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SUBSURFACE SOIL INVESTIGATION - ADDITION
BIG R STORE - FALCON
14155 US HIGHWAY 24
EL PASO COUNTY, COLORADO

Prepared for:

T-BONE CONSTRUCTION
1310 FORD STREET
COLORADO SPRINGS, CO 80915

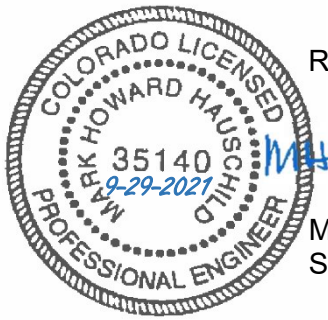
Attn: Darin Weiss

September 20, 2021

Respectfully Submitted,

ENTECH ENGINEERING, INC.

Daniel P. Stegman



Reviewed by:

Mark H. Hauschild, P.E.
Senior Engineer

DPS/bs

Encl.

Entech Job No. 211715
AAprojects/2021/211715 ssi

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SUBSURFACE SOIL INVESTIGATION
BIG R STORE - FALCON
14155 US HIGHWAY 24
EL PASO COUNTY, COLORADO

1.0 INTRODUCTION

The project is to consist of the construction of a 10,000 square-foot addition on to the existing commercial building and associated site improvements east of Colorado Springs, Colorado. The site is located approximately 0.4 miles south of the corner of the intersection of Stapleton Road and US Highway 24. The approximate location of the project site is shown on the Vicinity Map, Figure 1. The boring locations for the proposed building are shown on Figure 2, the Test Boring Location Map.

This report describes the subsurface investigation conducted for the planned building addition and provides recommendations for foundation design and construction. The Subsurface Soil Investigation included drilling test borings at three locations, one in the parking lot and two within the footprint of the addition, collecting samples of soil, and conducting a geotechnical evaluation of the investigation findings. A pavement design will be provided in a separate report. 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 our understanding that the project will consist of the construction of a new 10,000 square foot addition on to the west side of the existing commercial structure and include associated site improvements. Slab on grade floors are proposed. At the time of drilling, the site for the proposed building area consisted of a vacant lot with sparse vegetation consisting of field grasses and weeds. The building addition area is relatively flat. Adjacent properties consist of existing industrial/commercial buildings, residential lots and vacant lots.

3.0 SUBSURFACE EXPLORATIONS AND LABORATORY TESTING

The subsurface conditions were investigated by drilling three exploratory test borings, one in the parking lot and two in the building addition footprint, shown in Figure 2. The borings were drilled to depths of 10 to 20 feet below the existing ground surface. The drilling was performed using a truck-mounted continuous flight auger-drilling rig supplied and operated by Entech Engineering, Inc. Boring Logs description of the subsurface conditions encountered during drilling is presented in Appendix A. At the conclusion of drilling, observations of groundwater levels were made in each of the open borings.

Soil samples were obtained from the borings utilizing the Standard Penetration Test (ASTM D-1586) using a California sampler. Results of the Standard Penetration Test (SPT) are included on the Test Boring Logs in terms of N-values expressed in blows per foot (bpf). Soil samples recovered from the borings were visually classified and recorded on the Test Boring Logs. The soil classifications were later verified utilizing laboratory testing and grouped by soil type. The soil type numbers are included on the Test Boring Logs. It should be understood that the soil descriptions shown on the Test Boring Logs may vary between boring location and sample depth. It should also be noted that the lines of stratigraphic separation shown on the Test Boring Logs represent approximate boundaries between soil types and the actual stratigraphic transitions may be more gradual and vary with location. The Test Boring Logs are presented in Appendix A.

Moisture Content, ASTM D-2216, was obtained in the laboratory for all recovered samples. Grain-Size, ASTM D-422, and Atterberg Limits, ASTM D-4318, were determined for various samples for the purpose of classification and to obtain pertinent engineering characteristics. Swell/Consolidation testing was performed on a selected sample to evaluate the expansion/consolidation characteristics of the soils. Water soluble sulfate testing was performed to evaluate the soils corrosive characteristics. The Laboratory Test Results are included in Appendix B and summarized in Table 1.

4.0 SUBSURFACE CONDITIONS

Two soil types were encountered in the borings drilled for the subsurface investigation: Type 1: silty to slightly silty sand (SM, SM-SW), and Type 2: very silty sandstone (SM). Bedrock was encountered in Test Borings No. 1 and 2 at approximate depths of 16 to 17 feet below ground surface. The soil was classified in accordance with the Unified Soil Classification System (USCS) using the laboratory testing results and the observations made during drilling.

4.1 Soil

Soil Type 1 is a silty to slightly silty sand (SM, SM-SW). The sand was encountered in all of the test borings at the surface extending to depths of 16 to 17 feet below ground surface (bgs) in Test Borings Nos. 1 and 2 and to the termination of Test Boring No. 3 (10 Feet). Standard Penetration Testing on the sand resulted in N-values of 9 to 25 blows per foot (bpf), which indicates medium dense states. Moisture content tested resulted in water contents of 2 to 14 percent. Grain size analysis conducted on samples of the soil resulted in approximately 5 to 19 percent of the soil size particles passing the No. 200 sieve. The sand materials are anticipated to exhibit low expansion characteristics. Atterberg limits performed resulted in liquid limits of no-value and plastic indexes of non-plastic. Sulfate testing resulted in less than 0.01 percent soluble sulfate by weight, indicating the sand exhibits negligible potential for below grade concrete degradation due to sulfate attack.

Soil Type 2 is a very silty sandstone (SM). The sandstone was encountered in Test Boring Nos. 1 and 2 at depths of 16 to 17 feet bgs extending to the termination of the test borings (20 Feet).

Standard Penetration Testing on the sandstone resulted in N-values of greater than 50 blows per foot (bpf), which indicates very dense states. Moisture content tested resulted in water contents of 12 and 16 percent. Grain size analysis conducted on samples of the soil resulted in approximately 47 percent of the soil size particles passing the No. 200 sieve. Atterberg limits performed resulted in liquid limits of 32 percent and plastic indexes of 3 percent. A Swell/ Consolidation Test indicated a volume change of 2.2%, which is in the moderate expansion range for a sample of very silty sandstone from Test Boring No. 1 at a depth of 20 feet. Sulfate testing resulted in 0.00 percent soluble sulfate by weight, indicating the sand exhibits negligible potential for below grade concrete degradation due to sulfate attack.

