ENTECH
ENGINEERING, INC.

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

SUBSURFACE SOIL INVESTIGATION
RETREAT AT TIMBERRIDGE, FILING NO. 1
POCO ROAD SAND CREEK CROSSING, DROP STRUCTURES AND DETENTION PONDS
EL PASO COUNTY, COLORADO

Prepared for:

Elite Properties of America, Inc.
6385 Corporate Drive, Suite #200
Colorado Springs, Colorado 80919

Attn: Mr. Loren Moreland

August 8, 2019

Respectfully Submitted,

ENTECH ENGINEERING, INC.

Stan C. Culp, P.E.
Senior Engineer

COLORADO REGISTERED
STANLEY CLARE CULP
36723
8/8/19
PROFESSIONAL ENGINEER

Reviewed by:

Joseph C. Goode, Jr., P.E.
President

SCC/sc

Encl.

Entech Job No. 190975
AAprojects/2019/190975/190975 ssi

Table of Contents

Table
Table 1: Summary of Laboratory Test Results

Figures
Figure 1: Vicinity Map
Figure 2: Test Boring Location Plan

List of Appendices
Appendix A: Test Boring Logs
Appendix B: Laboratory Testing Results

SUBSURFACE SOIL INVESTIGATION
RETREAT AT TIMBERRIDGE, FILING NO. 1
POCO ROAD SAND CREEK CROSSING, DROP STRUCTURES AND DETENTION PONDS
EL PASO COUNTY, COLORADO

1.0 INTRODUCTION

Elite Properities of America, Inc. is planning the Sand Creek crossing at Poco Road, drop structures within the creek, and detention pond improvements in the Retreat at Timberridge subdivision, Filing No. 1. The subdivision is located in El Paso County, Colorado, southeast of Vollmer Road and Arroya Lane. The approximate location of the site is shown on the Vicinity Map, Figure 1. The general locations of the creek crossing, channel improvements, and detention ponds are shown on Figure 2, the Test Boring Location Plan.

This report describes the subsurface investigation conducted for the planned creek crossing, channel improvements, and detention ponds. The subsurface soil investigation included drilling eight test borings at the proposed creek crossing and at the planned channel/detention pond improvement areas, collecting samples of soil, and conducting a geotechnical evaluation of the investigation findings. All drilling and subsurface investigation activities were performed by Entech Engineering, Inc. (Entech). The contents of this report, including the geotechnical evaluation and recommendations, are subject to the limitations and assumptions presented in Section 6.0.

2.0 PROJECT AND SITE DESCRIPTION

It is Entech's understanding that the project will consist of the construction of arch culverts for Poco Road at Sand Creek, channel improvements, and detention ponds for the Retreat at Timberridge subdivision, Filing No. 1. The investigation was performed at predetermined locations provided by Classic Consulting. Sand Creek flows to the south with land on each side of the existing creek sloping gently toward the creek. The side banks of the creek are moderately to steeply sloping. Vegetation consists of grasses and weeds with trees, shrubs, and wetland vegetation common to Sand Creek. Existing rural residential properties and undeveloped land are located west, north, and east with the future Sterling Ranch development to the south of the filing. Vollmer Road borders the property to the west.

3.0 SUBSURFACE EXPLORATIONS AND LABORATORY TESTING

Subsurface conditions on the site were explored by drilling eight test borings at the approximate locations shown on Figure 2. Test Boring Nos. 1 through 6, 8, and 9 were drilled in the creek and detention areas. Test Boring Nos. 7, and 10 through 15 were drilled in the proposed lot areas and reported under a separate cover. The borings were generally drilled at the creek crossing for Poco Road, along the channel at creek improvements, and detention pond areas. The borings were drilled to depths of 15 to 20 feet below the existing ground surface (bgs). The drilling was performed using a truck-mounted, continuous flight auger-drilling rig and a mini-excavator supplied and operated by Entech. Boring logs descriptive of the subsurface conditions encountered during drilling are presented in Appendix A. At the conclusion and subsequent to drilling, observations for groundwater levels were made in each of the open boreholes.

Soil and bedrock samples were obtained from the borings utilizing the Standard Penetration Test (ASTM D-1586) using 2-inch O.D. split-barrel and California samplers. Results of the Standard Penetration Test (SPT) are included on the boring logs in terms of N-values expressed in blows per foot (bpf). Soil and bedrock samples recovered from the borings were visually classified and recorded on the boring logs. The soil and bedrock classifications were later verified utilizing laboratory testing and grouped by soil type. The soil and bedrock type

numbers are included on the boring logs. It should be understood that the soil and bedrock descriptions shown on the boring logs may vary between boring location and sample depth. It should also be noted that the lines of stratigraphic separation shown on the boring logs represent approximate boundaries between soil and bedrock types and the actual stratigraphic transitions may be more gradual or variable with location.

Water content testing (ASTM D-2216) was performed on the samples recovered from the borings, and the results are shown on the boring logs. Grain-Size Analysis (ASTM D-422) and Atterberg Limits testing (ASTM D-4318) were performed on selected samples to assist in classifying the materials encountered in the borings. Volume change testing was performed on selected samples using the Swell/Consolidation Test (ASTM D-4546) and the FHA Swell Test in order to evaluate potential expansion/compression characteristics of the soil and bedrock. Soluble sulfate testing was performed on select soil samples to evaluate the potential for below grade degradation of concrete due to sulfate attack. The Laboratory Testing Results are summarized on Table 1 and are presented in Appendix B.

4.0 SUBSURFACE CONDITIONS

One soil type and two bedrock types were encountered in the test borings drilled for the subsurface investigation: Type 1: native slightly silty to silty sand and well graded sand (SM-SW, SM, SW), Type 2: slightly silty to silty sandstone and clayey to very clayey sandstone (SM-SW, SM, SC), and Type 3: sandy to very sandy claystone (CL). The soil and bedrock were classified in accordance with the Unified Soil Classification System (USCS) using the laboratory testing results and the observations made during drilling.

4.1 Soil and Bedrock

Soil Type 1 classified as native slightly silty to silty sand and well graded sand (SM-SW, SM, SW). The sand was encountered in all of the test borings at the existing ground surface and extending to depths ranging from 4 to 20 feet below ground surface (bgs). Standard Penetration Testing conducted on the sand resulted in SPT N-values ranging from 11 to 34 blows per foot (bpf), indicating medium dense to dense states. Loose and wet sand was

encountered in Test Boring Nos. 2 through 6. Water content and grain size testing of selected soil samples resulted in a water content range of 5 to 34 percent, and 2 to 27 percent of the soil particles passing the No. 200 sieve. Atterberg Limits testing resulted in non-plastic results. FHA Swell testing resulted in a swell pressure of 130 psf, indicating low expansion potentials. Swell/Consolidation testing on a sample of silty sand resulted in a volume change of -0.4 percent, indicating a low consolidation potential. Sulfate testing resulted in less than 0.01 percent soluble sulfate by weight, which indicates a negligible potential for below grade concrete degradation due to sulfate attack.

Soil Type 2 classified as slightly silty to silty sandstone and clayey to very clayey sandstone (SM-SW, SM, SC). The sandstone was encountered in all test borings, but Test Boring Nos. 1, 2, 3, 8, and 9 underlying Soil Types 1 and 3 at depths ranging from 4 to 18 feet bgs and extending to depths ranging from 12 to 24 feet bgs and to the termination of the borings (15 to 20 feet). Standard Penetration Testing conducted on the sandstone resulted in SPT N-values of greater than 50 bpf, which indicates very dense states. Water content and grain size testing resulted in a water content range of 10 to 17, and 10 to 38 percent of the soil particles passing the No. 200 sieve. Atterberg Limits testing resulted in non-plastic results. Sulfate testing on the sandstone resulted in less than 0.01 percent sulfate by weight indicating the sandstone exhibits a negligible potential for below grade concrete degradation due to sulfate attack.

Soil Type 3 classified as sandy to very sandy claystone (CL). The claystone was encountered in Test Boring Nos. 1 and 9 underlying Soil Types 1 and 2 at depths ranging from 11 to 14 feet bgs and extending to depths ranging from 17 to 19 feet bgs. Standard Penetration Testing conducted on the claystone resulted in SPT N-values of greater than 50 bpf, which indicates hard consistencies. Water content and grain size testing resulted in a water contenta of 12 to 16, and approximately 51 percent the soil size particles passing the No. 200 sieve. Atterberg limits testing resulted in a Liquid Limit of 31 and Plastic Index of 16. Swell/Consolidation testing on the claystone resulted in volume changes of -0.1 percent, indicating a low consolidation potential.

4.2 Groundwater

Groundwater was encountered at depths ranging from 1 to 18 feet bgs in Test Boring Nos. 2 through 6, and 9. Groundwater will affect construction within the creek. It should be noted that groundwater levels, observed at the time of the subsurface investigation, will change due to seasonal variations, changes in land runoff characteristics and future development including of nearby areas.

5.0 GEOTECHNICAL EVALUATION AND RECOMMENDATIONS

The following discussion is based on the subsurface conditions encountered in the borings drilled at the creek crossing, drop structure areas, and detention pond areas. If subsurface conditions different from those described herein are encountered during construction or if the project elements change from those described, Entech Engineering, Inc. should be notified so that the evaluation and recommendations presented can be reviewed and revised if necessary.

The improvements will include a metal or concrete arch culvert for the creek crossing, drop structures within the creek, and detention structures outside of the creek channel. The proposed creek crossing is expected to utilize arch culverts bearing on shallow concrete foundation systems. Channel improvements will consist of drop structures within the existing creek, and the detention ponds excavated into the land above the creek alignment.

Subsurface soil conditions encountered in the two test borings drilled for the Poco Road / Sand Creek crossing consisted of clean to silty sand overlying sandstone. Bedrock was encountered in one test boring at approximately 18 feet. The surficial sands were encountered in loose and wet conditions. The soils underlying Ponds 1 and 2 consisted of surficial sands overlying sandstone and claystone. The claystone was encountered at hard consistencies. The underlying sandstone was encountered in dense states. The surficial sands and underlying sandstone were encountered with low plasticity indices.

