	0.0550	1.2	11.665	110.2	108.9
12	00:00:48	1535.376	0.0726	1,510.4	0.0600	1.3	11.678	131.1	129.3
13	00:00:52	1733.77	0.0776	1,708.8	0.0650	1.4	11.691	148.3	146.2
14	00:00:56	1869.054	0.0826	1,844.1	0.0700	1.5	11.704	160.0	157.6
15	00:01:00	1943.121	0.0876	1,918.1	0.0750	1.6	11.717	166.4	163.7
16	00:01:03	1936.54	0.0926	1,911.5	0.0800	1.7	11.730	165.9	163.0
17	00:01:06	1894.707	0.0976	1,869.7	0.0850	1.9	11.743	162.2	159.2
18	00:01:09	1822.571	0.1026	1,797.6	0.0900	2.0	11.756	156.0	152.9
19	00:01:12	1755.602	0.1076	1,730.6	0.0950	2.1	11.769	150.2	147.0
20	00:01:15	1697.741	0.1126	1,672.7	0.1000	2.2	11.782	145.1	142.0
21	00:01:18	1646.116	0.1176	1,621.1	0.1050	2.3	11.796	140.7	137.4
22	00:01:22	1608.535	0.1226	1,583.5	0.1100	2.4	11.809	137.4	134.1
23	00:01:25	1582.829	0.1276	1,557.8	0.1150	2.5	11.822	135.2	131.8
24	00:01:28	1560.355	0.1326	1,535.4	0.1200	2.6	11.835	133.2	129.7
25	00:01:32	1529.134	0.1376	1,504.1	0.1250	2.7	11.849	130.5	126.9
26	00:01:35	1488.317	0.1426	1,463.3	0.1300	2.8	11.862	127.0	123.4
27	00:01:38	1445.673	0.1476	1,420.7	0.1350	3.0	11.875	123.3	119.6
28	00:01:41	1395.171	0.1526	1,370.2	0.1400	3.1	11.889	118.9	115.2
29	00:01:45	1333.89	0.1576	1,308.9	0.1450	3.2	11.902	113.6	110.0
30	00:01:48	1267.339	0.1626	1,242.3	0.1500	3.3	11.916	107.8	104.3
31	00:01:51	1205.803	0.1676	1,180.8	0.1550	3.4	11.929	102.5	99.0
32	00:01:54	1147.806	0.1726	1,122.8	0.1600	3.5	11.943	97.4	94.0
33	00:01:58	1089.872	0.1776	1,064.9	0.1650	3.6	11.956	92.4	89.1

Project Name: Tres Laurels Subdivision Project Number: FGS-P-20032

Test Date: 10/27/2022 Technician: Miguel Gonzalez Jr Checked By: _____ Date: _____

Unconfined Compression Test - Specimen 3

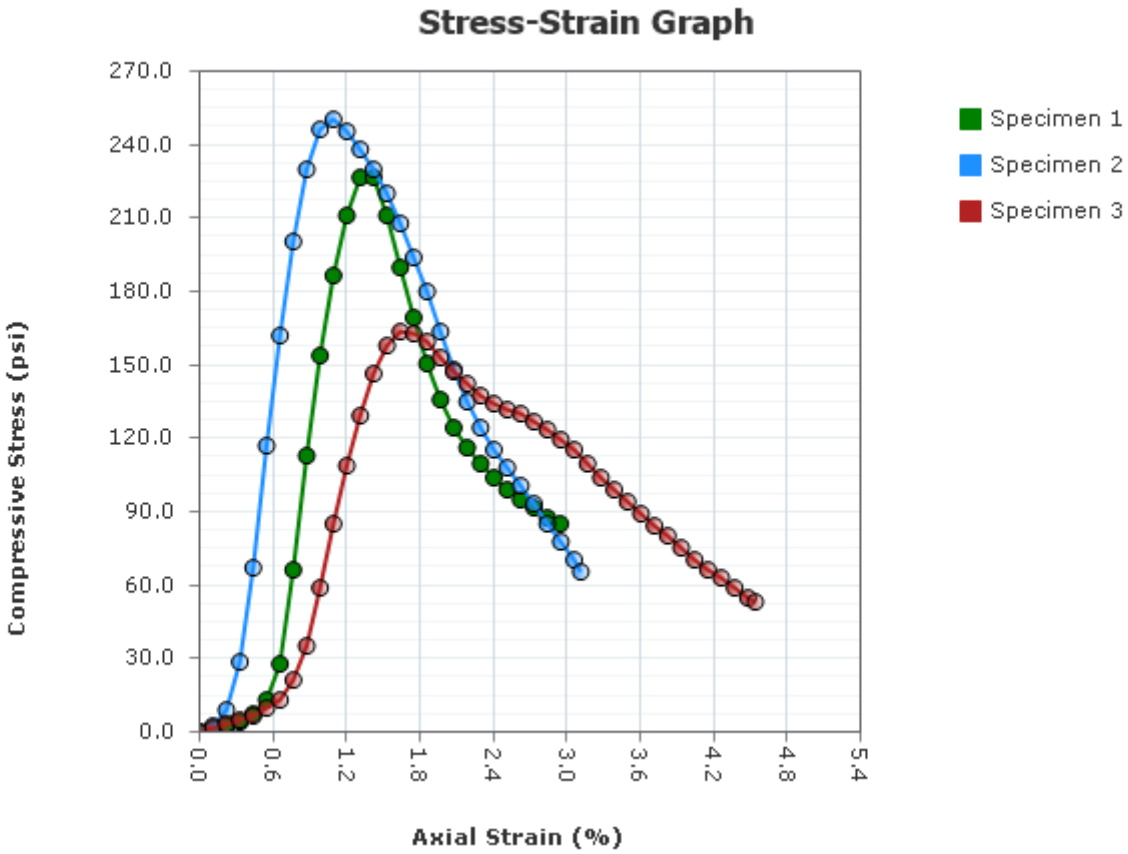
D2166 LIMS Specimen Code: [TO COME FROM LIMS]

Index	Elapsed Time (hh:mm:ss)	Load (Lbf)	Displacement (in)	Corrected Load (Lbf)	Corrected Displacement (in)	Axial Strain (%)	Cross Sectional Area (in²)	Stress (psi)	Compressive Stress (psi)
34	00:02:01	1035.248	0.1826	1,010.2	0.1700	3.7	11.970	87.7	84.4
35	00:02:04	981.2324	0.1876	956.2	0.1750	3.8	11.983	83.0	79.8
36	00:02:07	927.1176	0.1926	902.1	0.1800	3.9	11.997	78.3	75.2
37	00:02:10	874.8759	0.1976	849.9	0.1850	4.0	12.011	73.7	70.8
38	00:02:13	825.4622	0.2026	800.5	0.1900	4.2	12.024	69.5	66.6
39	00:02:16	779.8153	0.2076	754.8	0.1950	4.3	12.038	65.5	62.7
40	00:02:19	734.9026	0.2126	709.9	0.2000	4.4	12.052	61.6	58.9
41	00:02:22	689.224	0.2176	664.2	0.2050	4.5	12.065	57.6	55.1
42	00:02:24	666.4597	0.2203	641.5	0.2077	4.5	12.073	55.7	53.1

6 % LIME CURVE

Unconfined Compression Test

D2166



Project:	Tres Laurels Subdivision
Project Number:	FGS-P-20032
Received Date:	10/19/2022
Sampling Date:	10/27/2022
Sample Number:	1
Sample Depth:	
Boring Number:	
Location:	Tres Laurels Subdivision/Montgomery Rd
Client Name:	Mosiac Land Development
Remarks:	6% Lime

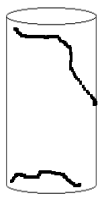
Unconfined Compression Test

D2166

	Specimen Number							
Before Test	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Moisture Content (%):	0.0	0.0	0.0					
Wet Density (pcf)	0.0	0.0	0.0					
Dry Density (pcf)	0.0	0.0	0.0					
Saturation (%):	0.0	0.0	0.0					
Void Ratio:	0.000	0.000	0.000					
Height (in)	4.5763	4.5763	4.5763					
Diameter (in)	3.8307	3.8307	3.8307					
Strain Limit @ 15% (in)	0.7	0.7	0.7					
Height To Diameter Ratio:	1.19	1.19	1.19					
Test Data	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Failure Angle (°):	0	0	0					
Strain Rate (in/min)	0.09	0.09	0.09					
Strain Rate (%/min):	1.97	1.97	1.97					
Unconfined Compressive Strength (psi)	226.7	250.0	163.7					
Undrained Shear Strength (psi)	113.3	125.0	81.9					
Strain at Failure (%):	1.4	1.1	1.6					

Specific Gravity:	2.72	Plastic Limit:	26	Liquid Limit:	77
Type:	Grab	Soil Classification:	CH		

Project:	Tres Laurels Subdivision
Project Number:	FGS-P-20032
Sampling Date:	10/27/2022
Sample Number:	1
Sample Depth:	
Boring Number:	
Location:	Tres Laurels Subdivision/Montgomery Rd
Client Name:	Mosiac Land Development
Remarks:	6% Lime

Specimen 1 Failure Sketch	Specimen 2 Failure Sketch	Specimen 3 Failure Sketch	Specimen 4 Failure Sketch	Specimen 5 Failure Sketch	Specimen 6 Failure Sketch	Specimen 7 Failure Sketch	Specimen 8 Failure Sketch
							

Unconfined Compression Test

D2166

LIMS Code: [TO COME FROM LIMS]

Specimen 1

Other Associated Tests:

Sampling Method:	Reconstituted	Material Moisture:	Trimmings	Source Moisture:	Before Shear
Molding Date:	10/19/2022	Test Date:	10/27/2022		
Large Particle:	NO	Sensitivity:	0		
Technician:	Miguel Gonzalez Jr	Test Time:	10/27/2022		
Specimen Description:	Dark Brown Clay				
Test Remarks:	6% Lime				

Specimen 2

Other Associated Tests:

Sampling Method:	Reconstituted	Material Moisture:	Trimmings	Source Moisture:	Before Shear
Molding Date:	10/19/2022	Test Date:	10/27/2022		
Large Particle:	NO	Sensitivity:	0		
Technician:	Miguel Gonzalez Jr	Test Time:	10/27/2022		
Specimen Description:	Dark Brown Clay				
Test Remarks:	6% Lime				

Specimen 3

Other Associated Tests:

Sampling Method:	Reconstituted	Material Moisture:	Trimmings	Source Moisture:	Before Shear
Molding Date:	10/19/2022	Test Date:	10/27/2022		
Large Particle:	NO	Sensitivity:	0		
Technician:	Miguel Gonzalez Jr	Test Time:	10/27/2022		
Specimen Description:	Dark Brown Clay				
Test Remarks:	6% Lime				

Unconfined Compression Test - Specimen 1

D2166

LIMS Specimen Code: [TO COME FROM LIMS]

Index	Elapsed Time (hh:mm:ss)	Load (Lbf)	Displacement (in)	Corrected Load (Lbf)	Corrected Displacement (in)	Axial Strain (%)	Cross Sectional Area (in²)	Stress (psi)	Compressive Stress (psi)
0	00:00:00	25.0256	0.0277	0.0	0.0000	0.0	0.000	0.0	0.0
1	00:00:03	38.54319	0.0327	13.5	0.0050	0.1	11.538	1.2	1.2
2	00:00:06	49.84052	0.0377	24.8	0.0100	0.2	11.550	2.2	2.1
3	00:00:10	73.82883	0.0427	48.8	0.0150	0.3	11.563	4.2	4.2
4	00:00:14	109.9171	0.0477	84.9	0.0200	0.4	11.576	7.4	7.3
5	00:00:18	177.8697	0.0527	152.8	0.0250	0.5	11.588	13.3	13.2
6	00:00:23	349.3822	0.0577	324.4	0.0300	0.7	11.601	28.1	28.0
7	00:00:30	798.8948	0.0627	773.9	0.0350	0.8	11.614	67.1	66.6
8	00:00:37	1338.997	0.0677	1,314.0	0.0400	0.9	11.627	114.0	113.0
9	00:00:42	1818.424	0.0727	1,793.4	0.0450	1.0	11.639	155.6	154.1
10	00:00:47	2201.366	0.0777	2,176.3	0.0500	1.1	11.652	188.8	186.8
11	00:00:52	2491.631	0.0827	2,466.6	0.0550	1.2	11.665	214.0	211.5
12	00:00:56	2670.252	0.0877	2,645.2	0.0600	1.3	11.678	229.5	226.5
13	00:01:00	2675.345	0.0927	2,650.3	0.0650	1.4	11.691	230.0	226.7
14	00:01:03	2492.896	0.0977	2,467.9	0.0700	1.5	11.704	214.1	210.9
15	00:01:06	2250.788	0.1027	2,225.8	0.0750	1.6	11.717	193.1	190.0
16	00:01:09	2008.693	0.1077	1,983.7	0.0800	1.7	11.730	172.1	169.1
17	00:01:12	1788.843	0.1127	1,763.8	0.0850	1.9	11.743	153.0	150.2
18	00:01:15	1621.852	0.1177	1,596.8	0.0900	2.0	11.756	138.6	135.8
19	00:01:18	1492.684	0.1227	1,467.7	0.0950	2.1	11.769	127.3	124.7
20	00:01:21	1395.436	0.1277	1,370.4	0.1000	2.2	11.782	118.9	116.3
21	00:01:24	1316.705	0.1327	1,291.7	0.1050	2.3	11.796	112.1	109.5
22	00:01:27	1250.3	0.1377	1,225.3	0.1100	2.4	11.809	106.3	103.8
23	00:01:30	1196.217	0.1427	1,171.2	0.1150	2.5	11.822	101.6	99.1
24	00:01:33	1152.586	0.1477	1,127.6	0.1200	2.6	11.835	97.8	95.3
25	00:01:36	1110.133	0.1527	1,085.1	0.1250	2.7	11.849	94.2	91.6
26	00:01:40	1067.046	0.1577	1,042.0	0.1300	2.8	11.862	90.4	87.8
27	00:01:42	1030.889	0.1625	1,005.9	0.1348	2.9	11.875	87.3	84.7

Unconfined Compression Test - Specimen 2

D2166

LIMS Specimen Code: [TO COME FROM LIMS]

Index	Elapsed Time (hh:mm:ss)	Load (Lbf)	Displacement (in)	Corrected Load (Lbf)	Corrected Displacement (in)	Axial Strain (%)	Cross Sectional Area (in²)	Stress (psi)	Compressive Stress (psi)
0	00:00:00	25.03685	0.0283	0.0	0.0000	0.0	0.000	0.0	0.0
1	00:00:03	54.54061	0.0333	29.5	0.0050	0.1	11.538	2.6	2.6
2	00:00:07	132.4267	0.0383	107.4	0.0100	0.2	11.550	9.3	9.3
3	00:00:13	357.5061	0.0433	332.5	0.0150	0.3	11.563	28.8	28.8
4	00:00:19	797.4752	0.0483	772.4	0.0200	0.4	11.576	67.0	66.7
5	00:00:25	1381.984	0.0533	1,356.9	0.0250	0.5	11.588	117.7	117.1
6	00:00:30	1899.881	0.0583	1,874.8	0.0300	0.7	11.601	162.7	161.6
7	00:00:35	2348.93	0.0633	2,323.9	0.0350	0.8	11.614	201.6	200.1
8	00:00:39	2694.961	0.0683	2,669.9	0.0400	0.9	11.627	231.7	229.6
9	00:00:44	2893.245	0.0733	2,868.2	0.0450	1.0	11.639	248.9	246.4
10	00:00:47	2938.298	0.0783	2,913.3	0.0500	1.1	11.652	252.8	250.0
11	00:00:51	2890.936	0.0833	2,865.9	0.0550	1.2	11.665	248.7	245.7
12	00:00:54	2808.938	0.0883	2,783.9	0.0600	1.3	11.678	241.6	238.4
13	00:00:57	2713.959	0.0933	2,688.9	0.0650	1.4	11.691	233.3	230.0
14	00:01:01	2596.605	0.0983	2,571.6	0.0700	1.5	11.704	223.1	219.7
15	00:01:04	2457.561	0.1033	2,432.5	0.0750	1.6	11.717	211.1	207.6
16	00:01:07	2302.312	0.1083	2,277.3	0.0800	1.7	11.730	197.6	194.1
17	00:01:10	2138.877	0.1133	2,113.8	0.0850	1.9	11.743	183.4	180.0
18	00:01:14	1952.672	0.1183	1,927.6	0.0900	2.0	11.756	167.3	164.0
19	00:01:17	1771.303	0.1233	1,746.3	0.0950	2.1	11.769	151.5	148.4
20	00:01:19	1619.142	0.1283	1,594.1	0.1000	2.2	11.782	138.3	135.3
21	00:01:22	1491.734	0.1333	1,466.7	0.1050	2.3	11.796	127.3	124.3
22	00:01:26	1389.346	0.1383	1,364.3	0.1100	2.4	11.809	118.4	115.5
23	00:01:28	1304.44	0.1433	1,279.4	0.1150	2.5	11.822	111.0	108.2
24	00:01:31	1217.885	0.1483	1,192.8	0.1200	2.6	11.835	103.5	100.8
25	00:01:33	1130.508	0.1533	1,105.5	0.1250	2.7	11.849	95.9	93.3
26	00:01:36	1035.937	0.1583	1,010.9	0.1300	2.8	11.862	87.7	85.2
27	00:01:39	949.9493	0.1633	924.9	0.1350	3.0	11.875	80.3	77.9
28	00:01:42	861.962	0.1683	836.9	0.1400	3.1	11.889	72.6	70.4
29	00:01:43	806.0429	0.1707	781.0	0.1425	3.1	11.895	67.8	65.7

Unconfined Compression Test - Specimen 3

D2166 LIMS Specimen Code: [TO COME FROM LIMS]