Additional descriptions and engineering properties of the soil encountered during drilling are included on the boring logs. Laboratory testing results are summarized on Table 1 and presented in Appendix B. It should be understood that the soil descriptions reported on the boring logs may vary between boring locations and sampling depths. Similarly, the lines of stratigraphic separation shown on the boring logs represent approximate boundaries between soil types and the actual transitions between types may be more gradual or variable.

4.2 Groundwater

Groundwater was encountered at 16 feet in Test Boring Nos 1 and 2 subsequent to drilling of the test borings, which were drilled to 20 feet. Groundwater is not expected to affect the construction of the shallow foundations proposed on this site. Development of this and adjacent properties, as well as seasonal precipitation changes, and changes in runoff may affect groundwater elevations.

5.0 GEOTECHNICAL EVALUATION AND RECOMMENDATIONS

The following discussion is based on the subsurface conditions encountered in the borings drilled in the planned addition footprint. 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 site will continue to be developed by constructing a new 10,000 square foot addition to the existing commercial building with associated site improvements. The proposed building addition is expected to have slab-on-grade type construction with no basement or below grade slab level. Given the subsurface conditions encountered at the time of drilling and the site development as described, it is anticipated that shallow foundations will be utilized. Design considerations are discussed in the following sections.

Subsurface soil conditions encountered in the test borings drilled for the planned structure consisted of silty to slightly silty sand overlying very silty sandstone. The soils predominantly consist of sand. SPT N-values measured in the sand indicated overall medium dense states. Although, loose sands were encountered in Test Boring No. 2, and may be encountered in excavations. The site sands are expected to be encountered at foundation grade and will provide good support for the foundation.

If loose sand or expansive soils are encountered at foundation grade, it is recommended that loose soils be removed below foundation members and recompacted in place, and 3 feet of the expansive clay soils (if encountered) be removed and replaced with compacted granular fill. Sand fill should be compacted in lifts not to exceed 6 inches after compaction, while maintaining a minimum of 95 percent of its maximum Modified Proctor Dry Density, ASTM D-1557. The fill soils should be placed at a moisture content conductive to adequate compaction (usually about ± 2 percent of Proctor optimum moisture content). Prior to placing structural fill, the overexcavated subgrade should be scarified to a minimum depth of 12 inches, moisture conditioned to ± 2 percent of optimum moisture, and compacted to a minimum of 95 percent of its maximum Modified Proctor Dry Density (ASTM D-1557). The overexcavated site should be observed by a representative of Entech Engineering, Inc. prior to fill placement, and the first density test should be conducted on the overexcavated subgrade and then after each 12 to 18 inches of fill have been placed. To document the quality of the compacted fills, frequent density tests should be taken.

Fill may be encountered in the excavation adjacent to the existing structure. This fill is considered to be uncontrolled and must be fully penetrated to native soils and be recompacted under controlled conditions, or be removed and replaced, if expansive soils are encountered.

Foundation excavations are recommended to extend at least 3 feet horizontally beyond the foundation wall limits (inside and outside), in order to provide adequate space for installation of drainage materials (if necessary) and placement of controlled fill. 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.

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 foundation drainage, based on the excavation conditions observed at that time.

5.1 Shallow Foundations

Provided the above recommendations are followed, the proposed structure can be supported with shallow spread footing foundations placed on non-expansive native medium dense site sands and compacted granular fills. A maximum allowable bearing pressure of 2000 pounds per square foot (psf) is anticipated for foundations supported on native medium dense sands. For final design, continuous spread footings are recommended to have a minimum width of 16 inches, and individual column footings should have minimum plan dimensions of 24 inches on each side in order to avoid punching failure into the supporting subgrade soils. Exterior footings should extend a minimum of 30 inches below the adjacent exterior site grade for frost protection. Following the above 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 to 1 and ½ inches, respectively. If such movement cannot be tolerated and overexcavation is impractical, consideration should be given to using a deep foundation system such as drilled piers and a structural floor to support the building and floor loads.

Foundation walls should be designed to resist lateral pressures generated by the soils on this site. An equivalent hydrostatic fluid pressure (in the active state) of 40 pcf is recommended for non-expansive backfill. Expansive soils are not recommended for backfill against walls that retain soil. It should be noted that this value applies to level backfill conditions. If sloping backfill

conditions exist, pressures will increase substantially depending on the conditions adjacent to the walls. Surcharge loading should also be considered in wall designs. Equivalent fluid pressures for sloping conditions should be determined on an individual basis.

5.2 Site Seismic Classification

Based on the subsurface conditions encountered at the site and in accordance with Section 1613 of the 2009 International Building Code (IBC), the site meets the conditions of a Site Class D.

5.3 On-Grade Floor Slabs

Floor slabs-on-grade, if any, should be separated from structural portions of the building and allowed to float freely. Interior partitions must be constructed in such a manner that they do not transmit floor slab movement to the roof or overlying floor. Backfill placed below floor slabs should be compacted to a minimum of 95% of its maximum Modified Proctor Dry Density, ASTM D-1557

5.4 Surface and Subsurface Drainage

Positive surface drainage must be maintained around the structure to minimize infiltration of surface water. A minimum gradient of 5 percent in the first 10 feet adjacent to foundation walls is recommended. A minimum gradient of 2 percent is recommended for paved areas. All grades should be directed away from the structure. All downspouts should be extended to discharge well beyond the backfill zone of the structure.

A subsurface perimeter drain is not required providing the slab is located above exterior grade, interior and exterior backfill is properly compacted, surface grading is maintained, downspouts discharge well away from the structure, and irrigation is minimized. A subsurface perimeter drain is recommended for any useable space below finished grade. A typical drain detail is shown in Figure 3. The drain should be provided with a free gravity outlet or be connected to a sewer underdrain. If such an outlet or connection is not available within a reasonable distance from the structure, a sump and pump system would be required.