Groundwater and loose soil conditions will impact construction of the arch culvert foundations and channel improvements. Water diversions during construction will likely be required.

Groundwater was encountered at very shallow depths in the areas explored. Excavations below the groundwater levels will likely be required. Dewatering during construction and soil stabilization will likely be required.

Possible loose and low bearing sand soils will require removal/recompaction or stabilization. The subgrade for the arch culvert foundations and channel improvement areas must be scarified and stabilized prior to placing any fill. Shallow sandstone bedrock may be encountered in the vicinity of Test Boring Nos. 8 and 9 and stabilization may not be required. Claystone may also be exposed within the pond excavations in the vicinity of Test Boring Nos. 1 and 9. Overexcavation and replacement with structural fill will be required for pond outlet structures if claystone is exposed in the excavations or in close proximity of foundation members.

Saturated unstable soil conditions will most likely be encountered in a majority of the channel improvement areas. Stabilization materials and procedures, drainage systems, and dewatering will likely be required. Stabilization for footings within the creek channel may include rock and/or geogrids. Excavations of wet soils will be difficult with rubber-tired equipment and may require track-mounted equipment.

5.1 Foundation Recommendations

The main purpose of the subsurface investigation was to gather soil and bedrock information for the proposed creek crossing, channel improvements, and detention pond areas for use in providing foundation recommendations and design values. Recommendations for arch culvert supports using shallow foundation systems, parameters for potential retaining walls, detention ponds, and main channel improvements are provided.

5.2 Shallow Foundation Parameters

The arch culvert structure can be supported with a shallow foundation resting on stabilized sands, recompacted and stabilized loose sands, or structural fill. It should be noted that due to shallow groundwater encountered on this site, extensive subgrade stabilization is anticipated to

support shallow foundations. The foundation members should bear on recompacted site sands according to the "Structural Fill" paragraph.

Any topsoil must be removed and the existing subgrade cleared of any debris prior to excavation. Loose material beneath foundation components will require removal and recompaction. Any expansive soils encountered beneath the foundation will require removal and replacement with non-expansive structural fill compacted according to the "Structural Fill" paragraph. Any new fill should be placed to the requirements of the "Structural Fill". On-site granular sands may be used as structural fill as approved by Entech. Any import material should be approved by Entech prior to hauling to the site.

Provided the above recommendations are followed, an allowable bearing pressure of 1500 psf is recommended for the arch culvert bearing on recompacted/stabilized sands. Footings should extend a minimum of 30 inches below the adjacent exterior surface grade for frost protection. Additional embedment may be required to allow for erosive conditions during times of increase creek flow rates. Following the above foundation subgrade preparation recommendations, and adhering to the recommended maximum allowable bearing pressure, it is expected to result in foundation designs which should limit total and differential vertical movements.

Foundation excavations/stabilization areas are recommended to extend at least 3 feet horizontally beyond the foundation members for drop structures, retaining walls, or pond outlet structures. All foundation excavation side slopes should be inclined at angles of $1^1/_2$ horizontal to 1 vertical or flatter, as necessary, to provide for excavation sidewall stability during construction or as required by OSHA regulations.

Entech should observe overexcavated subgrades as well as the overall foundation excavation subgrade and evaluate if the exposed conditions are consistent with those described in this report. Entech should also provide recommendations for overexcavation depth and other subgrade improvements, if necessary, and the need for drain systems based on the excavation conditions observed at that time.

5.3 Detention Ponds and Creek Improvements

The following recommendations a for constructing detention ponds and drop structures based on our investigation, laboratory testing, and requirements specified in the El Paso County Engineering Criteria Manual and the El Paso County Drainage Criteria Manual.

The soils in the vicinity of the Pond 1 were recovered from Test Boring No. 1. The soils recovered were determined to consist of medium dense silty sand overlying hard claystone with underlying very dense clayey sandstone with no groundwater encountered in the boing that was drilled to a 20-foot depth. Shallow cuts are likely proposed in this area, largely exposing the medium dense sands which should adequately support the proposed facility. The soils in the vicinity of the Pond 2 were recovered from Test Boring Nos. 8 and 9. The soils recovered were determined to consist of medium dense silty sand overlying very dense clayey sandstone and hard claystone with groundwater at a depth of 18 feet bgs in one test boring. Shallow cuts are likely proposed in this area, largely exposing the medium dense sands and very dense sandstone which should adequately support the proposed facility.

The detention pond design parameters and geometry shall conform to the requirements specified in the El Paso County Engineering Criteria Manual and the El Paso County Drainage Criteria Manual. Surficial sands and sandstone will likely be exposed based on our soil borings, with a soil bearing capacity of 2,400 psf for the sand and 3,500 psf for the undisturbed sandstone, and soil mitigation will likely not be required. It is anticipated that the detention ponds will primarily be excavated into existing grades. Embankments are not expected; however, embankment foundations, if required, shall be fully exposed and observed by personnel of Entech to determine mitigation requirements, if any, prior to constructing the embankment. Groundwater is not expected at shallow excavated depths. Embankment soils shall be compacted to the requirements specified in Section 5.8 in our soils report, 95 percent of the soils maximum dry density as determined by ASTM D-1557 at ±2 percent of the soils optimum moisture content. Based on the suggested compaction efforts for the embankment soils and the expected foundation soils, it is likely that embankment settlement will be less than 3 percent of the embankment height. Seepage through the embankment should be minimal

with proposed outlet structures which will decrease detention times and the ability to release the stored waters back into the creek.

The creek improvements will consist of small drop structures. Dewatering upgradient of the structures will likely be required during construction. Sheet pile cutoff walls should be constructed of impervious materials designed with water-tight seals at the panel connections. The sheet piles driven a minimum of 10 feet below the creek channel are anticipated. Loose sandy soils were encountered in the cut off wall locations (Test Boring Nos. 2, 5 and 6). An alternative to a sheet pile cutoff walls would be to utilize concrete cutoff walls bearing on well compacted soils below the local frost depth. Plans of the drop structures were not available at the time of developing this report.

5.4 Retaining Wall Parameters

The following values are recommended for use in designing retaining walls with unbalanced lateral loading that may be associated with this project. Roadway/Vehicle surcharge loading is required for wall design.

Recommended Design Values – Lateral Loading

Equivalent fluid density for lateral earth pressure (active), pcf (site granular soils)	45
Equivalent fluid density for lateral earth pressure (passive), pcf	300
Equivalent fluid density for lateral earth pressure (at rest), pcf	60
Unit weight of native overburden sand, pcf	120
Unit weight of native overburden sandy clay-silt, pcf	115
Unit weight of sandstone bedrock, pcf	125
Angle of Internal Friction (loose silty sand)	26°
Angle of Internal Friction (compacted silty sand)	34°
Coefficient of sliding between concrete and silty sand	0.30
Bearing capacity of well compacted sand, psf (Arch Culvert)	1500

*Note: The above lateral loading design values are for level back slope angles and no surcharge loads. If wall backfill is submerged, water pressures must be taken into account as additional wall loading. If backfill slope angles are greater than zero degrees, or if the backfill is surcharged, the design values must be adjusted to account for additional lateral loading.

5.5 Site Seismic Classification

Based on the subsurface conditions encountered at the site and in accordance with Section 1613 of the 2015 International Building Code (IBC), the site meets the conditions of a Site Class D.

5.6 Concrete Degradation Due to Sulfate Attack

Soluble sulfate testing was conducted on three samples of the site soils to evaluate the potential for sulfate attack on concrete placed below the surface grade. The test results indicated less than 0.01 percent soluble sulfate by weight for the site soils. The test results indicate the sulfate component of the in-place site soils present a negligible exposure threat to concrete placed below grade that comes into contact with the site soils.

Type II cement is recommended for concrete at this site. To further avoid concrete degradation during construction it is recommended that concrete not be placed on frozen or wet ground. Care should be taken to prevent the accumulation or ponding of water in foundation excavations prior to the placement of concrete. If standing water is present in the foundation excavations, it should be removed by ditching to sumps and pumping the water away from the foundation area prior to concrete placement. If concrete is placed during periods of cold temperatures, the concrete must be kept from freezing. This may require covering the concrete with insulated blankets and adding heat to prohibit freezing.

5.7 Foundation Excavation Observations

Subgrade preparation for arch culvert foundations and associated improvements should be observed by Entech Engineering prior to construction of the foundation elements in order to verify that (1) no anomalies are present, (2) materials of the proper bearing capacity have been

encountered or placed, and (3) no soft, loose, uncontrolled fill material, expansive soil or debris are present in the foundation area prior to concrete placement or backfilling. Pile driving should be observed to verify proper embedment or refusal. Piles should be driven a minimum of 10 feet below the drop structures or refusal into bedrock. Entech should make final recommendations for over-excavation or stabilization, if required, at the time of excavation observation, if necessary.

5.8 Structural Fill

Areas to receive fill should have all topsoil, organic material or debris removed. Fill must be properly benched. The surface should be scarified and moisture conditioned to within ±2 percent of its optimum moisture content and compacted to 95 percent of its maximum Modified Proctor Dry Density (ASTM D-1557) beneath footings or slabs prior to placing new fill. New fill beneath footings should be non-expansive and be placed in thin lifts not to exceed 6 inches after compaction while maintaining at least 95 percent of its maximum Modified Proctor Dry Density (ASTM D-1557). These materials should be placed at a moisture content conducive to compaction, usually ±2 percent of Proctor optimum moisture content. The placement and compaction of fill should be observed and tested by Entech Engineering, Inc. Imported soils should be approved by Entech Engineering, Inc. prior to being hauled to the site and on-site granular soils prior to placement.