Index	Elapsed Time (hh:mm:ss)	Load (Lbf)	Displacement (in)	Corrected Load (Lbf)	Corrected Displacement (in)	Axial Strain (%)	Cross Sectional Area (in²)	Stress (psi)	Compressive Stress (psi)
0	00:00:00	25.0041	0.0126	0.0	0.0000	0.0	0.000	0.0	0.0
1	00:00:03	41.11297	0.0176	16.1	0.0050	0.1	11.538	1.4	1.4
2	00:00:06	59.85956	0.0226	34.9	0.0100	0.2	11.550	3.0	3.0
3	00:00:10	81.53962	0.0276	56.5	0.0150	0.3	11.563	4.9	4.9
4	00:00:13	105.4375	0.0326	80.4	0.0200	0.4	11.576	7.0	6.9
5	00:00:17	134.5644	0.0376	109.6	0.0250	0.5	11.588	9.5	9.5
6	00:00:20	180.1198	0.0426	155.1	0.0300	0.7	11.601	13.5	13.4
7	00:00:25	274.6305	0.0476	249.6	0.0350	0.8	11.614	21.7	21.5
8	00:00:30	434.0338	0.0526	409.0	0.0400	0.9	11.627	35.5	35.2
9	00:00:35	706.5276	0.0576	681.5	0.0450	1.0	11.639	59.1	58.6
10	00:00:40	1014.202	0.0626	989.2	0.0500	1.1	11.652	85.8	84.9
11	00:00:44	1295.406	0.0676	1,270.4	0.0550	1.2	11.665	110.2	108.9
12	00:00:48	1535.376	0.0726	1,510.4	0.0600	1.3	11.678	131.1	129.3
13	00:00:52	1733.77	0.0776	1,708.8	0.0650	1.4	11.691	148.3	146.2
14	00:00:56	1869.054	0.0826	1,844.1	0.0700	1.5	11.704	160.0	157.6
15	00:01:00	1943.121	0.0876	1,918.1	0.0750	1.6	11.717	166.4	163.7
16	00:01:03	1936.54	0.0926	1,911.5	0.0800	1.7	11.730	165.9	163.0
17	00:01:06	1894.707	0.0976	1,869.7	0.0850	1.9	11.743	162.2	159.2
18	00:01:09	1822.571	0.1026	1,797.6	0.0900	2.0	11.756	156.0	152.9
19	00:01:12	1755.602	0.1076	1,730.6	0.0950	2.1	11.769	150.2	147.0
20	00:01:15	1697.741	0.1126	1,672.7	0.1000	2.2	11.782	145.1	142.0
21	00:01:18	1646.116	0.1176	1,621.1	0.1050	2.3	11.796	140.7	137.4
22	00:01:22	1608.535	0.1226	1,583.5	0.1100	2.4	11.809	137.4	134.1
23	00:01:25	1582.829	0.1276	1,557.8	0.1150	2.5	11.822	135.2	131.8
24	00:01:28	1560.355	0.1326	1,535.4	0.1200	2.6	11.835	133.2	129.7
25	00:01:32	1529.134	0.1376	1,504.1	0.1250	2.7	11.849	130.5	126.9
26	00:01:35	1488.317	0.1426	1,463.3	0.1300	2.8	11.862	127.0	123.4
27	00:01:38	1445.673	0.1476	1,420.7	0.1350	3.0	11.875	123.3	119.6
28	00:01:41	1395.171	0.1526	1,370.2	0.1400	3.1	11.889	118.9	115.2
29	00:01:45	1333.89	0.1576	1,308.9	0.1450	3.2	11.902	113.6	110.0
30	00:01:48	1267.339	0.1626	1,242.3	0.1500	3.3	11.916	107.8	104.3
31	00:01:51	1205.803	0.1676	1,180.8	0.1550	3.4	11.929	102.5	99.0
32	00:01:54	1147.806	0.1726	1,122.8	0.1600	3.5	11.943	97.4	94.0
33	00:01:58	1089.872	0.1776	1,064.9	0.1650	3.6	11.956	92.4	89.1

Project Name: Tres Laurels Subdivision Project Number: FGS-P-20032

Test Date: 10/27/2022 Technician: Miguel Gonzalez Jr Checked By: _____ Date: _____

Unconfined Compression Test - Specimen 3

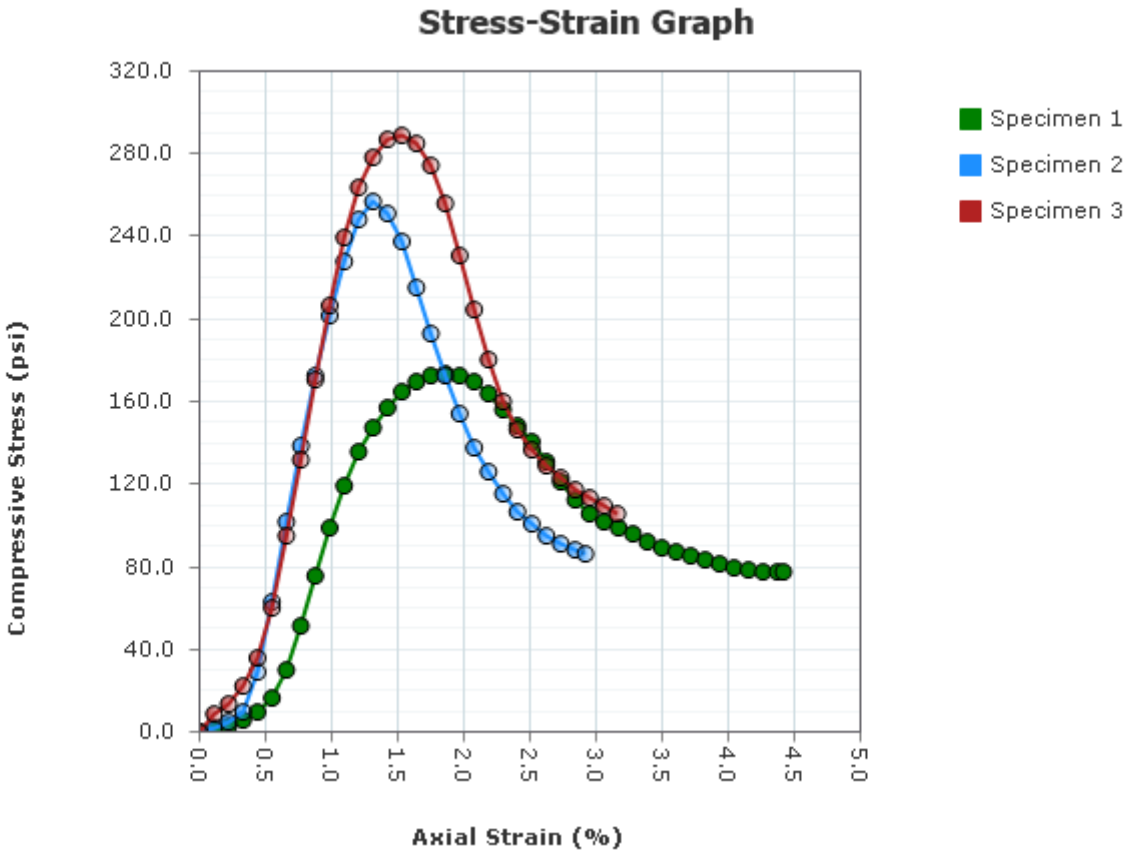
D2166 LIMS Specimen Code: [TO COME FROM LIMS]

Index	Elapsed Time (hh:mm:ss)	Load (Lbf)	Displacement (in)	Corrected Load (Lbf)	Corrected Displacement (in)	Axial Strain (%)	Cross Sectional Area (in²)	Stress (psi)	Compressive Stress (psi)
34	00:02:01	1035.248	0.1826	1,010.2	0.1700	3.7	11.970	87.7	84.4
35	00:02:04	981.2324	0.1876	956.2	0.1750	3.8	11.983	83.0	79.8
36	00:02:07	927.1176	0.1926	902.1	0.1800	3.9	11.997	78.3	75.2
37	00:02:10	874.8759	0.1976	849.9	0.1850	4.0	12.011	73.7	70.8
38	00:02:13	825.4622	0.2026	800.5	0.1900	4.2	12.024	69.5	66.6
39	00:02:16	779.8153	0.2076	754.8	0.1950	4.3	12.038	65.5	62.7
40	00:02:19	734.9026	0.2126	709.9	0.2000	4.4	12.052	61.6	58.9
41	00:02:22	689.224	0.2176	664.2	0.2050	4.5	12.065	57.6	55.1
42	00:02:24	666.4597	0.2203	641.5	0.2077	4.5	12.073	55.7	53.1

8 % LIME CURVE

Unconfined Compression Test

D2166



Project:	Tres Laurels Subdivision
Project Number:	FGS-G-20016
Received Date:	10/19/2022
Sampling Date:	10/27/2022
Sample Number:	1
Sample Depth:	
Boring Number:	
Location:	Tres Laurels Subdivision/Montgomery Rd
Client Name:	Mosiac Land Development
Remarks:	8% Lime

Unconfined Compression Test

D2166

	Specimen Number							
Before Test	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Moisture Content (%):	0.0	0.0	0.0					
Wet Density (pcf)	0.0	0.0	0.0					
Dry Density (pcf)	0.0	0.0	0.0					
Saturation (%):	0.0	0.0	0.0					
Void Ratio:	0.000	0.000	0.000					
Height (in)	4.5763	4.5763	4.5763					
Diameter (in)	3.8307	3.8307	3.8307					
Strain Limit @ 15% (in)	0.7	0.7	0.7					
Height To Diameter Ratio:	1.19	1.19	1.19					
Test Data	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Failure Angle (°):	0	0	0					
Strain Rate (in/min)	0.09	0.09	0.09					
Strain Rate (%/min):	1.97	1.97	1.97					
Unconfined Compressive Strength (psi)	173.3	257.0	288.6					
Undrained Shear Strength (psi)	86.6	128.5	144.3					
Strain at Failure (%):	1.9	1.3	1.5					

Specific Gravity:	2.72	Plastic Limit:	26	Liquid Limit:	77
Type:	Grab	Soil Classification:	CH		

Project:	Tres Laurels Subdivision
Project Number:	FGS-G-20016
Sampling Date:	10/27/2022
Sample Number:	1
Sample Depth:	
Boring Number:	
Location:	Tres Laurels Subdivision/Montgomery Rd
Client Name:	Mosiac Land Development
Remarks:	8% Lime

Specimen 1 Failure Sketch

Specimen 2 Failure Sketch

Specimen 3 Failure Sketch

Specimen 4 Failure Sketch

Specimen 5 Failure Sketch

Specimen 6 Failure Sketch

Specimen 7 Failure Sketch

Specimen 8 Failure Sketch

Unconfined Compression Test

D2166

LIMS Code: [TO COME FROM LIMS]

Specimen 1

Other Associated Tests:

Sampling Method:	Reconstituted	Material Moisture:	Trimmings	Source Moisture:	Before Shear
Molding Date:	10/19/2022	Test Date:	10/27/2022		
Large Particle:	NO	Sensitivity:	0		
Technician:	Miguel Gonzalez Jr	Test Time:	10/27/2022		
Specimen Description:	Dark Brown Clay				
Test Remarks:	8% Lime				

Specimen 2

Other Associated Tests:

Sampling Method:	Reconstituted	Material Moisture:	Trimmings	Source Moisture:	Before Shear
Molding Date:	10/19/2022	Test Date:	10/27/2022		
Large Particle:	NO	Sensitivity:	0		
Technician:	Miguel Gonzalez Jr	Test Time:	10/27/2022		
Specimen Description:	Dark Brown Clay				
Test Remarks:	8% Lime				

Specimen 3

Other Associated Tests:

Sampling Method:	Reconstituted	Material Moisture:	Trimmings	Source Moisture:	Before Shear
Molding Date:	10/19/2022	Test Date:	10/27/2022		
Large Particle:	NO	Sensitivity:	0		
Technician:	Miguel Gonzalez Jr	Test Time:	10/27/2022		
Specimen Description:	Dark Brown Clay				
Test Remarks:	8% Lime				

Unconfined Compression Test - Specimen 1

D2166 LIMS Specimen Code: [TO COME FROM LIMS]

Index	Elapsed Time (hh:mm:ss)	Load (Lbf)	Displacement (in)	Corrected Load (Lbf)	Corrected Displacement (in)	Axial Strain (%)	Cross Sectional Area (in²)	Stress (psi)	Compressive Stress (psi)
0	00:00:00	25.06422	0.0300	0.0	0.0000	0.0	0.000	0.0	0.0
1	00:00:03	40.56255	0.0350	15.5	0.0050	0.1	11.538	1.3	1.3
2	00:00:07	62.46257	0.0401	37.4	0.0100	0.2	11.550	3.2	3.2
3	00:00:10	93.99889	0.0451	68.9	0.0150	0.3	11.563	6.0	6.0
4	00:00:14	137.9583	0.0500	112.9	0.0200	0.4	11.576	9.8	9.8
5	00:00:18	221.6634	0.0551	196.6	0.0250	0.5	11.588	17.1	17.0
6	00:00:22	370.5036	0.0600	345.4	0.0300	0.7	11.601	30.0	29.8
7	00:00:27	620.1104	0.0650	595.0	0.0350	0.8	11.614	51.6	51.2
8	00:00:32	905.4693	0.0700	880.4	0.0400	0.9	11.627	76.4	75.7
9	00:00:36	1173.885	0.0750	1,148.8	0.0450	1.0	11.639	99.7	98.7
10	00:00:41	1409.586	0.0801	1,384.5	0.0500	1.1	11.652	120.1	118.8
11	00:00:45	1605.634	0.0850	1,580.6	0.0550	1.2	11.665	137.1	135.5
12	00:00:49	1745.402	0.0900	1,720.3	0.0600	1.3	11.678	149.3	147.3
13	00:00:52	1857.92	0.0950	1,832.9	0.0650	1.4	11.691	159.0	156.8
14	00:00:56	1950.82	0.1001	1,925.8	0.0700	1.5	11.704	167.1	164.5
15	00:01:00	2017.291	0.1051	1,992.2	0.0750	1.6	11.717	172.9	170.0
16	00:01:04	2044.463	0.1100	2,019.4	0.0800	1.7	11.730	175.2	172.2
17	00:01:07	2059.873	0.1150	2,034.8	0.0850	1.9	11.743	176.6	173.3
18	00:01:11	2055.117	0.1200	2,030.1	0.0900	2.0	11.756	176.1	172.7
19	00:01:14	2022.57	0.1250	1,997.5	0.0950	2.1	11.769	173.3	169.7
20	00:01:18	1955.55	0.1300	1,930.5	0.1000	2.2	11.782	167.5	163.8
21	00:01:20	1866.974	0.1350	1,841.9	0.1050	2.3	11.796	159.8	156.2
22	00:01:23	1771.952	0.1401	1,746.9	0.1100	2.4	11.809	151.6	147.9
23	00:01:26	1685.856	0.1450	1,660.8	0.1150	2.5	11.822	144.1	140.5
24	00:01:29	1571.022	0.1501	1,546.0	0.1200	2.6	11.835	134.1	130.6
25	00:01:32	1463.488	0.1550	1,438.4	0.1250	2.7	11.849	124.8	121.4
26	00:01:35	1358.138	0.1601	1,333.1	0.1300	2.8	11.862	115.7	112.4
27	00:01:38	1283.64	0.1650	1,258.6	0.1350	3.0	11.875	109.2	106.0
28	00:01:41	1238.14	0.1700	1,213.1	0.1400	3.1	11.889	105.3	102.0
29	00:01:45	1199.202	0.1751	1,174.1	0.1450	3.2	11.902	101.9	98.6
30	00:01:48	1164.608	0.1800	1,139.5	0.1500	3.3	11.916	98.9	95.6
31	00:01:51	1128.162	0.1850	1,103.1	0.1550	3.4	11.929	95.7	92.5
32	00:01:54	1092.618	0.1900	1,067.6	0.1600	3.5	11.943	92.6	89.4
33	00:01:57	1064.78	0.1950	1,039.7	0.1650	3.6	11.956	90.2	87.0

Project Name: Tres Laurels Subdivision Project Number: FGS-G-20016

Test Date: 10/27/2022 Technician: Miguel Gonzalez Jr Checked By: _____ Date: _____

Unconfined Compression Test - Specimen 1

D2166 LIMS Specimen Code: [TO COME FROM LIMS]

Index	Elapsed Time (hh:mm:ss)	Load (Lbf)	Displacement (in)	Corrected Load (Lbf)	Corrected Displacement (in)	Axial Strain (%)	Cross Sectional Area (in²)	Stress (psi)	Compressive Stress (psi)
34	00:02:00	1044.067	0.2000	1,019.0	0.1700	3.7	11.970	88.4	85.1
35	00:02:03	1023.407	0.2051	998.3	0.1750	3.8	11.983	86.6	83.3
36	00:02:06	998.4113	0.2100	973.3	0.1800	3.9	11.997	84.5	81.1
37	00:02:09	981.36	0.2151	956.3	0.1850	4.0	12.011	83.0	79.6
38	00:02:13	968.5033	0.2200	943.4	0.1900	4.2	12.024	81.9	78.5
39	00:02:16	964.3214	0.2250	939.3	0.1950	4.3	12.038	81.5	78.0
40	00:02:19	961.6132	0.2300	936.5	0.2000	4.4	12.052	81.3	77.7
41	00:02:21	958.1871	0.2321	933.1	0.2021	4.4	12.057	81.0	77.4

Unconfined Compression Test - Specimen 2

D2166

LIMS Specimen Code: [TO COME FROM LIMS]