To help minimize infiltration of water into the foundation zone, vegetative plantings placed close to foundation walls should be limited to those species having low watering requirements and

irrigated grass should not be located within 5 feet of the foundation. Similarly, sprinklers are not recommended to discharge water within 5 feet of foundations. Irrigation near foundations should be limited to the minimum amount sufficient to maintain vegetation. Application of more irrigation water than necessary can increase the potential for slab and foundation movement.

5.5 Concrete

Soluble Sulfate Testing was conducted on select samples to evaluate the potential for sulfate attack on concrete placed below surface grade. The tests results indicated less than 0.01 and 0.00 percent soluble sulfate by weight (Table 1). The test results indicate the sulfate component of the in-place soil presents a negligible exposure threat to concrete place below the site grade.

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 the foundation excavation prior to the placement of concrete. If standing water is present in the foundation excavation, 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.

5.6 Foundation Excavation Observation

Subgrade preparation for the building foundation should be observed by Entech Engineering prior to construction of the footings and floor slab 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 soil, loose soil, uncontrolled fill material, expansive soil or debris are present in the foundation area prior to concrete placement or backfilling. Entech should make final recommendations for over-excavation, if required, and foundation drainage at the time of excavation observation, if necessary.

5.7 Structural Fill

Areas to receive fill should have all topsoil, organic material or debris removed. Fill must be properly benched. The fill receiving surface should be scarified and moisture conditioned to within ± 2 percent of its optimum moisture content and compacted to minimum 95 percent of its maximum Modified Proctor Dry Density (ASTM D-1557) beneath footings and floor slabs prior to placing new fill. New fill beneath footings should be granular, 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. The on-site granular soils are suitable for use as structural fill.

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 area 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 floor 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 floor slab fill material.

5.8 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 Modified Proctor Test (ASTM D-1557). 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, usually within ± 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, as appropriate. All excavation and excavation shoring/bracing should be performed in accordance with OSHA guidelines.

5.9 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.

5.10 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).

5.11 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 eliminate burial of snow, ice or frozen material within the planned construction area.

5.12 Construction Observations

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

- Excavated and over excavated subgrades and subgrade preparation.
- Placement of drains (if installed).
- Placement/compaction of fill material for the foundation components or floor slab.
- Placement/compaction of utility bedding and trench backfill.

6.0 CLOSURE

The subsurface investigation, geotechnical evaluation and recommendations presented in this report are intended for use by T-Bone Construction with application to the new 10,000 square foot building addition located 0.4 miles south of the corner of the intersection of Stapleton Road and US Highway 24, east of Colorado Springs, 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

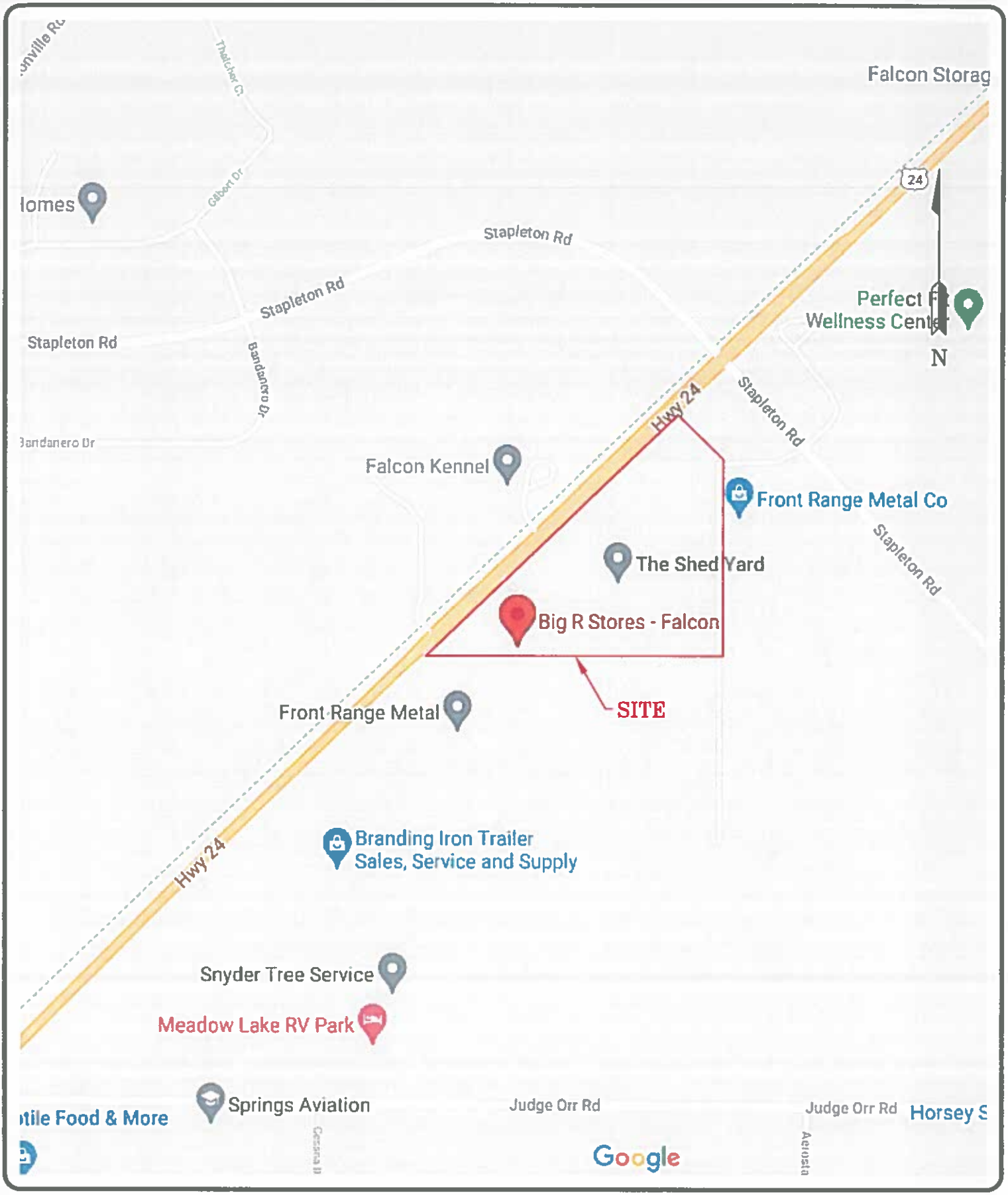
TABLE 1

SUMMARY OF LABORATORY TEST RESULTS

CLIENT T-BONE CONSTRUCTION
PROJECT 14155 US 24, BIG R
JOB NO. 211715

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	3	0-3			19.3	NV	NP				SM	SAND, SILTY
1	1	2-3			11.0						SM-SW	SAND, SLIGHTLY SILTY
1	2	10			5.1	NV	NP	<0.01			SM-SW	SAND, SLIGHTLY SILTY
1	3	1-2			5.4	NV	NP	<0.01			SM-SW	SAND, SLIGHTLY SILTY
2	1	20	16.9	115.4	47.1	32	3	0.00		2.2	SM	SANDSTONE, VERY SILTY