Compacted, non-expansive granular soil, free of organics, debris and cobbles greater than 3-inches in diameter, is recommended for filling foundation components. All fill placed within the foundation areas should be non-expansive and be compacted to a minimum of 95 percent of the soils maximum dry density as determined by the Modified Proctor Test (ASTM D-1557). Fill material placed beneath slabs should be compacted to a minimum of 95 percent of its maximum Modified Proctor Dry Density, ASTM D-1557. Fill material should be placed in horizontal lifts such that each finished lift has a compacted thickness of six inches or less. Fill should be placed at water contents conducive to achieving adequate compaction, usually within ±2 percent of the optimum water content as determined by ASTM D-1557. Mechanical methods can be used for placement and compaction of fill; however, heavy equipment should be kept at distance from foundation walls and below slab infrastructure to avoid overstressing. No water

flooding techniques of any type should be used for compaction or placement of foundation or slab fill material.

5.9 Utility Trench Backfill

Fill placed in utility trenches should be compacted to a minimum of 95 percent of its maximum dry density as determined by the Standard Proctor Test (ASTM D-698) for cohesive soils and 95 percent as determined by the Modified Proctor Test (ASTM D-1557) for cohesionless soils. Fill should be placed in horizontal lifts having a compacted thickness of six inches or less and at a water content conducive to adequate compaction, within $\pm$2 percent of the optimum water content. Mechanical methods should be used for fill placement; however, heavy equipment should be kept at a distance from foundation walls. No water flooding techniques of any type should be used for compaction or placement of utility trench fill.

Trench backfill placement should be performed in accordance with El Paso County specifications. All excavation and excavation shoring/bracing should be performed in accordance with OSHA guidelines.

5.10 General Backfill

Any areas to receive fill outside the foundation limits should have all topsoil, organic material, and debris removed. Fill must be properly benched into existing slopes in order to be adequately compacted. The fill receiving surface should be scarified to a depth of 12-inches and moisture conditioned to ± 2 percent of the optimum water content, and compacted to a minimum of 95 percent of the ASTM D-1557 maximum dry density before the addition of new fill. Fill should be placed in thin lifts not to exceed 6 inches in thickness after compaction while maintaining at least 95 percent of the ASTM D-1557 maximum dry density. Fill material should be free of vegetation and other unsuitable material and shall not contain rocks or fragments greater than 3-inches. Topsoil and strippings should be segregated from all other fill sources on the site. Fill placement and compaction beneath and around foundations, in utility trenches, beneath roadways or other structural features of the project should be observed and tested by Entech during construction.

5.11 Excavation Stability

Excavation sidewalls must be properly sloped, benched and/or otherwise supported in order to maintain stable conditions. All excavation openings and work completed therein shall conform to OSHA Standards as put forward in CFR 29, Part 1926.650-652, (Subpart P).

5.12 Winter Construction

In the event construction of the planned facility occurs during winter, foundations and subgrades should be protected from freezing conditions. Concrete should not be placed on frozen soil and once concrete has been placed, it should not be allowed to freeze. Similarly, once exposed, the foundation subgrade should not be allowed to freeze. During site grading and subgrade preparation, care should be taken to avoid burial of snow, ice or frozen material within the planned construction area.

5.13 Construction Observations

It is recommended that Entech observe and document the following activities during construction of the building foundations.

- Excavated subgrades and subgrade preparation.
- Placement of drains (if installed).
- Placement/compaction of fill material for the foundation components and retaining walls.
- Placement/compaction of utility bedding and trench backfill.
- Installation of sheet piles.

6.0 CLOSURE

The subsurface investigation, geotechnical evaluation and recommendations presented in this report are intended for use of Elite Properties of America, Inc. with application to the proposed Poco Road Sand Creek crossing, drop structures, detention ponds, and associated site improvements for the Retreat at Timberridge, Filing No. 1, in the northern portion of El Paso County, Colorado. In conducting the subsurface investigation, laboratory testing, engineering evaluation and reporting, Entech Engineering, Inc. endeavored to work in accordance with generally accepted professional geotechnical and geologic practices and principles consistent with the level of care and skill ordinarily exercised by members of the geotechnical profession currently practicing in same locality and under similar conditions. No other warranty, expressed or implied is made. During final design and/or construction, if conditions are encountered which appear different from those described in this report, Entech Engineering, Inc. requests that it be notified so that the evaluation and recommendations presented herein can be reviewed and modified as appropriate.

If there are any questions regarding the information provided herein or if Entech Engineering, Inc. can be of further assistance, please do not hesitate to contact us.

TABLE

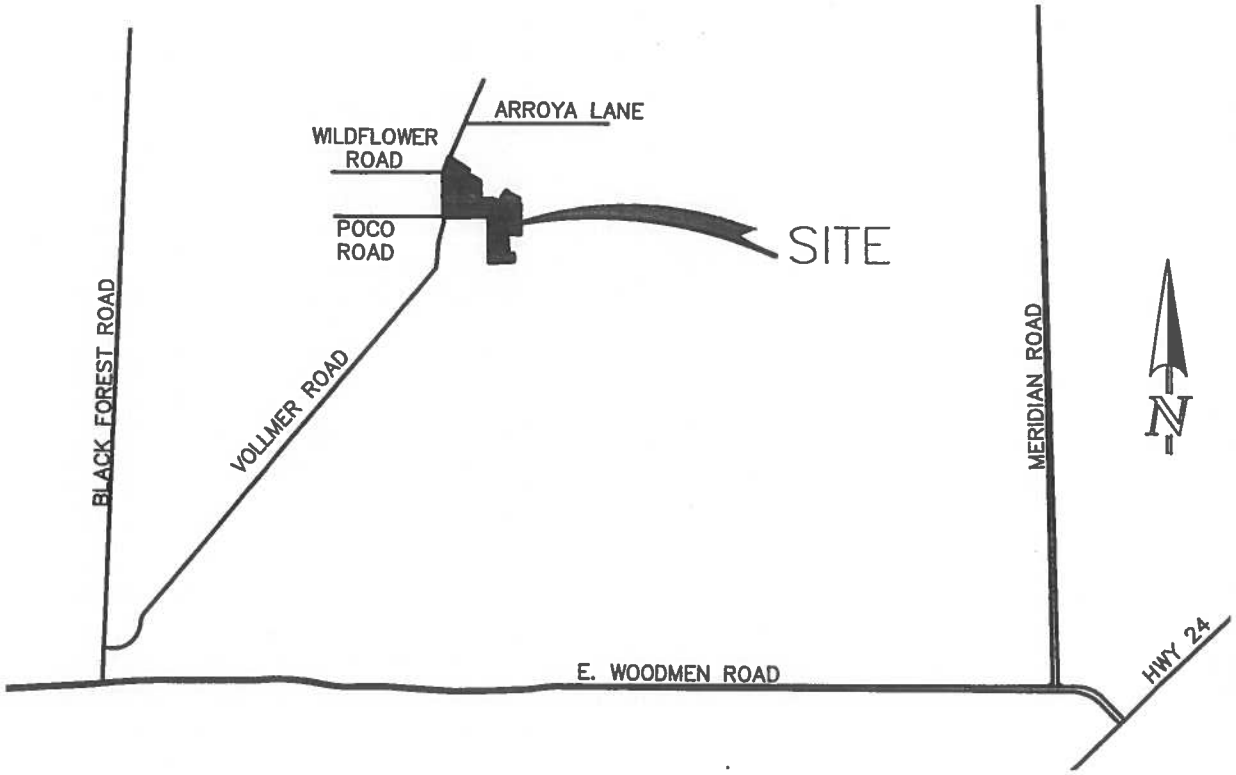
TABLE 1

SUMMARY OF LABORATORY TEST RESULTS

CLIENT CLASSIC COMMUNITIES
PROJECT TIMBER RIDGE, FILING 1
JOB NO. 190975

SOIL TYPE	TEST BORING NO.	DEPTH (FT)	WATER (%)	DRY DENSITY (PCF)	PASSING NO. 200 SIEVE (%)	LIQUID LIMIT (%)	PLASTIC INDEX (%)	SULFATE (WT %)	FHA SWELL (PSF)	SWELL/ CONSOL (%)	UNIFIED CLASSIFICATION	SOIL DESCRIPTION
1	1	5	9.5	114.6	27.1	NV	NP			-0.4	SM	SAND, SILTY
1	2	5			8.3			<0.01			SM-SW	SAND, SLIGHTLY SILTY
1	4	10			1.9						SW	SAND
1	5	5			4.7						SW	SAND
1	6	2-3			8.0						SM-SW	SAND, SLIGHTLY SILTY
1	8	5			12.6				130		SM	SAND, SILTY
2	2	15			38.4						SC	SANDSTONE, VERY CLAYEY
2	3	20			19.3	NV	NP	<0.01			SM	SANDSTONE, SILTY
2	8	10			10.3	NV	NP				SM-SW	SANDSTONE, SLIGHTLY SILTY
3	9	15	13.9	120.5	51.2	31	16			-0.1	CL	CLAYSTONE, VERY SANDY