Index	Elapsed Time (hh:mm:ss)	Load (Lbf)	Displacement (in)	Corrected Load (Lbf)	Corrected Displacement (in)	Axial Strain (%)	Cross Sectional Area (in²)	Stress (psi)	Compressive Stress (psi)
0	00:00:00	25.01387	0.0244	0.0	0.0000	0.0	0.000	0.0	0.0
1	00:00:03	48.64533	0.0294	23.6	0.0050	0.1	11.538	2.1	2.0
2	00:00:07	80.04527	0.0344	55.0	0.0100	0.2	11.550	4.8	4.8
3	00:00:10	137.6391	0.0394	112.6	0.0150	0.3	11.563	9.8	9.7
4	00:00:17	361.8757	0.0444	336.9	0.0200	0.4	11.576	29.2	29.1
5	00:00:23	760.5417	0.0494	735.5	0.0250	0.5	11.588	63.8	63.5
6	00:00:28	1209.663	0.0544	1,184.7	0.0300	0.7	11.601	102.8	102.1
7	00:00:34	1640.936	0.0594	1,615.9	0.0350	0.8	11.614	140.2	139.1
8	00:00:39	2034.487	0.0644	2,009.5	0.0400	0.9	11.627	174.4	172.8
9	00:00:43	2378.043	0.0694	2,353.0	0.0450	1.0	11.639	204.2	202.2
10	00:00:48	2678.458	0.0744	2,653.4	0.0500	1.1	11.652	230.2	227.7
11	00:00:52	2920.91	0.0794	2,895.9	0.0550	1.2	11.665	251.3	248.3
12	00:00:56	3026.497	0.0844	3,001.5	0.0600	1.3	11.678	260.4	257.0
13	00:01:00	2963.875	0.0894	2,938.9	0.0650	1.4	11.691	255.0	251.4
14	00:01:03	2801.422	0.0944	2,776.4	0.0700	1.5	11.704	240.9	237.2
15	00:01:06	2552.681	0.0994	2,527.7	0.0750	1.6	11.717	219.3	215.7
16	00:01:10	2293.859	0.1044	2,268.8	0.0800	1.7	11.730	196.9	193.4
17	00:01:13	2055.416	0.1094	2,030.4	0.0850	1.9	11.743	176.2	172.9
18	00:01:16	1836.606	0.1144	1,811.6	0.0900	2.0	11.756	157.2	154.1
19	00:01:18	1649.137	0.1194	1,624.1	0.0950	2.1	11.769	140.9	138.0
20	00:01:21	1506.727	0.1244	1,481.7	0.1000	2.2	11.782	128.6	125.8
21	00:01:24	1384.857	0.1294	1,359.8	0.1050	2.3	11.796	118.0	115.3
22	00:01:27	1285.574	0.1344	1,260.6	0.1100	2.4	11.809	109.4	106.7
23	00:01:30	1212.324	0.1394	1,187.3	0.1150	2.5	11.822	103.0	100.4
24	00:01:33	1147.753	0.1444	1,122.7	0.1200	2.6	11.835	97.4	94.9
25	00:01:36	1103.827	0.1494	1,078.8	0.1250	2.7	11.849	93.6	91.0
26	00:01:39	1069.495	0.1544	1,044.5	0.1300	2.8	11.862	90.6	88.1
27	00:01:41	1051.124	0.1579	1,026.1	0.1335	2.9	11.871	89.0	86.4

Unconfined Compression Test - Specimen 3

D2166

LIMS Specimen Code: [TO COME FROM LIMS]

Index	Elapsed Time (hh:mm:ss)	Load (Lbf)	Displacement (in)	Corrected Load (Lbf)	Corrected Displacement (in)	Axial Strain (%)	Cross Sectional Area (in²)	Stress (psi)	Compressive Stress (psi)
0	00:00:00	61.06453	0.0002	0.0	0.0000	0.0	0.000	0.0	0.0
1	00:00:04	156.6717	0.0052	95.6	0.0050	0.1	11.538	8.3	8.3
2	00:00:07	221.0221	0.0102	160.0	0.0100	0.2	11.550	13.9	13.8
3	00:00:11	316.5413	0.0152	255.5	0.0150	0.3	11.563	22.2	22.1
4	00:00:15	476.12	0.0202	415.1	0.0200	0.4	11.576	36.0	35.9
5	00:00:20	763.0944	0.0252	702.0	0.0250	0.5	11.588	60.9	60.6
6	00:00:25	1160.553	0.0302	1,099.5	0.0300	0.7	11.601	95.4	94.8
7	00:00:30	1598.029	0.0352	1,537.0	0.0350	0.8	11.614	133.4	132.3
8	00:00:35	2049.299	0.0402	1,988.2	0.0400	0.9	11.627	172.5	171.0
9	00:00:40	2469.513	0.0452	2,408.4	0.0450	1.0	11.639	209.0	206.9
10	00:00:44	2847.203	0.0502	2,786.1	0.0500	1.1	11.652	241.7	239.1
11	00:00:49	3133.305	0.0552	3,072.2	0.0550	1.2	11.665	266.6	263.4
12	00:00:53	3314.68	0.0602	3,253.6	0.0600	1.3	11.678	282.3	278.6
13	00:00:56	3412.614	0.0652	3,351.6	0.0650	1.4	11.691	290.8	286.7
14	00:01:00	3439.125	0.0702	3,378.1	0.0700	1.5	11.704	293.1	288.6
15	00:01:03	3400.601	0.0752	3,339.5	0.0750	1.6	11.717	289.8	285.0
16	00:01:07	3276.53	0.0802	3,215.5	0.0800	1.7	11.730	279.0	274.1
17	00:01:10	3069.709	0.0852	3,008.6	0.0850	1.9	11.743	261.1	256.2
18	00:01:13	2772.362	0.0902	2,711.3	0.0900	2.0	11.756	235.3	230.6
19	00:01:16	2473.708	0.0952	2,412.6	0.0950	2.1	11.769	209.3	205.0
20	00:01:19	2182.839	0.1002	2,121.8	0.1000	2.2	11.782	184.1	180.1
21	00:01:21	1951.769	0.1052	1,890.7	0.1050	2.3	11.796	164.1	160.3
22	00:01:24	1792.906	0.1102	1,731.8	0.1100	2.4	11.809	150.3	146.7
23	00:01:27	1677.509	0.1152	1,616.4	0.1150	2.5	11.822	140.3	136.7
24	00:01:31	1591.911	0.1202	1,530.8	0.1200	2.6	11.835	132.8	129.3
25	00:01:34	1518.083	0.1252	1,457.0	0.1250	2.7	11.849	126.4	123.0
26	00:01:37	1455.403	0.1302	1,394.3	0.1300	2.8	11.862	121.0	117.5
27	00:01:40	1407.156	0.1352	1,346.1	0.1350	3.0	11.875	116.8	113.4
28	00:01:43	1362.136	0.1402	1,301.1	0.1400	3.1	11.889	112.9	109.4
29	00:01:46	1320.765	0.1448	1,259.7	0.1446	3.2	11.901	109.3	105.8

NO STABILIZATION PAVEMENT DESIGNS

FGS Project No.: FGS-G20116-A

Pavement Optimization
Design Analysis

Tensar

Design	LOCAL - A	**Reference**	
Project	TRES LAURELS, SUB'D.	**Location**	San Antonio, TX, USA
Customer		**Designer**	FLORENTINO CABALLERO, P. E.
Company	FROST GEOSCIENCES, Inc.	**Date**	October 19, 2022

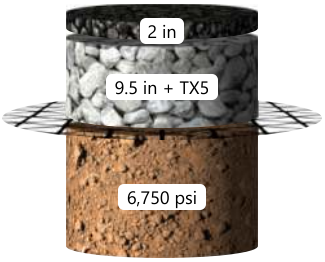
Results

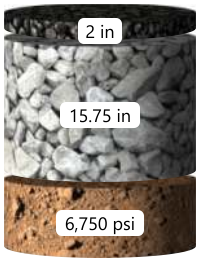
TriAx Stabilized Pavement Section

	Thickness	Coeff.	SN
HMA layer 1	2 in	0.440	0.880
Mechanically stabilized layer	9.5 in	0.232	2.204
Structural number (SN)			3.084
Calculated traffic (ESALs)			1,046,000

Unstabilized Pavement Section

	Thickness	Coeff.	SN
HMA layer 1	2 in	0.440	0.880
Aggregate base	15.75 in	0.140	2.205
Structural number (SN)			3.085
Calculated traffic (ESALs)			1,048,200





Parameters

Project Information

Subgrade resilient modulus	Target ESALs	Reliability	Standard deviation	Serviceability	
				Initial	Terminal
6,750 psi	1,000,000	70%	0.45	4.2	2

Pavement Optimization
Design Analysis

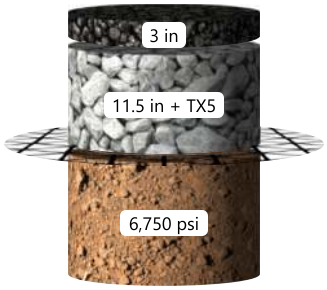
Tensar

Design	LOCAL - B	**Reference**	
Project	TRES LAURELS, SUB'D.	**Location**	San Antonio, TX, USA
Customer		**Designer**	FLORENTINO CABALLERO, P. E.
Company	FROST GEOSCIENCES, Inc.	**Date**	October 19, 2022

Results

TriAx Stabilized Pavement Section

	Thickness	Coeff.	SN
HMA layer 1	3 in	0.440	1.320
Mechanically stabilized layer	11.5 in	0.217	2.495
Structural number (SN)			3.815
Calculated traffic (ESALs)			2,005,100



Unstabilized Pavement Section

	Thickness	Coeff.	SN
HMA layer 1	3 in	0.440	1.320
Aggregate base	18 in	0.140	2.520
Structural number (SN)			3.840
Calculated traffic (ESALs)			2,095,600

Parameters

Project Information

Subgrade resilient modulus	Target ESALs	Reliability	Standard deviation	Serviceability	
				Initial	Terminal
6,750 psi	2,000,000	90%	0.45	4.2	2

Pavement Optimization
Design Analysis

Tensar

Design	ARTERIAL	**Reference**	
Project	TRES LAURELS, SUB'D.	**Location**	San Antonio, TX, USA
Customer		**Designer**	FLORENTINO CABALLERO, P. E.
Company	FROST GEOSCIENCES, Inc.	**Date**	October 19, 2022

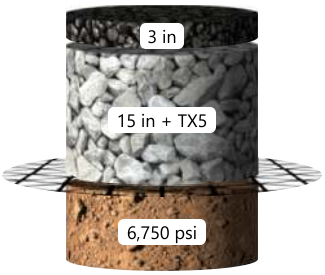
Results

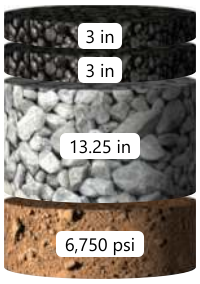
TriAx Stabilized Pavement Section

	Thickness	Coeff.	SN
HMA layer 1	3 in	0.440	1.320
Mechanically stabilized layer	15 in	0.199	2.985
Structural number (SN)			4.305
Calculated traffic (ESALs)			2,070,600

Unstabilized Pavement Section

	Thickness	Coeff.	SN
HMA layer 1	3 in	0.440	1.320
HMA layer 2	3 in	0.380	1.140
Aggregate base	13.25 in	0.140	1.855
Structural number (SN)			4.315
Calculated traffic (ESALs)			2,102,200





Parameters

Project Information

Subgrade resilient modulus	Target ESALs	Reliability	Standard deviation	Serviceability	
				Initial	Terminal
6,750 psi	2,000,000	95%	0.45	4.2	2.5

LIME STABILIZATION PAVEMENT DESIGN

FGS Project No.: FGS-G22127-A

Pavement Optimization
Design Analysis

Design	LOCAL - A, LIME STABILIZATION	**Reference**	
Project	TRES LAURELS, SUB'D.	**Location**	San Antonio, TX, USA
Customer		**Designer**	FLORENTINO CABALLERO, P. E.
Company	FROST GEOSCIENCES, Inc.	**Date**	November 2, 2022

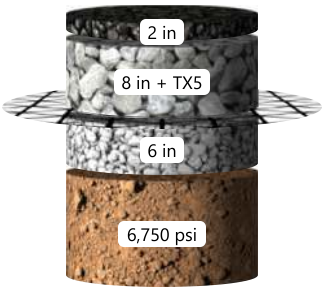
Results

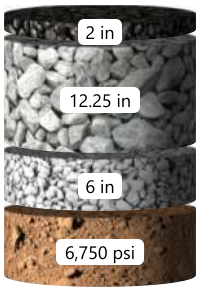
TriAx Stabilized Pavement Section

	Thickness	Coeff.	SN
HMA layer 1	2 in	0.440	0.880
Mechanically stabilized layer	8 in	0.238	1.904
Subbase	6 in	0.080	0.480
Structural number (SN)			3.264
Calculated traffic (ESALs)			1,524,600

Unstabilized Pavement Section

	Thickness	Coeff.	SN
HMA layer 1	2 in	0.440	0.880
Aggregate base	12.25 in	0.140	1.715
Subbase	6 in	0.080	0.480
Structural number (SN)			3.075
Calculated traffic (ESALs)			1,026,000





Parameters

Project Information

Subgrade resilient modulus	Target ESALs	Reliability	Standard deviation	Serviceability	
				Initial	Terminal
6,750 psi	1,000,000	70%	0.45	4.2	2

Pavement Optimization
Design Analysis

Design	LOCAL - B, LIME STABILIZATION	**Reference**	
Project	TRES LAURELS, SUB'D.	**Location**	San Antonio, TX, USA
Customer		**Designer**	FLORENTINO CABALLERO, P. E.
Company	FROST GEOSCIENCES, Inc.	**Date**	November 2, 2022

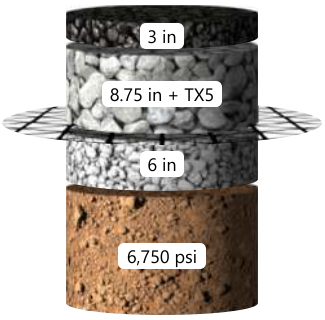
Results

TriAx Stabilized Pavement Section

	Thickness	Coeff.	SN
HMA layer 1	3 in	0.440	1.320
Mechanically stabilized layer	8.75 in	0.232	2.030
Subbase	6 in	0.080	0.480
Structural number (SN)			3.830
Calculated traffic (ESALs)			2,058,200

Unstabilized Pavement Section

	Thickness	Coeff.	SN
HMA layer 1	3 in	0.440	1.320
Aggregate base	14.5 in	0.140	2.030
Subbase	6 in	0.080	0.480
Structural number (SN)			3.830
Calculated traffic (ESALs)			2,058,200



Parameters

Project Information

Subgrade resilient modulus	Target ESALs	Reliability	Standard deviation	Serviceability	
				Initial	Terminal
6,750 psi	2,000,000	90%	0.45	4.2	2

Pavement Optimization
Design Analysis

Design	ATERIAL, LIME STABILIZATION	**Reference**	
Project	TRES LAURELS, SUB'D.	**Location**	San Antonio, TX, USA
Customer		**Designer**	FLORENTINO CABALLERO, P. E.
Company	FROST GEOSCIENCES, Inc.	**Date**	November 2, 2022

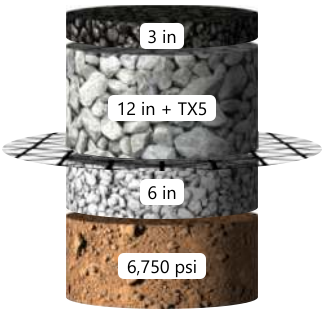
Results

TriAx Stabilized Pavement Section

	Thickness	Coeff.	SN
HMA layer 1	3 in	0.440	1.320
Mechanically stabilized layer	12 in	0.209	2.508
Subbase	6 in	0.080	0.480
Structural number (SN)			4.308
Calculated traffic (ESALs)			2,080,000

Unstabilized Pavement Section

	Thickness	Coeff.	SN
HMA layer 1	3 in	0.440	1.320
HMA layer 2	3 in	0.330	0.990
Aggregate base	10.75 in	0.140	1.505
Subbase	6 in	0.080	0.480
Structural number (SN)			4.295
Calculated traffic (ESALs)			2,039,400



Parameters

Project Information

Subgrade resilient modulus	Target ESALs	Reliability	Standard deviation	Serviceability	
				Initial	Terminal
6,750 psi	2,000,000	95%	0.45	4.2	2.5

GEOTECHNICAL ENGINEERING STUDY

TRES LAURELS SUBDIVISION
WEST MONTGOMERY ROAD EXTENSION
SAN ANTONIO, TEXAS
PAVEMENT DESIGN

FROST GEOSCIENCES, INC. PROJECT NO.: FGS-G 20016
JULY 23, 2020

Prepared Exclusively for:

Mr. Allen Hoover
Mosiac Land Development
6812 West Avenue, Suite 100
San Antonio, Texas 78213

Frost GeoSciences
Construction Materials ▪ Forensics
Environmental ▪ Geotechnical

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Frost GeoSciences

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TBPE Firm Registration # F-9227
TBPG Firm Registration # 50040

July 23, 2020

Mr. Allen Hoover
Mosiac Land Development
6812 West Avenue, Suite # 100
San Antonio, Texas 78213

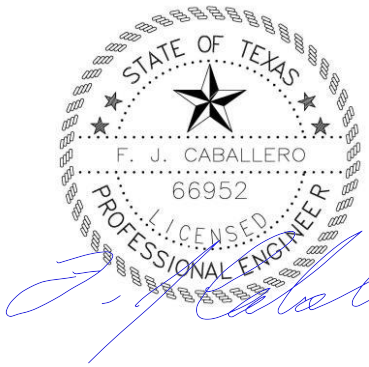
SUBJECT:
Geotechnical Engineering Services
Tres Laurels Subdivision
San Antonio, Texas
FGS Project No: FGS-G20016

Dear Mr. Hoover;

Frost GeoSciences, Inc. (FGS) is a geotechnical engineering company registered with the Texas Board of Professional Engineers, with registration No. F-9227, and is pleased to submit the results of our Geotechnical Engineering Study for the above referenced project. This report includes the results of field and laboratory testing along with recommendations for use in preparation of the appropriate design and construction documents for this project.

FGS appreciates this opportunity to be of service to you in this phase of your project. If you have any questions pertaining to this report, or if we may be of further service, please contact our office.

Respectfully submitted,
Frost GeoSciences, Inc.



F. J. Caballero, P.E.
Project Engineer

JOT – FGS-G20016

Copies Submitted:
i. One (1) Electronic: Mr. Allen Hoover, Mosiac Land Development, San Antonio, Texas
ii. One (1) File

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PROJECT INFORMATION

Project Authorization:

Frost GeoSciences, Inc. (FGS) has completed a geotechnical engineering study for new pavements to be constructed in **Tres Laurels Subdivision, (along West Montgomery Road Extension)** in San Antonio, Texas. This project was authorized by Mr. Allen Hoover of Mosiac Land Development, through acceptance of Frost GeoSciences **Proposal No.: FGS-P-G20032 dated June 5, 2020.** Our scope of services for this project is as outlined in that proposal.