FIGURES



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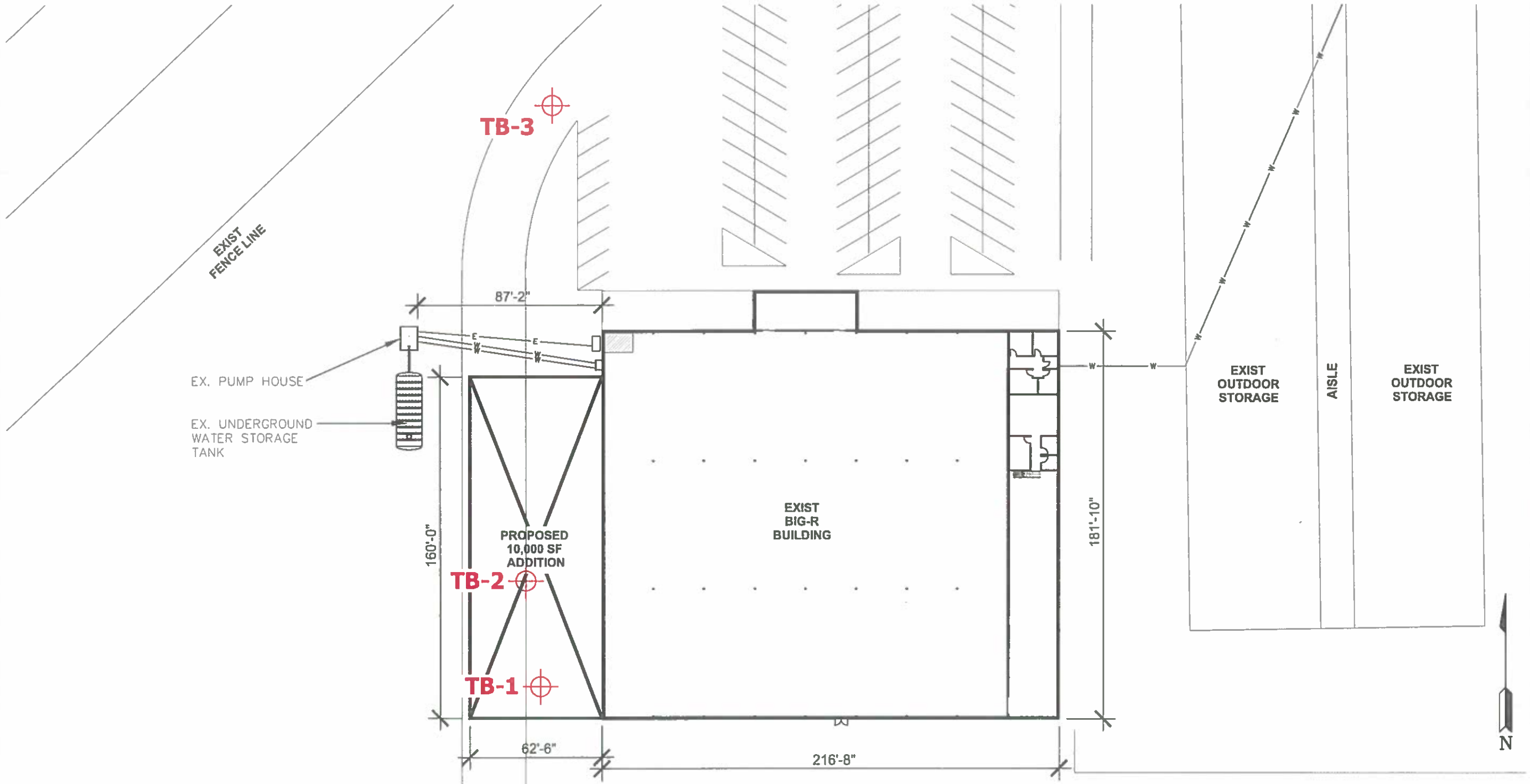
VICINITY MAP
BIG R STORES – FALCON
14155 US HIGHWAY 24
EL PASO COUNTY, CO
FOR: T-BONE CONSTRUCTION

