ENTECH
ENGINEERING, INC.

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

**SUBSURFACE SOIL INVESTIGATION**
**DUNKIN DONUTS**
**MERIDIAN ROAD and BENT GRASS MEADOWS DRIVE**
**EL PASO COUNTY, COLORADO**

Prepared for:

**First Cup, LLC NV & CO**
106 South Kyrene Road – Suite # 2
Chandler, Arizona 85226

Attn: Ms. Sandy Wilkerson

September 23, 2022

Respectfully Submitted,

ENTECH ENGINEERING, INC.

Daniel P. Stegman

DPS/jr

Encl.

Entech Job No. 221761
AAprojects/2022/221761ssi

Reviewed by:


Austin M. Nossokoff, P.E.

Table of Contents

# SUBSURFACE SOIL INVESTIGATION
## DUNKIN DONUTS
## MERIDIAN ROAD and BENT GRASS MEADOWS DRIVE
## EL PASO COUNTY, COLORADO

## 1.0 INTRODUCTION

The site is to be developed with the construction of a new Dunkin Donuts Restaurant and associated site improvements. The site is located on Meridian Park Drive to the south of Bent Grass Meadows Drive and west of Meridian Road in the northeast portion of El Paso County, Colorado. The location of the project is shown on the Vicinity Map, Figure 1. The proposed site plan and the test boring locations are shown on the Test Boring Location Map, Figure 2.

This report describes the subsurface soil investigation conducted for the site and provides recommendations for foundation design and construction. The Subsurface Soil Investigation included the drilling of four test borings across the site, 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

The project will consist of the construction of a new Dunkin Donuts store with associated site improvements. At the time of drilling the site was vacant. Site vegetation was sparse consisting of native grasses and weeds. Topography of the site is relatively flat with a very gradual slope to the southeast. The site is bordered by commercial development, with Meridian Road to the east.

## 3.0 SUBSURFACE EXPLORATIONS AND LABORATORY TESTING

Subsurface conditions on the site were explored by drilling four test borings. Two test borings were drilled in the proposed building area (Test Boring Nos. 1 and 2), and two were drilled in the parking/drive areas (Test Boring Nos. 3 and 4). A Pavement Design will be provided in a separate report. The test borings were drilled at the approximate locations shown on the Test Boring Location Map, Figure 2. The borings were drilled to depths of 10 to 20 feet below the existing ground surface (bgs). The drilling was performed using a truck-mounted, continuous flight auger-drilling rig supplied and operated by Entech. Boring logs descriptive of the subsurface conditions encountered during drilling are presented in Appendix A. At the conclusion of drilling, and subsequent to drilling, observations for groundwater levels were made in the open boreholes.

Soil samples were obtained from the borings utilizing the Standard Penetration Test (ASTM D-1586) using 2" O.D. Split-spoon 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 samples recovered from the borings were visually classified and recorded on the boring logs. The soil classifications were later verified utilizing laboratory testing and grouped by soil type. The soil type numbers are included on the boring logs. It should be understood that the soil 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 types and the actual stratigraphic transitions may be more gradual and vary with location.

Moisture 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 Testing (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. Sulfate testing was performed on selected samples to evaluate potential for below grade concrete degradation due to sulfate attack. The Laboratory Testing Results are summarized on Table 1 and are presented in Appendix B.

## 4.0 SUBSURFACE CONDITIONS

Two soil types and one bedrock type were encountered in the test borings drilled for the subsurface investigation: Type 1: silty sand fill (SM), Type 2: native silty to slightly silty sand (SM, SM-SW), Type 3: slightly silty sandstone (SM-SW). Bedrock was encountered in two of the test borings at 14 and 16 feet bgs in the main building, which were drilled to a depth of 20 feet. Each soil type 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 and Bedrock

Soil Type 1 classified as a silty sand fill (SM). The sand fill was encountered in all the test borings at the existing ground surface and extended to depths ranging from 8 to 9 feet bgs. Standard Penetration Testing resulted in N-values of 12 to 21 bpf indicating medium dense states. Water content and grain size testing resulted in water contents of 5 to 12 percent and approximately 22 to 27 percent of the soil size particles passing the No. 200 sieve. Atterberg Limits testing on samples of the fill resulted in the soils being non plastic. The sand fill is likely non-expansive. Sulfate testing resulted in less than 0.01 percent sulfate by weight, indicating the sand fill exhibits negligible potential for below grade concrete degradation due to sulfate attack.

Soil Type 2 classified as native silty to slightly silty sand (SM, SM-SW). The native sand was encountered in all the test borings below the Type 1 sand fill at 8 to 9 feet and extended to 14 to 16 feet bgs or to termination of borings at 10 feet. Standard Penetration Testing resulted in N-values of 12 to 44 bpf indicating medium dense to dense states. Water content and grain size testing resulted in water contents of approximately 2 to 14 percent and approximately 5 percent of the soil size particles passing the No. 200 sieve. Atterberg Limits testing on samples of the fill resulted in the soils being non-plastic. The expansion potential of the sand is anticipated to be low to negligible. Sulfate testing resulted in less than 0.01 percent sulfate by weight, indicating

the sand fill exhibits negligible potential for below grade concrete degradation due to sulfate attack.

Soil Type 3 classified as slightly silty sandstone (SM). The sandstone was encountered in Test Boring Nos. 1 and 2 at depths of 14 to 16 feet bgs and extended to the termination of the borings (20 feet). Standard Penetration Testing resulted in N-values of greater than 50 bpf, indicating very dense states. Water content and grain size testing resulted in approximately 12 to 13 percent water content and approximately 11 percent of the soil size particles passing the No. 200 sieve. Atterberg Limits testing on samples of the sandstone resulted in the soils being non-plastic. The expansion potential of the sandstone is anticipated to be low to negligible. Sulfate testing resulted in less than 0.01 percent sulfate by weight, indicating the sandstone exhibits negligible for below grade concrete degradation due to sulfate attack.