Project Description:

We understand that **The Tres Laurels Subdivision** involves the design and construction of both
Type "A" and Type "B" residential streets and ARTERIAL streets. The design will be designed in general accordance with the Bexar County Flexible Pavement Design Criteria. A Vicinity Map showing the location of the project is included in the section of this report entitled Illustrations.

Purpose and Scope of Services:

The study is to evaluate the subsurface conditions at the project site and develop geotechnical engineering recommendations and guidelines for use in preparing the appropriate design and other related construction documents for this project. Therefore, our scope of services for this project include the following:

- Drill borings and excavate test pits at selected locations within the project limits to evaluate subsurface conditions and to observe the potential presence of subsurface water;
- Perform geotechnical engineering laboratory tests on selected samples recovered during our field activities to evaluate their physical and engineering properties;
- Perform Engineering analyses to develop the appropriate geotechnical engineering recommendations and guidelines, to include:
    - Appropriate pavement section thickness recommendations;
    - Pavement section material requirements and specifications;
    - General site and subgrade preparation within the construction limits; and

- General comments regarding construction methods, sequences and potential difficulties that may arise during overall construction as it relates to the geotechnical engineering aspects of this project.

- Prepare a written report that includes a boring location plan, boring log at each bore site, and results of the laboratory testing program, descriptions of the subsurface conditions encountered and our geotechnical engineering recommendations and guidelines developed for this project.

Our scope of services for this project did not include the assessment of any potential environmental concerns at this site. Therefore, such concerns are not addressed in this report.

SITE AND SUBSURFACE CONDITIONS

Site Description:

The site conditions were assessed using a combination of aerial photography and observations made by the FGS personnel during our field operations. The following site conditions were noted:

- The site is the **Tres Laurels Subdivision**, located along the West Montgomery Road Extension is San Antonio, Texas.

Site Geology:

According to the Bureau of Economic Geology, Geologic Atlas of Texas – San Antonio Sheet (1984), the Site is located on the following Geological Groups:

- **The Anacacho Limestone (Kac)** consists of limestone and marl. The limestone is light yellow to yellow brown and light gray. This limestone is thick bedded, fossiliferous, and cross bedded alternating with marl. The marl is light gray to yellow. Some volcanic rock fragments and rusty bentonite beds with sandy seams in some parts. Marine mega fossils are abundant. Overall thickness is up to 500 feet.

- **The Navarro Group and Marlbrook Marl ("upper Taylor marl") undivided (Kknm)** formation is made up of two parts. The upper part consists of marl, clay, sandstone, and siltstone. The marl and clay are typically glauconitic and contain concretions of limonite and siderite. The sandstone portion is fine-grained and the siltstone portion is yellow-brown, with concretions of hard bluish-gray siliceous limestone 2-10' in diameter. Sandstone beds have little lateral continuity, becoming more abundant in the western portions. This formation's thickness can be up to 580'. The lower part consists of clay. It is usually montmorillonitic, unctuous, greenish-gray to brownish-gray in color. It typically weathers to a very thick, black, clayey soil that can reach a thickness of +/- 400 feet. Total thickness for this portion reaches +/- 980'.

- **The Quaternary Alluvium (Qal)** is floodplain and channel deposits. Most of the sediment is sand, silt, clay and gravel. This includes lowest terrace deposits near floodplain level and locally bedrock in stream channels. Thickness is about 30 feet, moderately brown, very fine grained, well sorted, in part argillaceous, locally burrowed, cross-bedded, and range from a few inches to 10 feet thick. Lignite is brownish black and occurs near the middle with seams 1 to 20 feet thick. Overall thickness of the Wilcox Group ranges from 440 to 1200 feet.

Soil Description:

According to the United States Department of Agricultural (USDA) Natural Resources Conservation Service (NRCS) Soil Survey of Bexar County (1966), the Site is located on the following soils:

- **The Brackett clay loam, 1-5% slopes (BpC)** consists of very shallow and shallow, light colored soils that developed over soft limestone interbedded with hard limestone. These soils occur as moderately sloping to steep, convex, cone shaped hills. They are mainly in the western and northwestern parts of the county but occur in a few places in the northeastern part. The surface layer is grayish brown gravelly clay loam and is about 6" thick. This layer has weak, granular structure and is friable when moist. It is very strongly calcareous and consists of limestone fragments that range from about a quarter of an inch to as much as 6 inches in diameter. The subsurface layer is light brownish gray silty clay and is about 9" thick. The structure is weak to moderate, fine, and granular. This layer is hard when dry but friable when moist. The underlying material is white chalk that can be penetrated by roots. The Brackett Soils are well drained. Internal drainage is medium or slow. Erosion is active in most areas, even where there is a natural cover of vegetation.

- **The Brackett-Austin Complex, 1-5% slopes (BsC):** consists of very shallow and shallow, light colored soils that developed over soft limestone interbedded with hard limestone. These soils occur as moderately sloping to steep, convex, cone shaped hills. They are mainly in the northern and northwestern parts of the county. The alternate layers of hard and soft limestone give the slopes a "stair step" appearance. The surface layer is grayish brown gravelly clay loam and is about 4 inches thick. This layer has weak, granular structure and is friable when moist. It is very strongly calcareous. About 20 percent of this layer consists of limestone fragments that range from about a quarter of an inch to as much as 6 inches in diameter. The subsurface layer is light brownish gray clay loam to silty clay and is about 8 inches thick. The structure is weak to moderate, fine, granular. This layer is hard when dry but friable when moist. The underlying material is a thick bed of soft limestone that is interbedded with hard limestone and contains lenses of chalky marl or calcareous clay. The Brackett-Austin Complex is well drained. Internal drainage is medium or slow. Erosion is active in most areas, even where there is a natural cover of vegetation. Natural fertility is low to moderate.

- **The Lewisville silty clay, 1-3% slopes (LvB)** consists of moderately deep, dark colored, nearly level alluvial soils. These soils occur mainly on terraces bordering the San Antonio and Medina Rivers and their main tributaries. The surface layer is dark grayish

brown and is about 20" thick. It has fine sub angular blocky or blocky structure, and is firm and crumbly when moist. This layer contains a few fine concretions of lime carbonate. The subsurface layer is limey brown clay and is about 17" thick. It has fine, sub angular blocky or blocky structure and is very firm but crumbly when moist. Lewisville soils have slow or medium surface drainage and medium internal drainage. Permeability is slow to moderate. The capacity to hold water is good. Natural fertility is high. The hazard of water erosion is serious on the more sloping parts but is very slight on the nearly level areas.

- **The Trinity and Frio Soils, Frequently Flooded (Tf)** occur as narrow, long and irregularly shaped areas on the flood plains of small streams and the larger field drainage ways. They are mostly in the northern and central parts of the county. These soils are flooded at least once a year, generally after a heavy rain. Some areas are subject to a thin deposition of sediments, and others to scouring or shifting. Channels in these areas are poorly defined and of small capacity. The surface layer ranges from clay loam to gravelly clay in texture. The subsurface layer is clay, but in places it contains thin loamy strata. These soils are typically 3-5' deep.

- **The Tarrant Association, gently undulating (1-5% slopes) (TaB)** consists of stony soils that are very shallow, dark colored, and gently undulating to steep. The Tarrant Association occurs on the limestone prairies in the northern third of the county. The surface layer is very dark grayish brown, calcareous clay loam and is about 10" thick. It has moderate, fine, sub angular blocky structure. This layer is crumbly and friable when moist. Limestone fragments that range from a ¼" to 24" in diameter cover about 35 percent of the surface. The subsurface layer, about 8" thick, is hard fractured limestone. The cracks and spaces are filled with dark grayish brown clay loam. The bedrock is hard limestone. Tarrant soils have rapid surface drainage and good internal drainage. Water erosion is a hazard. The capacity to hold water is low. Natural fertility is high.

- **The Tarrant Association, rolling 5-15% slopes (TaC)** consists of stony soils that are very shallow, dark colored, and gently undulating to steep. The Tarrant Association occurs on the limestone prairies in the northern third of the county. The surface layer is very dark grayish brown, calcareous clay loam and is about 10" thick. It has moderate, fine, sub angular blocky structure. This layer is crumbly and friable when moist. Limestone fragments that range from a quarter of an inch to 24" in diameter cover about 35 percent of the surface. The subsurface layer, about 8" thick, is hard fractured limestone. The cracks and spaces are filled with dark grayish brown clay loam. The bedrock is hard limestone. Tarrant soils have rapid surface drainage and good internal drainage. The capacity to hold water is low. Natural fertility is high. Water erosion is a hazard.

- **The Houston Black gravelly clay, 3-5% slopes (HuC)** consists of clayey soils that are deep, dark gray to black and calcareous with some gravel. The surface layer is black and about 36" thick. Gravel ordinarily makes up 10-18% of this layer by volume. On a few minor ridge tops, gravel may compose of 60% of the soil. The subsurface layer is about 12" thick. Water intake is slow and erosion due to water is a hazard. The formation of plow pans is common.

- **The Hilly Gravelly Land (HgD)** consists of bed of caliche or of gravelly, very strongly calcareous, loamy alluvium that is approximately 10-20' or more in thickness. The upper 3-12" of the caliche layer is generally hard and scaly. There are a few nearly level areas approximately 100' wide, and on these has formed a 4-8" thick mantle of limy, dark grayish brown loam or clay loam. On the slopes, there is very little soil; it is estimated that only approximately 15% of this land is actually soil. In some places, there is a 2-3' bed of weak conglomerate consisting of sediments cemented with calcium carbonate.

- **The Houston Black Clay, 1-3% slopes (HsB)** consists of clayey soils that are deep, dark gray to black and calcareous. The surface layer is very dark gray to black, mildly alkaline, and about 38 inches thick. This layer has weak, very fine, blocky structure in the uppermost 8 inches. Below that depth, it has moderate, fine, and very fine, blocky structure and is extremely firm but crumbly when moist. This layer cracks when dry and swells when wet. The subsurface layer is about 12 inches thick. It is gray or dark gray clay and has some grayish brown or olive brown streaks. It has moderate, medium blocky structure and is extremely firm when moist. Like the surface layer, this layer cracks when dry and swells when wet. The underlying material is very pale brown, calcareous clay or marl and has mottles of olive brown and gray. There are some shale fragments and gypsum crystals. The Houston Black Clay has slow to rapid surface drainage. Internal drainage is slow to none. Rainfall is very rapidly absorbed when the soil is dry and cracked, but practically all of it runs off after the water content of the soil has reached field capacity. Most areas lack a permanent water table. The capacity to hold water is good. Water erosion is a hazard.

- **Venus clay loam, 1 to 3 percent slopes (VcB).—**this soil occurs as gentle slopes, either between the terraces and the upland soils or between the terraces and the flood plains. It has a thinner surface layer, stronger slopes, and more rapid runoff than Venus clay loam, 0 to 1 percent slopes. Included in the areas mapped are small tracts of Patrick soils, 1 to 3 percent slopes, of Venus clay loam, 0 to 1 percent slopes, and of Lewisville silty clay, 1 to 3 percent slopes. The surface layer is about 14 inches thick. The subsurface layer, about 20 inches thick, is clay loam in texture but is less clayey than the surface layer. This is a fairly productive soil. Most of it is cultivated, and part of it is irrigated. Small grain, Sudan grass, grain sorghum, corn, and cotton are well suited, and track crops can be grown under irrigation. A crust readily forms on the surface. The hazard of sheet and gully erosion is moderate. Terracing, fertilization, contour tillage, and proper use of plant residues are needed to help control runoff and erosion, conserve moisture, and maintain tilth and fertility. (Capability unit IIe-3, dryland; IIe-3, irrigated; Clay Loam range site)

- **The Lewisville silty clay, 1-3% slopes (LvB)** consists of moderately deep, dark colored, nearly level alluvial soils. These soils occur mainly on terraces bordering the San Antonio and Medina Rivers and their main tributaries. The surface layer is dark grayish brown and is about 20" thick. It has fine sub angular blocky or blocky structure, and is firm and crumbly when moist. This layer contains a few fine concretions of lime carbonate. The subsurface layer is limey brown clay and is about 17" thick. It has fine, sub angular blocky or blocky structure and is very firm but crumbly when moist. Lewisville soils have slow or medium surface drainage and medium internal drainage. Permeability is slow to moderate. The capacity to hold water is good. Natural fertility is high. The hazard of water erosion is serious on the more sloping parts but is very slight on the nearly level areas.

- **The Houston clay, 3-5% slopes, eroded (HnC2)** consists of deep, moderately well drained clay soils. These soils have developed in calcareous marls, alluvial clays, and chalk, under a prairie of tall grasses. The surface layer is grayish brown clay about 25" thick. Some scattered pebbles are present; some as much as 3" thick. The next layer is dark gray clay that reaches to a depth of about 38 inches. The next lower layer, to a depth of about 80 inches, is grayish brown clay. The underlying material, to a depth of 104 inches is gray clay with mottles of olive and yellow. The hazard of erosion is moderate

Subsurface Conditions:

Subsurface conditions at the site were evaluated by drilling a total of **NINE** (9) soil borings to a depth of FIFTEEN (15) feet and Two (2) test pits to approximately two (2) feet depth were excavated to obtain soil samples to determine the California Bearing Ratio (CBR) of the soil samples. The number of borings and test pits, their locations and their depths were selected by FGS. The borings and test pits were located in the field by FGS personnel using Global Positioning System (GPS) technology. The borings were advanced using solid flight auger drilling methods and soil samples were routinely obtained during the drilling process; the test pits are routinely excavated to the appropriate depth. Drilling and sampling techniques were accomplished in general accordance with ASTM procedures. Logs of the borings are presented in the Appendix section at the end of the report. A Borehole Location Plan with the location of each boring is presented in the Illustrations section of this report.

The soil samples obtained during our field exploration were transported to our laboratory where they were reviewed by qualified geotechnical engineering personnel. Representative samples were selected and tested to determine pertinent engineering properties and characteristics for use in evaluating the project site. Laboratory testing and soil classification were accomplished in general accordance with ASTM procedures.

Based on the field and laboratory data, it is determined that the stratigraphy of the site is generally as follows:

Stratum	Range of Depth, ft.	Stratum Description and Classification
I	0.0 to 3.0	Fat Clay (CH), Dark Brown
II	3.0 to 15.0	Fat Clay (CH), Light Tan

The subsurface descriptions shown above are general in nature and highlight major subsurface stratification features and material types. The boring logs included in Appendix A should be reviewed for specific information such as soil or rock material descriptions, stratifications, sampling depths and intervals, field test data and laboratory test data. The stratifications shown on each boring log only represent the conditions and approximate boundaries between strata at that actual boring location. The actual transitions between strata may be gradual. Variations will occur and should be expected at locations away from each boring location. Subsurface water level observations made during field operations are also shown on the boring logs. The indicated stratum depths and any subsurface water levels are measured from the ground surface and are estimated to the nearest one-half (½) foot. Portions of any samples that are not altered or consumed by laboratory testing will be retained for 30 days from the date of issuance of this report. Unless otherwise requested by the client and/or depending upon project requirements, all soil samples will be discarded after that retention period.

The P.I. values obtained from the soil samples taken near the surface ranged from 36 to 51 in the CLAY subgrade soil. Due to the characteristics of the materials found in the area, FGS is of the opinion that the sulfate contents of the materials would pose a problem if not treated with lime. The P.I. value of the material near the surface is greater than 20 and could be reduced if lime is applied to the subgrade material or the native Clay material is replaced with a more suitable material.

Subsurface Water Information:

The borings were advanced using dry drilling techniques to their full depths in an attempt to detect the potential presence of subsurface water in the material. Subsurface water was not encountered either during or upon completion of drilling or sampling operations. The boreholes were backfilled with soil cuttings upon completion of drilling and sampling operations.

Short-term field observations generally do not provide accurate subsurface water levels for evaluation at most sites. Subsurface water levels are generally influenced by seasonal and climatic conditions that result in fluctuations of subsurface water levels over time. The earthwork contractor should check for subsurface water during excavation activities especially when sand and/or gravel are encountered. No specific notations concerning subsurface water are indicated on the boring logs in Appendix A since no subsurface water was observed.

Pavement Design:

Flexible pavements should be designed and constructed in accordance with the requirements established by local municipalities and the American Association of State Highway and Transportation Officials (AASHTO) "Guide for Design of Pavement Structures", for this project, the Bexar County Flexible Pavement Design Criteria was used.

Below is a table which outlines the Bexar County Flexible Pavement Design Criteria, which was used in the design of the proposed street sections for this project:

Input Parameters used in Asphalt Pavement Section Calculation

San Antonio Pavement Specifications								
	Primary and Secondary Arterials		Local Type "B" Streets		Local Type "A" Streets with **Bus Traffic**		Local Type "A" Streets with **NO Bus Traffic**	
W18	ESAL = 3,000,000		ESAL = 2,000,000		ESAL = 1,000,000		ESAL = 100,000	
R	95%		90%		70%		70%	
So	Flexible	Rigid	Flexible	Rigid	Flexible	Rigid	Flexible	Rigid
	0.45	0.35	0.45	0.35	0.45	0.35	0.45	0.35
Po	4.2	4.5	4.2	4.5	4.2	4.5	4.2	4.5
Pt	2.5	2.5	2.0	2.5	2.0	2.5	2.0	2.0
ΔPSI	1.7	2.0	2.2	2.0	2.2	2.0	2.2	2.5
T	20		20		20		20	
SN	Min.	Max	Min.	Max.	Min.	Max.	Min.	Max.
	3.80	5.76	2.92	5.05	2.58	4.20	2.02	3.18

In addition to the parameters shown above, the soil resilient modulus, M_R, of the subgrade soil, must be determined. Typically, this value is obtained through California Bearing Ratio (CBR) testing. Field investigations show that both soil samples obtained within the subgrade at the site are very similar with very similar (CBR) values. These soils are Dark Brown Fat Clay (CH) with CBR values ranging between 4.3 and 4.5. We will use the 4.5 CBR value to design our pavement sections.

Information regarding the moisture density relationships of the bulk samples of subgrade soil collected at this site and the CBR test results are presented in the Appendix section of this report.

The Pavement Sections for Clay soils with a CBR value of 4.5 are presented in the tables below.

