ENTECH
ENGINEERING, INC.

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

May 29, 2020

Phillip Buford
P.O. Box 100
Ordway, CO 81063

Re: Soil, Geology and Geologic Hazard Evaluation
Judge Orr Eastonville Commercial Center
Lot 1177, Woodmen Hills Filing No. 10
Judge Orr Road and Eastonville Road
El Paso County, Colorado

Dear Mr. Buford:

GENERAL SITE CONDITIONS AND PROJECT DESCRIPTION

The site is located in a portion of the SE¼ of SE¼ of Section 31, and SW¼ Section 32 Township 12 South, Range 64 West of the 6th Principal Meridian in El Paso County, Colorado. The site is located approximately 5 miles east of Colorado Springs city limits, northeast of Judge Orr Road and Eastonville Road in El Paso County, Colorado. The location of the site is shown on the Vicinity Map, Figure 1.

The topography of the site is gradually sloping to the southeast. A minor drainage is located in the eastern portion of the site that flows in a southerly direction, and a man-made drainage channel is located along the southern and western sides of the site. Water was not observed in the drainages at the time of this investigation. Water was noted in the drainage around the perimeter of the property at the culverts. This drainage is in the mapped floodplain. The site boundaries are indicated on the USGS Map, Figure 2. Previous land uses have included undeveloped and agricultural grazing land. The site is currently vacant and vegetation consist of primarily field grasses, cacti and weeds with cattails, trees and brush along the drainages in the western and southern portions of the site. Site photographs, taken May 18, 2020, are included in Appendix A.

The site consists of a 31.28-acre parcel. Proposed project consists of rezoning the parcel from Rural Residential to Commercial. The proposed development will be serviced by municipal water and sewer. The Site Plan is presented in Figure 3. A development plan was not available at this time.

LAND USE AND ENGINEERING GEOLOGY

This site was found to be suitable for the proposed commercial development. Areas were encountered where the geologic conditions will impose some constraints on development and land use. These include areas of artificial fill, seasonal shallow groundwater, standing water and floodplain areas. Based on the proposed development plan, it appears that these areas will have some minor impacts on the development. These conditions will be discussed in greater detail in the report.

In general, it is our opinion that the development can be achieved if the observed geologic conditions on site are either avoided or properly mitigated. All recommendations are subject to the limitations discussed in the report.

SCOPE OF THE REPORT

The scope of the report includes a general geologic analysis utilizing published geologic data. Detailed site-specific mapping will be conducted to obtain general information in respect to major geographic and geologic features, geologic descriptions and their effects on the development of the property.

FIELD INVESTIGATION

Our field investigation consisted of the preparation of a geologic map of bedrock features and significant surficial deposits. The Natural Resource Conservation Service (NRCS), previously the Soil Conservation Service (SCS) survey was also reviewed to evaluate the site. The position of mappable units within the subject site are shown on the Geologic Map. Our mapping procedures involved both field reconnaissance and measurements, and aerial photo reconnaissance and interpretation. The same mapping procedures have also been utilized to produce the Geology/Engineering Geology Map which identified pertinent geologic conditions affecting development. The field mapping was performed by personnel of Entech Engineering, Inc. on May 18, 2020.

Seven (7) test borings were drilled on the site to determine general soil and bedrock characteristics. The locations of the test borings are indicated on the Site Map/Test Boring Location Map, Figure 3. The Test Boring Logs are presented in Appendix B. Results of this testing will be discussed later in this report.

Laboratory testing was performed on the soils to classify and determine the soils engineering characteristics. Laboratory tests included grain-size analysis, ASTM D-422, and Atterberg Limits, ASTM D-4318. Swell/Consolidation Testing, ASTM D-4546, was performed to evaluate expansion potential. Sulfate testing was performed on selected samples to evaluate potential for below grade concrete degradation due to sulfate attack. The Laboratory Test Results are presented in Appendix C and summarized in Table 1.

SOIL AND GEOLOGIC CONDITIONS

Soil Survey

The Natural Resource Conservation Service (NRCS) (Reference 1, Figure 4), previously the Soil Conservation Service (Reference 2) has mapped one soil type on the site. Complete descriptions of the soils are presented in Appendix C. In general, the soils consist of gravelly sandy loam, loamy sand, and sand. The soils are described as follows:

Type	Description
19	Columbine Gravelly Sandy Loam, 0-3% Slopes

The soils have been described to have very rapid permeabilities. The soils are described as well suited for use as homesites. Possible hazards with soils erosion are present on the site. The erosion potential can be controlled with vegetation. The soils have been described to have moderate erosion hazards (Reference 2).

Soils

Two soil types and two bedrock types were encountered in the test borings drilled for the subsurface investigation: Type 1: native slightly silty to silty sand and clayey sand (SM-SW, SM, SC), Type 2: very sandy to sandy clay, Type 3: slightly silty to silty sandstone and clayey sandstone (SM-SW, SM, SC), and Type 4: weathered to formational sandy claystone (CL). Each soil and bedrock type were classified in accordance with the Unified Soil Classification System (USCS) using the laboratory testing results and the observations made during drilling.

Soil Type 1: classified as native slightly silty to silty sand and clayey sand (SM-SW, SM, SC). The native sand was encountered in all of the test borings at the existing ground surface and extending to depths ranging from 9 to 15 feet below the ground surface (bgs). Standard Penetration Testing on the native sand resulted in N-values of 5 to 36 bpf, indicating loose to dense states. Water content and grain size testing resulted in a water content range of 1 to 18 percent with approximately 5 to 37 percent of the soil size particles passing the No. 200 sieve. Atterberg limit testing resulted in liquid limits of 36 and no value and plastic indexes of 19 and non-plastic, respectively. Swell/Consolidation Testing resulted in a consolidation of 0.1 percent, indicating the sand exhibits a low consolidation potential. Sulfate testing resulted in 0.01 to less than 0.01 percent soluble sulfate by weight, indicating a negligible potential for below grade concrete degradation due to sulfate attack.

Soil Type 2: classified as sandy clay (CL). The clay was encountered in four of the test borings at depths ranging from 9 to 14 feet bgs and extending to depths ranging from 14 feet to the termination of the test borings (20 feet). Standard Penetration Testing on the clay resulted in N-values of 21 to 30 bpf, indicating stiff to very stiff consistencies. Water content and grain size testing resulted in water contents of 14 to 21 percent with approximately 52 percent of the soil size particles passing to No. 200 sieve. Swell/Consolidation Testing resulted in a volume change of 0.2 percent. These results indicated the clay exhibits low expansion potential; however, clays in the area are known to be highly expansive.

Soil Type 3: classified as slightly silty to silty sandstone and clayey sandstone (SM-SW, SM, SC). The sandstone was encountered in four of the test borings at depths of 14 to 19 feet bgs and extending to depths of 19 feet to the termination of the test borings (20 feet). Standard Penetration Testing on the sandstone resulted in N-values greater than 50 bpf, indicating very

percent with approximately 6 to 32 percent of the soil size particles passing the No. 200 sieve. Atterberg limit testing on samples of silty sandstone indicated in non-plastic results. Swell/Consolidation Testing resulted in a volume change of 1.2 percent. These results indicated the sandstone exhibits low to moderate expansion potential. Sulfate testing resulted in 0.00 to less than 0.01 percent soluble sulfate by weight, indicating a negligible potential for below grade concrete degradation due to sulfate attack.

Soil Type 4: classified as weathered to formational sandy claystone (CL). The claystone was encountered in three of the test borings at depths of 14 to 19 feet bgs and extending to the termination of the test borings (20 feet). Standard Penetration Testing on the claystone resulted in N-values of 43 to greater than 50 bpf, indicating very stiff to hard consistencies. Water content and grain size testing resulted in water contents of 16 to 25 percent with approximately 93 percent of the soil size particles passing to No. 200 sieve. Swell/Consolidation Testing resulted in a volume change of 0.9 percent. These results indicated the claystone exhibits low to moderate expansion potential; however, claystone in the area is known to be highly expansive.

Test Boring Logs are included in Appendix B. Laboratory Test Results are included in Appendix C and are summarized in Table 1.

Groundwater

Groundwater was encountered in all of the test borings at depths ranging from 8.5 to 13.5 feet (Appendix B). Groundwater should not affect the construction of shallow foundations anticipated for this site, provided grading cuts are minimal. Water should be expected in deeper excavations for utilities. Unstable conditions should be expected where excavations approach the groundwater level. Stabilization using shot rock or geo grids may be necessary. Areas of seasonal shallow groundwater and floodplains have been mapped on this site and are discussed in the following sections. It should be noted that fluctuation in groundwater levels could change due to seasonal variations, changes in land runoff characteristics and future development of nearby areas. Isolated sand layers within the soil profile can carry water in the subsurface. Contractors should be cognizant of the potential for the occurrence of subsurface water features during construction.

Geology

Approximately 16 miles west of the site is a major structural feature known as the Rampart Range Fault. This fault marks the boundary between the Great Plains Physiographic Province and the Southern Rocky Mountain Province. The site exists within a large structural feature known as the Denver Basin. Bedrock in the area is typically gently dipping in a northerly direction (Reference 3). The bedrock underlying the site consists of the Dawson Formation of Cretaceous Age. The Dawson Formation typically consists of coarse-grained arkosic sandstone with interbedded layers siltstone or claystone. Overlying the Dawson Formation are deposits of man-made fill soils and soils associated water-deposited alluvial sands.

The geology of the site was evaluated using the *Geologic Map of the Falcon Quadrangle,* by Madole and Thorson in 2003, (Reference 4, Figure 5). The Geology for the site is presented in Figure 6. Four mappable units were identified on this site which, are described as follows:

Qaf **Artificial Fill of Late Holocene Age:** These are man-made fill deposits associated with fill piles and erosion berms observed across the site. Areas of fill other than those mapped may be encountered.

Qa_1 **Alluvium One of Late Holocene Age:** This deposit typically consists of water deposited silty sands and may have clay layers. This deposit is associated with recent alluvial deposits along the drainages on the site within the mapped floodplain. This unit correlates with the Post-Piney Creek Alluvium in the Denver area, and recent alluvial deposits.

Qa_2 **Alluvium Two of Early Holocene Age:** This is a stream-deposited material typically occurring as terrace deposits along the drainage in the eastern portion of the site. Alluvium Two typically consists of dark brown silty to clayey sands and may contain some silt and clay lenses. This unit correlates with the Piney Creek Alluvium in the Denver area.

Qa_3 **Alluvium Three of Late Pleistocene Age:** These materials consist of lower stream terrace deposits. Alluvium Three typically consists of silty to clayey gravelly sands. This deposit is usually highly stratified and may contain lenses of silt, clay or cobbles. This unit correlates with the Broadway Alluvium in the Denver area.

The soils listed above were mapped from site-specific mapping, the *Geologic Map of the Falcon Quadrangle* distributed by the Colorado Geologic Survey in 2012 (Reference 4, Figure 5), and the *Geologic Map of the Pueblo 1° x 2° Quadrangle,* distributed by the US Geological Survey in 1978 (Reference 5). The test borings used in evaluating the site are included in Appendix B. The Geology Map prepared for the site is presented in Figure 6.

ENGINEERING GEOLOGIC HAZARDS

Mapping has been performed on this site to identify areas where various geologic conditions exist of which developers should be cognizant during the planning, design and construction stages should new construction be proposed. The engineering geologic hazards identified on this site include artificial fill, loose soils, seasonal shallow groundwater areas, standing water and floodplain areas. These hazards and recommended mitigation techniques are discussed as follows:

Artificial Fill

Fill associated with an existing fill stockpiles in the northern and southern portions of the site, and erosion berms across the site.

Mitigation: It is anticipated that the fill piles will be removed during site grading. Areas of fill other than those encountered may be encountered. The fill piles are considered uncontrolled. Any uncontrolled fill encountered beneath foundations should be removed and recompacted at a minimum of 95% of its maximum Modified Proctor Dry Density, ASTM D-1557.

Loose Soils

Loose to soils were encountered in some of the borings drilled on site. Loose soils encountered beneath the foundation or floor slabs will require mitigation.

Mitigation: Should loose soils be encountered beneath the foundations or floor slabs; mitigation will be necessary. Overexcavation and recompaction at a minimum of 95% of its maximum Modified Proctor Dry Density, ASTM D-1557 is a suitable mitigation, which is common in the area. An overexcavation depth of 2 to 3 feet is anticipated.

Expansive Soils

Expansive soils were encountered in the test borings, but were encountered at depths not anticipated to affect the proposed shallow foundations. Isolated clay lenses may be encountered in the alluvial deposits across the site. These occurrences are typically sporadic; therefore, none have been indicated on the maps. These clays, if encountered beneath foundations, can cause differential movement in the structure foundation.

Mitigation: Should expansive soils be encountered beneath the foundation; mitigation will be necessary. Mitigation of expansive soils will require special foundation design. Overexcavation and replacement with non-expansive soils at a minimum of 95% of its maximum Modified Proctor Dry Density, ASTM D-1557 is a suitable mitigation, which is common in the area. Floor slabs on expansive soils should be expected to experience movement. Overexcavation and replacement has been successful in minimizing slab movements.

Floodplain Areas

The southeastern portion of the site lies within a floodplain according to the FIRM Map, No. 08041CO554G (Reference 6, Figure 7). The proposed development is located at a higher elevation and away from the floodplain. Finished floors must be a minimum of one foot above the floodplain level. Any site grading considered should be modified to direct surface flows around the structures or roads, or carried off-site so as to not produce any areas of ponded water. Additionally, subsurface perimeter drains may be required. Specific drainage studies and exact floodplain locations are beyond the scope of this report.

ECONOMIC MINERAL RESOURCES

According to the *El Paso County Aggregate Resource Evaluation Map* (Reference 7), the area is mapped with upland deposits. According to the *Atlas of Sand, Gravel and Quarry Aggregate Resources, Colorado Front Range Counties* distributed by the Colorado Geological Survey (Reference 8), areas of the site are mapped with alluvial fan: sand resources. According to the *Evaluation of Mineral and Mineral Fuel Potential* (Reference 9), the area of the site has been mapped as "Fair" for industrial minerals. However, considering the clayey silty nature of the soils, they would be considered to have little significance as an economic resource.