### 4.2 Groundwater

Groundwater was not encountered the test borings which were drilled to depths of 10 to 20 feet bgs. It is anticipated groundwater will not affect construction on the majority of the site if the excavation depths are shallow. Interceptor and capillary break drain systems may be necessary to dewater the excavations if they approach the groundwater level. 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 for the planned development. 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.*

Subsurface soil conditions encountered in the test borings drilled across the site generally consisted of silty sand fill overlying native silty to slightly silty sand with underlying slightly silty sandstone. Bedrock was encountered at depths 14 to 16 feet and is not expected to affect shallow foundation construction. SPT N-values measured in sand fill and native sand indicated

overall medium dense to dense conditions. The medium dense to very dense native silty sands are considered to exhibit an adequate in-place density for support of the planned buildings using shallow foundations (i.e. spread footings). Loose soils, expansive soils, or uncontrolled fill encountered beneath foundations will require removal and recompaction according to the "Structural Fill" paragraph.

Eight (8) to nine (9) feet of fill was encountered in the test borings on the site. Standard penetration testing indicates that the fill is at medium dense states. The fill at the site was periodically observed and tested by personnel of Entech Engineering Inc. Any uncontrolled fill encountered beneath foundations will require complete penetration and removal and recompaction under controlled conditions according to the "Structural Fill" paragraph. Fills may extend deeper than shown on logs. Uncontrolled fills of any depth should be overexcavated. Areas of loose soils, if encountered, will require recompaction prior to fill placement or construction.

Given the subsurface conditions encountered at the time of drilling and the site development as described, a shallow spread footing foundation system bearing on controlled sand fill, native medium dense to dense silty sand, recompacted loose silty sands, or structural fill is recommended for the structure. Shallow foundations are anticipated to be standard footing/stemwall configurations. Design considerations are discussed in the following sections.

### 5.1 Footing Subgrade Improvement and Bearing Capacity

Based on the conditions encountered in the test borings and the laboratory testing results, the structure can be supported by shallow foundations resting on suitable granular native site sand soils, controlled on-site granular fill soils, recompacted loose sands or structural fill. Any fill required for the structure foundations or floor slabs should be placed according to the structural fill section of this report. Loose soils, expansive soils, or uncontrolled fill encountered beneath foundations will require removal and recompaction according to the "Structural Fill" paragraph. Sections 5.2 through 5.12 provide foundation design construction recommendations and considerations relative to the subsurface soil conditions encountered on this site.

### 5.2 Shallow Foundations

For design, a maximum allowable bearing pressure of 2400 pounds per square foot (psf) is recommended for suitable native granular soils, recompacted/controlled fill site soils and structural fill. Continuous spread footings are recommended to have a minimum width of 18 inches and individual column footings for main support beams 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.

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 the on-site sand soils. Expansive clay soils, if any, are not recommended for backfill against the walls. 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.

Entech should observe overexcavated subgrades as well as the overall foundation excavation subgrade and evaluate if the exposed soil conditions are consistent with those described in this report. Entech should also provide recommendations for additional overexcavation depth, if required, and foundation drainage based on the excavation conditions observed at that time.

### 5.3 Seismic Site 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.

### 5.4 On-Grade Floor Slabs

On-grade floor slabs for the planned structure can be supported with compacted on-site silty sand soils or compacted, non-expansive, granular structural fill. Uncontrolled fill or expansive soils, if encountered, below slabs should be overexcavated. Areas requiring overexcavation should be determined during site grading.

Grade supported floor slabs should be separated from other building structural components and utility penetrations to allow for possible future vertical movement unless they are designed as part of the foundation system. In the case of isolated slabs that are not designed as part of the foundation, interior partition walls should be constructed in such a manner so as not to transfer slab movement into the overlying floor(s) and/or roof members, should slab movement occur. Control joints in grade-supported slabs are recommended at 10 to 15 foot perpendicular spacing to control cracking. If slab movement cannot be tolerated a structural floor system should be used.

### 5.5 Surface and Subsurface Drainage

Positive surface drainage is recommended around the building's perimeter to minimize infiltration of surface water into the supporting foundation soils. A minimum ground surface slope of 5 percent in the first 10 feet adjacent to exterior foundation walls is recommended for unpaved areas. For paved areas and other impervious surfaces, a minimum slope of 2 percent is adequate. All roof drains and gutter downspouts should be extended to discharge well beyond the building's foundation backfill zone or be connected to a storm sewer system.

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.

Perimeter drains are recommended for usable space below grade. A typical perimeter drain detail is shown in Figure 3. If the slab elevation is above exterior grade, positive grading is maintained, and the foundation backfill is properly compacted an exterior perimeter drain is not required. The need for a perimeter drain will be determined after development plans are completed.

### 5.6 Concrete Degradation Due to Sulfate Attack

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.

### 5.7 Foundation Excavation Observation

Subgrade preparation for building foundations should be observed by Entech prior to construction of the footings and floor slabs 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 spots, expansive or organic soil, 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.

### 5.8 Structural Fill

Compacted, non-expansive granular soil, free of organics, debris and cobbles greater than 3-inches in diameter, is recommended for structural fill beneath foundation components and floor slabs. All fill placed within the foundation area should be approved by Entech, 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 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. The overexcavation subgrade should be scarified a minimum of 12 inches, moisture conditioned to 0 to +3 percent of Proctor optimum moisture content and be compacted to a minimum of 95 percent of its Standard Proctor Dry Density, ASTM D-698 for clay and 95 percent compaction, ±2 percent optimum moisture content, utilizing a Modified Proctor dry density ASTM D-1557 for sand. Mechanical methods can be used for placement and compaction of fill; however, heavy equipment should be kept at distance from foundation walls and 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. Entech should approve any imported fill to be used within the foundation area prior to delivery to the site and onsite materials prior to placement.

### 5.9 Utility Trench Backfill

Fill placed in utility trenches should be compacted according to local specifications. 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 ±2 percent of 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 City of Colorado Springs specifications. All excavation and excavation shoring/bracing should be performed in accordance with OSHA guidelines. Groundwater could be encountered in the deeper excavations.