FIGURES



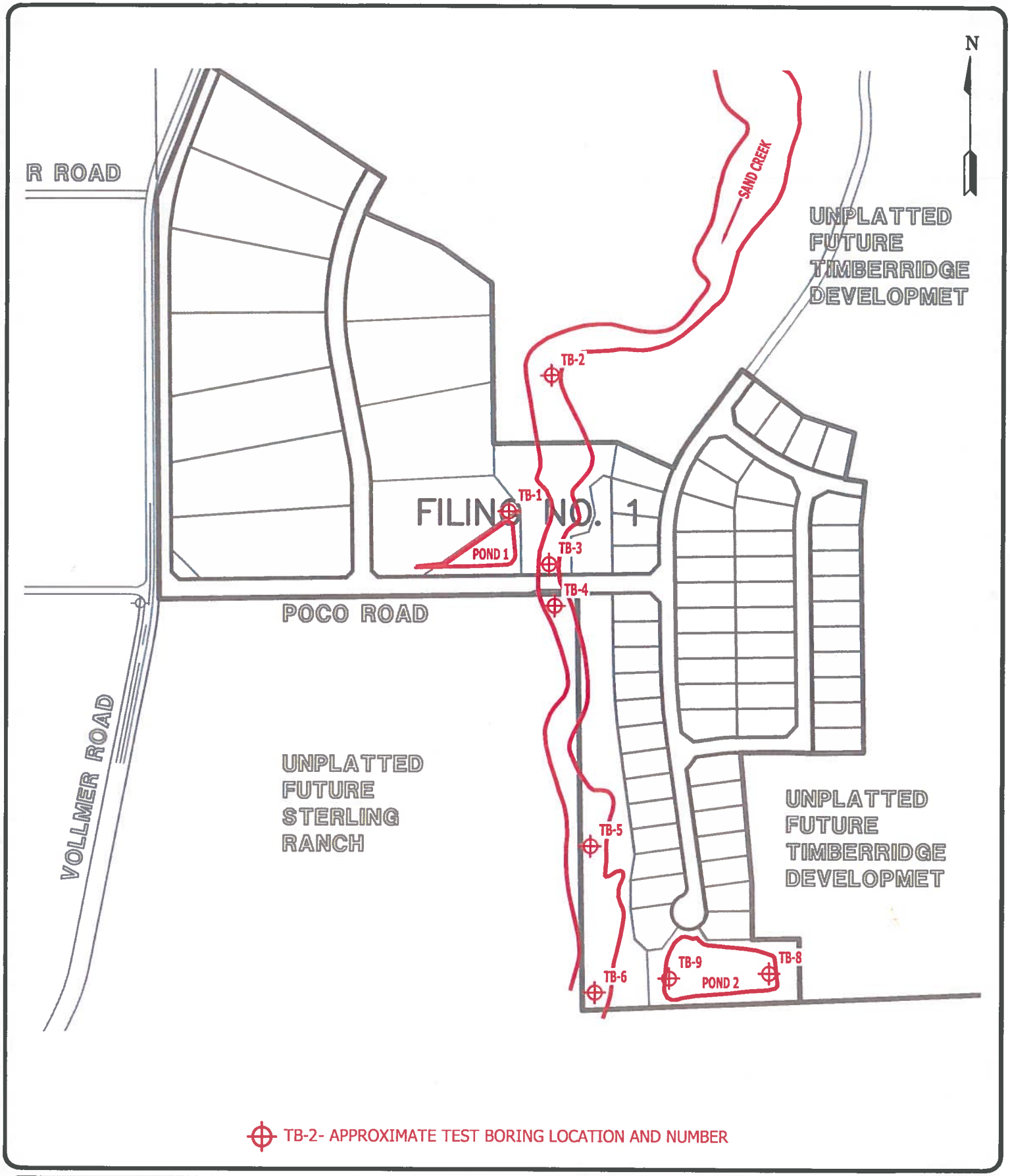
ENTECH ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, CO. 80907 (719) 531-5599

VICINITY MAP
THE RETREAT AT TIMBERRIDGE
EL PASO COUNTY, CO
FOR: CLASSIC COMMUNITIES

DRAWN BY:	DATE DRAWN:	DESIGNED BY:	CHECKED:
SC	07/17/19	SC	SC

JOB NO.: 190975

FIG. NO.: 1



TB-2- APPROXIMATE TEST BORING LOCATION AND NUMBER

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

TEST BORING LOCATION PLAN
THE RETREAT AT TIMBERRIDGE
EL PASO COUNTY, CO
FOR: CLASSIC COMMUNITIES

DRAWN BY:	DATE DRAWN:	DESIGNED BY:	CHECKED:
SC	07/17/19	SC	SC

JOB NO.: 190975
FIG. NO.: 2

APPENDIX A: Test Boring Logs

TEST BORING NO. 1
DATE DRILLED 6/12/2019
Job # 190975

REMARKS

DRY TO 20', 7/15/19

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			22	4.5	1
5			19	13.2	1
10			34	8.6	1
15			50/9"	15.9	3
20			50/6"	9.9	2

6" TOPSOIL, SAND, SILTY, FINE TO COARSE GRAINED, BROWN, MEDIUM DENSE TO DENSE, MOIST

CLAYSTONE, SANDY, GRAY BROWN, HARD, MOIST

SANDSTONE, CLAYEY, FINE TO COARSE GRAINED, GRAY BROWN, VERY DENSE, MOIST

TEST BORING NO. 2
DATE DRILLED 6/12/2019
CLIENT CLASSIC COMMUNITIES
LOCATION TIMBER RIDGE, FILING 1

REMARKS

WATER @ 6', 6/12/19

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5			*	6.3	1
10			*	15.3	1
15			*	16.9	2
20					

SAND, SLIGHTLY SILTY, FINE TO COARSE GRAINED, GRAY BROWN, MOIST TO WET

SANDSTONE, VERY CLAYEY, FINE GRAINED, WET

* - BULK SAMPLE TAKEN

ENTECH
ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
			7/16/19

JOB NO.: 190975
FIG NO.: A- 1

TEST BORING NO. 3
DATE DRILLED 6/12/2019
Job # 190975

REMARKS

WATER @ 1', 6/12/19

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
	SAND, CLEAN TO SILTY, FINE TO COARSE GRAINED, BROWN, MOIST TO WET				
5			*	23.6	1
10			*	33.9	1
15			*	19.0	1
	SANDSTONE, SILTY, FINE GRAINED, GRAY BROWN, MOIST				
20			*	13.1	2

* - BULK SAMPLE TAKEN

TEST BORING NO. 4
DATE DRILLED 6/12/2019
CLIENT CLASSIC COMMUNITIES
LOCATION TIMBER RIDGE, FILING 1

REMARKS

WATER @ 5', 6/12/19

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
	SAND, CLEAN TO SILTY, FINE TO COARSE GRAINED, BROWN, MOIST TO WET				
5			*	11.2	1
10			*	7.1	1
15			*	12.0	1
20					

* - BULK SAMPLE TAKEN

ENTECH
ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE: 7/16/19

JOB NO.: 190975
FIG NO.: A- 2

TEST BORING NO. 5
DATE DRILLED 6/12/2019
Job # 190975

REMARKS

WATER @ 1', 6/12/19

SAND, CLEAN TO SILTY, FINE TO COARSE GRAINED, BROWN TO DARK GRAY, MOIST TO WET

* - BULK SAMPLE TAKEN

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5			*	10.5	1
10			*	20.6	1
15			*	13.2	1
20					

TEST BORING NO. 6
DATE DRILLED 6/12/2019
CLIENT CLASSIC COMMUNITIES
LOCATION TIMBER RIDGE, FILING 1

REMARKS

WATER @ 3', 6/12/19

SAND, SLIGHTLY SILTY TO SILTY, FINE TO COARSE GRAINED, BROWN TO DARK GRAY, MOIST TO WET

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			*	5.0	1
5					
10			*	13.1	1
15			*	16.4	1
20			*	21.1	1

ENTECH
ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE: 7/12/19

JOB NO. 190975
FIG NO. A- 3

TEST BORING NO. 8
DATE DRILLED 6/12/2019
Job # 190975

REMARKS

DRY TO 20', 7/15/19

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			19	6.7	1	6" TOPSOIL, SAND, SILTY, FINE TO COARSE GRAINED, BROWN, MEDIUM DENSE, MOIST
5			27	13.6	1	
						SANDSTONE, SLIGHTLY SILTY, FINE TO COARSE GRAINED, BROWN, VERY DENSE, MOIST
10			50/11"	6.6	2	
15			50/5"	8.6	2	
20			50/5"	11.8	2	

TEST BORING NO. 9
DATE DRILLED 6/12/2019
CLIENT CLASSIC COMMUNITIES
LOCATION TIMBER RIDGE, FILING 1

REMARKS

WATER @ 18', 7/15/19

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			11	13.4	1	6" TOPSOIL, SAND, SILTY WITH CLAY LENSES, FINE TO COARSE GRAINED, BROWN, MEDIUM DENSE, MOIST
5			50/11"	8.9	2	SANDSTONE, SILTY, FINE TO COARSE GRAINED, BROWN, VERY DENSE, MOIST
10			50/9"	8.5	2	
15			50/6"	12.0	3	CLAYSTONE, VERY SANDY, BROWN, HARD, MOIST
20			50/7"	13.1	2	SANDSTONE, CLAYEY TO SILTY, FINE TO COARSE GRAINED, BROWN, VERY DENSE, MOIST