According to *the Evaluation of Mineral and Mineral Fuel Potential of El Paso County State Mineral Lands* (Reference 9), the site is mapped within the Denver Basin Coal Region. However, the area of the site has been mapped as "Poor" for coal resources. No active or inactive mines have been mapped in the area of the site. No metallic mineral resources have been mapped on-site (Reference 9).

The site has been mapped as "Fair" for oil and gas resources (Reference 9). No oil or gas fields have been discovered in the area of the site. The sedimentary rocks in the area may lack the geologic structure for trapping oil or gas; therefore, it may not be considered a significant resource. Hydraulic fracturing is a new method that is being used to extract oil and gas from rocks. It utilizes pressurized fluid to extract oil and gas from rocks that would not normally be productive. The area of the site has not been explored to determine if the rocks underlying the site would be commercially viable utilizing hydraulic fracturing. The practice of hydraulic fracturing has come under review due to concerns about environmental impacts, health and safety.

RELEVANCE OF GEOLOGIC CONDITIONS TO LAND USE PLANNING

Commercial development is proposed for this site. The existing geologic and engineering geologic conditions will impose minor constraints on development and construction. The geologic conditions on the site include artificial fill, loose soils, potentially expansive soils, seasonal shallow groundwater and floodplain areas, which can be satisfactorily mitigated through avoidance or proper engineering design and construction practices.

The upper granular soils in the borings drilled on the site were encountered at loose to dense states. Loose or collapsible soils, if encountered beneath foundation or floor slabs, will require recompaction. Expansive layers may also be encountered in the soil on this site. Expansive soils, if encountered, will require special foundation design. These soils will not prohibit development. Overexcavation and replacement with non-expansive soils at a minimum of 95% of its maximum Modified Proctor Dry Density, ASTM D-1557 is a suitable mitigation, which is common in the area. Floor slabs on expansive soils should be expected to experience movement. Overexcavation and replacement has been successful in minimizing slab movement.

Fill exists on this site that is associated with a fill piles and erosion berms. Areas of fill, other than those mapped, may be encountered. All fill piles and debris within building areas should be completely removed prior to construction. Erosion berms will likely be regraded during site development. Any uncontrolled fill encountered beneath new foundations and floor slabs will require removal and recompaction at a minimum of 95% of its maximum Modified Proctor Dry Density, ASTM D-1557.

Groundwater was encountered in all of the test borings at depths ranging from 8.5 to 13.5 feet (Appendix B). Areas where shallow groundwater was encountered should not affect the construction of shallow foundations anticipated for this site. Groundwater may affect deeper excavations for utilities. Unstable conditions should be expected where excavations approach the groundwater level. Stabilization using shot rock or geo grids may be necessary. According to the FEMA FIRM Map No. 08041CO0554G (Reference 6, Figure 7) the eastern and southern portions of the site are located in a floodplain. Additionally, drainage ditches exist along the southern and western portions of the site where seasonal shallow groundwater has been mapped. The proposed development is located at a higher elevation and away from the floodplain and drainage ditches. Subsurface perimeter drains may be necessary for areas below grade adjacent to the drainages. It is anticipated proposed commercial development will use slab-on-grade construction. Finished floors must be a minimum of one foot above the floodplain level. Specific drainage studies and exact floodplain locations are beyond the scope of this report.

In summary, the recompacted granular soils will likely provide suitable support for shallow foundations. The geologic conditions encountered on site can be mitigated with avoidance or proper engineering and construction practices. Additional subsurface investigations are recommended when development plans are finalized at each building location.

CLOSURE

It should be pointed out that because of the nature of data obtained by random sampling of such variable nonhomogeneous materials as soil and rock, it is important that we be informed of any differences observed between surface and subsurface conditions encountered in construction and those assumed in the body of this report. Any new construction considered on this site will require additional investigation. Construction and design personnel should be made familiar with the contents of this report. Specific construction and foundation recommendations will be provided when investigations are completed for any new construction.

This report has been prepared for Phillip Buford for application to the proposed development in accordance with generally accepted geologic, soil and engineering practices. No other warranty expresses or implied is made.

Phillip Buford
Soil, Geology and Geologic Hazard Evaluation
Judge Orr Eastonville Commercial Center
Lot 1177, Woodmen Hills Filing No. 10
Judge Orr Road and Eastonville Road
El Paso County, Colorado

We trust that this report has provided you with all the information that you required. Should you have any questions or require additional information, please do not hesitate to contact us.

Respectfully Submitted,

ENTECH ENGINEERING, INC.

Logan L. Langford, P.G.
Geologist

Kristen A. Andrew-Hoeser, P.G.
Senior Geologist

Reviewed by:

Joseph C. Goodwin, P.E.
President

COLORADO LICENSED
JOSEPH COLLIN GOODWIN
23725
5-29-2020
PROFESSIONAL ENGINEER

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Encl.

Entech Job No. 201019
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BIBLIOGRAPHY

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4. Morgan, Matthew, L., and White, Jonathan, L. 2012. *Geologic Map of the Falcon Quadrangle, El Paso County, Colorado.* Colorado Geological Survey. Open-File Report 12-05.

5. Scott, Glen R.; Taylor Richard B.; Epis, Rudy C; and Wobus, Reinhard A. 1978. *Geologic Structure Map of the Pueblo 1° x 2° Quadrangle, South-Central Colorado.* Sheet 2. U.S. Geologic Survey. Map I-1022.

6. Federal Emergency Management Agency. December 7, 2018. *Flood Insurance Rate Maps for the City of Colorado Springs, Colorado.* Map Number 08041CO554G.

7. El Paso County Planning Development. December 1995. *El Paso County Aggregate Resource Evaluation Maps.*

8. Schwochow, S.D.; Shroba, R.R. and Wicklein, P.C. 1974. *Atlas of Sand, Gravel, and Quarry Aggregate Resources, Colorado Front Range Counties.* Colorado Geological Survey. Special Publication 5-B.

9. Keller, John W.; TerBest, Harry and Garrison, Rachel E. 2003. *Evaluation of Mineral and Mineral Fuel Potential of El Paso County State Mineral Lands Administered by the Colorado State Land Board.* Colorado Geological Survey. Open-File Report 03-07.

TABLE

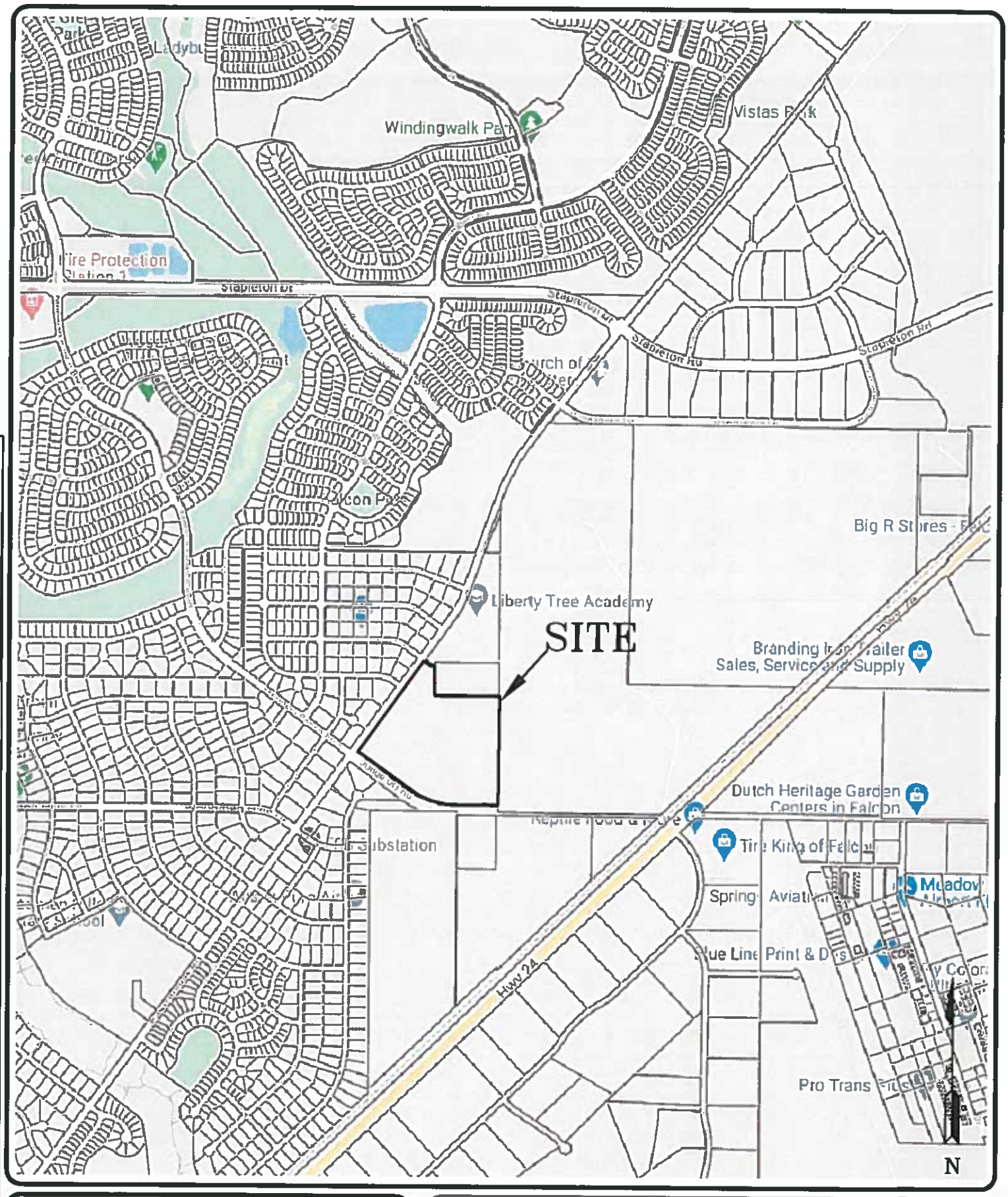
TABLE 1

SUMMARY OF LABORATORY TEST RESULTS

CLIENT PHILLIP BUFORD
PROJECT JUDGE ORR & EASTONEVILLE
JOB NO. 201019

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	2-3			30.9	NV	NP	<0.01			SM	SAND, SILTY
1	2	15	15.0	114.9	29.8	36	19	0.01		-0.1	SC	SAND, CLAYEY
1	3	5			8.1						SM-SW	SAND, SLIGHTLY SILTY
1	4	2-3			6.7						SM-SW	SAND, SLIGHTLY SILTY
1	5	2-3			36.8						SM	SAND, SILTY
1	6	5			11.8						SM-SW	SAND, SLIGHTLY SILTY
1	7	10			4.9						SW	SAND
2	6	15	19.5	106.0	51.7					0.2	CL	CLAY, VERY SANDY
3	2	20	15.1	111.1	5.8	NV	NP	<0.01		0.6	SM-SW	SANDSTONE, SLIGHTLY SILTY
3	3	20			31.7	NV	NP	0.00			SM	SANDSTONE, SILTY
3	6	20	20.8	107.5	26.2	NV	NP			1.2	SM	SANDSTONE, SILTY
4	4	20	16.5	110.9	92.8					0.9	CL	CLAYSTONE, SANDY

FIGURES



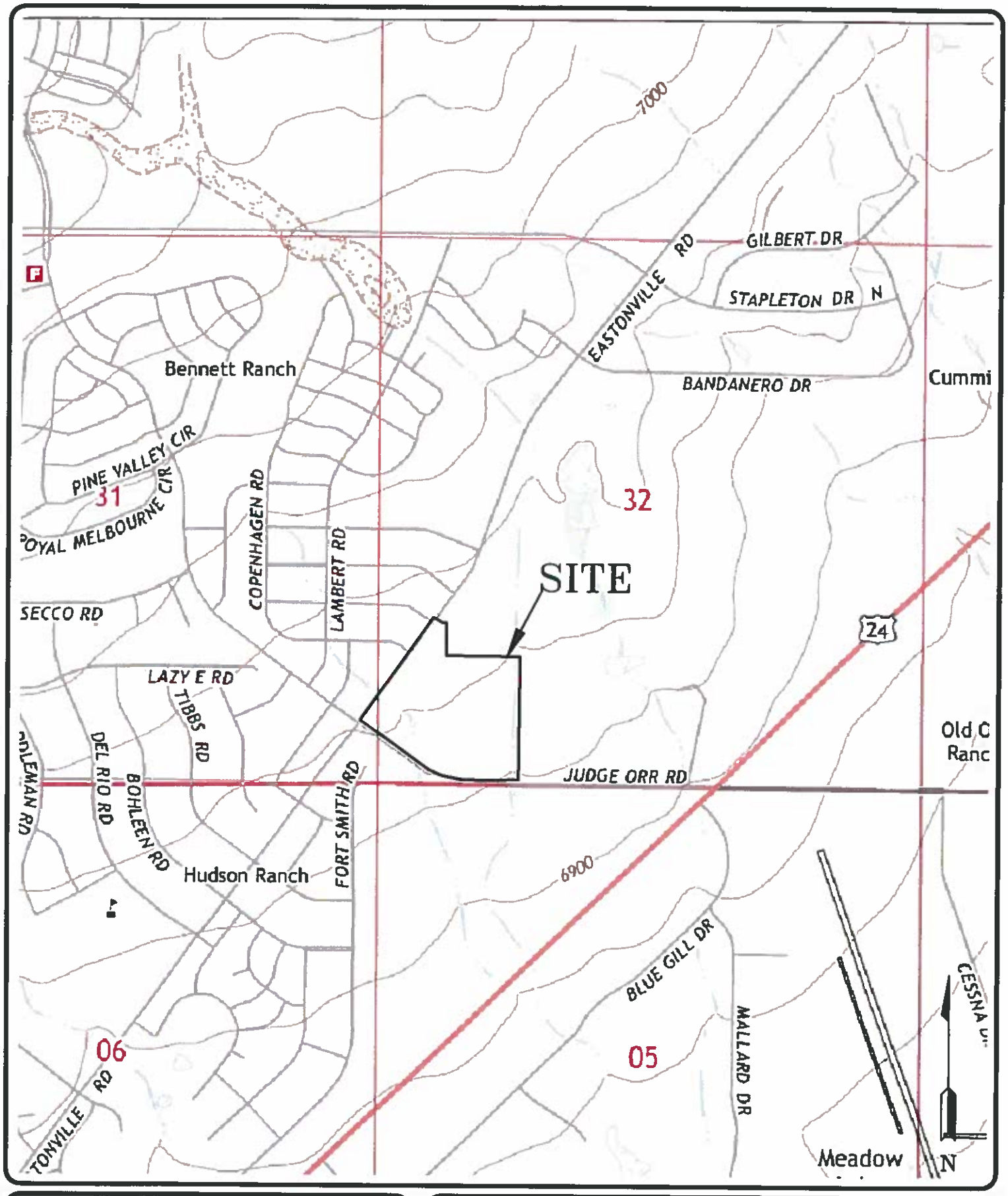
ENTECH ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, CO. 80907 (719) 531-5599