### 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 eliminate 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 foundation perimeter drains (if installed).
- Placement/compaction of fill material for the foundation components and 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 First Cup, LLC, NV and CO with application to the proposed Dunkin Donuts commercial building located on Meridian Park Drive to the south of Bent Grass Meadows Drive and west of Meridian Road in the northeast portion of El Paso, Colorado. Based on the results of this investigation, the site is suitable for the proposed development, if the subgrade improvements are implemented as discussed in the report. 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 development design and prior to construction, additional investigation is recommended after site grading to provide final recommendations for each building site.

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

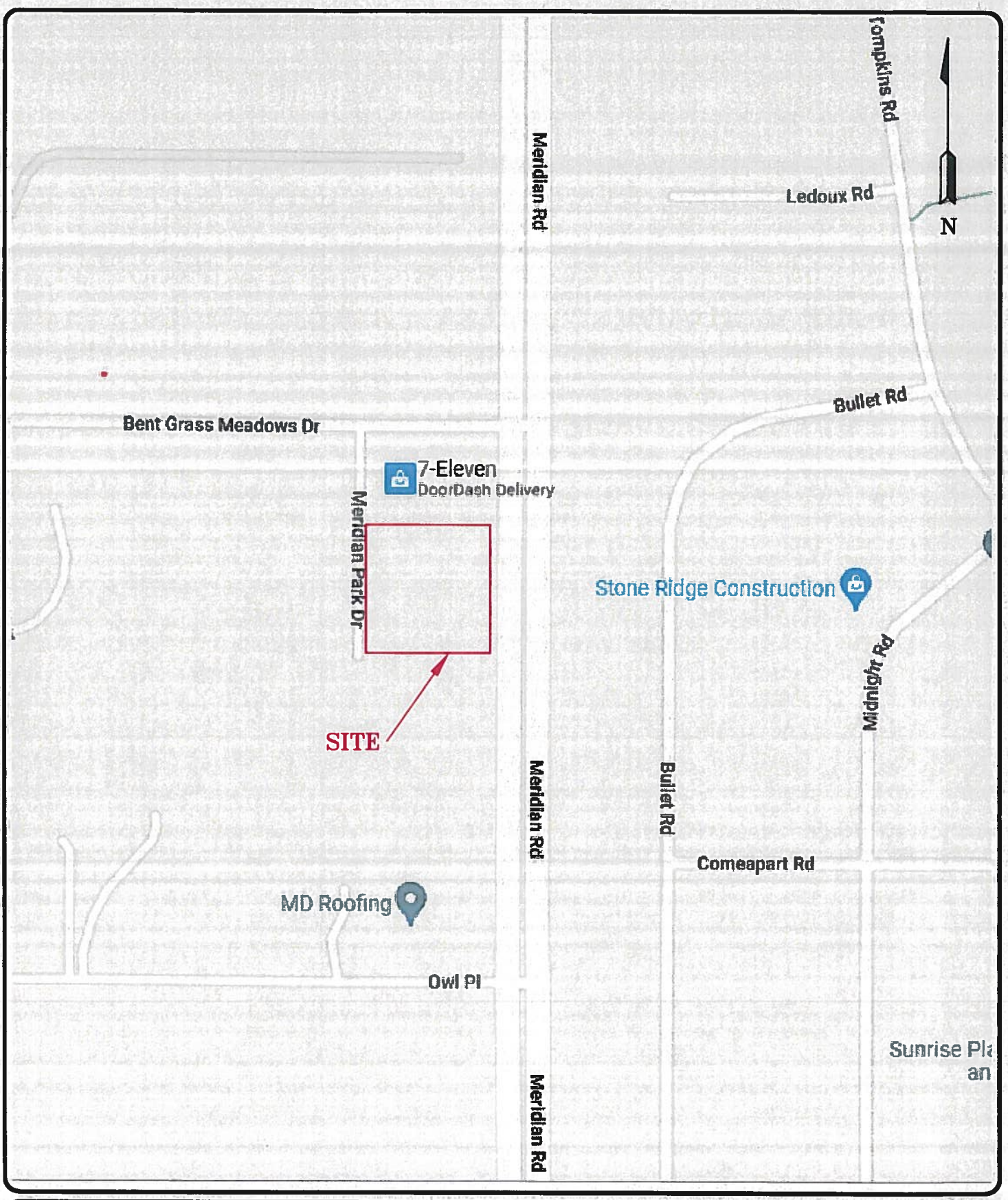
# TABLE 1

## SUMMARY OF LABORATORY TEST RESULTS

CLIENT FIRST CUP, LLC
PROJECT DUNKIN DONUTS, BENT GRASS
JOB NO. 221761

| 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 | | | 27.1 | NV | NP | | | | SM | FILL, SAND, SILTY |
| 1 | 1 | 2-3 | | | 21.5 | | | | | | SM | FILL, SAND, SILTY |
| 1 | 3 | 1-2 | | | 24.0 | NV | NP | <0.01 | | | SM | FILL, SAND, SILTY |
| 1 | 4 | 1-2 | | | 20.4 | NV | NP | | | | SM | FILL, SAND, SILTY |
| 2 | 2 | 10 | | | 5.4 | NV | NP | <0.01 | | | SM-SW | SAND, SLIGHTLY SILTY |
| 3 | 1 | 20 | | | 11.2 | NV | NP | <0.01 | | | SM-SW | SANDSTONE, SLIGHTLY SILTY |