DRAWN:	DATE:	CHECKED:	DATE:
JHR	8/13/21	DPS	

JOB NO.: 211715

FIG NO.: 1



TB- APPROXIMATE TEST BORING LOCATIONS AND NUMBERS

REVISION:	BY

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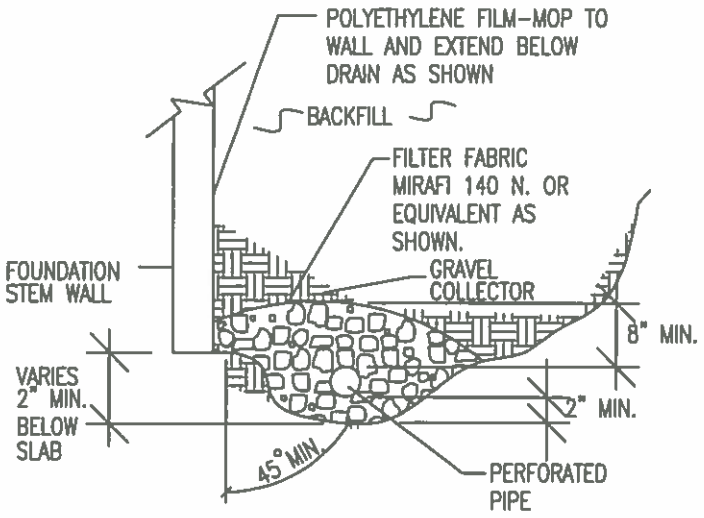
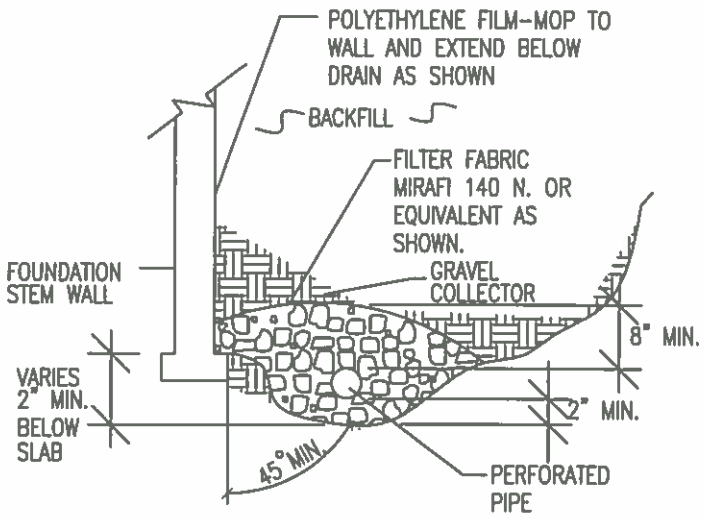
TEST BORING LOCATION MAP
BIG R STORES - FALCON
14155 US HIGHWAY 24
EL PASO COUNTY, CO
FOR: T-BONE CONSTRUCTION

DRAWN	JHR
CHECKED	DPS
DATE	8/13/2021
SCALE	AS SHOWN
JOB NO.	211715
FIGURE No.	2





NOTES:

–GRAVEL SIZE IS RELATED TO DIAMETER OF PIPE PERFORATIONS–85% GRAVEL GREATER THAN 2x PERFORATION DIAMETER.

–PIPE DIAMETER DEPENDS UPON EXPECTED SEEPAGE. 4–INCH DIAMETER IS MOST OFTEN USED.

–ALL PIPE SHALL BE PERFORATED PLASTIC. THE DISCHARGE PORTION OF THE PIPE SHOULD BE NON–PERFORATED PIPE.

–FLEXIBLE PIPE MAY BE USED UP TO 8 FEET IN DEPTH, IF SUCH PIPE IS DESIGNED TO WITHSTAND THE PRESSURES. RIGID PLASTIC PIPE WOULD OTHERWISE BE REQUIRED.

–MINIMUM GRADE FOR DRAIN PIPE TO BE 1% OR 3 INCHES OF FALL IN 25 FEET.

–DRAIN TO BE PROVIDED WITH A FREE GRAVITY OUTFALL, IF POSSIBLE. A SUMP AND PUMP MAY BE USED IF GRAVITY OUT FALL IS NOT AVAILABLE.

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PERIMETER DRAIN DETAIL

DRAWN:	DATE:	DESIGNED:	CHECKED: DPS

JOB NO.: 211715

FIG NO.: 3

APPENDIX A: Test Boring Logs

TEST BORING NO. 1
DATE DRILLED 7/29/2021
Job # 211715

REMARKS

WATER @ 16', 8/3/21

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	Description
			14	2.7	1	SAND, SLIGHTLY SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, DRY TO MOIST
5			21	2.3	1	
10			11	7.9	1	
15			18	13.1	1	
						SANDSTONE, VERY SILTY, FINE GRAINED, GRAY BROWN, VERY DENSE, MOIST
20			50/8"	16.1	2	

TEST BORING NO. 2
DATE DRILLED 7/29/2021
CLIENT T-BONE CONSTRUCTION
LOCATION 14155 US 24, BIG R

REMARKS

WATER @ 16', 8/3/21

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	Description
			10	13.8		SAND, SLIGHTLY SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, MOIST
5			9	2.8		
10			21	2.7		
15			16	11.6		
						SANDSTONE, VERY SILTY, FINE GRAINED, GRAY BROWN, VERY DENSE, MOIST
20			50/4"	11.8		

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TEST BORING LOG

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

JOB NO. 211715
FIG NO. A- 1

TEST BORING NO. 3
DATE DRILLED 7/29/2021
Job # 211715

REMARKS

DRY TO 10', 7/29/21

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			16	2.9	1	SAND, SLIGHTLY SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, DRY TO MOIST
5			12	3.4	1	
10			25	6.5	1	
15						
20						

TEST BORING NO.
DATE DRILLED
CLIENT T-BONE CONSTRUCTION
LOCATION 14155 US 24, BIG R

REMARKS

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5					
10					
15					
20					

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505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