VICINITY MAP
JUDGE ORR EASTONVILLE COMMERCIAL CENTER
EASTONVILL ROAD AND JUDGE ORR ROAD
EL PASO COUNTY, CO.
FOR: PHILLIP BUFORD

DRAWN:	DATE:	CHECKED:	DATE:
LLL	5/21/20	h	5/24/20

JOB NO.: 201019

FIG NO.: 1



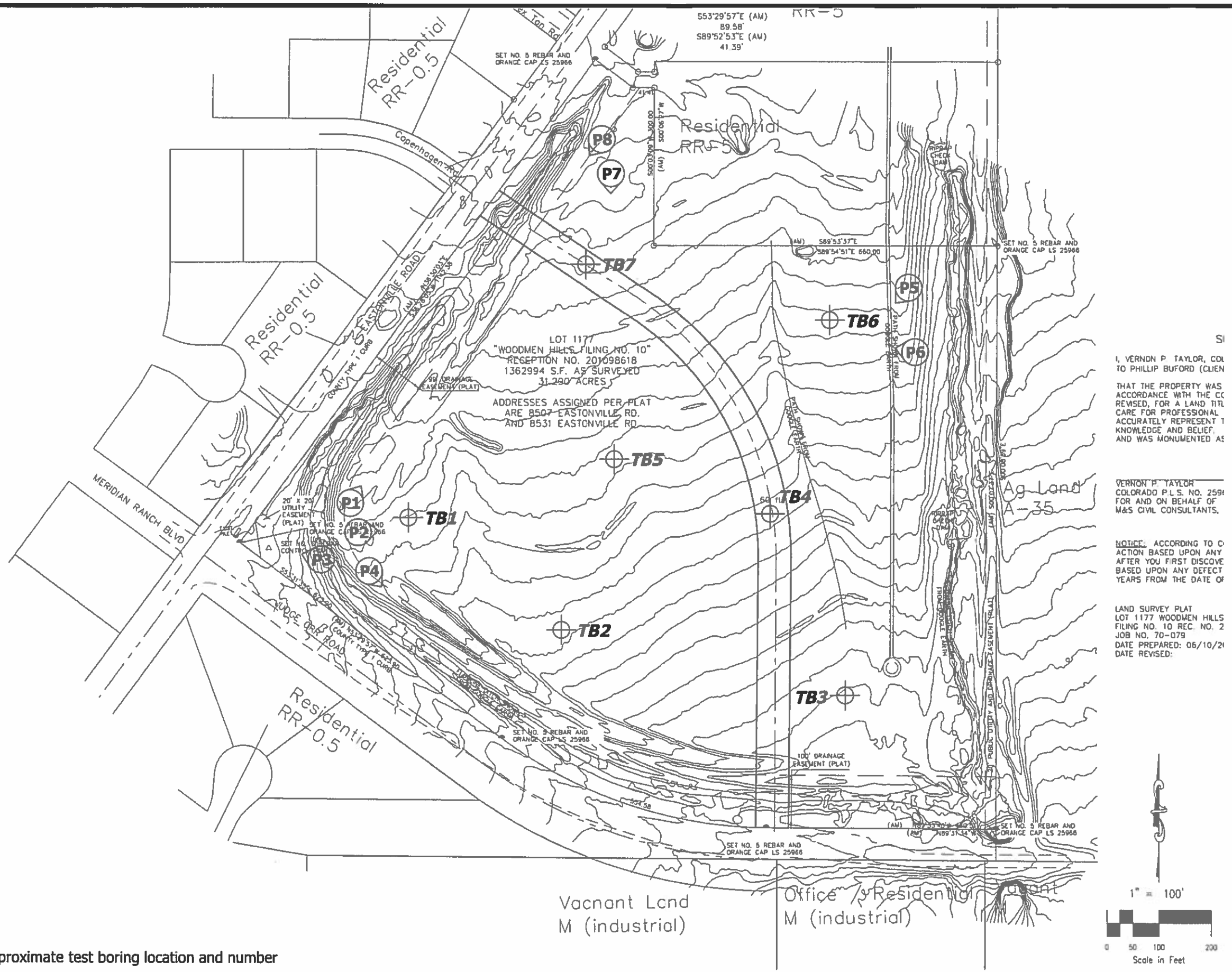
ENTECH ENGINEERING, INC.
595 ELKTON DRIVE
COLORADO SPRINGS, CO. 80907 (719) 531-5599

USGS TOPOGRAPHY MAP
JUDGE ORR EASTONVILLE COMMERCIAL CENTER
EASTONVILL ROAD AND JUDGE ORR ROAD
EL PASO COUNTY, CO.
FOR: PHILLIP BUFORD

DRAWN:	DATE:	CHECKED:	DATE:
LLL	5/21/20	h	5/22/20

JOB NO.: 201019

FIG NO.: 2



TB- approximate test boring location and number

P2 - approximate location and number of photograph

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TO PHILLIP BUFORD (CLIEN

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ACCORDANCE WITH THE CO
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CARE FOR PROFESSIONAL
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KNOWLEDGE AND BELIEF.
AND WAS MONUMENTED AS

VERNON P. TAYLOR
COLORADO P.L.S. NO. 259
FOR AND ON BEHALF OF
M&S CIVIL CONSULTANTS,

NOTICE: ACCORDING TO C
ACTION BASED UPON ANY
AFTER YOU FIRST DISCOVE
BASED UPON ANY DEFECT
YEARS FROM THE DATE OF

LAND SURVEY PLAT
LOT 1177 WOODMEN HILLS
FILING NO. 10 REC. NO. 2
JOB NO. 70-079
DATE PREPARED: 06/10/2
DATE REVISED:

REVISION	BY

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

SITE MAP/TEST BORING LOCATION MAP
JUDGE ORR EASTONVILLE COMMERCIAL CENTER
EASTONVILL ROAD AND JUDGE ORR ROAD
EL PASO COUNTY, CO.
FOR: PHILLIP BUFORD

DRAWN: LLL
CHECKED:
DATE: 5/22/20
SCALE: AS SHOWN
JOB NO.: 201019
FIGURE No.: 3

N

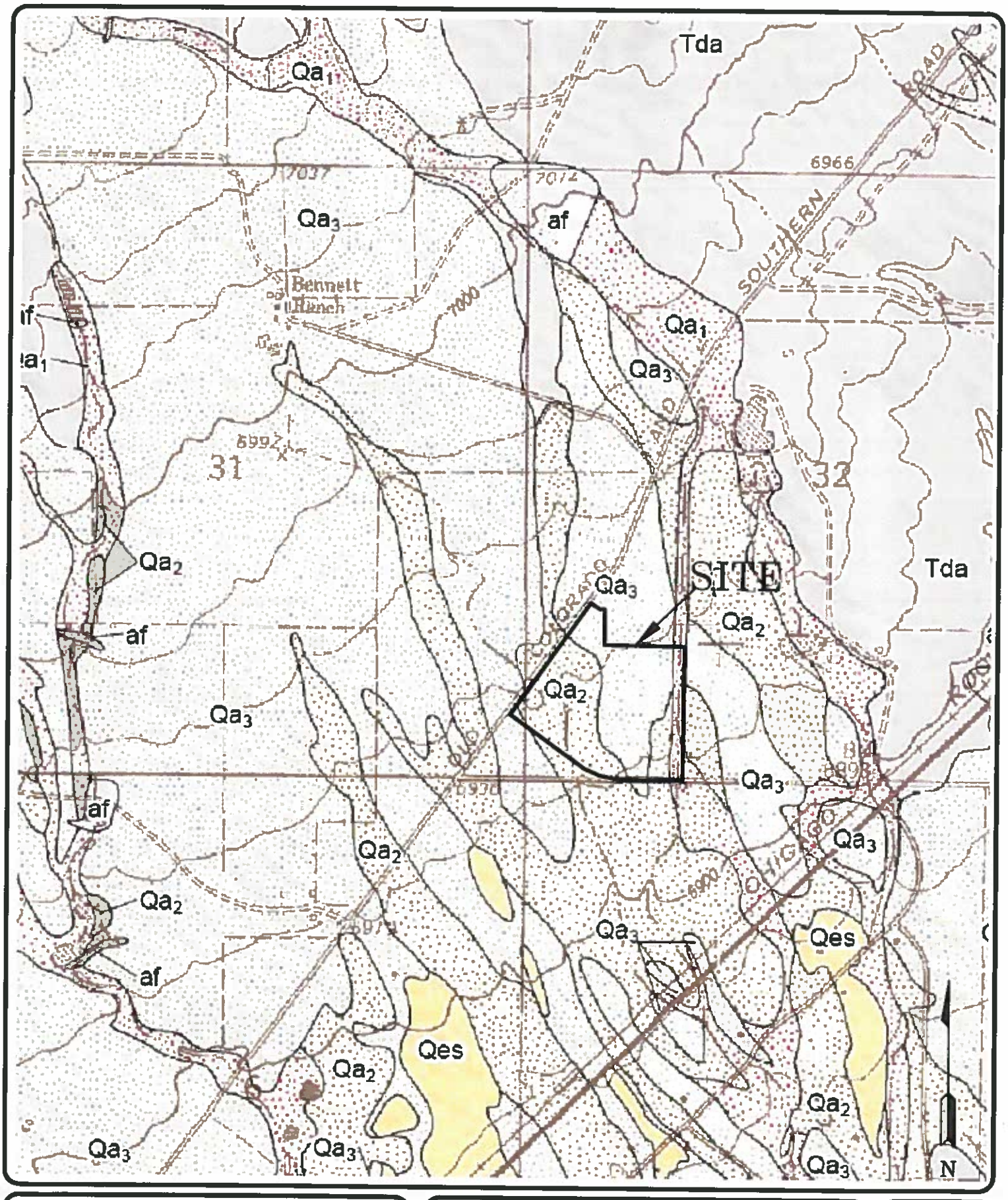
ENTECH
ENGINEERING, INC.
305 ELKTON DRIVE
COLORADO SPRINGS, CO. 80907 (719) 531-5599

JUDGE ORR EASTONVILLE COMMERCIAL CENTER
EASTONVILL ROAD AND JUDGE ORR ROAD
EL PASO COUNTY, CO.
FOR: PHILLIP BUFORD

DRAWN:	DATE:	CHECKED:	DATE:
LLL	5/21/20		5/29/20

JOB NO.: 201019

FIG NO.: 4



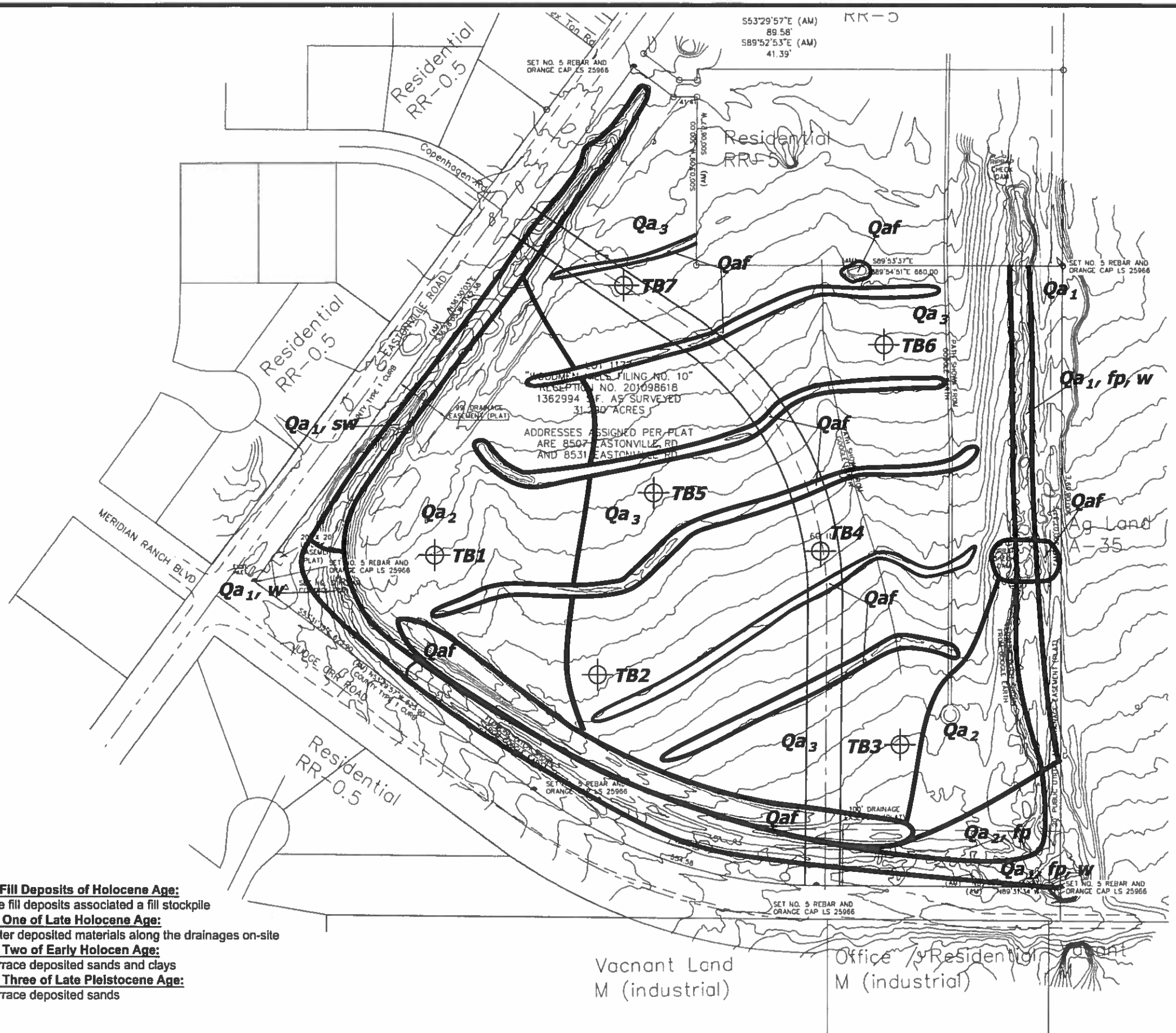
ENTECH ENGINEERING, INC.
395 ELKTON DRIVE
COLORADO SPRINGS, CO. 80907 (719) 531-5599