ENTECH
ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

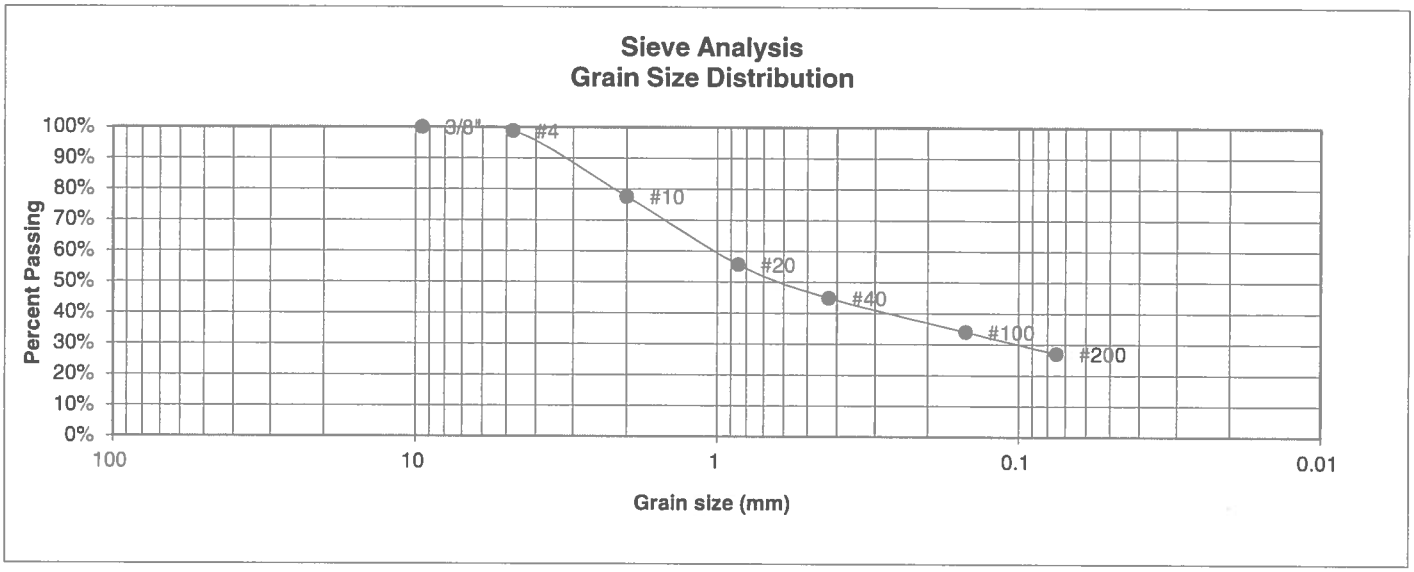
TEST BORING LOG

DRAWN:	DATE:	CHECKED: SLC	DATE: 7/17/19

JOB NO.: 190975
FIG NO.: A- 4

APPENDIX B: Laboratory Test Results

UNIFIED CLASSIFICATION	SM	CLIENT	CLASSIC COMMUNITIES
SOIL TYPE #	1	PROJECT	TIMBER RIDGE, FILING 1
TEST BORING #	1	JOB NO.	190975
DEPTH (FT)	5	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	98.8%
10	77.6%
20	55.7%
40	44.9%
100	34.1%
200	27.1%

Atterberg Limits

Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

Swell

Moisture at start

Moisture at finish

Moisture increase

Initial dry density (pcf)

Swell (psf)

ENTECH
ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

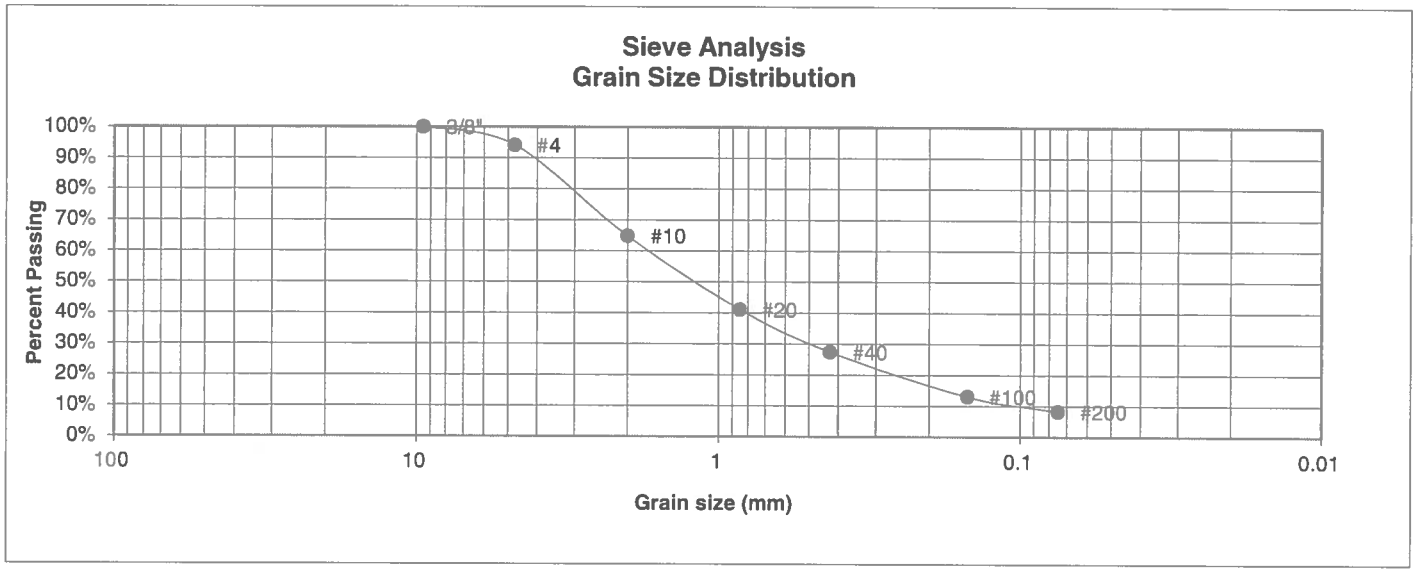
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
			7/16/19

JOB NO.: 190975

FIG NO.: B-1

UNIFIED CLASSIFICATION	SM-SW	CLIENT	CLASSIC COMMUNITIES
SOIL TYPE #	1	PROJECT	TIMBER RIDGE, FILING 1
TEST BORING #	2	JOB NO.	190975
DEPTH (FT)	5	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	94.1%
10	64.8%
20	41.1%
40	27.4%
100	13.1%
200	8.3%

Atterberg Limits
Plastic Limit
Liquid Limit
Plastic Index

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

ENTECH ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

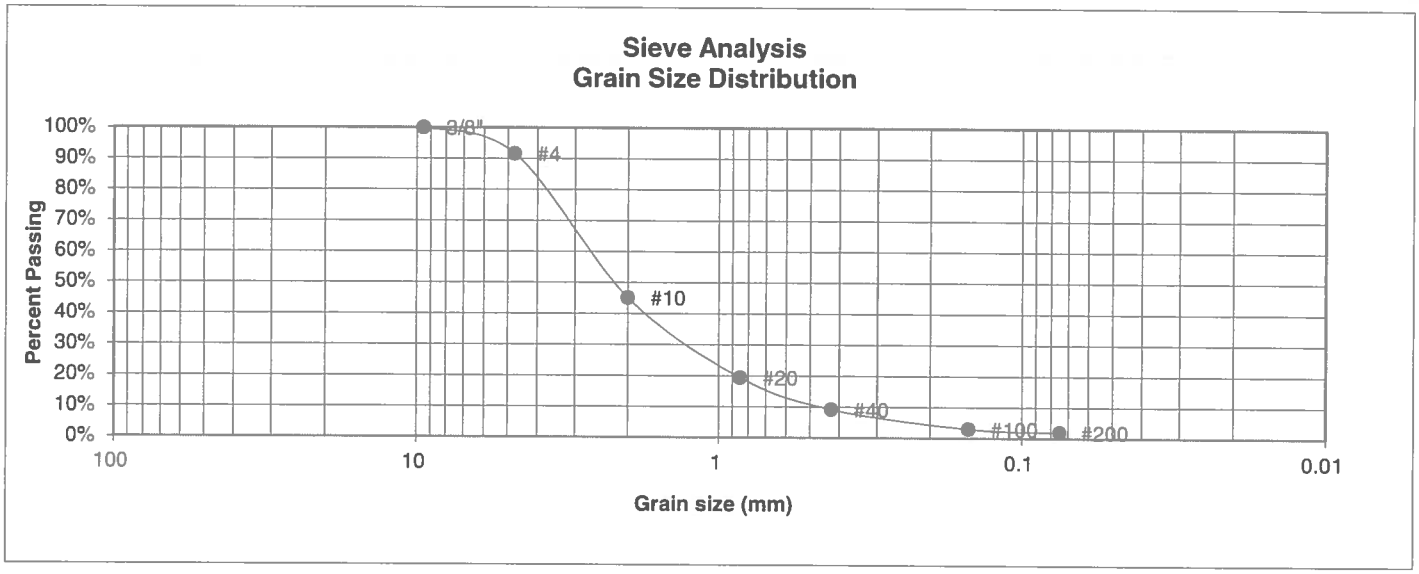
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE: 7/16/19

JOB NO.: 190975

FIG NO.: B-2

UNIFIED CLASSIFICATION	SW	CLIENT	CLASSIC COMMUNITIES
SOIL TYPE #	1	PROJECT	TIMBER RIDGE, FILING 1
TEST BORING #	4	JOB NO.	190975
DEPTH (FT)	10	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	91.6%
10	45.1%
20	19.4%
40	9.2%
100	3.0%
200	1.9%

Atterberg Limits
Plastic Limit
Liquid Limit
Plastic Index

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

ENTECH ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

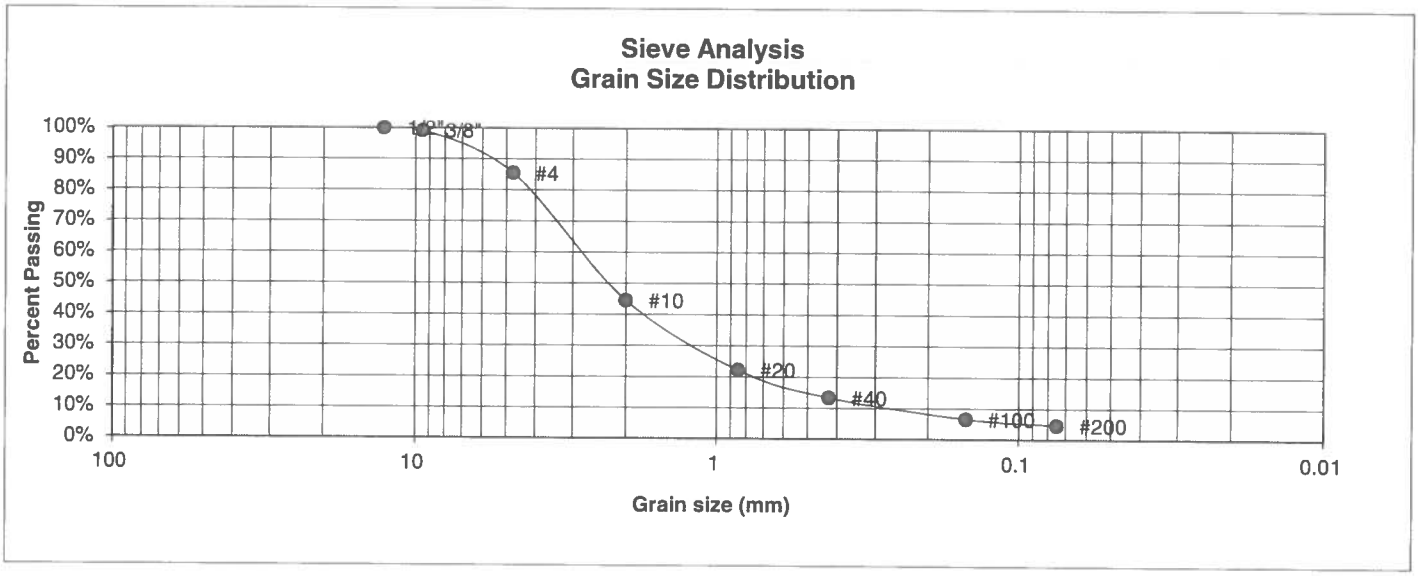
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
			7/16/19