# FIGURES



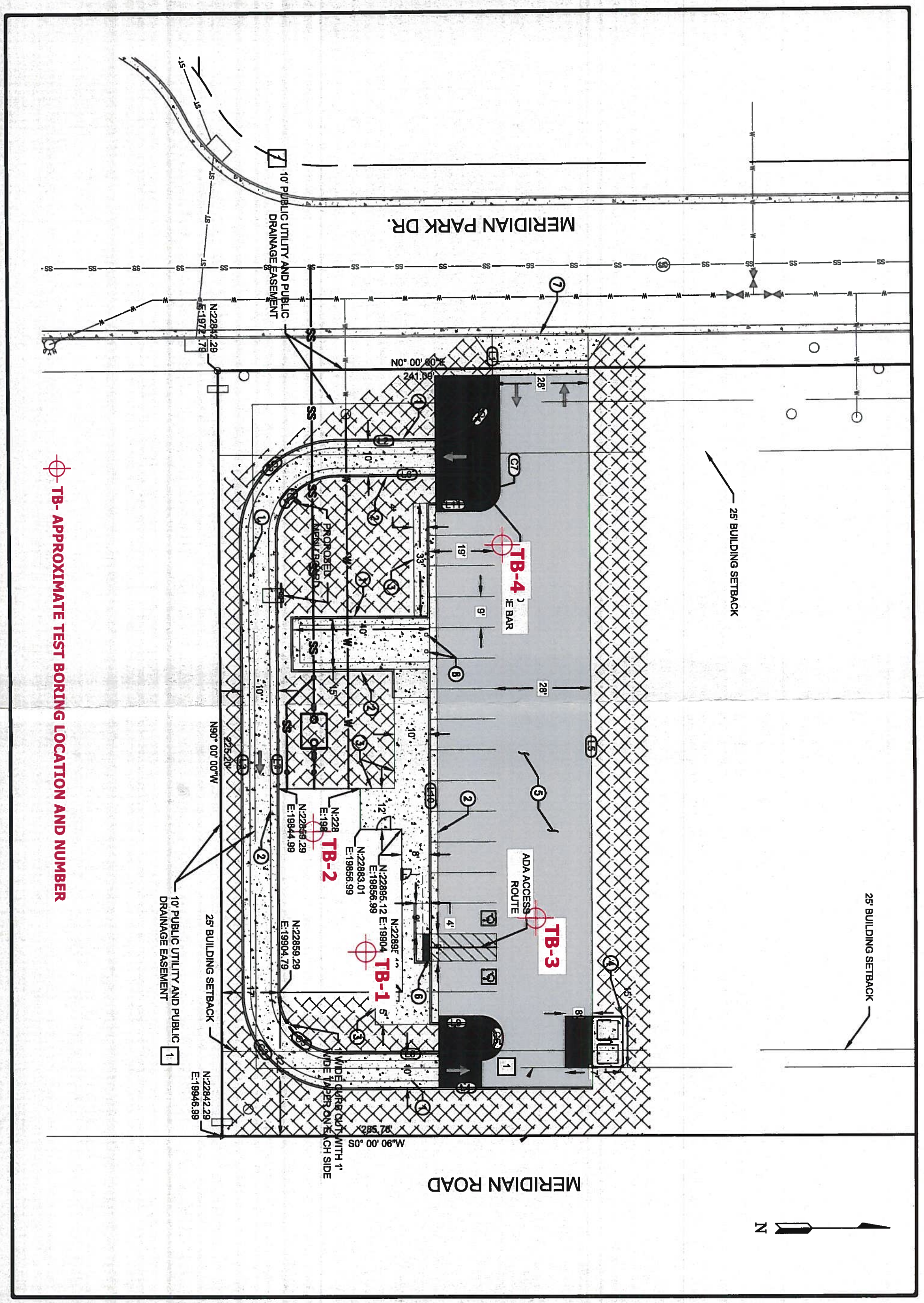

ENTECH ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, CO. 80907 (719) 531-5599

VICINITY MAP
MERIDIAN RD and BENT GRASS MEADOWS DR
EL PASO COUNTY, CO.
FOR: FIRST CUP

| DRAWN: | DATE: | CHECKED: | DATE: |
|---|---|---|---|
| JHR | 8/29/22 | DPS | 8/29/22 |

JOB NO.: 221761

FIG NO.: 1



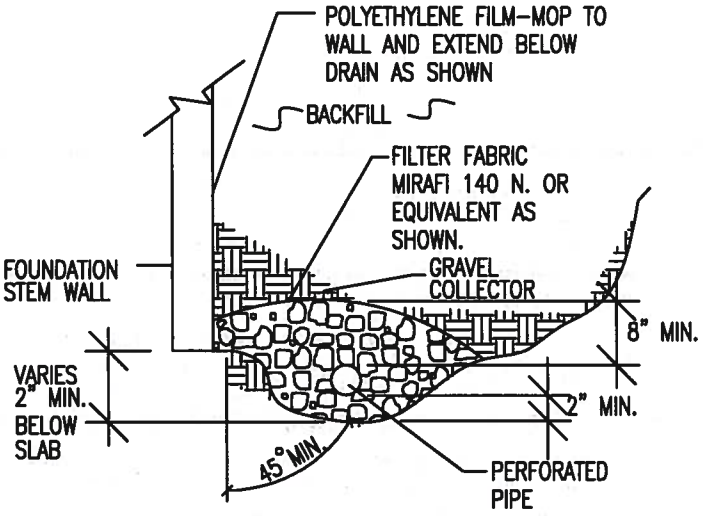

TB- APPROXIMATE TEST BORING LOCATION AND NUMBER

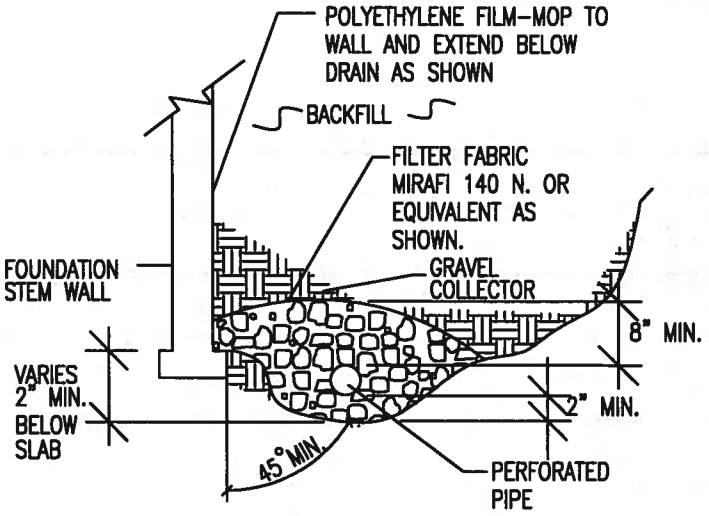
TEST BORING LOCATION MAP
MERIDIAN RD and
BENT GRASS MEADOWS DR
EL PASO COUNTY, CO.
FOR: FIRST CUP

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

| REVISION | BY |
|---|---|
| | |

DRAWN JHR
CHECKED DPS
DATE 6/20/22
SCALE N.T.S.
JOB NO. 221701
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.