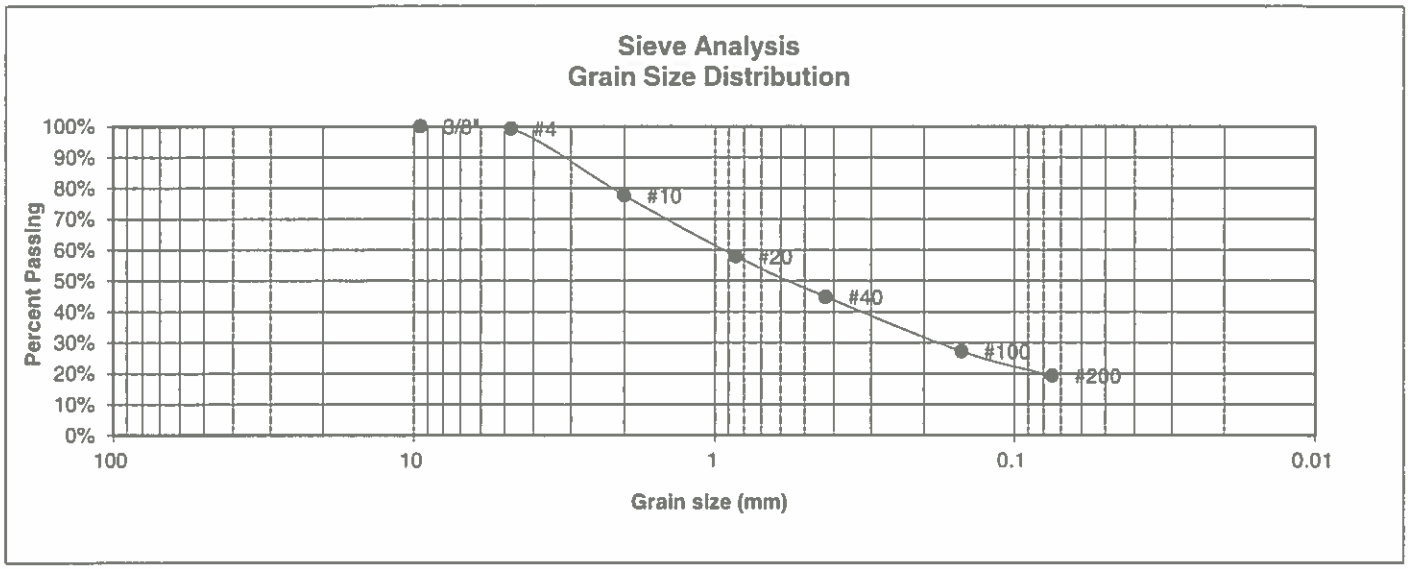
TEST BORING LOG

DRAWN	DATE	CHECKED: LLL	DATE: 8/11/21

JOB NO. 211715
FIG NO. A- 2

APPENDIX B: Laboratory Test Results

UNIFIED CLASSIFICATION	SM	CLIENT	T-BONE CONSTRUCTION
SOIL TYPE #	1	PROJECT	14155 US 24, BIG R
TEST BORING #	3	JOB NO.	211715
DEPTH (FT)	0-3	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	99.3%
10	77.6%
20	57.9%
40	44.8%
100	27.2%
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)	

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505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

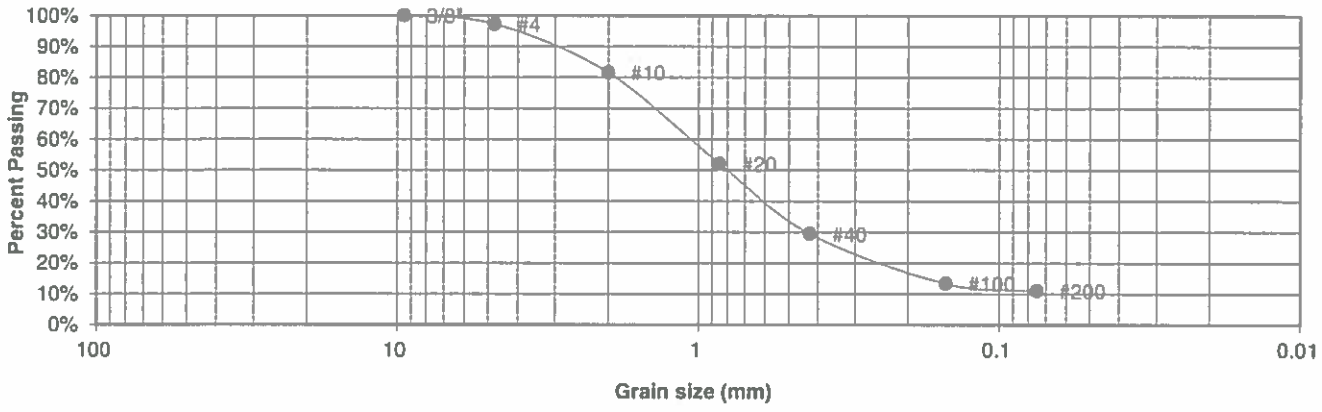
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	8/11/21

JOB NO.: 211715

FIG NO.: B-1

UNIFIED CLASSIFICATION	SM-SW	CLIENT	T-BONE CONSTRUCTION
SOIL TYPE #	1	PROJECT	14155 US 24, BIG R
TEST BORING #	1	JOB NO.	211715
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	97.2%
10	81.6%
20	52.1%
40	29.4%
100	13.3%
200	11.0%

Atterberg Limits
Plastic Limit
Liquid Limit
Plastic Index

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

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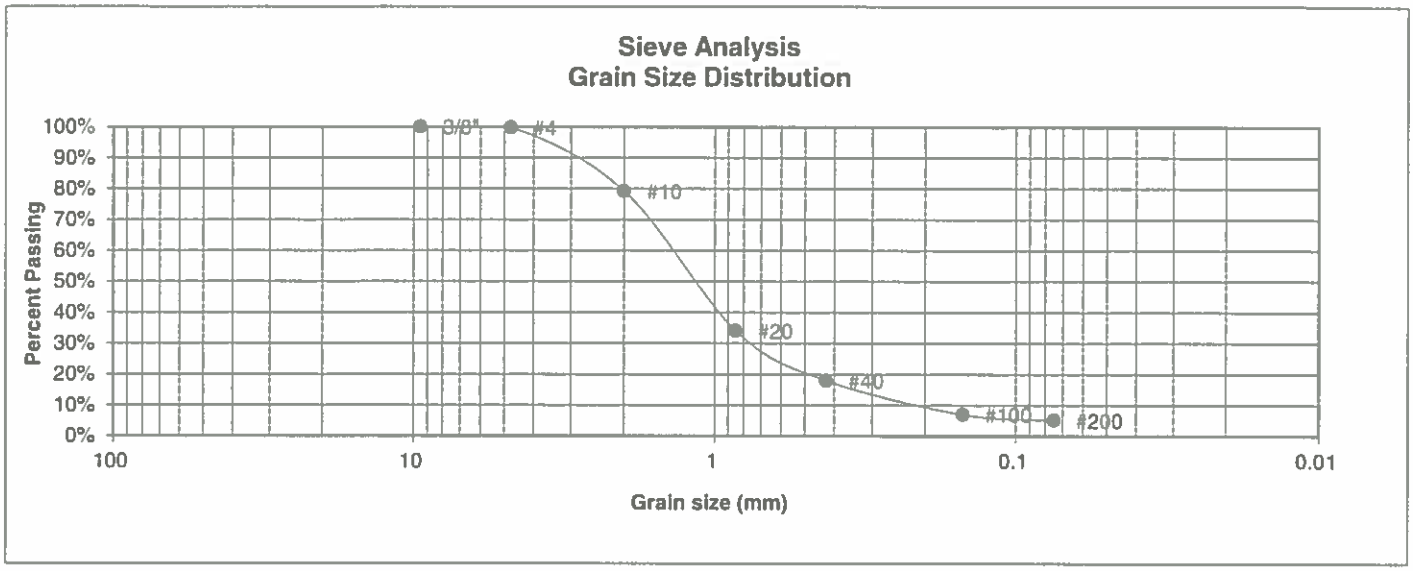
LABORATORY TEST RESULTS

