April 27, 2022

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

Jared Radar
15010 Henry Ride Heights
Colorado Springs, Colorado 80926

Re: Subsurface Soil Investigation
15010 Henry Ride Heights
El Paso County, Colorado

Dear Mr. Radar:

Personnel of Entech Engineering, Inc. have drilled two shallow test borings at the site referenced above. Specific findings for the site are presented in this letter.

Soil Classification:

Soil types observed in the test borings drilled on this site were found to consist of silty sand in Test Boring No. 1 and silty sand overlying sandy clay with underlying silty sand in Test Boring No. 2.

Allowable Bearing Capacity:

An allowable bearing pressure of 2400 psf is anticipated for the silty sand and for any imported structural fill which may be placed on this site. An equivalent hydrostatic fluid pressure (in the active state) of 50 pcf is anticipated for the sand soils on this site.

Soil Moisture Conditions:

Dry to moist.

Expansion Potential:

A Swell/Consolidation Test indicated a volume change of 1.6% which is in the compression range for a sample of sandy clay from Test Boring No. 2 at a depth of 10 feet. This is in the low to moderate compression range.

Fill:

None.

Foundation Type:

A spread footing (16")/stemwall foundation system with potential overexcavation is recommended for this site. Point load bearing pads should be sized for the allowable bearing capacity given. **This does not constitute a foundation design.** The bottoms of exterior foundations should be located at least 30 inches below finished grade for frost protection.

Special Conditions:

If the sandy clay is encountered at or within 3 feet of the foundation level an overexcavation will be required. The need for an overexcavation should be determined by Entech Engineering, Inc. personnel at the time of the excavation observation.

Excavation of site materials should be moderately easy with rubber-tired equipment. Site materials are acceptable for use as structural fill.

Reinforcing:

Reinforcing should be designed to permit foundation walls to span a minimum of 10 feet under the design load. Foundation walls should be designed to resist an equivalent fluid pressure (in the active state) of 45 pcf.

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.

Drainage and Grading:

The ground surface must be sloped away from the building to provide positive drainage away from the foundation. We recommend an equivalent slope of 6 inches in the first 10 feet (5%) surrounding the structure, where possible, or as required to quickly remove surface water. Where a 5% slope cannot be achieved practically, such as around patios, at inside foundation corners, and between a house and nearby sidewalk, we believe it is desirable to establish as much slope as possible and to avoid irrigation in the area. Roof downspouts should discharge beyond the limits of backfill. We recommend providing splash blocks and downspout extensions to discharge runoff beyond the limits of backfill.

Owners should maintain the surface grading and drainage installed by the builder to assure water is not directed toward the foundations and does not pond near the house. Landscaping should be carefully designed to minimize irrigation adjacent to the foundation. We do not recommend use of impervious plastic membranes below landscaped areas near foundations; geotextile fabrics can control weed growth while allowing evaporation. Plants used close to foundation walls should be limited to those with low moisture requirements; irrigated grass should not be located within 5 feet of the foundation. Sprinklers should not discharge water within 5 feet of foundations. Irrigation should be limited to the minimum amount sufficient to maintain vegetation. Application of more water will increase the potential for slab and foundation movements.

Subdrain:

A subsurface drain is recommended around portions of the structure which will have useable space located below the finished ground surface. Typical drain details are included with this letter.

Backfill:

Backfill should be compacted to 95% of its maximum Modified Proctor Dry Density, ASTM D-1557. Backfill must be compacted by mechanical means. No water flooding techniques of any type should be used in the compaction of backfill on this site. Expansive soils are not to be used as foundation backfill.

Concrete:

Type II cement is recommended for all concrete on this site. Concrete should not be placed on frozen or wet ground. Care should be taken to prevent the accumulation and ponding of water in the footing excavation prior to the placement of concrete. If standing water is present in the excavation, it should be removed by installing sumps and pumping the water away from the building area. 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 heating to prohibit freezing.

Open Foundation Excavation Observation:

The open foundation excavation should be observed prior to construction of the foundation in order to verify that no anomalies are present, that materials at the proper design bearing capacity have been encountered, and that no soft spots or debris are present in the foundation area.

Remarks:

The recommendations provided in this letter are based upon the observed soil parameters, anticipated foundation loads, and accepted engineering procedures. The recommendations are intended to minimize differential movement resulting from the heaving of expansive soils or resulting from settlement induced by the application of building loads. It must be recognized that the foundation may undergo movement. In addition, concrete floor slabs may experience movement; therefore, adherence to those recommendations which would isolate floor slabs from columns, walls, partitions or other structural components is extremely important, if damage to the superstructure is to be minimized. Owners should be apprised of the soil conditions and advised to maintain good practice in the future with regard to surface and subsurface drainage, framing of partitions above floor slabs, drywall and finish work above floor slabs, etc.