JOB NO.: 190975

FIG NO.: B-3

UNIFIED CLASSIFICATION	SW	CLIENT	CLASSIC COMMUNITIES
SOIL TYPE #	1	PROJECT	TIMBER RIDGE, FILING 1
TEST BORING #	5	JOB NO.	190975
DEPTH (FT)	5	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	99.2%
4	85.4%
10	44.5%
20	22.2%
40	13.3%
100	6.7%
200	4.7%

Atterberg Limits
Plastic Limit
Liquid Limit
Plastic Index

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

ENTECH ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

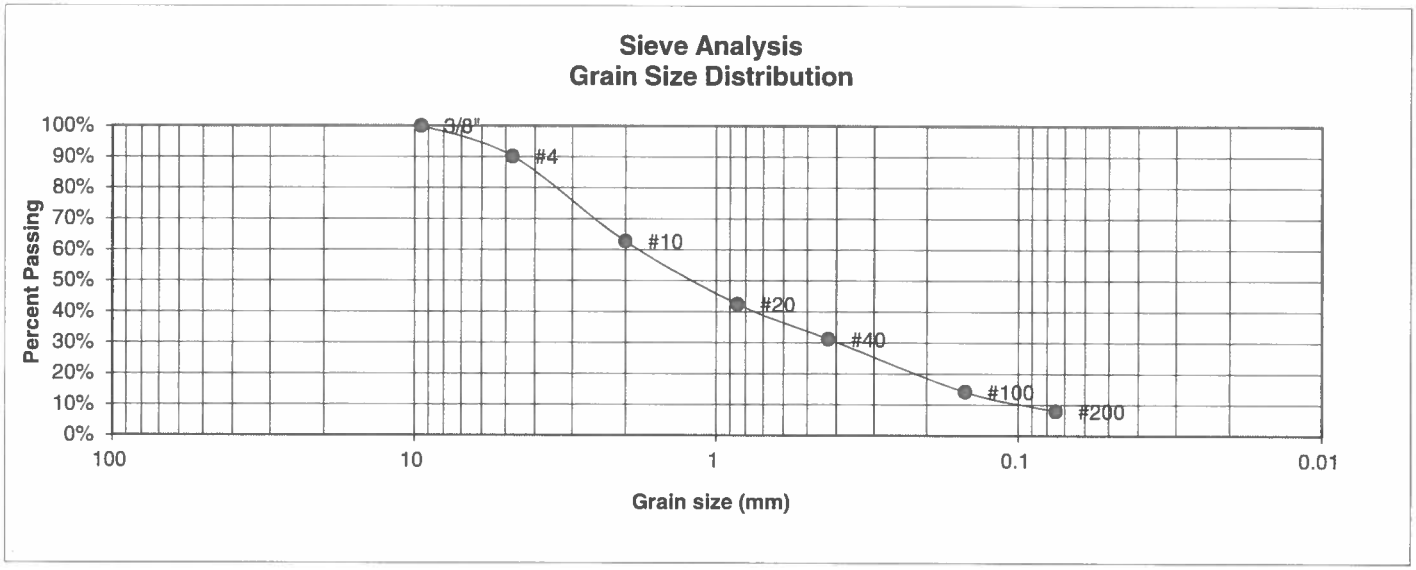
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
			7/16/19

JOB NO.: 190975

FIG NO.: B-4

UNIFIED CLASSIFICATION	SM-SW	CLIENT	CLASSIC COMMUNITIES
SOIL TYPE #	1	PROJECT	TIMBER RIDGE, FILING 1
TEST BORING #	6	JOB NO.	190975
DEPTH (FT)	2-3	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	90.2%
10	62.7%
20	42.5%
40	31.2%
100	14.2%
200	8.0%

Atterberg Limits
Plastic Limit
Liquid Limit
Plastic Index

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

ENTECH ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

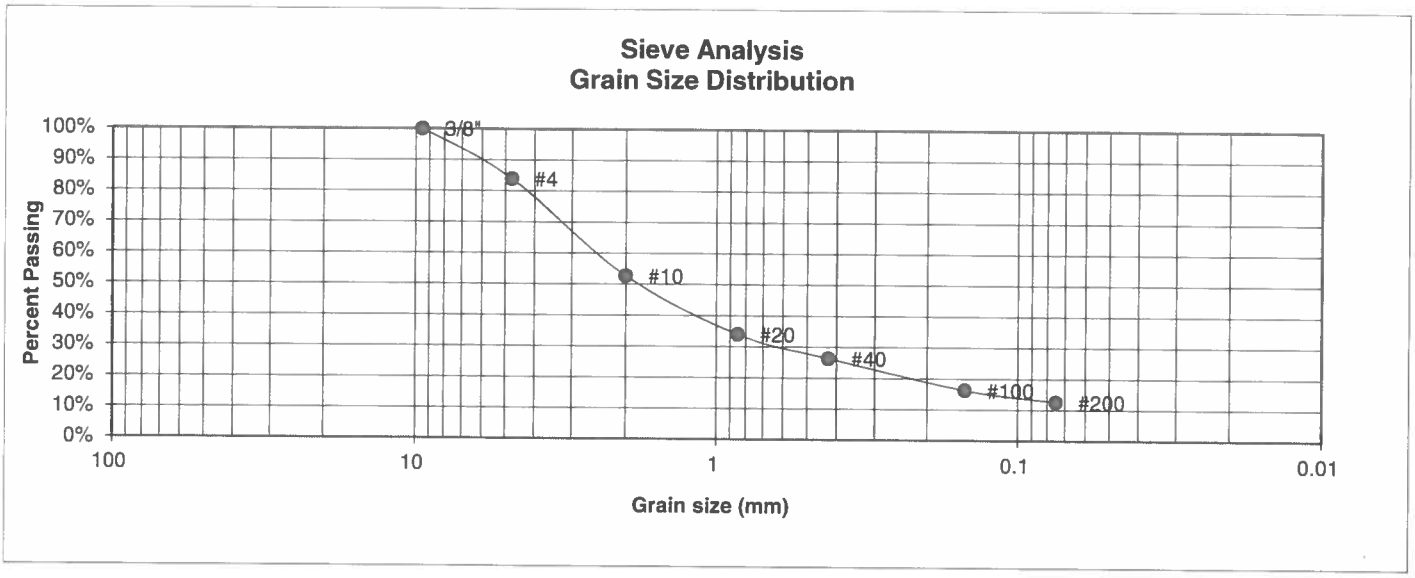
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
			7/16/19

JOB NO.: 190975

FIG NO.: B-5

UNIFIED CLASSIFICATION	SM	CLIENT	CLASSIC COMMUNITIES
SOIL TYPE #	1	PROJECT	TIMBER RIDGE, FILING 1
TEST BORING #	8	JOB NO.	190975
DEPTH (FT)	5	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	83.9%
10	52.7%
20	34.0%
40	26.3%
100	16.3%
200	12.6%

Atterberg Limits

Plastic Limit	
Liquid Limit	
Plastic Index	

Swell

Moisture at start	11.3%
Moisture at finish	20.9%
Moisture increase	9.6%
Initial dry density (pcf)	104
Swell (psf)	130

ENTECH ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

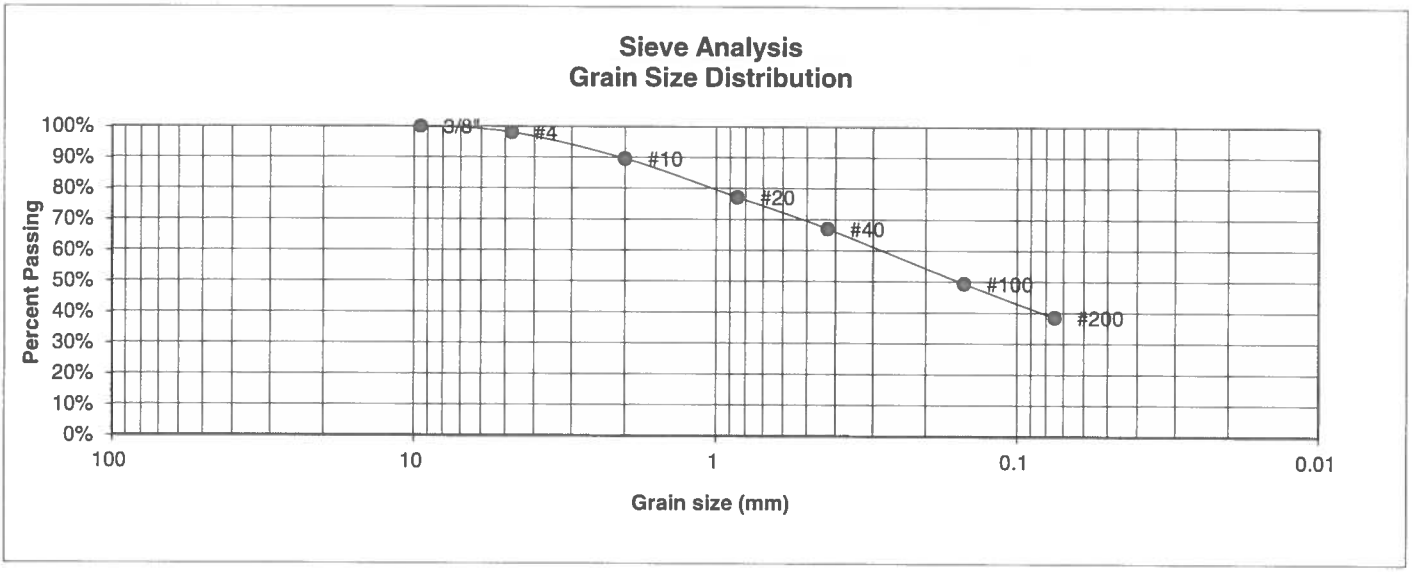
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
			7/16/19