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

PERIMETER DRAIN DETAIL

| DRAWN: | DATE: | DESIGNED: | CHECKED: |
|---|---|---|---|
| | | | DS |

JOB NO.: 221761

FIG NO.: 3

# APPENDIX A: Test Boring Logs

TEST BORING NO. 1
DATE DRILLED 8/10/2022
Job # 221761

REMARKS

DRY TO 19.5', 8/11/22

| Depth (ft) | Symbol | Samples | Blows per foot | Watercontent % | Soil Type |
|---|---|---|---|---|---|
| | | | 21 | 9.0 | 1 |
| | | | 12 | 7.6 | 1 |
| 5 | | | | | |
| | | | 17 | 2.3 | 2 |
| 10 | | | | | |
| | | | 44 | 13.6 | 2 |
| 15 | | | | | |
| | | | 50/9" | 13.3 | 3 |
| 20 | | | | | |

FILL 0-9', SAND, SILTY, FINE TO COARSE GRAINED, DARK BROWN, MEDIUM DENSE, MOIST

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

SANDSTONE, SLIGHTLY SILTY, FINE TO COARSE GRAINED, TAN, VERY DENSE, MOIST

TEST BORING NO. 2
DATE DRILLED 8/10/2022
CLIENT FIRST CUP, LLC
LOCATION DUNKIN DONUTS, BENT GRASS

REMARKS

DRY TO 17.5', 8/11/22

| Depth (ft) | Symbol | Samples | Blows per foot | Watercontent % | Soil Type |
|---|---|---|---|---|---|
| | | | 12 | 5.7 | 1 |
| | | | 14 | 4.8 | 1 |
| 5 | | | | | |
| | | | 15 | 4.2 | 2 |
| 10 | | | | | |
| | | | 50/10" | 9.9 | 3 |
| 15 | | | | | |
| | | | 50/7" | 12.0 | 3 |
| 20 | | | | | |

FILL 0-9', SAND, SILTY, FINE TO COARSE GRAINED, DARK BROWN, MEDIUM DENSE, MOIST

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

SANDSTONE, SLIGHTLY SILTY, FINE TO COARSE GRAINED, TAN, VERY DENSE, MOIST

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

**TEST BORING LOG**

| DRAWN: | DATE: | CHECKED: JHR | DATE: 8/29/22 |
|---|---|---|---|

JOB NO.: 221761
FIG NO.: A- 1

TEST BORING NO. 3
DATE DRILLED 8/10/2022
Job # 221761

REMARKS

DRY TO 10', 8/11/22

| Depth (ft) | Symbol | Samples | Blows per foot | Watercontent % | Soil Type | |
|---|---|---|---|---|---|---|
| | | | 19 | 7.5 | 1 | FILL 0-8', SAND, SILTY, FINE TO COARSE GRAINED, DARK BROWN, MEDIUM DENSE, MOIST |
| 5 | | | 18 | 8.6 | 1 | |
| 10 | | | 12 | 5.0 | 2 | SAND, SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, MOIST |
| 15 | | | | | | |
| 20 | | | | | | |

TEST BORING NO. 4
DATE DRILLED 8/10/2022
CLIENT FIRST CUP, LLC
LOCATION DUNKIN DONUTS, BENT GRASS

REMARKS

DRY TO 10', 8/10/22

| Depth (ft) | Symbol | Samples | Blows per foot | Watercontent % | Soil Type | |
|---|---|---|---|---|---|---|
| | | | 16 | 11.6 | 1 | FILL 0-9', SAND, SILTY, FINE TO COARSE GRAINED, DARK BROWN, MEDIUM DENSE, MOIST |
| 5 | | | 18 | 8.6 | 1 | |
| 10 | | | 28 | 10.3 | 2 | SAND, SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, MOIST |
| 15 | | | | | | |
| 20 | | | | | | |