FALCON QUADRANGLE GEOLOGY MAP
JUDGE ORR EASTONVILLE COMMERCIAL CENTER
EASTONVILL ROAD AND JUDGE ORR ROAD
EL PASO COUNTY, CO.
FOR: PHILLIP BUFORD

DRAWN:	DATE:	CHECKED:	DATE:
LLL	5/21/20		5/29/20

JOB NO.: 201019

FIG NO.: 5



Legend:

Qaf - **Artificial Fill Deposits of Holocene Age:**
man-made fill deposits associated a fill stockpile

Qa_1 - **Alluvium One of Late Holocene Age:**
recent water deposited materials along the drainages on-site

Qa_2 - **Alluvium Two of Early Holocen Age:**
stream terrace deposited sands and clays

Qa_3 - **Alluvium Three of Late Pleistocene Age:**
stream terrace deposited sands

fp- floodplain
sw- seasonally wet areas
w- areas of flowing water

I, VERNON P. TAYLOR, COL
TO PHILLIP BUFORD (CLIEN

THAT THE PROPERTY WAS
ACCORDANCE WITH THE CO
REVISED, FOR A LAND TITL
CARE FOR PROFESSIONAL
ACCURATELY REPRESENT T
KNOWLEDGE AND BELIEF.
AND WAS MONUMENTED AS

VERNON P. TAYLOR
COLORADO P.L.S. NO. 259
FOR AND ON BEHALF OF
M&S CIVIL CONSULTANTS,

NOTICE: ACCORDING TO C
ACTION BASED UPON ANY
AFTER YOU FIRST DISCOVE
BASED UPON ANY DEFECT
YEARS FROM THE DATE OF

LAND SURVEY PLAT
LOT 1177 WOODMEN HILLS
FILING NO. 10 REC. NO. 2
JOB NO. 70-079
DATE PREPARED: 06/10/2
DATE REVISED:

REVISION	BY

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

FLOODPLAIN MAP
LOT 2, APPALOOSA HWY 24
SUBDIVISION FILING NO. 2
EL PASO COUNTY, CO.
FOR: PLATTE VALLEY, LLC

DRAWN: J.L.L.
CHECKED: L
DATE: 7/13/18
SCALE: AS SHOWN
JOB NO. 181169
FIGURE No. 6

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

FEMA FLOODPLAIN MAP
JUDGE ORR EASTONVILLE COMMERCIAL CENTER
EASTONVILL ROAD AND JUDGE ORR ROAD
EL PASO COUNTY, CO.
FOR: PHILLIP BUFORD

DRAWN:	DATE:	CHECKED:	DATE:
LLL	5/21/20		5/29/20

JOB NO.: 201019

FIG NO.: 7

APPENDIX A: Site Photographs

1

Looking northeast from the southwest corner of the site.

May 18, 2020

2

Looking east from the southwestern portion of the site.

May 18, 2020

Job No. 201019

3

Looking west towards drainage culvert in the southwest corner of the site.

May 18, 2020

4

Looking east along drainage in the southwestern portion of the site.

May 18, 2020

Job No. 201019

5

Looking southwest from the northeastern portion of the site.

May 18, 2020

6

Looking west from the northeastern portion of the site.

May 18, 2020

Job No. 201019

7

Looking south from the northern portion of the site.

May 18, 2020

8

Looking southwest from the northern portion of the site.

May 18, 2020

Job No. 201019

APPENDIX B: Test Boring Logs

TEST BORING NO. 1
DATE DRILLED 5/21/2020
Job # 201019

REMARKS

WATER @ 10', 5/26/20

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
	SAND, SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, DRY TO WET		21	3.3	1
5			15	1.2	1
10			22	12.5	1
15	CLAY, VERY SANDY, BLUE GRAY, STIFF, MOIST		24	16.8	2
20			26	17.5	2

TEST BORING NO. 2
DATE DRILLED 5/21/2020
CLIENT PHILLIP BUFORD
LOCATION JUDGE ORR & EASTONEVILLE

REMARKS

WATER @ 8.5', 5/26/20

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
	SAND, SILTY, FINE TO COARSE GRAINED, BROWN TO TAN, MEDIUM DENSE TO LOOSE, MOIST TO WET		22	5.0	1
5			14	3.1	1
10			5	18.4	1
15	SAND, CLAYEY, FINE TO COARSE GRAINED, BROWN, MEDIUM DENSE, MOIST		17	14.5	1
20	SANDSTONE, SLIGHTLY SILTY, FINE TO COARSE GRAINED, BLUE GRAY, VERY DENSE, MOIST		50/6"	11.5	3

ENTECH
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COLORADO SPRINGS, COLORADO 80907

TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
		h	5/29/20

JOB NO.: 201019
FIG NO.: B- 1

TEST BORING NO. 3
DATE DRILLED 5/21/2020
Job # 201019

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
WATER @ 9', 5/26/20						
SAND, SLIGHTLY SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, DRY				15	1.5	1
	5			10	2.1	1
CLAY, SANDY, BROWN, STIFF, MOIST	10			21	14.3	2
SANDSTONE, CLAYEY, FINE TO COARSE GRAINED, BROWN, VERY DENSE, MOIST	15			50 / 10"	12.6	3
SANDSTONE, SILTY, FINE GRAINED, BLUE GRAY, VERY DENSE, MOIST	20			50 / 6"	13.8	3

TEST BORING NO. 4
DATE DRILLED 5/21/2020
CLIENT PHILLIP BUFORD
LOCATION JUDGE ORR & EASTONEVILLE

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
WATER @ 13.5', 5/26/20						
SAND, SLIGHTLY SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE TO LOOSE, DRY TO VERY MOIST				21	1.3	1
	5			8	4.2	1
	10			24	12.2	1
WEATHERED TO FORMATIONAL CLAYSTONE, SANDY, BLUE GRAY, VERY STIFF TO HARD, MOIST	15			46	19.8	4
	20			50 / 6"	15.7	4

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

TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE: 5/29/20

JOB NO.: 201019
FIG NO.: B- 2

TEST BORING NO. 5
DATE DRILLED 5/21/2020
Job # 201019

REMARKS

WATER @ 9.5', 5/26/20

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			36	6.8	1
5			21	1.3	1
10			21	15.8	1
15			50 / 10"	11.3	3
20			*	16.3	4

SAND, SILTY, FINE TO COARSE GRAINED, TAN, DENSE TO MEDIUM DENSE, DRY TO WET

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

CLAYSTONE, SANDY, GRAY BROWN, MOIST

* - BULK SAMPLE TAKEN

TEST BORING NO. 6
DATE DRILLED 5/21/2020
CLIENT PHILLIP BUFORD
LOCATION JUDGE ORR & EASTONEVILLE

REMARKS

WATER @ 11', 5/26/20

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			18	4.3	1
5			23	1.4	1
10			24	4.3	1
15			30	20.6	2
20			50 / 9"	13.1	3

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

CLAY, VERY SANDY, BLUE GRAY, VERY STIFF, MOIST

SANDSTONE, SILTY, FINE GRAINED, BLUE GRAY, VERY DENSE, MOIST

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COLORADO SPRINGS, COLORADO 80907

TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE: 5/29/20

JOB NO.: 201019
FIG NO.: B- 3

TEST BORING NO. 7
DATE DRILLED 5/21/2020
Job # 201019

TEST BORING NO.
DATE DRILLED
CLIENT PHILLIP BUFORD
LOCATION JUDGE ORR & EASTONEVILLE

REMARKS

WATER @ 11', 5/26/20

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			22	3.2	1
5			24	2.2	1
10			18	5.2	1
15			28	17.4	2
20			43	24.7	4

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

CLAY, SANDY, BLUE GRAY, STIFF, MOIST

WEATHERED CLAYSTONE, SANDY, BLUE GRAY, VERY STIFF, MOIST

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

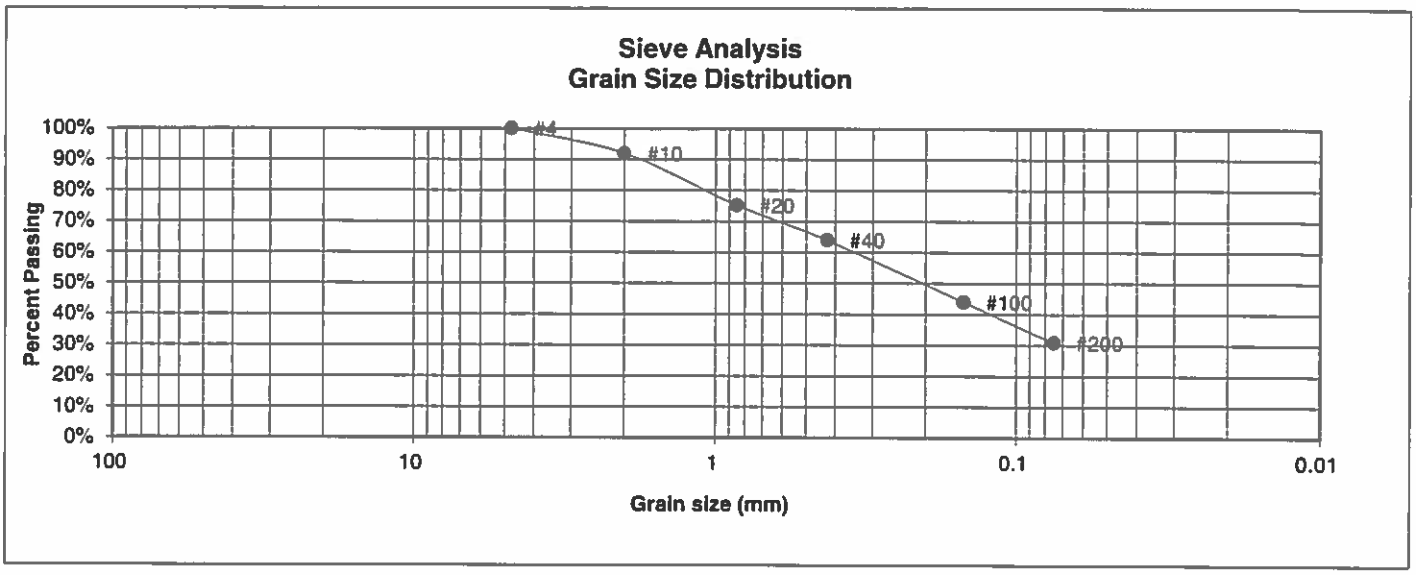
TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
			5/29/20

JOB NO.: 201019
FIG NO.: B- 4

APPENDIX C: Laboratory Testing Results

UNIFIED CLASSIFICATION	SM	CLIENT	PHILLIP BUFORD
SOIL TYPE #	1	PROJECT	JUDGE ORR & EASTONEVILLE
TEST BORING #	1	JOB NO.	201019
DEPTH (FT)	2-3	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	92.0%
20	75.2%
40	64.0%
100	44.0%
200	30.9%

Atterberg Limits	
Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

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

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505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

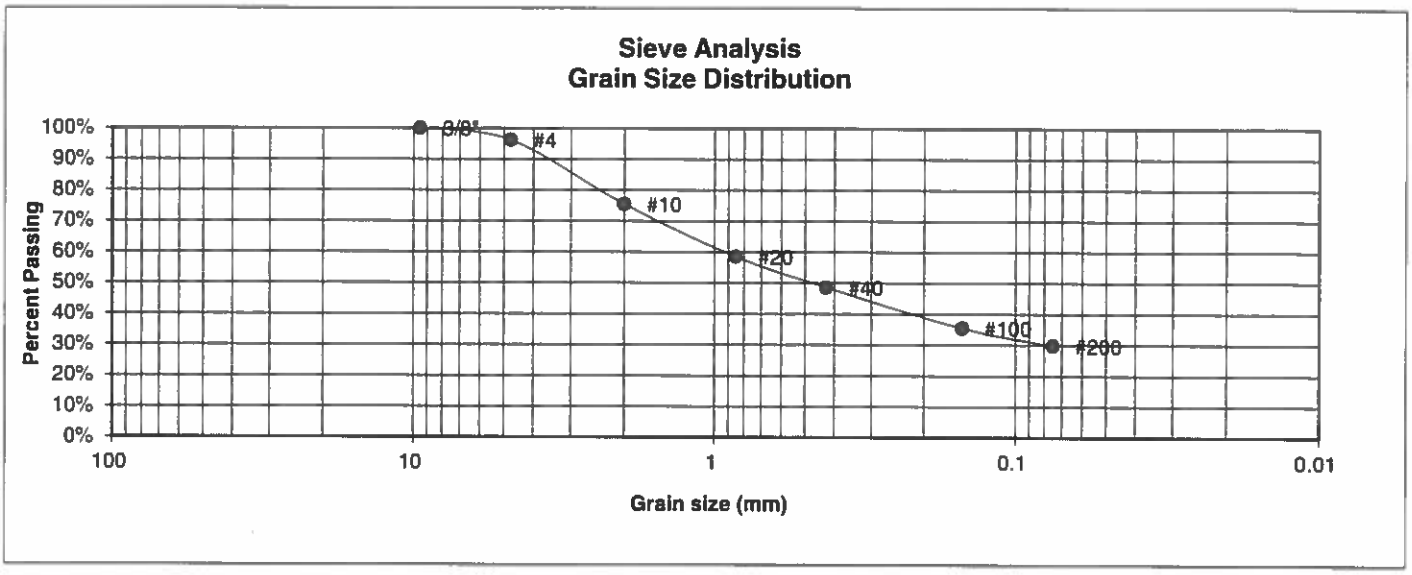
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
			5/29/20