It should be noted, the P.I. value of the Clay subgrade at this site varies between 36 and 51 where tested. The Clay soils may have areas with a P.I. value of 20 or less. While the Chalk soils will generally have a P.I. value of 20 or less. The subgrade soils with a P.I. value greater than 20 should be treated with lime to reduce their P.I. value or be replaced with better material approved by the Project Engineer. It will be important that once the field work starts, personnel from FGS be present to identify the areas where lime should be applied to reduce the P.I. value of the subgrade soil.

For the purposes of developing layer thicknesses for the pavement sections shown below, we have used the following structural coefficients in the calculation of pavement structural numbers:

Material Type	Structural Coefficient	Drainage Coefficient
TXDOT Item 340, Hot Mixed Asphaltic Concrete	0.44	1.00
TXDOT Items 292 or 340, Asphalt Treated Base	0.38	1.00
TXDOT Item 247, Flexible Base - Crushed Limestone	0.14	1.00
TXDOT Item 247, Flexible Base	0.08	1.00

Based on the design parameters and the structural coefficients discussed above, the minimum required Structural Number, SN, for the existing soil conditions may be determined using equation found in Appendix CC-1 of the Guide for Mechanistic-Empirical Design of New and Rehabilitated Pavement Structures prepared for the National Cooperative Highway Research Program

$$MR = 2555\ (CBR)^{0.64}$$

Where: MR = the DESIGN Resilient Modulus

$$MR = 2555\ (4.5)^{0.64}$$

MR = 6,690.32 psi

WE WILL USE MR=6,650 PSI FOR OUR PAVEMENT DESIGNS

In accordance with Bexar County design parameters we have developed the following flexible pavement recommendations for Local A Type Streets with bus Traffic on a Clay subgrade.

COMPONENT	FLEXIBLE DESIGN SECTION (inches)		
	Local Type "A" Streets with Bus Traffic		
	Option # 1	Option # 2	Option # 3
Type D HMAC Surface	2.0 inches	2.0 inches	2.0 inches
Type B HMAC Base	N/A	N/A	N/A
Flexible Base, (Type B, Grade 2), Pit Run	12.5 inches	12.5 inches	7.0 inches
Lime Treated Subgrade (6 inch Min.)	Yes	No	YES
3 X 5 Rock Wrapped in Mirafi 180N Filter Fabric	No	Yes	NO
TENSAR GEOGRID (TX-5)	No	No	Yes
Design ESAL Value	1,000,000	1,000,000	1,000,000
Actual ESAL Value	1,068,000	1,068,000	1,068,000

In accordance with Bexar County design parameters we have developed the following flexible pavement recommendations for Local "B" Type Streets on a Clay subgrade.

COMPONENT	FLEXIBLE DESIGN SECTION (inches)		
	Local Type "B" Streets		
	Option # 1	Option # 2	Option # 3
Type D HMAC Surface	3.0 inches	3.0 inches	3.0 inches
Type B HMAC Base	N/A	N/A	N/A
Flexible Base, (Type B, Grade 2), Pit Run	14.75 inches	14.75 inches	9.0 inches
Lime Treated Subgrade (6 inch Min.)	Yes	No	YES
3 X 5 Rock Wrapped in Mirafi 180N Filter Fabric	No	Yes	NO
TENSAR GEOGRID (TX-5)	No	No	Yes
Design ESAL Value	2,000,000	2,000,000	2,000,000
Actual ESAL Value	2,117,000	2,117,000	2,136,000

COMPONENT	FLEXIBLE DESIGN SECTION (inches)		
	Arterial Streets		
	Option # 1	Option # 2	Option # 3
Type D HMAC Surface	3.0 inches	3.75 inches	3.0 inches
Type B HMAC Base	3.0 inches	N/A	N/A
Flexible Base, (Type B, Grade 2), Pit Run	11.75 inches	17.50 inches	14.0 inches
Lime Treated Subgrade (6 inch Min.)	Yes	Yes	YES
3 X 5 Rock Wrapped in Mirafi 180N Filter Fabric	No	No	No[
TENSAR GEOGRID (TX-5)	No	No	Yes
Design ESAL Value	3,000,000	3,000,000	3,000,000
Actual ESAL Value	3,037,000	3,014,000	3,041,000

Note: Asterisk (*) If the P.I. value of the Clay Subgrade is 20 or less, than Moisture Conditioning may be substituted for Lime Treatment, see Pavement Analysis section for additional details.
Double Asterisk (**) the design was calculated using Tensar Spectra Pave4 PRO software.

Pavement Analysis:

The pavement designs presented in the previous paragraphs include designs for lime stabilized subgrade and lime treated subgrade, to be used on pavement sections with a Clay subgrade and a P.I. value greater than 20. The Bexar County pavement design criteria requires that a minimum of six (6) inches of subgrade soil below the pavement structure be treated or stabilized if the subgrade has a P.I. value greater than 20. If a Geogrid fabric is used to reduce the base course thickness, treatment or stabilization of the underlying high P.I. soil is still required, although The City of San Antonio will allow 3 X 5 Rock wrapped in a Filter Fiber.

In the case that subgrade fill is required to bring the subgrade elevation up to final grade, fills should be made with flexible base, on-site Chalk millings or other material approved by the Project Engineer. Fill material compaction shall be in accordance with subgrade compaction requirement for Bexar County.

Pavement Material Specifications:

The following guidelines have been prepared for use in the selection and preparation of various materials that may be used to construct the pavement sections. Submittals should be made for each pavement material and should be reviewed by the Geotechnical Engineer and other appropriate members of the

design team. The submittals should provide the test information necessary to verify full compliance of the materials with the recommended or specified material properties.

Fill Material - If fill is used to raise the grade, approved fill material underneath the pavement should be used. The fill should be free of deleterious material with a minimum CBR value of 4.5 and preferably a Plastic Index below 20. If the material has a PI greater than 20 the lime application rates should be re-evaluated and sulfate content tested for the fill material. The material should be placed as per applicable city or county guidelines.

Hot-Mix Asphaltic Surface Course – Asphaltic concrete should be plant mixed, hot laid, Type D meeting the 2014 TX DOT Standard Specification Item 340. Mix should be compacted to between 92 and 97 percent of the maximum theoretical density as determined by TEX-227-F.

Asphalt Treated Base – Asphalt treated base should be placed in **maximum six (6) inch compacted lifts**. These materials should conform to the requirements of the 2014 TX DOT Standard Specification Item 292, Grade 1 or Item 340, Type A or B.

Flexible Base Course – Flexible base materials should be placed in maximum eight (8) inch **compacted lifts.** The base materials should be compacted to at least 95 percent of the maximum dry density as determined by ASTM D 1557. Flexible base materials should be moisture conditioned to between plus or minus two (+-2) percentage points of the optimum moisture content. Flexible base materials should meet all requirements specified in 2014 TX DOT Standard Specification Item 247, Type A or B, Grade 1 or 2.

Lime Treated Subgrade – Clay subgrade (with P.I. values greater than 20) should be treated with hydrated lime to reduce its plasticity and improve its strength and load carrying ability. Hydrated lime should be mixed with the subgrade soils in accordance with Bexar County Specifications for Lime Treatment to reduce the P.I. value to 20 or less.

Lime Stabilized Subgrade – Clay subgrade (with P.I. values greater than 20) should be stabilized with hydrated lime to reduce its plasticity and improve its strength and load carrying ability. Hydrated lime should be mixed with the subgrade soils in accordance with Bexar County Specifications for Lime Stabilization. We estimate that approximately six (6) percent (by weight) hydrated lime will be required to properly stabilize these soils. This is equivalent to about 27 pounds of hydrated lime per square yard for a six (6) inch depth. The optimum lime content should result in a soil-lime mixture with

a pH of at least 12.4 when tested in accordance with ASTM C 977, Appendix XI and should reduce the P.I. to 20 or less.

3 X 5 Rock Wrapped in Filter Fabric – The City of Converse allows 3 X 5 rock wrapped in Filter Fabric instead of lime stabilization. However the **wrapping fabric must be Mirafi 180N Filter Fabric or equal.**

Geogrid – Tensar TX5 geogrid may be used to provide additional structural support to flexible base materials. The geogrid should be placed as per manufacturer's recommendations at the interface between the flexible base and subgrade.

Moisture Conditioned Subgrade – Exposed subgrade soils that do not need to be stabilized or treated should be scarified and moisture conditioned to between plus or minus three (+-3) percentage points of optimum to a depth of at least six (6) inches. The soils should then be compacted to at least 95 percent of the maximum dry density as determined by ASTM D 698.

Lime Series Curve and Unconfined Compressive Strength:

A Lime Series Curve was developed for the project to determine the optimum amount of hydrated lime required to stabilize the subgrade in accordance with Bexar County criteria. The optimum lime content should result in a soil-lime mixture with a pH of at least 12.4 when tested in accordance with ASTM C 977 and should reduce the Plasticity Index to 20 or less. The lime series curve depicts the percent lime added to the subgrade and the resulting pH/P.I. A strength verification test was performed on the lime stabilized subgrade to determine the Unconfined Compressive Strength (UCS) of the soil-lime mixture. **Bexar County requires an UCS of 160 psi, a pH of 12.4 or greater and a P.I. of 20 or less. Results of the**

Lime Series Curve and the Unconfined Compressive Strength test are presented in the Appendix section of this report. Additional field verification testing will be required during the subgrade stabilization process once the project has started.

Subgrade Preparation:

The pavement alignment should be stripped of topsoil, vegetation, roots, loose or soft soils and any other deleterious materials. The stripped materials should be removed from the site and properly disposed of or used elsewhere on site. Upon completion of stripping operations, the alignment may be either excavated or filled as necessary to achieve the desired pavement elevation. Prior to the placement of any fill for grade adjustments or the construction of the pavement section, the exposed subgrade should be proof rolled with appropriate construction equipment

weighing at least 20 tons. Unstable or non-uniform areas should be removed to expose stable soils and may be replaced with clean, properly compacted flexible base material or other more suitable material approved by the Project Engineer. All fill placed within the paved areas should be free of any deleterious materials and should not contain stones larger than the maximum lift thickness. The fill materials should be placed on prepared surfaces in lifts not to exceed eight (8) inches compacted measure. All fill materials placed in paved areas should be moisture conditioned to between plus or minus three (+-3) percentage points of the optimum moisture content and compacted to at least 95 percent of the maximum dry density as determined by ASTM D 698.

Drainage:

Proper pavement perimeter drainage should be provided and maintained to minimize the infiltration of surface water into the pavement section from surrounding unpaved areas. The infiltration of water into the pavement section typically results in the accelerated degradation of the section with time as vehicular traffic traverses the infiltrated area. Curbs used in paved areas should extend at least three (3) inches into the base materials to help reduce the potential for water infiltration into the pavement section. Prefabricated strip drains or small "French" drains may also be installed behind curbs to intercept and remove water from the pavement perimeter before water infiltrates the pavement section. Furthermore, all concrete and asphalt interfaces should be sealed using a sealant that is compatible with both asphalt and concrete.

Proper pavement drainage is a critical component in the long-term performance of a pavement section. The pavement section recommendations shown above are based on generally recognized structural coefficients. These coefficients reflect the relative strength of each pavement material type and their contribution to the structural integrity of the pavement. The infiltration of water into these pavement materials will generally weaken the materials and result in the degradation of the pavement's performance. Therefore, proper drainage of the pavement should be carefully considered by the project design team to ensure that water rapidly drains from the pavement and does not pond on or around the pavement.

Utilities:

Care should be exercised to make sure that utility lines do not serve as conduits that transmit water beneath foundations or pavements at this site. Secondary backfill for utility lines that are located beneath pavement, sidewalk and building areas should consist of lean clay (CL), flowable fill or other material in accordance with local municipality or utility provider specifications. Proper compaction of trench backfill is essential in pavement areas where settlement of the trench backfill can

cause significant distress to the overlaying pavement. Flowable fill materials should be as described in the American Concrete Institute ACI 229R. Granular materials such as sand or gravel are not recommended as secondary backfill in utility trenches located in building pad or pavement areas.

Excavations:

As was discussed previously, these materials that are penetrated by geotechnical augers can generally be excavated with conventional earthmoving equipment. It should be noted that excavation equipment varies and field conditions may vary. Generally, geologic processes (such as faulting, weathering, etc.) are erratic and large variations can occur in small lateral distances. Details regarding "means and methods" to accomplish the work (such as excavation equipment and technique selection) are the sole responsibility of the project contractor.

The Occupational Safety and Health Administration (OSHA) Safety and Health Standards (29 CFR Part 1926, Revised October 1989), require that excavations be constructed in accordance with the current OSHA guidelines. Furthermore, the State of Texas requires that detailed plans and specifications meeting OSHA standards be prepared for trench and excavation retention systems used during construction. The contractor is solely responsible for designing and constructing stable, temporary excavations and should shore, slope, or bench the sides of the excavations as required to maintain stability of both the excavation sides and bottom. The contractor's "responsible person", as defined in 29 CFR Part 1926, should evaluate the soil exposed in the excavation as part of the contractor's safety procedures.

In no case should slope height, slope inclination or excavation depth exceed those specified in local, state and Federal safety regulations. OSHA addresses the construction of slopes in large excavations that are less than 20 feet deep on OSHA Table B-1. We have provided this information solely as a service to our client. The OSHA regulations and OSHA Table B-1 should be consulted prior to any excavations that would be subject to OSHA regulations. FGS does not assume responsibility for construction site safety or the contractor's or other parties' compliance with local, state and Federal safety or other regulations.

QUALITY CONTROL

Document Review:

Due to the uniqueness of each project and construction site, it is important that all engineering reports, drawings, specifications, change orders and other related documents accurately reflect the recommendations intended by the respective

design professionals involved in the project. The performance of the pavements planned for this project will depend on the correct interpretation and implementation of our geotechnical engineering report and guidelines. We should be provided the opportunity to review the final design and construction documents to check that our geotechnical recommendations are properly interpreted and implemented in these documents. This review is not a part of our scope of services for this project and would be an additional service. We cannot be responsible for misinterpretation of our geotechnical recommendations if we have not had an opportunity to review these documents.

Construction Materials Testing:

As the Geotechnical Engineer of Record, we recommend that Frost GeoSciences be retained to monitor the pavement installation and earthwork related activities for this project. Due to our familiarity with this project, it is important that FGS provide these services to make certain that our geotechnical recommendations are interpreted properly and to make certain that actual field conditions are those described in our geotechnical report. We believe this technical overview and on-site surveillance during these activities is essential to provide well-constructed pavements and to check that the intent of these geotechnical recommendations is met.

REPORT LIMITATIONS

The recommendations and guidelines submitted in this report are based on the available subsurface information developed by FGS and project information provided by the client. If there are any changes in the nature, design or location of the project, the opinions, conclusions, recommendations and guidelines submitted in this report should not be used until we are able to review the changes and respond in writing as to whether the information contained within this report remains applicable.

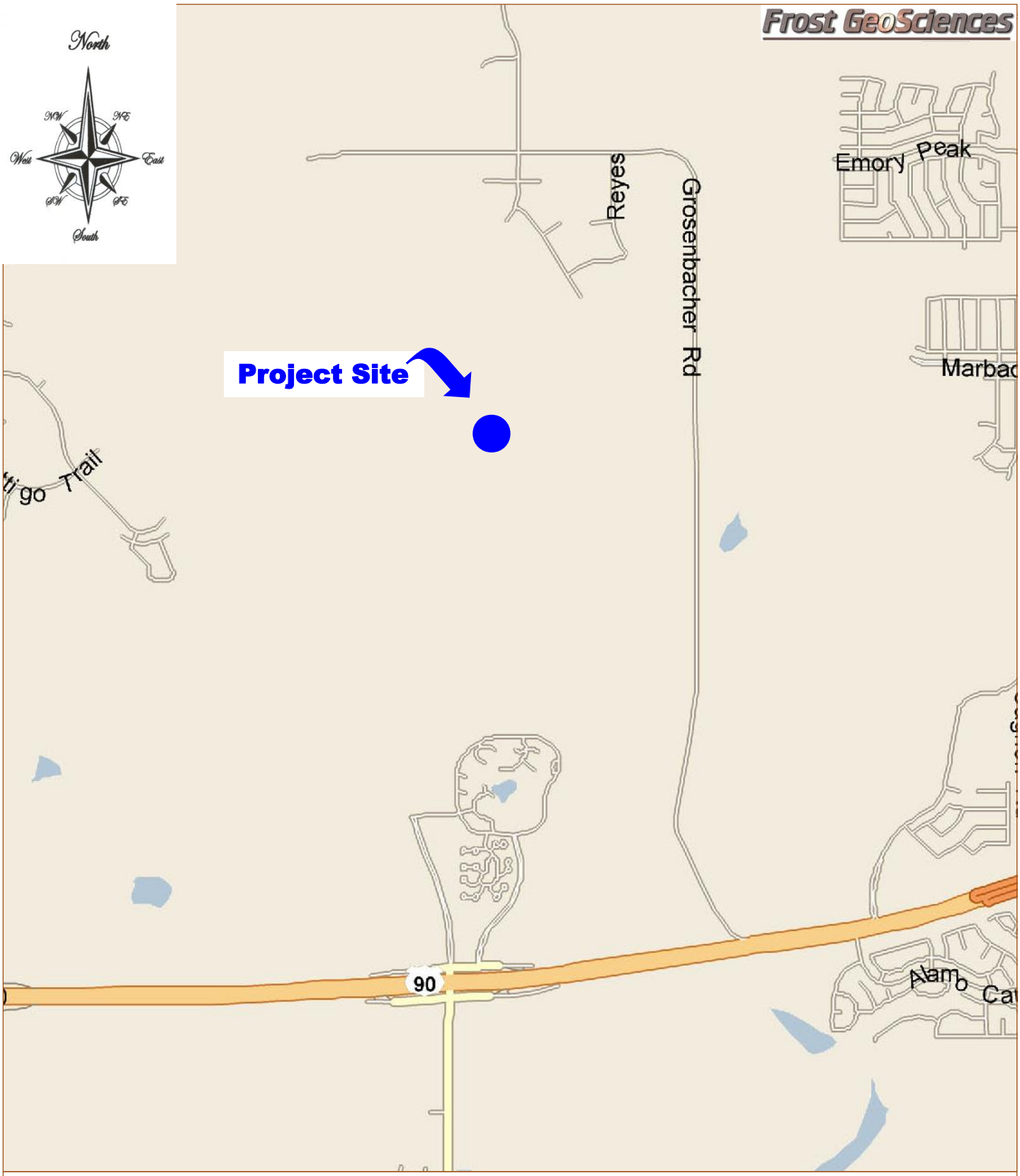
Subsurface conditions at this site have been observed and interpreted at the boring locations only. Substantial variations in subsurface materials resulting from local geologic conditions or previous site use may occur away from the boring locations. These variations may not become evident until construction begins. Therefore, any conditions that vary significantly from those described in our report should be reported to FGS immediately. FGS will then determine whether our conclusions, opinions and recommendations remain valid or whether additional investigation and/or engineering analysis is required.