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

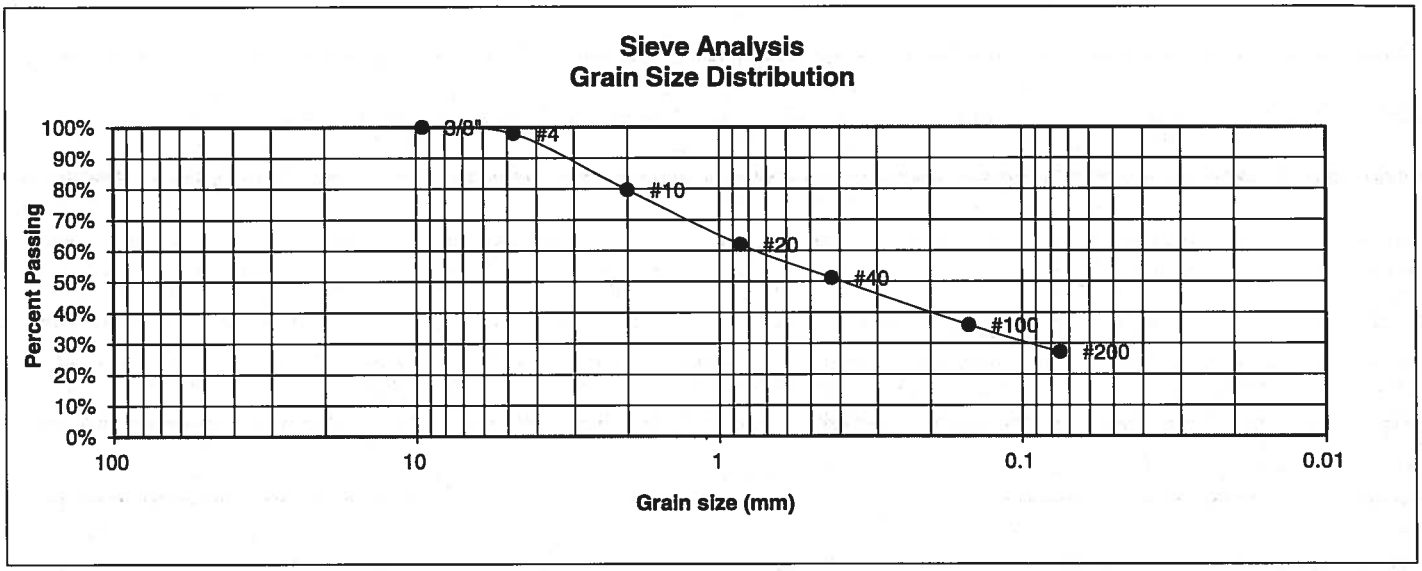
**TEST BORING LOG**

| DRAWN: | DATE: | CHECKED: | DATE: |
|---|---|---|---|
| | | JHR | 8/29/22 |

JOB NO.: 221761
FIG NO.: A- 2

# APPENDIX B: Laboratory Testing Results

| | | | |
|---|---|---|---|
| UNIFIED CLASSIFICATION | SM | CLIENT | FIRST CUP, LLC |
| SOIL TYPE # | 1 | PROJECT | DUNKIN DONUTS, BENT GRASS |
| TEST BORING # | 3 | JOB NO. | 221761 |
| 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 | 97.9% |
| 10 | 79.6% |
| 20 | 61.9% |
| 40 | 51.2% |
| 100 | 35.9% |
| 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

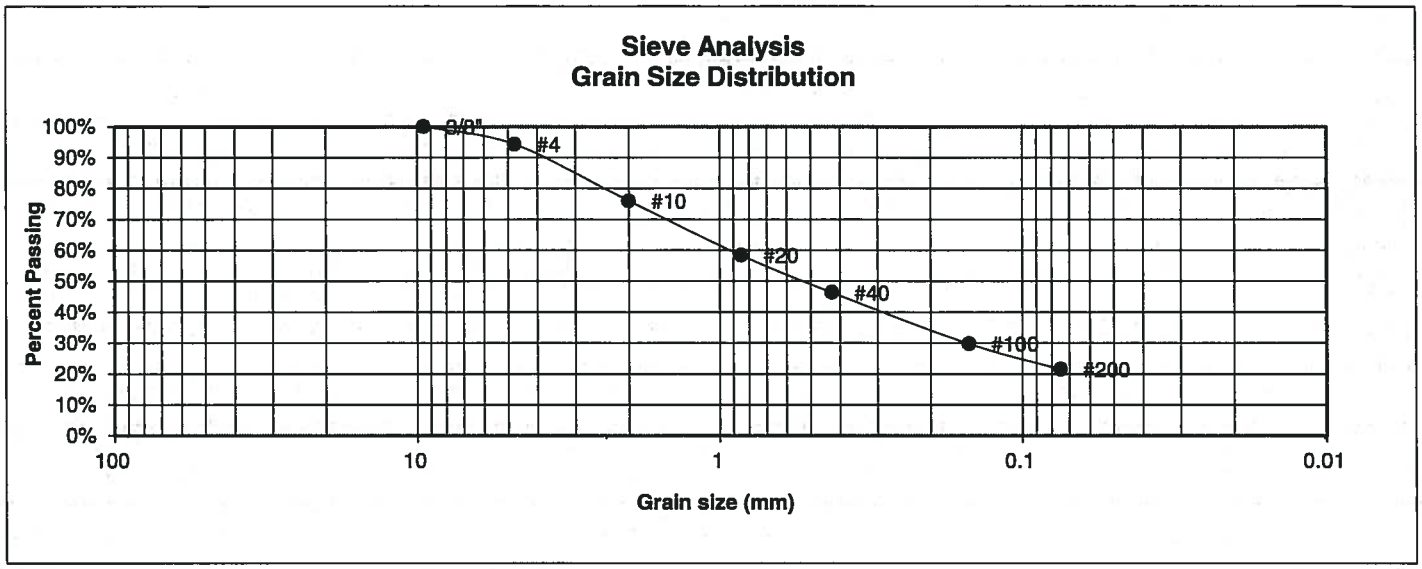

LABORATORY TEST RESULTS

| DRAWN: | DATE: | CHECKED: | DATE: |
|---|---|---|---|
| | | 8/24/22 | SHL |

JOB NO.: 221761

FIG NO.: B-1

| | | | |
|---|---|---|---|
| UNIFIED CLASSIFICATION | SM | CLIENT | FIRST CUP, LLC |
| SOIL TYPE # | 1 | PROJECT | DUNKIN DONUTS, BENT GRASS |
| TEST BORING # | 1 | JOB NO. | 221761 |
| 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 | 94.3% |
| 10 | 75.9% |
| 20 | 58.4% |
| 40 | 46.3% |
| 100 | 29.8% |
| 200 | 21.5% |