DRAWN	DATE	CHECKED	DATE
		LLL	8/11/21

JOB NO. 211715

FIG NO. B-2

UNIFIED CLASSIFICATION	SM-SW	CLIENT	T-BONE CONSTRUCTION
SOIL TYPE #	1	PROJECT	14155 US 24, BIG R
TEST BORING #	2	JOB NO.	211715
DEPTH (FT)	10	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	99.8%
10	79.2%
20	34.1%
40	17.9%
100	7.0%
200	5.1%

Atterberg Limits

Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

Swell

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

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LABORATORY TEST RESULTS

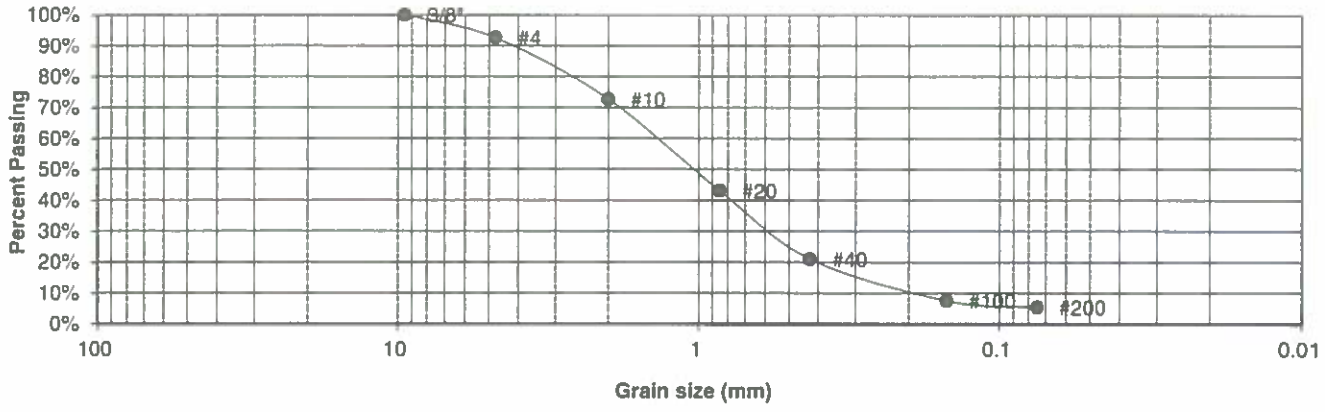
DRAWN:	DATE:	CHECKED:	DATE:
		LLL	8/11/21

JOB NO: 211715

FIG NO: B-3

UNIFIED CLASSIFICATION	SM-SW	CLIENT	T-BONE CONSTRUCTION
SOIL TYPE #	1	PROJECT	14155 US 24, BIG R
TEST BORING #	3	JOB NO.	211715
DEPTH (FT)	1-2	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	92.5%
10	72.6%
20	43.0%
40	21.0%
100	7.5%
200	5.4%

Atterberg Limits

Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

Swell

Moisture at start

Moisture at finish

Moisture increase

Initial dry density (pcf)

Swell (psf)

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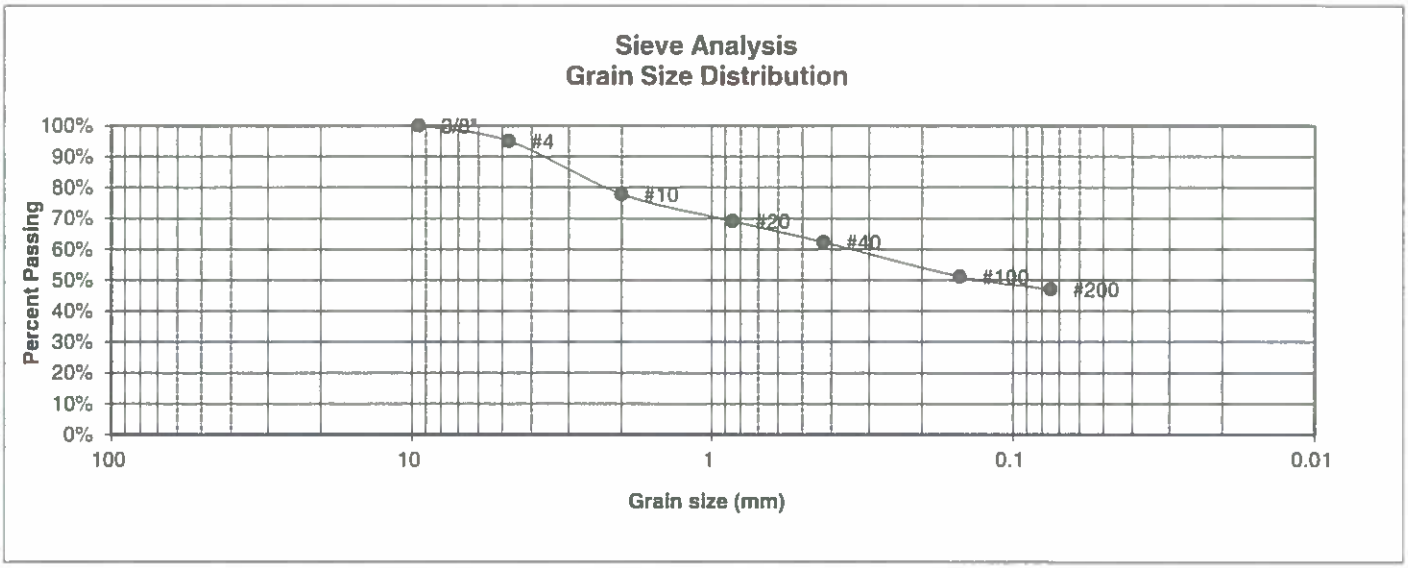
LABORATORY TEST RESULTS