Jared Radar
Subsurface Soil Investigation
15010 Henry Ride Heights
El Paso County, Colorado

We trust this has provided you with the information you required. If you have any questions or need additional information, please do not hesitate to contact us.

Respectfully Submitted,

ENTECH ENGINEERING, INC.

Joseph H. Robinson

Reviewed by:

Austin M. Nossokoff, P.E.

COLORADO LICENSED
AUSTIN M NOSSOKOFF
53477
4-27-22
PROFESSIONAL ENGINEER

AMN/jhr

Encl.

Entech Job No. 220917
F:\AA projects\2022\220917 - drill

TEST BORING NO. 1
DATE DRILLED 4/19/2022
Job # 220917

REMARKS

DRY TO 20', 4/19/22

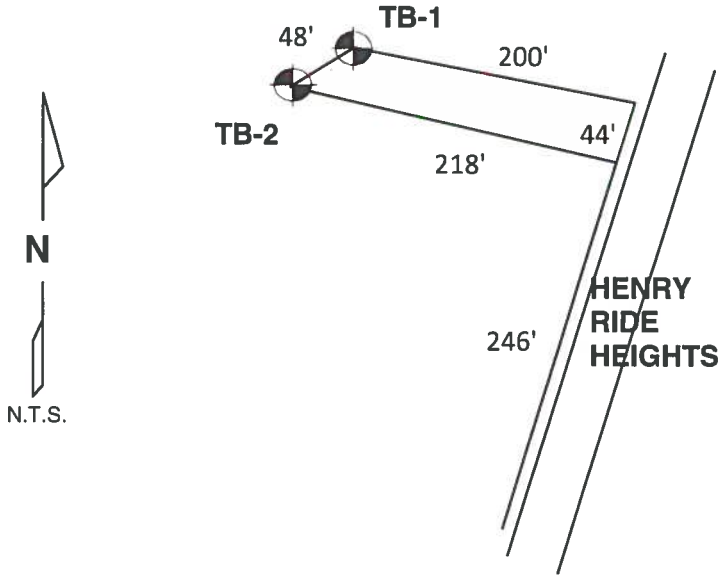
Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			12	3.3		SAND, SILTY, FINE TO COARSE GRAINED, RED BROWN, MEDIUM DENSE TO VERY DENSE, MOIST
5			13	6.0		
10			13	3.9		
15			29	7.2		
20			50/8"	2.9		GRAVEL LENS

TEST BORING NO. 2
DATE DRILLED 4/19/2022
CLIENT JARED RADER
LOCATION 15010 HENRY RIDE HEIGHTS

REMARKS

DRY TO 20', 4/19/22

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			16	2.3		SAND, SILTY, FINE TO COARSE GRAINED, RED BROWN, MEDIUM DENSE, DRY TO MOIST
5			19	4.4		
10			16	10.7		CLAY, SANDY, DARK BROWN, STIFF, MOIST
15			26	9.1		
20			30	8.5		SAND, SILTY, FINE TO COARSE GRAINED, RED BROWN, DENSE, MOIST



LOCATIONS OF TEST BORINGS ARE APPROXIMATE

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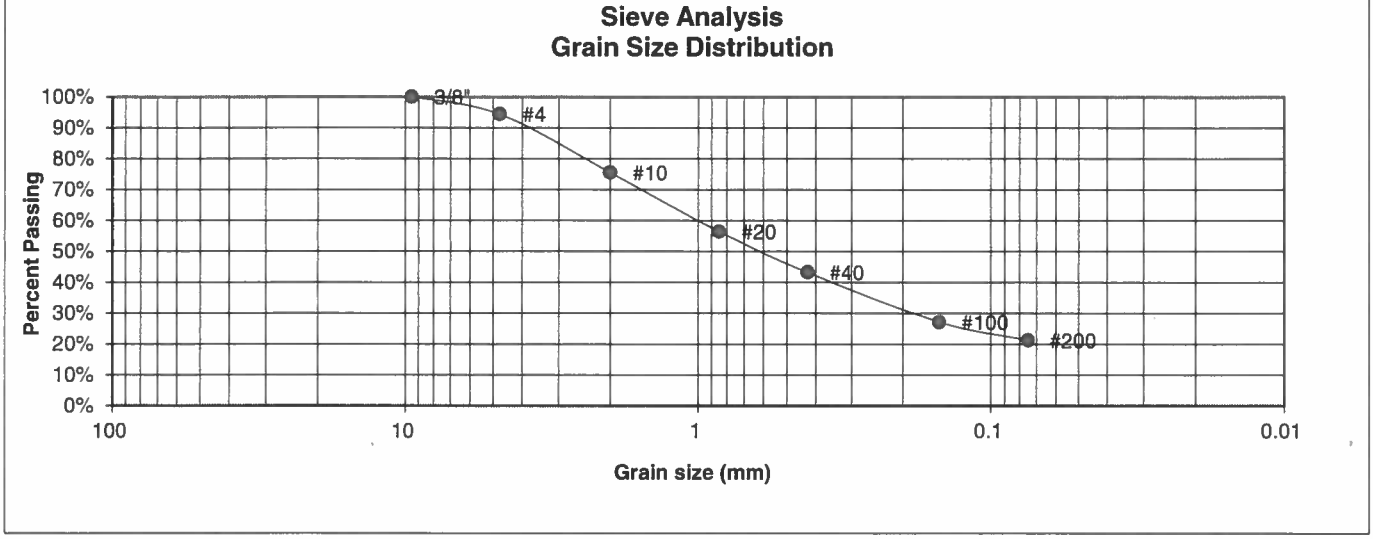
TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
		JHR	4-25