JOB NO.: 190975

FIG NO.: B-6

UNIFIED CLASSIFICATION	SC	CLIENT	CLASSIC COMMUNITIES
SOIL TYPE #	2	PROJECT	TIMBER RIDGE, FILING 1
TEST BORING #	2	JOB NO.	190975
DEPTH (FT)	15	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	98.0%
10	89.6%
20	77.1%
40	67.0%
100	49.4%
200	38.4%

Atterberg Limits
Plastic Limit
Liquid Limit
Plastic Index

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

ENTECH ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

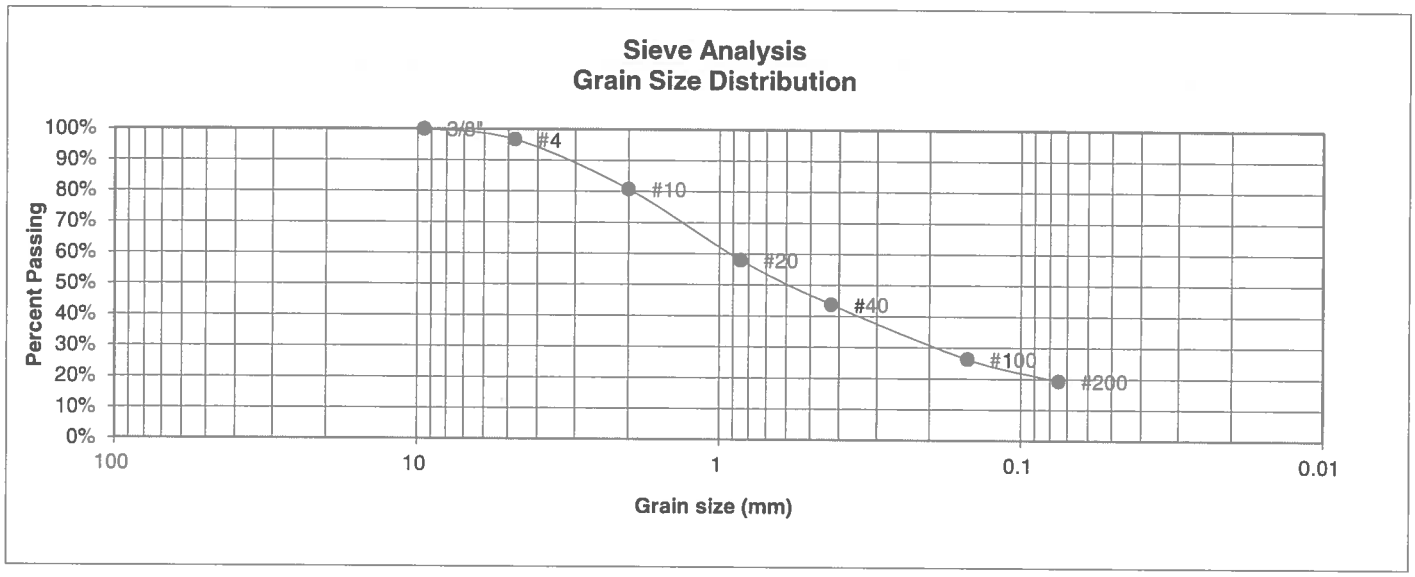
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
			7/16/19

JOB NO.: 190975

FIG NO.: B-7

UNIFIED CLASSIFICATION	SM	CLIENT	CLASSIC COMMUNITIES
SOIL TYPE #	2	PROJECT	TIMBER RIDGE, FILING 1
TEST BORING #	3	JOB NO.	190975
DEPTH (FT)	20	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	96.7%
10	80.7%
20	58.0%
40	43.8%
100	26.3%
200	19.3%

Atterberg Limits

Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

Swell

Moisture at start

Moisture at finish

Moisture increase

Initial dry density (pcf)

Swell (psf)

ENTECH ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

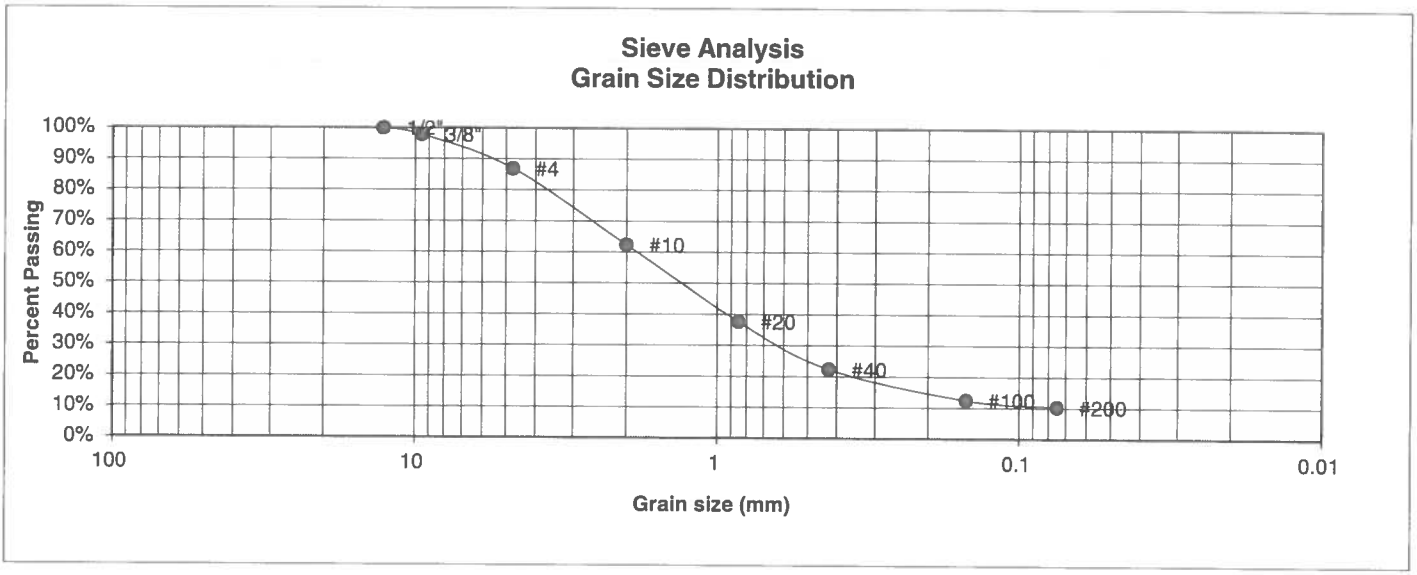
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
			7/16/14

JOB NO.: 190975

FIG NO.: B-8

UNIFIED CLASSIFICATION	SM-SW	CLIENT	CLASSIC COMMUNITIES
SOIL TYPE #	2	PROJECT	TIMBER RIDGE, FILING 1
TEST BORING #	8	JOB NO.	190975
DEPTH (FT)	10	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	97.9%
4	86.9%
10	62.3%
20	37.6%
40	22.3%
100	12.4%
200	10.3%

Atterberg Limits

Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

Swell

Moisture at start

Moisture at finish

Moisture increase

Initial dry density (pcf)

Swell (psf)

ENTECH ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

LABORATORY TEST RESULTS

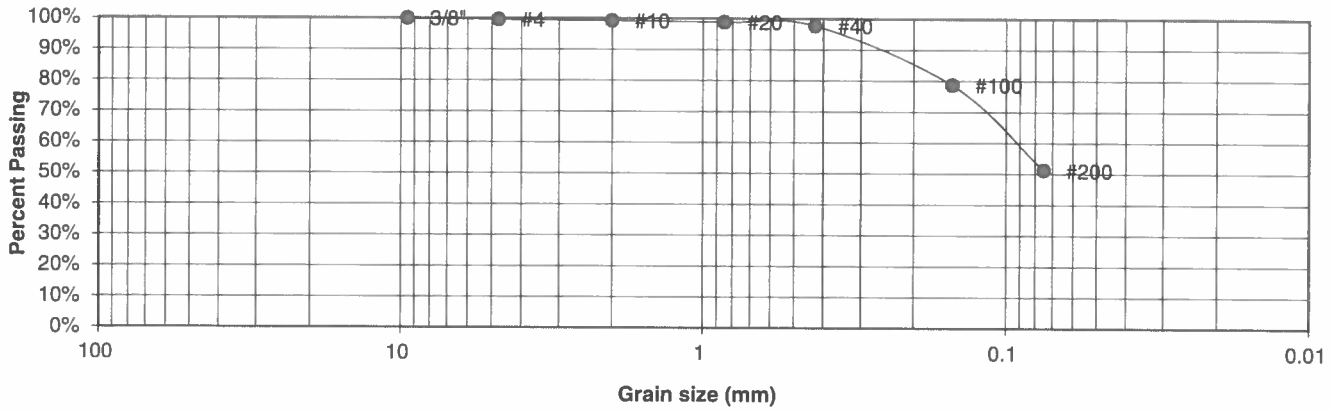
DRAWN:	DATE:	CHECKED:	DATE:
			7/16/19

JOB NO.: 190975

FIG NO.: B-9

UNIFIED CLASSIFICATION	CL	CLIENT	CLASSIC COMMUNITIES
SOIL TYPE #	3	PROJECT	TIMBER RIDGE, FILING 1
TEST BORING #	9	JOB NO.	190975
DEPTH (FT)	15	TEST BY	BL