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

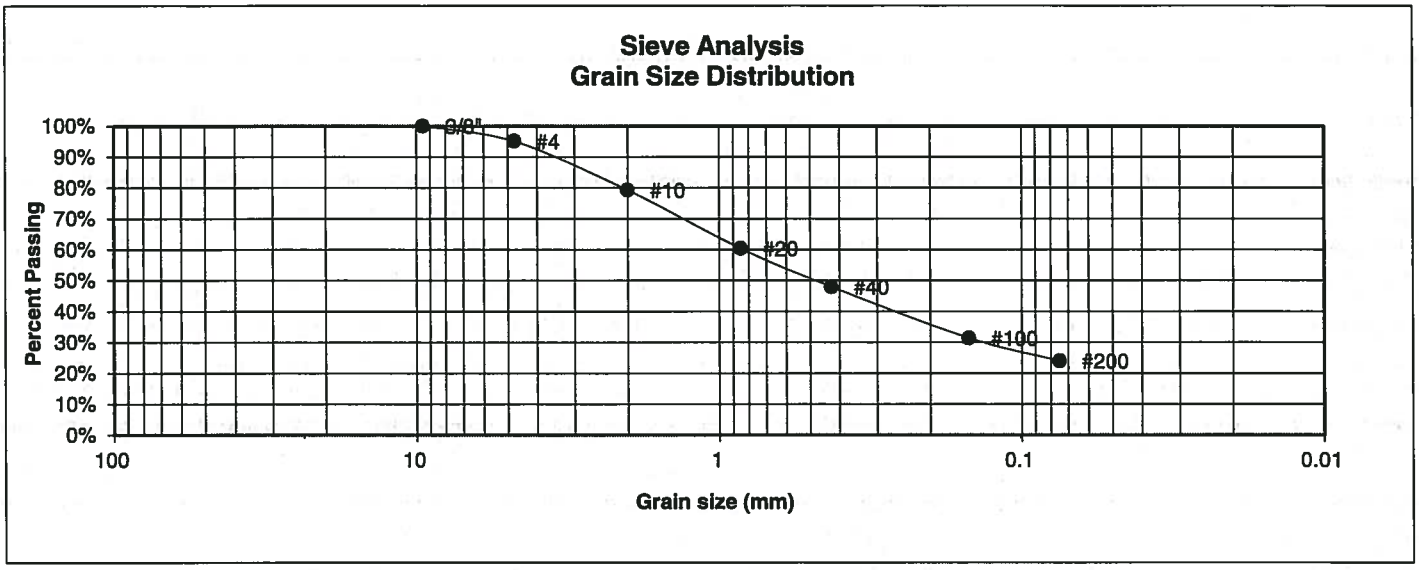
LABORATORY TEST RESULTS

| DRAWN: | DATE: | CHECKED: | DATE: |
|---|---|---|---|
| | | SHR | 8/29/22 |

JOB NO.: 221761

FIG NO.: B-2

| | | | |
|---|---|---|---|
| UNIFIED CLASSIFICATION | SM | CLIENT | FIRST CUP, LLC |
| SOIL TYPE # | 1 | PROJECT | DUNKIN DONUTS, BENT GRASS |
| TEST BORING # | 3 | JOB NO. | 221761 |
| DEPTH (FT) | 1-2 | TEST BY | BL |




| U.S. Sieve # | Percent Finer |
|---|---|
| 3" | |
| 1 1/2" | |
| 3/4" | |
| 1/2" | |
| 3/8" | 100.0% |
| 4 | 95.1% |
| 10 | 79.3% |
| 20 | 60.3% |
| 40 | 48.0% |
| 100 | 31.4% |
| 200 | 24.0% |

Atterberg Limits

| | |
|---|---|
| Plastic Limit | NP |
| Liquid Limit | NV |
| Plastic Index | NP |

Swell

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


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


LABORATORY TEST RESULTS

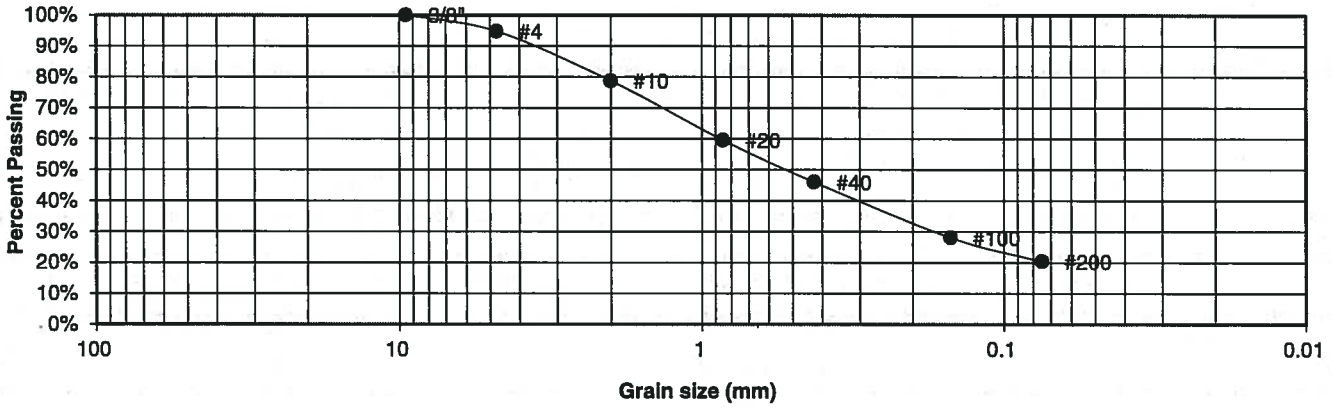
| DRAWN: | DATE: | CHECKED: | DATE: |
|---|---|---|---|
| | | JHR | 8/29/22 |

JOB NO.: 221761

FIG NO.: B-3

| | | | |
|---|---|---|---|
| UNIFIED CLASSIFICATION | SM | CLIENT | FIRST CUP, LLC |
| SOIL TYPE # | 1 | PROJECT | DUNKIN DONUTS, BENT GRASS |
| TEST BORING # | 4 | JOB NO. | 221761 |
| 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 | 94.7% |
| 10 | 78.8% |
| 20 | 59.5% |
| 40 | 46.0% |
| 100 | 28.1% |
| 200 | 20.4% |