JOB NO.: 201019

FIG NO.: C-1

UNIFIED CLASSIFICATION	SC	CLIENT	PHILLIP BUFORD
SOIL TYPE #	1	PROJECT	JUDGE ORR & EASTONEVILLE
TEST BORING #	2	JOB NO.	201019
DEPTH (FT)	15	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	96.2%
10	75.4%
20	58.5%
40	48.6%
100	35.5%
200	29.8%

Atterberg Limits	
Plastic Limit	17
Liquid Limit	36
Plastic Index	19

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

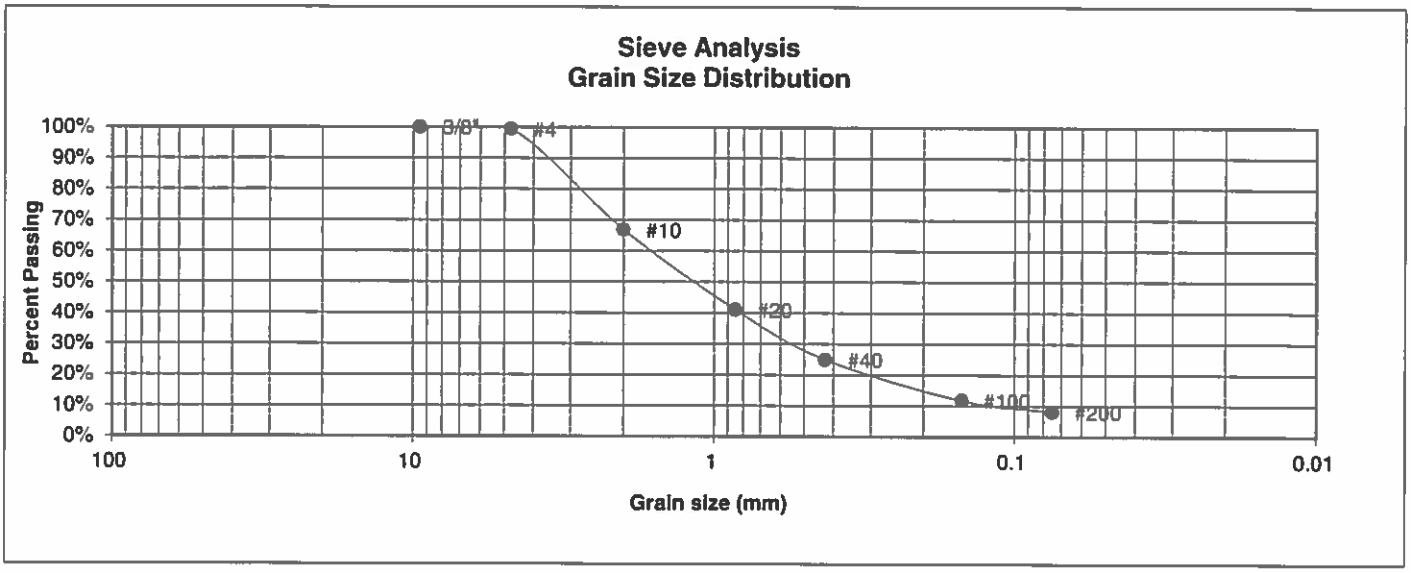
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED: h	DATE: 5/29/20

JOB NO.: 201019

FIG NO.: C-2

UNIFIED CLASSIFICATION	SM-SW	CLIENT	PHILLIP BUFORD
SOIL TYPE #	1	PROJECT	JUDGE ORR & EASTONEVILLE
TEST BORING #	3	JOB NO.	201019
DEPTH (FT)	5	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	99.3%
10	66.9%
20	41.0%
40	24.9%
100	11.8%
200	8.1%

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

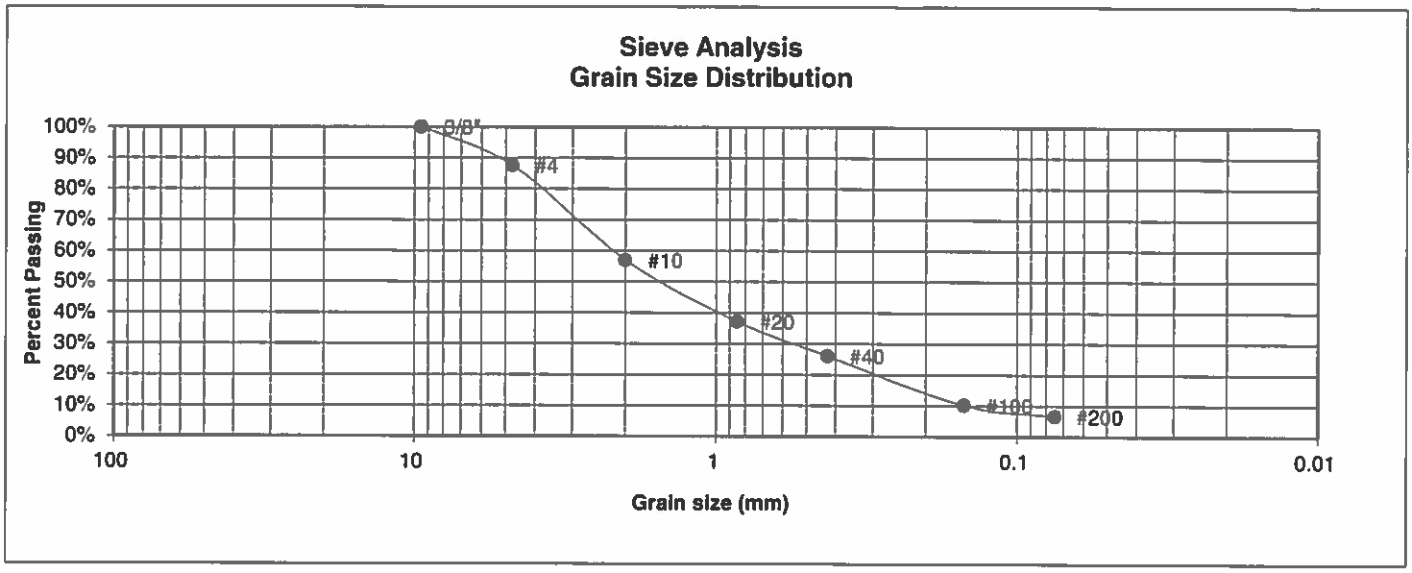
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
			5/29/20

JOB NO.: 201019

FIG NO.: C-3

UNIFIED CLASSIFICATION	SM-SW	CLIENT	PHILLIP BUFORD
SOIL TYPE #	1	PROJECT	JUDGE ORR & EASTONEVILLE
TEST BORING #	4	JOB NO.	201019
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	87.6%
10	57.0%
20	37.1%
40	26.0%
100	10.2%
200	6.7%

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

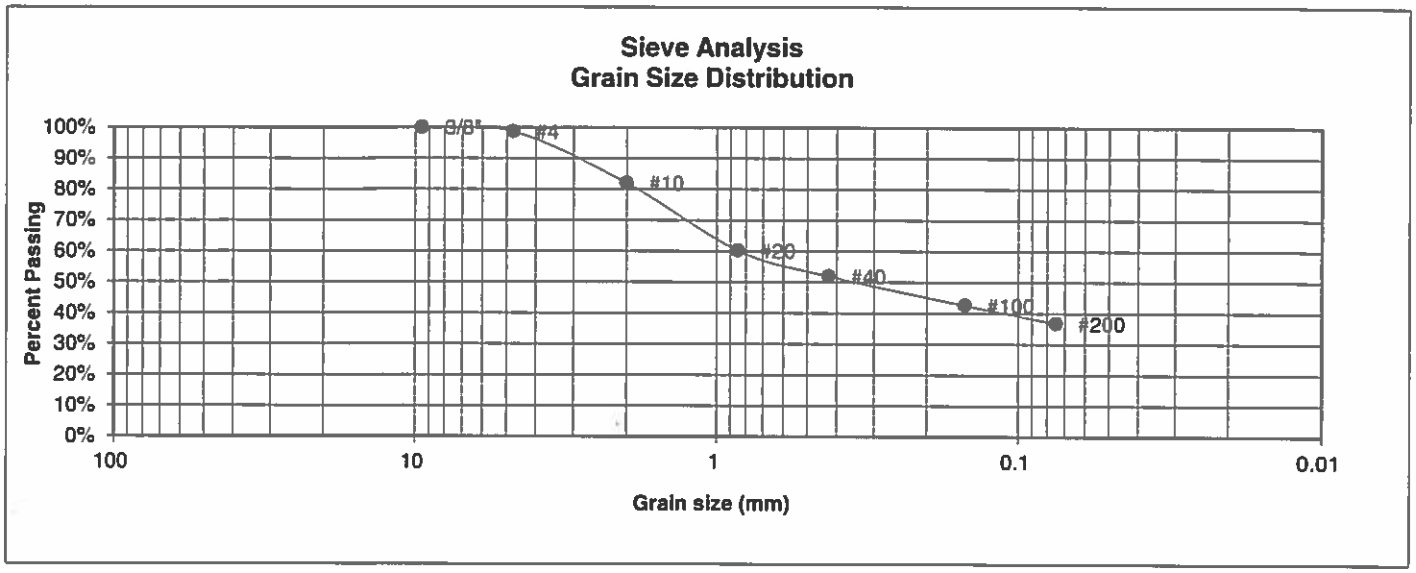
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE: 5/29/20

JOB NO.: 201019

FIG NO.: C-4

UNIFIED CLASSIFICATION	SM	CLIENT	PHILLIP BUFORD
SOIL TYPE #	1	PROJECT	JUDGE ORR & EASTONEVILLE
TEST BORING #	5	JOB NO.	201019
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	98.7%
10	82.0%
20	60.2%
40	51.9%
100	42.6%
200	36.8%

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

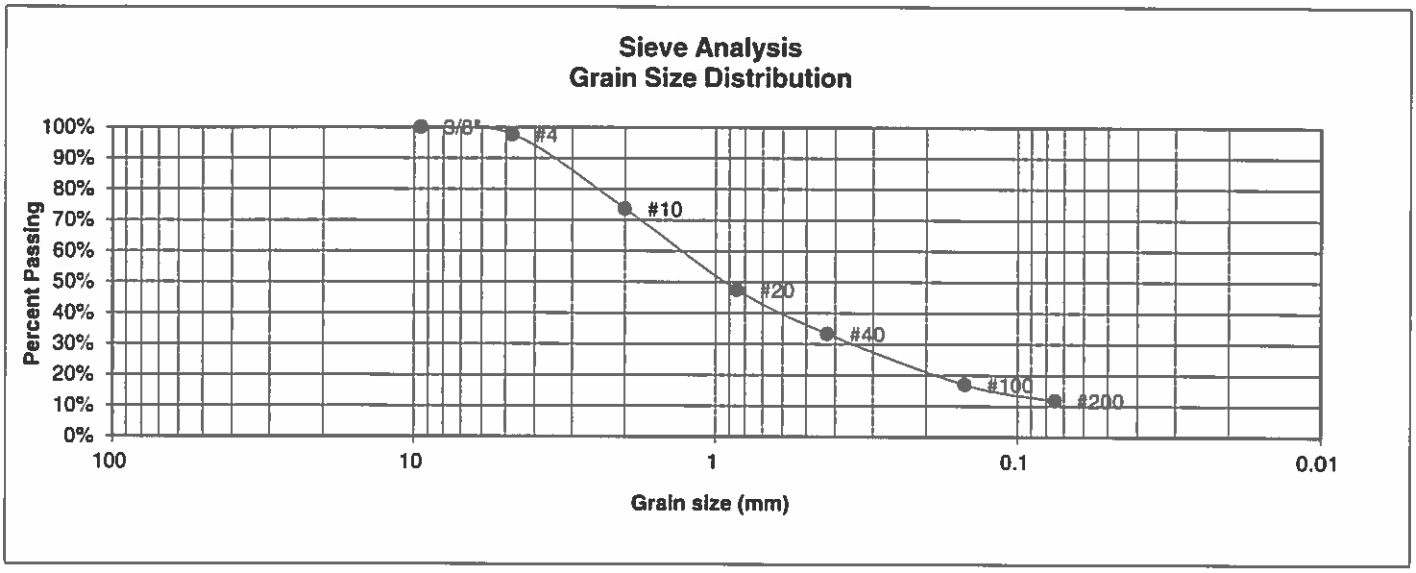
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		h	5/29/20

JOB NO.: 201019

FIG NO.: C-5

UNIFIED CLASSIFICATION	SM-SW	CLIENT	PHILLIP BUFORD
SOIL TYPE #	1	PROJECT	JUDGE ORR & EASTONEVILLE
TEST BORING #	6	JOB NO.	201019
DEPTH (FT)	5	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	97.7%
10	73.7%
20	47.5%
40	33.3%
100	17.0%
200	11.8%