JOB NO.: 220917

FIG NO.: 1

BORING NO.	1	UNIFIED CLASSIFICATION	SM	TEST BY	BL
DEPTH(ft)	2-3	AASHTO CLASSIFICATION		JOB NO.	220917
CLIENT	JARED RADER				
PROJECT	15010 HENRY RIDE HEIGHTS				



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	94.4%
10	75.5%
20	56.4%
40	43.2%
100	27.2%
200	21.3%

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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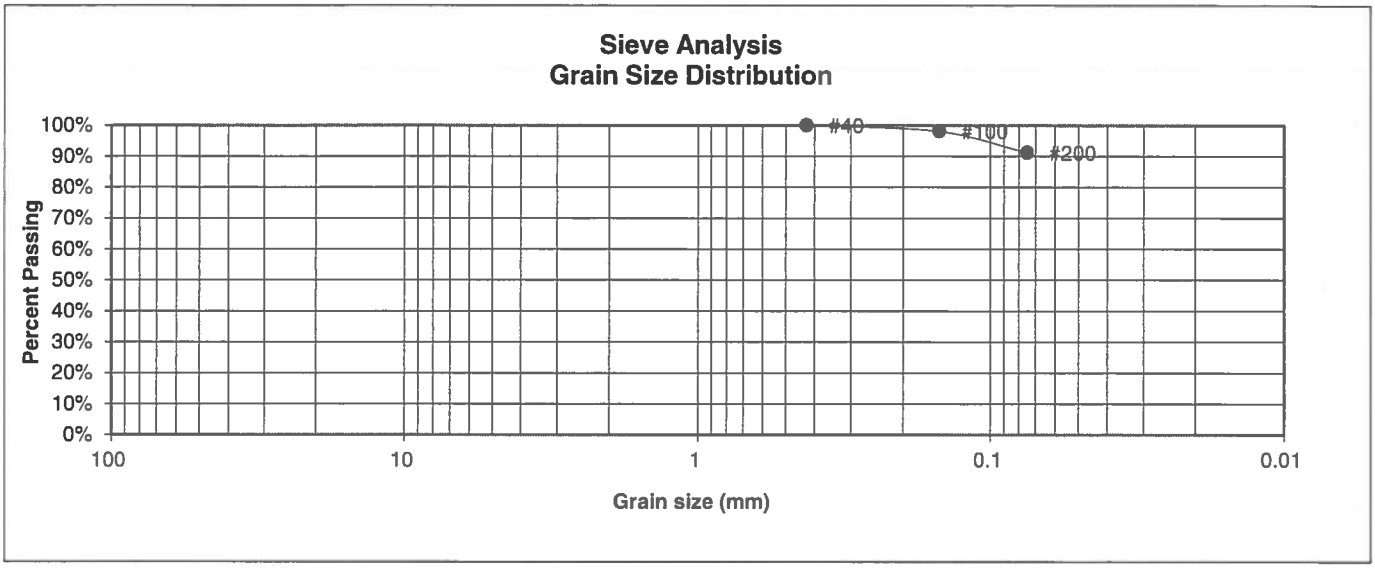
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED: SHR	DATE: 4-25

JOB NO.: 220917

FIG NO.: 2

BORING NO.	2	UNIFIED CLASSIFICATION	CL	TEST BY	BL
DEPTH(ft)	10	AASHTO CLASSIFICATION		JOB NO.	220917
CLIENT	JARED RADER				
PROJECT	15010 HENRY RIDE HEIGHTS				