This study has been performed in accordance with accepted geotechnical engineering practice using the standard of care and skill currently exercised by geotechnical engineers practicing in this area. No warranty, expressed or implied, is made or intended. This report has been prepared exclusively for the specified client; project and client's authorized project team for use in preparing the appropriate design and construction documents for this project. This report may be included in the construction documents for this project provided the report is reproduced in its entirety. This report shall not be reproduced or used for any other purpose without the express written consent of Frost GeoSciences, Inc.

ILLUSTRATIONS

Vicinity Map
Boring Location Plan

VICINITY MAP



PROJECT NAME:	Vicinity Map Microsoft Streets and Trips (2013)	
Geotech Engineering Study TRES LAURELS SUBDIVISION San Antonio, Texas	PROJECT NO.: FGS-G-20016	DATE CREATED: July 22, 2013

BORING PLAN

Frost GeoSciences

PROJECT NAME:

Geotechnical Engineering Study
TRES LAURELS SUBDIVISION
San Antonio, Texas

Boring Location Plan
(Google Earth)

PROJECT NO.: FGS-G-20016

DATE: June 10, 2024

APPENDIX A

Boring Logs
Boring PVR Values
Symbol Key Sheet

BORING LOGS

LOG OF BORING

Frost GeoSciences
Geologic • Environmental
Geotechnical

PROJECT: Tres Laurels Subdivision
Montgomery Rd
San Antonio, Tx

PROJECT NO.: FGS-G20016
BORING NO.: B-01
DRILLING DATE:
SURFACE ELEVATION:

CLIENT: Mosiac Land Development

SOIL SYMBOL	DEPTH (FT)	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T: BLOWS R: % RQD: %	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (LL)	ATTERBERG LIMITS: PLASTIC LIMIT (PL)	ATTERBERG LIMITS: PLASTICITY INDEX (PI)	DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ FT)	FAILURE STRAIN (%)	CONFINING PRESSURE (POUNDS/SQ IN)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
				7	63	24	39						Dark Brown Clay
	5			8	56	19	37						Light Brown Clay at 2'
	10			8	75	28	47						Light Tan Clay at 7'
	15												Boring Terminated at 15 feet of Depth
	20												

DRILLING METHOD(S):
Dry auger drilling techniques were used to the termination depth of the boring.

SUBSURFACE WATER INFORMATION:
Subsurface water was not encountered either during or upon completion of drilling operations and subsurface water observations.

N - STANDARD PENETRATION TEST RESISTANCE
P - POCKET PENETROMETER RESISTANCE
T - TXDOT CONE PENETRATION RESISTANCE
R - ROCK CORE RECOVERY
RQD - ROCK QUALITY DESIGNATION

REMARKS:

FROST LOG FGS-G20016.GPJ FROST.GDT 7/8/20

This log is not valid if separated from the report.

LOG OF BORING

Frost GeoSciences
Geologic • Environmental
Geotechnical

PROJECT: Tres Laurels Subdivision
Montgomery Rd
San Antonio, Tx

CLIENT: Mosiac Land Development

PROJECT NO.: FGS-G20016
BORING NO.: B-02
DRILLING DATE:
SURFACE ELEVATION:

DRILLING METHOD(S):
Dry auger drilling techniques were used to the termination depth of the boring.

SUBSURFACE WATER INFORMATION:
Subsurface water was not encountered either during or upon completion of drilling operations and subsurface water observations.

FIELD DATA				LABORATORY DATA									
SOIL SYMBOL	DEPTH (FT)	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T: BLOWS R: % RQD: %	MOISTURE CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT LL	PLASTIC LIMIT PL	PLASTICITY INDEX PI	DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ FT)	FAILURE STRAIN (%)	CONFINING PRESSURE (POUNDS/SQ IN)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
													Light Brown Clay
				6	77	26	51						Light Tan Clay at 2'
	5												
				8	73	27	46						
	10												
	15												Boring Terminated at 15 feet of Depth
	20												

N - STANDARD PENETRATION TEST RESISTANCE
P - POCKET PENETROMETER RESISTANCE
T - TXDOT CONE PENETRATION RESISTANCE
R - ROCK CORE RECOVERY
RQD - ROCK QUALITY DESIGNATION

REMARKS:

FROST LOG FGS-G20016.GPJ FROST.GDT 7/8/20

LOG OF BORING

Frost GeoSciences
Geologic • Environmental
Geotechnical

PROJECT: Tres Laurels Subdivision
Montgomery Rd
San Antonio, Tx

PROJECT NO.: FGS-G20016
BORING NO.: B-03
DRILLING DATE:
SURFACE ELEVATION:

CLIENT: Mosiac Land Development

FIELD DATA | LABORATORY DATA

SOIL SYMBOL	DEPTH (FT)	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T: BLOWS R: % RQD: %	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (LL)	ATTERBERG LIMITS: PLASTIC LIMIT (PL)	ATTERBERG LIMITS: PLASTICITY INDEX (PI)	DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ FT)	FAILURE STRAIN (%)	CONFINING PRESSURE (POUNDS/SQ IN)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
	0			9	77	26	51						Dark Black Clay
	5												
	10			7	72	33	39						Light Tan Clay at 6'
	15												Boring Terminated at 15 feet of Depth
	20												

N - STANDARD PENETRATION TEST RESISTANCE
P - POCKET PENETROMETER RESISTANCE
T - TXDOT CONE PENETRATION RESISTANCE
R - ROCK CORE RECOVERY
RQD - ROCK QUALITY DESIGNATION

DRILLING METHOD(S):
Dry auger drilling techniques were used to the termination depth of the boring.

SUBSURFACE WATER INFORMATION:
Subsurface water was not encountered either during or upon completion of drilling operations and subsurface water observations.

REMARKS:

FROST LOG FGS-G20016.GPJ FROST.GDT 7/8/20

LOG OF BORING

Frost GeoSciences
Geologic • Environmental
Geotechnical

PROJECT: Tres Laurels Subdivision
Montgomery Rd
San Antonio, Tx

PROJECT NO.: FGS-G20016
BORING NO.: B-04
DRILLING DATE:
SURFACE ELEVATION:

CLIENT: Mosiac Land Development

SOIL SYMBOL	DEPTH (FT)	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T: BLOWS R: % RQD: %	MOISTURE CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT LL	ATTERBERG LIMITS PLASTIC LIMIT PL	ATTERBERG LIMITS PLASTICITY INDEX PI	DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ FT)	FAILURE STRAIN (%)	CONFINING PRESSURE (POUNDS/SQ IN)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
													Dark Brown Clay
	5			8	65	25	40						
													Light Tan Clay at 7'
	10			9	72	30	42						
	15												Boring Terminated at 15 feet of Depth
	20												

DRILLING METHOD(S):

Dry auger drilling techniques were used to the termination depth of the boring.

SUBSURFACE WATER INFORMATION:

Subsurface water was not encountered either during or upon completion of drilling operations and subsurface water observations.

N - STANDARD PENETRATION TEST RESISTANCE
P - POCKET PENETROMETER RESISTANCE
T - TXDOT CONE PENETRATION RESISTANCE
R - ROCK CORE RECOVERY
RQD - ROCK QUALITY DESIGNATION

REMARKS:

FROST LOG FGS-G20016.GPJ FROST.GDT 7/8/20

This log is not valid if separated from the report.

LOG OF BORING

Frost GeoSciences
Geologic • Environmental
Geotechnical

PROJECT: Tres Laurels Subdivision
Montgomery Rd
San Antonio, Tx

CLIENT: Mosiac Land Development

PROJECT NO.: FGS-G20016
BORING NO.: B-05
DRILLING DATE:
SURFACE ELEVATION:

FIELD DATA				LABORATORY DATA									
SOIL SYMBOL	DEPTH (FT)	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T: BLOWS R: % RQD: %	MOISTURE CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT LL	ATTERBERG LIMITS PLASTIC LIMIT PL	ATTERBERG LIMITS PLASTICITY INDEX PI	DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ FT)	FAILURE STRAIN (%)	CONFINING PRESSURE (POUNDS/SQ IN)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
	0			7	64	28	36						Lght Brown Clay
	5												
	10			5	47	18	29						Light Tan Weathered Limestone at 7'
	15												Boring Terminated at 15 feet of Depth
	20												

N - STANDARD PENETRATION TEST RESISTANCE
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T - TXDOT CONE PENETRATION RESISTANCE
R - ROCK CORE RECOVERY
RQD - ROCK QUALITY DESIGNATION

DRILLING METHOD(S):
Dry auger drilling techniques were used to the termination depth of the boring.

SUBSURFACE WATER INFORMATION:
Subsurface water was not encountered either during or upon completion of drilling operations and subsurface water observations.

REMARKS:

FROST LOG FGS-G20016.GPJ FROST.GDT 7/8/20

LOG OF BORING

Frost GeoSciences
Geologic • Environmental
Geotechnical

PROJECT: Tres Laurels Subdivision
Montgomery Rd
San Antonio, Tx

PROJECT NO.: FGS-G20016
BORING NO.: B-06
DRILLING DATE:
SURFACE ELEVATION:

CLIENT: Mosiac Land Development

SOIL SYMBOL	DEPTH (FT)	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T: BLOWS R: % RQD: %	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (LL)	PLASTIC LIMIT (PL)	PLASTICITY INDEX (PI)	DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ FT)	FAILURE STRAIN (%)	CONFINING PRESSURE (POUNDS/SQ IN)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
	0			10	58	24	34						Dark Brown Clay
	5			8	71	30	41						Light Tan Clay at 6'
	10												
	15												Boring Terminated at 15 feet of Depth
	20												

DRILLING METHOD(S):
Dry auger drilling techniques were used to the termination depth of the boring.

SUBSURFACE WATER INFORMATION:
Subsurface water was not encountered either during or upon completion of drilling operations and subsurface water observations.

N - STANDARD PENETRATION TEST RESISTANCE
P - POCKET PENETROMETER RESISTANCE
T - TXDOT CONE PENETRATION RESISTANCE
R - ROCK CORE RECOVERY
RQD - ROCK QUALITY DESIGNATION

REMARKS:

FROST LOG FGS-G20016.GPJ FROST.GDT 7/8/20

LOG OF BORING

Frost GeoSciences
Geologic • Environmental
Geotechnical

PROJECT: Tres Laurels Subdivision
Montgomery Rd
San Antonio, Tx

PROJECT NO.: FGS-G20016
BORING NO.: B-07
DRILLING DATE:
SURFACE ELEVATION:

CLIENT: Mosiac Land Development

PAGE 1 of 1

FIELD DATA				LABORATORY DATA									
SOIL SYMBOL	DEPTH (FT)	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T: BLOWS R: % RQD: %	MOISTURE CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT LL	ATTERBERG LIMITS PLASTIC LIMIT PL	ATTERBERG LIMITS PLASTICITY INDEX PI	DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ FT)	FAILURE STRAIN (%)	CONFINING PRESSURE (POUNDS/SQ IN)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
	0			3	56	19	37						Light Brown Clay
	5												Light Brown Clay with small Gravel at 6'
	10			2	58	20	38						Light Brown Clay at 6.5'
	15												Boring Terminated at 15 feet of Depth
	20												

DRILLING METHOD(S):
Dry auger drilling techniques were used to the termination depth of the boring.

SUBSURFACE WATER INFORMATION:
Subsurface water was not encountered either during or upon completion of drilling operations and subsurface water observations.

N - STANDARD PENETRATION TEST RESISTANCE
P - POCKET PENETROMETER RESISTANCE
T - TXDOT CONE PENETRATION RESISTANCE
R - ROCK CORE RECOVERY
RQD - ROCK QUALITY DESIGNATION

REMARKS:

FROST LOG FGS-G20016.GPJ FROST.GDT 7/8/20

This log is not valid if separated from the report.

LOG OF BORING

Frost GeoSciences
Geologic • Environmental
Geotechnical

PROJECT: Tres Laurels Subdivision
Montgomery Rd
San Antonio, Tx

PROJECT NO.: FGS-G20016
BORING NO.: B-08
DRILLING DATE:
SURFACE ELEVATION:

CLIENT: Mosiac Land Development

FIELD DATA				LABORATORY DATA									
SOIL SYMBOL	DEPTH (FT)	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T: BLOWS R: % RQD: %	MOISTURE CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT LL	PLASTIC LIMIT PL	PLASTICITY INDEX PI	DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ FT)	FAILURE STRAIN (%)	CONFINING PRESSURE (POUNDS/SQ IN)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
	0			8	61	22	39						Dark Brown Clay
	5			6	76	28	48						Light Tan Clay at 6'
	10												
	15												Boring Terminated at 15 feet of Depth
	20												

DRILLING METHOD(S):
Dry auger drilling techniques were used to the termination depth of the boring.

SUBSURFACE WATER INFORMATION:
Subsurface water was not encountered either during or upon completion of drilling operations and subsurface water observations.

N - STANDARD PENETRATION TEST RESISTANCE
P - POCKET PENETROMETER RESISTANCE
T - TXDOT CONE PENETRATION RESISTANCE
R - ROCK CORE RECOVERY
RQD - ROCK QUALITY DESIGNATION

REMARKS:

FROST LOG FGS-G20016.GPJ FROST.GDT 7/8/20

LOG OF BORING

Frost GeoSciences
Geologic • Environmental
Geotechnical

PROJECT: Tres Laurels Subdivision
Montgomery Rd
San Antonio, Tx

CLIENT: Mosiac Land Development

PROJECT NO.: FGS-G20016
BORING NO.: B-09
DRILLING DATE:
SURFACE ELEVATION:

SOIL SYMBOL	DEPTH (FT)	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T: BLOWS R: % RQD: %	MOISTURE CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT LL	PLASTIC LIMIT PL	PLASTICITY INDEX PI	DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ FT)	FAILURE STRAIN (%)	CONFINING PRESSURE (POUNDS/SQ IN)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
				4	55	18	37						Light Tan Silty Clay
	5			5	77	28	49						Light Tan Marly Clay at 4'
	10												
	15												Boring Terminated at 15 feet of Depth
	20												

DRILLING METHOD(S):
Dry auger drilling techniques were used to the termination depth of the boring.

SUBSURFACE WATER INFORMATION:
Subsurface water was not encountered either during or upon completion of drilling operations and subsurface water observations.

N - STANDARD PENETRATION TEST RESISTANCE
P - POCKET PENETROMETER RESISTANCE
T - TXDOT CONE PENETRATION RESISTANCE
R - ROCK CORE RECOVERY
RQD - ROCK QUALITY DESIGNATION

REMARKS:

FROST LOG FGS-G20016.GPJ FROST.GDT 7/8/20

PVR VALUES

PVR Calculator

Frost GeoSciences, Inc.
13402 Western Oak
Helotes, Texas 78023

Project Name:	Tres Laurels Subdivision
Project Location:	Montgomery Rd
Project City:	San Antonio Tx
Project Number:	FGS-G20016
Boring Number:	B-01

Surcharge Pressure: 1.00 **psi** **Climatic Rating, C_w:** 16

Stratum	Plasticity Index	Bottom Depth (feet)	Moisture Condition		
			Dry	Average	Optimum
I	39	1.5	x		
II	37	7.0		x	
III	47	14.5			x
IV					
V					
VI					
VII					
VIII					

PVR Results

PVR = **2.14** inches

Effective Plasticity Index

BRAB	PCI
40	40

Soil Support Index

BRAB	PCI
0.72	0.72

Soil/Climatic Rating Factor

$1 - C_w$ = **0.28**

RULES

1.) Depths should not extend greater than 15 feet.
2.) Use only one moisture condition per stratum.
3.) Moisture conditions must be selected using an "x".
4.) Integers or one-half foot intervals must be used.
5.) Use PI = 8 for none expansive layers.
6.) DO NOT USE PI = 0 FOR NON-EXPANSIVE LAYERS.
7.) **Error checking is limited.**

PVR Calculator

Frost GeoSciences, Inc.
13402 Western Oak
Helotes, Texas 78023

Project Name:	Tres Laurels Subdivision
Project Location:	Montgomery Rd
Project City:	San Antonio Tx
Project Number:	FGS-G20016
Boring Number:	B-02

Surcharge Pressure: 1.00 **psi** **Climatic Rating, C_w:** 16

Stratum	Plasticity Index	Bottom Depth (feet)	Moisture Condition		
			Dry	Average	Optimum
I	51	4.0	x		
II	46	10.0		x	
III	45	14.5			x
IV					
V					
VI					
VII					
VIII					

PVR Results

PVR = **3.48** inches

Effective Plasticity Index

BRAB	PCI
51	47

Soil Support Index

BRAB	PCI
0.61	0.65

Soil/Climatic Rating Factor

$1 - C_w$ = **0.35**

RULES

1.) Depths should not extend greater than 15 feet.
2.) Use only one moisture condition per stratum.
3.) Moisture conditions must be selected using an "x".
4.) Integers or one-half foot intervals must be used.
5.) Use PI = 8 for none expansive layers.
6.) DO NOT USE PI = 0 FOR NON-EXPANSIVE LAYERS.
7.) **Error checking is limited.**

PVR Calculator

Frost GeoSciences, Inc.
13402 Western Oak
Helotes, Texas 78023

Project Name:	Tres Laurels Subdivision
Project Location:	Montgomery Rd
Project City:	San Antonio Tx
Project Number:	FGS-G20016
Boring Number:	B-03