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

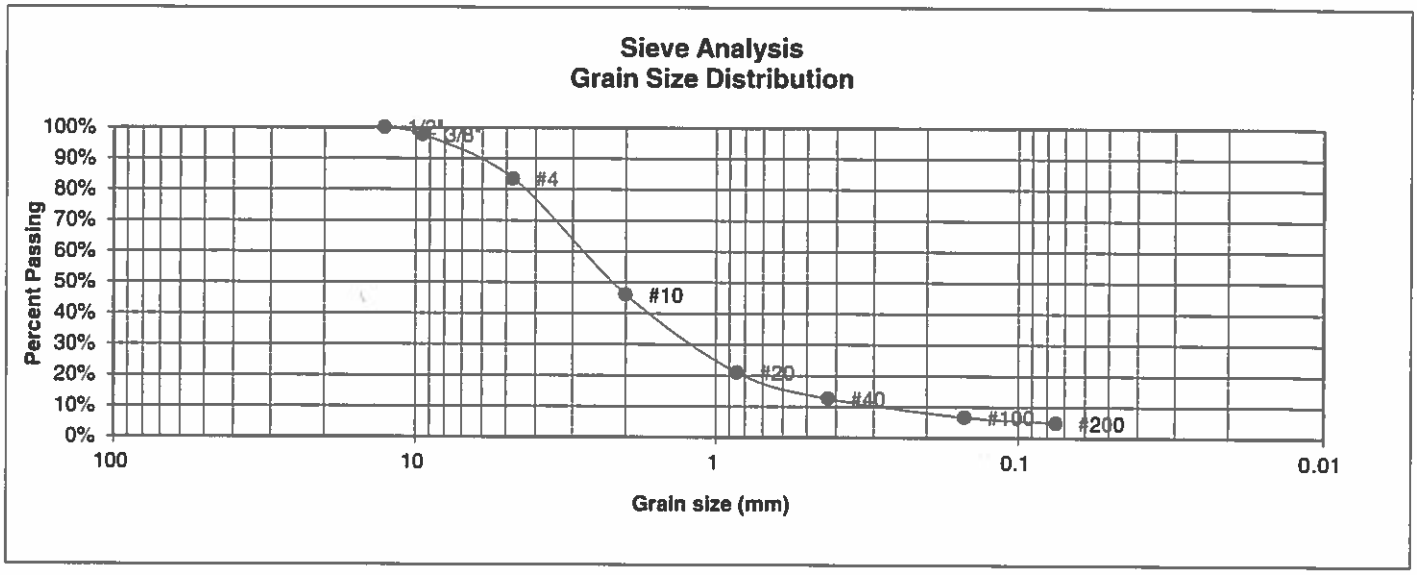
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
			5/21/20

JOB NO.: 201019

FIG NO.: C-6

UNIFIED CLASSIFICATION	SW	CLIENT	PHILLIP BUFORD
SOIL TYPE #	1	PROJECT	JUDGE ORR & EASTONEVILLE
TEST BORING #	7	JOB NO.	201019
DEPTH (FT)	10	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	97.7%
4	83.5%
10	46.1%
20	21.0%
40	12.6%
100	6.7%
200	4.9%

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

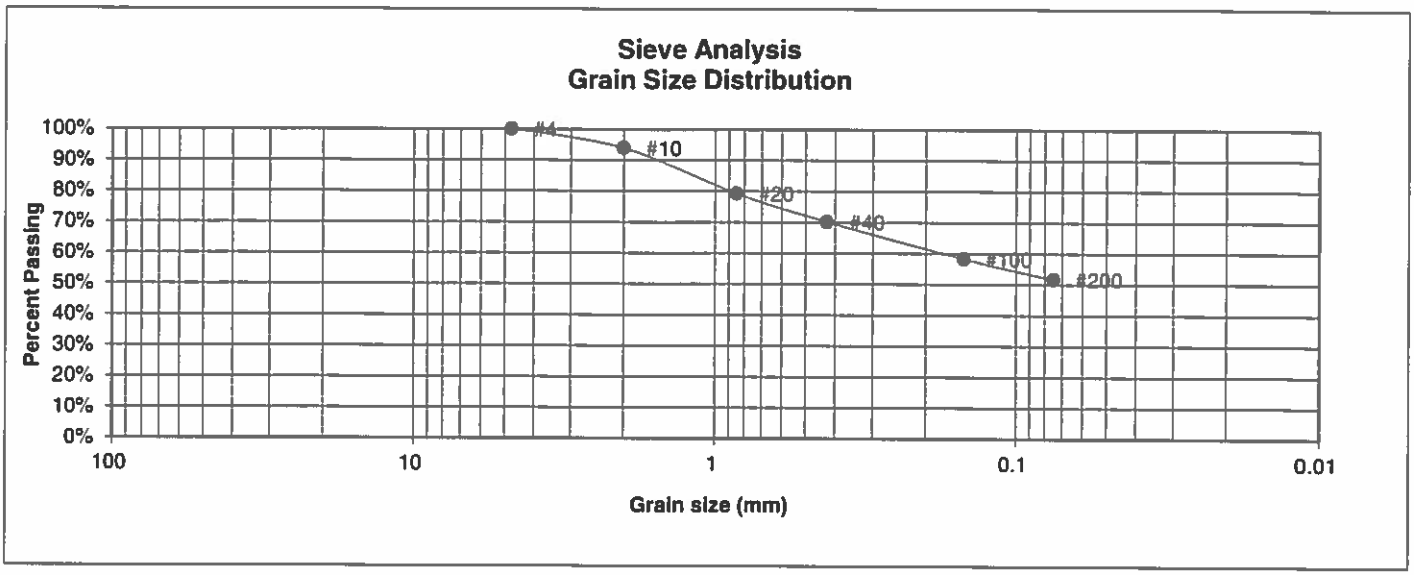
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
			5/29/20

JOB NO.: 201019

FIG NO.: C-7

UNIFIED CLASSIFICATION	CL	CLIENT	PHILLIP BUFORD
SOIL TYPE #	2	PROJECT	JUDGE ORR & EASTONEVILLE
TEST BORING #	6	JOB NO.	201019
DEPTH (FT)	15	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	94.0%
20	79.3%
40	70.2%
100	58.3%
200	51.7%

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

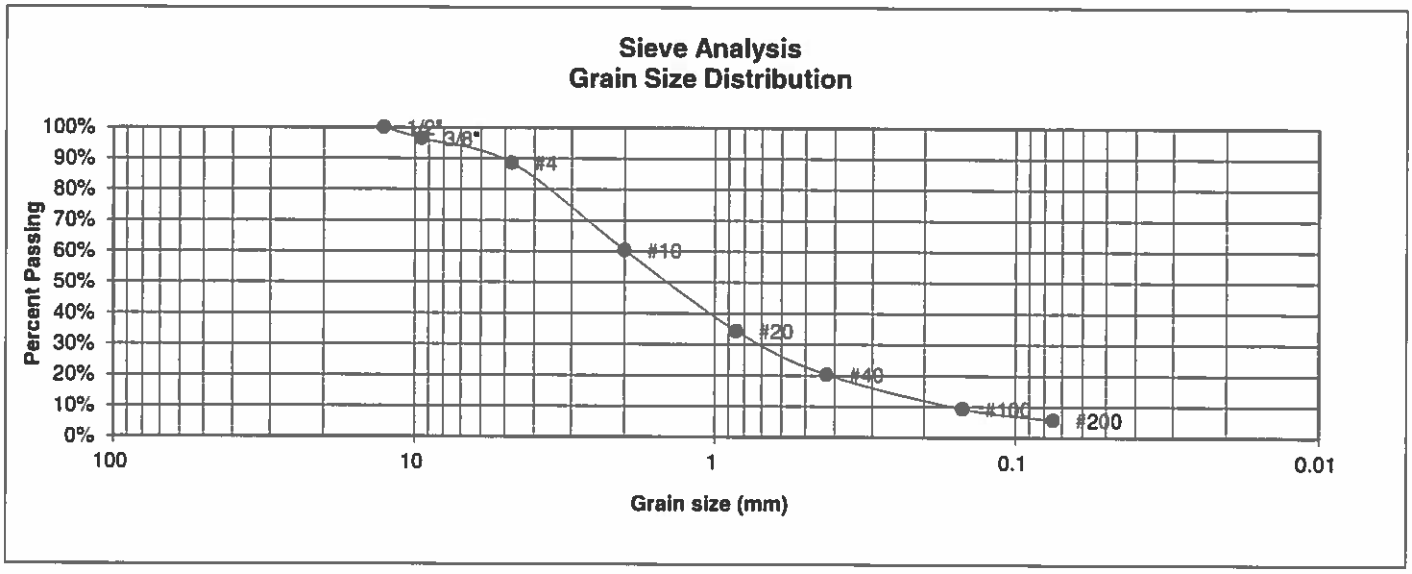
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
			8/29/20

JOB NO.: 201019

FIG NO.: C-8

UNIFIED CLASSIFICATION	SM-SW	CLIENT	PHILLIP BUFORD
SOIL TYPE #	3	PROJECT	JUDGE ORR & EASTONEVILLE
TEST BORING #	2	JOB NO.	201019
DEPTH (FT)	20	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	96.4%
4	88.6%
10	60.4%
20	34.4%
40	20.3%
100	9.3%
200	5.8%

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

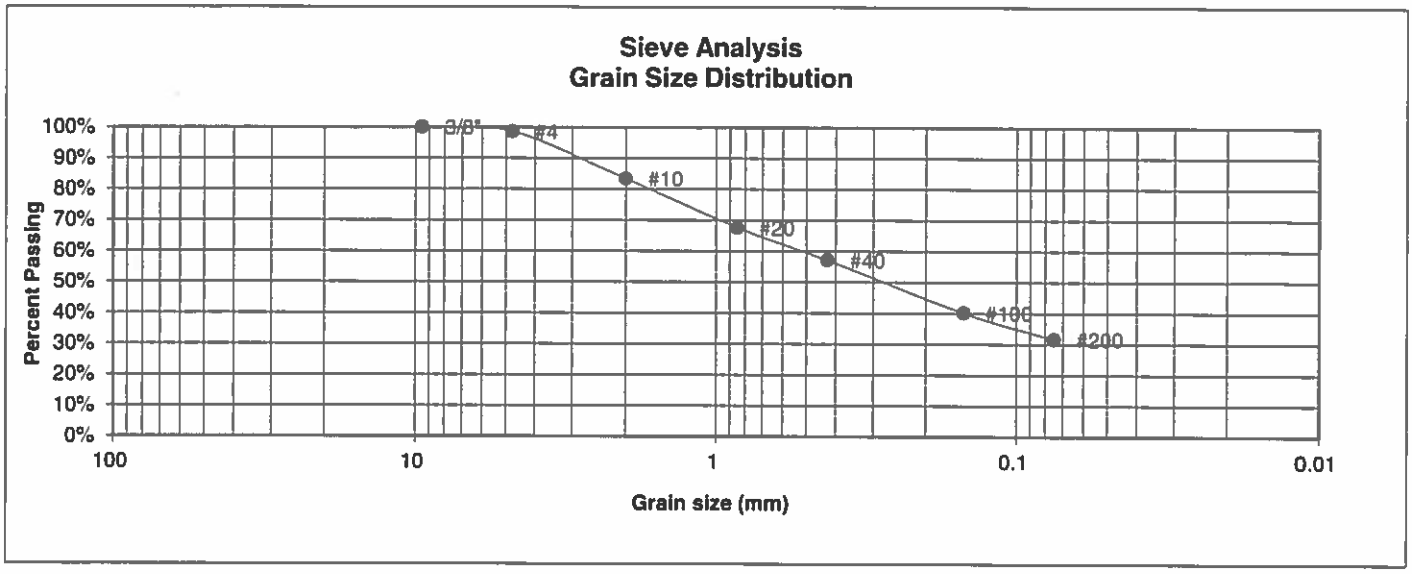
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE: 5/29/20

JOB NO.: 201019

FIG NO.: C-9

UNIFIED CLASSIFICATION	SM	CLIENT	PHILLIP BUFORD
SOIL TYPE #	3	PROJECT	JUDGE ORR & EASTONEVILLE
TEST BORING #	3	JOB NO.	201019
DEPTH (FT)	20	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	98.6%
10	83.4%
20	67.6%
40	57.1%
100	40.1%
200	31.7%

Atterberg Limits	
Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

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

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

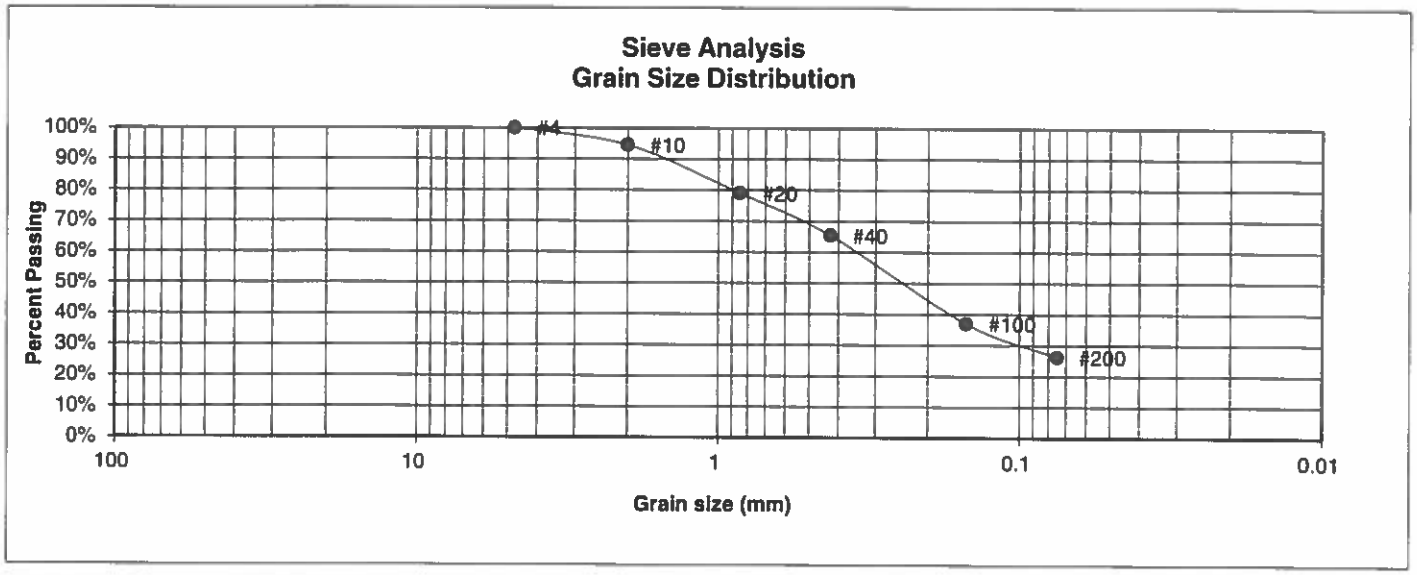
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
			5/25/20