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	
10	
20	
40	100.0%
100	98.1%
200	91.2%

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: JHR	DATE: 9-25

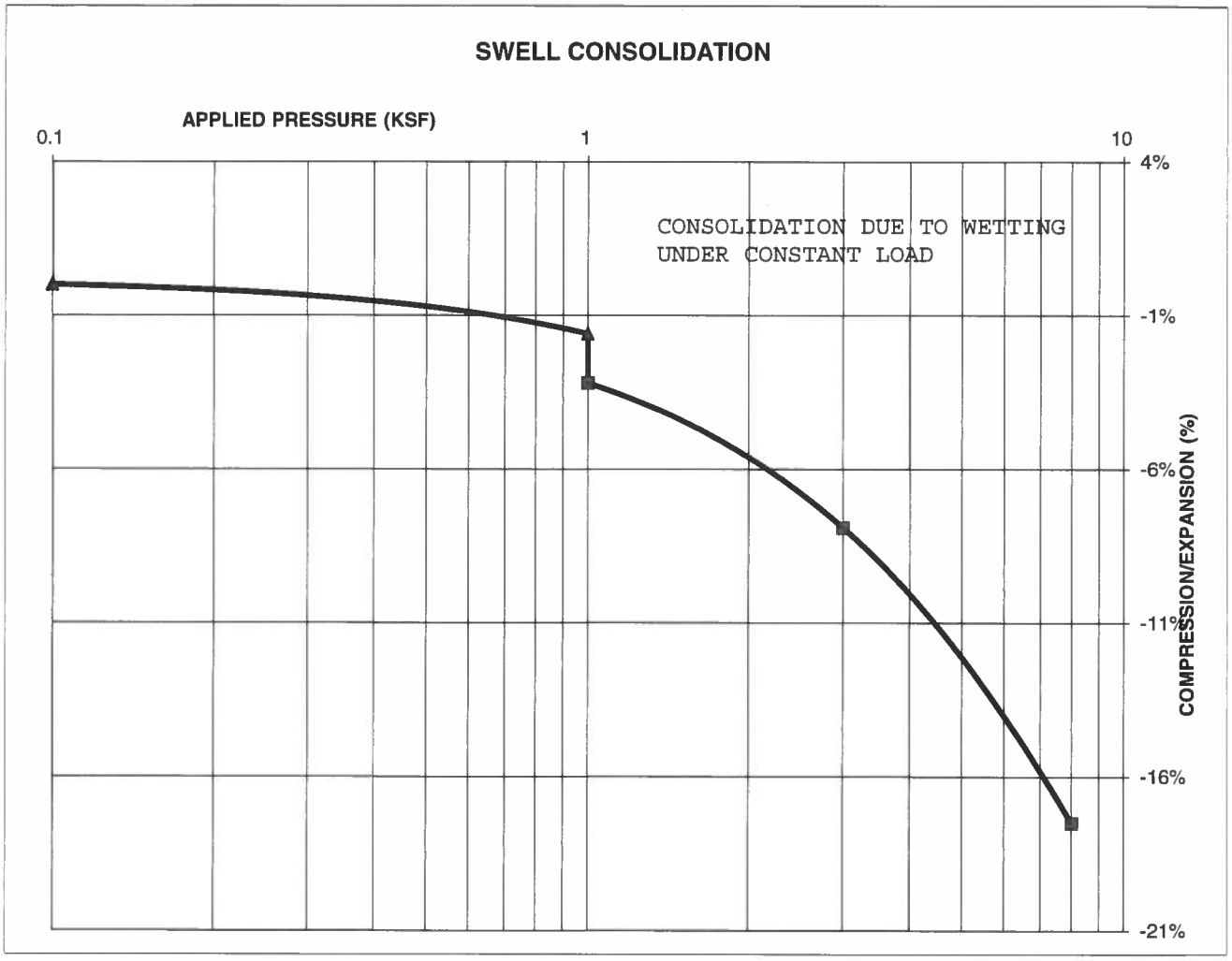
JOB NO.: 220917

FIG NO.: J

CONSOLIDATION TEST RESULTS

SAMPLE FROM:	2	DEPTH(ft)	10
DESCRIPTION	CLAY, SANDY		
NATURAL UNIT DRY WEIGHT (PCF)			76
NATURAL MOISTURE CONTENT			27.8%
SWELL/CONSOLIDATION (%)			-1.6%

JOB NO. 220917
CLIENT JARED RADER
PROJECT 15010 HENRY RIDE HEIGHTS



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SWELL CONSOLIDATION
TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		JHR	4-25

JOB NO.: 220917
FIG NO.: 4