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) | |


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

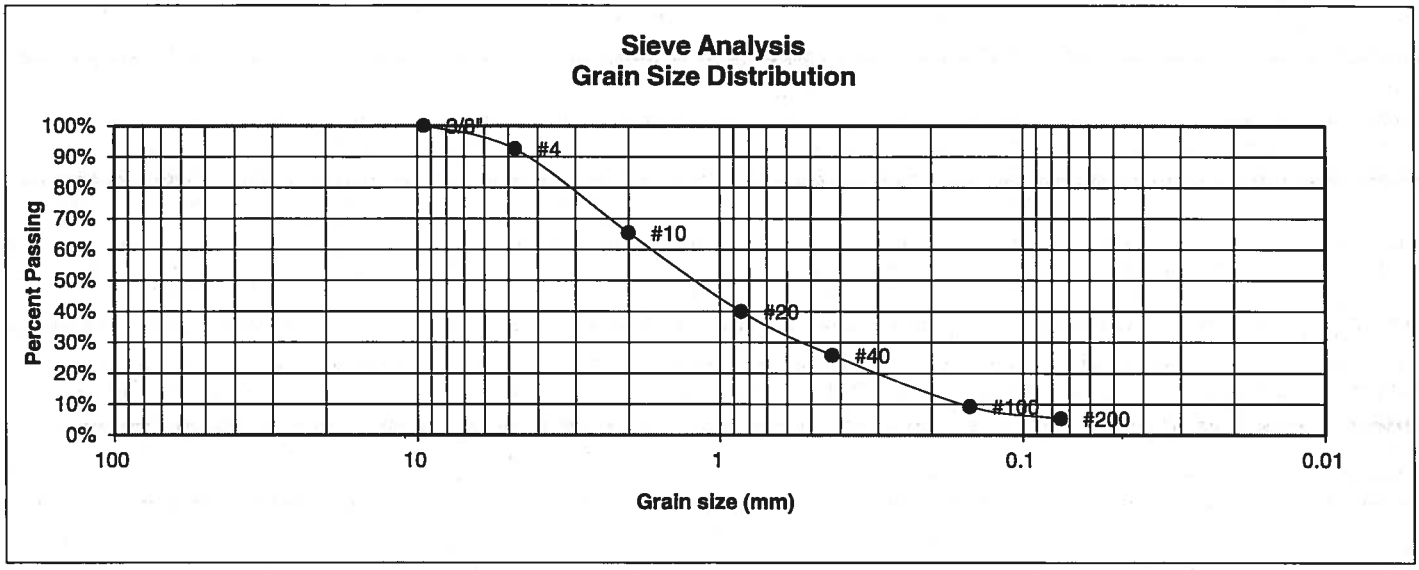

LABORATORY TEST RESULTS

| DRAWN: | DATE: | CHECKED: | DATE: |
|---|---|---|---|
| | | JHR | 8/29/22 |

JOB NO.: 221761

FIG NO.: B-4

| | | | |
|---|---|---|---|
| UNIFIED CLASSIFICATION | SM-SW | CLIENT | FIRST CUP, LLC |
| SOIL TYPE # | 2 | PROJECT | DUNKIN DONUTS, BENT GRASS |
| TEST BORING # | 2 | JOB NO. | 221761 |
| DEPTH (FT) | 10 | TEST BY | BL |




| U.S. Sieve # | Percent Finer |
|---|---|
| 3" | |
| 1 1/2" | |
| 3/4" | |
| 1/2" | |
| 3/8" | 100.0% |
| 4 | 92.5% |
| 10 | 65.4% |
| 20 | 39.9% |
| 40 | 25.8% |
| 100 | 9.3% |
| 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)

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

LABORATORY TEST RESULTS

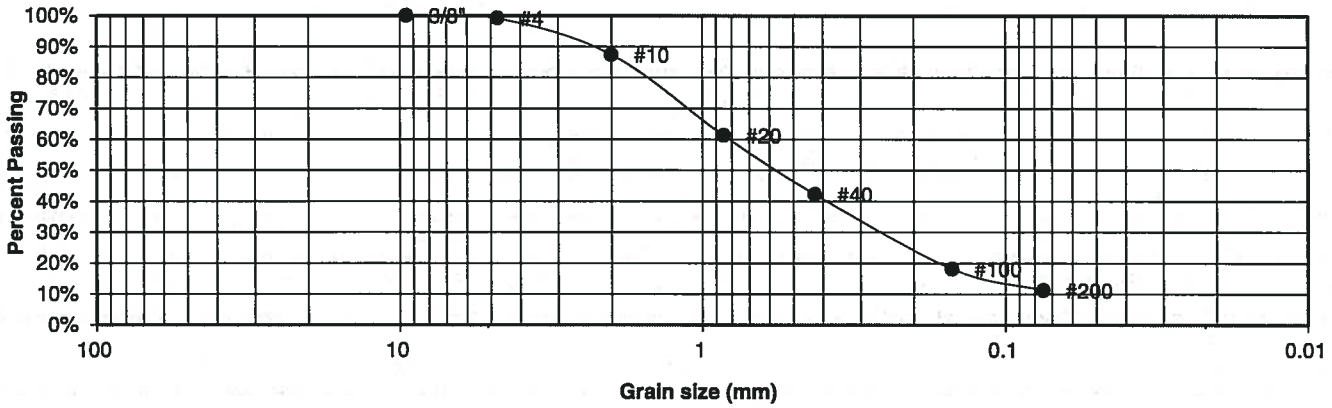
| DRAWN: | DATE: | CHECKED: | DATE: |
|---|---|---|---|
| | | JHR | 8/29/22 |

JOB NO.: 221761

FIG NO.: B-5

| | | | |
|---|---|---|---|
| UNIFIED CLASSIFICATION | SM-SW | CLIENT | FIRST CUP, LLC |
| SOIL TYPE # | 3 | PROJECT | DUNKIN DONUTS, BENT GRASS |
| TEST BORING # | 1 | JOB NO. | 221761 |
| DEPTH (FT) | 20 | 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 | 99.1% |
| 10 | 87.4% |
| 20 | 61.3% |
| 40 | 42.2% |
| 100 | 18.1% |
| 200 | 11.2% |

Atterberg Limits

| | |
|---|---|
| Plastic Limit | NP |
| Liquid Limit | NV |
| Plastic Index | NP |

Swell

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


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


LABORATORY TEST RESULTS

| DRAWN: | DATE: | CHECKED: | DATE: |
|---|---|---|---|
| | | JHR | 8/29/22 |

JOB NO.: 221761

FIG NO.: B-6

| | | | |
|---|---|---|---|
| CLIENT | FIRST CUP, LLC | JOB NO. | 221761 |
| PROJECT | DUNKIN DONUTS, BENT GRASS | DATE | 8/26/2022 |
| LOCATION | DUNKIN DONUTS, BENT GRASS | TEST BY | BL |

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

QC BLANK PASS

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

LABORATORY TEST
SULFATE RESULTS

| DRAWN: | DATE: | CHECKED: | DATE: |
|---|---|---|---|
| | | JHR | 8/29/22 |

JOB NO.: 221761

FIG NO.: D-7