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	99.6%
10	99.3%
20	98.9%
40	97.7%
100	78.7%
200	51.2%

Atterberg Limits

Plastic Limit	15
Liquid Limit	31
Plastic Index	16

Swell

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

ENTECH ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE: 7/16/19

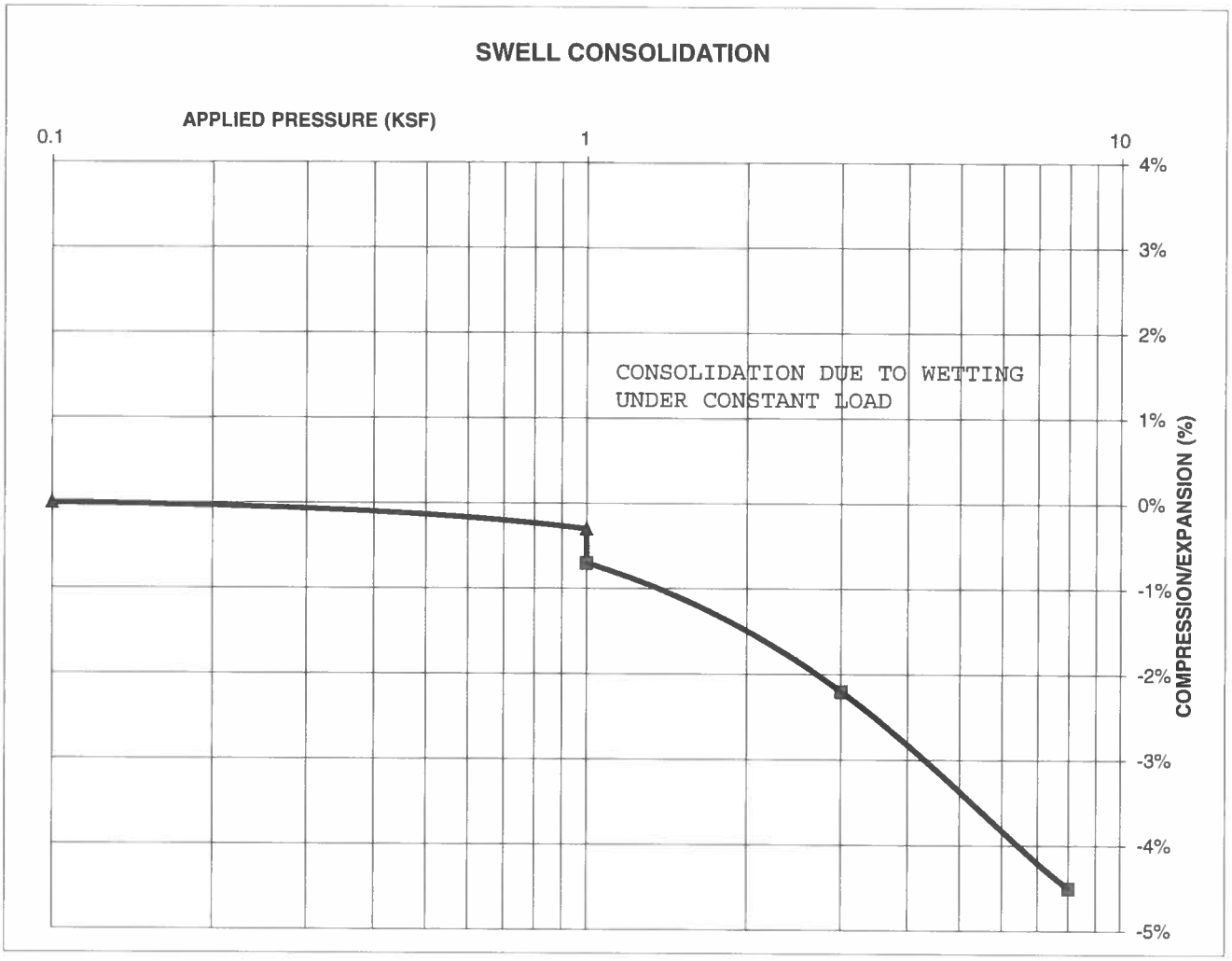
JOB NO.: 190975

FIG NO.: B-10

CONSOLIDATION TEST RESULTS

TEST BORING #	1	DEPTH(ft)	5
DESCRIPTION	SM	SOIL TYPE	1
NATURAL UNIT DRY WEIGHT (PCF)			115
NATURAL MOISTURE CONTENT			9.5%
SWELL/CONSOLIDATION (%)			-0.4%

JOB NO. 190975
CLIENT CLASSIC COMMUNITIES
PROJECT TIMBER RIDGE, FILING 1



ENTECH
ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

SWELL CONSOLIDATION
TEST RESULTS

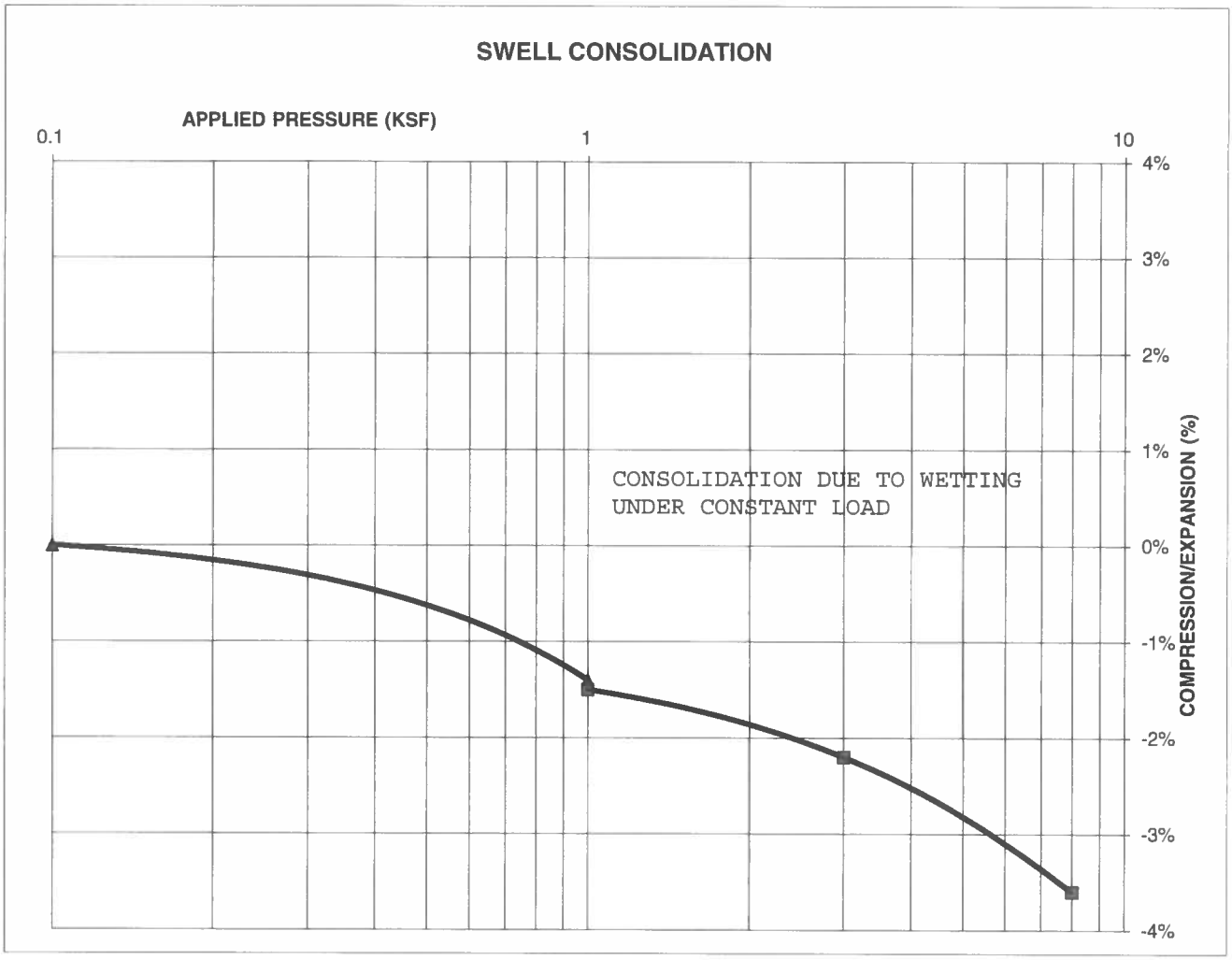
DRAWN:	DATE:	CHECKED:	DATE:
			7/16/19

JOB NO.: 190975
FIG NO.: B-11

CONSOLIDATION TEST RESULTS

TEST BORING #	9	DEPTH(ft)	15
DESCRIPTION	CL	SOIL TYPE	4
NATURAL UNIT DRY WEIGHT (PCF)			121
NATURAL MOISTURE CONTENT			13.9%
SWELL/CONSOLIDATION (%)			-0.1%

JOB NO. 190975
CLIENT CLASSIC COMMUNITIES
PROJECT TIMBER RIDGE, FILING 1



ENTECH
ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

SWELL CONSOLIDATION
TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
			7/16/19

JOB NO.: 190975
FIG NO.: B-12

CLIENT	CLASSIC COMMUNITIES	JOB NO.	190975
PROJECT	TIMBER RIDGE, FILING 1	DATE	7/11/2019
LOCATION	TIMBER RIDGE, FILING 1	TEST BY	BL

BORING NUMBER	DEPTH, (ft)	SOIL TYPE NUMBER	UNIFIED CLASSIFICATION	WATER SOLUBLE SULFATE, (wt%)
TB-2	5	1	SM-SW	<0.01
TB-3	20	2	SM	<0.01

QC BLANK PASS

ENTECH
ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

LABORATORY TEST
SULFATE RESULTS

DRAWN:	DATE:	CHECKED:	DATE: 7/16/19

JOB NO.: 190975

FIG NO.: B-13