Surcharge Pressure: 1.00 **psi** **Climatic Rating, C_w:** 16

Stratum	Plasticity Index	Bottom Depth (feet)	Moisture Condition		
			Dry	Average	Optimum
I	51	2.0	x		
II	39	10.0		x	
III	38	14.5			x
IV					
V					
VI					
VII					
VIII					

PVR Results

PVR = **2.56** inches

Effective Plasticity Index

BRAB	PCI
51	41

Soil Support Index

BRAB	PCI
0.61	0.72

Soil/Climatic Rating Factor

$1 - C_w$ = **0.28**

RULES

1.) Depths should not extend greater than 15 feet.
2.) Use only one moisture condition per stratum.
3.) Moisture conditions must be selected using an "x".
4.) Integers or one-half foot intervals must be used.
5.) Use PI = 8 for none expansive layers.
6.) DO NOT USE PI = 0 FOR NON-EXPANSIVE LAYERS.
7.) **Error checking is limited.**

PVR Calculator

Frost GeoSciences, Inc.
13402 Western Oak
Helotes, Texas 78023

Project Name:	Tres Laurels Subdivision
Project Location:	Montgomery Rd
Project City:	San Antonio Tx
Project Number:	FGS-G20016
Boring Number:	B-04

Surcharge Pressure: 1.00 **psi** **Climatic Rating, C_w:** 16

Stratum	Plasticity Index	Bottom Depth (feet)	Moisture Condition		
			Dry	Average	Optimum
I	40	4.0	x		
II	42	10.0		x	
III	40	14.5			x
IV					
V					
VI					
VII					
VIII					

PVR Results

PVR = **2.61** inches

Effective Plasticity Index

BRAB	PCI
40	40

Soil Support Index

BRAB	PCI
0.72	0.72

Soil/Climatic Rating Factor

$1 - C_w$ = **0.28**

RULES

1.) Depths should not extend greater than 15 feet.
2.) Use only one moisture condition per stratum.
3.) Moisture conditions must be selected using an "x".
4.) Integers or one-half foot intervals must be used.
5.) Use PI = 8 for none expansive layers.
6.) DO NOT USE PI = 0 FOR NON-EXPANSIVE LAYERS.
7.) **Error checking is limited.**

PVR Calculator

Frost GeoSciences, Inc.
13402 Western Oak
Helotes, Texas 78023

Project Name:	Tres Laurels Subdivision
Project Location:	Montgomery Rd
Project City:	San Antonio Tx
Project Number:	FGS-G20016
Boring Number:	B-05

Surcharge Pressure: 1.00 **psi** **Climatic Rating, C_w:** 16

Stratum	Plasticity Index	Bottom Depth (feet)	Moisture Condition		
			Dry	Average	Optimum
I	36	4.0	x		
II	33	7.0		x	
III	29	14.5			x
IV					
V					
VI					
VII					
VIII					

PVR Results

PVR = **1.68** inches

Effective Plasticity Index

BRAB	PCI
36	33

Soil Support Index

BRAB	PCI
0.77	0.81

Soil/Climatic Rating Factor

$1 - C_w$ = **0.19**

RULES

1.) Depths should not extend greater than 15 feet.
2.) Use only one moisture condition per stratum.
3.) Moisture conditions must be selected using an "x".
4.) Integers or one-half foot intervals must be used.
5.) Use PI = 8 for none expansive layers.
6.) DO NOT USE PI = 0 FOR NON-EXPANSIVE LAYERS.
7.) **Error checking is limited.**

PVR Calculator

Frost GeoSciences, Inc.
13402 Western Oak
Helotes, Texas 78023

Project Name:	Tres Laurels Subdivision
Project Location:	Montgomery Rd
Project City:	San Antonio Tx
Project Number:	FGS-G20016
Boring Number:	B-06

Surcharge Pressure: 1.00 **psi** **Climatic Rating, C_w:** 16

Stratum	Plasticity Index	Bottom Depth (feet)	Moisture Condition		
			Dry	Average	Optimum
I	34	1.5	x		
II	33	3.5		x	
III	41	7.0			x
IV					
V					
VI					
VII					
VIII					

PVR Results

PVR = **1.26** inches

Effective Plasticity Index

BRAB	PCI
29	29

Soil Support Index

BRAB	PCI
0.86	0.86

Soil/Climatic Rating Factor

$1 - C_w$ = **0.14**

RULES

1.) Depths should not extend greater than 15 feet.
2.) Use only one moisture condition per stratum.
3.) Moisture conditions must be selected using an "x".
4.) Integers or one-half foot intervals must be used.
5.) Use PI = 8 for none expansive layers.
6.) DO NOT USE PI = 0 FOR NON-EXPANSIVE LAYERS.
7.) **Error checking is limited.**

PVR Calculator

Frost GeoSciences, Inc.
13402 Western Oak
Helotes, Texas 78023

Project Name:	Tres Laurels Subdivision
Project Location:	Montgomery Rd
Project City:	San Antonio Tx
Project Number:	FGS-G20016
Boring Number:	B-07

Surcharge Pressure: 1.00 **psi** **Climatic Rating, C_w:** 16

Stratum	Plasticity Index	Bottom Depth (feet)	Moisture Condition		
			Dry	Average	Optimum
I	35	1.5	x		
II	37	3.5		x	
III	38	10.0			x
IV					
V					
VI					
VII					
VIII					

PVR Results

PVR = **1.45** inches

Effective Plasticity Index

BRAB	PCI
34	34

Soil Support Index

BRAB	PCI
0.80	0.80

Soil/Climatic Rating Factor

$1 - C_w$ = **0.20**

RULES

1.) Depths should not extend greater than 15 feet.
2.) Use only one moisture condition per stratum.
3.) Moisture conditions must be selected using an "x".
4.) Integers or one-half foot intervals must be used.
5.) Use PI = 8 for none expansive layers.
6.) DO NOT USE PI = 0 FOR NON-EXPANSIVE LAYERS.
7.) **Error checking is limited.**

PVR Calculator

Frost GeoSciences, Inc.
13402 Western Oak
Helotes, Texas 78023

Project Name:	Tres Laurels Subdivision
Project Location:	Montgomery Rd
Project City:	San Antonio Tx
Project Number:	FGS-G20016
Boring Number:	B-08

Surcharge Pressure: 1.00 **psi** **Climatic Rating, C_w:** 16

Stratum	Plasticity Index	Bottom Depth (feet)	Moisture Condition		
			Dry	Average	Optimum
I	39	1.5	x		
II	48	7.0		x	
III	45	14.5			x
IV					
V					
VI					
VII					
VIII					

PVR Results

PVR = **2.61** inches

Effective Plasticity Index

BRAB	PCI
45	45

Soil Support Index

BRAB	PCI
0.67	0.67

Soil/Climatic Rating Factor

$1 - C_w$ = **0.33**

RULES

1.) Depths should not extend greater than 15 feet.
2.) Use only one moisture condition per stratum.
3.) Moisture conditions must be selected using an "x".
4.) Integers or one-half foot intervals must be used.
5.) Use PI = 8 for none expansive layers.
6.) DO NOT USE PI = 0 FOR NON-EXPANSIVE LAYERS.
7.) **Error checking is limited.**

PVR Calculator

Frost GeoSciences, Inc.
13402 Western Oak
Helotes, Texas 78023

Project Name:	Tres Laurels Subdivision
Project Location:	Montgomery Rd
Project City:	San Antonio Tx
Project Number:	FGS-G20016
Boring Number:	B-09

Surcharge Pressure: 1.00 **psi** **Climatic Rating, C_w:** 16

Stratum	Plasticity Index	Bottom Depth (feet)	Moisture Condition		
			Dry	Average	Optimum
I	37	1.5	x		
II	49	7.0		x	
III	48	10.0			x
IV					
V					
VI					
VII					
VIII					

PVR Results

PVR = **2.45** inches

Effective Plasticity Index

BRAB	PCI
41	41

Soil Support Index

BRAB	PCI
0.71	0.71

Soil/Climatic Rating Factor

$1 - C_w$ = **0.29**

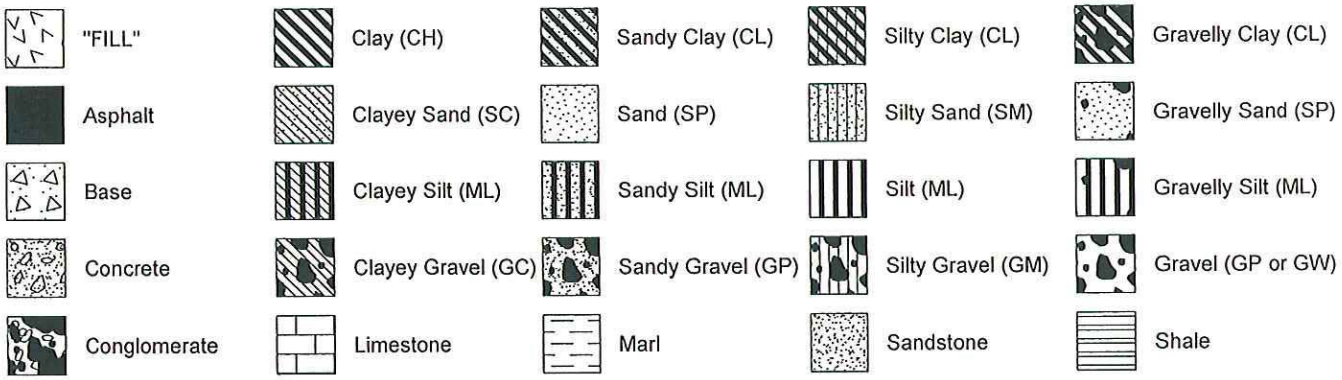
RULES

1.) Depths should not extend greater than 15 feet.
2.) Use only one moisture condition per stratum.
3.) Moisture conditions must be selected using an "x".
4.) Integers or one-half foot intervals must be used.
5.) Use PI = 8 for none expansive layers.
6.) DO NOT USE PI = 0 FOR NON-EXPANSIVE LAYERS.
7.) **Error checking is limited.**

SYMBOL KEY

Symbol Key Sheet

Material Symbols



Strength of Cohesive Soils

Consistency	Undrained Shear Strength, KSF
Very Soft	less than 0.25
Soft	0.25 to 0.50
Firm	0.50 to 1.00
Stiff	1.00 to 2.00
Very Stiff	2.00 to 4.00
Hard	greater than 4.00

Soil Plasticity

Degree of Plasticity	Plasticity Index (PI)
None	0 to 5
Low	5 to 10
Moderate	10 to 20
Plastic	20 to 40
Highly Plastic	more than 40

Density of Granular Soils

Descriptive Term	SPT Blow Count (blows/ft)
Very Loose	less than 4
Loose	4 to 10
Medium Dense	10 to 30
Dense	30 to 50
Very Dense	more than 50

Standard Penetration Test (ASTM D 1586) Driving Record

Note: Driving is limited to 50 blows per interval, or 25 blows for 0.25 inch advancement, whichever controls. This is done to avoid damaging sampling tools.

Blows Per Foot	Description
25	Sampler was seated 6 inches, then 25 blows were required to advance the sampler 12 inches.
75/8"	Sampler was seated 6 inches, 25 blows were required for the second 6 inch increment and the 50 blow limit was reached at 2 inches of the last increment.
Ref/2"	Sampler could only be driven 2 inches of the 6 inch seating penetration before the 50 blow limit was reached.

Terms Characterizing Structure

Soil Terms	Description
Blocky	Contains cracks or failure planes resulting in rough cubes of material.
Calcareous	Contains appreciable quantities of calcium carbonate.
Fissured	Contains shrinkage cracks, which are frequently filled with fine sand or silt. The fissures are usually near vertical in orientation.
Interbedded	Composed of alternating layers of different soil types.
Laminated	Composed of thin layers of varying color and texture.
Nodules	Secondary inclusions that appear as small lumps about 0.1 to 0.3 inch in diameter.
Partings	Inclusion of different material less than 1/8 inch thick extending through the sample.
Pockets	Inclusion of different material that is smaller than the diameter of the sample.
Seams	Inclusion of different material between 1/8 and 3 inches thick, and extends through the sample.
Slickensided	Has inclined planes of weakness that are slick and glossy in appearance. Slickensides are commonly thought to be randomly oriented.
Streaks or Stains	Stains of limited extent that appear as short stripes, spots or blotches.

Rock Terms	
Bedding Plane	A surface parallel to the surface of deposition, generally marked by changes in color or grain size.
Fracture	A natural break in rock along which no displacement has occurred.
Joint	A natural break along which no displacement has occurred, and which generally intersects primary surfaces.
% Recovery	The ratio of total length of recovery to the total length of core run, expressed as a percentage.
RQD - Rock Quality Designation	The ratio of total recovered length of fragments longer than 4 inches to the total run length, expressed as a percentage.
Weathering	The process by which rock is broken down and decomposed.

Sampler Symbols

APPENDIX B

Moisture Density Relationship
CBR Test Results
Lime Series Curve and Unconfined Compressive Strength Chart
Spectra Pave Design Analysis

MOISTURE DENSITY

13406 Western Oak
Helotes, TX 78023
(210) 372-1315 phone (210) 372-1318 fax

Frost GeoSciences
Construction Materials ▪ Forensics
Environmental ▪ Geotechnical

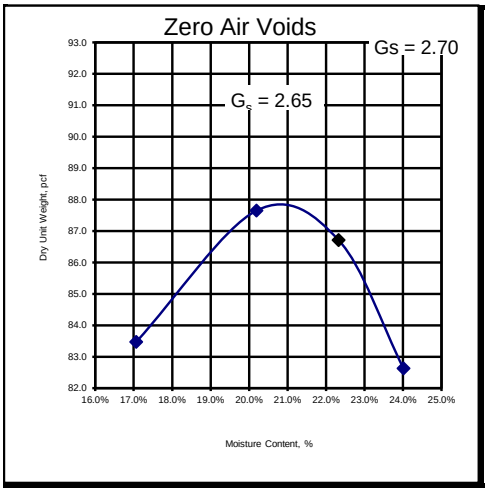
Project #: **FGS-G20016**

Project: **Tres Laurels**

Report Date: 6/30/2020
Sample Date: 6/25/2020

Client:	Mosiac Land Development		
Report:	ASTM - Standard Proctor	LAB NO:	4102
Material:	Subgrade	Report #:	S1

Moisture-Density Relationship - Subgrade Soil



Test Results

% Moisture	Dry Density Lbs./ft^3
17.1%	83.5
20.2%	87.6
22.3%	86.7
24.0%	82.6

Optimum = 21.0%

Maximum = 87.6

Sieve	% Passing
3 inch	100.0%
3/4 inch	100.0%
3/8 inch	100.0%
No. 4	100.0%
No.10	45.5%
No. 40	24.3%
No.100	5.2%
No.200	1.6%

Color: Light Brown
Description: Clay

Liquid Limit: 57
Plastic Limit: 21
Plasticity Index: 36

Location: Project Site

Desc of Rammer: Mechanical
Preparation Method: Dry
Remarks: No comments at this time.

Test Method (As Applicable): ASTM D-698 A
ASTM D-4318

Respectfully Submitted,
Frost GeoSciences, Inc.

F.J.Caballero, P. E. , Project Manager

13406 Western Oak
Helotes, TX 78023
(210) 372-1315 phone (210) 372-1318 fax

Frost GeoSciences
Construction Materials ▪ Forensics
Environmental ▪ Geotechnical

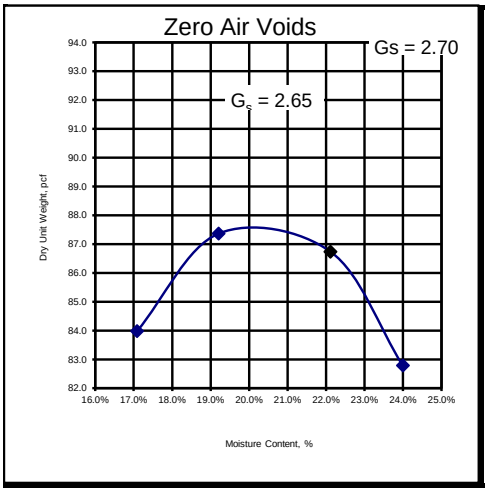
Project #: **FGS-G20016**

Project: **Tres Laurels**

Report Date: 6/30/2020
Sample Date: 6/25/2020

Client:	Mosiac Land Development		
Report:	ASTM - Standard Proctor	LAB NO:	4102
Material:	Subgrade	Report #:	S2

Moisture-Density Relationship - Subgrade Soil



Test Results

% Moisture	Dry Density Lbs./ft^3
17.1%	84.0
19.2%	87.4
22.1%	86.7
24.0%	82.8

Optimum = 20.5% Maximum = 87.4

Sieve	% Passing
3 inch	100.0%
3/4 inch	100.0%
3/8 inch	100.0%
No. 4	100.0%
No.10	44.9%
No. 40	23.8%
No.100	5.3%
No.200	1.7%

Color: Light Brown
Description: Clay

Liquid Limit: 56
Plastic Limit: 22
Plasticity Index: 34

Location: Project Site

Desc of Rammer: Mechanical
Preparation Method: Dry
Remarks: No comments at this time.

Test Method (As Applicable): ASTM D-698 A
ASTM D-4318

Respectfully Submitted,
Frost GeoSciences, Inc.