DRAWN	DATE	CHECKED:	DATE
		LLL	8/11/21

JOB NO.: 211715

FIG NO.: B-4

UNIFIED CLASSIFICATION	SM	CLIENT	T-BONE CONSTRUCTION
SOIL TYPE #	2	PROJECT	14155 US 24, BIG R
TEST BORING #	1	JOB NO.	211715
DEPTH (FT)	20	TEST BY	BL



U.S. Sieve #	Percent
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	95.1%
10	77.8%
20	69.2%
40	62.3%
100	51.1%
200	47.1%

Atterberg Limits	
Plastic Limit	29
Liquid Limit	32
Plastic Index	3

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

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LABORATORY TEST RESULTS

DRAWN	DATE	CHECKED:	DATE:
		LLL	8/11/21

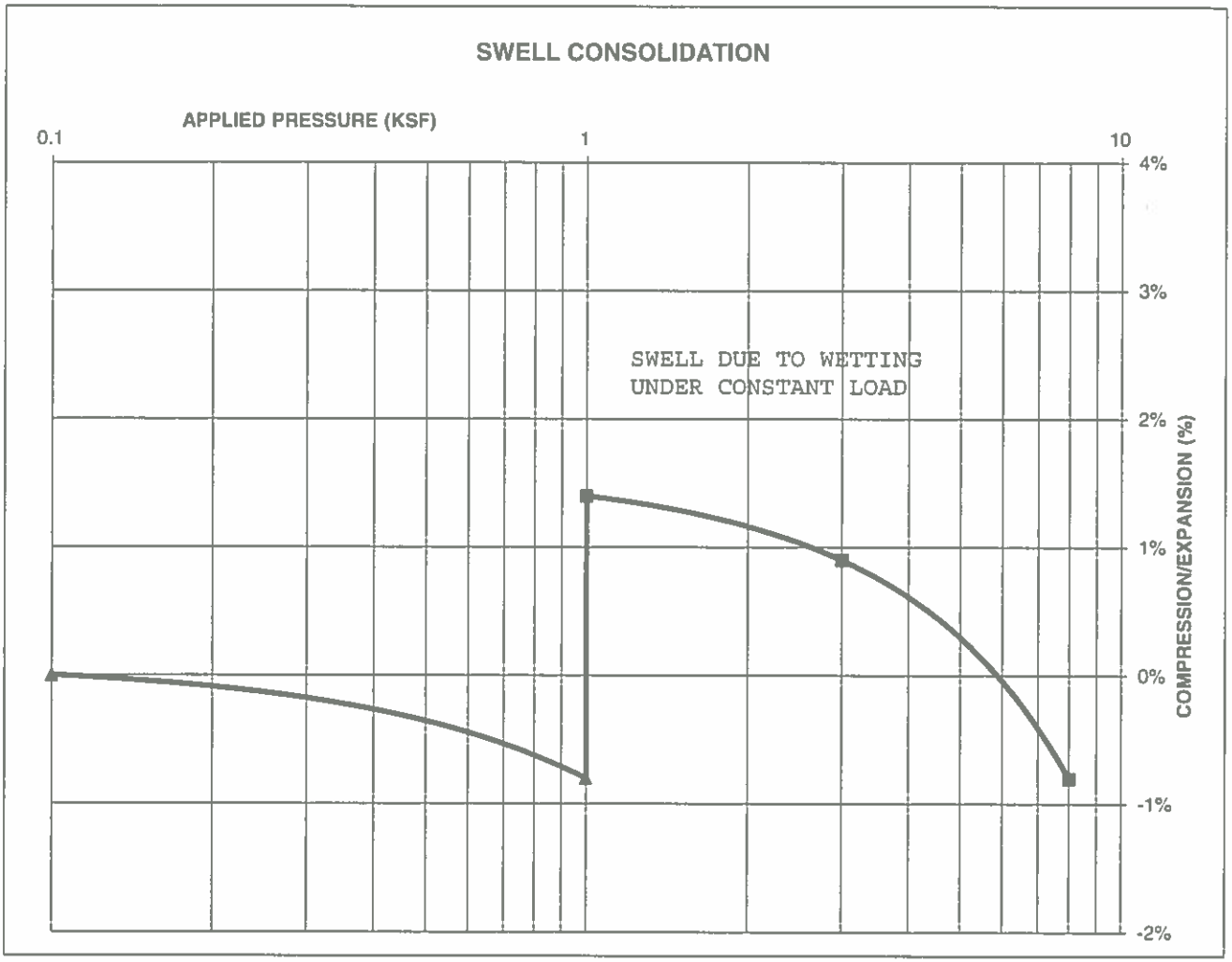
JOB NO: 211715

FIG NO: B-5

CONSOLIDATION TEST RESULTS

TEST BORING #	1	DEPTH(ft)	20
DESCRIPTION	SM	SOIL TYPE	2
NATURAL UNIT DRY WEIGHT (PCF)			115
NATURAL MOISTURE CONTENT			16.9%
SWELL/CONSOLIDATION (%)			2.2%

JOB NO. 211715
CLIENT T-BONE CONSTRUCTION
PROJECT 14155 US 24, BIG R



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SWELL CONSOLIDATION
TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	8/11/21

JOB NO. 211715
FIG NO. B-6

CLIENT	T-BONE CONSTRUCTION	JOB NO.	211715
PROJECT	14155 US 24, BIG R	DATE	8/3/2021
LOCATION	14155 US 24, BIG R	TEST BY	BL

BORING NUMBER	DEPTH, (ft)	SOIL TYPE NUMBER	UNIFIED CLASSIFICATION	WATER SOLUBLE SULFATE, (wt%)
TB-1	20	2	SM	0.00
TB-2	10	1	SM-SW	<0.01
TB-3	1-2	1	SM-SW	<0.01

QC BLANK PASS

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LABORATORY TEST SULFATE RESULTS

DRAWN	DATE	CHECKED:	DATE:
		LLL	8/11/21

JOB NO. 211715

FIG NO. B-7