JOB NO.: 201019

FIG NO.: C-10

UNIFIED CLASSIFICATION	SM	CLIENT	PHILLIP BUFORD
SOIL TYPE #	3	PROJECT	JUDGE ORR & EASTONEVILLE
TEST BORING #	6	JOB NO.	201019
DEPTH (FT)	20	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	94.5%
20	79.0%
40	65.4%
100	37.0%
200	26.2%

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

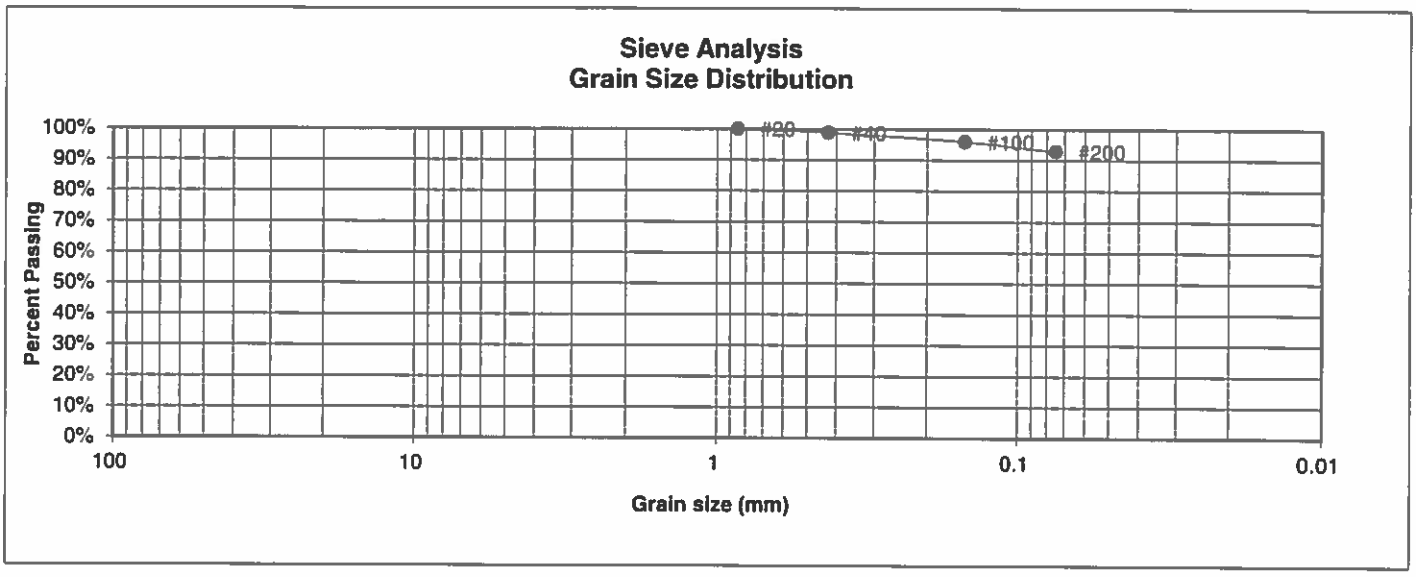
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		A	5/29/20

JOB NO.: 201019

FIG NO.: C-11

UNIFIED CLASSIFICATION	CL	CLIENT	PHILLIP BUFORD
SOIL TYPE #	4	PROJECT	JUDGE ORR & EASTONEVILLE
TEST BORING #	4	JOB NO.	201019
DEPTH (FT)	20	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	
10	
20	100.0%
40	98.8%
100	96.0%
200	92.8%

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:
			5/21/21

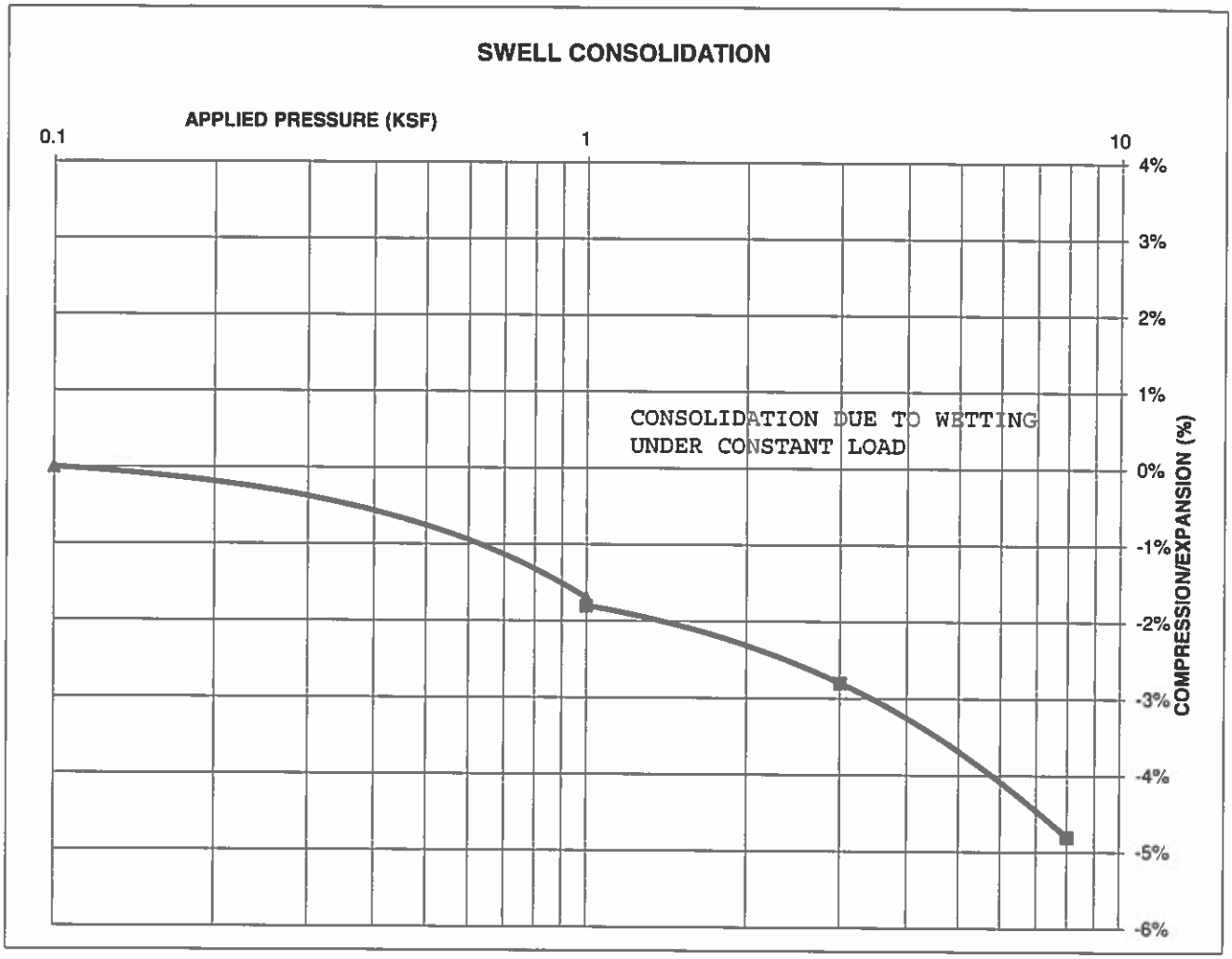
JOB NO.: 201019

FIG NO.: C-12

CONSOLIDATION TEST RESULTS

TEST BORING #	2	DEPTH(ft)	15
DESCRIPTION	SC	SOIL TYPE	1
NATURAL UNIT DRY WEIGHT (PCF)			115
NATURAL MOISTURE CONTENT			15.0%
SWELL/CONSOLIDATION (%)			-0.1%

JOB NO. 201019
CLIENT PHILLIP BUFORD
PROJECT JUDGE ORR & EASTONEVILLE



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

SWELL CONSOLIDATION
TEST RESULTS

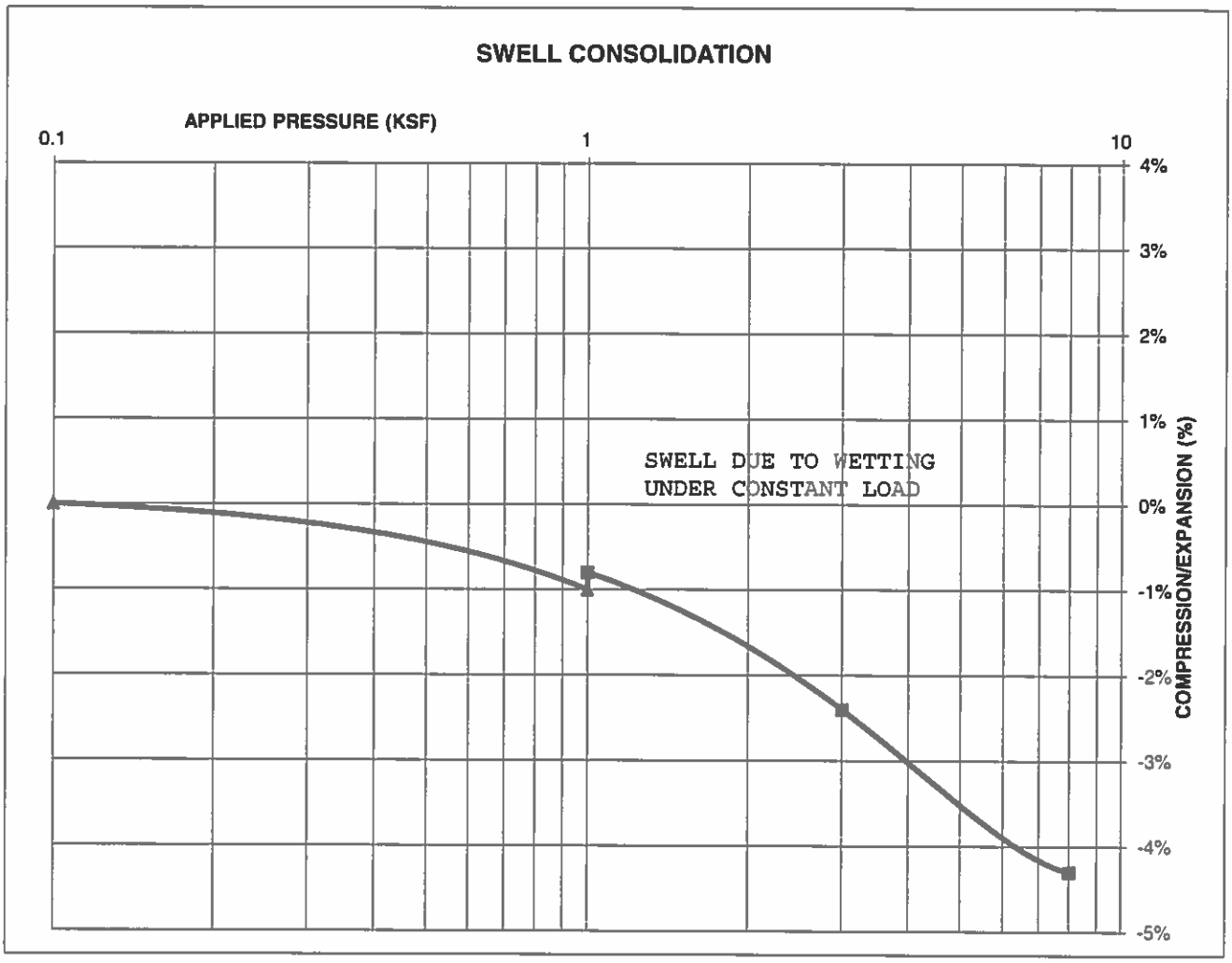
DRAWN:	DATE:	CHECKED:	DATE:
			5/29/20

JOB NO.: 201019
FIG NO.: C-13

CONSOLIDATION TEST RESULTS

TEST BORING #	6	DEPTH(ft)	15
DESCRIPTION	CL	SOIL TYPE	2
NATURAL UNIT DRY WEIGHT (PCF)			106
NATURAL MOISTURE CONTENT			19.5%
SWELL/CONSOLIDATION (%)			0.2%

JOB NO. 201019
CLIENT PHILLIP BUFORD
PROJECT JUDGE ORR & EASTONEVILLE



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SWELL CONSOLIDATION
TEST RESULTS

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			5/29/20

JOB NO.: 201019
FIG NO.: C-14

CONSOLIDATION TEST RESULTS

TEST BORING #	3	DEPTH(ft)	20
DESCRIPTION	SM	SOIL TYPE	3
NATURAL UNIT DRY WEIGHT (PCF)			111
NATURAL MOISTURE CONTENT			15.1%
SWELL/CONSOLIDATION (%)			0.6%