F.J.Caballero, P. E. , Project Manager

CBR RESULTS

Frost GeoSciences, Inc.
13406 Western Oak
Helotes, Texas 78023

CBR (California Bearing Ratio)
ASTM D1883

Project Name: Tres Laurels Project #: FGS-G20016
Soil Desc. Light Brown Clay CBR # 1
Tested By: Miguel Gonzalez Jr Test Date: 07/06/20

Compaction Energy: Rammer: 5.5 lbs. # layers: 3 Blows: 56
w at compaction: 21.00% Mold Dia. 6 in. Soil Ht. 4.584 in.
Volume 0.075 $ft.^3$ Opt. M.C. 21.0
Opt. Dry Unit wt. 87.6

	Initial	Final	%S
Date/Time	7/01/20 9:00am	7/06/20 9:00am	
Swell Data	0.000	0.039	0.85

Mold #	2
Surcharge, lbs.	10
Initial mass of wet soil + mold, lbs.	26.531
Final mass of wet soil + mold, lbs.	26.632
Mass of Mold, lbs.	18.104
Initial mass of wet soil, lbs.	8.427

Dry density = 87.7 Comp. 1.00114
Moisture = 21.6 Points Opt. 0.61992

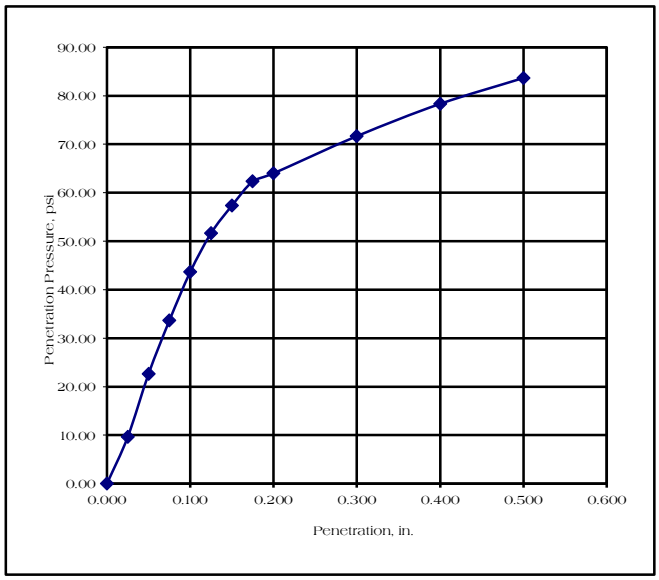
ASTM D2216 Moisture Content

Compaction	Project #	Can No.	Wet Wt. (1)	Dry Wt. (2)	Tare Wt. (3)	(1) - (2) = A	(2) - (3) = B	%MC = A/B*100
Before	GS-G20016		642.69	551.21	127.69	91.48	423.52	21.59992
After	GS-G20016		667.41	571.45	128.01	95.96	443.44	21.63991

ASTM D1883 Date: 7/6/2020
Time: 9:15am

Strain, in.	Load, lbs	Stress, psi	CBR
0.000	0.00	0.00	
0.025	29.00	9.67	
0.050	68.00	22.67	
0.075	101.00	33.67	
0.100	131.00	43.67	4.4
0.125	155.00	51.67	
0.150	172.00	57.33	
0.175	187.00	62.33	
0.200	192.00	64.00	4.3
0.300	215.00	71.67	
0.400	235.00	78.33	
0.500	251.00	83.67	

Used=TexDot Sieves



Frost GeoSciences, Inc.
13406 Western Oak
Helotes, Texas 78023

CBR (California Bearing Ratio)
ASTM D1883

Project Name: Tres Laurels Project #: FGS-G20016
Soil Desc. Light Brown Clay CBR # 2
Tested By: Miguel Gonzalez Jr Test Date: 07/06/20

Compaction Energy: Rammer: 5.5 lbs. # layers: 3 Blows: 56
w at compaction: 20.50% Mold Dia. 6 in. Soil Ht. 4.584 in.
Volume 0.075 $ft.^3$ Opt. M.C. 20.5
Opt. Dry Unit wt. 87.4

	Initial	Final	%S
Date/Time	7/01/20 9:00am	7/06/20 9:00am	
Swell Data	0.000	0.042	0.92

Mold #	3
Surcharge, lbs.	10
Initial mass of wet soil + mold, lbs.	26.542
Final mass of wet soil + mold, lbs.	26.641
Mass of Mold, lbs.	18.096
Initial mass of wet soil, lbs.	8.446

Dry density = 87.3 Comp. 0.99886
Moisture = 20.8 Points Opt. 0.33143

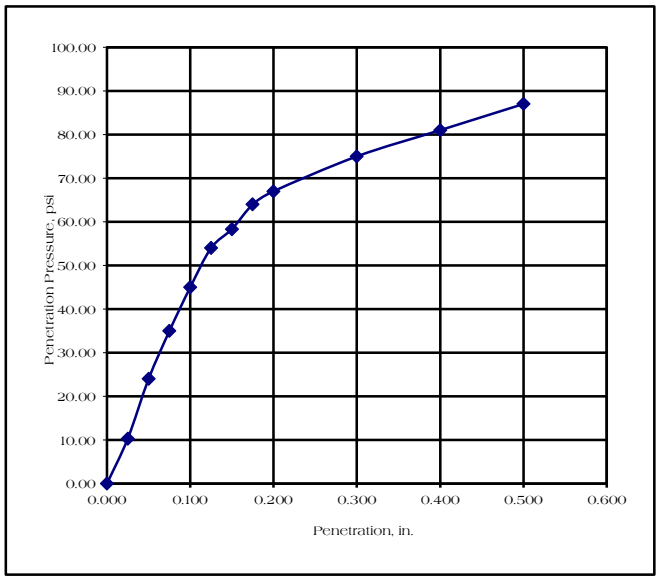
ASTM D2216 Moisture Content

Compaction	Project #	Can No.	Wet Wt. (1)	Dry Wt. (2)	Tare Wt. (3)	(1) - (2) = A	(2) - (3) = B	%MC = A/B*100
Before	GS-G20016		635.65	505.33	128.41	130.32	376.92	34.57498
After	GS-G20016		657.31	622.22	127.15	35.09	495.07	7.087887

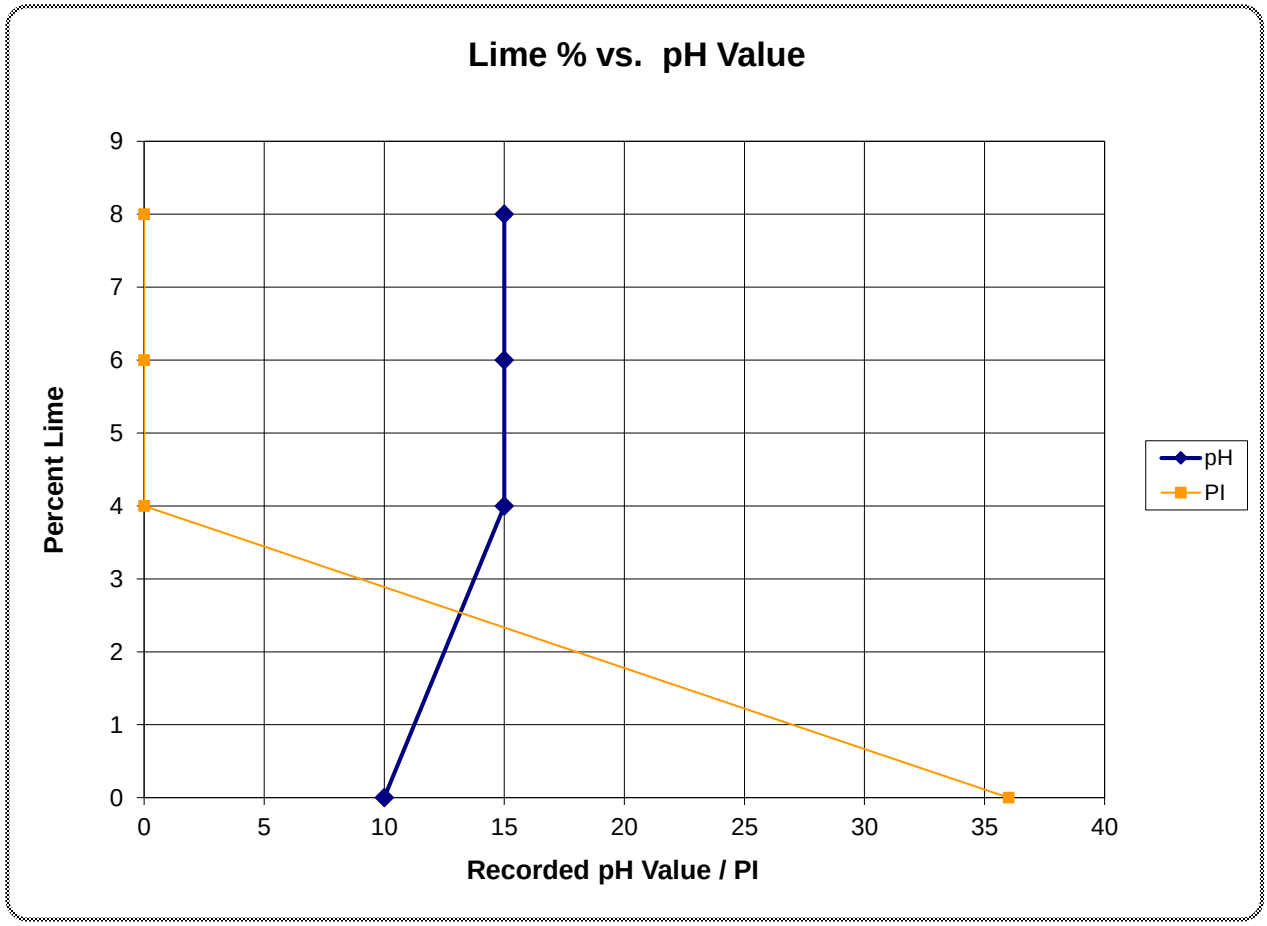
ASTM D1883 Date: 7/6/2020
Time: 9:15am

Strain, in.	Load, lbs	Stress, psi	CBR
0.000	0.00	0.00	
0.025	31.00	10.33	
0.050	72.00	24.00	
0.075	105.00	35.00	
0.100	135.00	45.00	4.5
0.125	162.00	54.00	
0.150	175.00	58.33	
0.175	192.00	64.00	
0.200	201.00	67.00	4.5
0.300	225.00	75.00	
0.400	243.00	81.00	
0.500	261.00	87.00	

Used=TexDot Sieves



LIME SERIES CURVE



Project Name: Tres Laurels
Project Number: FGS-G20016
Soil Description: Light Brown Clay

%Lime	pH	PI
0	10	36
4	15	0
6	15	0
8	15	0

	6`/.		8`/.
Set #1	160	Set #1	175
Set #2	155	Set #2	180

SPECTRA PAVE

SpectraPave™
Pavement Optimization Design Analysis

Design Parameters for AASHTO (1993) Equation

Reliability (%)	= 70	Initial Serviceability	= 4.2
Standard Normal Deviate	= -.524	Terminal Serviceability	= 2.0
Standard Deviation	= 0.45	Change in Serviceability	= 2.2

Aggregate fill shall conform to following requirement:

D50 <= 27mm (Base course)

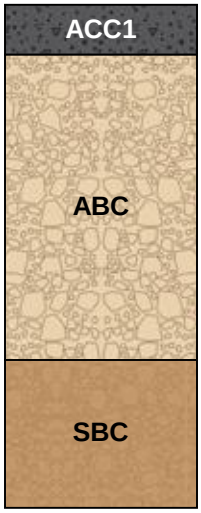
Unstabilized Section Material Properties

Layer	Description	Cost ($/ton)	Layer coefficient	Drainage factor
ACC1	Asphalt Wearing Course	70.00	0.440	N/A
ABC	Aggregate Base Course	20.00	0.140	1.0
SBC	Subbase Course	16.00	0.080	1.0

Stabilized Section Material Properties

Layer	Description	Cost ($/ton)	Layer coefficient	Drainage factor
ACC1	Asphalt Wearing Course	70.00	0.440	N/A
MSL	Mechanically Stabilized Base Course	20.00	0.250	1.0
SBC	Subbase Course	16.00	0.080	1.0

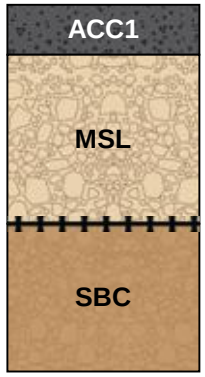
Unstabilized Pavement



2.00 (in)
12.50 (in)
6.00 (in)

Subgrade Modulus = 6,650 (psi)
Structural Number = 3.110
Calculated Traffic (ESALs) = 1,068,000

Stabilized Pavement



Tensar TX5
(Overlap=1.0ft)

2.00 (in)
7.00 (in)
6.00 (in)

Subgrade Modulus = 6,650 (psi)
Structural Number = 3.110
Calculated Traffic (ESALs) = 1,068,000

LIMITATIONS OF THE REPORT

The designs, illustrations, information and other content included in this report are necessarily general and conceptual in nature, and do not constitute engineering advice or any design intended for actual construction. Specific design recommendations can be provided as the project develops.

Project Name	TRES LAURELS SUB'D., LOCAL "A" STREET		
Company Name	MOSIAC LAND DEVELOPMENT		
Designer	F. J. CABALLERO, P. E.	Date	July 23, 2020

SpectraPave™
Pavement Optimization Design Analysis

Design Parameters for AASHTO (1993) Equation

Reliability (%)	= 90	Initial Serviceability	= 4.2
Standard Normal Deviate	= -1.282	Terminal Serviceability	= 2.0
Standard Deviation	= 0.45	Change in Serviceability	= 2.2

Aggregate fill shall conform to following requirement:

D50 <= 27mm (Base course)

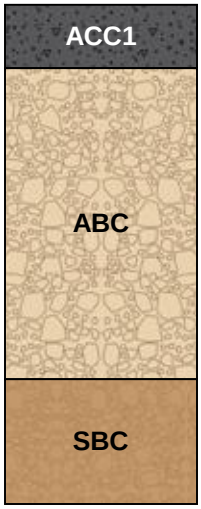
Unstabilized Section Material Properties

Layer	Description	Cost ($/ton)	Layer coefficient	Drainage factor
ACC1	Asphalt Wearing Course	70.00	0.440	N/A
ABC	Aggregate Base Course	20.00	0.140	1.0
SBC	Subbase Course	16.00	0.080	1.0

Stabilized Section Material Properties

Layer	Description	Cost ($/ton)	Layer coefficient	Drainage factor
ACC1	Asphalt Wearing Course	70.00	0.440	N/A
MSL	Mechanically Stabilized Base Course	20.00	0.230	1.0
SBC	Subbase Course	16.00	0.080	1.0

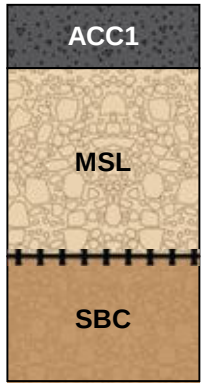
Unstabilized Pavement



3.00 (in)
14.75 (in)
6.00 (in)

Subgrade Modulus = 6,650 (psi)
Structural Number = 3.865
Calculated Traffic (ESALs) = 2,117,000

Stabilized Pavement



Tensar TX5
(Overlap=1.0ft)

3.00 (in)
9.00 (in)
6.00 (in)

Subgrade Modulus = 6,650 (psi)
Structural Number = 3.870
Calculated Traffic (ESALs) = 2,136,000

LIMITATIONS OF THE REPORT

The designs, illustrations, information and other content included in this report are necessarily general and conceptual in nature, and do not constitute engineering advice or any design intended for actual construction. Specific design recommendations can be provided as the project develops.

Project Name	TRES LAURELS SUB'D., LOCAL "B" STREET		
Company Name	MOSIAC LAND DEVELOPMENT		
Designer	F. J. CABALLERO, P. E.	Date	July 23, 2020

SpectraPave™
Pavement Optimization Design Analysis

Design Parameters for AASHTO (1993) Equation

Reliability (%)	= 95	Initial Serviceability	= 4.2
Standard Normal Deviate	= -1.645	Terminal Serviceability	= 2.5
Standard Deviation	= 0.45	Change in Serviceability	= 1.7

Aggregate fill shall conform to following requirement:

D50 <= 27mm (Base course)

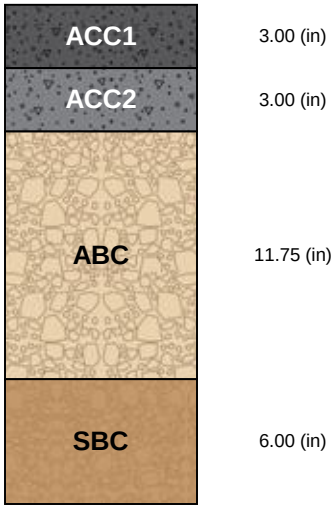
Unstabilized Section Material Properties

Layer	Description	Cost ($/ton)	Layer coefficient	Drainage factor
ACC1	Asphalt Wearing Course	70.00	0.440	N/A
ACC2	Dense-graded Asphalt Course	70.00	0.380	N/A
ABC	Aggregate Base Course	20.00	0.140	1.0
SBC	Subbase Course	16.00	0.080	1.0

Stabilized Section Material Properties

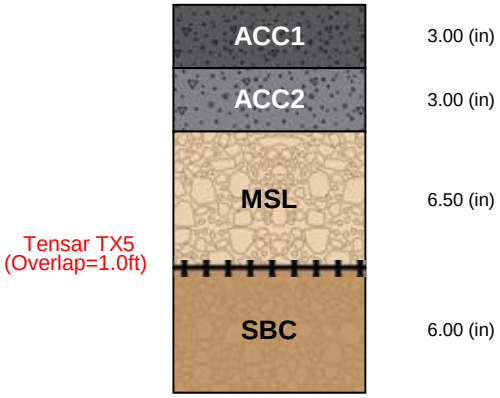
Layer	Description	Cost ($/ton)	Layer coefficient	Drainage factor
ACC1	Asphalt Wearing Course	70.00	0.440	N/A
ACC2	Dense-graded Asphalt Course	70.00	0.380	N/A
MSL	Mechanically Stabilized Base Course	20.00	0.257	1.0
SBC	Subbase Course	16.00	0.080	1.0

Unstabilized Pavement



Subgrade Modulus = 6,650 (psi)
Structural Number = 4.585
Calculated Traffic (ESALs) = 3,037,000

Stabilized Pavement



Subgrade Modulus = 6,650 (psi)
Structural Number = 4.610
Calculated Traffic (ESALs) = 3,152,000

LIMITATIONS OF THE REPORT

The designs, illustrations, information and other content included in this report are necessarily general and conceptual in nature, and do not constitute engineering advice or any design intended for actual construction. Specific design recommendations can be provided as the project develops.

Project Name	TRES LAURELS SUB'D., (ARTERIAL STREET)		
Company Name	MOSIAC LAND DEVELOPMENT		
Designer	F. J. CABALLERO, P. E.	Date	July 23, 2020