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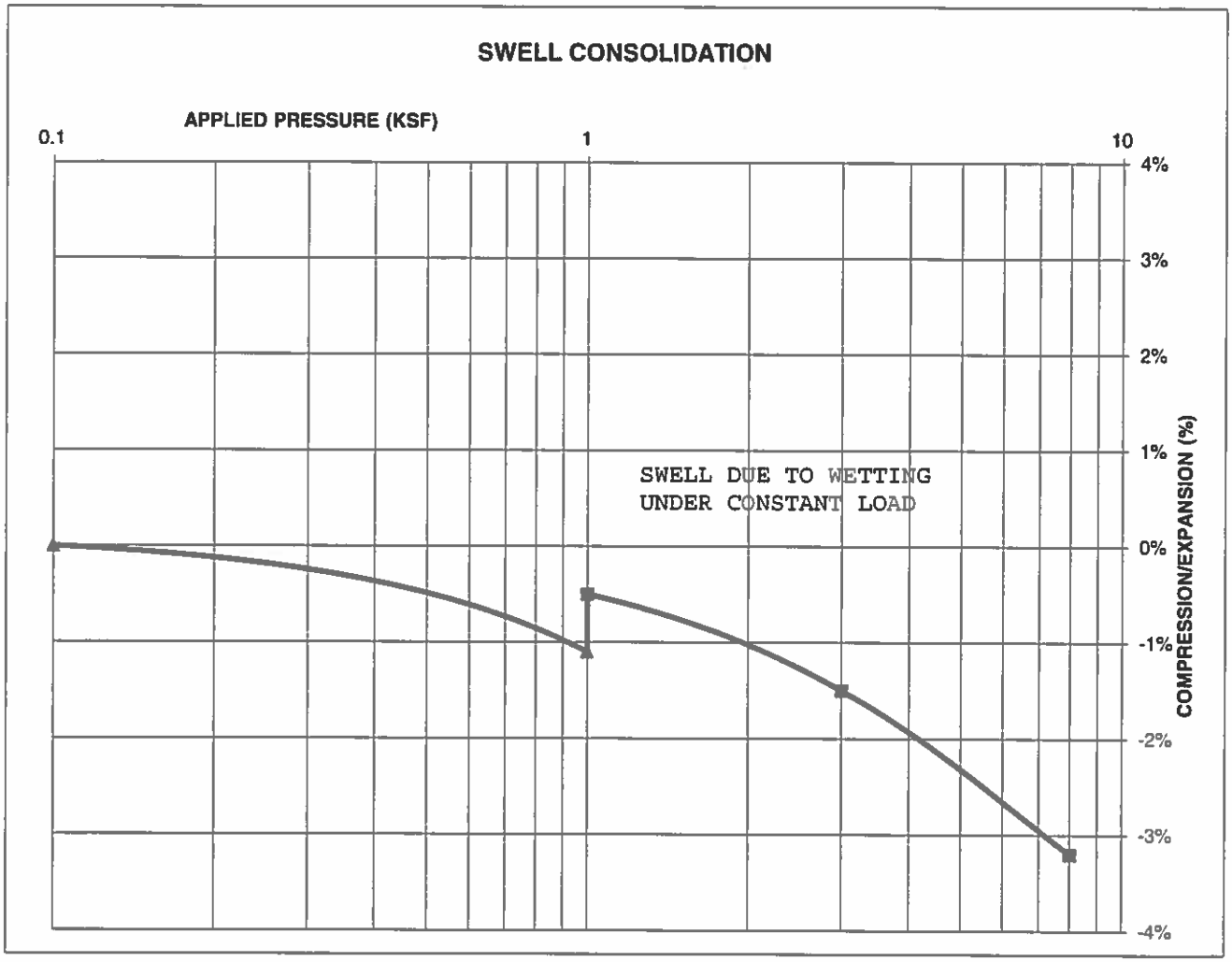
PROJECT JUDGE ORR & EASTONEVILLE



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SWELL CONSOLIDATION
TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE: 5/29/21

JOB NO.: 201019
FIG NO.: C-15

CONSOLIDATION TEST RESULTS

TEST BORING #	6	DEPTH(ft)	20
DESCRIPTION	SM	SOIL TYPE	3
NATURAL UNIT DRY WEIGHT (PCF)			107
NATURAL MOISTURE CONTENT			20.8%
SWELL/CONSOLIDATION (%)			1.2%

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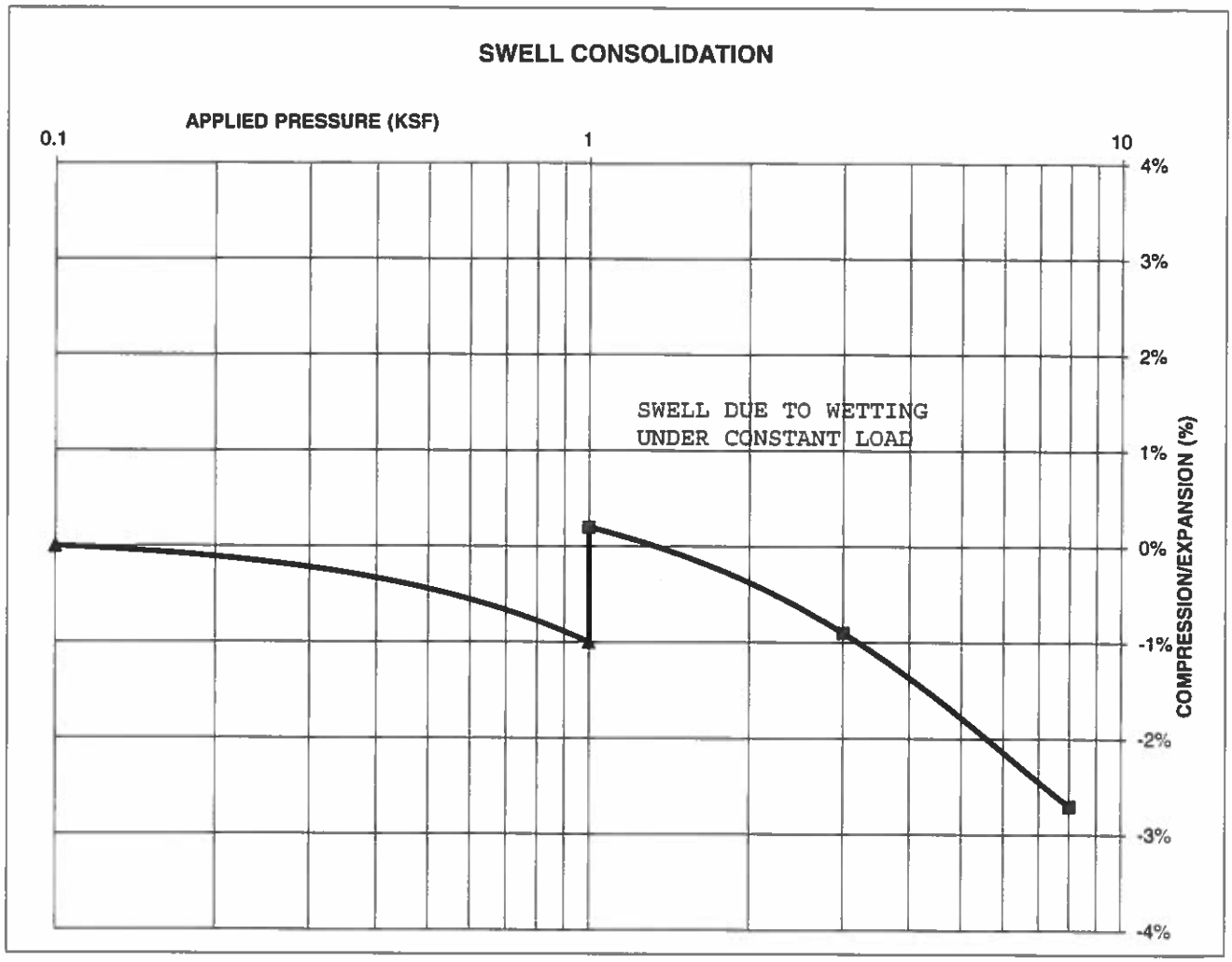
PROJECT JUDGE ORR & EASTONEVILLE



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SWELL CONSOLIDATION
TEST RESULTS

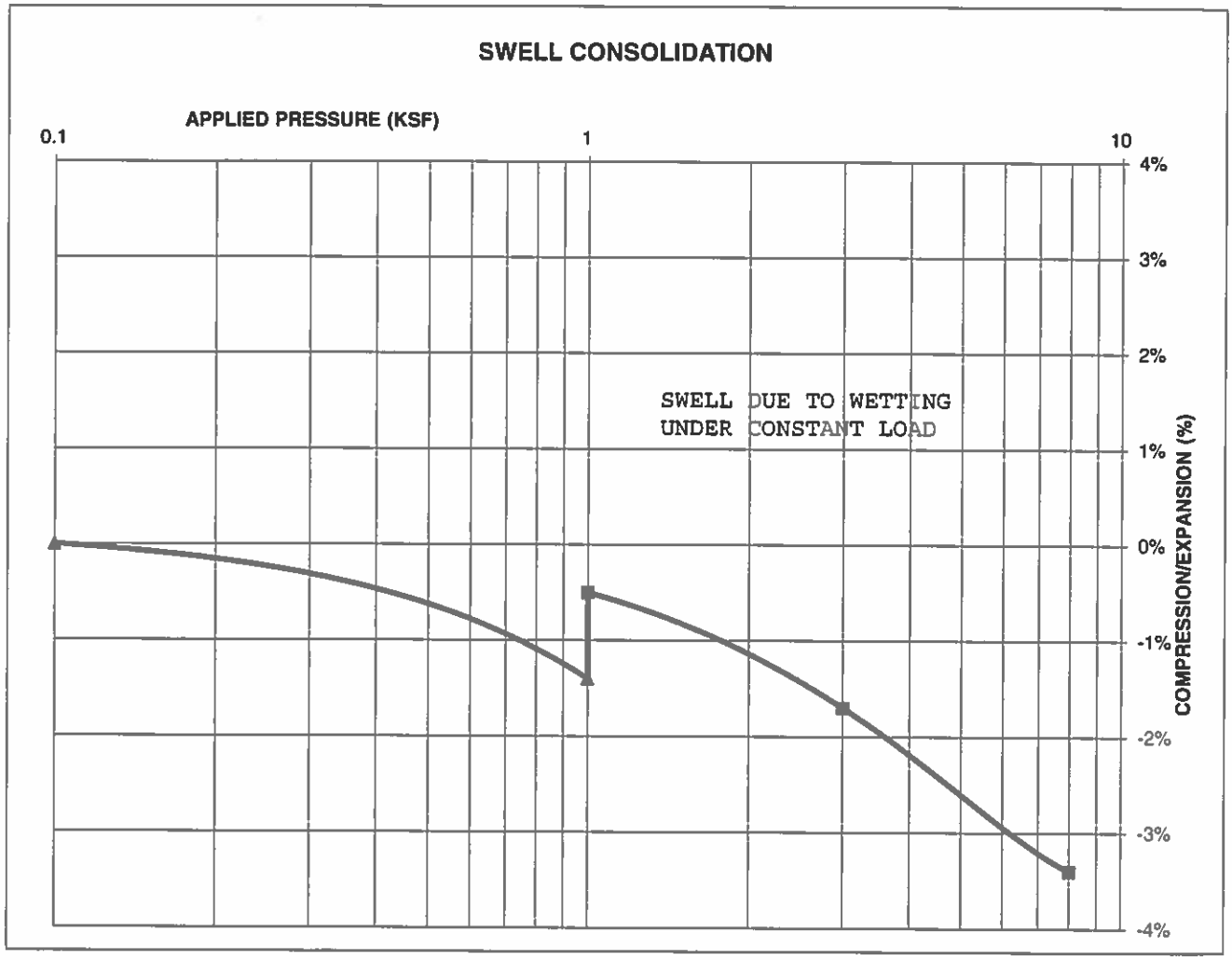
DRAWN:	DATE:	CHECKED:	DATE: 5/29/20

JOB NO.: 201019
FIG NO.: C-16

CONSOLIDATION TEST RESULTS

TEST BORING #	4	DEPTH(ft)	20
DESCRIPTION	CL	SOIL TYPE	4
NATURAL UNIT DRY WEIGHT (PCF)			111
NATURAL MOISTURE CONTENT			16.5%
SWELL/CONSOLIDATION (%)			0.9%

JOB NO. 201019
CLIENT PHILLIP BUFORD
PROJECT JUDGE ORR & EASTONEVILLE



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SWELL CONSOLIDATION
TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
			5/25/20

JOB NO.: 201019
FIG NO.: C-17

CLIENT	PHILLIP BUFORD	JOB NO.	201019
PROJECT	JUDGE ORR & EASTONEVILLE	DATE	5/27/2020
LOCATION	JUDGE ORR & EASTONEVILLE	TEST BY	BL

BORING NUMBER	DEPTH, (ft)	SOIL TYPE NUMBER	UNIFIED CLASSIFICATION	WATER SOLUBLE SULFATE, (wt%)
TB-1	2-3	1	SM	<0.01
TB-2	15	1	SC	0.01
TB-2	20	3	SM-SW	<0.01
TB-3	20	3	SM	0.00

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LABORATORY TEST
SULFATE RESULTS

DRAWN:	DATE:	CHECKED:	DATE: 5/29/20

JOB NO.: 201019
FIG NO.: C-18

APPENDIX D: Soil Survey Descriptions

El Paso County Area, Colorado

19—Columbine gravelly sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 367p
Elevation: 6,500 to 7,300 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 125 to 145 days
Farmland classification: Not prime farmland

Map Unit Composition

Columbine and similar soils: 97 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Columbine

Setting

Landform: Flood plains, fan terraces, fans
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

A - 0 to 14 inches: gravelly sandy loam
C - 14 to 60 inches: very gravelly loamy sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: Gravelly Foothill (R049BY214CO)
Hydric soil rating: No

Minor Components

Fluvaquentic haplaquolls

Percent of map unit: 1 percent

Landform: Swales
Hydric soil rating: Yes

Other soils
Percent of map unit: 1 percent
Hydric soil rating: No

Pleasant
Percent of map unit: 1 percent
Landform: Depressions
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 17, Sep 13, 2019